

1st INTERNATIONAL TURKISH JAPANESE DENTAL CONGRESS 2nd ANKARA-OSAKA UNIVERSITY DENTAL WORKSHOP

June 24-26 2021

ABSTRACT BOOK

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Dear colleagues, Dear Friends,

I would like to welcome you to the website of the 2nd Turkish Japanese Dentistry Congress. I am excited to be together in another congress. We are very excited to organize the 2nd Turkish Japanese Dentistry Congress, which we will organize internationally this year, and our faculty will provide scientific, educational, and professional activities. In our congress, which will be held online between 24-26 June 2021, we aim to bring not only academicians but also dentist colleagues and technology companies together with our colleagues. On the last day of the congress, on June 26, four different sessions will be planned in the form of "Digital Dentistry session", "Imaging session", "Implant session" and "Restorative Materials session", and the industry partners will try to convey the innovations about their products to you.

In our congress, which we believe will be enriched with your participation, subject contents are determined according to your feedback. In the scientific program, besides the basic topics, current issues and new developments will also be included. For this purpose, Turkish colleagues, experts in their subjects, working abroad will be presenting in our congress and the scientific committee. Besides, according to the latest regulations, the presentations of the participants will be accepted as full text and will be published in our journal "European Annals of Dental Sciences", which is a periodical and registered in DERGIPARK.

Hope to be together in a beautiful congress as always,

Yours truly,

Prof. Dr. Kaan ORHAN

Chair of the Congress

Dean of Ankara University Faculty of Dentistry

Dear Colleagues and friends

It is my great pleasure and honor to invite you to The 2nd Turkish-Japanese Dentistry Congress to be held on 24-26 June, 2021. This congress is organized based on the relationship between Osaka University Graduate School of Dentistry/School of Dentistry, Japan and Ankara University Faculty of Dentistry, Turkey. Osaka University Graduate School of Dentistry/School of Dentistry has a long history of friendly relationship with Ankara University Faculty of Dentistry, and both schools have been working together actively in terms of research collaboration, students exchange, and various joint events. Although whole entire world is facing difficult time due to pandemic of COVID-19, I feel very excited to provide this wonderful congress in collaboration with many dear Turkish friends. The congress will cover diverse aspects of dental/oral and craniofacial sciences, consisting of a highly interesting program with keynote lectures. This can be a wonderful opportunity to learn cutting-edge knowledge and exchange new scientific information. I hope that this congress also works as a platform to communicate with many people.

I look forward to seeing you online at the exciting 2nd Turkish-Japanese Dentistry Congress.

Prof. Dr. Satoshi IMAZATO

Dean of Osaka University Graduate School of Dentistry/School of Dentistry

1st International Turkish Japanese Dentistry Congress 2nd Ankara-Osaka University Dental Workshop Scientific Program First Day: 24.06.2021 Thursday		
1 st Session: Opening and welcome remarks (15:00 Japan time)		
9:00-9:10 (15:00-15:10 Japan time)	Prof. Dr. Kaan ORHAN (Dean of Ankara University Dentistry Faculty)	
9:10-9:20 (15:10-15:20 Japan time)	Prof. Dr. Satoshi IMAZATO (Dean of Osaka University Graduate School of Dentistry)	
9:20-9:30 (15:20-15:30 Japan time)	Assoc. Prof. Ozge ULKER (International Student Office Coordinator, Ankara University)	
9:30-9:40 (15:30-15:40 Japan time)	Prof. Dr. Shojiro NISHIO (President, Osaka University)	
9:40-9:50 (15:40-15:50 Japan time)	Prof. Dr. Necdet UNUVAR (Rector, Ankara University)	
09:50-10:30 (:00-16:30 Japan time)	**Break**	
2 nd Session: Surgery and Periodontology (Chair.: Prof. Dr. Nejat Bora SAYAN)		
10:30-10:45 (16:30-16:45 Japan time)	Prof. Dr. Nejat Bora SAYAN (Former Dean of Ankara University Dentistry Faculty, President of the Turkish-Japanese Foundation)	History of the Relationship Between Osaka University and Ankara University
10:45-11:15 (16:45-17:15 Japan time)	Mikihiko KOGO (Professor Emeritus, Osaka University Graduate School of Dentistry)	Inhibition of Maxillary Growth of Cleft Palate Patients is Not a Cliché
11:15-11:45 (17:15-17:45 Japan time)	Prof. Dr. Aysegul TUZUNER (Ankara University Dentistry Faculty, TR)	Bone Grafting in Cleft Alveol: When & How?
11:45-12:15 (17:45-18:15 Japan time)	Chiharu FUJIHARA (Assistant Professor, Osaka University Graduate School of Dentistry, JP)	Elucidation of Pathogenesis of Periodontal Disease Using a Mathematical Model
12:15-13:00 (18:15-19:00 Japan time)	**Lunch Break**	
3 rd Session: Preventive Dentistry (Chair.: Prof. Dr. Shumei MURAKAMI)		
13:00-13:30 (19:00-19:30 Japan time)	Masae KUBONIWA (Associate Professor, Osaka University Graduate School of Dentistry, JP)	The Saliva Metabolome for Monitoring of Individuals' Health Trajectories
13:30-14:00 (19:30-20:00 Japan time)	Atsuo AMANO (Professor, Osaka University Graduate School of Dentistry, JP)	Etiology of Chronic Periodontitis in Persons with Disabilities and Healthy Persons
14:00-14:30 (20:00-20:30 Japan time)	**Break**	
4 th Session: Biomaterials and Prosthodontics (Chair.: Prof. Dr. Ayse Tuba ALTUG)		
14:30-15:00 (20:30-21:00 Japan time)	Atsushi MINE (Senior Lecturer, Osaka University Graduate School of Dentistry, JP)	Adhesive Dentistry: Clinical performance, mechanism and effectiveness of bonding
15:00-15:30 (21:00-21:30 Japan time)	Jun'ichi SASAKI (Senior Lecturer, Osaka University Graduate School of Dentistry, JP)	Three-dimensional Cell Constructs for Oral Tissue Engineering and Regenerative Medicine
15:30-16:00 (21:30-22:00 Japan time)	Prof. Dr. Burak YILMAZ (University of Bern School of Dental Medicine, CH)	High-density and High-performance Polymers Used for Implant Prosthodontics
16:00-16:30 (22:00-22:30 Japan time)	**Break**	
5 th Session Pedodontics/Rejenerative Medicine (Chair.: Assoc. Prof. Dr. Tugba BEZGIN)		

16:30-17:00	Prof. Dr. Ece EDEN (Ege University Dentistry Faculty, TR)	What Can We Do to Prevent Early Childhood Caries?
17:00-17:30	Prof. Dr. Elif Bahar INCE (Istanbul University Dentistry Faculty, TR)	Reduction of Dental Anxiety and Pain in Children using Computer Technologies
17:30-18:00	Prof. Dr. Sema HAKKI (Selçuk University Faculty of Dentistry, TR, University of Michigan, US)	Immuno-modulatory Roles of Mesenchymal Stem Cells in Periodontal Therapy
18:00-19:00	**Break**	
6 th Session: Artificial Intelligence in Dentistry (Chair.: Prof. Dr. Kaan ORHAN)		
19:00 – 19:30	Görkem SAYGILI (Assistant Professor, Tilburg University School of Humanities and Digital Sciences, NL)	Machine Learning and Its Applications in Radiology
19:30 – 20:00	Eugene SHUMILOV (Diagnocat, US)	How to Introduce an AI Tool into Routine Practice in Dentistry
20:00 – 21:30	Ruben PAUWELS (Associate Professor, Denmark and Catholic University of Leuven Aarhus Institute of Advanced Studies, DK)	Artificial Intelligence: Potential Impact in Dentistry
21:30	**First Day Closing**	

Second Day: 25.06.2021 Friday		
1st Session: Basic Sciences in Dentistry (Chair.: Assoc. Prof. Dr. M. Okan EKIM)		
9:00-9:30 (15:00-15:30 Japan time)	Takafumi KATO (Professor, Osaka University Graduate School of Dentistry, JP)	Physiological Research Perspectives in the Field of Sleep Bruxism
9:30-10:00 (15:30-16:00 Japan time)	Kenji HATA (Associate Professor, Osaka University Graduate School of Dentistry, JP)	Molecular Mechanisms of Skeletal Development: How Does Bone Develop and Grow?
10:00-10:30 (16:00-16:30 Japan time)	Masaya YAMAGUCHI (Senior Lecturer, Osaka University Graduate School of Dentistry, JP)	Molecular Evolutionary and Microbiological Approach to Investigate Pneumococcal Infection
10:30-11:00 (16:30-17:00 Japan time)	Prof. Dr. Burak BILECENOGLU (Medipol University-Ankara, TR)	Clinical Anatomy of Oral Cancers
11:00-11:30 (17:30-18:00 Japan time)	**Break**	
2nd Session: Stem Cells in Dentistry (Chair.: Assoc. Prof. Dr. Sema BELLI)		
11:30-12:00 (17:30-18:00 Japan time)	Shinya MURAKAMI (Professor, Osaka University Graduate School of Dentistry, JP)	Future Prospect of Periodontal Tissue Engineering
12:00-12:30 (18:00-18:30 Japan time)	Prof. Dr. Sema BELLI (Selcuk University Dentistry Faculty, TR)	Limitations of Fiber-reinforced Restorations in Biomimetic Dentistry
12:30-13:00 (18:30-19:00 Japan time)	Assoc. Prof. Zeynep Burçin GONEN (Erciyes University Faculty of Dentistry, TR)	Somatic Cell Therapy for Temporomandibular Joint Regeneration
13:00-14:00 (19:00-20:00) Japan time	**Lunch Break**	
3rd Session: Orthodontics (Chair.: Prof. Dr. Okan AKCAM)		
14:00-14:30 (20:00-20:30 Japan time)	Hiroshi KUROSAKA (Senior Lecturer, Osaka University Graduate School of Dentistry, JP)	Roles of Orthodontics in The Treatment of Rare Diseases with Craniofacial Deformities
14:30-15:00 (20:30-21:00 Japan time)	Prof. Dr. M. Ali DARENDELILER (University of Sydney School of Dentistry, AU)	Accelerated Orthodontic Tooth Movement; What is the Truth?
15:00-15:30 (21:00-21:30 Japan time)	Kenji TAKADA (Former Professor, National University of Singapore, SG, Professor Emeritus, Osaka University Graduate School of Dentistry, JP)	Orthodontic Decisions - The Intelligent Perspectives on Class III Diagnostics
15:30-16:00 (21:30-22:00 Japan time)	**Break**	

4th Session: Student Panel (Dental Education Experience in COVID-19 Pandemic) (Chair.: Sena USTA)		
16:00-16:30 (22:00-22:30 Japan time)	Yuki SHIRAKAWA & Shingen SEN (Osaka University Dentistry Faculty 6th grade students, JP)	Life as a Dentistry Student in Osaka University / Before and After COVID-19
16:30-17:00 (22:30-23:00 Japan time)	Nazlıcan AYDIN & Deniz Baran BEK (Ankara University Dentistry Faculty 5th & 3rd grade students, TR)	Being a Dentistry Student at Ankara University / How Did COVID-19 Effect Dental Education
17:00-17:15 (23:00-23:15 Japan time)	Oguzcan KARAER (Graduate, Ankara University Dentistry Faculty, TR)	Osaka University Experience as a Turkish PhD Candidate
17:15-17:30 (23:15-23:30 Japan time)	**Break**	
5th Session: / Dental Implantology and Imaging (Chair.: Prof. Dr. Ozlem UCOK)		
17:30-18:00	Ingrid ROZYLO-KALINOWSKA (Professor, Medical University of Lublin, PL)	Ultrasound Imaging in Dentomaxillofacial Radiology
18:00–18:30	Ilser TURKYILMAZ (Clinical Professor, New York University, US)	Restoring Edentulous Arches Using Implants and CAD/CAM Technology
18:30–19:00	**Break**	
6 th Session: Turkish Scientists Practicing Abroad (Chair: Prof. Dr. Cagri DELILBASI)		
19:00-19:30	Husniye DEMIRTURK KOCASARAC (Clinical Assistant Professor, Marquette University School of Dentistry, US)	CBCT for General Dental Practitioners: from Anatomy to Pathology
19:30-20:00	Prof. Dr. Mehmet MANISALI (St. George's Hospital, UK)	Virtues of Virtual Orthognathic Surgical Planning
20:00–20:30	Assoc. Prof. Dr. Roda SESEOGULLARI DIRIHAN(University of Turku, FI)	Strategies to Prevent Degradation of Dentin Collagen Matrix
20:30-21:00	Assoc. Prof. Dr. Aylin BAYSAN (Professor, Queen Mary University of London, UK)	Early and Deep caries management: Two Ways to Go with MI Approach
	Award Ceremony	
7 th Session: Panel – Turkish Experience in Japan (Chair.: Prof. Dr. Nejat BORA SAYAN)		
21:00-22:30	Prof. Dr. Cagri DELILBASI (Medipol University Dentistry Faculty, TR)	
	Assoc. Prof. Dr. Zekai YAMAN (American Hospital, TR)	
	Prof. Dr. Kaan ORHAN (Ankara University Dentistry Faculty, TR)	
	Prof. Dr. Okan AKCAM (Ankara University Dentistry Faculty, TR)	
	Closing - Prof. Dr. Kaan Orhan - Prof. Dr. Satoshi Imazato	

Evaluation of Airway Changes After Orthognathic Surgery with Maxillomandibular Advancement or Maxillary Advancement and Mandibular Setback

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Introduction/Purpose: The relationship between craniofacial morphology and airway has been well documented in the literature. Surgical changes in jaw positions create reorganization in the surrounding tissues i.e. soft palate, tongue and pharynx; depending on the magnitude and direction of correction. Therefore, oropharyngeal changes caused by orthognathic surgery can affect the airway function. Aim of the present study was to evaluate upper airway changes in two different orthognathic surgery modalities: 1) Bimaxillary Advancement, 2) Maxillary Advancement+Mandibular Setback.

Method: Sample in this retrospective study was derived from clinical archive of Orthodontic department in Marmara University. Preoperative (T1) and 6-12 months postoperative (T2) lateral cephalometric radiographies of 24 adult subjects (mean age: 22,3 ± 1,8 years), who underwent bimaxillary orthognathic surgery, were analyzed and superimposed. Direction and amount of horizontal displacement of A-point and B-point were recorded to define surgical movements. Patients were then divided into two groups: Group 1 (n=13) included maxillary advancement+mandibular setback. Group 2 (n=11) included maxillomandibular advancement. Pharyngeal airway changes were measured at posterior (PAS), superoposterior (SPAS), middle (MAS), inferior (IAS) and epiglottic airway spaces (EAS). For intragroup changes Paired sample t-test and Wilcoxon's test; for intergroup changes Two independent samples t-test and Mann-Whitney U-test were used. Pearson Correlation analysis was performed.

Findings: In both groups SNA, SNB,ANB, Wits-Appraisal, Nasion-perpendicular to A-point, maxillary depth values changed significantly. In Group 1, pharyngeal airway changes were non-significant. In Group 2 PAS, SPAS, MAS increased significantly and mean pharyngeal airway changes were significantly higher than Group 1. In Group 2, significant and powerful correlation was found between SNB and IAS (r=0,800) and EAS (r=0,719).

Conclusion: Mandibular setback did not cause significant reduction in airway when applied in combination with maxillary advancement. Maxillomandibular advancement significantly increased the upper airway parameters and a powerful correlation was observed between SNB and IAS, EAS in this group.

Keywords: Craniofacial morphology, maxillary advancement, mandibular setback, ortognathic surgery.

Effects of Different Beverages on Color Stability of Bulk-Fill Restorative Materials

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Introduction/Purpose: The color stability of restorative materials has gained importance with the increasing matter given to esthetics. Color stability has become a success criterion not only for the anterior but also for the posterior restorations.
The aim of the study is to evaluate the color stability of a conventional composite resin and bulk-fill composite resins containing different organic matrix, filler and photoinitiator.
Method: A total of 30 samples of 10 mm diameter and 2 mm thickness were prepared from each of three bulk-fill (Beautifil Bulk-Fill, Filtek One Bulk-Fill, Tetric N-Ceram Bulk-Fill) and one conventional composite (Z250) using polytetrafluoroethylene molds. The samples polimerized for 20 seconds with a light-curing device and left in an incubator in 37^0 distilled water for 24 hours to complete the polymerization. The upper surfaces of the samples were polished with polishing discs from coarse to fine grained. Initial color measurements were made with a spectrophotometer according to the CIE Lab system. 4 measurements were made from each sample and the avarage values were recorded. Samples for each composite were randomly divided into 3 groups (black, kombucha and matcha tea) (n = 10). The samples were kept in the solutions for 12 days, after which the color measurement was repeated. The values of ΔL, Δa, Δb and ΔE_{00} were calculated. SEM images were taken from a randomly selected sample from each group. In the statistical analysis of the data, compliance with normal distribution was examined using the Shapiro-Wilk test. Two-way analysis of variance (ANOVA) with Bonferroni correction was used to evaluate the color parameters.
Findings: According to the composites, Beautifil composite showed the greatest change in all values of E_{00} (8.93±3.17), ΔL (-5.56±1.58), Δa (1.41±0.98) and Δb (12.07±6.68) ($p<0.01$). According to the solutions, matcha tea is different ($p<0.01$) in all composites E_{00} (4.03±5.10), ΔL (-1.21±2.17), Δa (0.05±0.43) and Δb (6.53±8.71) values. When ΔE_{00} values were compared, the highest color change after Beautifil composite was caused by Filtek One (2.91±0.99) and Tetric (1.30±0.74), respectively, and there was no difference between Z250 (0.82±0.32) and Tetric (respectively, $p<0.01$, $p<0.01$. $p =0.322$). The lowest ΔL value belonged to Z250 composite (0.05±0.74), there was no difference between Tetric (-0.89 ± 0.86) and Filtek One (-1.00±0.71) ($p<0.01$, $p> 0.05$). When the Δa values were compared, the change after Beautifil was mostly due to Tetric (0.62 ± 0.28), there was no difference between the Z250 (-0.17±0.22) and Filtek One (-0.05 ± 0.38) groups, which had a lower Δa value (respectively. $p<0.01$, $p<0.01$, $p> 0.05$). When the Δb data were evaluated, it was found that there was no difference between the Beautifil composite followed by Filtek One (5.53±2.10) and Tetric (0.78±1.36) with the lower Δb value and Z250 (1.16±0.77) ($p<0.01$, $p<0.01$, $p>0.05$).
Conclusion: Beverages can negatively affect the surface properties of bulk-fill composite resins in terms of color stability. Beautifil bulk-fill composite resin containing previously reacted glass ionomer particles can be said to have lower color stability than other bulk-fill composites used.

Keywords: Bulk-fill, color stability, tea, spectrophotometer.

Effect of Different Surface Treatments on Shear Bond Strength of PAEK Polymers to Veneering Materials

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Introduction/Purpose: This study aimed to evaluate the effect of various surface treatments on the shear bond strength (SBS) of polyetheretherketone (PEEK) and polyetherketoneketone (PEKK) polymers to indirect laboratory composite (ILC) and lithium disilicate ceramic (LDC) veneering materials.
Method: 294 polymer samples (7 x 7 x 2 mm) were prepared from PEEK and PEKK CAD-CAM discs and divided into 7 subgroups (n = 10) according to the surface treatments; control (C), atmospheric cold plasma (PLS), sulfuric acid (SA), sandblasting (SB), tribochemical silica coating (TBC), sandblasting + sulfuric acid (SB+SA), tribochemical silica coating + sulfuric acid (TBC+SA). SEM analyzes were performed for one sample of each subgroup. ILC and LDC veneers were applied onto the remaining samples equally and stored in a water for 24 hours at 37°C. Then each sample was subjected to the SBS test with a universal test machine, and failure modes were evaluated using a stereomicroscope. SBS data were analyzed statistically by three-way analysis of variance (ANOVA), independent sample t-test, and Tukey HSD test. Failure modes were statically analyzed by Pearson chi-square and correlation tests.
Findings: The highest SBS values were detected for SA applied and ILC veneered groups for both PEEK (21.55 ± 1.45 MPa) and PEKK (17.04 ± 1.99 MPa) polymer ($P<.05$). The SBS values of ILC applied groups were significantly higher than LDC groups, regardless of surface treatment and polymer type ($P<.05$).
Conclusion: The effects of surface treatment had varied on the SBS values and surface topography of both polymers. Therefore, the parameters of surface treatments should be more specified for the applied polymer and veneering type. Furthermore, ILC veneering material may be more durable than LDC.
Keywords: High-performance polymer, PEEK, PEKK, surface treatment, veneering technique, shear bond strength test.

Colour Stability of Different Denture Teeth Stored in Various Beverages

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Introduction/Purpose: New types of denture teeth using modified acrylic resin that incorporate cross-linking agents and composite resin containing different types of filler have become increasingly common. It has been possible to produce nano-sized filler particles with nanotechnology. However, evidence-based information regarding composition and properties is lacking. The purpose of this study was to evaluate the colour stability of four commercially available denture tooth materials with different chemical structure when subjected to various beverages.

Method: Conventional acrylic resin, reinforced acrylic resin, microfiller composite resin, and nanofiller composite resin teeth with different brands were used, for a total of four different denture teeth groups. Denture teeth were subjected to four beverages (tea, filtered coffee, cola, and cherry juice) and distilled water as control. The test period of 24 hours appears comparable to approximately 1 month of normal beverage consumption. The test periods used in this study were arrenged according to this protocol and 1 week, 1 month, 3 months and 6 months of normal beverage consumptions were simulated. From each group, 10 maxillary first molar denture teeth were immersed in each of the five solutions. The baseline, 1st week, 1st month, 3rd month and 6th month values for colour change of denture teeth were measured.

Findings: The differences of each value were calculated by one-way ANOVA statistically. For colour changes (ΔE) there was no significant difference among the specimens immersed in distilled water (Tukey HSD test, $p>0.01$). The highest colour changes were recorded for the specimens of Integral and Major immersed in cola, whereas for the specimens of Veracia and Orthosit immersed in tea (Tukey HSD test, $p<0.01$).

Conclusion: Within the limitations of this study, daily intake of common beverages may lead to colour changes of denture teeth. Microfiller composite resin denture tooth material is recommended due to its improved physical properties.

Keywords: Colour stability, denture teeth, nanotechnology.

Examination of Cone-Beam Computed Tomography Requests Reasons in Patients Admitted to Akdeniz University Faculty of Dentistry

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Introduction/Purpose: Cone-beam computed tomography (CBCT) is a system based on the cone beam technique allows three dimensional imaging of maxillofacial structures. With its widespread use, CBCT has shown benefits in different areas for all departments of dentistry. The aim of this study is to retrospectively examine the reasons of CBCT request in Akdeniz University Faculty of Dentistry, Department of Oral and Maxillofacial Radiology and the distribution of these requests according to age, gender, departments and requested areas.
Method: CBCT request forms, obtained from the archive records of the patients who were admitted to Akdeniz University Faculty of Dentistry, Department of Oral and Maxillofacial Radiology were evaluated retrospectively. Age, gender, requesting departments, request reasons and requested areas were recorded. Request reasons were classified as intraosseos lesion, orthodontics, endodontics, impacted tooth, dental anomally, soft tissue calcification, preoperatif, trauma, implant surgery, evaluation of temporomandibular joint bone structure, and other causes. Requesting departments were classifield as Department of Oral and Maxillofacial Radiology, Department of Oral and Maxillofacial Surgery, Department of Orthodontics, Department of Endodontics and others. Requested areas were classified as maxilla, mandible, maxillofacial region and single tooth area. The data were analyzed by descriptive statistics methods with SPSS.
Findings: 679 CBCT included to the study (51% male and 49% female) and the mean age was 37.44± 17.39. The most common request reason was assesment of intraosses lesion (29.6%), the most CBCT requesting department was Department of Oral and Maxillofacial Radiology (51.4%) and the most requested area was maxillofacial region (52.9%). In under 18 years patients, the most common request reason was orthodontic purposes (21,2%) and the most CBCT requesting department was Department of Orthodontics.
Conclusion: The results of the study showed that most of the CBCT images were requested for assesment of intraosseos lesion. Evaluating the request reasons of CBCT by physicians and determining the usage areas of CBCT can be beneficial in terms of improving the technique.
Keywords: Cone-beam computed tomography, dentistry, radiography.

Evaluation of Dentists' Approach to Implant-Supported Restorations

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Introduction/Purpose: There is a limited data in the literature about dentists' approach to implant-supported prosthetic restorations. The purpose of this study was to evaluate the dentists' approach in Turkey to the selection of implant-supported restorations connection type, abutment cleaning, and screw closure.

Method: Ethics committee approval was obtained from Bruni Unversity Ethics Committee (Decision NO:2019/26-19). As a result of the literature review, a short questionnaire form consisting of 10 questions was created. The questions generally aim to learn the practices of dentists in some essential points while performing fixed prosthetic restoration on implants. The questionnaire includes questions about retention type (cement/screw-retained), the type of material utilized when closing the access hole of the screw-retained, and the abutment screw hole of the cement-retained restorations, the cleaning process of the abutments before the screws are torqued, and for the final restorations. The questionnaire was delivered to dentists via TDB.

Findings: A total of 294 dentists participated in the survey. 9.8% of the participants stated that they do not perform implant-supported restorations. Out of the 265 dentists that performed implant-supported restorations, 58.9% of the participants had ten years or more clinical experience, 94% of the participants work in private clinics and practices. 72.8% stated that they do not perform abutment cleaning, and 74.7% do not renew the abutment screw before the delivery of the implant-supported prosthesis. 46,8% stated that they prefer cement-retained crowns. 58.5% of the participants stated that they encountered periimplantitis in less than 5% of the cases. Teflon tape+composite resin was the most preferred combination to close the access hole of the screw-retained prosthesis. At the same time, Teflon tape+temporary filling was the first choice, and cotton+temporary filling was the second choice to cover the abutment hole of the cement-retained prosthesis. Many different applications have been observed concerning abutment cleaning (chemical disinfection, sterilization by autoclave, ultrasonic cleaning, steaming, wiping with alcohol cotton, holding in chlorhex solution, …).

Conclusion: It has been observed that dentists have made very different applications, especially regarding abutment cleaning. Protocols based on more standard and scientific data are needed for implant-supported restorations.

Keywords: Abutment cleaning, dental implant, prosthesis, cement-retained, screw-retained.

Clinical and Radiographic Evaluation of Biomaterials Used in Different Endodontic Procedures-with Four Cases

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Introduction/Purpose: Endodontic treatment may be required in permanent teeth due to different reasons in childhood. Among these reasons, trauma and caries are frequently encountered. Necrosis can occur in the pulp tissue as a result of damage to the vascular nerve package in the apical of the tooth due to severe trauma. Root development of the tooth cannot be completed in necrose that occur in immature permanent teeth. Apexification with calcium hydroxide has been tried in these teeth up to the last 15 years. However, since there are some disadvantages of calcium hydroxide, biological materials such as MTA and biodentine have started to be used nowadays. Studies have shown that these materials stimulate the formation of new vascularized tissue in the apical of mature teeth with necrotic pulp and periapical lesions. In addition, MTA and biodentine are preferred in direct and indirect capping due to their properties such as biocompatibility and impermeability. The aim of this study is to examine the teeth clinically and radiologically after the use of biodentine and MTA as a barrier on the pulp capping, cvek pulpotomy and regenerative endodontic treatment.

Findings: Case 1: A 12-year-old girl presented to our clinic with complaints of intermittent pain and cold sensitivity in the upper first molar tooth. Direct pulp capping was done with MTA. In the follow-up of the patient 1 year later, it was observed that the tooth was clinically and radiographically asymptomatic. Case 2: An 8-year-old male patient with a complicated crown fracture in the maxillary central tooth as a result of the trauma was admitted to our clinic 18 hours after the trauma. Cvek pulpotomy was performed with biodentin. In the follow-up of the patient 1,5 years later, it was observed that the tooth was clinically asymptomatic and radiographically continued root development. Case 3: An 8-year-old girl with crown fracture in the upper maxillary central tooth as a result of the trauma was admitted to our clinic with a complaint of pain and swelling two months after the trauma. Regenerative endodontic treatment with biodentine was applied to devital tooth. İn the follow-up of the patient 1 year 3 months later, it was observed that the tooth was clinically asymptomatic and radiographically thickening of the root dentin. Case 4: Indirect pulp capping was performed using MTA to a 7-year-old male patient who was admitted to our clinic with the complaint of cold sensitivity in his lower right first molar tooth. In the examination performed 1 year later, no clinical or radiological pathology was observed.

Conclusion: Successful results are achieved in dentistry with the development of new materials and treatments. Today, the success rate is high in vital pulp treatments with newly developed materials such as MTA and Biodentine. Root development continues after regenerative endodontic treatments applied with MTA or Biodentin in devital and open apex teeth.

Keywords: Biomaterials, endodontic treatment, pulpotomy.

Evaluation of Oral Health Literacy of Pregnant Women

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Introduction/Purpose: Oral health literacy is defined as" the capacity of individuals to receive and understand the health information and services necessary to make appropriate oral health decisions." Low oral health literacy is associated with negative outcomes such as poor oral health, inadequate oral health knowledge, and behaviors. Thanks to the fact that mothers have an adequate level of oral health literacy, it can be easier for them to instill oral hygiene habits in their children. The aim of our study was to assess the level of oral health literacy of pregnant women and their ability to recognize words on the REALD-30 scale, as well as their knowledge of the meaning of words.

Method: Our study evaluates the level of oral health literacy of 300 pregnant women between the ages of 18-45 who are admitted to the Obstetrics and Gynecology outpatient clinic of Atatürk University Faculty of Medicine. Word recognition tests in dentistry, such as the REALD-30, quickly and easily assess the ability to read and pronounce common dental words correctly. The TREALD-30, which has been studied for validity and reliability of the Turkish version, contains 30 words consisting of dental terms. Participants were asked to read each word in TREALD 30 aloud, moving on to the next one when they could not read one word. For correctly pronounced words, 1 point was given and a total score of 0-30 points was scored. In addition, participants were questioned whether they knew the meaning of the words, and word scores whose meaning was known were evaluated under the heading TREALD-30-A. Analysis of the collected data was carried out in SPSS v26 program.

Findings: The average age of the participants was 31.2 years and the average educational status was 13 years. It was found that 31% of participants had a first pregnancy, 30% had one child and 38.7% had at least 2 children. 66.7% of respondents were housewives and 9.7% were health workers. Of the 30 words on the TREALD-30 scale, only the number of words that can be read was 29 ± 2, while the number of those that can be read by knowing the meaning was 17 ± 4, and the number of those that cannot be read was 3 ± 6 words. As the level of education increased, the level of oral health literacy increased ($p<0.001$). Health workers showed higher TREALD-30 and TREALD-30-A scores compared to housewives ($p<0.001$).

Conclusion: In order to increase the level of oral health literacy of mothers and expectant mothers, it is important to conduct health protection and development programs by working in cooperation with the education and health system.

Keywords: Oral health literacy, pregnant, REALD-30.

Reactive Hyperplasias in the Oral Mucosa: Case Series

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Introduction/Purpose: Reactive hyperplasias are often encountered tumor-like exophytic lesions of the oral mucosa, but they are not a neoplasm. Local factors such as dental calculus, food residue stuck between teeth, incompatible prosthetic restoration, and systemic factors such as hormonal changes play a role in the etiology of these hyperplasia. The aim of this presentation is to evaluate the possible etiological factors, clinical and radiological findings of 10 reactive hyperplasia cases seen in different regions of the mouth.

Case Reports: Ten patients (seven females, three males) with a mean age 40.2 applied to our clinic with complaints of swelling in the mouth. In the medical anamnesis, it was learned that three (30%) patients had recently given birth and the related swelling started to occur in the second trimester of pregnancy, three (30%) patients had different diseases such as heart, hypertension, diabetes, and cholesterol, and were under regular medication for systemic disease. No finding was found in the extraoral examination. In intraoral examination, different sizes exophytic lesions which painless, red and/or mucosal colored, pedunculated and/or sessile, smooth and/or lobular, swollen from the oral mucosa surface was seen on the upper jaw of six patients, lower jaw of three patients, and lower lip mucosa of one patient. Poor oral hygiene in five (50%) patients, prosthetic restoration in the lesion-related area in two (20%) patients, and atrision incisal tooth surface and diastema in one (10%) patient was found. Radiographic examination, minimal resorption of the alveolar crest in the lesion-related area of only three (30%) patients was seen. Lesions detected in different parts of the oral mucosa were examined histopathological after surgical excision. According to the clinical and histopathological features, diagnosis of the lesions was made as pyogenic granuloma (four cases; 40%), peripheral ossifying fibroma (three cases; 30%), traumatic fibroma (two cases; 20%) and peripheral giant cell granuloma (one case; 10%).

Conclusion: It was concluded that the lesions examined in this case series were mostly caused by local factors. The clinical findings observed in the patients were painless, swollen from the oral mucosa surface, and exophytic lesions. On the radiographic examination, no finding was detected in most of the lesions.

Keywords: Reactive hyperplasia, pyogenic granuloma, peripheral ossifying fibroma, traumatic fibroma, peripheral giant cell granuloma

Clinic and Radiographic Evaluation of Cemento-osseous Dysplasia: Case Series

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Introduction/Purpose: Cemento-osseous dyplasia (COD) is usually asymptomatic and slowly progressing benign fibro-osseous lesion characterized by the replacement of normal bone by fibrous tissue. The aim of this presentation is to evaluate the clinical and radiographical findings of six COD cases that were detected incidentally during radiographic examination.

Case Reports: Six female patients who four of them with different dental complaints and two of them for routine control examination of the previously diagnosed COD with a mean age of 38 applied to our clinic. It was learned that the patients did not have any systemic disorders in their medical anamnesis. No finding was found in extraoral examination. In intraoral examination, teeth associated with COD were detected as vital as a result of the electric pulp test, and no other finding related to the lesion was found. In the panoramic radiography examination, different sizes lesions which radiolucent-radiopaque (mixed) internal structure and surrounded by radiolucent (two cases) and/or sclerotic (four cases) lines were observed in the mandible. It was found that the lesions were related to teeth in four cases, were located in the edentulous region in one case, and in both the related to teeth and edentulous region in one case. It was observed that the lesions, which were examined in more detail with cone-beam computed tomography, caused thinning and resorption in the buccal and lingual cortical bones in some places. As a result of histopathological examination in four patients, the lesions were diagnosed as COD. With the combined interpretation of clinical, radiographic and histopathological examinations, three of the cases were evaluated as periapical COD and the other three as florid COD. All patients were followed up periodically for six months.

