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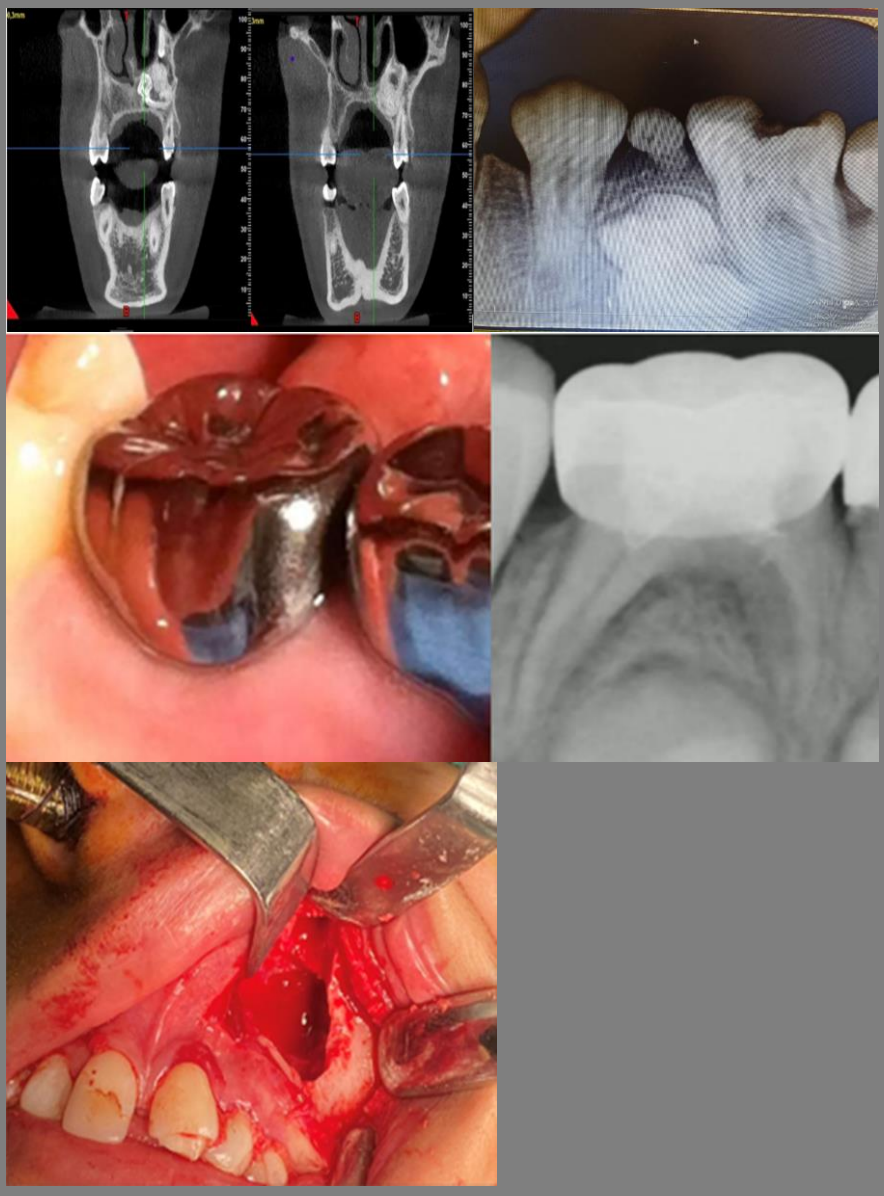

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Evaluation of Analgesic Use in Patients Presenting to Pediatric Dental Clinic With Pain

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Abstract

Aim: The aim of this study was to evaluate the use of analgesics, the doses used and the level of knowledge of patients about analgesics in patients presenting with pain to the pediatric dentistry clinic.
Materials and Methods: A questionnaire was applied to the parents of 120 children aged 3-15 years who referred to Kırıkkale University Faculty of Dentistry, Department of Pediatric Dentistry, with pain. The questionnaire included following data; the duration of the pain, the type and dose of the analgesic used, the intensity of the pain before and following analgesic use based on the VAS scale, knowledge about the maximum daily dose of the analgesic used. The data were analyzed statistically with Chi-square and Mann-Whitney U test.
Results: One hundred and twenty patients were included in the study. The mean age of children using analgesics was 8.2±2.6 years. Paracetamol was the most frequently used analgesic in this population (64,2%) followed by ibuprofen (45%). 18,3% of children were taking more than one analgesic. Although 66,6% of the parents were unaware of the maximum daily dose, only three of the children exceeded this limit (using paracetamol). Also 65% of the parents were unaware of side effects of the analgesics. Parents taking analgesics on medical advice were not more aware of the maximum daily dose.
Conclusıons: We found that paracetamol was the first analgesic preferred by parents for toothache. A large portion of the parents were unaware of the maximum daily dose and side effects of analgesics used in children. Dentists treating cases with pain should inform patients about the use of analgesics, side effects and maximum doses.

Research Article (HRU Int J Dent Oral Res 2023; 3(3):124-129)

Key words: Dental pain, children, analgesics.

Introduction

According to the International Association for the Study of Pain: “Pain is an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage" (1). Pain is a complex, multifactorial phenomenon. Its perception in children may be modulated by their cognitive abilities, maturity and emotional or situational factors (2).

Toothache is defined as pain originating from a tooth and its supporting structures, and it is often described as the most common type of orofacial pain (2). Toothache is a common problem in the general population and studies have shown that this condition impacts patients' quality of life. Toothache can negatively affect learning, communication, nutrition, and other activities necessary for normal growth and development in children and adolescents (3). Dental caries lesions are the main cause of toothache occurrence, but tooth eruption and exfoliation, traumatic dental injuries, molar-incisor hypomineralization, oral ulcerations, and lesions can also cause toothache (2).

Analgesics are among the most used drugs and are also frequently used in self-medication (4). Self-medication is traditionally defined as "the taking of medicines, herbs, or home remedies on one's initiative or the advice of another person without consulting a physician" (5). There are two types of nonprescription medicines defined by their accessibility.

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These are over-the-counter (OTCs) drugs and behind-the-counter (BTCs) drugs. OTC drugs are used to relieve simple everyday ailments and are sold directly to patients without the need to see a healthcare professional. Over-the-counter medicines include such as analgesics, vitamins, and mineral supplements (6).

Drugs available for acute pain management belong to two major groups: non-narcotic analgesics (e.g., non-steroidal anti-inflammatory drugs and paracetamol) andopioids (or narcotics) (7,8). The most used non-narcotic analgesics in dentistry are aspirin, ibuprofen, and paracetamol; all of which are available as 'over the counter' medications. Acetaminophen (paracetamol), a very common drug used to treat toothache, relieves acute toothache and is often taken by patients with toothache (7,9).

When the manufacturer's recommended dosing is followed, these medications are very safe (10). However, various side effects occur in overdose of analgesics (7,10,11). Analgesics cannot replace proper dental treatment but can support treatment (4).

Pain assessment in children is difficult, because of their limited ability to understand assessment instructions and articulate descriptions of their pain. Two approaches were used in the previous studies: parental report and self-report. Self-report measures (e.g., visual analogue scale) are more reliable than a parental report; however, it depends on sufficient intellectual development from the child to understand the question asked and use the scale appropriately (12–14).

This study aimed to evaluate the use of analgesics, the doses used, and the level of knowledge of patients about analgesics in patients presenting with pain to the pediatric dentistry clinic.

Material and Method

Patient selection

The questionnaire study was applied to the parents of pediatric patients (between 3 and 15 years old) who came to the Kırıkkale University Faculty of Dentistry Pedodontics clinic for a routine pedodontics examination.

A total sample size of 119 patients was required for power calculation (with a power of >90% at the 5% significance level). Sample size estimation was performed by using the G*Power version 3.0.10 (Kiel, Germany © 1992–2008) software.

The inclusion criteria for the study were; patients aged 3-15 years who presented to the pediatric dental clinic with pain complaints, had no systemic disease, were taking analgesics for pain complaints and agreed to participate in the study. This study was performed following the ethical standards of the Declaration of Helsinki (1964) and its subsequent amendments. The compliance of this study with the scientific, ethical rules was approved by Kırıkkale University Non-Invasive Clinical Research Ethics Committee (19/01-20.11.2018).

Before inclusion in the study, the written consent form stating that parents agreed to participate was obtained. Individual results were not disclosed in any way to ensure privacy and confidentiality.

Analgesics and doses used

A questionnaire of 11 questions was designed and administered to the parents of the patients to evaluate the use of analgesics.

The questionnaire includes questions to determine age, gender, duration of pain, type and amount of analgesic used, severity of pain before and after using analgesics according to the VAS scale, the parent's knowledge about the maximum daily dose of analgesic used, and whether they have been informed by a healthcare professional.

In the present study, a catalogue with the picture of the drug package of the most frequently analgesics was provided to the patient to facilitate remembering the name of the used analgesics and to improve the quality of the data collection.

Statistical Analysis

All data were statistically analyzed using IBM SPSS Statistics version 23 (IBM, Armonk, NY, USA). The questionnaire was analyzed by descriptive analysis and correlation analysis combined with the chi-square ($\chi 2$) test and the Mann-Whitney U test. The significance level was set at 0.05.

Results

A total of 120 parents participated in the study to fill out the questionnaire. The mean age of the children participating in the study was 8.2±2.6 years.

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Of the participants, 48.3% were girls and 51.7% were boys.

The frequencies and percentages of the answers given to the survey questions are presented in Table 1. Of the participants, 77 parents used paracetamol, 54 parents used ibuprofen, 3 parents used dexketoprofen, 2 parents used diclofenac potassium, and 1 parent used flurbiprofen. In our study, paracetamol was the most used analgesic (64.1%), followed by ibuprofen (45%). 18.3% of children used more than one type of analgesic.

Table 1. Frequency and percentage of answers given to survey questions

Age	Under the of age 10	83	69,1
	Age of 10 and over	37	30,9
Gender	Female	58	48,3
	Male	62	51,7
Which analgesic have you used for your child? (You could select multiple options)	Parasetamol	77	64,2
	İbuprofen	54	45
	Deksketoprofen	3	2,5
	Diklofenakpotasyum	2	1,7
	Flurbiprofen	1	0,8
Who did you consult when you decided to use analgesic for your child?	Consulting a doctor, dentist or pharmacist	53	44,2
	Consulting no one	67	55,8
How did you get the analgesic that you were given to your child?	Pharmacy with prescription	60	50
	Pharmacy without prescription	57	47,5
	I used the analgesics already at home	3	2,5
Have you already been informed by your doctor, pharmacist or other health staff about the usage information and side effects of the analgesic that you use for your child?	Yes	26	21,7
	No	94	78,3

Before using analgesics, 55.8% of respondents reported that they did not consult anyone; 44.2% reported that they consulted a doctor, dentist, or pharmacist. 21.7% of patients had been previously informed by a physician, pharmacist or other health personnel about the drug's usage information and side effects. While 50% of the parents obtained analgesics with a prescription, 47.5% obtained them from the pharmacy without a prescription, 2.5% used home medicines.

The mean pain score on the VAS scale was 5±0.9 before analgesic intake and 2.1±1.2 after analgesic use.

Figure 1 shows the number of days patients experienced pain before visiting the dentist. Almost half of the patients (50.8%) waited in pain for more than 3 days before going to the pediatric dental service. One patient mentioned a 3-month period of pain before coming for dental treatment.