Conclusion: The findings of this case series showed that all lesions examined were clinically asymptomatic and mixed on radiography. There is a risk of infection in the bone in the COD region due to insufficient vascular support and osteomyelitis may occur. Therefore, dentists should know the clinical and radiographic features of COD in clinical practice and patients should be followed up periodically.

Keywords: Cemento-osseous dysplasia, mixed lesion, radiographic examination.

Comparison of Mineral Content of Enamel and Dentin with SEM-EDX

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Introduction/Purpose: The aim of this study is to investigate and compare mineral content of enamel and dentin with SEM-EDX.
Method: 48 impacted 3rd molar teeth were used for our study. After the teeth were removed by surgical operation, they were kept in 10% formalin solution to be sent to SEM/EDX analysis. The root and crown sections of the samples were separated from the enamel/cement junction using Isomet. Each tooth was cut longitudinally in one mesio-distal direction and two equally spaced bucco-lingual directions longitudinally in order to obtain 6 equal parts measuring 3x3x2 mm from the teeth (3 buccal, 3 lingual). The cut surfaces of all samples were polished and smoothed with silicon carbide papers of 500, 800 and 2000 sizes and 0.5 µm alumina paste was used for 1 minute each. The samples were then washed in an ultrasonic bath for 10 minutes to remove residues caused by our previous preparations. For XRD analysis, 2 teeth were divided into two parts (buccal and lingual) in the same way and 4 samples were obtained. For XRD analysis, 2 teeth were divided into two parts (buccal and lingual) in the same way and 4 samples were obtained. For XRF analysis, an x-ray fluorescence spectrometer was used. C, O, Ca, N, P, Mg, Na, Al, F levels in enamel and dentin were measured by EDX method and Zn, S, Si, Sr levels were measured by XRF method.
Findings: The difference between the amounts of Al and F in enamel and dentin was statistically insignificant ($p > 0.05$). C, P, Na, Sr amounts were found to be significantly higher in dentin than enamel ($p < 0.05$). O, Ca, N, Mg, Zn, Si amounts in enamel were also significantly higher than dentine ($p < 0.05$).
Conclusion: The SEM-EDX method is a useful method for comparing the mineral content of enamel and dentin.
Keywords: enamel, dentin, mineral content, SEM-EDX.

Is it Possible to Increase the Bonding Strength of a Universal Adhesive System to Prepared Enamel?

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Introduction/ Purpose: Universal adhesive systems are frequently used in restorative dentistry due to their easy application, their ability to be used with or without acid (multi-mode), and their successful adhesion to dental tissues. There are studies in the literature investigating the effects of different application procedures of universal adhesive systems on bonding values. The aim of this study is to investigate the bonding values of the different application procedures of a universal adhesive system to the prepared enamel tissue.

Method: The enamel tissue on the vestibular surface of ninety bovine incisors was prepared using yellow-belted diamond bur. The prepared teeth were randomly divided into five groups (n=18). A universal adhesive system (GC Solare Universal) was applied to each group as follows: Group 1: Universal adhesive only (U), Group 2: Orthophosphoric acid (37%) + universal adhesive (A + U), Group 3: Er: YAG laser (1.5 W, 15 Hz) + universal adhesive (L + U), Group 4: Er: YAG laser (1.5 W, 15 Hz) + orthophosphoric acid (37%) + universal adhesive (L + A + U), Group 5: Universal adhesive x 2 times (2U). The adhesive system was polymerized with a 1200 mW /cm^2 LED light device for 10 s. Composite restorations with a diameter of 1 mm were performed with a micro-hybrid composite resin on bonded surfaces. While the restorations were being performed, a plastic mold with a diameter of 1 mm was used. Each restoration was polymerized for 20 seconds with the same LED light device. All samples were kept in distilled water for 6 months.

The shear bond strength (SBS) test of the specimens was performed with a test device approaching at a speed of 1 mm / min. The data were analyzed with a statistical program using One-Way Analysis of Variance and Tukey tests ($p = 0.05$).

Findings: While the highest mean SBS value was observed in the L + U group (24.25 ± 5.94 MPa), the lowest value was observed in the U group (16.24 ± 5.17 MPa). The mean SBS value of the U group was found to be statistically lower than all other groups ($p < 0.05$). The mean SBS values of the other groups were found to be statistically similar ($p > 0.05$).

Conclusion: The application of the universal adhesive system twice to the prepared enamel tissue increases the SBS value. In addition, treating the enamel surface with 37% orthophosphoric acid or Er: YAG laser (1.5 W, 15 Hz) or Er: YAG laser + orthophosphoric acid before applying the universal adhesive increases the SBS value.

Keywords: Bonding strength, enamel, universal adhesive systems.

Monomer Release of Commonly Used Restorative Dental Materials in Children

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Introduction/Purpose: There is contemporary alarming literature on the subject of resin-based materials. It is quite important to obtain accurate information related to the materials used, especially, in pediatric dentistry. This study aims to evaluate the elution of residual TEGDMA, UDMA and Bis-GMA monomers from resin-based materials commonly used in pediatric dentistry.

Method: Three commercially available resin-based restorative materials were investigated: compomer filling (Nova, Imicryl, Konya, Turkey); bulk fill filling (Tetric N-Ceram Bulk Fill, Ivoclar, Vivadent,Liechtenstein); composite filling (Filtek Ultimate Universal Restorative,3M ESPE, Germany). The composite resin inserted into a polytetrafluoroethylene mold with internal dimensions 4 mm diameter x 2 mm thickness according to International Standards Organization (ISO) 4049. The polymerization process of the samples was implemented by the use of LED light (EliparTM, 3M ESPE, USA) with an output irradiance of 1200 mW/cm^2 and wavelength range 430–480nm. Cylindrical samples were stored in 1 mL of extraction solution at 37 °C in the dark environment until the time of measurement. The samples were analyzed by using high performance liquid chromatography. The data were analyzed using the one way analysis of variance at a significance level of $p < 0.05$ were used to detect significant differences in the amount of each monomer released from the tested materials

Findings: The elution of TEGDMA, UDMA and Bis-GMA from the materials continued up until four weeks after they had been immersed initially. TEGDMA, UDMA and Bis-GMA elution was clearly higher in compomer filling ($p<0.05$). The released TEGMA, UDMA and Bis-GMA for 1 h was calculated as; 9950, 3980 and 3476 nmol, respectively. On the other hand, the other materials showed approximately 50-fold less release than Compomer material.

Conclusion: The highest release was observed for compomer filling. In addition to technical properties, biological effects of the filling material should be considering while choosing the material. Monomer contents should be evaluated especially in terms of the filling materials used for children.

Furthermore, although eluted monomers for one filling may not cause a short-term risk, additional research on potential long-term toxicity and adverse effect level of more than one filling should be performed as justified by the findings of our study.

Keywords: Compomer, composite, monomer release.

Detection of Decayed Teeth in Panoramic Radiographs Taken From Primary Dentition Period Children with The Artificial Intelligence Method

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Introduction/Purpose: Caries diagnosis in clinical dentistry; It includes concepts such as determination of treatment, determination of caries risk level, application of preventive methods and is a very important stage that guides planning in the clinic. The secret of a successful treatment is timely and correct diagnosis. Various restoration methods recommended for the treatment of dental caries have developed rapidly over the past decade. However, there has been no significant improvement in diagnostic methods due to the various anatomical structures and restoration forms of the teeth. Especially in cases where deep fissures, tight interfacial contacts, and secondary caries are present, it becomes difficult to detect caries at an early stage, and many lesions are usually detected at an advanced stage of caries. Most of the decay determinations made by dental radiography and catheter, which are considered reliable as the method of diagnosis of caries, are based on empirical evidence. The difficulties in reaching the correct result with conventional caries diagnosis methods have led to the development of new methods and devices for caries detection. These problems paved the way for the use of artificial intelligence methods in dentistry for the diagnosis of caries. This study aims to evaluate the diagnostic effectiveness of detection of decayed teeth in panoramic radiographs taken from primary dentition period children with the artificial ıntelligence method.
Method: In this study, 1857 panoramic images are included. The radiographs were obtained from the radiology archive of Atatürk University Faculty of Dentistry, Department of Pedodontics. The dataset consisted of 1,857 images, with 1,497 images (12,203 labels) in the training set, 180 images (1,276 labels) in the validation set and 180 images (1,551 labels) in the testing set. The images were randomly distributed. The U-Net model applied with the PyTorch library was used for the detection and segmentation of carious lesions. The diagnostic performance of the Deep CNN algorithm was evaluated in terms of sensitivity, precision, accuracy, and F1 score using the confusion matrix.
Findings: The artificial intelligence evaluated 1006 of 1276 caries tag number in 180 images of the primary dentition test group as true positive, 96 as false positive, and 174 as false negative. The sensitivity, precision, and F1 scores calculated using the confusion matrix were found as 0.8525, 0.9128, and 0.8816, respectively.
Conclusion: Deep learning-based artificial intelligence models are promising tools for the detection and diagnosis of caries in panoramic radiographs taken from children. Artificial intelligence saves time and helps the clinician as well as it may play an important role in the automated detection of caries. More comprehensive studies are needed to evaluate the success of artificial intelligence in caries diagnosis.
Keywords: Artificial intelligence, caries, deep learning, panoramic radiography.

Investigation of The Interactions Between Root Canal Irrigants and Anesthetic Solutions: An Observational Study

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Introduction/Purpose: Elimination of bacteria and debris are the key factors for the success of root canal treatment in endodontics. Effective pain management during treatment is very important for both the comfort of patient and physician. Local anaesthetics that commonly used for additional intrapulpal injection may come into contact with root canal irrigation solutions during endodontic therapy. The dual interactions of anaesthetic solutions have been investigated in the literature, but no data has been found about triple usage of them. The aim of this study is to observe the interactions of double and triple combinations between 4% articaine (ACF) and 3% mepivacaine (MC) with 5.25% NaOCl, 2% chlorhexidine (CHX), 3.5% chlorine dioxide (ClO_2), 17% EDTA and 18% etidronic acid (HEDP).

Method: The double and triple combinations of the solutions were mixed in equal volumes in eppendorf tubes at room temperature. Images of the mixtures were photographed at the 1st min, 10th min, 30th min and 1st h. Mixtures (M) are; M1: ACF + NaOCl, M2: ACF + ClO_2, M3: ACF + CHX, M4: ACF + EDTA, M5: ACF + HEDP, M6: MC + NaOCl, M7: MC + ClO_2, M8: MC + CHX, M9: MC + EDTA, M10: MC + HEDP, M11: ACF + NaOCl + EDTA, M12: ACF + ClO_2 + EDTA, M13: ACF + NaOCl + HEDP, M14: ACF + ClO_2 + HEDP, M15: MC + NaOCl + EDTA, M16: MC + ClO_2 + EDTA, M17: MC + NaOCl + HEDP, M18: MC + ClO_2 + HEDP.

Findings: A milky white precipitate was observed in the binary mixture of ACF with NaOCl, and bubble formation was observed with CHX. An orange precipitate was formed in the mixture of MC with NaOCl, while bubble formation was observed in the mixture with CHX. ACF + NaOCl + EDTA mixture formed milky white precipitate, while ACF + NaOCl + HEDP and MC + NaOCl + HEDP formed yellowish white precipitate. In the mixture of ACF + ClO_2 + EDTA, a mauve coloured mixture without precipitation was observed. An orange precipitate formed in the MC + NaOCl + EDTA mixture. No change was observed in M2, M4, M5, M7, M9, M10, M14, M16 and M18 mixtures.

Conclusion: Changes were observed in all mixtures where NaOCl was used. For ClO_2, only the mixture of ACF + ClO_2 + EDTA occurred a change. While a yellow white precipitate was observed in the mixtures of HEDP with only NaOCl, no change was observed in the mixtures with other solutions. Further studies are needed to define the contents of the precipitates and mixtures resulting from the interactions of anaesthetic solutions and other irrigation agents.

Keywords: Irrigation solutions, local anaesthetics, interaction

Effect of Mouthwashes on the Colour Stability of Different Composite Resins

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Introduction/Purpose: Recently, because of the increasing awareness and aesthetic demands of the patient's tooth coloured restorative materials are being used frequently in clinical dentistry. Discolouration of the restorative material is one of the common reason for restoration replacement. Obtaining a colour match between restoration and sound tooth structures and colour stability of the restoration along with the clinical service are essential requirements for successful and durable restoration. The aim of this study was to evaluate the effect of mouthwashes with different contents on the colour change of four different types of restorative materials in vitro.

Method: Twenty-eight disk-shaped specimens (Ø8x2 mm) were prepared for each resin composite type [micro-hybrid (Point 4, Kerr), nano-hybrid (Harmonize, Kerr), bulk-fill (Sonic Fill, Kerr), and giomer (Beautifil II, Shofu)]. In all groups, specimens were ground with 600, 800, and 1000, 1200 and 1500-grit sandpaper under running water, for surface standardization. Initial colour measurements of the samples were performed three times on a standard white background using a spectrophotometer (Vita Easyshade, VITA Zahnfabrik). The average L *, a * and b * colour values were recorded in the CIELab colour system. Each resin composite groups were divided into subgroups regarding three different mouthwashes non-alcoholic mouthwash (Colgate Plax, Colgate- Palmolive), chlorhexidine gluconate (Kloroben, Drogsan), halitosis preventive solution (Halitosil, Imk farma), and artificial saliva (n=7). Specimens were immersed for 2 minutes 2 times daily, -14 days and colour measurements were repeated. Colour change values were calculated. Two-way Analysis of Variance and Tukey HSD tests were used for statistical analysis ($p<0.05$).

Findings: After immersion in mouthwashes and artificial saliva, all the specimens showed a perceivable colour change that was above the perceptibility threshold ($\Delta E=1$). After the immersion in Kloroben all the restorative materials except of nano-hybrid composite resin demonstrated significant colour change that is above the acceptability threshold ($\Delta E=3.3$). The highest colour change was observed in the micro-hybrid composite resin immersed in Kloroben, ($\Delta E=3.44\pm0.49$) while the least colour change was recorded in the nano-hybrid composite resin immersed in artificial saliva (1.30 ± 0.38). Kloroben caused a significantly higher colour change in all composite resins compared to the artificial saliva ($p<0.05$).

Conclusion: The micro-hybrid composite resin was the most affected restorative material by mouth rinse solutions, while the mouthwash containing chlorhexidine caused the most colour change.

Keywords: Composite dental resin, mouthwashes, discoloration.

A Retrospective Evaluation of Number of Pediatric Dental Patients and Types of Treatment in Pre and Mid-Covid-19 Pandemic

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Introduction/Purpose: The COVID-19 epidemic, has affected Turkey and the whole world in all aspects of life and led to significant changes in the course of dental treatments. The fact that the disease is mainly transmitted by contact and droplets carries a great risk of transmission during dental treatments and is a cause of concern for the dentists who are providing the dental treatment, the assistant healthcare professionals and the patients. Lack of knowledge about the disease at the beginning of the COVID-19 epidemic caused the society and healthcare professionals to refrain from dental treatments, and only urgent dental treatments were recommended at that period. The aim of this study was to compare the number and types of dental treatments before, at the beginning and during the COVID-19 pandemic by examining the archive data of pediatric patients who applied to Atatürk University Faculty of Dentistry Department of Pedodontics for dental treatment between March and April months from 2019 to 2021.

Method: For our retrospective study, automation records of Atatürk University Faculty of Dentistry Department of Pedodontics were used. The number of patients applied, restorative treatments, pulpatomies, root canal treatments, space maintainers and caries prophylaxis applications were evaluated.

Findings: According to the evaluated automation records, the number of patients and dental treatment procedures performed at the beginning of the pandemic has decreased by 25% and 28%, respectively, in comparison to the pre-pandemic. Also, compared to the pre-pandemic, the number of incoming patients decreased to 54% after the pandemic, but the number of endodontic treatments was doubled up. The dental treatment procedures rates applied in our clinic before, at the beginning and after the pandemic were respectively found as the following: 60%, 69% and 194% for restorative treatments, 16%, 20% and 57% for endodontic treatments; 19%, 34% and 149% for caries prophylaxis and 4%, 6% and 3% for space maintainers. An increase in endodontic treatments, restorative treatments and preventive applications (2, 1.8 and 4.2 times, respectively) and a decrease in space maintainers applications (0.4 times) was observed after the pandemic in comparison to the pre-pandemic.

Conclusion: Due to the COVID-19 epidemic, the fact that the access to dental treatments was more difficult in 2020 has paved the way for the formation of new caries and the progress of existing caries. With the new normalization process of 2021, the fact that access to dental treatment centers has become easier and that people's need for dental treatment has increased, dentists have a greater responsibility than before the pandemic. As a result, the increase in treatments performed after the first year of the COVID-19 epidemic is remarkable.

Keywords: COVID-19 pandemic, pediatric dental patient, dental treatment.

Evaluation of the Effect of Tooth Brushing Education on First-Year Dental Students

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Introduction/Purpose: Dental students, as potential health practitioners, will play an important role in education in public oral health. The oral health attitudes of dental students reflect their understanding of disease prevention and contribution to improving the oral health of their patients; these attitudes should be developed and strengthened during undergraduate study.
The aim of this study was to evaluate the effect of tooth brushing education on plaque control, which is the most important factor in the preservation of oral and dental health, by using the Simplified Oral Hygiene Index (OHI-S) among dental students.

Method: A total of 51 students (25 girls, 26 boys) studied in the first year of School of Dentistry, Çanakkale Onsekiz Mart University in 2019-2020 education period were included in the study. In the first session, the students were asked to brush their teeth for two minutes using a standard toothbrush and toothpaste. Then, the amount of plaque on the tooth surfaces was recorded using plaque-disclosing tablets, and the OHI-S scores of the individuals were determined. Next day, tooth brushing technique with Modified Bass method was demonstrated and explained by a pediatric dentist on the dental model in the lesson of oral and dental health education. The students were asked to brush their teeth again in accordance with the technique they learned. After brushing, plaque staining was done again and OHI-S values were recorded after the brushing. The students were also questioned about their daily tooth brushing frequency, toothbrush replacement frequency and gum bleeding during tooth brushing. Statistical analysis of the data obtained was performed by frequency analysis and dependent sample t-test, and the results were considered statistically significant for $p < 0.05$.

Findings: 74.5 % of the students stated that they brushed their teeth twice a day, 58.8 % of them changed their toothbrushes with a new one every three months, and 86.3 % of them stated that there was no gum bleeding during tooth brushing. While the mean OHI-S score of the students before the education was 0.741 ± 0.42, the mean score after the education was measured as 0.437 ± 0.38 and difference was found to be statistically significant ($p < 0.001$). Statistically significant differences were also found between the OHI-S values of students of the same sex before and after the education ($p < 0.001$). Statistically significant differences were observed between pre- and post-education OHI-S values in groups with and without gum bleeding ($p < 0.001$, $p = 0.015$, respectively). It was observed that mean OHI-S scores decreased significantly in all groups after tooth brushing education ($p < 0.001$).

Conclusion: In order to protect and improve oral health of dentists, who are at the forefront of providing public oral health, oral hygiene and brushing education should be given at regular intervals from the first year of dental education.

Keywords: Dental students, plaque, tooth brushing.

Contemporary Disinfections Methods On the Microhardness of Root Canal Dentin

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Introduction/Purpose: The main purpose of root canal treatment is to eliminate microorganisms from root canal space and prevent reinfection. Surface changes in dentin structure caused by irrigation solutions affects the clinical performance of endodontically treated teeth. Recently, a new disinfection method photodynamic therapy (PDT) was recommended for endodontic treatment. There was limited knowledge of the effect of PDT and ozone on the surface hardness of root canal dentine. The purpose of this study is to compare PDT and ozone with traditional disinfection methods including NaOCl/EDTA and chlorhexidine in terms of root canal dentin microhardness.

Method: Distal roots from hundred extracted mandibular third molars were selected and were randomly assigned to 5 groups (n = 20). Canals were prepared with Reciproc (VDW, Munich, Germany) and VDW gold endodontic motor and were irrigated with 10ml distilled water. Twenty root canals from each group were used with 2.5% of sodium hypochlorite + 17% of EDTA (NaE), 2% chlorhexidine (CHX), 170 ppm of ozone (OZ) and photodynamic therapy (PDT) as final root canal disinfection method. Distilled water was used in the control group (DW). The root canal dentin microhardness was assessed by the Vickers test method. Also, SEM images were obtained from a randomly selected sample from each group. The data were analyzed using the Kruskal-Wallis test at a 5% significance level.

Findings: The OZ group was the group with the highest microhardness value of 53.83 and the differences were significant when compared with NaE (48.45), CHX (48.58) and DW (49.07) groups, p values were 0.003, 0.009, 0.022, respectively. There was a significant difference in the PDT group with 53.74 microhardness values when compared with the NaE and CHX groups, p values were 0.044 and 0.014, respectively.

Conclusion: Within the limitations of this in vitro study, ozone or photodynamic therapy as the final irrigation methods may contribute to preserving the weakened dentin structure by root canal treatment.

Keywords: Chlorhexidine, microhardness, ozone, photodynamic therapy, root canal

Endodontic Treatment of Teeth with Open Apices Using Mta as Apical Plug: Report of 3 Cases

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Introduction/Purpose: When pulpal vitality is lost due to microbial or mechanical reasons, the root development process may be interrupted in permanent teeth and apical closure may not occur. In such clinical situations, creating an apical barrier with root canal filling can be one of the most challenging clinical situations. The aim of this case series is to present the endodontic treatments of 3 systemically healthy patients who applied to the endodontics department of Ankara University, including the creation of an apical plug in a single appointment with necrotic pulp and open apices teeth.

Case reports: A 19-year-old female patient applied with the complaint of sensitivity to percussion and palpation in her lower right second molar tooth. The tooth gave a negative response to the electric pulp test. Radiographic examination revealed a deep carious lesion in the tooth. After the root canal treatment was initiated, it was decided to apply a single visit apexification with MTA due to the open apices. $Ca(OH)_2$ was applied at the first appointment. Endodontic treatment was completed the day after applying MTA in a single appointment. At the control examination 12 months later, the tooth was asymptomatic. Radiolucency resolved in periapical radiography.

A 47-year-old female patient applied with a swelling in the upper right maxillary region. In the intraoral examination, there was sensitivity to percussion and palpation in the maxillary right lateral incisor tooth. Clinically, there was no restoration or caries in the tooth and a pit was observed in the palatinal surface. The tooth gave a negative response to the electrical pulp test. Wide radiolucency was observed in the radiographic examination. Immature root development and abnormal internal root structure were diagnosed as Type 2 dense invaginatus. $Ca(OH)_2$ was applied in the first appointment. Endodontic treatment was completed the day after applying MTA in a single appointment. After 2 months, the tooth was asymptomatic and partial improvement in radiolusency was seen on the control radiography. The patient's follow-up continues.

A 25-year-old male patient was admitted with the complaint of discoloration in the maxillary right central tooth. In his dental history, he had been exposed to trauma to the maxillary anterior region 15 years ago. There was no percussion or palpation sensitivity. The tooth gave a negative response to the electric pulp test. Radiographic examination revealed an enlarged root canal space compared to the symmetrical tooth. $Ca(OH)_2$ was applied in the first appointment. Endodontic treatment was completed 3 days after applying MTA in a single appointment. At the control examination 3 months later, the tooth was asymptomatic and the periapical area was healthy on periapical radiography.

Conclusion: In these case series, an apical plug was created with MTA in mature and necrotic teeth with unclosed apices due to various etiological factors such as infection, dental anomaly and trauma at a single appointment. Thus, it was possible to obturate the root canal system hermetically in optimum time and the continuity of the teeth in the dentition was ensured.

Keywords: Root canal, MTA, apical plug

Effect of Surface Roughening on the Shear-Bond Strength of Orthodontic Brackets

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Introduction/Purpose: The purpose of this in vitro study was to determine the effects of different surface roughening methods on the shear bond strength (SBS) of orthodontic metal brackets to aged micro-hibrid composite resin surfaces.

Method: One hundred micro-hibrit composite resin-discs (3M filtek silorane) were prepared each of them 6mm in diameter and 3mm in height, aged by thermocycled, and randomly divided to five surface roughening groups. Group-I, control; Group-II, diamond-bur; Group-III, 37% phosphoric acid gel; Group-IV, air-flow; Group-V, sandblasting. After the surface roughening, the metal brackets were bonded to aged composite surfaces with a light-cure orthodontic adhesive (Transbond XT). All specimens were stored in water for 1 day at 37°C prior to thermocycled (5000-cycles, 5–55°C) and then SBS testing were applied. The SBS values were evaluated by a shear test with 0.5 mm/min crosshead speed in megapascals (MPa) and failure types were classified using adhesive remnant index (ARI) scores. The data were analyzed with one-way analyses of variance, chi-square tests and post-hoc Tukey at the α=.05 level.

Findings: The means of SBS values were compared using one-way Anova, there was a significant difference between the groups (P<0.001). While looking the results of post-hoc Tukey test, no significant difference was found between Group-I (4.39±1.23 MPa) and Group-III (4.99±1.37MPa), Group-II (9.45±2.18) and Group-IV (8.46±2.14). While the lower SBS values were determined in group-I and III, significantly highest SBS value was recorded for the sandblasting group (12.95±1.60MPa). The analysis of chi-square test of ARI scores revealed significant differences among five groups tested (P<0.001).

Conclusions: Although the diamond-bur and air-flow surface roughening methods are acceptable, the sandblasting surface roughening method is recommended as a more effective method of bonding orthodontic metal brackets to micro-hibrid composite resin surfaces.

Keywords: Shear-bond strength, Ortodontic brackets, surface roughening

Evaluation of Dentists' Perspectives on Sedation and General Anesthesia Applications

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Introduction/Purpose: There was no consensus on the usage of sedation and general anesthesia (S/GA) for dental treatments. Many patients require S/GA to undergo dental treatment due to anxiety, fear, disability, medical illness, or extensive treatment. Dental treatments under S/GA provide a comfortable process to the patient and physicians. Sedation and general anesthesia are performed by only anesthesiology specialists in Turkey Most practitioners recognize the importance of dental anesthesia education and training. The existence and widespread use of these practices reduce the individual and social burden caused by delayed dental treatments due to patients' medical compromises.
This study aims to evaluate the usage of sedation and general anesthesia by dentists and their current practice in Turkey
Method: A 30 item, predominantly multiple-choice survey was conducted in the Department of Oral and Maxillofacial Surgery in Marmara University Faculty of Dentistry. The survey was sent to 526 dentists via email. The first part of the questionnaire, the participants' demographic data and practice information were asked, and in the second part, questions about the physicians' approaches to S/GA were asked. The data obtained from 158 physicians who agreed to participate in the study.
Findings: According to the results of our study, it was observed that 58.3% of the participants lived in Istanbul, 44.9% were attended to a specialty program, and 47.5% had more than ten years of experience in the profession. It was observed that 69.7% of the participants worked in private health institutions, and 25.9% had both general anesthesia and sedation rooms in their workplace. The results of the survey showed that the most common causes for dentists to direct patients to sedation were (81.6%) anxiety, (70.9%) mental retardation, (69.6%) excessive gag reflex, and (67.7%) patients with psychological problems, for general anesthesia indications were maxillofacial surgery (85.4%), mental retardation (83.5%) and large cyst/tumor excision operations close to vital tissues (76.6%). The decision to treat non-cooperative children under S/GA was 90,5%, where dentists use cognitive-behavioural therapy (74,8%) before this decision. For procedures with an anticipated duration of treatment of 2 hours or more only 31, 6% of dentists prefer S/GA. A significant difference was found between the city of residence and workplace equipment and the use of S/GA. ($p<0,001$)**Conclusion**
Although S/GA can be done by anesthesiologists in Turkey, the decision of S/GA indication must be done by both dentists and anesthesiologists. The physical conditions of the workplace and region of residency play an essential role in the dental treatments of patients with medical compromises. A guidebook for dental treatments under sedation and general anesthesia will offer an option of safe accessibility to treatment.

Keywords: Sedation, dentists' perspectives, general anesthesia

Evaluation of Dentists' Awareness and Attitudes About Infection Control

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Introduction/Purpose: Dental treatments have high risk due to close relation with the patient and exposure to infectious material including body fluids such as saliva and blood. Also rotatory devices produce large amounts of aerosols while working with water and fluids in mouth. Therefore, current knowledge and practices of dentists on infection control and precautions are of primary importance for the protection of both themselves and their patients' health. During and after the COVID-19 pandemic the world is going through, new regulations and protocols so infectious diseases knowledge became significant in dentistry.
The objective of this study was to investigate the knowledge, attitudes and behavior of Turkish dentists regarding infection control and the effect of changes experienced with the onset of the COVID-19 pandemic and to compare them with the studies before the epidemic.
Method: The cross-section, descriptive survey study was prepared and conducted in Marmara University Faculty of Dentistry, Department of Oral and Maxillofacial Surgery, with the approval of the local ethics committee on 19.05.2020. The survey form consists of thirty questions with two parts. The first part has questions about demographic data (age, gender, specialty, the number of patients cared daily, the working environment, etc.), and second part aimed to evaluate dentists' awareness and attitudes on infection control (exposure to contact, precautions taken, information on vaccination, sterilization and disinfection reliability etc.). The questionnaire was delivered to the members of the Turkish Dental Association via e-mail and via WhatsApp groups with the purposeful sampling technique. Statistical analysis was performed using descriptive and multivariate analyzes with the data obtained from dentists (n = 238) who agreed to participate in the study.
Findings: The gender of participants was 53.4% (n = 127) female and 46.6% (n = 111) were male. The half of participants (n=119) were graduated from faculties in Istanbul and 53.4% (n = 127) of them attended to no specialty training. Most of the (96%) dentists expressed themselves at high risk group for infectious diseases. A majority of participants (69.3%) took medical history about infectious diseases before starting the procedure and hepatitis B (87.3%), hepatitis C (62.6%) and HIV (46.6%) were included to questions. While 37,8% (n=90) of dentists indicated that they had contact with infected blood and body fluids in the last 1 year, 27.3% of these dentists did not take any precautions after contact. Most (95%, n=226) of the dentists had at least one dose of Hepatitis B vaccine, it was expressed that only 61.3% (n = 146) had 3 doses of their vaccines. Participants were also checked their Anti-HBs titer after vaccination. There were similarities between the answers about protective equipment used during dental treatments of the infected patient and daily protective equipment usage after the COVID-19 pandemic. Nearly all respondents prefer separate containers for hazardous wastes.
Conclusion: The results of the study showed that the knowledge about infection control became higher than the previous studies. It was observed that dentists have conscious awareness about the cross-infection and personal protective equipment usage to prevent infection transmission.
Keywords: Dentists' awareness, infection control, dental treatment.

Evaluation of YouTube™ videos as an information resource about space maintainers

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Introduction/Purpose: The YouTube ™ platform has become the most used online video service for patients or parents to consult healthcare-related information in recent years. Parents can be viewed YouTube ™ videos to obtain information about space maintainers often recommended by the pediatric dentist in early deciduous tooth loss. However, the reliability and quality of information about space maintainers on YouTube ™ videos have not been investigated. Therefore, the purpose of this study was to examine the quality of the information provided on YouTube™ about space maintainers in pediatric dentistry.

Method: A video search was performed on the Youtube™ platform using the keywords of "space maintainer'' and "dental space maintainer" by determining related terms in the Google Trends application. Inclusion criteria in the study were defined as follows; Turkish language videos, space maintainers as primary content, and acceptable audio-visual quality. Each video was scored as ranging from 0 to 8 point and the their information content were classified as high, moderate and low. Also, video lengths, dates of upload, numbers of total views, likes, dislikes and comments were collected. Viewing rates and interaction rates were then calculated. The quality of the selected videos in providing adequate information about the space maintainer was evaluated by two pediatric dentists with reaching a consensus.

Findings: Among the total of 60 videos scanned within the scope of the study, 27 videos that met the inclusion-exclusion criteria were analyzed. It was observed that the videos were mostly uploaded by dentists (n = 15) and dental clinics (n = 10). When the videos were evaluated according to their information content levels, it was determined that 6 (22%) videos had high information content, 11 (41%) videos had moderate information content, and 10 (37%) videos had low information content. The highest number of views and interaction index averages were found in the video group with moderate level of information.

Conclusion: The videos on the YouTube™ platform are insufficient as a Turkish source of information for space maintainers and parents should be advised to follow them with attention.

Keywords: YouTube ™, video service, pediatric dentistry

Assessment of Knowledge and Awareness Levels of Healthcare Professionals and Candidates on Dentoalveolar Injuries

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Introduction/Purpose: To evaluate the knowledge and awareness levels about traumatic dental injuries of various healthcare professionals and candidates who may encounter dentoalveolar injuries.

Method: In this study, A total of 160 people, consisting of 3rd, 4th, 5th year students (47) studying at Faculty of Medicine, 3rd and 4th year students (91) studying at School of Nursing, and emergency physicians, emergency and traumatology nurses, and otorhinolaryngologist and specialist nurses (22) attended. Participants were asked to answer the questionnaire forms sent in digital environment.

Findings: 82.3% of the participants stated the percentage of teeth and jaws affected by trauma to the head and facial area as 40-60% or more. When asked about what to do when you encounter an avulsed tooth case, 50.9% of them stated that they will refer the patient to the dentist and 48.4% should be in the first half hour, 11.3% of them reimplanting the avulsed tooth. While 23.9% of the participants preferred sterile saline solution during the transportation of the avulsed tooth, 33.3% stated that they did not have any knowledge. In addition, 29.6% stated that it was possible to replace the permanent tooth in the avulse, 73.6% stated that it is appropriate to hold the crown part and insert it, 66% stated that if the tooth is broken, it is important to find the broken piece. 87.4% of the participants stated that it is important to participate in an educational program related to dental trauma and 85.5% of them want to participate in an educational program.

Conclusion: Within the limits of this study; It was concluded that training programs to improve the knowledge and awareness levels of non-dentist healthcare professionals who may encounter dentoalveolar trauma are necessary.

Keywords: Dentoalveolar trauma, healthcare professionals and candidates, knowledge level

The Relationship Between Psychotropic Drugs Use and Temporomandibular Joint Dysfunction

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Introduction/Purpose: The term temporomandibular joint dysfunction (TMD) includes dysfunction of masticatory muscles, temporomandibular joint and associated structures. The etiology of TMD is multifactorial; trauma, malocclusion, bruxism, psycho-social factors, parafunctional habits and emotional stress are included in the etiology of TMD. One of the treatment options of TMD is psychotropic drugs. While psychotropic drugs can be used in the treatment of TMD, they can also cause bruxism and increase existing TMD or cause TMD especially selective serotonin reuptake inhibitors (SSRIs) and serotonin and norepinephrine reuptake inhibitors (SNRIs).To evaluate the relationship between temporomandibular joint disfunction and psychotropic drugs use, also to raise awareness about psychotropic drugs.
Method: The prevalence of TMD were appraised with the help of Fonseca questionnaire in a total of 438 volunteers, 244 girls and 194 boys from Ataturk University Faculty of Dentistry students**.** 438 volunteer dentistry students were asked questions about psychotropic drugs use and the Fonseca questionnaire in order to detect TMD in sealed envelopes. The name of the drug they used was also asked to those who used psychotropic drugs.
Findings: In 72.3% of the participants, any level of TMD was found according to the Fonseca questionnaire. Only 3.4 % (15) of the partipicants use psychotropic drugs. 11 of 15 participants are taking selective serotonin reuptake inhibitors(SSRIs), 1 participant use serotonin and norepinephrine reuptake inhibitors(SNRIs), 1 participant use anxiolytics, 1 participant use tricyclic antidepressant,1 participant use SSRIs with antipsychotic. The rate of psychotropic drugs use is 4.4% in patients with TMD and 0.8% in patients without TMD. As a result of the statistical analysis, there is no statistically significant relationship between TMD and psychotropic drugs use ($p > 0.05$).
Conclusion: 14 of the 15 participants using psychotropic drugs have TMD, only 1 of 15 does not have TMD**.** However, the relationship between TMD and psychotropic drugs use was not found to be significant**.** This can be explained by the small number of participants and being in the same age group. Some psychotropic drugs can cause bruxism and increase existing TMD or cause TMD. Dentists do not have sufficient knowledge about these drugs. Dentists and psychiatrists should decide on treatment and medications together in patients with TMD.
Keywords: Temporomandibular joint dysfunction syndrome, bruxism, psychotropic drugs

Comparison of EndoSequence Xpress and E3 Azure System Instruments for Filling Material Removal Effect

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Introduction/Purpose: The aim of this study was to compare EndoSequence Xpress and E3 Azure system instruments in terms of filling material removal efficacy during retreatment procedure.

Method: The root canals of fourteen extracted mandibular premolar teeth with single root and root canal were prepared to #30 master endodontic instrument, and then filled with lateral compaction technique. After 2 weeks, the teeth were randomly divided into 2 groups according to instrumentation systems for retreatment (n=7): EndoSequence Xpress and E3 Azure system instruments. The root canals were prepared with #30/.04 instrument in EndoSequence Xpress system group, and #30 instrument in E3 Azure system group. Then, periapical radiographs were taken from the root canals, to measure the areas of total root canal and remnant filling material using ImageJ software. The ratio of these areas were calculated to obtain remnant material percentage. The mean percentages obtained from the two groups were statistically compared with t-test. The significance level was set at $p < 0.05$.

Findings: The mean percentage obtained in EndoSequence Xpress group (0.38 ± 0.19) was statistically similar with that of E3 Azure system group (0.53 ± 0.22) ($p > 0.05$).

Conclusion: Filling material removal effects of EndoSequence Xpress and E3 Azure system instruments were similar for retreatment procedures.

Keywords: Endodontics, Periapical Radiography, Retreatment

Effect of Different Beverages on the Surface Roughness and Color Stability of Various Fluoride-Releasing Restorative Materials

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Introduction/Purpose: The aim of this study was to evaluate and compare the effects of different beverages on surface roughness and color stability of various fluoride-releasing restorative materials.

Method: In the study, a microhybrid composite (Filtek Z250, 3M ESPE, USA) as a control group, a giomer-based bulk-fill (Beautifil Bulk Restorative, Shofu, Japan), a compomer (Glasiosite, Voco, Germany), an alkasite (Cention- N, Ivoclar Vivadent, Lichenstein) and double capsule self-curing glass ionomer cement (IonoStar Molar, Voco, Germany & SDI Riva Self Cure, SDI Limited, Australia) were used. Of these materials, 28 samples were prepared, each with a width of 8mm and a depth of 2mm, following the user's instructions. After the polymerization, curing and surface standardization process of the samples (OptiDisc 4-stage polishing system), the samples were randomly divided into 4 subgroups (n=7); Initial color and roughness values were measured. Color measurements were made with a contact type spectrophotometer (Vita Easyshade V); surface roughness measurements were made with a contact type profilometer (Mitutoyo SJ-410, Japan). Later, the samples divided into 4 subgroups were kept in distilled water, tea, coffee and cola solutions 37 ° C at for 14 days. After the samples taken out of the solution at the end of 14 days were washed and dried, their color and roughness values were measured again and the color change values (ΔE) and roughness change values (ΔRa) were calculated. Statistical evaluation of the data was performed using one-way analysis of variance (ANOVA) and post hoc Tukey multiple comparison test, and the statistical significance level was accepted as $p < 0.05$.

Findings: As a result of the study, the surface roughness and color change values of the materials were found to be statistically different from each other as a result of holding in different beverages ($p < 0.05$). Among the materials, the highest ΔE value was observed when the SDI Riva Self Cure material was kept in coffee solution and the highest ΔRa value was observed when the same material was kept in cola solution. In all of the solutions, the group whose surface roughness and color stability were least affected was the Filtek Z250 group. In all of the groups, coffee caused the most color change, and coke caused the most change in surface roughness. Surface roughness changes of samples kept in tea and distilled water were found to be statistically similar.

Conclusion: Restorative materials with fluoride release property containing resin content were found to be more resistant to changes in color and surface roughness caused by beverages consumed in daily life.

Keywords: Surface roughness, color change, color stability, fluoride release, restorative materials

Late Developing Supernumerary Teeth: Report of Four Cases

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Introduction/Purpose: In this case series, it is aimed to report late-developing supernumerary teeth in four patients. Supernumerary teeth may cause delayed eruption and displacement of the permanent teeth, cyst formation and, root resorption of the adjacent teeth. Also, they may interact with orthodontic tooth movement and may cause difficulties in dental implant placement. Chronologic classification of the supernumerary teeth can be made according to the time they develop as; before the primary dentition, contemporary to the permanent teeth, and after the permanent dentition. Most of the supernumerary teeth develop later than normal teeth of that region.

Case reports: This case series demonstrates four cases of late-developing supernumerary teeth detected incidentally in Oral Diagnosis and Maxillofacial Radiology Clinic.Case 1 was a seventeen years old male with no systemic condition. Two supernumerary teeth with complete crown formation were detected in the mandibular premolar region. Case 2 was a fourteen years old male patient and bilateral supernumerary teeth in the mandibular premolar region were detected. Both teeth were in the early stages of crown formation. Case 3 and Case 4 were male siblings aged sixteen and eleven years. The older brother had seven supernumerary teeth. Two supernumerary teeth were in the right, two were in the left maxillary premolar region and, two were in the right mandibular premolar region. Also, a mesiodens was present in the maxilla anterior region which blocked the eruption of the right maxillary central incisor. The younger brother had two supernumerary teeth; a mesiodens in the maxilla anterior region and a premolar in the right mandibular region. All the detected supernumerary teeth were at different stages of tooth formation.

Conclusion: In these case series, major complications were the blockage of the eruption of the maxillary incisor teeth in cases 3 and 4. Also; possible interaction with orthodontic tooth movement may be a complication of supernumerary teeth in the premolar region. Patients were referred to the department of orthodontics and the decision regarding the management of the supernumerary teeth was left to orthodontic treatment planning. In cases 1 and 2 no complications were observed and a radiographic follow-up was decided.

Keywords: Supernumerary teeth, late-developing, permanent teeth

Retrospective Evaluation of the Relationship of Occipital Condyl with Foramen Magnum and Hypoglossal Canal

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Introduction/Purpose: Skull base is an important area in terms of both anatomy and surgery. The foramen magnum is located in the center of the skull base, and through the foramen magnum passes the medulla oblongata and surrounding meninges, accessory nerve roots and vertebral arteries. Occipital Condyles are anterolateral to the Foramen Magnum and joins the joint of the skull with the cervical vertebra. The Hypoglossal Canal is located in the Occipital Condyle and the anterolateral edge of the Foramen Magnum. The Hypoglossal Canal is surrounded by cortical bone and contains the hypoglossal nerve, the meningeal branch of the ascending pharyngeal artery, and a venous plexus that provides communication between the basilar venous plexus and the marginal sinus. Lesions such as Foramen Magnum tumors, nerve lesions in the Hypoglossal Canal, and vertebral artery lesions are particularly important as they are in a risky area. A solid knowledge of the morphometry of this area can provide significant benefits in identifying safe surgical sites during surgical procedures such as transcondylar, supracondylar, and lateral suboccipital approaches.
The aim of this study is to examine and define the detailed anatomy of the Foramen Magnum, Occipital Condyle and Hypoglossal Canal with KIBT, which has lower radiation dose and image acquisition time compared to CT, for use in surgical interventions involving the Occipital Condyle area.
Method: Thirty (15 female, 15 male) CBCT images selected from the archive of Ankara University Faculty of Dentistry were included in our study. All of the KIBT images used in the study were taken with the Planmeca ProMax 3D Max (Planmeca, Promax, Finland) device. Occipital condyle length, occipital condyle width, anterior intercondylar distance, posterior intercondylar distance, hypoglossal canal - occipital condyle anterior border distance, hypoglossal canal - occipital condyle posterior border distance, occipital condyle thickness, foramen magnum index were measured on the images. Occipital condyle protrusion was also evaluated. SPSS 11.5 program was used to analyze the data.
Findings: The mean value of FM index was 1.16 ± 0.08 in men and 1.18 ± 0.08 in women. Regardless of gender, the mean value of FM index was found to be 1.17 ± 0.08. Occipital condyle protrusion was detected on the right in 3.8%, on the left in 4.4%, and on both sides in 21.1% of all images examined. The means for left and right side measurements of the patients are respectively as follows: occipital condyle length 19.83 ± 2.81 and 19.99 ± 2.7, occipital condyle width 9.88 ± 2.12, hypoglossal canal - occipital condyle anterior border distance 10.06 ± 2, 30 and 9.90 ± 2.30, hypoglossal canal - occipital condyle posterior border 12.87 ± 3.02 and 12.89 ± 2.94, occipital condyle thickness is 9.13 ± 1 , 77 and 9.16 ± 1.70.
Conclusion: The data presented here provide additional information on the complex morphology of this region of the skull base and this will help reduce mortality and morbidity during and after surgical interventions.

Keywords: Occipital condyl, foramen magnum, hypoglossal canal.

Comparison of Panoramic Radiography and CBCT to Identify Roots within the Maxillary Sinus

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Introduction/Purpose: Surgical operations of the maxillary posterior teeth are another procedure in which some complications occur. The oroantral opening-sinus appears after tooth extraction, with the anatomical proximity between maxillary posterior tooth roots and maxillary sinus in mind. This complication, which dentists should consider in most procedure, is the result of damage to the maxillary sinus floor and the rupture of the Schneiderian membrane is desired.This study has the quality to decide whether CBCT scans are needed before the interventional procedures planned in the posterior maxillary region. Our aim in this study is to compare the precision of panoramic radiography with CBCT in evaluating the relationship between maxillary posterior teeth and maxillary sinus, and to decide in which cases CBCT should be taken in the planned procedures.

Method: In this study, radiographic data of 50 patients (350 posterior maxillary teeth) with panoramic radiography and CBCT data for various dental reasons in the Oral, Dental and Maxillofacial radiology clinic were retrospectively analyzed. In the study, radiological examinations were performed by 2 expert radiologists, and 50 patients with both CBCT and panoramic radiographic data and teeth with teeth seen in proximity with the maxillary sinus were selected for comparison.

Findings: CBCT images showed that 136 tooth roots (38.9%) entered the maxillary sinus cavity, whereas 115 teeth (32.9%) had a distinct gap with the maxillary sinus floor. ($p < 0.001$) Overall, 251 (71.7%) patients agreed on detecting a relationship with the sinus in both imaging methods.

Conlusion: Although panoramic radiography does not allow the topographic relationship between the posterior teeth and the maxillary sinus to be determined precisely, radiographic signs such as root projection into the sinus cavity and cut of the sinus floor suggest that the roots may protrude into the maxillary sinus.

Keywords: Panoromic radiography, CBCT, Maxillary sinus

Evaluation of Canalis Sinuous and Accessory Canals' via Cone-Beam Computed Tomography Images

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Introduction/ Purpose: Canalis Sinuous (CS) is a common anatomical variation in the anterior maxilla that originates from the infraorbital canal and carries the anterior superior alveolar nerve and vessels. This study aims to examine the presence, frequency, and features of CS and accessory canals (AC) via cone beam computed tomography (CBCT) images.

Methods: A total of 495 CBCT images, were evaluated retrospectively by a dentomaxillofacial radiologist in axial, sagittal, and coronal planes. The age and sex of patients, presence or absence of CS, if any, location as right, left, or bilateral and the number of AC were recorded. In addition, the terminal regions of the accessory canals were noted as central incisors, between central-lateral incisor, lateral incisors, between lateral incisor-canine, and canine regions. All recorded data were analyzed statistically.

Findings: 54 (10.9 %) of 495 CBCT images of patients had at least one CS. CS was seen bilaterally in 26 (48.2%) cases and unilaterally in 28 (25 on the left side and 3 on the right side) (51.8%) cases. It was observed that the AC s' of CS were mostly terminated in the lateral incisor region. The frequency of CS is not statistically different between males and females ($p=0.313$).

Conclusion: Determining the presence of CS and ACs' in the anterior maxilla by the clinicians and examine this area with CBCT, will prevent misdiagnosis and post-operative complications due to these structures.

Keywords: Canalis Sinuosus, anterior maxilla, anatomical variation, cone beam-CT

Assessment Of Juxta-Apical Radiolucency with Cone Beam CT

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Introduction/Purpose: The juxta-apical radiolucency (JAR), is a radiographic sign adjacent to the roots of mandibular third molars. It is a variation of the normal aspect of the trabecular bone in this region and pointed out as an important predictor of inferior alveolar nerve damage during third molar surgery. This study aimed to investigate the association of JAR with third molar status and mandibular canal and also describe its radiologic features through cone beam computed tomography (CBCT).

Method: CBCT images of 100 individuals (153 mandibular third molars) were evaluated for the presence of JAR. Than, the CBCT images were analysed to evaluate the position of the JAR and its relationship to the impacted teeth, mandibular canal and buccal-lingual cortical plates. Descriptive statistical analyses were used.

Findings: JAR was identified in 70 individuals and 95 mandibular third molars (48 right side, 47 left side). 22 of the individuals with JAR were male and 48 were female. It was found that 26 (27,36%) of the 95 third molars were erupted, 10 (10,52%) were partially erupted, 59 (62,10%) were impacted. 74,73 % were on the apical third of the root and the rest was located along the mesial or distal surfaces of root. Close proximity to the buccal cortical plate was seen in 25,35 % of JAR located apically, whereas it was seen only 25% of JAR located along the root surface. Only 23.4 % were associated with the mandibular canal.

Conclusion: The present study gives an insight into the relationship of JAR with mandibular canal and cortical plates using CBCT. However, future studies are warranted that use a larger sample size to validate the above findings.

Keywords: Mandible, radiolucency, third molar teeth.

The Evaluation of Anxiety Levels in Preclinical Dental Students During the Covid-19 Pandemic

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Introduction/Purpose: The biggest challenge for the administration of dental schools is trying to balance the important task of safeguarding the health of students, faculty, and patients, while keeping track of the changing environment and local or national policies, and at the same time, ensuring that there is continuity in the education of the students. With the rise of confirmed COVID-19 cases in Turkey, dental schools have had to manage the increasing anxiety among students and faculty members. This study aimed to determine the general anxiety levels of preclinical students during the Covid-19 pandemic and evaluate the effects of this era on the dental education and approaches to the profession.

Methods: This study was approved by the Research Ethics Committee in Alanya Alaaddin Keykubat University. A total of 230 dental students were invited to participate, and 101 responded, resulting in a response rate of 44%. The online questionnaire was edited in Turkish and distributed to the dental students. The questionnaire was divided into two sections to assess different parameters: sociodemographic information of respondents and assessment of anxiety with STAI-II (Stait-Trait Anxiety Inventory) scale. The sociodemographic section of the questionnaire included specific questions about the effectiveness and student satisfaction regarding online education in the theoretical and practical aspects of dental colleges. Data were analyzed through SPSS Statistics, using chi-squared test for categorical variables and One-way ANOVA test for continuous variables ($p<.05$).

Findings: Mean STAI-II scores were found 45.76±5.87. There was no statistically significance difference between STAI-II scores and age, gender, economic and family education status, having a chronic disease, living with a parent age 65 or older and whether COVID-19 was diagnosed or not ($p<0.05$). %77 of 101 respondents found it inefficient to have e-learning for dental education, while %65 stated that synchronous teaching was more efficient than asynchronous teaching.

Conclusion: Within the limitations of this study, the results showed high anxiety levels in preclinical students during the COVID-19 pandemic. Face-to-face learning could not have conducted due to the COVID-19 pandemic, and distance learning for dental education has become essential. However, distance learning for dental education was inefficient, while synchronous teaching was much more efficient than asynchronous teaching.

Keywords: anxiety, COVID-19, dental education, education technology, e-learning, pandemic.

Management of Immature Permanent Central Incisors with Complicated Crown Fracture: Case Series

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Introduction/Purpose: Complicated crown fracture is common injury in the permanent dentition. The incidence of complicated crown fractures ranges from 2% to 13% of all dental injuries. The success of treatment and prognosis of the traumatized tooth depends on accurate diagnosis and treatment procedures and materials. In addition to providing aesthetics and function in immature teeth with complicated crown fractures, ensuring the completion of root development is the primary factor to be considered in the selection of the treatment procedure. The aim of this case series was to report four complicated crown fracture patients treated with different treatment options with at least 12 months follow-up.

Methods: In the present case series; five necrotic immature teeth (5 maxillar incisor in four patients), were treated via the reattachment technique and restorative materials. All patients had been referred to the practice for diagnosis and treatment of a pulpal exposure due to complicated crown fractures. 2 teeth were treated with regenerative endodontic treatment protocol and reattached of fractured teeth fragments. 2 teeth of case series were treated with MTA plug and restorated with composite resin. 1 tooth were treated with Cvek pulpotomy and restorated with reattachment technique.

Findings: At the end of the follow-up periods, none of the treated teeth were sensitive to percussion or palpation and all teeth showed evidence of healing. Radiographic examination showed continued thickening of root canal walls and apical closure of the root apex of three teeth.

Conclusion: The treatment of complicated crown fractures in immature teeth is required firstly the appropriate treatment for the completion of root development, and if possible, to provide aesthetics and function with the use of fractured tooth fragments or the use of restorative materials will be the appropriate treatment approach.

Keywords: Dental trauma, complicated crown fracture, immature teeth, fragment reattachment, revascularization.

Do Euphorbia Plant Species Have a Role in the Incidence of Burkitt Lymphoma in Cyprus? A Hypothesis.

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Introduction/Purpose: The purpose of this study is to evaluate Burkitt Lymphoma (BL) cases (0-14 year-old patients) in Cyprus with governmental and World Health Organization (WHO) data and to investigate the effect of euphorbia plant species (EPS).

Methods: Data of Cyprus Cancer Registry (CyCR) of Republic of Cyprus (2003-2016) and data of Cancer Country Profile of World Health Organization (2020) were scanned in means of BL. Euphorbia plant species were also scanned in botanic databases. The relation between the EPS and BL was investigated in the PubMed database.

Findings: No cases of BL were reported between 2003-2005. However, 2 cases were reported between 2005-2007 (2 male patients aged between 5-9), 1 case was reported between 2006-2008 (1 male patient aged between 5-9), 2 cases were reported between 2011-2013 (2 male patients aged between 1-4 and 10-14). WHO reported an additional BL case in 2020 without clarifying the age or sex of the patient which makes it a total of 6 cases between 2003-2020. 6 BL cases were found in 310 malignant lesions (%1.93 BL incidence) which were diagnosed in child patients (0-14 years) between 2003 and 2020. PubMed research revealed that EPS are present in the etiology of Non-Hodgkin Lymphoma which raised a suspicion that these plants may actually increase the incidence of BL especially at areas/cities where EPS are endemic. Takeda et al reported that "Soil-extracts collected under several EPS have been known to possess Epstein-Barr virus (EBV). EBV can activate substances which may cause nasopharyngeal carcinoma in the southern part of China and BL in tropical Africa. Endemicity of BL overlaps with the profusion of euphorbia tirucalli in tropical Africa. Euphorbia tirucalli contains a 4-deoxyphorbol ester which enhances EBV infection of B-lymphocytes.Orem et al reported that the sap of the EPS are possible risk factors for BL with their ability to activate the viral replication cycle of EBV-infected cells. It is found that euphorbia tirucalli is not present in Cyprus; however, another EPS, euphorbia lemesiana is endemic at the southern shores of Cyprus.

Conclusion: Since the localization of BL cases and euphorbia lemesiana are overlapping with each other the possible interaction between BL and EPS should be investigated thoroughly.

Keywords: Lymphoma, euphorbia plant, burkitt lymphoma.

Evaluation of Impression Material Preferences and Techniques Used by Orthodontists and Prosthodontics Specialists

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Introduction/Purpose: An important stage of orthodontic and prosthetic treatments is dental impression. The impression is the negative image of the teeth and surrounding tissues. A variety of materials and techniques have been introduced for dental impressions. A good dental impression is possible with the application of the appropriate impression material with a correct technique. An impression that reflects anatomical structures and dental tissues accurately and in detail is one of the most important factors affecting the success of diagnosis and treatment. The aim of this study is to evaluate the impression material preferences and techniques used by orthodontists and prosthodontics specialists in diagnosis and treatment methods.

Methods: A questionnaire consisting of 20 questions was applied to 53 orthodontists and 53 prosthodontics specialists, totally 106 specialist dentists working in various institutions. The first part of survey included personal information, while the second part included questions about pre-impression preparation, impression material preference, impression preparation, impression disinfection, material preference for model acquisition and CAD / CAM use.

Findings: The frequency analysis and the distribution of the data was formed according to the question groups. As a result, the rate of obtaining a diagnostic model before starting the treatment is 92% for orthodontists; while 8% before starting treatment and 77% when necessary in prosthodontics specialists. Additionally, it was found that orthodontists used irreversible hydrocolloid impression material at 100% for the first impression and prosthodontics specialists used at a rate of 89%. Also, it was found that 81.3% of the specialists adopted the putty-wash impression technique. 97.1% of the dental specialists, stated that the primary reason for the selection of impression material is that it reflects the measured tissue precisely and in detail. Chemical disinfectant sprays were used at a rate of 86.7% for the disinfection of the measured impressions. 63.6% of physicians use digital dentistry effectively. 20.2% of the specialist stated that after the Covid-19 pandemic, there was a change in measurement techniques as the transition from conventional technique to digital technique.

Conclusion: While the majority of specialists use traditional impression methods and techniques, there are also dentists who apply alternative materials and methods. Irreversible hydrocolloid impression material, which is mixed with the machine according to the company recommendations, is the most preferred impression material by specialist dentists. After the Covid-19 pandemic, it was determined that there were changes in specialists' choice of impression technique.

Keywords: Anatomical impression, Functional impression, Impression material, Orthodontics, Prosthesis

A Deep Learning Approach For Masseter Muscle Segmentation on Ultrasonography

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Introduction/Purpose: Deep learning methods have recently been applied for the processing of medical images, and they have shown promise in a variety of applications, including segmentation. The aim of this study is to develop and evaluate the function of computer based diagnostic software designed to evaluate masseter muscle segmentation on ultrasonography images.

Methods: A total of 388 anonymous adult masseter muscle retrospective ultrasonographic images were evaluated. The masseter muscle was labeled on the ultrasonography images using the polygonal type labeling method with the CranioCatch labeling program (CranioCatch, Eskişehir, Turkey). All images were re-checked and verified by Oral and Maxillofacial Radiology experts. This data set was divided into training (n = 312), verification (n = 38) and test (n = 38) sets. In the study, an artificial intelligence model was developed using PyTorch U-Net architecture, which is a deep learning approach.

Findings: In our study, the artificial intelligence (AI) deep learning model U-net provided the detection and segmentation of all test images, and when the success rate in the estimation of the images was evaluated, the F1, sensitivity and precision results of the model were 1.0, 1.0 and 1.0, respectively.

Conclusion: Artificial intelligence shows promise in automatic segmentation of masseter muscle on ultrasonography images. This method can help surgeons, radiologists, and otherprofessionals in saving time for diagnosis.

Keywords: Masseter muscle, ultrasonography, deep learning, artificial intelligence

Evaluation Of Knowledge Levels Of Ordu University Faculty Of Dentistry Students About Hepatitis B

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Introduction/Purpose: To evaluate the knowledge levels of Ordu University Faculty of Dentistry students about Hepatitis B Virus (HBV), preventive measures, and compare differences between academic classes.
Methods: Students from Ordu University Faculty of Dentistry (1th to 5th year from 2019-2020 academic year) were asked to respond a one-page questionnaire form measuring their knowledge about HBV. The questionnaire was created online and a total of 417 students were asked to respond. Data were analyzed using descriptive statistics and Kruskal Wallis test. Mann-Whitney U test was used for pairwise comparison with Bonferroni correction. Significance level was set at a $P<0.05$.
Findings: In this study, 318 of 417 students participated. In total, 97.8% of 318 students knew that HBV can be transmitted through dental treatments. In addition, 85.2% of students stated that HBV can be transmitted through saliva. 94.7% of students who answered the questionnaire knew that HBV vaccination program consisted of 3 doses. In the question of standard universal precautions for HBV contagiousness, 28% of students selected the option 'I do not know', and there was a statistically significant difference between academic classes in this question ($P<0.05$).
Conclusion: According to the results of this study, although students had better knowledge about HBV when compared to similar studies, it is recommended that knowledge of students, especially on standard universal measures, should be reviewed. In addition, the vaccination and immune status of the students should be followed regularly.
Keywords: Hepatitis B virus, dental students, questionnaire.

Autotransplantation of Impacted Third Molar Teeth and 2 –year Follow-up with Laser Doppler Flowmeter: 3 Case Reports

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Introduction/Purpose: It was aimed to evaluate the 2-year clinical results of patients following autotransplantation of third molar teeth with laser doppler flowmeter, vitality tests and radiological examinations. Autotransplantation is the process of placing an impacted or erupted tooth in another extraction cavity in the mouth in the same person or in a surgically created slot in the alveolar crest[1].With this procedure, the physiological stimulation of the periodontal ligament in the recipient area occurs and bone loss that may occur in the alveolar bone after tooth extraction is prevented. It is indicated for the repositioning of impacted teeth, for the recovery of non-congenital or permanent teeth lost due to trauma, tooth decay, periodontal diseases. Autotransplantation of immature 3rd molars is a preferred alternative treatment option for compensation of tooth deficiencies, especially in young individuals with early loss of 1st or 2nd molars.

Case reports: After the clinical and radiological examination, autotransplantation of the third molar teeth with incomplete root formation was performed in the extraction socket of the teeth. The perfusion of the transplanted tooth and its adjacent teeth on the postoperative second week was measured by laser doppler flowmeter. The healing in the 2-year follow-up results of the teeth consisting of panoramic film, cold test and electric pulp test records was uneventful. Case 1:15 years old female patient, who was diagnosed with extraction due to excessive caries and material loss without systemic disease, applied to our clinic for extraction of the right mandibular 2nd molar tooth. Case 2: A 18-year-old female patient without systemic disease, who was diagnosed with extraction due to excessive caries and material loss, was sent to our clinic for extraction of left mandibular first molar tooth. Case 3: A 18-year-old female patient, who was diagnosed with extraction due to excessive caries and material loss, without systemic disease, applied to our clinic for extraction of the right maxillary 2nd molar tooth. Third molar teeth in the same quadrant with the extracted teeth were adapted to the socket. After the teeth were transferred, they were fixed with 8 sutures and splint for 2 weeks. A positive response was obtained in all teeth to the cold test and the electric pulp test two weeks later. After 2 years, transplanted teeth were in occlusion and vital. Perfusion levels in laser doppler flowmeter were determined as 7.63-15.34 PU. In the panoramic films teeth had no mobility and root resorption. Root formation with induced osteoblastic activity was observed.

Conclusion: In evaluating the success of the transplanted tooth, criteria such as the presence of periodontal and periapical healing, ankylosis, root resorption and the absence of inflammatory changes are taken into consideration. Depending on the success rate in these three cases, it can be said that autotransplantation may be an alternative treatment option for the reconstruction of tooth deficiencies, especially in individuals in the middle adolescence period.

Keywords: autotransplantation,tooth loss,third molar teeth

Management of Maxillary Incisor Teeth with Crown Root Fractures: Three Representative Cases

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Introduction/Purpose: Crown-root fracture involves enamel, dentin, and cementum, extending below the gingival margin with or without pulpal involvement. Depending on the presence or absence of pulpal involvement, they are classified as complicated or uncomplicated fractures. Primary goal of the treatment remains esthetic and functional rehabilitation. The aim of these case series is to explain the clinical and radiological symptoms of crown root fractures and to present the treatment methods and prognosis.
Methods: One of these cases is uncomplicated crown root fracture and two are complicated crown root fractures. In all cases, loose fragments were removed and periodontally examined whether the teeth have sufficient tissues to allow restoration. After root canal treatment permanent restorations were completed and teeth were followed for certain period.
Findings: In all cases teeth and gingival tissues have normal function and no sign or symptom was detected in the clinic or radiographic evaluation.
Conclusions: The clinician should schedule follow-up for uncomplicated and complicated crown root fracture and clinical, radiological findings should be reassesed at each visit. Long-term success depends on the quality of the coronal restoration. Our cases demonstrated good prognosis, the teeth were in normal limits during follow-up period.
Keywords: Crown-root fracture, dental trauma, root canal treatment

Determination of Pterygoalar and Pterygospinous Ligament Calcification using CBCT

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Introduction/Purpose: It is assumed that the calsification of the pterygoalar and pterygospinous ligaments may cause lingual nerve neuralgia due to the pressure exerted on the lingual nerve by calcified pterygoalar and pterygospinous ligaments, especially during the contraction of the medial pterygoid muscle. Presence of these ligaments calcification has been studied on dry skulls, but studies on the definition of three-dimensional radiological anatomy is few. The aim of the present study was to determine the frequency, morphological characteristics and imaging description of the complete or partial calcification of the pterygoalar and pterygospinous ligaments.

Methods: Cone beam computed tomography (CBCT) images of a total of 300 patients (163 male, 137 female) between the ages of 18-83 (mean age 41.5) who applied to our clinic between 2006-2015 for various reasons were retrospectively analyzed. DICOM images were imported into InVivo 5.1.2 (Anatomage, San Jose, CA, USA) software and calcification diagnosis of both ligaments was made in multiplanar reconstructions (axial, coronal and sagittal planes) and volume rendered images. The detected ligament calcifications are divided into two groups as Pterygoalar and Pterygospinous ligament. Each of these two groups was examined in four subgroups as right and left according to the side of ligament calcification and as complete and incomplete according to the morphological feature of the calcification.

Findings: In the images of all patients examined, a total of 21 ligament calcifications were found in 16 patients and were mostly found in males (12 in males, 4 in females). A total of 16 of them are pterygoalar ligament calcification, 11 on the right and 5 on the left, and 5 of them are pterygospinous ligament calcification, 4 on the right and 1 on the left side. Of the detected pterygoalar ligament calcifications, 5 were complete (3 on the right, 2 on the left) and 11 of them incomplete (8 on the right, 3 on the left). Pterygospinous ligament calcifications were all incomplete. Three of the pterygoalar ligament calcifications were bilateral, the others were unilateral, and both pterygoalar and pterygospinous ligament calcifications were detected unilaterally.

Conclusion: Along with the results of our study, which are important for physicians planning a surgical intervention on the skull base through the infratemporal fossa, CBCT allows the detection of calcification of these ligaments in vivo.

Keywords: Ossification, calsification, pterygoalar ligament, pterygospinous ligament, CBCT

Evaluation of Nasopalatine Canal Morphology by Cone Beam Computerized Tomography (CBCT)

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Introduction/Purpose: The nasopalatine canal located in the maxilla anterior region is one of the important anatomical structures connecting the oral cavity and the nasal cavity. It is important to know the anatomical structure and variations of the canal well in order to prevent complications that may occur during the evaluation of pathologies in this area or during surgical procedures. The aim of this study is to evaluate nasopalatine canal morphologies in Cone Beam Computed Tomography (CBCT) images.

Methods: Retrospective images of 100 patients (50 females and 50 males, mean age 38.03 ± 12.98) who applied to Marmara University Faculty of Dentistry and had CBCT images in the archives of the Department of Oral and Maxillofacial Radiology were evaluated in sagittal section. The nasopalatine canal was examined in 6 different groups according to the classification by Etoz et al. (2014). In addition, the inferior and superior diameter and length of the nasopalatine canal in men and women were measured and evaluated. IBM SPSS Statistics 25.0 (IBM SPSS, Turkey) program was used for statistical analysis. The level of significance was evaluated as $p < 0.05$.

Findings: The most common nasopalatine canal morphology was in the form of type 1 (cylinder, 31%), and this ratio was found to be 15% in women and 16% in men. In the study, the least common nasopalatine canal morphology in total in both genders was found to be type 5 (tree branch, 5%), and when evaluated according to gender, it was found to be 3% in males and 1% in females. In our study, the mean length of the nasopalatine canal was determined as 9.40 ± 2.19 mm in female patients and 11.59 ± 2.45 mm in male patients. As a result of examining male and female patient images in nasopalatine canal morphology, no statistically significant difference was found between classes ($p > 0.05$).

Conclusion: The anatomical structures of the nasopalatine canal are diverse. Owing to their two-dimensional nature, traditional dental radiographs are inadequate for assessment. As a result, it's important to use conical beam computed tomography, which has three-dimensional vision. Knowing the canal's morphological composition and differences makes detecting pathological changes easy.

Keywords: Cone beam computed tomography, nasopalatine canal, anatomical variation

The Evaluation of Signs of Temporomandibular Joint Osteoarthritis

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Introduction/Purpose: The aim of this study is to evaluate temporomandibular joint osteoarthritis (TMJ OA) findings in elder patients using cone beam computed tomography.