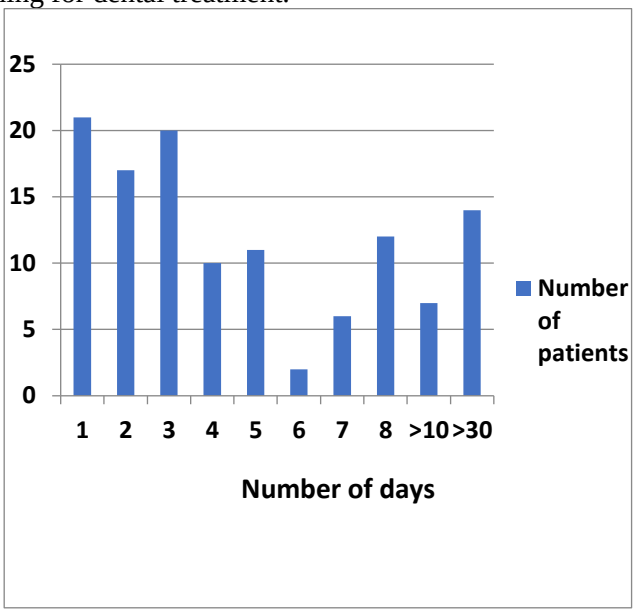

Figure 1. Number of days in pain before subjects visited the pediatric dentistry department.

Figure 2 shows the percentage values in parents' knowledge of the maximum daily dose and the side effects of the analgesics. Although 66.7% of the parents did not know the maximum daily dose, only three children exceeded the maximum dose (when using paracetamol). None of the parents who exceeded the daily maximum dose knew the daily maximum dose. Only 33.3% of the participants stated that they knew the maximum daily dose. And 65% of parents do not know the side effects of analgesics.

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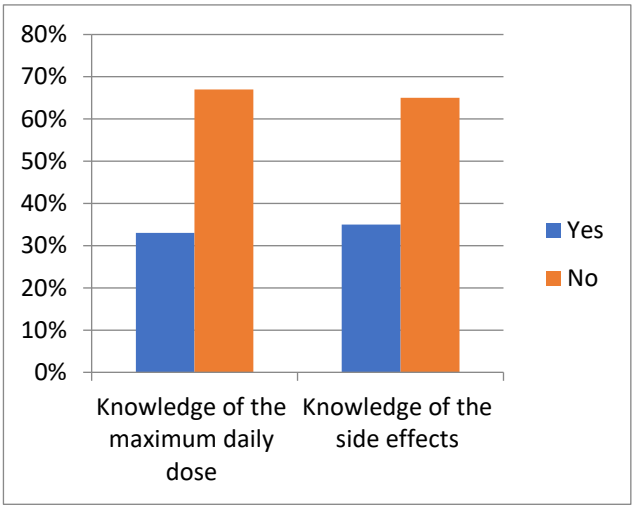

Figure 2. Percentage values in parents' knowledge of the maximum daily dose and the side effects of the analgesics.

Discussion

Toothache, a public health problem, is one of the main reasons for seeking dental care. Toothache can negatively impact oral health-related quality of life and subsequently lead to dental anxiety. Identifying the causes of dental pain and treating them earlier could minimize the consequences (15).

The use of nonprescription analgesics for dental pain is widespread, and public awareness of the safe use of acetaminophen is known to be low (16). In our study, paracetamol was the most used analgesic (64.1%), followed by ibuprofen (45%). 18.3% of children used more than one type of analgesic. In other studies in the literature, it was observed that the most commonly used analgesics were paracetamol and ibuprofen, respectively (4,11,17). The reason these drugs are the most used analgesics may be their widespread availability and low cost.

In a study conducted in Brazil, the rate of self-medication was 69.8%. In our study, self-medication was observed in more than half of the participants (17). A study conducted during the COVID-19 pandemic period reported that an extremely high prevalence (70.2%) of self-medication was found in children with dental problems in Northern Turkey (6). Although the study was conducted before the COVID-19 pandemic, it showed that half of the participants in our study used self-medication.

Pape et al. reported that 85.5% of the patients used paracetamol in self-medication (18). In the same study, it was reported that paracetamol was obtained from the pharmacy without a prescription (44.7), from the pharmacy with a previous prescription (29.9) or with paracetamol already available at home (10.9). Macit et al. reported that., 84 of the 173 participants purchased analgesics from the drugstore with a prescription, whereas 74 individuals did so without one (19). In our study while 50% of the parents obtained analgesics with a prescription, 47.5% obtained them from the pharmacy without a prescription, 2.5% used home medicines. It is essential not to ignore that taking analgesics unconsciously can have significant risks, and one should limit its self-use. Considering this, using analgesics directly for self-treatment without a dental check-up would not be a rational decision.

Hommez et al. (4) reported that 76.6% of the participants exceeded the maximum daily dose in the use of ibuprofen and 32.4% in the use of acetaminophen. George et al. reported that 2 patients exceeded the maximum daily dose of acetaminophen.

Pape et al. reported that 27 of the patient's using paracetamol had overdose and some of these patients had clinical signs of hepatoxicity (18). In our study only three children exceeded the maximum dose (when using paracetamol). It was observed that more than half of the parents participating in our study did not know about the maximum daily dose. It may be that more than half of the parents do not know the maximum daily dose, but do not give high doses to protect their children.

Accessible and simple to use analgesics can have serious side effects in both young and old people, such as liver and renal impairment. Although acetaminophen is usually considered as a safe drug, this medicine is associated with hepatotoxicity at high doses (20) and is the main cause of drug intoxication and acute liver failure worldwide (21). Since acetaminophen is available over-the-counter, patients can take supratherapeutic doses without realizing it or appreciating the dangers (20).

Concerning patients, it has been shown that there is a lack of knowledge about safe self-medication, particularly in the context of dental pain, which leads to a considerable number of acute medical admissions due to accidental acetaminophen overdose. Therefore, it is important for parents to be aware of the proper analgesic dosage, as well as the signs and consequences of an overdose. To prevent the need for analgesics due to toothaches, regular dental appointments are crucial.

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The difficulty in recognizing and assessing pain in children is one of the obstacles in treating this pain. The use of pain assessment tools is usually necessary to confirm the presence of pain, assess its intensity, determine the analgesic agents needed, and evaluate the effectiveness of the treatment initiated (22). The VAS is widely used throughout the world as a measure of pain intensity. VAS has been shown to be a valid, reliable and interval scale. VAS has high test-retest reliability and repeatability (23).We also used VAS to help us study pain score. The mean pain score on the VAS scale was 5±0.9 before analgesic intake and 2.1±1.2 after analgesic use. Patients reported a reduction in the pain of their teeth after the use of the analgesic.

The high incidence of toothache suggests that ineffective and delayed pain management is a significant risk factor for the abuse of over-the-counter and other analgesics (4). Almost half of the patients (50.8%) waited in pain for more than 3 days before going to the pediatric dental service. One patient mentioned a 3-month period of pain before coming for dental treatment. The variability in the onset of pain and admission to the clinic was similar to that in other studies (4,24). The optimal advice for patients experiencing pain is to immediately seek dental treatment, as this is the only solution for predictable and effective pain relief. The use of analgesics is solely complimentary to accurate dental treatment.

Limitations

This study was monocentric, and a larger sample size would have been advantageous to generate a more representative and reliable sample. The validity of our findings may be diminished if we rely on patients to remember the dosage of analgesic they had taken because they might forget how much medication they self-prescribed.

Conclusion

In our study, we found that paracetamol was the first analgesic preferred by parents for toothache.

A large portion of the parents were unaware of the maximum daily dose However, very few parents exceeded the maximum analgesic dose.

Parents' level of knowledge about side effects of analgesics used in children was insufficient.

Dentists treating cases with pain should inform patients about the use of analgesics, side effects and maximum doses.

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Diş Hekimlerinin Antiagregan ve Antikoagülan İlaçlar Hakkındaki Bilgi Düzeyinin Değerlendirilmesi

Evaluation of The Knowledge Level of Dentists About Antiaggregant and Anticoagulant Drugs

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Özet

Amaç: Diş hekimlerinin tedavilerinin birçoğu kanama riski olan işlemlerden oluşmaktadır. Antiagregan/antikoagülan ilaç kullanmakta olan hastalar, çeşitli dental girişimlerde perioperatif süreçte uzamış kanama süresiyle karşı karşıyadır. Diğer yandan bu ajanların kullanımı hastanın genel medikal sağlığının idamesi için de gereklidir. Bu çalışmada, diş hekimlerinin antiagregan ve antikoagülan ilaçlar hakkındaki bilgi düzeylerini ölçmek ve aynı zamanda cinsiyet, çalıştığı kurum, çalışma süresi ve ünvanın bu bilgi düzeyi üzerine etkisinin değerlendirilmesi amaçlanmıştır.
Yöntem: Araştırma, tanımlayıcı bir anket çalışması olarak planlanmıştır. Anket formu, Elazığ ilinde bulunan diş hekimleri, Fırat Üniversitesi Diş Hekimliği Fakültesi'nin son sınıf öğrencileri, asistanlar ve öğretim üyeleri olmak üzere toplam 200 kişiye ulaştırıldı. Formu yanıtlamayı kabul eden 157 katılımcı çalışmaya dahil edildi. Veriler sayı ve yüzde olarak ifade edildi.
Bulgular: Diş hekimlerinin %41,4'ü antiagregan/antikoagülan kullanan hastalarla çok sık karşılaştıklarını belirtti. Bu ilaçlar hakkında kendini yeterli bilgiye sahip gören hekim oranı %42,04, kanama problemi durumunda yapılacak tedavi hakkında kendini yeterli gören hekim oranı ise %36,94 olmuştur. Hangi ilacın ne zaman kesilmesi gerektiği konusunda yeterli bilgiye sahibim diyen diş hekimi oranı %29,3 olduğu görüldü. Hangi ilacın antiagregan veya antikoagülan olduğunu belirtiniz sorusuna hekimlerin %56,05'i heparin, %60,06'sı aspirin, %70,7'si warfarin ve %46,05'i klopidogrel için doğru yanıt verebilmiştir.
Sonuç: Çalışmamızın sonucunda ülkemizde henüz kapsayıcı ve standardize edilmiş bir tedavi protokolünün bulunmadığı görülmüştür. Diş hekimlerinin büyük bir kısmının antiagregan ve antikogulan ilaçlar hakkında yeterli bilgiye sahip olmadığı bu yüzden farklı tedavi seçeneklerine yöneldikleri görülmüştür. Cinsiyet, çalıştığı kurum, çalışma süresi ve ünvanın; antiagregan ve antikoagülan ilaçlar hakkında bilgi düzeyleri üzerine anlamlı bir etkisinin olduğu görülmüştür.

Research Article (HRU Int J Dent Oral Res 2023;3(3): 130- 138)

Anahtar Kelimeler: Antiagregan/antikoagülan, pıhtılaşma, diş hekimi, anket.