Methods: Sixty-four patients (fifty women, twelve men) were included in the study. A total of 124 TMJs were evaluated in the study. According to the presence of OA, TMJs were divided into two groups as “with osteoarthritis” and “without osteoarthritis”. When any of the osteoarthritis findings were present, the joint was included in the “with osteoarthritis” group. OA findings were listed as osteophyte, erosion, flattening, sclerosis and pseudocyst. Also, TMJs were divided into two age groups: Group 1 (50-64 years old) and group 2(65-81 years old) For statistical analysis, SPSS v24 was used.

Findings: No significant difference was found between genders for the presence of OA ($p>0.005$). There were significant differences between group 1 and group 2 for flattening and sclerosis ($p<0.005$). No significant difference was found between group 1 and group 2 for osteophyte,erosion and pseudocyst ($p>0.005$).

Conclusion: In elder patients, reperative degenerative findings of OA can be seen more common with advancing age.

Keywords: Osteoarthritis, cone beam computed tomography, aging

Incidental Calcification Findings in the Head and Neck Region in CBCT Scans: A Retrospective Study

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Introduction/Purpose: Cone beam computed tomography (CBCT) has rapidly been incorporated into dentistry and has become the preferred method for maxillofacial radiographic imaging. Using cbct, dentists can evaluate the patient for a wide variety of diseases and conditions. Although it is advantageous to better view the general anatomical features of the head in Cbct, this increases the chance of discovering coincidental findings. Incidental findings (IFs: discoveries unrelated to the original purpose of the scan) According to the guidelines of the American and European Dentomaxillofacial Radiology Academies, all structures included in the examination should be examined.Therefore, one should have knowledge not only about the dentomaxillary complex, but also about the neighboring structures.As this can have medical and legal consequences, it increases the responsibility of clinicians to analyze and report incidental findings from radiographic scans.

Methods: The radiographic images of the patients who were examined at the Faculty of Dentistry of Ankara University and whose dental volumetric tomography images were obtained on the Planmeca branded Promax 3dmaxproface model volumetric dental tomography device, regardless of age and gender, were analyzed retrospectively at 230x170 cm FOV size.Incidentally observed prevalence of carotid artery calcifications, facial artery calcifications, tonsilloitis, ponticulus posticus, myosis ossificans, intranasal and intraorbital calcifications; It was determined as age, gender, right-left distinction.

Findings: In our study, we had the chance to view extracranial calcifications in the neck area, as well as intracranial calcifications, using the fov size of 230x170.The disadvantages of CBCT are its inability to visualize soft tissue, high image noise, and higher radiation emissions compared to conventional radiographs. One study found that patients who underwent CBCT scanning for dental implants had IFs, such as soft tissue and vascular calcifications, with degenerative vertebral changes.One study examined the incidental findings of extra and intracranial arterial calcifications in adults. There were 150 (30.99%) extracranial calcifications and 161 (33.26%) intracranial calcifications from 484 scans.

Conclusion: Discovering and reporting calcifications in a dentist's office can lead to early detection and prevention of other diseases. It is a great need to increase knowledge on this Failure to inform the patients about the discovered incidental findings or not be directed to the appropriate branch may have negative consequences for the patient.It can also cause dentists to neglect their legal responsibilities.

Keywords: cbct, incidental calcification, dentomaxillar radiology

In Vitro Comparison of Indirect Bonding Methods Using Different Isolation and Adhesive Systems With Each Other and With the Direct Bonding Technique

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Introduction/Purpose: To compare the shear bond strength and adhesive remnant index of a new indirect bonding isolation method for different adhesive systems with the direct bonding technique.

Methods: 100 premolar and 10 centrally extracted human teeth were bonded with one direct and four indirect bonding methods, and then subjected to 1000 thermal cycles between 5°C and 55°C. ARI was analyzed by the chi-square test. The Shear Bond strength was analyzed by the analysis of variance (ANOVA) and the Tukey multiple comparison (HSD) test. The bracket-enamel interface area of two teeth from each group was examined under SEM.

Findings: All groups provided clinically acceptable bond strengths. In the traditional isolation + light-cured bonding group with the highest bonding values identified, the scores for all failures were recorded as 3 and this group differs from all other groups in respect of ARI scores ($p<0.05$). In addition, it was identified from SEM images that there were air bubbles in the adhesive layer in the groups where chemical adhesives were used.

Conclusion. When tape is used as the isolation material, the laboratory process stage is shortened and simplified. Therefore, if the custom base indirect bonding technique is to be used, this new method can be used with light-cured bonding agent for isolation.

Keywords: Indirect Bonding, light-cured, chemically cured

Retrospective Evaluation of Apical Response Types in Regenerative Endodontic Treatments

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Introduction/Purpose: Teeth may lose their vitality due to various reasons such as caries, trauma and dental anomalies, and endodontic treatment may be required. Root development in teeth is completed 3 years after the teeth eruption. If necrosis occurs in this development, root development cannot be completed, the roots remain short and thin. Since the root apex are not closed, an ideal endodontic treatment cannot be performed. Apexification methods or regenerative endodontic treatment methods should be preferred for such open apex teeth. Traditional apexification treatments in teeth with open apex cannot maintain root maturation, and thin dentin walls cause the teeth to be fragile and weak. Regenerative endodontic treatment is a biologically based treatment aiming to regenerate the dentin-pulp complex. The goals of regenerative endodontic treatment include elimination of symptoms, continuity of root growth and regeneration of pulp tissue. However, although regenerated pulp tissue was targeted, the tissue was replaced by bone, cementum, periodontal connective tissue-like tissues instead of damaged in many human and animal studies. Root development, which is one of the main goals of treatment, cannot be controlled. The aim of this study is to retrospectively evaluate the apical response types in immature necrotic teeth treated with regenerative endodontics.

Methods: In this study, 38 cases who received regenerative endodontic treatment in Selçuk University Faculty of Dentistry between 2014-2019 were included. The latest revision of the American Association of Endodontists was taken as reference as the treatment procedure.

According to the available data, PRP in 16 cases and PRF in 22 cases were used as scaffold. Total follow-up time varies between 12-77 months. Apical response types were evaluated by two different dentists in the radiographs taken during patient follow-up.

Apical response types are classified in 5 different ways using the Chen and Chen index (for apical responses). According to this classification, type 1, increased thickening of the canal walls and continued root maturation; type 2, no significant continuation of root development with the root apex becoming blunt and closed; type 3, continued root development with the apical foramen remaining open; type 4, severe calcification (obliteration) of the canal space; type 5, a hard tissue barrier formed in the canal between the coronal MTA plug and the root apex. In statistical analysis, the level of significance was determined as $p < 0.05$. Apical response types were compared using the chi-square test in terms of PRP and PRF treatment methods.

Findings: When apical response types were compared statistically, no significant difference was found between PRP and PRF methods. Among both treatment methods, type 3 was the most common response.

Conclusion: Although an apical closure like natural teeth is desired because of regenerative endodontic treatment, apical development can vary in regenerative endodontic treatments. Obliterations and hard tissue barriers in the root canals are possible results of this treatment.

Keywords: Regenerative endodontics, Immature tooth, Root development

Dental Students' Perspective on 'Leadership in Dentistry' Course

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Introduction/Purpose: Dental students are future leaders of oral health care and the dental profession. Through leadership training programs in dental schools, dental students can develop needed leadership skills in preparation for their future. Istanbul Medipol University (IMU), School of Dentistry launched an elective course named 'Leadership in Dentistry' for its undergraduate students in 2020 in order to introduce them the latest principles regarding becoming a leader and to empower a network of next generation dental professionals that can lead the future of dentistry at national and global level. The aim of this study is to investigate how current participants of this course evaluated the program, and to reframe the next course based upon this perspective.

Methods: An anonymous online survey was delivered to all students who have enrolled to this course. The survey included totally 13 questions about student demographics, respondents' leadership-related attitudes and evaluations of their leadership-related education. Participation to this questionnaire was administered on voluntary basis. The approval of Ethics Committee (EC) was received from IMU EC on 20.05.2021(Decision No: 502).

Findings: Participants were 66 of the 102 students enrolled to this course (response rate: 65%). Most of the responding students were international (83.3%) and female (68.2%) students. Their average age was 20.59 years (range:18-30). The course received an overall rating of 4.43 on a scale of 1(very poor) to 5(excellent). The responding students assessed their current leadership skills best at 'Personal responsibility' (4.16) and worst at 'Managing conflict' (3.81). Students reported that they developed new awareness such as types of leadership, time management, importance of leadership, team-work in this course. Eighty-nine percent of responding students indicated that 'Leadership in dentistry' course helped them to develop their leadership skills.

Conclusion: The results of this study may suggest that improving leadership training could positively affect future dentists' attitudes about leadership. With more data and longitudinal studies, we will assess how these programs translate leadership after graduation.

Keywords: Leadership, dental education, dental students, competencies

Series of Pyogenic Granuloma Case Developed by Different Etiologies

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Introduction/ Purpose: Pyogenic granuloma (PG) is a prevalent inflammatory benign soft tissue tumor of skin and oral mucosa which is often caused by local irritation, poor oral hygene or hormonal factors. Oral PG occurs predominantly on the gingiva, but it is also encountered on the lips, tongue, buccal mucosa and rarely on the hard palate. These lesions usually appear as localized solitary nodule with a sessile or pedunculated base and colour varying from red, purplish, or pink, depending on the vascularity of the lesion. The natural course of this lesion can be categorized into three distinct phases, namely, (i) cellular phase, (ii) capillary phase/vascular phase, and (iii) involutionary phase. Histopathologically, pyogenic granuloma is classified into lobular capillary hemangioma (LCH) and non-lobular capillary hemangioma (non-LCH).

Methods: Case report; 3 patients applied to the Department of Periodontology, Kahramanmaraş Sütçü İmam University Faculty of dentistry with complaining of a bleeding and enlargement of gums. case 1; A 44-year-old female patient was admitted to our clinic due to the renewal of the operated lesion in the right upper jaw within 1 month. Case 2; A 29-year-old, 31-week pregnant patient came to our clinic with the complaint of soft tissue growth in the right lower jaw, which tended to bleed spontaneously. case 3; A 27-year-old male patient applied to our clinic with the complaint of soft tissue in the lower anterior which was occured 3 months ago and tending to grow. Excisional biopsy planned.

Findings: They were discharged with a prescription of chlorhexidine mouthwash(except pregnant patient) and necessary post-operative instructions. A diagnosis of pyogenic granuloma was made in the histopathological examination of the biopsy specimens. Patients were followed up routinely.

Conclusion: It should be kept in mind that Pyogenic Granulomas can develop rapidly and recurrence is possible. It is important to correct oral hygiene habits and to eliminate possible etiological factors.

Keywords: Pyogenic granuloma, biopsy, local irritation, pregnancy, poor oral hygene

Evaluation of Dental Students' Knowledge About Artificial Intelligence

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Introduction/Purpose: Artificial intelligence is defined as the way a machine functions similar to human intelligence. The aim of this study is to evaluate the knowledge of dental students towards artificial intelligence.

Method: This study consisted of a 22-items questionnaire survey and was distributed online to 1st, 4th and 5th grade dental students. The survey involves questions about the students knowledge about the concept of artificial intelligence, their behavior towards the use of artificial intelligence, and their attitudes towards artificial intelligence in the future.

Findings: The study was conducted with a total of 391 dental students, 175 (44.8%) male and 216 (55.2%) female, ranging in age from 20 to 25. 143 (36.6%) of the students are 1st grade, 127 (32.5%) students are 4th grade and 121 (30.9%) students are 5th grade students. The rate of having knowledge about the concept and use of artificial intelligence was found to be lowest 1st grade students (p1:0.029; p2:0.045; $p<0.05$). The rate of requesting to use an auxiliary program in radiographic diagnosis of 5th grade students was found to be higher than the 1st and 4th grades. The rate of suggesting artificial intelligence applications by 1st grade students is lower than those of 4th and 5th grades.The acceptance rate of artificial intelligence that it will help the physician to evaluate the details is lowest in 1st graders.The rate of thinking artificial intelligence will lead to great advances in dentistry and medicine is lowest 1st grade studens.

Conclusion: This study revealed that 1st grade students generally have less knowledge about the concept and using of artificial intelligence than 4th and 5th grades. Generally, students are familiar with the concept of artificial intelligence. Most students agree that the using artificial intelligence for diagnosis of the diseases and creating treatment planning in the future is exciting.

Keywords: Artificial intelligence, Dental Students,

Odontogenic Keratocysts : Three Case Series

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Introduction/Purpose: Odontogenic keratocysts (OKC), previously known as keratocystic odontogenic tumors (KCOT or KOT), are rare benign cystic lesions involving the or and are believed to arise from dental lamina. Whether these lesions are developmental or neoplastic is controversial, with placing it back into the developmental lesion category. Odontogenic keratocysts (OKCs) are now considered benign cysts of odontogenic origin that account for about 10% of all odontogenic cysts. The reported age distribution of OKCs is considerably wide, with a peak of incidence in the third decade of life and a slight male predominance. OKCs originate in tooth-bearing regions and the mandible is more often affected than the maxilla. In the mandible, the most common location is the posterior sextant, the angle or the ramus. Conversely, the anterior sextant and the third molar region are the most common sites of origin in the maxilla. Diagnosis is based on the clinical history, clinical appearance, and radiographs and histology. Recurrence is common in odontogenic keratocysts during long-term follow-up. In this study, cases of odontogenic keratocysts treated with different surgical procedures are presented.
Method: Case 1. A 10-year-old male patient presented to our clinic with complaints of extraoral swelling and missing teeth. In the clinical and radiological examination of the patient, multiple lesions with the impacted teeth were found in the mandible right and left posterior and maxilla anterior regions. Biopsy was taken from the patient and a diagnosis of keratocyst was made and marsupalization treatment was initiated.
Case 2 - A 21-year-old male patient, applied to our clinic with complaints of pain and swelling in the lower jaw. In the clinical and radiological examination of the patient, a lesion associated with the impacted tooth was found in the left posterior region of the mandible. Biopsy was taken from the patient and a diagnosis of keratocyst was made and treatment was started. The cyst is completely enucleated.
Case 3 - A 21-year-old male patient, applied to our clinic with complaints of pain and swelling in the lower jaw. In the clinical and radiological examination of the patient, a lesion was found in the left posterior region of the mandible. Biopsy was taken from the patient and a diagnosis of keratocyst was made and marsupalization treatment was initiated.
Findings: No complications or recurrences were observed during the 2 years follow-up period.
Conclusions: Treatment methods such as marsupialization, enucleation with or without decompression are used in the treatment of OKC. Simple cyst enucleation without curettage is not recommended in the treatment of OKC because the capsule of OKC is easily degradable. In recent years, it has been shown that marsupialization application can be successful in the treatment of keratocysts that have reached very large sizes. In two of our cases, treatments were applied with marsupalization and in one with enucleation method.
Keywords: Keratocysts, benign cystic lesion, treatment methods

Middle Mesial And Distal Canals In Mandibular Molars: Case Reports

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Introduction/Purpose: A successful root canal treatment needs a thorough knowledge of both internal and external anatomy of a tooth. Variations in root canal anatomy constitute an impressive challenge to the successful completion of endodontic treatment. Undetected extra roots and canals are a major reason for failed root canal treatment. Traditionally, mandibular molars are described as 2-rooted teeth with 2 canals in the mesial root and 1 or 2 canals in the distal root. However, studies have shown several variations in the anatomy of mandibular molars. One of these a third middle root canal usually was found between the mesiobuccal and mesiolingual root canals. These three case reports aimed to present the treatment of a mandibular first molar teeth with middle mesial and distal canals.

Method: Two of mandibular first molar teeth had middle mesial canals and the other had middle distal. They were diagnosed as irreversible pulpitis. All the root canals were detected under dental operation microscope. After chemomechanical preparation, root canals were obturated with resin based root canal sealer and gutta percha. Postoperative control radiographs from different angles were taken to confirm the quality of the performed treatment. Finally the crowns were restored with composite resin.

Findings: These endodontically treated cases followed for a certain time. They were asymptomatic and functional.

Conclusion: Modern diagnostic techniques like cone beam computed tomography, and endodontic operating microscope may have to be used more for predictable endodontic treatment. These case reports highlight the importance of knowledge and its application in the management of abnormal anatomic variants which play a crucial role in the success of endodontic retreatment.

Keywords: Anatomic variation, middle mesial canal, middle distal canal, CBCT, endodontic therapy

Cone Beam CT Evaluation of C-Shaped Canal Morphology in Mandibular Premolar Teeth

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Introduction/Purpose: Endodontic treatment of C-shaped canals can be challenging due to their complex morphology and require some modifications in order to ensure effective cleaning and shaping. Although mandibular molar C-shaped canal configuration is well-known, C-shaped anatomy in mandibular premolars has recently been reported and has not been studied thoroughly. The aim of this study was to evaluate the prevalence and the morphology of the C-shaped root canal(s) in mandibular premolars using cone beam computed tomography (CBCT) images.

Method: CBCT images of 1095 mandibular premolars in 586 patients (229 male, 357 female) were evaluated. The mean age of the patients was 31.8±14.6. Mandibular premolars were examined on sections of CBCT images at coronal, middle and apical thirds of the root canals. Teeth with an external radicular grove and C1 or C2 configuration at any axial level were considered having C-shaped canal. The level of the C-shaped anatomy was recorded along with the position of the C-shaped canal (buccal or lingual).

Absolute counts and percentages of different groups and subgroups of C-shape morphologies were calculated for all mandibular premolar teeth. The proportion of each group was determined, as was the range for the true population proportion, to a confidence level of 95%. The Z-test for proportions in independent groups was used to analyze the differences in mandibular C-shaped premolar proportions between location (left and right side), and tooth (first or second premolars) ($p=0.05$).

Findings: Among 1095 mandibular premolars, C-shaped root canal morphology was present in 44 teeth. The percentage of C-shaped morphologies was determined as 6.9% and 1.6% in mandibular first and second premolars, respectively. Comparison of the first and the second premolars showed that the C1 type ($p=0.008$) and the C4b type ($p=0.013$) configurations were more common in the first premolars at the coronal level, whereas the C2 type configuration was significantly prevalent in the second premolars ($p=0.009$). No significant differences were observed between 1st and 2nd premolars as regards to C-shaped canal morphology at the middle and the apical levels ($p>0.05$). Comparison of the right and left premolars revealed that the C4c type configuration was significantly frequent on the right premolars at the coronal level ($p=0.038$). However, no significant differences were observed between right and left premolars at the middle and the apical levels ($p>0.05$). In addition, C5 and C6 type configurations were not present at the coronal level, whereas C4a, C5, C6 at the middle level and C4b, C4c, C5 at the apical level were not observed.

Conclusion: It is clear that C-shape canal morphology is a rare, but a complex anatomic feature in mandibular premolars. Therefore; endodontists and clinicians should have the awareness of this complex root canal anatomy for the success of endodontic treatment in mandibular premolar teeth.

Keywords: Cone Beam CT, C-Shaped Canal Morphology, Mandibular Premolar Teeth

Evaluation Of Stress as a Risk Factor in Chronic Periodontitis: A Meta-Analysis

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Introduction/ Purpose: Some studies have shown that psychological stress can trigger immune responses that favor the occurrence of periodontitis. The purpose of this meta-analysis is to investigate the relationship between State Trait Anxiety Index (STAI) scoring and chronic periodontitis.
Method: This review was conducted through a systematic search from two databases (Google Academy and PubMed). Studies on CP participants were included as an experimental group, and studies on periodontally healthy (PH) participants were included as a control. Mean effects were expressed as standardized mean difference with their associated 95% confidence intervals.
Findings: A systematic search in PubMed and Google Academy identified 3008 articles. Of these, 380 were duplicates. After reading the abstracts of the remaining 174, 46 were selected for full-text assessment. Those excluded were of low quality, did not answer the research question, or did not meet the inclusion and exclusion criteria. Of the 46 in the qualitative synthesis, 7 were included in the meta-analysis. The 7 studies in the meta-analysis were combined in a random effects model. Their heterogeneity was high ($Q = 49.28$, $p < 0.001$, $I^2 = 87.8\%$). The difference in mean STAI scoring between chronic periodontits patients and healthy subjects was estimated at 0.434 (95% CI -0.058-0.926).
Conclusions: Although some studies have suggested that stress may favor the occurrence of periodontitis the evidence is still fragile, due to variations in the method and lack of standardization in the definition of exposure and outcome factors, and as a result of a small sample size. Within the limitations of this study, the result of our meta-analysis can not supported the rationale that there was a direct link between stress and periodontal disease.
Keywords: chronic periodontitis; physical stress; State Trait Anxiety Index (STAI) scoring.

C-shaped Root Canal in a Mandibular Second Molar: Three Case Series

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Introduction/Purpose:: Successful root canal treatment depends on the thorough management of the root canal anatomy. Unusual root canal anatomy could create a diagnostic and treatment challenge. The mandibular second molar has many root canal variations. C-shaped canal configuration is such an aberrant morphology of molar teeth that vary in different population and is commonly seen in a mandibular second molar. Effective irrigation and activation of irrigation solutions are required to overcome the difficulties encountered in shaping due to variations in root canal anatomy. Root canal system should be filled from the apical end to the coronal access hermetically by using different filling techniques.
In these case series, three different case reports are presented in terms of diagnosis and treatment of C-shaped canals in mandibular second molar tooth.
Case reports: There were C-shaped canals in three mandibular second molars. CBCT was used for detailed view of canal morphology in case 1. One mesiolingual and a C-shaped canal in the distal which communicated with mesiobuccal were detected. The mesial root canal was filled with the single-cone and the distal C-shaped canal with the lateral compaction technique. In case 2, a complete C-shape in the coronal region was detected. It was divided into three 2mm below from the pulpal floor. After chemomechanical preparation all root canals were filled with lateral compaction technique. CBCT was used for evaluating the root canal fillings in case 1 and 2. For case 3 endodontic retreatment was applied because of inadequate root canal therapy. A single root canal in the mesiobuccal and C-shaped root canal in the distal which communicated with mesiolingual were diagnosed. The mesial root canal was filled by using single cone technique and distal C-shaped canal was filled by using the warm gutta-percha obturation technique. In all three cases, 5.25% sodium hypochlorite and finally 17% EDTA were used as irrigation solutions activated with Endoactivator. Resin based sealer was used as a sealer and access cavities were restored with composite resin. These case reports were followed up for certain time. They were asymptomatic and functional.
Conclusions: The C-shaped root canal is a common configuration in mandibular molars. CBCT can help to diagnose these cases. Activation of irrigation solutions is required to overcome insufficent mechanical preparation difficulties caused by canal morphology and also warm gutta-percha obturation techniques can be useful for hermetic filling of amorphous root canal system.
Keywords: C-shaped canal, mandibular second molar, root canal anatomy, endoactivator

Do Overbite Depth, Age and Gender Affect the Buccal Cortical Bone Thickness of Central Incisors in Adolescents? A Pilot CBCT Study

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Introduction/Purpose: Mini implants are used to provide a properanchorage in fixed orthodontics. Since these mini implants pass through soft and hard tissues, soft tissues and cortical bone thicknesses play a vital role in their initial stability. The aim of this study is to investigate the correlation between the depth of overbite (OD) and buccal cortical bone thickness (BCBT) of maxillary and mandibular central incisors and to determine the differences according to age and gender.

Method: Cone beam computed tomography (CBCT) images of 52 patients who met the inclusion criteria were reviewed. OD and BCBTs of maxillary and mandibular central incisors were evaluated and classified using CBCT images. BCBT was measured at the enamel-cementum junction, in the middle trio of the root and at the apical level. The level of significance was set at $P < 0.05$.

Findings: A total of 208 central incisors were examined on the CBCT images of 52 patients (26 males and 26 females) with a mean age of 15.42 ± 1.51 years. The frequencies of ODs of the teeth evaluated in the sample were as follows; 30.8% Class I, Class II 57.7% Class III 11.5%. The BCBTs of the maxillary and mandibular central incisors at the enamel-cementum junction, at the middle trio and at apicalis of the root varied between 0.56-1.30 mm and increased from the enamel-cement junction to th eapex. The males had statistically thicker BCBT of the root of the right central incisor in the enamel-cement junction and in the middle third ($p < 0.05$). There was no correlation between BCBTs and age ($p > 0.05$). BCBT did not differ statistically according to the OD classification ($p > 0.05$).

Conclusion: Within the limitations of this study, the majority of adolescent individuals had Class II OD. OD and age were not effective factors on BCBT. Only BCBT in the enamel-cementum junction of the and in the middle trio right central incisor were higher in males. In future studies, it is recommended to conduct studies evaluating interradicular distance, cortical bone thickness, and mineral bone density of cortical bone in other mini implant sites in larger samples. In conclusion, it is recommended that clinicians perform CBCT analysis before orthodontic treatment in order to obtain appropriate aesthetic and functional treatment in adolescents.

Keywords: Overbite, buccal cortical bone thickness, cone beam computed tomography, central incisors

Evaluation of the Relationship Between the Zygomaticomaxillary Complex, Infraorbital Foramen Region and Condylar Morphology with Facial Symmetry in Unilateral CLP

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Introduction/Purpose: Cleft lip and palate (CLP) is one of the most common cranio-facial deformities. Although its etiology is not known exactly, it is thought that genetic and environmental factors cause this anomaly. Facial asymmetry, which is a common condition, can occur for various reasons. Asymmetry can be caused by congenital malformations, hereditary and environmental factors. In facial asymmetries, the patient group with the most prominent effect of heredity is CLP. Asymmetry can be seen in the middle and lower facial regions of this patient group. Skeletal and dentoalveolar asymmetries have been reported on the cleft side of the maxilla in individuals with CLP. The integrity and symmetry of the zygomatic complex contributes significantly to the overall face shape. Internal irregularity of the temporomandibular joint can alter the condylar morphology on the affected side, thus contributing to facial asymmetry. The aim of this study is to determine the relationship between the zygomaticomaxillary complex, infraorbital foramen region and condylar morphology with facial symmetry in patients with unilateral CLP using the cone beam computed tomography (CBCT) and to compare this with the control group.

Method: CBCT images of 30 unilateral CLP patients and 30 healthy individuals were evaluated in this retrospective study. The control group was obtained from the retrospective images of patients who underwent CBCT for various reasons (impacted teeth, implant planning, etc.). To evaluate the zygomaticomaxillary complex symmetry; the distance between the most prominent point of the zygoma (malar eminence) and the vertical line drawn from the basion point was measured from the right-left sides in the axial section. To evaluate the symmetry in the infraorbital foramen region; the distance between the widest point of the infraorbital foramen and the vertical line drawn from the crysta galli of the ethmoid bone was measured from the right-left sides in the coronal section. Condylar morphology was categorized as convex, angled, straight and round according to the classification defined by Yale et al, and evaluated in coronal section. Statistical analysis was performed using IBM SPSS software version 20.0.

Findings: In this retrospective study, zygomaticomaxillary complex and infraorbital foramen region measurements and condylar morphology evaluations of 60 patients were performed from the right and left sides using CBCT images. Zygomaticomaxillary complex and infraorbital foramen region measurements were significantly lower on the cleft sides of the study group ($p < 0.05$). Zygomaticomaxillary complex and infraorbital foramen region measurements were significantly lower on the cleft side of the study group compared to the control group ($p < 0.05$). There was no significant difference between the control group and the study group in terms of condylar morphology ($p > 0.05$).

Conclusion: This study shows that individuals with CLP have asymmetry both on the zygomaticomaxillary complex and the infraorbital foramen region compared to control group. This condition creates a negative effect in terms of facial aesthetics. More comprehensive studies can be planned to investigate the relationship between condyle morphology and facial symmetry.

Keywords: Zygomaticomaxillary Complex, Infraorbital Foramen Region, Condylar Morphology, Facial Symmetry, Unilateral CLP

Treatment Outcome of Manual versus Rotary Techniques in Undergraduate Student Teaching

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Introduction/Purpose: The technical quality of root canal treatment (RCT) may impact on the outcome. The quality of education received during undergraduate school may be linked to the quality of treatment provided in general dental practice. This study aimed to compare the technical quality of RCTs where rotary or manual step-back canal preparatory technique was employed in an undergraduate dental clinic at the College of Dentistry, Istanbul Medipol University, Turkey

Method: Dental records of 270 patients who received RCT between 2018 and 2020 undertaken by dental students were investigated by retrospective chart review. Five hundred sixty four teeth belonging to 270 patients were randomised into two [(Rotary, n=280 and Manual, n=284)] groups. Root canal obturation was evaluated on the basis of the length of obturation being >2 mm from the radiographic apex, with uniform radiodensity and good adaptation to root canal walls. Inadequate root canal obturation included cases containing procedural errors such as furcal perforation, ledge, canal transportation, strip perforation, root perforation, instrument separation, voids in the obturation, or underfilling or overfilling of the obturation. Quality of root fillings were evaluated. Descriptive statistics were used to define categorical variables (N, %) and the level of significance was set at 0.05.

Findings: In 211 (75.35%) teeth in rotary group, RCT was adequate and without procedural errors. However, in 69 (24.65%) teeth in rotary group, RCT was inadequate and contained procedural errors. The frequency of procedural errors in the entire sample of rotary group was 24.65% as follows: underfilling 0-2 mm from the radiographic apex, 18 (6.42%); underfilling >2 mm from the radiographic apex, 15 (5.35%); overfilling, 20, (7.14%); voids, 69 (24.64%); broken instruments, 5 (1.78%); apical perforation 5 (1,78); apical transportation, 10 (3.57%); and ledge formation, 4 (1.42%). In 154 (54.22%) teeth in manual group, RCT was adequate and without procedural errors. However, in 130 (45.78%) teeth in rotary group, RCT was inadequate and contained procedural errors. The frequency of procedural errors in the entire sample of rotary group was 31.1% as follows: underfilling 0-2 mm from the radiographic apex, 34 (11.97%); underfilling >2 mm from the radiographic apex, 24 (8.45%); overfilling, 22 (7.74%); voids, 96 (33.80%); broken instruments, 9 (3.16%); apical perforation, 3 (1.05%); root canal transportation, 17 (5.98%) and ledge formation 16 (5.63%). There were significant differences ($p < 0.05$) in the type or frequency of procedural errors between the manual- and rotary- preperation types. The highest procedural errors were seen in molars for both rotary (64.70%) and manual (74.19%) groups respectively. The technical quality of RCT performed by undergraduate dental students was classified as 'adequate' in 75.35% and 54.22% of the cases, respectively for manual and rotary groups. There was significant difference between the two groups in relation to the the technical quality ($p <0.05$). Overall occurrence of procedural errors did not differ between the groups, being 10.91% in rotary group and 12.32% in manual

group. However, occurrence of ledge formation was higher in manual group than that of rotary group.

Conclusion: There was a significantly more favourable treatment outcome in the rotary compared to the step-back technique in canal preparation, employing radiographic criteria. Occurence of ledge was significantly higher for manual technique. There is a need for improvement in the training of students at the preclinical and clinical levels for both instrumentation techniques.

Keywords: Endodontics, rotary preparation, manual step-back preparation, root canal treatment, undergraduate dental students

Evaluation of the Effect of Finishing and Polishing of Resin-Based Restorative Materials on Monomer Elution by High Performance Liquid Chromatography (HPLC)

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Introduction/Purpose: Resin-based restorative materials are widely used in modern restorative dentistry due to their satisfying aesthetic properties and the ease of use over amalgam. However, it is known that the polymerization of resin-based restorative materials is usually incompleted and the degree of conversion of monomer to polymer varies between 55% to 80%. The unreacted monomers released from resin-based restorative materials have been considered as a reason for local and systemic adverse reactions. Finishing and polishing procedures are used to enhance the degree of conversion by eliminating the unreacted monomers. Nevertheless, there is no study in the literature investigating the effect of finishing and polishing procedures on monomer elution from resin-based restorative materials. The purpose of the study is to evaluate the effect of finishing and polishing procedures on monomer elution in compomer and bulk-fill restorative materials, using High Performance Liquid Chromatography (HPLC).

Method: Two types of resin-based restorative materials, bulk-fill composite (3M ESPE GmbH Seefeld, Germany) and compomer (Dentsply DeTrey Konstanz, Germany) in A2 shade were used. Test specimens were prepared in plexiglass molds. The volume of test specimens was calculated as 28.3 mm^3, which approximately simulates the mesio-occluso-distal cavity volume of a primary teeth.

After curing, the specimens were randomly divided into two groups and finishing-polishing procedures were applied to the experimental groups. Finishing procedures were performed with a 12-fluted carbide finishing bur (Meisinger, Neuss, Germany) in a high-speed handpiece. The specimens were then polished with coarse, medium, fine and superfine grit Sof-lex discs (3M ESPE, St. Paul, MN, USA) with low-speed handpiece No finishing or polishing procedures were applied to the control groups.

Each specimen was then immediately immersed in 75% ethanol-water solution and stored in the amber colored HPLC vials at room temperature. 0.5 mL of ethanol/water samples were collected from the vials after 24, 48 and 72 hours. The release of residual monomers was analyzed by using HPLC system (Agilent Technologies, Palo Alto, CA) with C18 column (150x4.6mm; 5 µm, ACE, Aberdeen, Scotland).

Findings: The quantity of residual monomers eluted from both of the materials increased over time. Finishing and polishing procedures led to a significant decrease in the quantity of UDMA release in Filtek™ Bulk Fill composite and Bis-GMA, HEMA, TEGDMA release in Dyract XP compomer.

Conclusions: The results of the present study demonstrated that the restorative materials investigated here are not chemically stable after polymerization. Concentrations of eluted monomers may reach critical toxicity levels even after one restoration placement and further research is needed to understand potential long-term toxicity of resin-based restorative materials.

Keywords: Finishing and polishing, resin-based restorative materials, monomer elution, high performance liquid chromatography

The Evaluation of the Content and Usefulness of Youtube Videos about Oil Pulling

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Introduction/ Purpose: Oil pulling is a traditional Indian remedy used to prevent and cure various diseases. In recent years, several studies have provided conclusive evidence of the strong association between oral and systemic diseases. Today, many studies emphasize the necessity of maintaining optimal oral hygiene in order to significantly reduce the risk factors of various systemic diseases. Oil pulling is an old, natural, cheap and available method that aims to improve general health based on oral health, reduces the body's toxin load and has no side effects. The aim of this study is to evaluate the content and usefulness of the YouTube videos on 'oil pulling' available in Turkish and English languages.