Abstract

Objective: Many of the treatments of dentists consist of treatments with bleeding risk. Patients using antiaggregant/anticoagulant drugs are at risk of prolonged bleeding during the perioperative period in various dental procedures. On the other hand, the use of these agents is also necessary for the maintenance of the general medical health of the patient. In this study, it was aimed to measure the knowledge level of dentists about antiaggregant and anticoagulant drugs, and also to evaluate the effect of gender, institution, working period and title on this level of knowledge.
Method: The research was planned as a descriptive survey study. The questionnaire was delivered to a total of 200 people, including dentists in Elazig, senior students of the Faculty of Dentistry of Fırat University, assistants and lecturers. 157 participants who agreed to answer the form were included in the study. Data were expressed as numbers and percentages.
Results: 41.4% of the dentists stated that they encountered patients using antiaggregant/anticoagulant very frequently. The rate of physicians who considered themselves to have sufficient knowledge about these drugs was 42.04%, and the rate of physicians who considered themselves adequate about the treatment to be performed in case of bleeding problems was 36.94%. It was observed that the rate of dentists who said that they had sufficient information about which drug should be

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discontinued and when was 29.3%. To the question of which drug is an antiaggregant or anticoagulant, 56.05% of the physicians gave the correct answer for heparin, 60.06% for aspirin, 70.7% for warfarin and 46.05% for clopidogrel.
Conclusion: As a result of our study, it was seen that there is no comprehensive and standardized treatment protocol in our country yet. It has been observed that most of the dentists do not have enough knowledge about antiaggregant and anticoagulant drugs, so they turn to different treatment options. Gender, institution, duration of employment and title; It has been observed that there is a significant effect on the level of knowledge about antiaggregant and anticoagulant drugs.
Research Article (HRU Int J Dent Oral Res 2023;3(3): 130- 138)

Key words: Antiaggregant/anticoagulant, coagulation, dentist, questionnaire.

Giriş

Çeşitli hastalıkların tedavisinde kullanılan antiagregan ve antikoagülan ilaçların günümüzde giderek kullanımı artmaktadır ve buna bağlı olarak diş hekimlerinin çok sık bu hastalarla karşılaştıkları belirtilmiştir (1, 2).

Travma veya girişimsel bir cerrahi işlem sonrasında damarlarda meydana gelen hasarlanmaya cevap olarak pıhtılaşma olayı gerçekleşir. Antiagregan ve antikoagülan ilaçlar, kanın pıhtılaşma ve koagülasyon özelliğini inhibe edici etkiye sahiptirler (3).

Antiagregan ve antikoagülan ilaçlar etkilerini koagülasyon sürecinin çeşitli basamaklarında gösterebilirler. Aspirin, klopidogrel, dipiridamol gibi antiagregan ilaçlar; trombosit agregasyonunu geri dönüşümlü ya da geri dönüşümsüz olarak çeşitli basamaklarda inhibe ederek primer hemostaz üzerinde etki gösterirler. Antikoagülan etkili ilaçlar da pıhtılaşma kaskadının çeşitli basamaklarında etki göstererek pıhtılaşma faktörlerinin aktifleşmesini engellerler. Warfarin gibi K-vitamini antagonisti ajanlar, protrombin ve diğer K vitamini bağımlı koagülasyon faktörlerinin yapısını etkileyerek, sekonder hemostazı zayıflatır (4).

Dünyada ve ülkemizde artan bu ilaçların kullanımı özellikle kanama riski olan tedaviler nedeniyle, diş hekimlerin sıkça karşılaştıkları bir problem olmaya başlamıştır. Dental tedavilerde, kanama riskinin düşük olması ve operasyon bölgesine ulaşımın kolay olması nedeniyle birçok dental işlemden önce antiagregan ilaçların kesilmemesi gerektiği önerilir (5).

Bu ilaçları kullanan hastalarda özellikle invaziv tedavilerden sonra hayatı tehdit eden kanamaların, baş ve boyun bölgesinde büyük hematomlara neden olduğu bilinmektedir. Günümüzde diş tedavilerinden önce antikoagülan ilaçlarının kesilmesine bağlı hayatı tehdit eden komplikasyonlar oluşur ve bu komplikasyonların ekonomik yük oluşturduğu çeşitli çalışmalar ile detaylı olarak belirtilmiştir (6-11).

Diş hekimleri, antiagregan ve antikoagülan kullanan hastaların dental tedavilerinden önce uygulayabilecekleri bir tedavi protokolü 2018 yılında TDB tarafından yayınlanmıştır (4). Ancak diş hekimlerinin çoğu bu protokol hakkında yeterli bilgiye sahip değildir. Diş hekimleri diğer tıp alanların aksine çoğu zaman hastalarında dental tedavilerden önce antiagregan ve antikoagülan ilaçları kesip diş tedavilerini yapmaktadır. Diş hekimleri, ciddi sistemik rahatsızlığı bulunan ve antikoagülan ilaçlarının kesilmesinin önerilmediği hastalarda çoğu zaman dental tedavilerden kaçınmakta veya hastaları merkezi üniversite hastanelerine sevk etmektedir. Ayrıca ciddi sistemik rahatsızlığı olmayan hastaların invaziv olmayan birçok dental tedavilerinin sevki gereksiz olup, zaman ve maddi kayıplara neden olmaktadır (12).

Materyal ve Metod

Bu çalışma bir anket çalışması olup 06.10.2022 tarihinde Fırat Üniversitesi Diş Hekimliği Fakültesi Etik Kurulu toplantısında 2022/11375 sayılı etik kurul onayını almıştır. Anket formları Fırat Üniversitesin ‘de 5. Sınıf mezun olmak üzere olan diş hekimliği fakültesi öğrencileri, ağız ve diş sağlığı merkezinde çalışan diş hekimleri, üniversite hastanelerinde çalışmakta olan araştırma görevlileri ve öğretim üyeleri olmak üzere toplam 200 katılımcıya ulaştırıldı. Katılımcılara anketin kesinlikle bir sınav olmadığı, kimlik bilgilerinin açıklanmayacağı, tüm verilerin bilimsel çalışma için kullanılacağı açıklandı. Anket formunu yanıtlamayı kabul eden 157 katılımcı, onamları alındıktan sonra çalışmaya dahil edildi. Diş hekimleri ile yüz yüze görüşülerek 2 sayfalık anketten oluşan çalışmamızı kendilerinin doldurulması istenmiştir. Anket 2 sayfada toplam 19 sorudan oluşmaktadır. İlk sayfada diş hekiminin yaşı, cinsiyeti, unvanı ve çalıştığı kurum gibi demografik özellikleri istenilen sorular yöneltildi. İkinci sayfada ise diş hekimlerinin antiagregan ve antikoagülan ilaçlar hakkındaki bilgi düzeylerini ve diş hekimlerinin genel olarak uyguladıkları tedavi protokolü hakkında bilgi elde edebileceğimiz 14 soru soruldu (Tablo 1).

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Tablo 1. Katılımcılara sorulan anket soruları

Yaş:
Cinsiyet:
Çalıştığınız süre: 1-5 yıl arası ☐ 5-10 yıl arası ☐ 10 yıldan fazla ☐
Çalıştığınız kurum: Diş hekimliği fakültesi ☐ Özel klinik ☐ Ağız ve diş sağlığı merkezi ☐
Ünvan: Öğrenci ☐ Asistan ☐ Diş hekimi ☐ Öğretim üyesi ☐

	Evet	**Hayır**	**Kararsızım**
1-Antiagregan ve antikoagülan ilaçlar hakkında yeterli bilgiye sahibim			
2-Çok sık antiagregan veya antikoagülan kullanan hasta tedavi ederim			
3-Antiagregan veya antikoagülan kullanan hastalarda dental işlemlerden 1 hafta önce ilacı kesmesini öneririm			
4-Tüm dental işlemler için ilacın kesilmesini öneririm			
5-Her antiagregan veya antikoagülan kullanan hastaya konsültasyon yazarım			
6-Antiagregan veya antikoagülan kullanan hastada aşırı kanama sorunu karşısında tedavi için yeterli biliye sahibim			
7-Hangi ilacın kesilmemesi veya kaç gün önceden kesilmesi gerektiği konusunda yeterli bilgiye sahibim			
8-Antiagregan veya antikoagülan kullanan ve dental tedavisi sonrası kanama problemi yaşadığım hasta oldu			
9-Antiagregan veya antikoagülan kullanan hastayı tedavi etmekten çekinirim			

	yok	**az**	**sık**	**Çok sık**
10-Antiagregan veya antikoagülan kullanıp dental tedaviye gelmeden önce doktoruna danışmadan ilacını kesip gelen hastam oldu				

11-Hangi ilaçlarda INR bakılması önerilir	Antiagregan ☐	Antikoagülan ☐	Kararsızım ☐
12-Hangi INR değerlerinde dental tedavi yaparsınız	1-4 ☐	4 + ☐	Kararsızım ☐

13-Antiagregan veya antikoagülan ilaçları işaretleyiniz?

	Antiagregan	**Antikoagülan**	**Kararsızım**
Aspirin			
Warfarin			
Heparin			
Klopidogrel			

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14-Antiagregan veya antikoagülan kullanan hastalarda hangi işlemlerden önce ilacın kesilmesini önerirsiniz?

Dolgu		Polisaj	
Kanal tedavisi		Diş preparasyonu	
Detertraj		Gömülü diş ameliyatı	
İmplant cerrahisi		Tüm dental işlemlerde	
Tek diş çekimi			

Antiagregan/antikoagülan kullanan hastalarda hangi dental tedavilerden önce ilacın kesilmesini önerirsiniz?

Çalışmanın istatistikleri için IBM Statistical Package for the Social Sciences (SPSS) 22 paket programından yararlanıldı. Verilerin normale uygunluğu Shapiro-Wilk ile test edildi. Tanımlayıcı istatistikler ile sayı(n) ve yüzde (%) halinde elde edildi. Kategorik değişkenler arasındaki ilişki ise Pearson ki-kare testi ile bakıldı. Gruplar arasındaki farkların istatistiksel anlamlılık seviyesi 0,05 olarak belirlendi.

Bulgular

Çalışmaya 82 erkek (%52,23) ve 75 kadın (%47,77) olmak üzere toplam 157 kişi dahil edildi. Diş hekimliği mesleğinde çalışma süresi 1-5 yıl arasında olan 96 kişi (%61,15), 5-10 yıl arasında olan 30 kişi (%19,11) ve 10 yıldan fazla olan31 kişi (%19,75) bulunmaktadır. Katılımcılardan 92 kişi (%58,6) diş hekimliği fakültesinde, 46 kişi (%29,3) ADSM'de ve 19 kişi (%12,1) özel kliniklerde çalışmaktadır. Çalışmamıza katılan hekimlerin 68'i (%43,31) diş hekimi, 59'u (%37,58) öğrenci, 22'si (%14,01) asistan ve 8'i(%5,1) öğretim üyelerinden oluşmaktadır.

Anketimize katılan diş hekimlerinin antiagregan ve antikoagülan ilaçlar hakkındaki sorulan sorulara verdiği cevaplar tablo 2'de yer almaktadır. Antiagregan/antikoagülan kullanıp dental tedaviye gelmeden önce doktoruna danışmadan ilacını kesip gelen hastanız oldu mu? Diye sorduğumuz soruda hekimlerin %17,8'i (n=28) çok sık,%35'i(n=55) sık,%33,8'i(n=53) az ve %13,4'ü(n=21) hayır olmadı yanıtını verdi. Hangi ilaçlarda INR bakılması gerekir? Sorusuna katılımcıların %43,9'u(n=69) antikoagülan, %15,9'u(n=25) antiagregan ve %40,1'i(n=63) kararsızım yanıtını verdi. Hangi INR değerlerinde dental tedavi yaparsınız? Sorusuna ise katılımcıların %74,5'i(n=117) 1-4, %6,4'ü(n=10) 4 üzeri, %19,1'i(n=30) kararsızım cevabını verdi.

Katılımcıların antiagregan ve antikoagulan ilaçların hangileri olduğu hakkında sorduğumuz sorulara en yüksek oranda doğru yanıt warfarin(%70,7) için, en düşük oranda doğru yanıt ise klopidogrel(46,5) için alınmıştır. Sorulara verilen cevaplar tablo 3'te belirtildi.

Sorularına hekimlerin verdiği cevaplar tablo 4'te gösterilmiştir.

Heparin, klopidogrel, aspirin ve warfarin hakkındaki sorulara diş hekimliği fakültesinde ve ağız diş sağlığı merkezinde çalışan hekimler özel klinikte çalışan hekimlerden daha yüksek oranlarda doğru yanıt vermiştir. Sorulara asistan ve öğretim üyeleri en yüksek oranlarda doğru yanıt alınmıştır. Aspirin ve heparinin, antiagregan veya antikoagülan olduğunu belirtiniz dediğimiz soruda kadınlar, erkeklerden daha yüksek oranda doğru yanıt vermiştir. P değerleri 0.05 ten küçük ölçülmüş ve guruplar arasında anlamlı fark bulunmuştur. 5-10 yıl arası çalışan diş hekimleri aspirin ve heparin hakkındaki soruya daha yüksek oranda doğru yanıt vermişken, 1-5 yıl arası çalışan diş hekimleri warfarin sorusuna daha yüksek oranda doğru yanıt vermiştir. 10 yıl üzeri çalışan diş hekimlerinin doğru yanıt oranı genelde en düşük seviyede görülmüştür. Cinsiyet, ünvan, çalıştığı kurum ve çalışma sürelerinin, antiagregan/antikoagülan ilaçlar hakkındaki bilgi düzeyi üzerine etkisinde anlamlı farklar çıkan cevaplar Tablo 5-9'de gösterildi.

Tartışma

Bu anket çalışmasının amacı, Elazığ ili ve çevresinde çalışmakta olan ve halen diş hekimliği fakültesinde öğrenim gören son sınıf öğrencilerinin antiagregan/antikoagülan ilaçlar hakkındaki bilgi düzeyini değerlendirmektir. Aynı zamanda cinsiyet, çalıştığı kurum, çalışma süresinin ve ünvanın bu bilgi düzeyi üzerine etkisini araştırmaktır.

Fabiana Luca ve ark. antitrombotik ilaçlarının kullanımının günümüzde giderek artığını bildirmiştir(1). Girotra ve ark.diş hekimlerinin bu ilaçları kullanan

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hastalarla artık çok sık karşılaşabileceğini belirtmiştir(2). Çalışmamızda da diş hekimlerinin bu hastalarla çok sık karşılaştığı görülmüştür. Katılımcıların %41,4'ü antiagregan/antikoagülan kullanan hastaları çok sık tedavi ettiklerini belirtmişlerdir.

Tablo 2. Antiagregan/antikoagülan ilaçlar hakkındaki sorulara verilen cevaplar

	Evet	Hayır	Kararsızım
Antiagregan/antikoagülan ilaçlar hakkında yeterli bilgiye sahibim	%42 (n=66)	%19,1 (n=30)	%38,9 (n=61)
Çok sık antiagregan/antikoagülan kullanan hastayı tedavi ederim	%41,4 (n=65)	%43,3 (n=68)	%15,3 (n=24)
Antiagregan/antikoagülan kullanan hastalarda dental işlemlerden 1 hafta önce kesmesini öneririm	%26,8 (n=42)	%58 (n=91)	%15,3 (n=24)
Tüm dental işlemler için tedavi öncesi ilacın kesilmesini öneririm	%4,5 (n=7)	%86 (n=135)	%9,6 (n=15)
Her antiagregan/antikoagülan kullanan hastaya tedavi öncesi konsültasyon yazarım	%28 (n=44)	%60,5 (n=95)	%11,5 (n=18)
Antiagregan/antikoagülan kullanan hastada aşırı kanama sorunu karşısında tedavi için yeterli biliye sahibim	%36,9 (n=58)	27,4 (n=43)	%35,7 (n=56)
Hangi ilacın kesilmemesi veya kaç gün önceden kesilmesi gerektiği konusunda yeterli bilgiye sahibim	*%29,3 (n=46)*	%33,8 (n=53)	%36,9 (n=58)
Antiagregan/antikoagülan kullanan ve dental tedavi sonrası kanama problemi yaşadığı hasta oldu	%45,2 (n=71)	%45,2 (n=71)	%9,6 (n=15)
Antiagregan/antikoagülan kullanan hastayı tedavi etmekten çekinirim	%21 (n=33)	%54,8 (n=86)	%24,2 (n=38)

Tablo 3. Antiagregan ve antikoagülan ilaçların hangileri olduğunu belirtiniz? Sorusuna verilen yanıtlar

	Antiagregan	Antikoagülan	Kararsızım
Aspirin	%63,1 (n=99)	%28 (n=44)	%8,9 (n=14)
Klopidogrel	%46,5 (n=73)	%17,8 (n=28)	%35,7 (n=56)
Warfarin	%14,6 (n=23)	%70,7 (n=111)	%14,6 (n=23)
Heparin	%32,5 (n=51)	%56,1 (n=88)	%11,5 (n=18)

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Tablo 4. Dental tedaviler öncesi antiagregan/antikoagülan ilaçlarının kesilmesini önerme oranları

	Öneririm	Önermem		Öneririm	Önermem
Dolgu	%15,9 (n=25)	%84,1 (n=132)	Polisaj	%8,3 (n=13)	%91,7 (n=144)
Kanal tedavisi	%38,9 (n=61)	%61,1 (n=96)	Gömülü diş ameliyatı	%99,4 (n=156)	%0,6 (n=1)
Detertraj	%47,1 (n=74)	%52,9 (n=83)	Preperasyon	%52,9 (n=83)	%47,1 (n=74)
İmplant	%96,8 (n=152)	%3,2 (n=5)	Tüm dental tedaviler	%14,6 (n=23)	%85,4 (n=134)
Tek diş çekimi	%81,5 (n=128)	%18,5 (n=29)			

Tablo 5. Cinsiyetin; antiagregan ve antikoagülan ilaçlar hakkındaki bilgi düzeyi üzerine etkisinin analiz sonuçları

	Cinsiyet	Antiagregan n(%)	Antikoagülan n(%)	Kararsızım n(%)	Toplam	P değeri
Aspirin	Erkek	45 (54,9)	26(31,7)	11 (13,4)	82	0,038
	Kadın	54 (72.0)	18(24,0)	3(4,0)	75	
	Toplam	99 (63,1)	44(28,0)	14 (8,9)	157	
Heparin	Erkek	33(40,2)	36(43,9)	13(15,9)	82	0,005
	Kadın	18(24,0)	52(69,3)	5(6,7)	75	
	Toplam	51(32,5)	88(56,1)	18(11,5)	157	

Tablo 6. Çalıştığı kurumun; antiagregan ve antikoagülan ilaçlar hakkındaki bilgi düzeyi üzerine etkisinin analiz sonuçları

	Çalıştığı kurum	Antiagregan n(%)	Antikoagülan n(%)	Kararsızım n(%)	Toplam	P değeri
Aspirin	Diş hekimliği fakültesi	56(60,9)	33(35,9)	3(3,3)	92	0,001
	Özel klinik	6(31,6)	5(26,3)	8(42,1)	19	
	ADSM	37(80,4)	6(13,0)	3(6,5)	46	
	Toplam	99(63,1)	44(28,0)	14(8,9)	157	
Warfarin	Diş hekimliği fakültesi	16(17,4)	70 (76,1)	6 (6,5)	92	0,001
	Özel klinik	3 (15,8)	5(26,3)	11(57,9)	19	
	ADSM	4 (8,7)	36 (78,3)	6 (13)	46	
	Toplam	23 (14,6)	111 (70,7)	23 (14,6)	157	
Heparin	Diş hekimliği fakültesi	41(44,6)	46(50)	5(5,4)	92	0,001
	Özel klinik	5(26,3)	4(21,1)	10(52,6)	19	

	ADSM	5(10,9)	38(82,6)	3(6,5)	46	
	Toplam	51(32,5)	88(56,1)	18(11,5)	157	
Klopidogrel	Diş hekimliği fakültesi	42(45,7)	19(20,7)	31(33,7)	92	0,014
	Özel klinik	3(15,8)	4(21,1)	12(63,2)	19	
	ADSM	28(60,9)	5(10,9)	13(28,3)	46	
	Toplam	73(46,5)	28(17,8)	56(35,7)	157	

Tablo 7. Çalışma süresinin; antiagregan ve antikoagülan ilaçlar hakkındaki bilgi düzeyi üzerine etkisinin analiz sonuçları

	Çalışma yılı	**Antiagregan** n(%)	**Antikoagülan** n(%)	**Kararsızım** n(%)		**P değeri**
Aspirin	1-5 yıl	59(61,5)	34(35,4)	3(3,1)	96	0,001
	5-10 yıl	21(70)	6(20)	3(10)	30	
	10 yıl üzeri	19(61,3)	4(12,9)	8(25,8)	31	
	Toplam	99(63,1)	44(28)	14(8,9)	157	
Warfarin	1-5 yıl	16(16,7)	73(76)	7(7,3)	96	0,004
	5-10 yıl	4(13,3)	21(70)	5(16,7)	30	
	10 yıl üzeri	3(9,7)	17 (54,8)	11(35,5)	31	
	Toplam	23(14,6)	111(70.7)	23(14.6)	157	
Heparin	1-5 yıl	38(39,6)	52(54,2)	6(6,3)	96	0,032
	5-10 yıl	6 (20)	19(60,3)	5(16,7)	30	
	10 yıl üzeri	7(22,6)	17(54,8)	7(22,6)	31	
	Toplam	51(32,5)	88 (56,1)	18(11,5)	157	

Tablo 8. Ünvanın; antiagregan ve antikoagülan ilaçlar hakkındaki bilgi düzeyi üzerine etkisinin analiz sonuçları

		Antiagregan (%)	**Antikoagülan (%)**	**Kararsızım (%)**	**P değeri**
Aspirin	Öğrenci	50,8	45,8	3,4	0,001
	Asistan	86,4	13,6	0,0	
	Dişhekimi	63,2	20,6	16,2	
	Öğretim üyesi	87,5	0,0	12,5	
Warfarin	Öğrenci	20,3	69,5	10,2	0,018
	Asistan	13,6	86,4	0,0	
	Dişhekimi	11,8	63,2	25,0	
	Öğretim üyesi	0,0	100,0	0,0	
Heparin	Öğrenci	45,8	47,5	6,8	0,001
	Asistan	31,8	68,2	0,0	
	Dişhekimi	16,2	64,7	19,1	
	Öğretim üyesi	75,0	12,5	12,5	
Klopidogrel	Öğrenci	33,9	20,3	45,8	0,022
	Asistan	72,7	22,7	4,5	
	Dişhekimi	47,1	14,7	38,2	
	Öğretim üyesi	62,5	12,5	25,0	

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Tablo 9. Farklı ünvana sahip hekimlerin hangi ilaçlarda INR bakılır sorusuna verilen cevapların analiz sonuçları

	Ünvan	Antiagregan n(%)	Antikoagülan n(%)	Kararsızım n(%)	Toplam	p
Hangi ilaçlarda INR bakılır?	Öğrenci	14(23,7)	24 (40,7)	21(35,6)	59	0,020
	Asistan	1 (4,5)	16(72,7)	5(22,7)	22	
	Diş hekimi	10(14,7)	24 (35,3)	34(50)	68	
	Öğretim üyesi	0(0.0)	5(62,5)	3(37,5)	8	
	Toplam	25(15,9)	69(43,9)	63(40,1)	157	

Van Dierman ve ark. 2007-2012 yılları arasında yapılan çalışmaların sistematik bir literatür taraması yapmışlardır. Bu literatür taramasında diş tedavilerinin çoğunun düşük kanama riski taşıdığını, operasyon bölgesine ulaşımın kolay olduğunu ve bu nedenle antikoagülan ilaçların kesilmemesi gerektiğini önermişlerdir (5). Wahl ve ark. 2015 yılında yaptığı literatür taraması sonucunda; dental cerrahilerde antikoagülana ara veren hastaların embolik morbidite riskinin, oluşabilecek postoperatif kanama riskinden yüksek olması nedeniyle warfarinin çoğu dental operasyonlardan önce kesilmemesi gerektiğini savunmuştur (13). Bu çalışmaların sonuçlarına paralel olarak anketimize katılan diş hekimlerinin çoğu dental tedavi öncesi antiagregan/antikoagülan ilaçları kestirmeyi önermediklerini belirtmişlerdir. Diş hekimlerinin %57,96'sı hastalarına antiagregan/antikoagülan ilaçları dental tedavi öncesi kestirmeyi önermediklerini, %26,75'i kestirmeyi önerdiklerini, %15,29'u ise kararsız olduklarını ifade etmiştir.