Method: The first 305 videos were examined by writing the word 'oil pulling' in YouTube video search field. The duration, date, views, likes, dislikes and upload sources of the videos were recorded. Only video contents in Turkish and English languages were taken into consideration. In order to evaluate the content of the videos, a usefulness level scale consisting of some criteria related to oil pulling was created. According to these criteria, four different usefulness groups were created among the videos. Variables were analyzed with appropriate statistical methods. Statistical significance level was $p<0.05$.

Findings: 127 videos were excluded for various reasons such as video language, irrelevant content, oil advertisement and repeated videos; 178 videos were included in the study. The duration of the videos changed from 8 seconds to 28 minutes and the dates were between 2007-2021. The usefulness groups of videos found to be as follows: 3.9% is useless, 13.5% is less useful, 60.7% is useful and 21.9% is very useful. The sources of uploading videos were as; 21.3% doctors, 48.3% individual users, 30.3% websites. There were no statistically significant difference between usefulness groups according to the video durations, average number of views, likes and dislikes. The usefulness of videos recommended by health professionals was significantly higher than other groups ($p <0.05$).

Conclusion: Most of the oil pulling videos on YouTube, were found to be helpful or very helpful (82,6%). More research studies should be carried on by health professionals about oil pulling and science based informative videos on Youtube will help users to reach accurate knowledge.

Keywords: Oil pulling, video, YouTube

Evaluation of Mandibular Bone Quality in Chronic Periodontitis Patients

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Introduction/Purpose: Chronic periodontitis is a widespread pathological condition affecting the gingival and bone tissues. As the severity of the disease increases, bone destruction increases. Patients are affected by many conditions such as chronic infection, tooth mobility, tooth loss, and decreased bite force. The destruction of bone tissue from chronic periodontitis may affect the internal structure of the remaining bone. Examination of the internal bone structure can be critical to preventing severe bone resorption and the course of the disease. The aim of this study was to examine three regions of interest (ROI) of the mandible (mandibular condyle, angulus, and alveolar bone) of patients diagnosed with chronic periodontitis with the fractal analysis method using panoramic radiographs and compare them with the control group composed of individuals with healthy gingival status.
Method: In this retrospective study, medical and radiological records of 54 patients diagnosed with chronic periodontitis and 60 patients without any gingival disease were used. ROIs were selected from panoramic radiographs. ROI1 included the mandibular condyle, ROI2 included the mandibular angle, and ROI3 included the alveolar bone of the mandible. All the ROIs were analyzed by fractal analysis using the box-counting method. ROIs were measured as right and left for each patient, and their averages were used for statistical analysis.
Findings: There was no significant difference between the groups in terms of age and gender. For ROI1, the mean fractal dimension (FD) value of the periodontitis group was 1.23 (± 0.07), while the mean FD value of the control group was 1.27 (± 0.05) ($p < 0.05$). For ROI2, the mean FD value of the periodontitis group was 1.26 (±0.06), while the mean FD value of the control group was 1.28 (±0.05) ($p > 0.05$). For ROI3, the mean FD value of the periodontitis group was 1.21 (± 0.03), while the mean FD value of the control group was 1.26 (± 0.06) ($p < 0.05$).
Conclusion: ROI1 and ROI3 values were significantly lower in the chronic periodontitis group compared to the control group. No significant difference was found between the two groups for ROI2 values. The findings may be related to the fact that chronic periodontitis affects the bone locally; the FD value of the patient group was found to be low in the ROI close to the bone destruction area, indicating the weak internal structure of the bone. The possible reason for the significant difference in ROI1 values between the groups may be related to the decreased bite force observed in patients with chronic periodontitis and temporomandibular joint disorders that may be consequently seen.
Keywords: Mandibular bone quality, chronic periodontitis, fractal analysis method

Comparative Evaluation of Solid and Bundle Fiber Post Designs in terms of Bond Strength to Dentine

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Introduction/Purpose: Nowadays, various post designs are available for restoration of endodontically treated teeth. These different post designs present for improving to strength of tooth structure. Fiber reinforced posts are widely used to support tooth structure in case of missing of dental hard tissue. Bond strength is an important parameter for long-term success of restoration after root canal treatment. The aim of this study is to evaluate the bond strength of two different fiber posts (solid and bundle) to dentin walls by using push out test.
Method: Twenty human maxillary central teeth with intact roots, mature root tips were used in the present study. Teeth with similar coronal-apical size, which were extracted for purposes irrelevant to this study, were collected and stored in 0.1% thymol solution at 4°C until use. The samples were divided into two groups (n=10). These samples were decoronized and standardized to approximately ~12 mm in root length and canals were prepared up to # F3 with the ProTaper rotary file system. During the preparation, canals were irrigated with sodium hypochlorite and dried with paper points. All root canals were filled with lateral condensation technique. The specimens were held for 7 days for setting of the root canal sealer. The post cavities were prepared for both groups by using the appropriate drill according to the manufacturer's instructions and after following that related protocol was applied before cementation. Posts were placed in Group 1 (micro glass bundle fiber post) and Group 2 (glass solid fiber post). The same adhesive material and procedure were applied for both groups. Sections were taken 4 mm and 8 mm away from root tip using a cutting machine for all samples. The push out test was performed using a universal machine and the bond strength values were noted. Bond strength data were statistically analyzed with Mann Whitney and Kolmogorov-Smirnov multiple-comparison test at 5% significance level.
Findings: According to the results of the study, the bond strength of the cervical sections is higher than the apical section $p<0.05$ regardless of post design. There were no statistical differences between bundle and solid post design for all sections $p>0.05$.
Conclusion: Bundle post designs can be an alternative instead of using the solid post designs.
Keywords: Bundle fiber post, solid fiber post, bond strength

The Effect of Chitosan-Silver Nanoparticles on Resin-based Sealer Bond Strength to Dentine: A Pilot Study

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Introduction/Purpose: Sealer penetration to dentine is one of the most important aspect in terms of micro-leakage and durable root canal filling for the success of endodontic treatment. After the root canal shaping process, multiple solutions are used for disinfection and elimination of smear layer. There are various chemical agents that can be applied in different dosage forms. Chitosan is a non-toxic cationic biopolymer that has a chelating capacity and antimicrobial effect. Besides, presenting new treatment alternatives in the medical field, nanotechnology has getting popular in endodontics and silver nanoparticles (AgNPs) are well known nanomaterials that possess unique antimicrobial properties. The aim of this study is to evaluate the combine effect of silver nanoparticle and chitosan on resin-based sealer bond strength to dentine.
Method: 40 mandibular premolar teeth with a single root that had been extracted for various reasons were used in this study. All specimens were intact, or had minimal caries, and had closed apices. The samples were decoronized and standardized to approximately ~12 mm in root length and canals were prepared up to # F3 with the ProTaper rotary file system. During the preparation, canals were irrigated with 5.25% sodium hypochlorite (NaOCl). Medium molecular weight chitosan was used at two different concentrations (0.2% and 0.4%) to prepare final solutions. Chitosan-silver nanoparticles were synthesized by chemical reduction method. To determine the characterization of chitosan-silver nanoparticles, UV visible spectrometer was used and TEM analysis was performed. Then all samples were randomly divided into 7 experimental and 1 control group according to final irrigation solutions. Group1, 2% chlorhexidin gluconate solution; Group2, 0.2% chitosan solution; Group3, 0.4% chitosan solution; Group4, chitosan (0.2%) - silver nanoparticle dispersion; Group5, chitosan (0.4%) - silver nanoparticle dispersion; Group6, 0.2% chitosan solution containing 2% chlorhexidine gluconate; Group7, 0.4% chitosan solution containing 2% chlorhexidine gluconate. Only distilled water was applied for control group. All final solutions were performed during 1 min. Root canals were dried with paper points. Subsequently, the teeth were filled with a resin-based sealer by using a lateral condensation technique. 2mm thickness of sections were taken from the apical, middle, and coronal parts of each root. Push out test was applied to these sections by using a universal test machine. The results were subjected to statistical analysis using Kruskal-Wallis and post hoc Scheffe test to determine the differences between the groups $p<0.05$.
Findings: Group 5 (chitosan (0.4%) - silver nanoparticle dispersion) and Group7 (0.4% chitosan solution containing 2% chlorhexidine gluconate) showed better results than other groups ($p<0.05$). However, there was no statically differences between Group 5 and Group 7 ($p>0.05$).
Conclusion: Chitosan - silver nanoparticles can be used alternative final irrigation solution for improving bond strength of resin-based sealers to dentinal walls.
Keywords: Chitosan, chitosan-silver nanoparticle, chlorhexidine gluconate, irrigation solutions

Evaluation of Accuracy of Different Electronic Apex Locators

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Introduction/Purpose: Removal of pulp tissue, protein degradation products, bacteria and bacterial toxins from necrotic and gangrenous root canals is the main factor in successful endodontic treatment. Correct determination of working length is the most important step in cleaning, shaping and filling the root canal system. It is great significance that the apical 3 mm part of the root is cleaned and filled well, especially in infected cases. Lateral canal, isthmus and canal irregularities, which are frequently located in this region, also affect the success of the treatment. The aim of this study was to compare the accuracy of three electronic apex locators Apex ID (SybronEndo, Glendora, CA), Propex Pixi (Dentsply Maillefer, Ballaigues, Switzerland) and Root ZX mini (J Morita, Tokyo, Japan) to determined the working length and the evaluation of their approach to the apical constriction.

Method: In this study, 33 maxillary central teeth extracted for periodontal disease were used. In order to standardize the root length and obtain a straight reference line, the crowns of the teeth were removed from this marked point using a cutting device under water cooling.Under in vitro conditions, the roots were embedded in the alginate model to mimic the electrical conductivity of the periodontal ligament.The actual working length was visually determined to be 0.5 mm shorter than the major foramen for each tooth. Electronic root canal length was determined by performing measurements at the "0.0" point with electronic apex locators. Then actual working length was compared to each electronic apex locaters measurements. Data was analyzed variance ANOVA and Bonferroni post hoc tests were used. In all analyses, $p<0.05$ was taken to indicate statistical significance.

Findings: Within the limitations of this study, no significant difference was found between the three electronic apex locators (Apex ID, Propex Pixi, Root ZX mini) and the actual working length measurements ($p> 0.05$).

Conclusion: All apex locators measurments results were similar and coherent to actual working length.

Keywords: Apex ID, propex pixi, root ZX mini, electronic apex locator, apical constriction, working length determination.

Panoramic Radiography Findings of Patients That Applied to Necmettin Erbakan University Faculty of Dentistry Before Prosthetic Treatments

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Introduction/Purpose: Panoramic radiography is very important for detecting abnormalities and evaluating edentulous patients before starting prosthetic treatment. Thus, the diagnosis and treatment planning of many oral and maxillofacial diseases can be made in the most ideal way possible. The aim of this study was to evaluate the conditions such as retained roots, impacted teeth, foreign bodies, the presence of mental foramen close to the crest edge, maxillary sinus close to the crest edge, which was detected in the routine panoramic radiographs of a group of edentulous patients and to report the frequency of important radiographic findings in edentulous patients before conventional or implant-supported prosthetic rehabilitation.
Method: The study was conducted on completely edentulous patients who applied to Necmettin Erbakan University, Faculty of Dentistry, Department of Prosthodontics for various reasons. For this purpose, 110 complete edentulous patients were examined in terms of remaining roots, impacted teeth, foreign bodies, the presence of mental foramen close to the crest edge, maxillary sinus, and foreign body close to the crest edge, and the existing positive findings for each patient were recorded. The distribution of the findings by age and gender was calculated as percentages. Chi-square test and Fisher's Exact test were used to compare groups and categorical variables (a=0.05).
Findings: 45 (40.9%) of the 110 patients were female, 55 (59.1%) were male. The patients were between the ages of 44-90 and the mean age of the patients was 67.2. According to age groups, the highest number of patients in this study was observed in the population and the most findings were observed in patients between the ages of 61-70 (40.9%). The most common positive finding was the presence of maxillary sinus close to the edge of the alveolar crest and in 82 (74.5%) patients the maxillary sinus was close to the residual alveolar crest. The number of patients with mental foramen close to the top of the alveolar crest was 49 (44.5%). In 30 of the 110 patients (27.3%), the remaining root fragment was detected. In addition, embedded teeth were detected in 8 (7.3%) patients, while no foreign body was found in any of the patients. There is no statistically significant difference in terms of the distribution of remaining root presence and the distribution of the maxillary sinus close to the alveolar crest margin according to age and gender ($P>0.05$). The distribution of the presence of impacted teeth by gender is not statistically significant ($P> 0.05$), however, significant differences were found among the distribution by age ($P<0.05$). The distribution of the presence of mental foramen close to the top of the alveolar crest by age and gender is statistically significant ($P<0.05$).
Conclusions: Within the limitations of this study, age and gender are associated with the proximity of the mental foramen to the alveolar crest. The presence of impacted teeth is not associated with gender but is associated with age. The remaining roots and the presence of the maxillary sinus close to alveolar crest were not associated with age and gender.
Keywords: Panoramic Radiography, Prosthetic Treatment, Diagnosis, Treatment Planning

Investigation of the Prevalence of Pulp Stones and Pulp Canal Obliteration in a Group of Turkish Population Using Cone-Beam Computed Tomography

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Introduction/Purpose: Pulp stones are calcified masses on human dental pulp which present on healthy teeth, teeth with caries or large amount of restoration, teeth with trauma history, even the unerupted teeth. Pulp stones exist on coronal or radicular part of the pulp and do not cause any symptoms. Pulp canal obliteration, also called calcific metamorphosis, is a term used when the root canal becomes narrow or restricted. It is characterized by deposition of hard tissue within the root canal system. Its etiology is unknown, but it usually occurs due to trauma. Partial or total obliteration of the pulp space may be observed. Endodontic therapy of teeth with pulp stone or pulp canal obliteration may pose treatment challenges. According to several studies based on radiographic evaluation of pulp stone and pulp canal obliteration, it is obvious that the prevalence of pulp stone and pulp canal obliteration varies fairly to the type and design of the study. Cone-beam computed tomography (CBCT) allows three-dimensional visualization of root canal morphology that enables the identification of the canals, their directions, and degrees of obstruction. Due to difficulty in managing these pulpal anomalies, proper diagnosis, and careful planning before initiating endodontic treatment must be needed. To determine the prevalence of pulp stones and pulp canal obliteration in maxillary incisors and canines, in a group of Turkish population and to evaluate the relationship of pulp stone and pulp canal obliteration according to gender, age and type of tooth.

Method: CBCT images in the archive of Istanbul Aydın University, Faculty of Dentistry, Department of Oral and Maxillofacial Radiology were analyzed retrospectively between January 2016 and September 2018 by an endodontist. A total of 1678 maxillary incisors and 809 canines were examined to identify the pulp stones and obliterated root canals. The data were analyzed statistically.

Findings: Out of the 2487 teeth examined in our study, pulp stone was detected in 15 teeth (0.6%) and pulp calcification in 11 teeth (0.4%). Pulp stone and pulp canal obliterations were mostly observed in lateral incisors. The patients aged between 40 and 59 years showed higher degree of pulp stones whereas pulp canal obliteration in patients aged 60 and over. The prevalence of pulp stone and pulp canal obliteration in females and males were 2.42%, 0.79% and 1.2%, 1.58% respectively. No statistically significant relationship of pulp stone and pulp canal obliteration was found according to gender, age, and type of tooth.

Conclusion: According to the results of our study, it was revealed that increasing age is related to formation of pulp stone and calcification. Pulp stone and pulp canal obliteration were mostly detected in lateral incisors.

Keywords: Pulp stones, pulp canal obliteration, cone-beam computed tomography

C-Shaped Canal Prevalence and Morphology in Maxillary Molar Teeth: A Cone Beam CT Evaluation

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Introduction/Purpose: Complex root canal anatomies such as C-shaped canals present various difficulties to the clinician in preparation, irrigation, and obturation of the root canal. Many studies have investigated the canal morphology of mandibular molars, but few studies evaluated the C-shaped canals in maxillary molar teeth. Therefore, the aim of this study was to evaluate the prevalence and the morphology of the C-shaped root canal(s) in maxillary molar teeth using cone beam computed tomography (CBCT) images.

Method: 2024 previously obtained CBCT images of 475 patients with at least one maxillary molar without root canal treatment and metallic restorations were evaluated retrospectively. Maxillary molars were examined on sagittal, axial and coronal sections of CBCT images at three different levels. A modification of lower C-shape molar classification was used for maxillary molars. The root canal system was classified as a maxillary C-shape first according to the five root fusion types and then according to the consecutive axial slices with an upper C-shape (UC1 or UC2) configuration. The level of the C-shape anatomy was recorded as well. Absolute counts and percentages of different groups and subgroups of C-shapes were calculated. The proportion of each group was determined, as was the range for the true population proportion, to a confidence level of 95%. The Z-test for proportions in independent groups was used to analyze the differences in maxillary C-shaped molar proportions between location (left and right side), and tooth (first or second upper molars). Chi-square test was used for the comparisons of root fusion types ($p=0.05$).

Findings: C-shaped canal morphology was found in 39 (4.89%) of 797 maxillary molars (460 first molar, 337 second molar) from 475 patients. C-shapes were found in 11 maxillary first molars (2%) and 28 maxillary second (8%). Among five types, 4 different root fusion configurations were observed with fusion type-A (23%) having the highest occurrence ($p>0.05$). Comparison of the first and the second molars showed that the UC1 configuration was more common in the second molars at the middle ($p=0.017$) and apical levels ($p=0.007$), but no difference was observed between 1st and 2nd molars as regards to C-shaped canal morphology at the coronal level ($p>0.05$). Comparison of the right and left molars revealed no difference regarding C-shape canal morphology at the coronal, middle and the apical levels ($p>0.05$). In addition, UC4 and UC5 type configurations were not present at the coronal and middle levels, whereas only UC5 type was not observed at the apical level.

Conclusion: The first and most crucial step in root canal treatment is to have knowledge about the root canal morphology. Despite the low prevalence, the clinicians should recognize that C-shape canal morphology might occur in the upper molar teeth in order to avoid failures and complications in root canal treatment.

Keywords: C-shaped root canal, cone beam computed tomography, molar teeth

Evaluation of the Frequency of Extracranial Internal Carotid Artery Calcification by Cone-Beam Computed Tomography

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Introduction/Purpose: Internal carotid artery calcification is accepted as an indicator of atherosclerotic vascular diseases. Cone Beam Computed Tomography (CBCT) is a frequently used advanced imaging tool in dentistry and allows many soft tissue calcifications to be detected frequently. The aim of this study is to evaluate the frequency of extracranial internal carotid artery calcification with CBCT in a group of individuals in terms of age, gender and some risk factors.

Method: This study was planned retrospectively, cross-sectionally. CBCT images of a total of 305 individuals, 138 women and 167 men, taken for different reasons, were examined in terms of extracranial internal carotid artery calcification. Statistical analysis of all data was done with SPSS version 22. Basic descriptive statistical analysis and chi-square test were used to evaluate the data.

Findings: In the whole study group, extracranial internal carotid artery calcification was found in 39.3%. It was seen in 44% of women and 34.7% of men and the rate of incidence between genders was not statistically significant ($p = 0.07$). The number of hypertensive and diabetic individuals in the group with extracranial internal carotid artery calcification was statistically significantly higher than the group without calcification ($p = 0.001$).

Conclusion: In this study, extracranial internal carotid artery calcification was found at a high rate in accordance with the literature. There was no significant difference in the frequency of occurrence between genders. In accordance with the literature, increased carotid artery calcification is observed in hypertensive and diabetic individuals. It should be kept in mind that, extracranial internal carotid artery calcification, which is common in our society, is an important indicator of atherosclerotic disease and its incidence may increase with age, especially in diabetic and hypertensive individuals.

Keywords: Internal carotid artery calcification, cone beam computed tomography, soft tissue calcification

Evaluation of Patients Who Applied to the Department of Oral and Maxillofacial Surgery During the Covid-19 Pandemic Period.

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Introduction/Purpose: The outbreak of SARS-CoV-2 has been named as Coronavirus Disease 2019 (Covid-19) by the World Health Organization (WHO). Transmission increased rapidly after the identification of the first reported COVID-19 case in Wuhan, China, at the end of 2019. It has spread to other provinces of the Republic of China and then to all countries of the world by leaving its regional border. The most important concern in oral and maxillofacial surgery is the transmission of COVID-19 via droplets and aerosols. Oral and maxillofacial surgery is constantly exposed to respiratory secretions, blood, saliva, and other contaminated body fluids due to close contact with patients and frequent use of sharp devices, and is always at risk for COVID-19. The objective is the evaluation of patients who applied to the oral and maxillofacial surgery department during the period when measures were taken to prevent the COVID-19 pandemic, according to age, gender, and reasons for admission.
Method: 100 patients who applied to the oral and maxillofacial clinic for various reasons were included in the study. Gender, age, and reasons for applying to the clinic were evaluated.
Findings: 59 of 100 patients were female and 41 were male. The average age of female who admitted to the department of oral and maxillofacial surgery was 33.24 (± 16.1), and the average age of males was 42.2 (± 17.36). 34% of patients applied for tooth extraction. The average age of patients admitted due to tooth extraction is 41.18 (± 19.22). 52.9% of the patients who admitted due to tooth extraction were female and 47.1% were male. The mean age of 28 patients who admitted for the control examination was 37.18% (± 15). 53.6% of the patients who came for control examination were female and 46.4% were male. It was observed that the average age of 24 patients who came with impacted teeth was 26.17 (± 10.3). It was observed that 66.7% of the patients who came with impacted teeth were female and 33.3% were male.
Conclusion: In our study there was no significant difference in gender among the patients who applied for tooth extraction due to toothache and dental infection. The female-to-male ratio was 2: 1 in patients presenting with impacted teeth. In these challenging times, it is important to make informed clinical decisions and inform patients while ensuring the health and well-being of patients.
Keywords: Covid-19 pandemic, dental procedures, oral and maxillofacial surgery

Clinical Evaluation of Cad/Cam Zirconia Single Crowns with Different Subgingival Marginal Finish Design: A Retrospective Study

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Introduction/Purpose: Subgingival margin design is often preferred for aesthetic reasons, especially in the anterior region. Marginal finish line configurations for full crown preparations can be formed with 2 ways: horizontal preparations with a limited, defined finish line and vertical preparations. The aim of this study is to compare the periodontal responses and prosthetic situation of zirconia-supported single crown restorations (SC) according to the marginal finish line configuration and to evaluate the results.

Method: 93 single crown restorations were included in the study. 51 of these had vertical margin line (Group 1) and 42 had horizontal margin line (Group 2). Periodontal parameters; Gingival Index (GI), Plaque Index (PI) and Bleeding on Probing (BoP) scores were measured and recorded from all the restored abutment teeth. Prosthetic evaluations were made according to modified USPHS criteria. Accordingly modified USPHS criteria, the restorations were evaluated in terms of anatomical form, marginal adaptation, marginal discoloration and veneer fracture. Observation period was mean 21 months (15-28 month). Student T-test and one-way analysis of variance (ANOVA) was used to determine statistically significant differences and Tamhane's t2 test were used for post hoc test ($p<0.05$).

Findings: There was a significant difference between the groups for GI and BoP scores, and for both, Group 1 showed statistically significantly higher scores than Group 2 ($p=0.00$ for GI) ($p=0.02$ for BoP). There was no significant difference between groups for PI scores ($p=0.298$). No significant difference was found between groups in any modified USPHS criteria categories ($p=.607$ for anatomical form, $p=.082$ for marginal adaptation, $p=.364$ for marginal discoloration, $p=.281$ for veneer fracture).

Conclusion: With many clinical scenarios where subgingival margin is required, especially vertical marginal preparations showed a clinically increased gingival inflammatory response compared to the horizontal preparation. According to prosthetic evaluations, vertical and horizontal margins showed similar clinical results. However, clinical studies with longer follow-up periods should be performed.

Keywords: marginal finish design, clinical study, USPHS criteria, periodontal response, single crowns

Comparison of Cephalometric Radiography and Dental Volumetric Tomography Measurements of Bucco-Lingual Angle and Bone Thicknesses in Mandibular Symphyseal Area

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Introduction/Purpose: One of the sites with the highest risk of clinically important complications is anterior mandibular region in terms of implant or advanced surgical applications due to its complex anatomical features, insufficient bone volume, and anastomoses of vital anatomic structures. Accordingly, determination of the angle and dimensions of bone at implant recipient site in the symphyseal area has a vital importance both for the formation of osseointegration and long-term clinical success. Therefore, the aim of this study was to compare the buccal concavity, lingual- and the tooth-inclination angles of the mandibular symphysis area, as well as buccal & lingual cortical bone and total bone thickness measurements using cephalometric radiography (CR) and dental volumetric tomography (DVT) images.

Method: One hundred patients justifying both CR and DVT exposures for various reasons were included in the study. Images were obtained with the Kodak 9000 3D DVT system (Kodak Carestream Health, Trophy, France) and also with the KaVo OP 3D cephalometric machine (KaVo OP 3D™ Biberach, Germany. Parameters particularly important for implant planning such as buccal-concavity, lingual- and tooth-inclination angles as well as buccal, lingual, and total bone thickness measurements were performed on all images using the measurement tool provided by the system software. Two observers performed the measurements independently and mean of the measurements were used for statistical analysis. While magnification correction was made on CR measurements, DVT measurements were used directly. Comparison of the measurements and the imaging methods were done using paired- and Wilcoxon t-tests. Inter-observer reliability was evaluated with the intra-class correlation coefficient.

Findings: The mean buccal concavity angles measured on CR was 141.7° ± 7.73, while it was 144.6° ± 6.6 on DVT images. Mean value of lingual inclination angle measurements was 68.6° ± 8.1 on CR and 70.6° ± 14.5 on DVT images, respectively. The mean value of the tooth inclination angle was 71.1° ± 9.4 for CR and 74.7° ± 8.37 for DVT.

The mean of total bone thickness measured on CR was 6.7 ± 1.8 mm, while it was 6.3 ± 1.9 mm on DVT. The mean of buccal & lingual cortical bone thicknesses as measured on CR were 1.6 ± 0.4 mm and 1.7 ± 0.4 mm respectively, while identical measurements on DVT were 1.1 ± 0.38 mm 1.6 ± 0.4 mm. There was a significant difference between two imaging methods in buccal-concavity and tooth-inclination angles as well as buccal and total bone thicknesses ($p < 0.05$). However, no difference was obtained in lingual-inclination angle and lingual bone thickness measurements ($p > 0.05$). Inter-observer reliability ranged between 0.86 and 0.99.

Conclusion: Based on the present data, CR can be reliable for measurements of lingual inclination angle and lingual cortical bone thickness in the mandibular symphyseal region. However, CR measurements significantly deviated from DVT measurements for buccal-concavity, tooth inclination angle and total bone thickness of the anterior mandibular region.

Accordingly, 3-D imaging of the mandibular symphysis is recommended before implant surgery and/or graft operations to reduce the risk of complications.
Keywords: Cephalometric Radiography, Dental Volumetric Tomography, Mandibular Symphyseal Area

Knowledge Skills and Attitudes of Dentistry and Dental Clinic Assistant Students Related to Online Pedodontics Lecture During the Covid-19 Pandemic

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Introduction/Purpose: In Turkey, with the Covid-19 pandemic, an online education system has been introduced, as is the case all over the world. Since March 2020, dentistry(D) and dental clinic assistant(DCA) students have taken pedodontics lessons online. This research; Necmettin Erbakan University Faculty of Dentistry and dental clinic assistant students aim to evaluate the efficiency of the education given in the online pedodontics course, the satisfaction of the students and the online course system.
Method: In the questionnaire, there are multiple-choice questions about methods of accessing the online education system and access knowledge and skills of students. In addition, various propositions about pedodontics classes were presented to students to be answered with the Likert scale consisting of 1-5, strongly disagree, disagree, undecided, agree and strongly agree options. This questionnaire was conducted over internet, with anonymity for the identity of students. IBM SPSS Statistics 25 program was used for statistical evaluations.
Findings: Survey participated by 88D and 59DCA students; 40.1% of students reported that they connected to lessons via their mobile phones and tablets. Statistically significant difference was not found between two groups in terms of difficulty and effort levels in their connection to classes($p=0.622$,$p=0.348$). In the contribution of pedodontics to students' knowledge levels was found that knowledge levels of students with easy access to internet at the beginning and end of lessons were significantly different from those with difficult access($p=0.002$). Lecturers' skill level and their competence do not differ significantly according to groups. Statement that watching webinars is more beneficial than online education has been the proposition with the lowest mean score.
Conclusion: Dentistry and dental clinic assistant students faced various difficulties adapting to online education system. This internet and technology-based system caused inequalities in education levels of students, tried to be balanced lecturers. While the pandemic process continues in an unpredictable way, lecturers have a great responsibility to make pedodontics lesson reach their goals fairly.
Keywords: Covid-19 pandemic, pediatric dentistry, online education

Evaluation of the Effectiveness of Panoramic Radiography to Determinate the Vertical Growth Pattern

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Introduction/Purpose: Panoramic radiographs and cephalometric radiographs are diagnostic tools frequently used by orthodontists, thanks to their known advantages. According to a study published in Finland in 2010, when radiographs taken from children aged 0-16 are evaluated in terms of prevalence of use, panoramic radiography comes first with 27%, and cephalometric radiography comes second. It has been reported that cephalometric radiography is an important tool for diagnosis in orthodontic treatment planning, but it does not affect treatment planning to a great extent. Although the radiographs used for diagnosis and treatment planning have many advantages, radiation received by patients is a disadvantage. Therefore, the number of radiographs should be minimal. Given that dentists routinely use panoramic radiographs, panoramic radiographs can be a useful tool in determining growth direction and diagnosing vertical growth problems. The aim of our study is to evaluate the usability of panoramic radiography in determining the vertical relationship of the jaws in order to reduce the amount of radiation and the number of radiographs used for diagnosis.

Method: A total of 135 individuals aged between 13 and 26 (mean: 17.32±2.68) whose growth and development were completed were included in our study. The individuals included in the study were divided into groups as skeletal class 1 ($0 \leq ANB < 4°$), skeletal class 2 ($ANB \geq 4°$), and skeletal class 3 ($ANB < 0°$). Each group consists of 15 hypodivergent (SN / GoMe <26 °), 15 normodivergent (25 ° <SN / GoMe <38 °) and 15 hyperdivergent (38 ° <SN / GoMe °) individuals. In our study, lateral cephalometric and panoramic films taken at the beginning of the treatment were used. The correlation of measurements made on panoramic radiography with the cephalometric SN/GoMe angle was evaluated.

Findings: While there was a positive correlation between SN/GoMe angle and panoramic gonial angle in all groups ($p<0.001$), a negative correlation was found between SN/GoMe angle and CoANSCo angle only in skeletal class 2 group ($p<0.05$). A positive correlation was found between SN/GoMe angle and panoramic ANS-PNS length ($p<0.05$).

Conclusion: Panoramic gonial angle can give information about vertical relationship. Panoramic radiographs cannot be a complete alternative to cephalometric radiographs; however, with panoramic radiographs, not only dental but also limited skeletal estimations can be made.

Keywords: Panoramic radiography, vertical growth pattern, cephalometric radiographs

Coronally Advanced Flap Associated with a Connective Tissue Graft for the Treatment of Multiple Recession Defects in Mandibular Anterior Teeth with Tooth Sensitivity

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Introduction/Purpose: The multiple recession defects in mandibular anterior teeth is challenging area for clinicians when tooth sensitivity occurs. Tooth sensitivity is considered one of the main indications for surgical root coverage. The coronally advanced flap with a connective tissue graft has been documented as an effective surgical technique for the treatment of gingival recessions in cases of multiple adjacent recession defects. The aim of the present case series was to test the coronally advanced flap, in association with a connective tissue graft, in a case series of three patients concerning tooth sensitivity, presenting six buccal gingival recessions on adjacent teeth in the anterior mandibular area.

Method: Three subjects ranging in age between 25 and 50 years who were periodontally healthy with multiple adjacent gingival recession concerning with tooth sensitivity– type defects in the mandibular buccal anterior area were enrolled in this case series. Periodontal parameters (recession depth, keratinized tissue height, probing pocket depth) and tooth sensitivity (thermal sensitivity-air jet) was applied to each tooth were recorded on teeth involved in the surgeries at baseline (before surgery) and 90 days. The pain scores were recorded using a 10-point scale. A total of 18 recessions were treated the coronally advanced flap, in association with a connective tissue graft.

Findings: No significant complication affected the surgeries. Recession depth was reduced from 2.22 ± 0.69 mm at baseline to 0.44 ± 0.17 mm at the 90-day control. Keratinized tissue increased from 3.62 ± 0.82 mm to 5.05 ± 0.64 mm. A mean 80.2% ± 7% recession coverage was obtained. The dentin hypersensitivity was lessened from 5.00 ± 1.36 to 0.77 ± 0.52 with air jet.

Conclusion: The coronally advanced flap in association with a connective tissue graft can be proposed as a valid therapeutic approach for the presence of moderate or severe tooth sensitivity in mandible anterior recession defects**.**

Keywords: Coronally advanced flap, connective tissue graft, tooth sensitivity

The Effect of Social Media on Patients in Dentistry

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Introduction/Purpose: Social media, which has become an important communication tool and source of information in every field, is also widely used in health services. The aim of this study is to evaluate the effects and potential benefits on patients of the posts about dentistry on social media networks

Method: In the study, 379 patients (253 females, 166 male) who applied to Süleyman Demirel University Faculty of Dentistry Dentomaxillofacial Radiology clinic for various reasons, a survey consisting of 23 questions was applied. The content of the survey included questions about demographic information, duration of using social media and the impact of social media on dentist, hospital, and treatment selection.

Findings: It was found that 94.2 % of the participants had a social media account, and the majority (34 %) stated that they used social media to follow current developments. 47.8 % of respondents had social media accounts of four and more than four. A statistically significant association was found between the number of social media accounts and age groups. (p=0.00) 42.2 % of the participants reported that they saw posts about the field of medicine and 16.7 % of them about dentistry. The majority of the participants (35.9 %) in the selection of dentist and hospital stated that visual sharing (photos, videos, before and after treatment) mostly affected their thoughts. The majority of the respondents (37.3%) stated that they saw the most tooth whitening posts related to dentistry. Most of the participants reported that they didn't choose a dentist (92.2 %) and a hospital (88.8 %) due to the influence of social media. The rate of the participants who stated that they shared their satisfaction with the treatment they received in the field of dentistry on their social media account was 10.9 %.