Gaballah ve arkadaşları tarafından Birleşik Arap Emirlikleri'nde lisanslı diş hekimleri arasında yapılan antitrombotik ilaçları kullanan hastaların yönetimine ilişkin çalışmada diş hekimlerin sadece % 5,6'sı aspirin, %5,9'u ise klopidogrel hakkında tatmin edici yanıt verebilmiştir. Aynı zamanda diş hekimlerinin %87,6'sı bu konular hakkında güncel kurslar görmek istediklerini belirtmişlerdir (14). Türkiye'de diş hekimliği fakültesi öğrencilerinden oluşan toplam 1007 öğrenciye yapılan bir anket çalışmasında, öğrencilerin % 58,2'si üniversitelerinde öğretim üyelerinin yetersiz olduğunu ifade etmiştir (15). Üniversitelerdeki bu eksikliklerden dolayı diş hekimi öğrencileri birçok güncel tedavi protokolleri hakkında yeterli bilgiye sahip olamamaktadır. Yaptığımız anket çalışmasında bu çalışmaları destekler şekilde diş hekimlerinin çoğu antiagregan/antikoagülan ilaçlar konusunda teorik olarak kendilerini yetersiz görmüşlerdir. Anketimize katılan diş hekimlerinin sadece %42,04'ü antiagregan/antikoagülan ilaçlar hakkında teorik olarak kendilerini yeterli görmüşlerdir. Hangi ilacın ne zaman kesilmesi gerektiği konusunda yeterli bilgiye sahibim diyen diş hekimi oranı ise %29,30 olduğu görülmüştür. Antiagregan/antikoagülan kullanan hastaların kanama problemi karşısında hekimlerin sadece %36,94'ü tedavi için yeterli bilgiye sahip olduklarını belirtmişlerdir.

Hanken ve arkadaşları 2015 yılında yapmış olduğu araştırmada trombüs ve ölüm riskleri olmasına rağmen hala birçok hastanın dental tedavileri öncesi tıp uzmanlarına danışmadan antikoagülan ilaçları kestiğini belirtmiştir (16). Çalışmamızda Hanken ve ark. destekleyecek şekilde diş hekimlerin %86,6'sı tıp doktoruna danışmadan antiagregan/antikoagülan ilaçlarını kesip gelen hastasının olduğunu belirtmiştir.

Dinkova ve ark. ASA veya klopidogrel alan hastalarda tek ve çoklu diş çekimlerinin, uygun lokal hemostaz sağlandığında ilaçların kesilmeden güvenle yapılabileceğini belirtmişlerdir (17). Çalışmamızın sonucuna göre diş hekimlerinin yüksek oranlarda bu araştırmayı destekleyecek şekilde invaziv olamayan dental tedavilerde antikoagülan ilaçlara ara vermeyi önermedikleri görülmüştür. Anketimizde diş hekimleri polisaj tedavisinde %91,72, kanal tedavisinde %61,15, dolgu tedavisinde ise %84,08 oranıda antikoagülan ilaçların kesilmesini önermediklerini belirtmişlerdir. Ancak bu çalışmanın aksine katılımcıların %81,53'ü tek diş çekimlerinde de ilaçların kesilmesini önerdiklerini belirtmiştir.

Ward ve Smith, K vitamini kullanan hastaların tedavilerinde belirli cerrahi prosedürlerin uygulanması için uluslararası normalleştirilmiş oran (INR) sınırlarını tanımlayan çalışmalarında, prosedürün kapsamının cerrahın bireysel antikoagülasyon yönetimini önemli ölçüde etkilediğini belirtmişlerdir (18). Perry ve arkadaşları oral antikoagülan kullanan ve 2-4 terapötik aralıkta (yani <4) stabil bir INR'ye

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sahip hastalarda kanama riskinin çok düşük olduğunu ve oral antikoagülanların geçici olarak kesildiği hastalarda tromboz riskinin artabildiğini belirtmişlerdir. Diş çekimi de dahil olmak üzere komplike olmayan diş ameliyatı gerektiren hastaların çoğunda oral antikoagülanların kesilmemesi gerektiğini savunmuştur (19). Yaptığımız anket çalışmasında da hekimlerin INR değerinin tedavi sürecini etkileyeceğini ve belirli aralıklarda tedavinin uygun olduğunu belirtmişlerdir. Çalışmamıza katılan hekimlerin % 43,9'u antikoagülan kullanan hastalarda INR değerlerine bakılmasını önerdiklerini ve aynı zamanda hekimlerin % 74,5'i INR'nin 1-4 değerleri arasında tedavinin yapılabileceğini belirtmişlerdir.

Sonuçlar

Antiagregan ve antikoagülan ilaçları kullanan hastalar hakkında kapsayıcı ve standardize edilmiş bir tedavi protokolünün henüz bulunmaması ve diş hekimlerinin çoğunun yeterli bilgiye sahip olmaması hekimlerin tedavi öncesi farklı tercihlere yönelmelerine neden olmaktadır. Antiagregan ve antikoagülan ilaçların kesilmemesi sonucu oluşabilecek kanama komplikasyonlarının ilacın kesilmesinden dolayı oluşabilecek trombüs kaynaklı komplikasyonlardan daha düşük riskli olduğu sonucuna varılmıştır. Düşük riskli dental tedavilerde ilaçların kesilmemesi orta ve yüksek riskli tedavilerde ise uzman doktora danışılarak gerekirse ilacın kesilmesi veya tedavi süresince yarı ömrü daha kısa bir ilaç ile değiştirilip tedavi sonrası tekrar eski ilaca dönülmesi uygun görülmüştür.

Antiagregan ve antikoagülan ilaçların sınıflandırmasında kadınların erkeklerden daha fazla teorik bilgiye sahip olduğu bulunmuştur. Özel kliniklerde çalışan diş hekimleri antiagregan ve antikoagülan ilaçlar hakkında daha az teorik bilgiye sahip oldukları görülmüştür.

Bu ilaçları kullanan hastalarda aşırı kanama problemi durumunda uygulanması gereken tedavi protokolü hakkında da en az bilgiye sahip gurup yine özel kliniklerde çalışan hekimler olmuştur. Çalışma süresi artıkça teorik bilgilerin azaldığı özellikle 10 yıldan fazla çalışma süresine sahip hekimlerin doğru cevap verme oranlarının genelde en düşük olduğu görülmüştür. Öğretim üyeleri ve asistanların, diğer hekimlerden daha yüksek oranlarda teorik bilgiye sahip oldukları sonucuna varılmıştır.

Cinsiyet, çalıştığı kurum, çalışma süresi ve ünvanın; antiagregan ve antikoagülan ilaçlar hakkındaki bilgi düzeyleri üzerine istatiksel olarak anlamlı bir etkisinin olduğu görülmüştür.

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Investıgatıon Of Early Loss Of Permanent Teeth in Patıents Among the Age Of 10-25

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Abstract

Objective: It is aimed to identify the prevalence of permanent missing teeth in patients between the ages of 10-25 and to emphasize the importance of early diagnosis and treatment planning.
Material and Methods: The radiographs of patients who applied to the Department of Oral and Maxillofacial Radiology of Fırat University Faculty of Dentistry and had panoramic radiography taken for various reasons were evaluated retrospectively. Radiographs of 1879 patients (1037 women, 842 men) aged between 10-25 were included in the study. Permanent missing teeth were examined according to number, location and gender. In addition to descriptive methods (mean, standard deviation, frequency), Chi-square test and one-sided chi-square test were used to compare qualitative data. Significance was evaluated at $p<0.05$ level.
Results: In 1879 panoramic radiographs, 569 missing permanent teeth were detected in 299 patients (175 women, 124 men). The prevalence of permanent missing teeth was found to be 15.9% (16.9% in women, 14.7% in men). The most common missing teeth are: lower first molar, lower second premolar and upper lateral incisor. The prevalence of permanent tooth deficiency was higher in the mandibula than in the maxilla, and a statistically significant difference was obtained. In addition, among patients with missing teeth, the rate of patients with only one missing tooth was found to be 48.2%.
Conclusion: The most common missing permanent tooth was found to be the lower first molar in our study. This was followed by the lower second premolar and the upper lateral incisor, respectively, and the least missing tooth was the lower canine. The most missing teeth were in the mandible. No significant difference was observed between genders.

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Keywords: Hypodontia, Congenital tooth deficiency, Permanent tooth deficiency

Introduction

Tooth development, which begins with the interaction between epithelium and mesenchyme in intrauterine life, is a complex process that progresses through a series of stages (1). Although the etiology of missing teeth is not fully clarified, it depends on many factors such as caries, periodontal diseases, infections, trauma, radiotherapy, chemotherapy, orthodontic treatment, systemic diseases, genetic factors, and syndromes (2, 3).
MSX, PAX9, TGFA etc. gene mutations are associated with congenital tooth deficiency and different rates of tooth deficiency are encountered in different ethnic groups. In addition, in societies with low socio-economic levels, the increase in dental infections and periodontal diseases due to inadequate oral and dental health equipment and difficulty in accessing them brings about acquired tooth loss (4, 5, 6).

Since tooth deficiency causes asymmetry in the upper and lower jaw, it leads to disruption of the harmony between facial and dental structures (7).

Early extraction of permanent teeth negatively affects both arches and the entire occlusion, leading to early contacts and shifting of the midline towards the extraction site (8). The missed tooth socket is closed primarily and especially by the mesial movement of the posterior teeth and partially by the distal movement of the anterior teeth. Rotational movement occurs in the upper jaw as the posterior group of teeth slide mesially and this movement causes crossbite in the posterior region. In the lower jaw, more tipping is observed in the teeth adjacent to the extraction area, significant early contacts and horizontal displacement occurs in the lower jaw. These effects can cause dentofacial asymmetries and TMJ problems (9, 10). It is known that early and unilateral loss of permanent teeth causes asymmetry by causing changes in chewing habits and muscle structures (9, 11).

In order to prevent many dentofacial problems caused by the loss of permanent teeth in the early stage, treatment planning should be made by evaluating factors such as the patient's age, tooth development status, presence of crowding, degree and class, which jaw the tooth will be extracted from, occlusal relations and congenital tooth deficiency.

Early diagnosis of caries before they cause premature loss of permanent teeth and treatments which appropriate to patient’s needs and prevention of possible occlusal disorders play a key role in establishing a normal occlusion and ensuring aesthetics and function. In the light of this information, we can conclude that early loss of permanent teeth is one of the most undesirable situations in dentistry.

It is aimed to evaluate the early loss of permanent teeth and loss rates of individuals between the ages of 10-25 according to gender and location.

Materıal and Methods

Panoramic radiographs of 2000 patients who applied to Fırat University Faculty of Dentistry, Department of Oral and Maxillofacial Radiology clinic due to several reasons were evaluated retrospectively. 1879 (1037 women and 842 men) radiographs that met the study criteria were included. Permanent third molars and 121 radiographs with poor image quality were not included. Radiographs were received from a Planmeca ProMax (Planmeca OY, 00880 Helsinki, Finland) panoramic radiography device with exposure settings of 10 mA, 85 kVp and 14 s.

The images were evaluated by a pedodontist and radiologist with 5 years of experiences. Permanent tooth deficiencies were recorded according to number, gender and location. Ethical approval was obtained from Fırat University Non-Interventional Clinical Research Ethics Committee (22.10.2018 -18/06) for this study. During the evaluation of the results, IBM SPSS Statistics 22 (IBM SPSS, USA) program was. In addition to descriptive methods (frequency, mean, standard deviation), Chi-square and one-sided chi-square tests were used to compare qualitative data. Significance was evaluated at $p<0.05$ level.

Results

This research was performed on a total of 1879 patient, 842 (44.8%) men and 1037 (55.2%) women, aged between 10-25 years. The average age was 17.61±2.172. Missing teeth were detected in 299 (15.9%) of the patients. Missing teeth were reported in 14.7% of men and 16.9% of women. The total of missing teeth was 569 (Table 1).

Table 1: Prevalence of missing teeth according to gender

	Missing Teeth		
	Absent	Present	
	n (%)	n (%)	p
Men	718 (%85,3)	124 (%14,7)	0,205
Women	862 (%83,1)	175 (%16,9)	

The number of missing teeth varied between 1 and 12 and the average was found to be 1.90±1.45. The prevalence of one missing tooth was 48.2%, two missing teeth was 35.8%. The prevalence of one or two missing teeth was 84% (Table 2).

Table 2: Distribution of the number of missing teeth

Number of missing teeth	n	%
1 tooth missing	144	48,2
2 teeth missing	107	35,8
3 teeth missing	24	8

4 teeth missing	12	4
6 teeth missing	4	1,3
7 teeth missing	3	1
8 teeth missing	3	1
10 teeth missing	1	0,3
12 teeth missing	1	0,3

Of the total 569 missing teeth, 347 (61%) were in the mandibula and 222 (39%) were in the maxilla; the prevalence of missing teeth in the mandibula was found to be significantly higher than in the maxilla (p:0.001; p<0.05) (Table 3).

Table 3: Prevalence of missing teeth according to the jaws

	Missing Teeth		
	n	**%**	**p**
Maxilla	222	39,0	0,001*
Mandibula	347	61,0	
Total	569	100	

While permanent tooth loss was mostly seen in the lower first molars (27.1%, n = 154), it was followed by the lower second premolars (17.4%, n = 99) and upper laterals (12.3%, n = 70) (Table 4).

Table 4: Distribution of missing teeth according to tooth groups

Tooth groups	**n**	**%**
Upper centrals	8	1,4
Upper laterals	70	12,3
Upper canines	3	0,5
Upper 1.Premolars	46	8,1
Upper 2.Premolars	23	4
Upper 1.molars	54	9,5
Upper 2.molars	18	3,2
Lower centrals	25	4,4
Lower laterals	17	3
Lower 1.premolars	23	4
Lower 2.premolars	99	17,4
Lower 1.molars	154	27,1
Lower 2.molars	29	5,1
Total	569	100

Dıscussıon

The problem of missing teeth are still one of the biggest dental problems despite intensive strategies for prevention. In the literature, the prevalence of permanent missing teeth varies between 2.2% and 36.5%. Factors such as differences in evaluated age groups , examination methods, geography, race and gender ratios are shown as the reasons for this variability (3, 12).

The prevalence of missing teeth, which can also be defined as hypodontia, is reported as 11.2% in Korea (13), 8.5% in Japan (5), 6.3% in Brazil (14), 10.9% in Iran (6), and studies in different regions in Turkey it was reported as 6.77% in Konya (15), 7.9% in Izmir (3), and 8.5% in the Black Sea region (2). Although the rate of permanent tooth deficiency in our study was found to be consistent with the literature; there are also quite different results in the literature.

There is no complete consensus in the literature regarding the location of the most common missing tooth. In some studies, it was reported that the most common missing tooth was the lower second premolar (3, 5, 6, 12, 16), in some it was the upper lateral (14, 17, 18), and in others it was reported that the lower first molar which is in parallel with our study (1, 19, 20). In a study carried out in China, the most common missing tooth was the lower incisor (21) and in the study by Topkara and Sarı, when the third molars were included, the most frequently missing tooth was the third molar (15).

In general, the effect of gender on hypodontia is not fully understood. While some studies found a higher rate of tooth loss in women (12, 17), some studies found a higher rate of tooth loss in men (22). In some studies, no significant difference was found between genders which parallel to our study (5, 14, 16, 23, 24).

In our study, the rate of missing teeth in the lower jaw was found to be higher than in the upper jaw, and some researchers found the rate of missing teeth to be higher in the mandibula, similar to our study (25, 26). There are also studies that found the rate of missing teeth to be higher in the maxilla (4,

14). In addition, in the study of Tunç and Koyutürk, the rates of missing teeth in the lower and upper jaw were found to be similar (2).

The rate of patients with only 1 or 2 missing teeth was 86.9% in Fekonja's study and 84.5% in Candan et al.'s study (3, 27). Our study is also consistent with these studies.

In the study of İncebeyaz et al., which they investigated missing teeth in different age groups, the prevalence of missing teeth in the group between the ages of 7-15 was found to be 7.2% and it was reported that this rate increased with age.Also it was found that the prevalence of missing teeth were quite similar between genders and the missing lower first molar (43.9%) was more common than the upper first molar (38.6%). Researchers have associated this situation with the earlier eruption of lower first molars compared to other permanent teeth (28).

In the study of Günal and Bozkurt, 84 permanent teeth extracted from 1536 patients between the ages of 0-16 who applied to the surgery clinic: 34 lower molars (40.4%), 18 upper premolars (21.4%), 17 upper molars (20.2%), 2 lower incisors (2.3%) and 13 lower premolars (15.4%) were reported and early tooth loss was found to be more common in the mandible than in the maxilla. Researchers explained the reason for this situation that mandibular first molars are the teeth which most exposed to the oral environment and most prone to loss among permanent teeth (20).

In the study conducted by Olatosi and Sote with 493 patients between the ages of 1-16, the patients were grouped as primary, early mixed, late mixed and permanent dentition. The most common causes of tooth loss in the 9-12 and 13-16 age groups were: caries, orthodontic treatment, trauma and failure of previous treatment, respectively. It has also been reported that the first molar is the most commonly lost tooth in the permanent dentition period (1).

George et al. reported that the most common missing teeth in the maxilla and mandible are teeth 26 and 46 respectively; the least missing teeth were teeth numbered 23 and 33, similar to our study (19).

Murray et al. found that 86% of tooth extractions in children under the age of 12 were for orthodontic indications. This shows that extractions performed for orthodontic treatment are an important cause of missing teeth (29).

Conclusıon

The most common missing permanent tooth was found to be the lower first molar in our study. This was followed by the lower second premolar and the upper lateral incisor, respectively, and the least missing tooth was the lower canine. The most missing teeth were in the mandible. No significant difference was observed between genders. Since our study was a retrospective study, the cause of permanent tooth loss could not be determined. More comprehensive studies to determine the causes of tooth loss will contribute to the development of new measures, treatments and health policies to prevent tooth loss and the its complications.

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Investigation of Color Selection Criteria Determined by Dentists in Different Titles and Study Centers

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Abstract

Background: Color selection holds significant importance in the field of dentistry, particularly concerning aesthetics and achieving a natural appearance. However, diverse dentists and practice centers may adopt distinct methodologies in their color selection processes. This study aims to investigate the criteria guiding color selection in prosthetic treatments among dentists with varying titles in different workplace settings.
Material and Methods: Approval for this study was obtained from the Clinical Research Ethics Committee of Dicle University Faculty of Dentistry (2019/44). Conducted in September 2019, the study involved a voluntary survey distributed among academics and dentists nationwide. The survey comprised 14 questions, two collecting demographic data and the remaining 12 presenting multiple-choice inquiries.
Results: A total of 437 participants, consisting of 213 males and 224 females, completed the study. The average age of participants was 30.6, with 50.6% working in university hospitals. Other participants were distributed among oral and dental health centers, community health centers, state hospitals, private clinics owned by themselves, or private clinics owned by another dentist. In terms of professional roles, 43.7% identified as general practitioners, 27.7% as dental students, 17.8% as research assistants, 7.8% as specialist dentists, and 3% as faculty members. SPSS 22 (Statistical Package for the Sciences Version 22.0) was employed for data analysis, utilizing the chi-square test for categorical data. Statistical analysis was conducted with significance set at $p < 0.05$.
Conclusion: This study reveals a lack of standardized approaches among dentists in the color selection process for prosthetic dental treatments. Given the rising expectations in aesthetics, it is advocated that a standardized protocol be established to ensure accurate color determination and enhance the overall success of treatments.

Research Article (HRU Int J Dent Oral Res 2023;3(3): 144-151)

Key words: Color selection, aesthetics, standardization.

Introduction

Prosthetic treatments hold a pivotal role in addressing diverse dental issues, encompassing the rectification of tooth deficiencies, aesthetic enhancements, and the restoration of oral functionalities. The triumph of such treatments is contingent upon the meticulous selection of an appropriate color to attain a natural and harmonious aesthetic. The chosen color must seamlessly integrate with the adjacent tissues of the patient's teeth and complement the overall oral structure. Aesthetic components, namely the general configuration of dental restoration, its surface structure, light transmittance, and the color of the utilized materials, constitute fundamental elements governing the overall aesthetic appeal. Consequently, the process of color determination emerges as a critical juncture significantly impacting the aesthetic success of the restoration. However, the complexity of the color selection process often leads to variations in approaches among dentists (1,2,3).

Numerous factors wield influence over the identification of the optimal tooth color. Various tools and techniques, including visual inspection, employment of color scales, color analysis devices, consideration of patient preferences, color testing, assurance of color stability, and consultation with different specialist physicians, can be employed (4).

To visually assess the current tooth and gum color of the patient and ensure harmony, it becomes imperative to employ light sources that closely mimic both natural and artificial lighting conditions affecting color perception. The utilization of color scales and validation through digital color analyzers is necessary to pinpoint the most fitting tone amid different options. Naturally, the integration of appropriate colors aligned with patient expectations, coupled with the insights of diverse medical professionals, is integral to the process (5,6).