Conclusion: As a result of this survey study, it was found that most of the participants did not choose a dentist or hospital due to the effect of social media, and the opinions of the patients were mostly influenced by visual sharing. Aware of legal responsibilities social media used more effectively in the field of dentistry is important that patients reach accurate information

Keywords: Dentistry, health communication, social media

Age Estimation of Adults From Cone Beam Computed Tomography Images

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Introduction/Purpose: Age estimation is one of the most important procedures used for identifying an individual in medical, forensic and anthropological studies. Anatomical structures such as teeth, vertebra, cranial structures, pelvis are used in the identification of the individual. Teeth have been frequently used in age estimation methods because they can remain unchanged for a long time and they are less affected by external factors than other body structures. The narrowing of the pulp cavity due to the secondary dentin formation with age is an important criterion that is taken into consideration in dental age estimation of adults. The aim of this study is to estimate age by performing linear measurements of pulp cavity of the maxillary central and canine tooth according to Kvaal's method on cone beam computed tomography (CBCT) images in a sample of Turkish population.

Method: CBCT images of 74 individuals (37 females, 37 males) aged between 18 and 63 years were evaluated retrospectively. Linear measurements of pulp cavity of 74 maxillary central and 74 canine tooth were made on pseudopanoramic CBCT sections using Kvaal's method. The relationship between age and morphological variables was calculated by the Pearson correlation analysis. Multiple linear regression models were established for each tooth to estimate the age.

Findings: Regression equation analysis were respectively developed to estimate age from morphological variables using the multiple regression analysis for the maxillary canine tooth, the maxillary central tooth and both teeth with a linear measurements (the maxillary canine tooth standard error of estimate, SEE = ±10.42, the maxillary canine tooth coefficient of determination R^2= 0.158; the maxillary central tooth standard error of estimate, SEE = ±10.65, coefficient of determination R^2= 0.131; both teeth standard error of estimate, SEE = ±10.18, coefficient of determination R^2 = 0.207).

Conclusion: Linear measurements and ratios of pulp cavity of the maxillary central and canine tooth on CBCT images were insufficient to estimate the age according to Kvaal's method in a sample of Turkish population. In future studies, it is recommended to use different radiographic measurements with a larger sample size number or secondary dentin indicator, such as pulp area, pulp volume, to increase the accuracy of age estimation in adult Turkish individuals.

Keywords: Age estimation, cone beam computed tomography, forensic dentistry, Kvaal's method, tooth

Investigation of Stylohyoid Chain Complex Incidence: A Radiological Study

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Introduction/Purpose: The elongated styloid process (SP) and calcified stylohyoid ligament can evaluate radiologically and associated with some symptoms and syndromes. The aim of this study was to define the incidence of different types of stylohyoid chain patterns in a group of Turkish population and classify.

Method: 1217 patients were included the study to evaluate the incidence and types of elongated SP, who visited at the Faculty of Dentistry at Necmettin Erbakan University. The styloid chain complex in the images was evaluated according to the O'Carroll classification. The data set have been analyzed with SPSS 21.00 software (SPSS, Chicago, IL, USA). Beside descriptive statistics, Chi-square tests have been performed to evaluate statistical significancy with significance level p=0.05.

Findings: Ratio of normal SP (Patterns A, B, C and D) is averagely calculated for left and right sides as 86.5%. Ratios of elongated SP (Pattern E) and calcified stylohyoid ligament (Patterns F, G, H, I, J and K) are 7.1% and 2.2%, respectively. The absent stylohyoid chain (Pattern L) is 2.8%. Remaining 1.4% are observed as unclassified stylohyoid chain (Pattern U). Also, most of the population has symmetry of stylohyoid chain complex, that is right and left patterns are same, with ratio 80.4%. Influence of gender on the symmetry of stylohyoid chain complex is observed as statistically insignificant with p=0.224. There is almost statistically a significant difference between the stylohyoid complex pattern and age groups for both sides as p=0.048 for right side and p=0.015 for left side.

Conclusion: We believe that this study provides additional information about the frequency of elongated styloid process and provides valuable knowledge of the anatomical variations of the SP which may help clinicians from various specialties to diagnose the Eagle syndrome.

Keywords: Styloid process, Digital panoramic tomography, Diagnostic imaging, Eagle's syndrome, Ossification

Additional Esthetic Restorative Treatment Needs After Orthodontic Treatment

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Introduction/Purpose: Esthetic treatment goals cannot always be achieved with orthodontics only, therefore the need of restorative treatment is required. This retrospective study emphasizes the importance of multidisciplinary approaches in these case.

Method: A total of 164 orthodontic patients from the finished orthodontic patients' list were examined. Patients who received esthetic restorative treatments due to congenitally missing lateral incisors, peg-shaped lateral incisors and tooth size-arch length discrepancies were noted.

Findings: The need of restorative treatment after orthodontic treatment was determined for 25 patients.8, 5 and 12 patients had peg-shaped lateral incisor on either one side or two sides in the upper arch, congenitally missing lateral incisor on one side or two sides in the upper arch and tooth size-arch length discrepancy in the upper arch respectively.

Conclusion The need of restorative treatment can vary many reasons as some being peg-shaped or micrognathic lateral incisors, congenital deficiencies and tooth size-dental arch length discrepancy. Orthodontic treatment may not always be sufficient to meet the esthetic goals of patients in the presence of these kind of problems. Prosthetic and esthetic restorations could be offered to the patient instead of an orthodontic treatment but in some patients, due to the abnormal occlusion, orthodontic treatment should be performed before restorations. Tooth-arch size length discrepancy in the upper arch was found to be the most common problem among restorative treatment needs after orthodontic therapy. Multidisciplinary treatment approaches should be planned for patients with tooth size discrepancies or congenitally missing incisors at the beginning of the orthodontic treatment in order to reach excellent treatment results.

Keywords: Orthodontic treatment, restorative treatment, multidisciplinary treatment approaches

Five-Year Retrospective Analysis of the Patient Data of the T.U. Oral and Dental Health Application and Research Center: The Frequency and Localizations of Overhanging Dental Restorations

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Introduction/Purpose: The aim of this study is to detect overhanging restorations by examining the routinely taken panoramic radiographs of patients retrospectively for 5 years, and to determine the change in prevalence by years.

Method: Routinely taken panoramic radiographs of 59.247 patients between the ages of 18-85 (mean 43.3±11.9) who admitted to the T.U. Oral and Dental Health Application and Research Center for treatment between 2015-2020, were retrospectively examined after the approval of the ethics committee (TÜTF-BAEK 2021/219) and the radiographs of 885 patients (48.9% male, 51.1% female) with at least one overhanging restoration were included. Superposed interdental areas were excluded. Frequency distribution and percentages were given for categorical data regarding the localization of teeth with overhanging restoration such as maxillary or mandibular, right or left jaw, and tooth type. The frequency of overhangs was determined by years and the Chi-square test was used for comparisons.

Findings: In 2015, 2% of the patients had overhanging restoration. Overhangs were detected in 1.5% of patients in 2016, 1.4% in 2017, and 1.3% in 2018 and 2019. The frequency of overhanging restorations in the maxilla (56.5%) was statistically significantly higher than those in the mandible (43.3%) ($p < 0.05$). The frequency of overhangs in molars (80.9%) was statistically significantly higher than premolars (19.1%) ($p < 0.05$). 63.3% of the overhanging margins of the proximal restorations were on the distal surface, and this ratio was higher than those on the mesial surface (36.7%) ($p < 0.05$).

Conclusion: As a reflection of the developments in dental technology, materials, and equipment, the risk of overhang in restorations can be prevented. However, depending on the tooth and other treatment-related factors (tooth morphology, lesion type and depth, treatment method, and selection of restorative material, etc.), overhanging restorations are still encountered, especially in areas that are difficult to reach during treatment.

Keywords: Overhanging restoration, marginal adaptation, panoramic radiography.

Evaluation of the Awareness and Attitudes of Infection Control at the Faculty of Dentistry and Vocational School of Health Oral and Dental Health Program Students

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Introduction/Purpose: Dentists, dental students and allied health personnel are at risk for infections transmitted by blood and saliva during daily treatment procedures. According to the researches, many diseases in dentistry can be transmitted through direct and indirect contact such as sharp-stab wounds, contact with contaminated instruments, devices and surfaces, and settlement on the skin or mucous membranes with impaired integrity. The aim of this study is to determine the knowledge level of clinical students in our faculty of dentistry and in the oral dental health program of the vocational school of health and to evaluate the necessity of additional training studies in line with the results obtained.

Method: The research is a descriptive study aimed at measuring the knowledge levels of dentistry and oral dental health program students on sterilization, antisepsis and disinfection. The study was done at 62 oral-dental health program students and 182 dentistry students who did internship at the Necmettin Erbakan University Faculty of Dentistry. In the study, the questionnaire created by using the literature was applied face to face. IBM SPSS Statistics 25 program was used for statistical evaluations.

Findings: While 25.4% of the students participating in the study are 2nd year students studying in the dental services of the oral and dental health program, 74.6% are dentistry students. Of the dentistry students, 49.1% are in the 4th grade and 50.9% are in the 5th grade. 80.3% of the participants stated that they had not received training on sterilization disinfection before, while 19.7% stated that they had received training. When the answers given by the students to the medical waste question were evaluated, it was observed that 92% of them gave correct answers. When the answers they gave to the question of whether they were in the risky group in terms of occupational infection were evaluated, it was seen that 71.3% of them considered themselves in the risky group, 11% answered that they were not in the risky group, and 17.7% said that they were undecided. 43.4% of the students stated that they had contact with infected blood and body fluids, while 56.6% stated that they did not. When the answers given to the hand hygiene question were evaluated, it was seen that the 5th grade students gave more correct answers than the students in the other class ($p<0.05$). When the answers given by the students to the question of whether they trust the institution and solutions for sterilization & disinfection are evaluated, 58.5% answered yes, 10.9% answered no, and 30.6% answered undecided. The rate of correct answers to the question of the order of putting on and taking off the protective equipment of the students was 89.1% for the 5th grade students, 78.3% for the 4th grade students, and 77.7% for the oral and dental health program students.

Conclusion: The knowledge levels of our physician candidates and assistant personnel regarding infection control measures should be reviewed, practical training hours should be checked in our training curricula and their knowledge on hygiene and isolation measures should be completed.

Keywords: Vocational school, dentistry, students

Relationship Between Periodontal Inflamed Surface Area and Systemic Inflammatory Markers

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Introduction/Purpose: The purpose of this study is to evaluate a dose–response relationship between periodontal inflamed surface area (PISA) and the systemic Tumor necrosis factor-alpha (TNF-α) and Matrix metalloproteinase-8 (MMP-8) levels in periodontal health and periodontitis.

Method: Thirty participants without systemic diseases were included in this study. Fifteen patients were periodontitis (Group P) and 15 individuals were periodontal healthy (Group PH). The full mouth periodontal examination was performed at all participants. PISA was calculated from periodontal probing depth (PPD) and bleeding on probing (BOP) assessments. Serum TNF-α and MMP-8 levels were analyzed by enzyme-linked immunosorbent assay.

Findings: Clinical periodontal parameters, PESA and PISA ($p<0.001$) were higher in Group P than those in Groups PH. Serum TNF-α and MMP-8 levels were higher in Group P ($p<0.001$) than those in Groups PH ($P<0.001$). The positive correlations were observed between plaque index (PI), gingival index (GI), PPD, BOP%, clinical attachment level (CAL), periodontal epithelium surface area (PESA) and PISA ($P<0.05$). The positive correlations were observed between serum PISA and MMP-8 and TNF-α levels ($P<0.05$).

Conclusion: PISA is a quantitative variable represented multiple periodontal indexes, such as PI, BOP and PPD. The relationship of PISA and systemic inflammatory markers demonstrates the validity of PISA.

Keywords: Periodontitis, periodontal inflamed surface area, systemic inflammation

Long-term Follow-up of the Treatment of Gingival Recession Defects with Titanium Platelet-Rich Fibrin(T-PRF): Case Series

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Introduction/Purpose: Bruxism, traumatic tooth brushing, shallow vestibule depth, long frenulum attachment causes gingival recession. Although many methods are used in the treatment of gingival recessions, autogenous products such as connective tissue grafts are considered the gold standard. Titanium Platelet Rich Fibrin (T-PRF) can be applied as an autogenous biomaterial and graft substance in soft and hard tissues today. The literature confirmed that the basic histological structure of T-PRF is similar to Glass Tube Platelet Rich Fibrin (L-PRF); however, the fibrin of T-PRF seemed more tightly woven and thicker than that of L-PRF.

Case Reports: It was determined that 3 patients who referred to our clinic had gingival recession in a total of 16 tooth regions. As a result of the clinical examination, it was evaluated that two of these tooth regions had single gingival recession, and the other 14 tooth regions were part of multiple gingival recessions. It has been observed that existing gingival recessions develop due to traumatic tooth brushing. Aesthetic problems and tooth sensitivity complaints were recorded in patients. Multiple gingival recession defects of patients who completed Phase I periodontal treatment were treated with the web coronal positional flap technique. T-PRF treatment was applied in two single gingival recession defects with double papillary flap and modified tunnel technique. After surgical treatments, all the defects healing was uneventful. Each of the three patients was called for regular controls every 6 months. The initial mean value of gingival recession in two single teeth was 5 mm, and the mean root coverage rate was 92.85% after 36 months of surgical treatment. The average initial value of 14 multiple gingival recessions was 3.75 mm, after 24 months the mean root coverage rate was 68.45%. As a result of long-term follow-up of surgical treatments, improvements in clinical parameter values (clinical attachment level, gingival recession, keratinized tissue width) were recorded.

Conclusion: Many methods can be used in the treatment of gingival recessions. Completely autogenous, blood-derived T-PRF is an easy to obtain, inexpensive and practical method and is noted as an important treatment alternative, especially in multiple gingival recessions. The fibrin carpet formed with titanium has a firmer network structure than L-PRF. This strong fibrin structure is important to extend the time for resorption of fibrin and release time of growth factors.

Keywords: Gingival recession defects, surgical treatment, titanium platelet rich fibrin

Evaluation of Airway Volume by CBCT in Patients with Class I and Class II Skeletal Patterns: A Pilot Study

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Introduction/Purpose: Anatomical changes of the craniofacial structure and soft tissue may affect the morphology and volume of the pharyngeal airway space. The purpose of this study is to compare the airway volumes in patients with class I and II skeletal patterns with cone-beam computed tomography (CBCT).

Method: The study sample consisted of 34 class I patients (12 females and 22 males; mean age: 42.88±11.94) and 34 age and sex matched class II patients (12 females and 22 males; mean age: 42.88 ±11.94). The sample was divided into two groups according to the anteroposterior jaw relationship; The angle ANB was defined as Class I from 0° to 4°, and Class II if it was greater than 4°. Images in DICOM format were transferred to Dolphin 3D software. The upper limit according to the pharyngeal airway boundaries was defined as the line passing through the anterior nasal spina and the posterior nasal spina points. The lower border was defined as the line passing through the supero-anterior edge of the fourth cervical vertebra and the mentone points. The independent sample t-test was used to evaluate the airway of patients with class I and class II skeletal patterns and the Mann-Whitney *U*-test was used to compare the parameters according to gender ($p<0.05$). IBM SPSS software version 25.0 statistical program was used for statistical analysis. The significance level was set at 5% (p- value < 0.05).

Findings: The airway volumes of patients with class II skeletal pattern (24063 ± 7232) were smaller than those of patients with class I skeletal pattern (24527 ± 8951). But the difference between the groups was not statistically significant ($p>0.05$). There was no statistically significant difference in airway volume between the genders in both groups ($p>0.05$).

Conclusion: Airway volumes of patients with class I and class II skeletal patterns are similar.

Keywords: Cone-beam computed tomography, pharyngeal airway, pilot study

Impact of Non-Surgical Periodontal Treatment of Generalized Chronic Periodontitis on Quality of Life

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Introduction/Purpose: The term 'Quality of life' (QoL) references the general well-being of individuals and societies. In recent years, after treatments variety of measurement scales are used to record the extent and impact of the treatment on quality of patient's life. Among these scales, Oral Health Impact Profile (OHIP-49) and a shorter version of that OHIP-14 are the most comprehensive, accessible and common ones. Our aim was to evaluate the effect of non-surgical periodontal therapy on quality of generalized chronic periodontitis patients' life by using OHIP-14.

Method: Following clinical and radiographic examinations, 58 patients were recruited in the study (37 men and 21 women), diagnosed with generalized chronic periodontitis and requiring non-surgical periodontal therapy for treatment. All patients were asked to fill in a form, containing demographic (age and sex), socio-economic (education level, marital status and income) information, reason of dental visit and oral hygiene habits (toothbrushing, dental flossing and use of oral rinse). Clinical parameters (PI, GI, PPD, BOP, CAL) of the patients were recorded. Non-surgical treatment was performed during one week in two seperate sessions. Non-surgical treatment contained scaling and root planning and subgingival curettage under local anesthesia. All clinical parameters recorded again one month after treatment. Finally, OHIP-14 TR questionnaires have been filled out in order to evaluate oral health quality of life before and after treatment.

Findings: There was a significant decrease in all periodontal parameters (PI, GI, PPD, BOP, CAL) and OHIP-14 TR one month after non-surgical periodontal treatment ($p<0.001$). OHIP-14 had significant positive correlation with PI ang GI (respectively; $p=0.024$, $p=0.026$), but there were no correlations between BOP, PPD, CAL ($p>0.05$). The questions in the OHIP covered 7 dimensions: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap. When these 7 parameters were compared with clinical periodontal parameters, a statistically significant positive correlation was found between physical pain and BOP and CD. After the treatment, while BOP and CD decreased, physical pain also decreased.

Conclusion: In this study the relationship between non-surgical periodontal therapy and oral health/quality of life was investigated using OHIP-14 TR during one-month period of time. The results showed a significant decrease of OHIP after non-surgical periodontal therapy and consequently, improving quality of life. Finally, the significant impact of non-surgical periodontal therapy should be considered on the improvement and growth of quality of life of patients.

Keywords: Chronic periodontitis, quality of life, oral health impact profile, periodontal treatment

Comparative Evaluation of Bond Strength of Self-Adhesive and Microhybrid Composites to Calcium Hydroxide

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Introduction/Purpose: The bond strength between calcium hydroxide and overlying restoration is important for pulp capping treatment success. This study aimed to compare the shear bond strength of self-adhesive and microhybrid composite resin to calcium hydroxide cement with different application modes of universal adhesive system.
Method: Two different restorative materials [a microhybrid composite (Filtek Z250, 3M ESPE) and a self-adhesive composite (Vertise Flow, Kerr)] were used in this study. Totally 75 acrylic blocks with central holes (2 mm of depth and 5 mm of diameter) were prepared and calcium hydroxide cement (Dycal, Dentsply Sirona) were placed. Then, they were randomly divided into 5 groups (n=15): 1) Vertise Flow+no adhesive system application, 2) Vertise Flow+self-etch mode, 3) Vertise Flow+etch&rinse mode, 4) Filtek Z250+self-etch mode, 5) Filtek Z250+etch&rinse mode. The universal adhesive system was applied. Then, the cylinder-shaped composite specimens (diameter:3 mm, height:2 mm) were bonded. All specimens were stored in distilled water for 24 h and subjected to shear bond strength test at a crosshead speed of 1 mm/min using universal testing machine. Fractured surfaces were observed under a steremicroscope. Data were statistically analyzed with Welsch ANOVA and Games Howell tests($p<0,05$).
Findings: Regarding the different application modes of adhesive system, self-etch modes caused statistically higher shear bond strength than etch&rinse mode for both composite resins. Regarding the restorative materials, Filtek Z250 showed statistically higher shear bond strength than Vertise Flow with etch&rinse mode whereas no statistical differences were found in shear bond strength with self-etch mode. Besides, Vertise Flow with no adhesive application showed statistically higher shear bond strength than the ones with etch&rinse mode while it showed statistically lower shear bond strength than the ones with self-etch modes. Both composite resins with etch&rinse mode and Vertise Flow with no adhesive application showed predominantly adhesive failures while both composites with self-etch mode presented mixed failures.
Conclusion: The self-etch mode application of universal adhesive system might be preferred for the adhesion of microhybrid and self-adhesive composite to calcium hydroxide.
Keywords: Calcium hydroxide, composite resin, microhybrid shear bond strength, self-adhesive

Evaluation of the Efficiency of Fluorescence-Aided Caries Excavation (FACE) Method Under In-Vitro Conditions

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Introduction/Purpose: Primary teeth with a high prevalence of caries have some anatomical differences compared to permanent teeth. These differences increase the probability of pulp perforation while removing caries in primary teeth. For this reason, the minimally invasive dentistry approach is important in the treatment of primary teeth. FACE, which is reported to work with the principle of minimally invasive dentistry, is a caries removal technique based on the fluorescent characteristic of oral biofilm. The aim of this study was to investigate the ideal caries removal method that preserves the tooth structure as much as possible in pediatric dentistry by evaluating the decay removal efficiency and minimal invasiveness potentials of the traditional method and FACE method on extracted primary teeth with micro CT.

Method: 42 primary molar teeth with medium size decay in the interface were included and which has a pulpal perforation is excluded in our study. Teeth were randomly divided into 2 groups as 21 samples in each study group. Before scanning the samples, the x-ray hardening curve of the device was prepared using hydroxyapatite phantoms (HAP) obtained from two conical calcium hydroxyapatite crystals of 8mm diameter with two different mineral densities, 0.25g/cm^3 and 0.75g/cm^3 to ensure standardization of microCT. HAP phantoms were scanned at 80mA and 15µm/pixel, and a 0.25mm aluminum filter was placed in front of the detector during scanning. The samples were scanned twice with the same values, before and after caries removal.

Findings: When mineral densities (BMD) were evaluated in our study, the average BMD was measured as 0.55g/cm^3 before decay removal, and BMD after decay removal was measured as a value in the range of 0.96-1.08g/cm^3. When the increase in cavity volumes between the groups was evaluated, a statistically significant increase was observed in both groups after caries removal compared to the previous volume, however, this increase was found to be statistically significant in the traditional method group (0,83mm^3) compared to the FACE method group (0,42mm^3). When the minimal invasiveness potential (MIP) of the groups was evaluated, it was found that the FACE method (1,18mm3) was a more minimally invasive method compared to the traditional method (1,45mm3).

Conclusion: According to the results of our study, it was seen that an effective caries removal procedure can be performed with a minimally invasive approach with the use of the FACE method in caries removal in pediatric dentistry.

Keywords: FACE, minimal invasive dentistry, micro-CT

Mandibular Fracture and Treatment: Case Series

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Introduction/Purpose: Mandibular fracture is fourth most frequent fracture of the maxillofacial fracture. Among patients with facial injuries, mandibular fracture occurs in between 37% and 67% of the cases. The types of mandibular fractures are classified symphysis, parasymphysis, corpus, angulus, ramus, alveolar process, condylar, and coronoid process based on location. Facial injury common causes include motor vehicle collisions and assaults sports-related injuries, industrial or work place accidents, and falls. Maxillomandibular fracture could be occurred by direct and indirect forces. Indirect trauma generally causes fracture of mandible and injury to the posterior teeth because of indirect force. The traumatized patient was referred to dentist. Open or closed treatment options are considered according to the type and localization of the fracture, the age and health of the patient. Majority of mandible fracture could be treated with lag screws, manipulates and reconstruction bone plates or intermaxillary fixation. The purpose of case series was to evaluate the results of different type of mandibular fracture and its treatment .

Case reports: Case 1: An 18-year-old male was referred to clinic pain and swelling. In the radiographic examination left parasymphisis and right angulus mandible fracture was seen. IMF treatment was applied for 2 weeks. Case 2: 36 years old patient visited to our clinic due to trauma with pain and chewing difficulty. Clinical and radiological examination revealed angulus fracture distally to left second molar. This patient was treated one titanium plate with 4 screws on upper boundary of the mandible; in accordance with the Champy Principle. Case 3: A case of a 40-year-old man was referred to our clinic with non-depleted fracture extending from the sigmoid notch to the angulus in the right mandible corpus. This patient managed by open reduction using two titanium plate with 4 screws and arc bar. All three patient mandible fracture was healed and functional recovery of the occlusion was obtained. Successful bone healing was achieved. No complication was observed in the post-operative 3-6-month follow-up.

Conclusion: Current treatment used for mandibular fractures is intermaxillary fixation with closed reduction (using arch bars and wires) or fixation with an open reduction (using titanium plates and screws or resorbable plates and screws). Mandibula fractures have been treated with IMF techniques for many years; however currently, IMF has been less common, and mini plate and screw systems have been popular. The most common treatment option for dislocated mandibular fractures is the open reduction and IMF with plates and screws. These case reports presented three different treatment options: IMF, titanium plate and their combination in three patients which had isolated parasymphysis fracture, isolated angulus fracture and angulus with symphysis fracture.

Keywords: Case series, mandibular fracture, titanium plate

A Retrospective Assessment of Pediatric Dental Trauma Patients Before and During The COVID-19 Outbreak

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Introduction/Purpose: Due to the COVID-19 outbreak, which began in the last months of 2019 and affected the world and our country, applications to health centers for dental treatments have negatively affected due to the doubts that patients can receive treatment services and the risk of transmission during dental treatments. However, since it is evaluated within the scope of emergency dental treatment for dental injuries in our country, dental treatment service has been provided since the beginning of the pandemic. The aim of our study was to compare the number of patients admitted to the Department of Pediatric Dentistry of Ataturk University Faculty of Dentistry in 2020 due to dental trauma with pandemic, the causes and forms of trauma with the previous year.

Method: Dental trauma records of Ataturk University Faculty of Dentistry Department of Pediatric Dentistry were used for our retrospective study. The number of patients admitted in the records, age, gender, type of trauma, where the trauma occurred, and the teeth affected by the trauma were evaluated. The distribution of trauma cases over the years in terms of gender, dentition, jaw, and location was evaluated by Chi-square analysis.

Findings: The number of patients admitted to our clinic due to dental trauma for one year in 2019 before the pandemic was 103 (girls=34, boys=69), while in 2020, when the pandemic began in our country, this number was 69 (Girls=24, boys=45). The average age of children is 7.8 in 2019, compared to 7.4 in 2020. In both years, the incidence of trauma in boys is higher. In 2019 and 2020, enamel-dentin fractures from dental hard tissue injuries were the most common with rates of 25% and 22%, respectively, while complex crown fractures took the second place at rates of 11% and 16%. In terms of periodontal tissue injuries, lateral luxation injuries for 2019 and 2020 were observed by 19% and 23%, respectively, while avulsion incidence rates were found to be the same for both years, being 8%. Judging by the location of the trauma, 48% of the injuries that occurred in 2019 and 55% in 2020, despite curfew restrictions due to the pandemic, occurred outside. In 2019, 34% of the trauma cases admitted were in primary dentition and 66% were in permanent dentition, while in 2020 these values changed to 30% and 70%. No statistically significant differences were found in the distribution of trauma cases by year in terms of gender, dentition, jaw and location ($p>0.05$).

Conclusion: Since no significant reduction in the frequency of dental traumas has been observed during the COVID-19 outbreak in children, it is important that parents and children are trained in dental trauma prevention and protection methods.

Keywords: COVID-19 outbreak, dental trauma, pediatric dentistry

Comparison of Procedures in Prosthodontics Clinic Before and During the Covid-19 Pandemic

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Introduction/Purpose: Regular dental examinations without complaints or pathologies allow to protect oral and dental health, as well as to produce solutions with more conservative treatments, which may be less costly thanks to early diagnosis. However, as of March 2020, when the Covid-19 pandemic began to appear in Turkey, most of the non-emergency prosthetic dental treatments had to be postponed due to the risk of transmission. The aim of this study is to compare the prosthetic dental treatment and maintenance practices of the patients applied to our clinic for a period of one year before and during the Covid-19 pandemic.
Method: Approval for the study was obtained from the Turkish Ministry of Health (No: 2021-04-07T23_35_11) and Ethics Committee of Pamukkale University (Approval No: 60116787-020-44414). The records of patients applied to Pamukkale University Faculty of Dentistry, Department of Prosthodontics, were reviewed retrospectively. 15th of March 2019 to 14th of March 2020 as the pre-pandemic period, and 15th of March 2020 to 14th of March 2021 as the pandemic period were observed. The age, gender, number of examinations, prosthetic application types, Covid-19 PCR positiveness of the patients were checked over and recorded through the hospital information system. The prosthetic applications were divided into two categories: aerosol-generating (AG) and without aerosol (WA). Data were analyzed using descriptive statistical methods and Pearson's chi-square test was used to analysis of qualitative data. Mann Whitney U test was used to compare two groups with non-parametric distribution of quantitative data. Statistical significance was estimated at $p<0.01$ and $p<0.05$.
Findings: A total of 13863 procedure recordings of 1973 patients (female, n=1114; 56.42% and male, n=859; 43.58%) were observed from 15th of March 2019 to 14th of March 2021. Patients' average age was 50.46 ± 15.96 in this period. It was observed that the number of patients for both of the AG- and WA-procedures were higher in the period pre-Covid-19 (n=638; 52.26% and n=538; 47.74%, respectively) than during Covid-19 (n=385; 51.2% and n=367; 48.8%, respectively). Although the number of AG-procedures observed in the period pre-Covid-19 (n=5291; 59.48%) were more than the ones observed during Covid-19 (n=2853; 57.43%), considering the percentages of the WA-procedures in the period pre-Covid-19 (n=3604; 40.52%), during Covid-19 (n=2115; 42.57%) they were significantly higher (p=0.002). It was determined that the rate of AG-procedures performed during the Covid-19 period was higher than the rate of WA-procedures, and this difference was found to be statistically significant except for the full-closure period in Turkey (p=0.001).
Conclusion: In order to reduce the risk of transmission in the pandemic, postponing all treatments -except non-emergency- reduces the treatment time, resulting in less aerosol release. It is thought that the correct analysis of the risk transmission will guide clinicians in terms of deciding on future procedure durations and treatment options.
Keywords: Covid-19 pandemic, dental health, prosthetic treatments

Observation of the Methodology Types of Original Studies Published by International Journals with the Highest Impact Factor on Prosthetic Dentistry

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Introduction/Purpose: The concept of impact factor has become an important criterion in the evaluation of scientific journals and the selection of journals for researchers recently. The aim of this study is to analyze the methodology types of the original studies published in the last five years in the first three prosthetic dentistry journals in the 2020 impact factor ranking.
Method: Impact factor ranking of dental journals for 2020 was ranged using the SCImago Journal & Country Rank (https://www.scimagojr.com/journalrank) data system, and it was determined that the first three prosthetic dentistry journals were Journal of Prosthetic Dentistry (JPD), Journal of Prosthodontic Research (JPR), and Journal of Prosthodontics (ACP), respectively. The contents of all issues published from May 2016 to May 2021 were examined and only "original research" studies were evaluated. The published volume and number of research were recorded. “Material and Methods” sections of all studies were evaluated and they were grouped according to a methodologic classification as *in vivo*, *in vitro*, finite element analysis, survey, and animal study, and the data were recorded. It was evaluated whether there was a statistical relationship between the journals and the published study methodologies. Data were analyzed using descriptive statistical methods and the Chi-square test. Significance was evaluated at $p<0.01$ and $p<0.05$ levels.
Findings: A total of 65 issues and 957 studies were examined in JPD, a total of 20 issues and 267 studies in JPR, and a total of 48 issues and 543 studies in ACP. It was observed that the number of *in vitro* studies was the highest in all of the journals (n=663 (69.2%) in the JPD, n=140 (52.4%) in the JPR, and n=336 (61.8%) in the ACP), and the animal studies were the least. A statistically significant relationship was found between journals and accepted study methodologies ($p <0.001$). While the acceptability of *in vivo* studies was higher in JPD (n=242; 25.2%), it was determined that this result showed a statistically significant difference from other journals ($p<0.001$). A statistically significant difference was observed between all three journals in terms of *in vitro* study, and the highest *in vitro* acceptance rate was found in the JPD journal ($p<0.001$). When evaluated in terms of FEM and survey studies, no statistically significant difference was observed in terms of acceptance rate in all three journals ($p>0.05$).
Conclusion: With the quantitative data obtained by evaluating the publication characteristics of scientific journals, ideas can be obtained for new studies to be planned. In particular, the fact that more *in vitro* studies have been published maybe since researchers prefer such studies because their methodology is more applicable, does not require ethical obligations, and does not include patient factors.
Keywords: Impact factor, original study, prosthetic dentistry

The Use Of Artificial Intelligence in TMJ Osteoarthritis

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Dentistry has made a rapid entry into the digital world with artificial intelligence applications. Artificial intelligence, which has been actively applied in a wide variety of sectors in recent years, is an active interest of many researchers. Dentistry is no exception to this trend, and artificial intelligence applications are particularly promising in the field of oral and maxillofacial (OMF) radiology. Recent research on artificial intelligence in OMF radiology has mostly used access neural networks capable of image classification, detection, segmentation, recording, rendering and enhancement. Artificial intelligence systems in this field have been developed for radiographic diagnosis, image analysis, forensic dentistry and image quality improvement.

When starting this compilation, our aim was to review the studies made with artificial intelligence in dentistry and to inform our physicians about the existence of this new technology. However, it has been observed in the literature that there are few cases of TMJ osteoarthritis diagnosed with artificial intelligence. This study has been carried out in order to increase the use of artificial intelligence to examine a complex structure such as TMJ and to diagnose diseases.

Keywords: artificial intelligence, dentistry, Tmj osteoarthritis

Resin-Nanoceramic Restoration of Persistent Primary 2nd Molar Teeth in Congenital Absence of Mandibular 2nd Premolar Teeth: Case Series with Clinical Follow-up

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Introduction/Purpose: Mandibular 2nd premolar teeth are the most frequent congenital absent teeth. In case of congenital deficiencies of these teeth, if the primary 2nd molars need to be kept in the mouth, it is recommended to transform these teeth into premolar tooth morphology in order to ensure ideal implant placement and ideal occlusion, considering their loss in future period. In this case series study, it was aimed to present the clinical-radiological follow-up of 12 full-crown restorations produced by CAD/CAM and applied to persistent primary second molars and the clinical features associated with periodontal health in 8 cases with the congenital absence of mandibular second premolars.

Case Reports: 8 patients with unilateral or bilateral (4 unilateral, 4 bilateral) missing mandibular 2nd premolars detected clinically and radiologically were included in this case series study. Among the inclusion criteria; restorable crown structure, absence of a lesion large enough to require an indication for extraction, absence of severe orthodontic anomalies and presence of the cooperation of patients and the parents. After MTA (Angelus, Brazil) amputation was applied to 12 primary 2nd molars of 8 patients, teeth were prepared to allow the final form of the restoration to be in premolar morphology. After the preparation, dental impressions were taken and restorations were produced using composite-ceramic hybrid blocks (Cerasmart, GC Dental Products, Japan) and CAD/CAM system (Cerec MC-XL Premium, Germany). Completed restorations were cemented with a resin-containing luting cement. 3 cases were followed for 12 months, 2 cases for 24 months and 3 cases for 36 months. During the follow-up period, the cases followed-up clinically regarding marginal fit, fracture, staining, decementation of the crown; radiologically, the teeth were monitored regarding the presence of secondary caries, inadaptability of the crown and presence of pathological lesions around the root. In almost all cases, spontaneous closure of the 1-2 mm residual space mesial and distal to the primary molars has been found. On the other hand, internal root resorption was detected in 1 case in 36 months follow-up, and secondary caries was detected in 1 case with 24-month follow-up. In the follow-up of the cases in terms of periodontal health, mean plaque index scores (Silness and Löe) were recorded between 0.6 and 1.3. In addition, mean gingival index scores (Löe and Silness) were found between 0.6 and 1.3.

Conclusion: In this case series study, it was concluded that restoration of persistent primary 2nd molar teeth in premolar morphology provides successful clinical, radiological and periodontal results in long term. It is possible to recommend the use of composite-ceramic hybrid restorations in order to ensure oral health in cases where persistent primary teeth without permanent tooth germ are planned to be kept in the mouth for a long time.

Keywords: Congenital tooth agenesis, persistent primary tooth, resin-nanoceramic

Endocrown Restorations of Severely Damaged Primary Anterior Teeth: Case Series

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Introduction:/Purpose: In recent years, computer aided design and computer aided manufacturing (CAD/CAM) have been frequently used in the restorative treatment of primary anterior teeth with excessive loss of structure. Among the restorative treatment options for these teeth, endocrown placed to the pulp chamber have an important role. In this case series study, it was aimed to present the clinical and radiological follow-up of endocrown restorations produced from resin-nanoceramic hybrid blocks using the CAD-CAM system, and applied to the upper primary anterior teeth with excessive loss of structure.

Case Reports: Eight pediatric patients aged 5.5-7 years (16 primary anterior teeth with excessive loss of substance) were included in this study. The inclusion criteria were as follows: the presence of a restorable coronal structure, the presence of a suitable root structure for root canal treatment, and the absence of severe radiographic lesions around the root. The root canal treatment was performed with a resorbable paste (Endoflas, Sanlor and Cia, S. en C.S., Cali, Colombia) and the pulp chamber was temporarily closed with glass ionomer cement (Ionofil Plus, Voco, Germany). In the next session, the temporary filling was removed, the teeth were prepared, and the digital impression was taken. Subsequently, the endocrowns were fabricated using CAD/CAM system (Cerec MC-XL Premium, Germany) and resin-nanoceramic hybrid blocks (Cerasmart, GC Dental Products, Japan), and cemented with dual-cure resin cement (Variolink N, Ivoclar Vivadent, Lichstenstein). All cases were followed-up for 18 months. Clinically, the cases followed-up regarding the conditions such as marginal fit, fracture, discoloration, decementation of endocrown and radiologically followed-up regarding the conditions such as the presence of secondary caries, inadaptability of the crown, and the presence of pathological lesions. During the follow-up period, 1 patient (2 lateral incisors) lost to follow-up and the study was carried out on a total of 14 teeth (7 lateral incisors, 1 central incisor, and 6 canines). Restoration loss was observed in 4 teeth (28.5%) (3 lateral incisors and 1 canine) at 6^{th} months and 2 canines (20%) at 12^{th} months. In cases with restoration loss, the ferrule effect was below 1 mm. Until the end of the 18^{th} month, 3 teeth (21%) (1 central incisor and 2 canines) continued to function in the mouth and the overall success rate was found 64%. Regarding all endocrown restorations followed in the study, no complications were occured in terms of marginal fit, anatomical form, surface roughness, marginal discoloration, secondary caries and periapical pathology.

Conclusion: In this case series study, it was concluded that the endocrown restorations of primary anterior teeth with excessive loss of substance offer successful clinical and radiological results in long-term. The ferrule effect is an important factor in restoration success and it is thought that ferrule effect more than 1 mm increases the durability of the restoration. In addition, considering the clinical difficulty of the direct composite restorations for the primary teeth, CAD/CAM is an usefull tool for resin-based indirect restorations.

Keywords: Primary teeth, endocrown, CAD/CAM

Patient and Parent Motivation for Orthodontic Treatment

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Introduction/Purpose: Patient motivation in orthodontics is highly important in achieving the desired treatment outcome. But when the age of orthodontic treatment is taken into consideration, the parents also play a very important role in the treatment demand. This study aims to determine patient and parent motivation of orthodontic treatment.

Method: A total of 424 individuals, 210 patients and 214 parents, who stated that they volunteered to participate in this cross-sectional qualitative study, which was conducted on 45 patients in the pilot study student research activity, were included. After the demographic information was obtained, the patient and the parents were asked to fill in the information about the reasons for applying for orthodontic treatment, and they were asked to rate the severity of the disorder.

Findings: The responses of the patients and their parents were similar regarding the appearance of the teeth, the appearance of the face, applying for orthodontic treatment for health and aesthetic reasons, and the severity of the orthodontic disorder. On the other hand, there was a difference between the patient and the parent in terms of presentation due to functional impairment and treatment urgency.

Conclusion: There are similarities and differences between the patients' and their parents' expectations during orthodontic treatment. Knowing these similarities and differences by the orthodontist is an important issue that may affect the satisfaction with the orthodontic treatment result and needs to be studied further.

Keywords: Patient, parent, motivation

Evaluation of Bone Loss in the Second Molar Related to İmpacted Mandible Third Molars by Comparison With Panoramic İmages And Cone Beam Computed Tomography

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Introduction/Purpose: Deciding whether to extract third molars is still a controversial issue in dentistry. Assessing the relationship between second and third molars is essential before taking decisions in practice. Using panoramic radiographs for investigating bone loss in the interface of second and third molars may be challenging because of the inherent image distortion and overprojection of structures – usually the crown of the impacted third molar and the distal surface of the second molar. This study aimed to evaluate bone loss in the second molar tooth adjacent to impacted mandibular third molars and compare it on panoramic radiographs (PAN) and cone beam computed tomography (CBCT) scans.
Method: 126 teeth with both panoramic and CBCT images were evaluated. In the first analysis, the third molar position was classified into mesioangular, horizontal, vertical, distoangular,inverted. In the second, the absence or presence of marginal bone loss of the adjac ent second molar was recorded. In the case of bone loss in imaging methods, it was classified as mild, moderate and severe. Concordance between PAN and CBCT scans was evaluated. It was also recorded whether there was resorption in the second molars.
Findings: Third molars were most commonly impacted in the mesioangular position. While in panoramic imaging, resorption was detected in 6%(n=8) of the teeth; in CBCT resorption was observed in 20.6% (n=26) of the teeth. The most common bone loss type seen in the panoramic radiographs was slight, whereas it was moderate in CBCT.
Conclusion: Diagnosis of second molar bone loss due to impaction of adjacent third molar in PAN may be difficult due to false negatives. For a more detailed and reliable treatment plan, the loss should be evaluated precisely with CBCT. In the presence of an impacted third molar, bone loss in the second molar is common and extraction of the third molars may be considered in order to protect second molar.
Keywords: Bone loss, CBCT, panoramic radiograph, second molar, third molar

Micro-CT Analysis of the Root Canal Configuration of Maxillary Second Molars with Fusion

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Introduction/Purpose: The present study investigated the root canal configuration of maxillary second molars with root fusion using micro-computed tomography (micro-CT).
Method: A total of 136 fused maxillary second molars were scanned with micro-computed tomography. Images were transferred to CTAn v.1.18.8 software (Bruker-microCT) to obtain three-dimensional models. The specimens were classified according to the fusion type. According to Vertucci, classification of the root canal configuration of fused roots was determined using CTVol v. 2.3.2.0 (Bruker-microCT) and DataViewer v.1.5.6 (Bruker-microCT) softwares. The specimens that could not be represented were also specified. The frequency of canal configuration according to the fusion type was calculated.
Results: For Type 1 fusion (n=40) and Type 2 fusion (n=22), the most common canal configuration for mesiobuccal (MB), distobuccal (DB) and palatal (P) canals was Type I. In type 3 fusion specimens (n = 21), DB and P canals were completely fused in 1 sample in accordance with Vertucci type IV, while in the remaining specimens, types II, I, V, VI and IV were observed in decreasing order in the MB canal. In type 4 fusion, MB and DB canals were completely fused in 4 of 21 specimens and showed Vertucci type VI, II, I and III configurations. In the remaining 17 samples, MB had Vertucci type I, II, IV, V, VI, VII configurations, while DB showed type I, V and III configurations. In 7 samples with type 5 fusion all canals displayed different configurations. In type 6 fusion, the canal configurations of 6 samples could not be classified. Type II, I, and V configurations were seen in 9 of the remaining 19 samples with a single canal.
Conclusion: Vertucci type I was the dominant canal configuration in the P and DB, however, MB showed much more diverse configurations either independently or when included in fusion.
Keywords: Canal configuration, root canal anatomy, Vertucci classification

Oral Health Experiences of Turkish Children With Hereditary Spherocytosis

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Introduction/Purpose: Hereditary spherocytosis (HS) is a heterogeneous disorder affecting red blood cells. The disease shows clinical diversity in various genes like eccrine, band 3, and spectrin. The aim of this study was to examine the oral findings of healthy children (healthy group) and children with HS disease (study group).
Method: We included a total of 26 children aged 4-14 years in this study and investigated and recorded their demographic characteristics (years, gender, toothbrushing frequencies and socioeconomic levels) and oral health variables such as caries, extraction, filled teeth for the primary and permanent dentition (dmft-DMFT), gingival index (GI) and plaque index (PI).
Findings: In the study and control groups, 'dmft' of the groups were 5.23 (±4.11) and 2.23 (±2.55), respectively (p=0,048), there was a significant difference between these groups . In these groups, 'DMFT' were 2.08 (±2.32) and 3.07 (±1.55), respectively, and there were no significantly difference between the groups (p=0.175). In the study and control groups, the gingival indices were 0.69 (±0.37) and 0.48 (±0.40) (p=0.172), and the plaque indices were 0.77 (±0.34) and 0.56 (±0.32) (p=0.098) respectively, and there were no significantly difference.
Conclusion: Oral health was worse in primary teeth of the children with HS.
Keywords: Hereditary spherocytosis, caries, periodontal health, pediatric dentistry

SEM Evaluation of Fractured Conventional And Heat Treated Ni-Ti Instrument Surfaces

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Introduction/Purpose: The purpose of this study is to examine fractured surfaces of Ni-Ti files broken with cyclic fatigue by using SEM.
Methods: ProTaper Universal and ProTaper Gold nickel titanium files used for this study. The files were rotated until they broken in artificial canals with 45°, 60° and 90° angles. In order to examine the morphological features of fractured parts due to cyclic fatigue, random samples from each group were evaluated in a scanning electron microscope (SEM).
Findings: In 100% of fractographic images obtained by SEM results showed similar characteristic structures in pits and fissures caused by fracture due to cyclic fatigue regardless of angle and file type. **Conclusion:** Although surface properties of broken instruments do not play a decisive role in clinical practice it was observed that heat-treated Ni-Ti files exhibited higher fatigue resistance at all angles compared to conventional files according to the number of cycles during experimental period.
Keywords: cyclic fatigue; SEM, heat-treated Ni-Ti files, conventional Ni-Ti files

Investigation of the Effect of Different Content of Mouthwashes on Rezin CAD / CAM Blocks

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Introduction/Purpose: The use of mouthwashes is often recommended to improve oral hygiene. However, the use of mouthwashes has become more popular recently as a result of the studies on reducing the transmission of severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2). The aim of this study is to examine the effect of different content mouthwashes on the color changes of resin-based CAD/CAM blocks.
Methods: Two different resin-based CAD/CAM materials (Vita Enamic and Brilliant Crios) were used in the study (n=32). 64 samples were prepared by taking 2 x 7 x 12 mm sized sections from CAD/CAM blocks (n=32). After the prepared samples were kept in artificial saliva at 37° C for 24 hours, initial color measurements were made with a spectrophotometer device (VITA Easy shade V, Germany). Then the samples were kept in 3 different mouthwashes containing Cetylpyridinium chloride (Oral-B), Povidone iodine (Batiqon) and Chlorhexidine (Kloroben) twice a day for 1 minute (n=8). Color measurement of the samples was repeated on the 7^{th}, 14^{th} and 30^{th} days. Color change values (ΔE_{00}) were evaluated by one-way analysis of variance (ANOVA) and Tukey test ($p<0.05$).
Results: There was no statistically significant difference between the color changes of resin-based CAD/CAM blocks held in mouthwash at the end of the 7^{th}, 14^{th} and 30^{th} days ($p>0.05$). Similar color changes were observed in the samples kept in mouthwashes and the control group samples kept in artificial saliva throughout the entire time period.
Conclusion: At the end of the 30^{th} day, color change was observed below the noticeable threshold value ($\Delta E_{00}>0.8$) in the hybrid ceramic CAD/CAM block samples (Vita Enamic) kept in the mouthwash. In composite-reinforced CAD/CAM samples (Brilliant Crios), only Povidone-iodine-containing mouthwash produced color change above the noticeable threshold value ($\Delta E_{00}>0.8$), while Chlorhexidine and Cetylpyridinium chloride did not produce a noticeable change.
Keywords: Mouthwash, COVID-19, CAD/CAM materials, discoloration.

Evaluation of Alveolar Bone Destruction Pattern With Cone Beam Computer Tomography in the Posterior Region of Maxilla

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Introduction/Purpose: Accurate assessment of bone morphology is essential for the diagnosis, treatment and prognosis of periodontal diseases. The main diagnostic tool in periodontology are clinical examination and intraoral radiography. However, cone beam computer tomography (CBCT) which is developed today, provides a high-contrast three-dimensional (3D) image of periodontal structures and helps to determine the definitive diagnosis and treatment options in successful periodontal treatment. The aim of this study is to evaluate alveolar bone destruction pattern with cone beam computer tomography in the posterior region of maxilla.

Methods: The study group consisted of cone beam computer tomography image records of 361 patients, 180 males and 181 females, aged 20 years and over. In this study, alveolar crest morphology in maxillary right and left first and second molar teeth on archival images was classified as a horizontal or vertical defect (one wall, two walls, three walls and combined bone defect) on four surfaces (mesial, distal, buccal and palatinal). On the other hand, bone crater defects were defined in the interdental region of the teeth, and buccal and palatinalalveolar bone opening and fenestration were detected. Furcation involvements and combined periodontal-endodontal lesions (CPEL) were placed in another category.

Results: Our study was performed on 361 cases and 1444 teeth, ranging in age from 20 to 63, 49.9% of the cases were male and 50.1% were female. The average age of the patients included in our study is approximately 34.11±9.71. For all cases, 11.5% 1-walled, 15.9% 2-walled, 12% 3-walled, 35% combined, 60.2% mesial, 60.7% distal, 51.4% buccal and 46.5% palatinal horizontal destruction, 0.5% 2-walled, 0.6% 3-walled, 0.3% combined, 1.2% mesial, 1% distal, 0.9% buccal and 0.6% palatinal vertical destruction has been detected. Crater was detected in 38.5% of all cases, while no furcation involvement was detected in 93.8%. While no dehiscence was detected in 97.9% of the cases, CPEL was observed in 4.3% of the cases. It was found that the rate of 1-walled horizontal destruction in the right molar teeth was statistically significantly higher in female cases than in male cases (p: 0.002; $p < 0.05$). The rate of no furcation involvement in the right molar teeth was found to be statistically significantly higher in female cases than in male cases (p: 0.000; $p < 0.05$). It was found that the mean age of the patients with combined horizontal destruction in the right and left molar teeth, horizontal destruction in the palatinal and horizontal 3-walled destruction was found to be statistically significantly higher than the average age of the patients without these periodontal destructions (p: 0.000; $p < 0.05$).

Conclusions: According to the findings obtained in this study, it was determined that dental volumetric tomography has many advantages in accurate 3D imaging of teeth and support structures compared to other radiographic methods, and valuable information was obtained in periodontal evaluation by preventing superposition and magnification.

Keywords: Cone beam computer tomography (CBCT), periodontal defect, alveolar bone, combined periodontal-endodontal lesion (CPEL)

Automatic Detection of Dentigerous Cysts on Panoramic Radiographs: A Deep Learning Study

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Introduction/Purpose: The aim of this study is to create a model that enables the detection of dentigerous cysts on panoramic radiographs in order to enable dentistry students to meet and apply artificial intelligence applications.
Methods: E.O. and I.T. who are 5th year students of the faculty of dentistry, detected 36 orthopantomographs whose histopathological examinations were determined as Dentigerous Cyst, and the affected teeth and cystic cavities were segmented using CranioCatch's artificial intelligence supported clinical decision support system software. Since the sizes of the images in the dataset are different from each other, all images were resized as 1024x514 and augmented as vertical flip, horizontal flip and both flips were applied on the train-validation. Within the obtained data set, 200 epochs were trained with PyTorch U-Net with a learning rate of 0.001, train: 112 images (112 labels), val: 16 images (16 labels). With the model created after the segmentations were completed, new dentigerous cyst orthopantomographs were tested and the success of the model was evaluated.
Results: With the model created for the detection of dentigerous cysts, the F1 score (2TP / (2TP+FP+FN)) precision (TP/ (TP+N)) and sensitivity (TP/ (TP+FN)) were found to be 0.67, 0.5 and 1, respectively.
Conclusion: With a CNN approach for the analysis of dentigerous cyst images, the precision has been found to be 0.5 even in a small database. These methods can be improved, and new graduate dentists can gain both experience and save time in the diagnosis of cystic lesions with radiographs.
Keywords: Deep learning, artificial intelligence, dentigerous cyst

Efficacy of Endoscope to Detect Residual Root Canal Filling: A Micro-CT Study

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Introduction/Purpose: To evaluate the efficacy of endoscopic examination of root canal in determine of residual root canal filling materials by comparing to micro-computed tomographic (micro-CT) images as reference.
Methods: Thirty maxillary second premolars with oval shaped canals were root canal treated. Then, root canal fillings were removed using D-Race retreatment instruments supplemented by XP-endo Finisher. Samples were scanned to reconstruct micro-CT reference images. Digital radiographs were taken from buccolingual and mesiodistal directions from all samples. The specimens were mounted on the mannequins and their root canals were evaluated using endoscope. The radiographic and endoscopic scoring results were recorded as 'correct' or 'incorrect' after comparing with micro-CT images as reference by 2 blinded observers. Inter-examiner reliabilities for each assessment were verified by Kappa test and the accuracy of endoscopic visualization according to the presence of residual root canal filling materials was compared using Pearson's chi-square test with a significance threshold at 5%.
Result: The endoscopic examination was significantly more efficient for detecting residual root filling materials than the periapical radiograph in apical, middle and coronal thirds of the root canals ($p < .05$).
Conclusion: The endoscope was able to detect the residual root canal filling material better than periapical radiograph.
Keywords: Endoscope, micro-computed tomograpy, residual filling material, root canal retreatment

Torsional Resistance of Reciproc Blue Nickel Titanium Instruments after Simulated Retreatment Procedure

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Introduction/Purpose: To evaluate torsional resistance of thermomechanically treated Reciproc Blue instruments after retreatment procedure.

Methods: Reciproc and Reciproc Blue instruments were used for the retreatment of mesiobuccal root canals of maxillary first molar with curvature. Twenty-four instruments of each brand were used for the retreatment of mesiobuccal root canals of maxillary first molar teeth with curvature angle between 25°- 35° and radius of curvature between 4 and 6 mm. The torsional fatigue resistances of unused and used instruments were tested using a custom-designed torsional testing device. The fractured instruments were examined using scanning electron microscope (SEM). Two-way variance analysis and post-hoc Tukey tests were used to analyse data (α-level 0.05).

Findings: Following retreatment procedures, torsional strength of used Reciproc Blue was not significantly different than unused Reciproc Blue ($p > .05$), while torsional strength of used Reciproc decreased significantly ($p < .05$).

Conclusion: A second reuse of Reciproc Blue for retreatment could be considered safe in terms of torsional strength, as the torsional strength of Reciproc Blue is not affected by its use for retreatment of a curved root canal.

Keywords: Reciproc blue, retreatment, torsional resistance

Determination of Idiopathic Osteosclerosis Frequency and Distribution

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Introduction/Purpose: The aim of this study is to determine the frequency of idiopathic osteosclerosis (IO) seen in the jaws, its distribution according to age, gender and jaw settlement area by means of panoramic radiographs.

Methods: In the study, panoramic radiography of 1150 patients (613 women, 537 men) between the ages of 16-92 were retrospectively analyzed. Uniform radiopacities larger than 3 mm, with no surrounding radiolucency, associated with normal bone, with regular borders, without symptoms, were evaluated as IO. The jaw region with IO (right-left; mandible/maxilla; anterior-premolar-molar), relation of IO with neighboring teeth (apical-interradicular-independent from tooth region) and shape of IO (round-elliptic-irregular) were recorded. Descriptive statistics were calculated and the chi-square test was used in the analysis of categorical data. The significance of the test results was evaluated according to the $p<0.05$ level.

Findings: A total of 122 IO lesions were detected in 103 (9%) of 1150 patients. All lesions were seen in the mandible. There was no significant difference between the incidence of lesions and age and gender ($p>0.05$). IO was most frequently observed in the molar region of the mandible (45.9%) and then in the premolar region (25.4%) with an irregular shape (78.7%). 45.1% of the lesions were located in the right mandible, 50% in the left mandible, 4.9% in the midline region and the most common tooth-independent mandibular alveolar bone (70.5%).

Conclusion: In the studied population, IO is a lesion with a frequency of 9% observed independent of age and gender parameters.

Keywords: Idiopathic osteosclerosis, Dense bone island, panoramic radiography

Periodontal Treatment of Gingival Overgrowth due to Amlodipine Use: Case Series

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Introduction/Purpose: A common side effect of calcium channel blockers, which are frequently used in the treatment of patients with hypertension and cardiovascular problems, is that they can cause overgrowth in gingiva. Gingival overgrowths should be treated because they create inaccessible areas, making oral hygiene practices difficult due to increased plaque retention. In this case series, clinical properties of gingival overgrowths deriving from the usage of amlodipine, which is a type of calcium channel blockers and its treatment protocols are explained.

Methods: Three male patients aged 15, 60 and 45 applied to our clinic with the complaints of gingival overgrowth and bleeding. In the anamnesis, it was learned that they were using antihypertensive medication containing amlodipine. In the first session, scaling and root planning applications were performed. Then, the patients who were given detailed oral hygiene instructions, consulted with the relevant physicians. It was deemed appropriate to replace the drug the patients were using with another antihypertensive drug, which is an alternative that does not lead to gingival overgrowth. After the controls performed at certain time intervals and oral hygiene evaluations, it was observed that a perfect recovery was achieved. In addition to these, gingivoplasty was performed using classic surgical method under local anesthesia on one case.

Findings: All three patients showed uneventful healing without any complications. During periodic controls, it was observed that patients' complaints disappeared, the gingiva regained their natural physiological form, aesthetically pleasing results were achieved, no recurrences were observed in the 6th month and periodontal health could be maintained.

Conclusion: The treatment protocol for gingival overgrowth due to drug use includes the replacement or discontinuation of the current drug with an alternative drug with the physician's consultation, after the initial periodontal treatment and oral hygiene practices, periodontal surgical procedures and regular controls in severe cases.

Keywords: Gingival overgrowth, amlodipine, hypertension, calcium channel blockers

Post Covid Mucormycosis- 5 Case Series Report

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Introduction/Purpose: The new coronavirus, SARS-CoV-2, is the etiologic agent of the COVID-19 which has taken pandemic proportion across the globe affecting millions of lives. New challenges have emerged in the healthcare arena, in managing this pandemic in terms of early diagnosis, treatment and effective vaccination for COVID-19 disease. Growing risks of co-infection during and after the course of treatment is now a major concern among the healthcare professionals as this has become a major threat to the patient's lives. Opportunistic oral fungal infection is one such disease affecting the post COVID treated patients.
High incidence of post covid mucorymcosis is being reported in dental clinical scenario. Such increase in fungal infections is closely associated with the significant increase in immunocompromised patients due to glucocorticoid therapy, immunotherapy used in the COVID-19 treatment. Purpose of this case series is to discuss in detail the oral and systemic involvement of mucormycosis with its radiological features by Cone Beam Computed Tomography (CBCT) and outlining the treatment protocol for this severe health hazardous disease.
Method: 5 post COVID treated patients, presenting with clinical features of mucormycosis reported to the dental clinical setup with jaw pain. A thorough clinical & radiological investigations (CBCT) was performed to evaluate the diagnostic findings of mucormycosis in the maxillofacial and para nasal sinus regions and a diagnostic & treatment protocols was established for managing this disease.
Findings: Covid treated patients reported with unexplained dental pain, unilateral facial swelling, blurred vision, bleeding from the nose, oral mucosal ulceration and mobile teeth as common findings. CBCT imaging of the patients showed predominant involvement of the maxillary sinuses and ethmoid sinuses with further extension in the orbits and deep skull base. Loss of periodontal support around the involved teeth and alveolar bone separation as major radiological findings.
Conclusion: Complications arising due to therapeutic protocols for COVID-19 can lead to opportunistic fungal infections like mucormycosis. Patients will be reporting to dentists with such cases and its imperative for the dentists to arrive at an early diagnosis by using imaging modalities like CBCT for prompt and definitive treatment.
Keywords: SARS-CoV-2, mucormycosis, CBCT

Evaluation of Airway Changes After Orthognathic Surgery with Maxillomandibular Advancement or Maxillary Advancement & Mandibular Setback

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Introduction/Purpose: The relationship between craniofacial morphology and airway has been well documented in the literature. Surgical changes in jaw positions create reorganization in the surrounding tissues i.e. soft palate, tongue and pharynx; depending on the magnitude and direction of correction. Therefore, oropharyngeal changes caused by orthognathic surgery can affect the airway function.

Aim of the present study was to evaluate upper airway changes in two different orthognathic surgery modalities: 1) Bimaxillary Advancement, 2) Maxillary Advancement+Mandibular Setback.

Methods: Sample in this retrospective study was derived from clinical archive of Orthodontic department in Marmara University. Preoperative (T1) and 6-12 months postoperative (T2) lateral cephalometric radiographies of 24 adult subjects (mean age: 22,3 ± 1,8 years), who underwent bimaxillary orthognathic surgery, were analyzed and superimposed. Direction and amount of horizontal displacement of A-point and B-point were recorded to define surgical movements. Patients were then divided into two groups: Group 1 (n=13) included maxillary advancement+mandibular setback. Group 2 (n=11) included maxillomandibular advancement. Pharyngeal airway changes were measured at posterior (PAS), superoposterior (SPAS), middle (MAS), inferior (IAS) and epiglottic airway spaces (EAS). For intragroup changes Paired sample t-test and Wilcoxon's test; for intergroup changes Two independent samples t-test and Mann-Whitney U-test were used. Pearson Correlation analysis was performed.

Findingss: In both groups SNA, SNB, ANB, Wits-Appraisal, Nasion-perpendicular to A-point, maxillary depth values changed significantly. In Group 1, pharyngeal airway changes were non-significant. In Group 2 PAS, SPAS, MAS increased significantly and mean pharyngeal airway changes were significantly higher than Group 1. In Group 2, significant and powerful correlation was found between SNB and IAS (r=0,800) and EAS (r=0,719).

Conclusion: Mandibular setback did not cause significant reduction in airway when applied in combination with maxillary advancement. Maxillomandibular advancement significantly increased the upper airway parameters and a powerful correlation was observed between SNB and IAS, EAS in this group.

Keywords: Bimaxillary advancement, maxillary advancement, mandibular setback

Frequency of Pericoronal Radiolucency in Impacted Teeth: A Panoramic Radiography Study

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Introduction/Purpose: All permanent teeth may remain impacted. However, the most frequently impacted teeth are the third molars, maxillary canines, maxillary and mandibular premolars, and maxillary santral incisors. Impacted teeth can remain in the jaw for years without causing any symptoms and without causing a pathological event, as well as causing neuralgiform pain, infection, teinporomandibular joint complaints, root resorption in adjacent teeth, dentigerous cysts and ameloblastic fibroma. It is stated that the embryonic residues in the dental follicles around the impacted teeth have the potential to proliferate and transform into odontogenic lesions. It is stated that impacted teeth are most commonly associated with dentigerous cyst, unicystic ameloblastoma, ameloblastic fibro-odontoma, adenomatoid odontogenic tumor and odontoma. The radiographic appearance around an impacted tooth may not be a reliable indicator of disease associated with a dental follicle, and diagnosis based on radiographic findings alone can be highly misleading. However, pericoronal radiolucencies observed over 2.5 mm in panoramic or intraoral imaging are suspicious and there is a potential for pathological transformation, most commonly dentigerous cyst. Based on this, the solution of the problem can be provided at an early stage by careful radiographic evaluation. The aim of this study is to investigate the frequency of pericoronal radiolucencies in impacted teeth examined in panoramic radiographs.

Method: The study was conducted by retrospectively examining the panoramic radiographs of 1128 patients (633 females, 495 males) over the age of 18. Permanent impacted teeth that have completed root development were included in the study, and deciduous teeth, mesiodens, supernumerary and suplamental impacted teeth were excluded from the study. In the case of pericoronal radiolucency (> 3 mm) associated with the impacted permanent tooth on panoramic radiographs, the pericoronal radiolucency was recorded as 'present'. SPSS v.21 (IBM Corp., Armonk, NY, USA) program was used to analyze the data. Descriptive statistics (mean, standard deviation) were calculated for all parameters in the study. Chi-square test was used to determine the relationships between categorical variables, and it was considered significant at the $p < 0.05$ level.

Findings: The mean age of the individuals included in the study is 31 ± 11 years (18-85). A total of 2247 impacted teeth from 1128 individuals were evaluated. The most common impacted tooth groups are the lower third molars, upper third molars, upper canines, lower canines, upper premolars and lower premolars, respectively. Pericoronal radiolucency was detected in 208 impacted teeth (9.3%). There is a statistically significant relationship between gender and age and the frequency of pericoronal radiolucency ($p < 0.05$). The frequency of pericoronal radiolucency is lower in women and individuals over 60 years of age.

Conclusion: The frequency of pericoronal radiolucencies associated with impacted teeth is 9.3%. Men and individuals under 60 years are more likely to be seen on radiographic examinations. To detect at an early pathological stage and implement appropriate treatment, it is recommended to carefully examine the teeth radiologically that are time to erupt, but is not included in the arch in the clinical examination.

Key words: Pericoronal radiolucency, impacted tooth, panoramic radiography

The Frequency of Internal Resorption in Full-Bony Impacted Teeth: A Cone-Beam CT Study

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Introduction/Purpose: Resorption is the loss of dentin, cementum or bone by a physiological or pathological process. Physiological resorption is the destruction process that occurs in primary teeth for permanent teeth to grow. Other than this, traumatic injuries, orthodontic tooth movement, pulpal or periodontal infections are associated with pathological resorption. Since the impacted teeth with bone retention are not open to the oral environment, carious lesions are not observed in these teeth. However, radiolucent-looking internal resorption lesions can be encountered in radiographic examinations, albeit rarely. It has been stated that resorption of impacted teeth may develop due to apical infection of the leading deciduous tooth, hypoplasia due to enamel-dentin developmental anomaly, or uncalcified enamel matrix inclusion. The aim of this study is to investigate the frequency of internal resorption in impacted teeth with full-bony retention.

Method: In the study, the cone beam computed tomography (CBCT) records of 2365 patients (1293 females, 1072 males) between the ages of 18-89, taken between 2018 and 2021 for various diagnostic reasons, were retrospectively analyzed. A total of 2434 teeth were evaluated in the study. The mean age of the patients was 45 ± 16 years (43 ± 16 for women, 47 ± 16 for men). The presence of internal resorption in impacted teeth with full bone retention was recorded. The well-circumscribed oval-round radiolucent enlargement (balloon-like pulpal dilatation) observed in the root or crown region of the impacted tooth in the coronal, axial, sagittal planes was defined as internal resorption. Semi-impacted teeth in eruption process, CBCT records with jaw pathologies associated with impacted teeth, deciduous teeth with complete bone retention, mesiodens, supernumerary and supplemental impacted teeth were not included in the study. SPSS v.21 (IBM Corp., Armonk, NY, USA) program was used to analyze the data. Descriptive statistics (mean, standard deviation) were calculated for all parameters in the study. The chi-square test was used to determine the relationships between categorical variables, and it was considered significant at the $p < 0.05$ level.

Results: A total of 276 impacted teeth with bone retention were observed in 207 of 2365 patients. Internal resorption (6 molar, 4 canines, 1 incisor, 1 premolar) was detected in 12 (4.3%) of the examined impacted teeth. 7 of them were in the maxilla and 5 were in the mandible. 5 of the patients with internal resorption were male and 7 were female ($p > 0.05$) and their mean age was 54.3 (28-75).

Conclusion: The frequency of internal resorption in impacted teeth with complete bone retention is 4.3%, and it is most common in molar teeth. If there is a possibility of eruption of the resorbed impacted tooth, it is followed and kept in the mouth with endodontic treatment or the extraction of the relevant tooth constitutes treatment options.

Keywords: Internal resorption; Impacted tooth; Cone beam computed tomography

Potential Biomarkers for Early Detection of Oral Cancer: Leptin and Adiponectin

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Introduction/Purpose: Adipokines are bioactive proteins that regulate metabolism, inflammation, angiogenesis and proliferation. In studies which evaluate the relationship between leptin and adiponectin, with the development of cancer, it was suggested that there may be a positive relationship between the increase in serum leptin level and tumor growth, and adiponectin can suppress development of cancer. However, contradictory results have also been reported making the role of adipokines in cancer development still questionable. The aim of this study is to determine adiponectin and leptin expression levels in tissue samples from healthy, dysplastic and cancerous oral lesions, and to investigate the potential role of these biomarkers in oral cancer development.