The objective of this study is to scrutinize the methodologies employed in determining color selection criteria within diverse dental practice centers where dentists of varying titles operate. This investigation stands as a significant stride toward comprehending the existing diversity and distinct approaches to color selection in prosthetic treatments. The gleaned insights aim to serve as a compass for refining the color selection process in prosthetic treatments, fostering more standardized and reliable outcomes.

Material and Method

This research adopts a survey-based design, comprising a total of 14 questions. Two of these questions pertain to demographic information, while the remaining 12 are optional inquiries. The study actively encourages voluntary participation from academics and dentists nationwide.

Ethical Approval:

Ethical considerations were meticulously observed throughout the study. Approval for the research protocol was obtained from the Dicle University Faculty of Dentistry Clinical Research Ethics Committee under the reference number 2019/44, signifying adherence to ethical standards in human research.

Participant Selection Criteria:

The inclusion criteria for participants stipulated active engagement in patient care and a willingness to partake in the study. Only dentists meeting these criteria were considered eligible for inclusion.

Inclusion Criteria:

To be eligible for participation, individuals must hold the title of dentist and actively engage in patient care.

Exclusion Criteria:

Physicians who declined participation, those not currently practicing the dental profession or involved in patient care, were excluded from the study.

Recruitment and Consent:

Participants were recruited on a voluntary basis, emphasizing their professional involvement in patient care. Prior to inclusion, informed consent was obtained from each participant, affirming their willingness to contribute to the study.

Research Initiation:

Following the approval report (2019/44) from the Dicle University Faculty of Dentistry Clinical Research Ethics Committee, the research commenced in accordance with the established ethical framework. This stringent adherence to inclusion and exclusion criteria, along with ethical considerations, ensures the reliability and integrity of the study's methodology.

Results

The comprehensive study involved 437 participants, comprising 213 males and 224 females, with an average age of 30.6. Among them, 50.6% were affiliated with university hospitals, while others served in various capacities in oral and dental health hospitals, community health centers, public hospitals, or private clinics. The distribution of professional roles indicated that 43.7% were general practitioners, 27.7% were dentistry students, 17.8% were research assistants, 7.8% were specialist physicians, and 3% held lecturer positions.

Table I: Survey Form Applied to Volunteer Physicians

General Information	**Your age: ( ) years** **Your gender: Female ( ) Male ( )** **Years of professional experience: ( ) years**
Where do you practice your profession?	**( ) in your own private clinic** **( ) in someone else's private clinic** **( ) in a university hospital** **( ) in a public hospital or state hospital**
What is your professional title?	**( ) General Practitioner** **( ) Research Assistant Department: (……..…)** **( ) Specialist Department: (……) PhD ( ) Master's ( )** **( ) Faculty Member Department: (……...)**
Which method do you use for color selection?	**( ) Visual Method - Color Scale (If your answer is this, go to Question 4; Otherwise, mark the method you use from the options below and proceed to Question 5.)** **( ) Color Determination Devices (Spectrophotometer, Digital Color Measurement Device, Colorimeter)** **( ) Program Commonly Used with the Laboratory** **( ) Photography**
Which color scale do you use when choosing colors?	**( ) Ivoclar Classic Color Scale** **( ) Vita Classic Color Scale** **( ) Vita 3D Master**
Do you have hereditary or acquired color blindness?	**( ) Yes, (Proceed to Question 6)** **( ) No, (Proceed to Question 7)**
Do you seek assistance from another set of eyes when choosing colors in your dental treatments?	**( ) Yes, I take** **( ) No, I don't take**
what type of lighting do you use in your workspace when selecting colors?	**( ) Only Daylight** **( ) Daylight + Fluorescent Light** **( ) Only Fluorescent Light** **( ) Daylight + Reflector Light + Fluorescent Light** **( ) Daylight + Reflector Light** **( ) Reflector Light + Fluorescent Light**
How many seconds does it take for you to determine the color of prosthetic restorations?	**( ) 0-5 seconds** **( ) 5-10 seconds** **( ) >10 seconds**
When selecting colors, do you:	**( ) I seat the patient in the chair.** **( ) The patient is standing; there is a height difference between the dentist and the patient.** **( ) The patient is standing; there is no height difference between the dentist and the patient.**
Perform a polishing procedure on the teeth before choosing the color?	**( ) Yes** **( ) No**
Take photographs of the patient before selecting the color and send records to	**( ) Yes** **( ) No**

the laboratory?	

Survey Result Distributions:

Table II: General Information of Survey Respondents

	%(n) veya mean±SD
Gender	
Male	48.7(213)
Female	51.3(224)
Age	30.6±9.7
Where do you practice your profession?	
University hospital	50.6 (221)
ADSM-TSM-State hospital	26.1 (114)
Private clinic owned by yourself	15.6 (68)
Private clinic owned by another dentist	7.8 (34)
Professional title	
General practitioner	43.7 (188)
Dentistry student	27.7 (121)
Research assistant	17.8 (77)
Specialist dentist	7.8 (34)
Faculty member	3 (16)

Table III: Effects of Gender on Color Selection

Effects of Gender on Color Selection

	Gender		
	Male (n:213)	**Female** (n:224)	p
What type of lighting do you use in your workspace when selecting color?			0.06
Daylight+reflector+fluorescent	%7.5(16)	%5.8(13)	
Daylight+fluorescent	%23(49)	%16(36)	
Daylight+reflector	%5.2(11)	%6.7(15)	
Reflector+fluorescent	0	%1.3(3)	
Only fluorescent	%1.4(3)	0	
Only daylight	%62.9(134)	%70(157)	
Patient positioning			0.59
Patient mouth-Doctor eye at the same level, sitting upright	%62.4(133)	%67(150)	
Patient mouth-Doctor eye at the same level, sitting inclined	%11.3(24)	%9.4(21)	
Patient eye-Doctor eye at the same level, sitting upright	%26.3(56)	%23.4 (53)	
Determining the color of prosthetic restoration			0.9
0-5 seconds	%28(60)	%29(65)	
5-10 seconds	%38.5(82)	%31(71)	
>10 seconds	%33(71)	%39(88)	

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Testing the compatibility of the final color of the prosthesis with the pre-determined color			0.19
Yes	%86.4(184)	%81.7(183)	
No	%13.6(29)	%18.3(41)	

Statistical analysis revealed no significant difference between genders concerning the type of light used in the working environment, patient positioning, color determination time, and testing whether the final color of the prosthesis matched the predetermined color.

Table IV: Effects of Age on Color Selection

The Effects of Age on Color Selection

	Age			
	>30 Age	30-50 Age	50< Age	p
What type of lighting do you use in your workspace when selecting color?				<0.01
Daylight+reflector+fluorescent	%6.6(19)	%7.8(9)		
Daylight+fluorescent	%3(1)			
Daylight+reflector	%18(52)	%23.5(27)		
Reflector+fluorescent	%18(6)			
Only fluorescent	%5.2(15)	%7(8)		
Only daylight	%9(3)			
	%1(3)	0	0	
	%0.7(2)	0		
	%3(1)			
	%68.5(198)	%61.7(71)		
	%66.7(22)			
Patient positioning				0.9
Patient mouth-Doctor eye at the same level, sitting upright	%67.1(194)	%58.3(67)		
Patient mouth-Doctor eye at the same level, sitting inclined	%66(22)			
Patient eye-Doctor eye at the same level, sitting upright	%8.3(24)	%14.8(17)	%12(4)	
	%24.6(71)	%27(31)	%21(7)	
Determining the color of prosthetic restoration				0.7
0-5 seconds	%30(87)	%29(34)		
5-10 seconds	%12(4)			
>10 seconds	%40(116)	%38(44)		
	%30(10)			
	%30(86)	%32(37)		
	%57(19)			

Among participants under the age of 30, between the ages of 30-50, and over the age of 50, no statistical significance was found in the type of light used in the study environment and patient positioning. However, a notable difference emerged among participants over 50, indicating that the color of the restoration was not determined within the first 5 seconds between age groups.

Table V: Effects of Color Blindness on Color Selection

The Effects of Color Blindness on Color Selection

	Color blindness		
	Yes(n:12)	No(n:425)	p
Determining the color of prosthetic restoration			<0.01
0-5 seconds	%75(9)	%27(116)	
5-10 seconds	0	%40(170)	
>10 seconds	%25(3)	%33(139)	
Which method do you use for color selection?			0.9
Photography	%8(1)	%5.2(22)	
Visual method-color scale	%91(11)	%92.5(393)	
Any smile design program	0	%0.2(1)	
Color determination devices	0	%2.1(9)	
Do you seek assistance from another pair of eyes when choosing the color in dental treatments?			0.7
Yes	%83.3(10)	%73.2(311)	
No	%16.7(2)	%26.8(114)	

For participants diagnosed with color blindness, 75% reported making color selections within 0-5 seconds, a statistically significant result. Notably, no significant difference was observed in color selection methods between individuals with and without a color blindness diagnosis. The visual method and color scale were identified as the most prevalent methods. Regarding seeking assistance from another individual when choosing colors in dental treatments, 83.3% of those with color blindness and 73.2% without a color blindness diagnosis affirmed receiving such assistance. The conclusion drawn was that the participants' diagnosis of color blindness did not significantly impact their ability to determine color with external assistance.

Discussion

The role of color selection in prosthetic dental treatments is crucial, directly impacting the aesthetic outcome of restorations (6). A seamless integration of color with neighboring teeth is essential for the overall success of restorations. This study aims to assess the correlation between methods and criteria employed by dentists and dentistry students in color selection, a critical step for treatment success (7).

Color selection involves translating color perception into effective communication, categorized as visual and digital methods (8). Presently, the visual method is preferred for its practicality. In our study, participants were provided with visual color scale options, and 43.3% indicated the use of the Vita Classic color scale.

Efficiency in color selection is emphasized, recommending completion within 5 seconds to prevent cone cell fatigue (9). Surprisingly, only 28.6% of participants adhered to this recommended timeframe in our study.

Age-related changes impact color perception, making differentiation between yellow and white challenging. This tendency towards yellow-brown tones becomes more pronounced after the age of 50, with a decline in color determination ability after the age of 60 (10). Our findings support this information, indicating that participants over 50 had a color identification time longer than 5 seconds.

Strategic patient positioning and color determination techniques are essential, necessitating alignment of the patient's mouth with the clinician's eye level. The clinician, positioned between the light source and the patient, must prioritize brightness and make selections with eyes half-squinted (11,12). Swift

color selection within 5 seconds is reiterated to avoid cone cell fatigue. Our study revealed that only 28.5% of prosthetic restoration color determination occurred within 5 seconds.

Factors influencing color selection include object-dependent, observer-dependent, and light source-dependent factors. Observer-related factors encompass color blindness, age, fatigue, medications, inter-eye color perception differences, and individual variations in color perception. Color blindness, impacting physicians' success in color selection, was noted below 1% among physicians in our study.

The study delves into the dichotomy of visual and digital color selection methods, highlighting the prevalent use of visual methods (16,17). The visual method is not without drawbacks, such as potential insufficiencies in available color keys and variations in color detection under different conditions. Our study underscores the need for standardization in color determination to align with the CIE color system (18). Diversity in light source usage and its impact on color perception are explored, aligning with existing literature noting variability in color measurements based on factors such as sunlight angles and time of day (19,20,21).

The susceptibility of the human eye to various factors, including environmental conditions, tooth discoloration positioning, and professional experience, is acknowledged. Gender-based differences in color perception, with reported color blindness discrepancies between male and female dentists, are discussed. The study indicates a high rate of seeking assistance from another physician during color selection, especially from female dentists (21,22,23,24).