Method: Paraffine embedded tissue samples from the archives of Ege University, Faculty of Medicine, Department of Pathology which were histologically diagnosed as oral squamous cell carcinoma (OSCC) (n=24), oral dysplasia (n=12) and healthy tissue (n=16) were included in this retrospective study. Total RNA extraction was performed using PureLink FFPE total RNA Isolation kit, and thereafter the concentration and purity of samples were determined with Nanodrop™ device (Thermo Scientific). Complementary DNA synthesis from isolated RNA was performed using High-Capacity cDNA Reverse Transcription kit. The differences between expression levels of leptin and adiponectin in tissues was evaluated with qPCR. Leptin and adiponectin expression levels related to OSCC was performed according to normalizing gene ACTB. ΔΔCT method was used for comparison of leptin and adiponectin expression levels. An increase in expression level was concluded in case the 2-ΔΔCT value was over 2, and a decrease in expression level was noted in case the 2-ΔΔCT value was under 1. Student t-test was used to compare the differences in gene expression levels between groups, using 2 ^ (- Delta CT) value for each gene.

Findings: When compared to the healthy group, adiponectin and leptin expression levels were decreased by 1.09 ($p = 0.49$) and 10.3 ($p = 0.22$), respectively, in the OSHC group, however the differences were not statistically significant. The level of adiponectin expression decreased 1.65 times ($p = 0.62$) and the leptin expression increased 3 times ($p = 0.30$) in the dysplasia group when compared to the healthy group. When the OSHC and dysplasia groups were compared, it was found that the level of adiponectin expression increased 1.52 times ($p = 0.99$) and the level of leptin expression decreased 30.94 times ($p = 0.16$) in the OSHC group. The samples were re-grouped as increased risk (OSCC+dysplasia) (n=36) and healthy (n=16) and a decrease by 16.5 ($p= 0.3$) in leptin expression and an increase by 1.14 ($p= 0.6$) in adiponectin expression was observed in increased risk group compared to the healthy group.

Conclusion: The expression levels for leptin and adiponectin in tissue samples from oral lesions diagnosed as healthy, dysplastic and OSCC has not been compared before. An increase in serum leptin level in oral premalignant lesions and a decrease in serum adiponectin levels in tongue cancer was reported previously. The results of the present study revealed a significant decrease in leptin expression and an increase in adiponectin expression in samples from increased risk group which included dysplasia and OSCC tissue samples. Further studies with larger study samples are needed to clarify the roles of leptin and adiponectin in oral cancer development.

Keywords: Adiponectin, leptin, oral cancer

Statistical Analysis of Pub-Med Data Related to Cad-Cam Technology

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Introduction/Purpose: The ability to complete the integrity of lost tissues in a short time with satisfactory quality and aesthetics is one of the important goals of dentistry. In this context, in the production process of indirect restorations, computer-aided design and computer-aided manufacturing (CAD/CAM) technology has become quite popular in recent years. In general, this system consists of collecting intraoral tissue data with a scanning device, designing restorations with computer software (CAD) and processing blocks formed from various materials according to the designed data with a milling device (CAM). The choice of blocks used in the CAD-CAM system may vary depending on factors such as the location of the restoration to be performed on the patient, the physician's preference and the patient's socioeconomic status. Block mataries are generally classified as ceramic blocks, composite blocks, metal blocks and polymer blocks. Pub-Med, known as a database used to scan literature over the internet, sheds light on a lot of information in the field of Health Sciences. In this study, the generic names of different CAD-CAM blocks were written in the Pub - Med search engine and the search results were evaluated over the last twenty years. The study aims to enable researchers or clinicians who want to examine CAD-CAM technology, which has become very popular in recent years, to conduct a more systematic literature review and thus to have easy access to information.

Methods: In the study, generic names of different CAD-CAM blocks were written in the Pub-Med search engine to obtain search results found in the last twenty years. The twenty-year process from 2001 to 2020 was divided into four groups of five years, and the search result numbers found were examined in four groups for each generic name. The results were evaluated using the SPSS 15 program.

Findings: The highest number of search results found for the 2001-2005 year group belongs to IPS-empress CAD. IPS-Emax CAD has the highest number of search results for the 2006-2010, 2011-2015 and 2016-2020 year groups. For all year groups, the highest number of results found by searching for generic names is significantly higher than the average of the total search results found for that year. In addition, a significant change was observed between the search results found in any year group and the results found in the next year group.

Conclusion: Research on CAD - CAM technology, which has become popular in dental practice in recent years, shows significant increases, especially in the last quarter of the last two decades. In order for researchers who want to examine CAD - CAM to have easy access to accurate information, literature scans are recommended taking into account the results of this research.

Keywords: Computer-aided design; computer-aided manufacturing, indirect restorations

Evaluation of Bond Strength of Polyether Ether Ketone (PEEK) to Composite Resin on Hypobaric and Hyperbaric Conditions

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Introduction/Purpose: PEEK is used in various medical applications due to its excellent chemical, mechanical and thermal properties. In dentistry, PEEK is used in fixed prostheses, abutments, implant-supported bars, dental implants, partial prostheses. Based on the literature review, scant studies are examining the effect of pressure changes on the properties of dental restorations. The aim of this study was to investigate the shear bond strength of composite resin to PEEK under hypobaric and hyperbaric pressure changes in different PEEK surface treatments.
Method: Ninety-six PEEK specimens were divided into three groups (n=32). PEEK surfaces were sandblasted; acid-etched, and non-treated. Two specimen from each surface-treated group were determined by atomic force and scanning electron microscopy. The composite resin with 2mm×3mm was applied on the samples after adhesive bonding and light-cured. Every group was then divided into three sub-groups (n=10) for simulating hyperbaric pressure, hypobaric pressure and control. The specimens underwent pressure cycles for 20 days. The shear bond strength test was measured by using the Universal Testing Machine. ANOVA followed by the post-hoc Tukey test was used to analyze the differences between groups.
Findings: Regardless of the environmental pressure changes, it was determined that the bonding strength was the highest in the PEEK material treated with acid etching surface treatment. Bonding strengths were lower in all groups after exposure to environmental pressure changes, but this difference was not statistically different.
Conclusion: Bond strengths between the PEEK material and composite resin can be affected by environmental pressure, while surface modification of the PEEK material plays an important role on bond strength.
Keywords: Polyetheretherketone, composite resin, shear bond strength, hypobaric, hyperbaric

Endocrown Restoration of the Endodontically Treated Teeth by Using Cad/Cam: Case Series

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Introduction/Purpose: As a result of large coronal destruction in endodontically treated premolar and molar teeth, significant losses occur in the dentin tissue around the pulp and the need for prosthetic treatment occurs. In these cases, the traditional treatment option that can be applied is post-core application and crown restoration. However, as a result of today's developing technology, monoblock restorations extending to the pulp chamber can be applied in a single session with the CAD/CAM device. In this case series, endocrown applications produced in a single session with CAD/CAM system are presented as an alternative to crown restoration traditionally applied to premolar and molar teeth with excessive crown destruction.
Case Reports: In first case, 38-year-old male patient number 25, 46 year old female patient number 36 in our second case, 21-year-old female patient number 46 in our third case, 26-year-old male patient number 46 in our fourth case, and in the last case 52-year-old male patient tooth number 15 has been applied to root canal treatment. Patients applied to clinic with the need for prosthetic treatment. As a result of the clinical and radiological examinations of the patients, it was observed that there were no systemic diseases, root canal treatment was applied to one of the premolar or molar teeth, and prosthetic treatment was required due to excessive crown damage. Endocrown restoration was seen appropriate in patients with less dentin tissue and recommended to patients instead of performing traditional crown preparation which causing more material loss. Firstly, teeth are prepared for endocrown restoration. Afterwards, the impressions were digitalized by scanning the jaws with an intraoral optical scanner (Cerec Omnicam, Dentsply Sirona, USA). The restorations were designed with the help of the CEREC 4.3 software (Dentsply Sirona, USA) on the models created with the impressions transferred to the digital environment later, and the milling process was carried out using the feldspathic ceramic block (Vita Mark II, Vita Zahnfabrik, Germany) in the same session by CEREC inLab MC XL (Dentsply Sirona, USA). Later, the restorations were glazed. Finally, the restorations were cemented with dual polymerized resin cement (RelyX Ultimate, 3M ESPE, USA), taking into account the manufacturer's recommendations.
Conclusion: Endocrown restorations are a minimally invasive, conservative treatment approach that provides mechanical adhesion to the pulp chamber and cavity walls with adhesive resin cement and allows the preservation of the remaining tooth structure. Requiring less preparation compared to traditional crown preparation and completing it in a single session are its important advantages. For this reason, it is a treatment option that can be preferred instead of post-core and crown application in teeth with root canal treatment.

Keywords: Endocrown restoration; Cad/Cam; post-core

Effects of Dipping Time and Surface Finishing Technique on the Color of Monolithic Zirconia

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Introduction/Purpose: Zirconia has been used in prosthetic restorations due to improved aesthetic properties, high biocompatibility, and mechanical strength. Zirconia can be used with veneer porcelain or used as monolithic full-contour restorations. Monolithic zirconia restorations eliminate veneering porcelain thus avoid complications chipping, fracture, and delamination. Coloring is important for monolithic zirconia restorations to simulate natural tooth color. Zirconia coloring techniques include adding and painting techniques. In the adding technique, metal oxides are mixed with the zirconia powder during the production of green-stage zirconia blocks. In painting techniques, zirconia restorations are dipped into coloring liquids or liquids are applied to presintered zirconia surfaces with a brush. Dipping time is a key factor to achieve the desired color. After coloring the zirconia, mechanical polishing or glazing is applied as surface finishing. There is a lack of knowledge of how the color of monolithic zirconia restorations with different surface finishing was affected by the dipping time in coloring liquids. The purpose of this study was to evaluate the effects of liquid coloring in different dipping times and different finishing procedures on color difference of precolored and liquid-colored monolithic zirconia ceramics.

Method: Uncolored and precolored monolithic zirconia blocks (A1, A2, A3) were cut using a low-speed cutting machine into 240 rectangular zirconia specimens. After sintering, 15 × 12 mm in dimensions and 1 ± 0.2 mm in thickness were obtained. Specimens divided into groups according to shades of a coloring liquid (A1, A2, A3), dipping time (3 minutes, 5 minutes, and 7 minutes), and surface finishing procedures (glaze and mechanical polishing) (n=10). Except for the control groups (precolored), coloring liquids were applied according to dipping time. After the dipping procedure, the specimens dried and sintered in a sintering furnace. After sintering, each group was divided for glazing and mechanical polishing. After surface finishing procedures, the CIE L*, a*, and b* values of the specimens were measured by spectrophotometer, and color differences (ΔE) were calculated. The data were analyzed with a three-way analysis of variance (ANOVA) and Tukey's honestly significant differences (HSD) test (α=.05).

Findings: The CIE L*, a*, and b* values are strongly influenced by liquid coloring, dipping time, and finishing procedures. (P<.001). The a* and b* values decreased after coloring by dipping. Glazing caused higher L* values than mechanical polishing. Color difference (ΔE) among groups varied from 7.10 to 27.52. The highest color difference was observed in 7 minutes dipping in A3 liquid and mechanically polished group.

Conclusion: The color difference between the precolored and liquid-colored zirconia ceramics are not in acceptable limits. In order to meet the natural tooth's color and texture of the surface, the coloring and finishing procedures are important for monolithic zirconia restorations.

Keywords: Monolithic Zirconia, Dipping, Veneering porcelain

Evaluation of the Efficacy of Rotary and Reciprocating Systems for Removal of Filling Material in Various Root Canal Filling Techniques

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Introduction/Purpose: Orthograd retreatment is the primary target in unsuccessful root canal treatments. The aim of this study is to evaluate the efficacy of the root canal filling with various techniques removal of oval shaped root canals with using PTN and Reciproc systems using dental operation microscopy.
Method: 60 distal roots of mandibular molar teeth included in the study. The roots were prepared using PTN X4 instrumantation system and irrigated with 2.5% NaOCl. Then the roots were divided into three groups and filled with Total Fill BC selaer using following methods (n=20):SC method, GC method and WVC method. The retreatment procedure was performed using two different instrumentation techniques: Reciproc 50 and ProTaper Next X5 instruments(n=10). For the analysis of the remaining filling material, the roots were divided into two parts with the help of diamond separators as bucocolingual and photographs were taken at x16 magnification under DOM. The remaining filling materials were calculated by transferring the photos to the Image J program. The data were evaluated statistically using Kruskal-Wallis test.
Findings: None of the retreatment procedures assessed could completely remove filling materials from the root canals. In both instrumentation techniques, more root canal filling materials remained in the WVC group in the apical, middle and coronal sections ($p < 0.05$). It was observed that GC filling technique has higher cleaning percentage than WVC technique and SC in coronal region.
Conclusion: The R50 system was found superior to PTN X5 during the retreatment procedure, and the root canal filled with the WVC technique were more difficult to remove than other techniques.
Keywords: Orthograd retreatment, WVC technique, R50 system

The Effect of Edta Gel During Root Canal Preparation on the Incidence of Dentinal Cracks

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Introduction/Purpose: The purpose of the study is to investigate the effect of combined usage of EDTA (ethylenediaminetetraacetic acid) gel with Ni-Ti files to create cracks in the apical, middle and coronal thirds of the root.
Method: Twenty extracted mandibular premolars selected (N=20). Periapical radiographs were taken of selected teeth from the mesiodistal and buccolingual angles to verify the presence of the single canal. The bone and soft tissue remnants on the roots and crowns were removed using hand instruments. The crowns of the teeth were removed at the cemento-enamel junction with a low speed saw under water cooling and samples were randomly divided into two groups. Teeth in group 1 were prepared with the Reciproc R25 (VDW, Munich, Germany) instrument and 5 ml of 2.5% NaOCl was used during preparation (n = 10). Teeth in group 2 were prepared and irrigated in the same manner with group 1 but additional EDTA gel (Promida, Eskişehir, Turkey) was used to lubricate the root canals (n = 10). All samples in both groups were irrigated with 2.5 ml distilled water after preparation. All the roots were horizontally sectioned 3, 6 and 9 mm from the apex and 1mm thickness of sections were obtained. Sections were taken from the samples with Minitom Precision Cutting Device (Struers ApS, Ballerup, Denmark) under water cooling. The sections were photographed under a stereo-microscope (Leica; Wetzlar, Germany) at × 25 magnification to determine the presence of dentinal cracks. The sections with cracks were recorded according to the groups respectively.
Findings: In group 1, in which 2.5% NaOCl was used alone, 20% cracks were detected in the apical thirds, 40% in the middle thirds and 20% in the coronal thirds. In group 2, in which 2.5% NaOCl + EDTA gel was used in root canal preparation, 10% of the samples cracks were detected in the apical thirds and 20% in the middle thirds and 40% in the coronal thirds.
Conclusion: Adjunctive EDTA gel usage with NaOCl reduced dentinal cracks in the apical and middle thirds but caused more cracks in coronal thirds.
Key Words: EDTA gel, NaOCl, Ni-Ti, crack

Evaluation of Students in the Pediatric Dentistry Doctorate Program within 'Preventive and Interceptive Orthodontics' Course Using Motivated Strategies for Learning Questionnaire

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Introduction/Purpose: The transfer of knowledge, skills and attitudes in education in health fields and their implantation to clinics takes place through a lifelong learning process, deep and complete learning. In recent years, it has become more important to evaluate the complexity of the procedure and to evaluate the quality of the treatment procedure, rather than grading the number of procedures in the patient applied in dental education or in the dental simulation clinics. In this context, the importance and evaluation of competencies for professionalism in health fields education come to the fore. The aim of this study is to evaluate the access to the competencies targeted in the students after the interactive lessons and the courses for treatment planning accompanied by case studies in the "Preventive and Preventive Orthodontics" curriculum in the Pediatric Dentistry doctorate program, and thus to evaluate the reflection level of learning level, cognitive achievements to patient service delivery in the clinic and in this way, evaluation of educational program development and evaluation models. It is intended to assess the motivational development and learning strategies of these students before and after getting this specific course.

Method: The students get a one-hour theoretical course of "Preventive and Preventive Orthodontics" class in the first year of pediatric dentistry doctorate education. This course consists of a total of 28 course hours for two semesters. Theoretical information is processed interactively within the scope of the course. Virtual clinical cases given within the course are examined and dental treatment methods are discussed throughout the course. At the end of this course, only written exams are used in the learning assessment. The concepts integration of theoretical knowledge to clinics and deep learning are not determined in the current assessment. 18 doctoral students enrolled in the pediatric dentistry program were evaluated in this present study. The group who were just assigned in this course consisted of 7 students whereas 11 students did already get this course. Motivated Strategies for Learning Questionnaire (MSLQ) was used to evaluate the students who did not get the course and who did. There are 81-item in this questionnaire and a 7-point Likert-type scale ranging from 1 (not at all true of me) to 7 (very true of me) was used. The MSLQ, a self-report questionnaire, was designed to correspond to the three elements in the definition of self-regulated learning: motivation, metacognition, and behavior which is one of the most widely used questionnaire designed to measure self-regulated learning. The MSLQ consists of two major sections: motivation (31 items) and learning strategies (50 items). Cronbach's alpha coefficient was tested to determine the internal consistency reliability.

Findings: The results of the study reveal the motivational subscale, intrinsic goal orientation, control of learning beliefs, and self-efficacy for learning and performance were significantly ($p=0.001$) higher for the students who get the course. The test anxiety, task value, critical thinking, and metacognitive self-regulation improved significantly as well ($p=0.04$). The help seeking improved although the increase was not significant ($p=0.06$).

Conclusion: In conclusion, the results of the present study showed that the improvements of this course promoted the students with certain motivation and learning strategies specifically the attitudes, intrinsic motivation and critical thinking.

Keywords: Preventive orthodontics, interceptive orthodontics, preventive

Evaluation of the Uncinate Process Pneumatization by Cone-Beam Computed Tomography

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Introduction/Purpose: The nasal cavity is a region where anatomical variations are frequently seen. Anatomical variations of sinonasal structures are responsible for the etiology of chronic and recurrent sinusitis. Pneumatization of the uncinate process, also called uncinate bulla, may reduce the drainage of the sinuses by narrowing the ethmoid infundibulum as a result of mucosal contact with the neighboring ethmoid bulla or middle turbinate. In this study, it was aimed to investigate the uncinate process pneumatization and to determine its prevalence by cone-beam computed tomography.
Method: Cone-beam computed tomography images of 110 patients (57 men, 53 women) included in the study were evaluated retrospectively. The presence of the pneumatized uncinate process was examined in axial, sagittal, and coronal planes on multiplanar reformat images.
Findings: The ages of the patients ranged from 20 to 70 (Mean age: 40.26 ± 14.85). Uncinate process pneumatization was observed in 6 (5.4%) of the 110 cases. There was no significant difference between genders in terms of uncinate process pneumatization ($p > 0.05$).
Conclusion: Cone - beam computed tomography is a useful diagnostic tool for examining sinonasal variations. Even images taken for different reasons should be examined in all three planes and anatomical variations such as uncinate process pneumatization and their effects on the osteomeatal complex should be reported in detail.
Keywords: Nasal cavity, uncinate bulla, cone-beam computed tomography

Investigation of Frequency of Heterotopic Teeth: A Cone Beam CT Study

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Introduction/Purpose: Teeth that occurrence in distant places from the alveolar arch (maxillary sinus, orbita, infratemporal fossa, condylar region, etc.) due to various local or systemic factors are named heterotopic teeth. The heterotopic tooth is a rare phenomenon. Although the etiology is still unknown, it is known that it may be seen due to pathologies caused by cystic lesions, cleft lip-palate, trauma history, and infectious conditions. They are usually asymptomatic, so they are detected by chance in routine clinical and radiological examinations. To the best of our knowledge, there is no study in the literature regarding the prevalence of heterotopic permanent teeth until today. This study aims to determine the frequency of heterotopic permanent teeth and their anatomical localization with the help of cone-beam computed tomography (CBCT).

Method: This study was retrospectively performed in Necmettin Erbakan University Faculty of Dentistry, Department of Oral and Maxillofacial Radiology with CBCT slices taken between 2018-2021 years. CBCT sections of 2590 individuals (1432 females, 1158 males) between the ages of 10-89 (mean: 44 ± 17 years) were evaluated in the study. Heterotopic teeth were investigated using coronal, axial, sagittal CBCT sections in regions distant from the maxillary-mandibular arch (eg: ramus, maxillary sinus, condylar region, orbital). CBCT records of heterotopic tooth-related jaw pathologies, heterotopic deciduous teeth, mesiodens, supernumerary and supplementary teeth were excluded from the study. SPSS V.21 software (IBM Corp., Armonk, NY, USA) was used for data analysis. Descriptive statistics (mean, standard deviation) were calculated for all parameters in the study. The chi-square test was used to determine the relationships between categorical variables, and it was considered significant at the $p < 0.05$ level.

Findings: Heterotopic teeth were found in 10 of 2590 individuals (0.4%). All of the heterotopic teeth detected are molar teeth; 4 are mandibular third molar teeth, 5 are maxillary third molar teeth and 1 is maxillary second molar tooth. The frequency of heterotopic teeth according to gender did not show a statistically significant difference (4 females, 6 males) $p > 0.05$. The average age of individuals with heterotopic teeth is 35.3 (17-65 years). 4 of the heterotopic impacted teeth are located in the ramus and 6 in the maxillary sinus.

Conclusion: The prevalence of heterotopic teeth is very rare (0.4%). The teeth with the highest frequency of heterotopia are the third molars. Heterotopic teeth do not have an anatomical location and gender that they prefer predominantly.

Key words: Heterotopia, ectopia, impacted tooth, CBCT

Reasons for Requesting Cone Beam Computed Tomography Examination in Pediatric Patients

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Introduction/Purpose: Cone Beam Computed Tomography (CBCT) is proven to be significant for pediatric patients, especially having malocclusions and craniofacial anomalies. CBCT provides a proper assessment of treatment planning and its outcome by determining the relationship between hard tissues during dentition and, helping a correct diagnosis of pathologies. Considering the importance of proper assessment and correct determination of the maxillofacial structures, clinicians should have sufficient knowledge about the indications and reasons for CBCT imaging in pediatric patients. In this study, it was aimed to investigate the reasons for CBCT imaging requests in pediatric patients who were consulted to maxillofacial surgery.

Method: CBCT request forms for the periods between 2015-2021, obtained from records of the 0-12 aged pediatric patients, were admitted to Istanbul Medipol University Faculty of Dentistry Department of Pedodontics and then referred to Oral Maxillofacial Department, were evaluated retrospectively. Age distributions and reasons of CBCT request (lesion/cyst, impacted tooth, trauma, orthodontic purpose, supernumerary tooth and other) of the patients included in this study were evaluated. The data were analyzed by descriptive statistics methods.

Findings: The mean age of 49 patients meeting the inclusion criteria was 10.2 ± 1.84 years (Min-Max=6-12). It was determined that the most common request reason was impacted teeth (40.8%), followed by jaw cyst (20.4%), supernumerary teeth (16.3%), orthodontic purposes (12.2%), other reasons (6.1%), lesions (2%) and odontogenic tumor (2%), respectively.

Conclusion: The results of the study showed that most of the CBCT images were requested due to the impacted tooth in the pediatric patient population.

Keywords: CBCT, pediatric patient, dentistry

Effects of Weathering Conditions on Hardness of Maxillofacial Prosthesis

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Introduction/Purpose: Maxillofacial prosthesis is of great importance in providing function and esthetics to patients with congenital, developmental or acquired maxillofacial defects. Silicone elastomers are used commonly for maxillofacial prosthesis production. Changes in the physical and mechanical properties of silicone elastomers necessitate the replacement of the prostheses in a period ranging from 6 months to 2 years. One of these properties is hardness and increase in hardness may disrupt the movement of the prosthesis in harmony with the surrounding tissue and cause irritation in the surrounding tissues. The aim of this study is to investigate the effect of weather conditions simulated with an aging device on the hardness of silicone elastomers.
Method: High temperature vulcanizing silicone and room temperature vulcanizing silicone were used in the research. Twenty five square-shaped specimens (25x25x6mm^3) were prepared. There were five groups consisting of silicone elastomers having different hardness values. Shore A hardness test was performed using a hardness tester device according to American Society for Testing of Materials D2240 standards. Specimens were subjected to artificial aging after hardness measurement. The aging process were performed according to American Society for Testing and Materials G154. The second hardness measurement was performed after the aging process. For each group, the initial hardness values and post-aging hardness values were compared. Hardness changes between groups were compared with each other.
Findings: A statistically significant increase was found in the hardness values of the specimens after aging process ($p<0.005$). Also there was a significant difference between hardness changes of all groups ($p<0.005$). The increase in the hardness value of silicone vulcanized at high temperature was higher than that of silicone vulcanized at room temperature.
Conclusion: Moisture, light and temperature changes cause the hardness of silicone elastomers to increase. The increase in the hardness of the maxillofacial prosthesis may lead to the deterioration of the function and esthetics of the prosthesis.
Keywords: Maxillofacial prosthesis, weathering conditions, vulcanizing silicone

Trend of Dental Treatments under General Anesthesia of Children in Lokman Hekim Hospital after Covid-19.

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Introduction/Purpose: It is one of the important duties of pediatric dentists to control the behaviors of the pediatric patient and to perform dental treatments. Behavior orientation techniques should be tried first in pediatric patients who do not comply. However, in some cases, these methods may be insufficient. In such cases, pharmacological applications are applied (general anesthesia and sedation methods). Therefore, the objective of this study was to provide baseline information regarding trends in pediatric dental treatment performed under GA after covid-19. The information collected by this study should be very useful when planning the future use of GA in pediatric dentistry. The purpose of the present study was to report trends in pediatric dental treatment performed under GA after covid-19.
Method: A retrospective review of the hospital records of patients who received dental treatment under GA after july of was conducted. The following dataset was collected for each participant: age, sex, medical diagnosis, caries status, types and numbers of treatments, and any complications. Caries status was recorded based on the World Health Organization oral health survey criteria and methods, which use the decayed, extracted, and filled tooth (dmft) index for primary dentition. The types of dental treatment identified consisted of restoration, pulp therapy, and extraction.
Findings: Among 15 participants, there were boys and girls enrolled in our study. The mean age of the enrolled girls were 4.13 and boys were 4.38 years. The mean number of teeth treated by compomer was 4,25. The mean number of pulpotomy was 0.71. The mean number extraction of primary teeth was 2.21. The distribution of dental treatments and the number of treated teeth within each sex were also analyzed.
Conclusion: Especially after Covid-19 pandemic using GA results in a higher quality of care, especially when children experience extreme dental fear and have multiple dental caries.
Keywords: Dental general anesthesia, rationale for anesthesia, dental treatment type

Minimally Invasive Treatment Approach in Pediatric Dentistry – A Case Series

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Introduction/Purpose: Dental caries is the most common childhood disease and is five times more prevalent than asthma and seven times as common as hay fever. Understanding of caries defines it as an ecological imbalance within the dental biofilm, with acidogenic and aciduric bacteria being more competitive under frequent intake of carbohydrates and eventually dominating the biofilm. Mechanical removal unable to eliminate all bacteria, it would neither "heal" caries nor control the lesion activity. Removing caries should thus be regarded as a symptomatic rather than a casual treatment, which is why modern concepts for managing caries and its symptoms aim to avoid invasive treatments whenever possible and instead attempt to control the activity of the biofilm and the lesion. For non-cavitated lesions, non-invasive strategies like dietary control, mechanical or chemical oral hygiene control, Remineralization strategies employing fluorides, micro invasive strategies like resin infiltration can be attempted. None of these strategies remove carious lesion, but maintains equilibrium of mineral loss and gain to rebalance biofilm activity. Minimally invasive strategies like selective caries removal, hall technique, silver diamine fluoride application, fluoride varnish application, SMART restorations, pit and fissure sealant application etc can be attempted. In this paper going to present different cases of patients treated using these techniques to reduce the fear and anxiety, treatment time, and cost of the treatment.

Case Reports: This case series will include treatments like SDF application, fluoride varnish application, pit and fissure sealant application, SMART restorations, hall crowns and minimally invasive treatment approach in MIH etc. In all this cases patients came with the complaint of pain and food lodgment or sensitivity. On clinical examination observed the caries was in dentin or enamel only, and kids were little agitated on their dental visits. On radiographic examination pulp involvement or pdl changes was not visible. Dental caries is a preventable disease. Disturbing the biofilm from cavitated dentine lesions appears to arrest further progression of such lesions. Remineralisation of demineralised dentine occurs through:1) the function of odontoblasts process, providing calcium and phosphate from the vital pulp 2) diffusion of ions (calcium, phosphate, fluoride) from materials placed on the floor of a restored cavity

Conclusion: The adage 'the seal is the deal' should be adopted to keep the functional natural dentition healthy from young to old age. Minimally Invasive Dentistry (MID), has developed a new approach for addressing dental decay through minimally invasive technique and the preservation of tooth. It is a conservative philosophy that reduces restorative procedure time, pain and stress, and results in decreased patient anxiety. Preservation of a healthy set of natural teeth for each patient should be the objective of every dentist.

Keywords: Dental caries, minimally invasive dentistry, SDF application

Prevalence of Temporal Bone Pneumatizations in Patients with Temporomandibular Disorders: A Cone Beam Computed Tomography Study

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Introduction/Purpose: The aim of this study is to evaluate the incidence of pneumatized articular eminence and pneumatized roof of the glenoid fossa in patients with temporomandibular disorders on cone beam computed tomography images.
Methods: The cone beam computed tomography images of 134 patients who were diagnosed with temporomandibular disorders as a result of clinical and radiological evaluations were analyzed retrospectively. The presence of pneumatized articular eminence or/and pneumatized roof of the glenoid fossa, laterality, gender and age information was noted. The data were assessed using IBM SPSS 22 statistics program and statistical comparisons between two categorical variables were conducted using Chi square tests.
Findings: The average age of the patients was 41.7. Of the 134 patients, 86 (64%) had pneumatized articular eminence or/and pneumatized roof of the glenoid fossa, but not pneumatizat ion in 48 (36%) patients. There was no significant difference in the prevalence of pneumatization in roof of glenoid fossa and articular eminence between males and females. Bilateral pneumatization was more common than unilateral (p=0.000).
Conclusion: Pneumatized articular eminence and pneumatized roof of the glenoid fossa are frequently seen in patients with temporomandibular disorders. Appropriate surgical methods can be used by evaluating the pneumatization of the articular eminence and glenoid fossa regions before temporomandibular joint surgery.
Keywords: Articular eminence, cone-beam computed tomography, glenoid fossa, pneumatization, temporomandibular disorders

Evaluation of The Effect of Different Application Techniques on Color Change after Coloring with Coffee in Bulk-fill Composite Resins

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Introduction/Purpose: The aim of this study is to investigate the effect of different application techniques on color change after coloring with coffee in 1 universal composite and 3 different bulk-fill composite resins.
Methods: In this study, 1 universal (Universal Restorative 200 (U), 3M-ESPE, USA) and 3 different bulk-fill composite resins (Filtek-One Bulk-Fill Restorative (F), 3M-ESPE, USA Tetric Evo-Ceram Bulk-Fill (E), Ivoclar-Vivadent, Liechtenstein; Tetric N-Ceram Bulk-Fill (N), Ivoclar-Vivadent, Liechtenstein) materials were used. A total of 60 disc shaped samples, including 20 samples from each bulk fill composite resin group, were prepared. One group of bulk fill composite resins were polymerized with 2 mm (40 sec) + 2 mm (40 sec) layering technique and the other group was 4 mm bulk technique (40 sec). The polymerization of the U composite resin (control group) was completed with the 2 mm + 2 mm (40 sec) incremental technique (n = 10). Color measurements were made with a spectrophotometer at the beginning and after 3 days of soaking in coffee. Color changes (ΔE00) were determined using the CIEDE 2000 color formula. Data were analyzed using Kruskal Wallis and Man Whitney U tests ($p < 0.05$).
Findings: A clinically noticeable color change (ΔE00; 1.82-3.32) was observed in composite resin samples after 3 days in coffee. The highest color change was determined in the incremental technique group of the 3M bulk fill composite, and the lowest color change in the Tetric Evo Ceram bulk technique group ($p < 0.05$). There was no difference between the groups of the same bulk fill composite resins applied by bulk or incremental technique. ($p > 0.05$)
Conclusion: It was observed that the application of bulk fill composite resins by incremental or bulk technique has no effect on color change.
Keywords: Bulk-fill, coloration, ciede2000, incremental technique, bulk technique

Investigating the Effect of Different Remineralization Agent on the Shear Bond Strength of Enamel Exposed to Radiation

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Introduction/Purpose: It has been reported that there are deteriorations in the enamel collagen structure and enamel-dentin connection after radiation application. Especially this deterioration is more evident after radiation application 60 Gy in head and neck radiotherapy. With these deteriorations, multifactorial factors such as changing dietary habits and reduced saliva flow cause suddenly seen and rapidly developing radiation caries in the teeth. With the remineralizing agents used, it is aimed to reduce this destruction and result in the balance between demineralization and remineralization in the direction of remineralization. Studies have reported that remineralizing agents cannot completely eliminate the destructive effect of radiation, but reduce it. The success rate of composite restorations made after radiotherapy is known to decrease due to deteriorating enamel and dentin content.
The aim of this study is to evaluate the effect of different remineralizing agents used during radiotherapy on the shear bond strength of enamel.
Methods: Enamel samples were prepared using extracted and embedded third molar teeth and were taken workıng grups created randomly (n=6). A total of 60 Gy radiation was applied to all groups at a rate of 2 Gy per session. Between the radiation sessions, a different remineralizing agent (Sodium Fluoride, CPP-ACP, CPP-ACFP, bioactive glass, chitosan) was used in each group except the control group. After the 60 Gy treatment dose was completed, G-Premio Bond was used on the enamel samples and a 4 mm diameter 2 mm high composite resin (G-ænial anterior) was applied in accordance with the manufacturer's instructions. After the samples were kept in distilled water at 37^0C for 24 hours, their shear bond strength was measured using a universal test device at a speed of 0.5 mm / min. After fracture type of failure is classified. Analyzes of the obtained data were made with one-way analysis of variance and Tukey test ($\alpha = 0.05$).
Findings: The highest shear bond strength was observed in the CCP-ACFP group and the lowest in the control group without any agent. Shear bonding values were statistically higher in CCP-ACP, CCP-ACFP and bioactive glass applied groups than control and chitosan groups ($p < 0.05$). The NaF applied group showed similar bond strength with the control and chitosan group ($p > 0.05$). Failure type was frequently determined as adhesive in all groups except CCP-ACP, CCP-ACFP and chitosan groups.
Conclusion: The use of remineralizing agents between radiotherapy sessions increases the bond strength to enamel tissue. Within the limitations of the study, the use of CCP-ACP, CCP-ACFP and bioactive glass was found to be more effective.
Keywords: Bioactive glass, chitosan, radiation, remineralization, shear bond strength.