In conclusion, this discussion illuminates the multifaceted considerations in color selection for prosthetic dental treatments, underscoring the need for efficient, standardized practices that account for individual, environmental, and age-related factors to enhance overall treatment success.

Conclusion

This research sheds light on the diverse methodologies employed by dentists in prosthetic dental treatments for color selection. The findings underscore the absence of a standardized approach, highlighting the necessity for a unified protocol to meet the rising aesthetic expectations in dental restorations. The study emphasizes the age-related variations in color identification time and the limited impact of color blindness on the selection process. The prevalent use of visual methods, despite potential drawbacks, suggests their practicality in current dental practices. The identified areas for improvement, such as the limited adherence to the recommended timeframe, call for attention to enhance efficiency. The significance of strategic patient positioning and consideration of environmental factors, including light source diversity, further contributes to the complexity of color selection. The high rate of seeking assistance, especially among female dentists, emphasizes the collaborative nature of decision-making in color selection. Overall, this research provides valuable insights into the multifaceted aspects of color selection, urging the development of systematic and standardized approaches for improved treatment success and aesthetic outcomes in prosthetic dental procedures.

ETHICS COMMITTEE APPROVAL: Our study was approved by the Ethics Committee of Dicle Univercity (2019/44).

CONTRIBUTION RATES OF RESEARCHERS:
HÇ planned the study and adminıstered the survey,
VE planned the study and contrıbuted to wrıtıng,
AIZ contrıbuted to the ımplementatıon of the survey and adminıstered the study dıscussıon,
EGB contrıbuted to the study desıgn and statıstıcs.

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There is no conflict of interest in this study.

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Content Analysis of Youtube Videos Related to Maxillary Central Incisor Tooth Manipulation

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Abstract

Background: Today video sharing platforms on Internet like YouTube has become an important source of information in many areas like health. purpose of this investigation is to evaluate the suitability, usefulness, and quality of YouTube video contents related to 'Maxillary Central Incisive Tooth Manipulation' used by dentistry students for first-year preclinical education.
Material and Methods: A scoring system consisting of 10 parameters was used to assess the video content quality. The viewership, likes, comments, reliability of information, global quality scores(GQS), and video duration were recorded for evaluation with parameters by two dentists according to the uploader (dentist, dentistry student, dental technician) and the information content (high, medium, poor quality). Group comparisons were analyzed using the Kruskal Wallis H and post-hoc Tamhane's T2 test.
Results: 20 relevant videos were classified as 55% high (GQS 4.7±0.6), 35% medium (GQS 3.3±1.6), and 10% considered poor quality (GQS 1.0±0). Evaluated according to their quality, no significant difference was found between the parameters except GQS(p=0.013). The videos are as follows, in order of their sources: dentists (n=6,30%), dentistry students (n=11,55%) and dental technicians (n=3,15%).
Conclusion: The fact that there was no difference in the viewing and popularity of useful and misleading videos revealed that the high quality video could not be chosen by the video viewers. In this study, it was concluded that dentistry students should pay particular attention to the video provider while providing video access to support their preclinical education. Health academics and health institutions need to increase studies on 'pre-clinical practice courses' and try to raise awareness by uploading more useful and systematic videos to the internet/YouTube.

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Keywords: Dental education, digital technology, e-health, internet, YouTube.

Introduction

The internet; due to the fact that it is accessible to a large part of the world's population and there are a wide variety of information sources in its content. It has become an important source of information for health as well as many areas that have been used quite frequently in recent years (1,2). Technological developments have been reached in a short time with the Internet from different sources and distance learning environments have differentiated (3).

YouTube is a website that can be easily accessed through communication tools such as smart phones, computers and televisions. As most widely used video sharing platform in the world for education and information purposes in health (4,5). Education systems and the accessibility and measurability of information have been affected by the outbreak of covid-19 epidemic. In this way, the interest in online education platforms has

also increased (6). Online education, communication, electronic library access, student communications on social networking sites and videos uploaded for educational purposes are easily accessible with today's internet and technological advances. YouTube™ is a subjective website due to the lack of any control mechanism before video upload, which can be useful for users and can lead to misleading information (7). Many studies have mentioned uncertainties about the reliability and accuracy of video content and have shown that the information provided by these videos is not homogeneous (8,9).

Dentistry education program, like other medical school programs, focuses more on technical skills due to the scientific nature of the curriculum. A dentist must have the ability to think and produce in three dimensional ways and students' skills must be developed before clinical education. The aim of dentistry education is to develop students in practical and theoretical applications with preclinical trainings and to enable them to start the clinic in that way. The objectives of the preclinical courses are: 1. Recognition and understanding of dental anatomy 2. Adequate understanding of the 3D anatomy of the tooth 3. Understanding the relationships between teeth (10).

Laboratory and clinical conditions are the main components in dental education, it is important in terms of bringing them together and applying different areas of learning, including intellectual-conceptual, sensory-emotional and psychomotor-physical (11). For this reason, students are entitled to move on to clinical studies after taking preclinical courses, working on various materials, gaining sufficient experience and having sufficient theoretical knowledge. Many dental instructors have observed that dental students have difficulty at the beginning of their practical training (12). YouTube, social media and video sharing platform is one of the most frequently used resources for educational and information purposes in the process of students getting used to preclinical practical training.

Studies in the literature are scarce on analyzing the videos on the YouTube video platform about the information given to dentistry students in the preclinical and the practical exercises performed. The aim of this study is to evaluate the suitability, usefulness and quality of the video contents related to 'Maxillary Central Incisor Tooth carving on YouTube. The null hypothesis of this study was 'The videos on YouTube™ about Maxillary Central Tooth Sculpting are inadequate and/or misleading.'

Materials and Methods

In this study, videos related to the Upper Central Incisor tooth carving on YouTube, were examined on 12-20 February 2023. For data collection, we explored "http://www.youtube.com" using the google chrome web browser. Internet search history has been reset to avoid restrictions on past searches. In the video searches, the terms "maxillary central tooth carving" and "upper central incisor tooth wax up " were entered as keywords. Previous studies have shown that 95% of YouTube™ video platform users focus on watching the first 60 videos (13,14). The first 60 videos that came out of the searches were watched and a total of 35 videos were found suitable for evaluation. Duplication videos - which are follow through to each other- (2 of them), which provide insufficient practical information on the subject (5 of them), and which are shorter than ten minutes (8 of them) are excluded from the study. A total of 20 videos were included in the study. Human and animal biological materials were not used in this study so there was no need for an ethics committee report.

The URL address, number of views, video duration, time elapsed since the video was uploaded (days), number of likes, number of comments, video uploader (dentist, dental student, dental prosthesis technician) information were recorded for each video included in the study. Based on this information, the view rate [number of views / time since upload x 100%] parameter was calculated. In addition, the Global Quality Score (GQS) and information reliability parameters, which provide general quality information of the videos, were also calculated (15). In order to evaluate the video content quality, a scoring system consisting of 10 parameters in Table 1 was used. Rating parameters used to determine video quality were kron length, root length, mesiodistal width, labiolingual width, cervical line, cingulum, incisal edge, root apex, contour crests and polishing. (Table1)

Each video was monitored by two physicians who were experts and specialized in their field and video information qualities were scored by taking these parameters. The total video content score was determined with the scores given to these parameters (1 if any, 0 if not) and according to the total score of each video, it was included in one of three categories: poor quality information content (0-3 points), medium quality information content (4-7 points) and good quality information content (8-10 points). Also these videos were classified according to the uploader; dentist, dentistry student and dental prosthesis technician.

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The narrative language, sound intangibility, comprehensibility, video narrator-source, material selection, tool selection and use, naming of tooth areas and contributing to the narrative by drawing a large tooth image of the videos were examined.

Data collected from YouTube videos was summarized using a standard form and saved using the Microsoft Excel 2016 program. Statistical Package of Social Sciences (SPSS, Ver. 16.0, IBM Inc., Armonk, USA) statistical analysis program was used for all statistical evaluations. Analysis of variables according to video source category [(1) dentist, (2) dentistry student, (3) dental prosthesis technician] and video quality category [(1) poor, (2) moderate, (3) good] was performed using Kruskall Wallis H and post-hoc Tamhane T2 test. 0.05 was taken as significance value.

Table 1: Rating parameters used to determine video quality

	RATING PARAMETER	**DEFINITION**	**SCORE**
1	KRON LENGTH	The dimension between the neck of the tooth (chole-collum dentis) and the highest point of the incisor face.	**0-1**
2	ROOT LENGTH	The size between the neck of the tooth (chole-collum dentis) and the root tip.	**0-1**
3	MESIODISTAL WIDTH	The length between the most mesial and the most distal of the tooth.	**0-1**
4	LABIOLINGUAL WIDTH	The length between the front (lip) and back (lingual) of the tooth.	**0-1**
5	CERVICAL LINE	The enamel-cementum boundary forms a line called the cervical line.	**0-1**
6	SINGULUM	Convex protruding field in the cervical third region on the lingual surfaces of the anterior teeth.	**0-1**
7	INCISAL EDGE	It is the edge formed by the union of the labial and lingual surfaces of the anterior teeth.	**0-1**
8	ROOT APEX	End point of tooth roots.	**0-1**
9	CONTOUR CRESTS	Mesial -distal lateral tooth contact points.	**0-1**
10	POLISHING	Polishing, loss of imperfections and traces by abrasion.	**0-1**

Results:

The descriptive characteristics of the videos included in the study, such as the number of views, video durations, time elapsed after the video upload date, number of likes, number of comments, viewing rate, reliability of information and GQS values are presented in Table 2. And also video quality scores are shown in Table3.

When the distribution of the 20 videos included in the study according to their uploaders was evaluated, it was seen that the most videos were uploaded by Dentistry students (n=11, 55%). Dentistry students followed by dentists (%30) and dental technicians (%15), respectively. (Table 4)

It has been found that the video quality varies depending on the uploader of the videos shown in Table 5. It has been determined that the information content of the videos uploaded by dentists is of higher quality and that these videos provide sufficient and accurate information for dentistry students in preclinical practice.

The distribution of videos according to the parameters used in the evaluation of video quality is shown in Figure 1. Crown length, root length was indicated and cervical line was defined in 16 videos (80%), the concepts of cingulum and incisal edge were emphasized and applied practically in 17 videos (85%). Mesio-distal and bucco-lingual tooth widths were indicated in 13 videos (65%). And the model was polished after manipulation in 15 videos (75%).

In half of the videos (n= 10, 50%), the root apex was identified and processed on the model. The contour crest

is not shown in the model in 11 videos (55%). So based on this section, there is a lack of contour crest identification in this study.

20 relevant videos were classified as 55% good (GQS 4.7±0.6), 35% medium (GQS 3.3±1.6), and 10% considered poor quality (GQS 1.0±0). Evaluated according to their quality, no significant difference was found between the parameters except GQS(p=0.013). (Figure 2)

Table 2: Descriptive attributes of videos

VIDEO UPLOADER	VIDEO QUALITY	TOTAL SCORE	NUMBER OF VIEW	VIDEO DURATION	NUMBER OF DAYS AFTER UPLOAD TIME	NUMBER OF LIKES	NUMBER OF COMMENTS	VIEWS RATE (number of views/time after upload 100%)	RELIABILITY OF INFORMATION	GQS *(0-5)
Dentist-1	3	9	194000	23:39 min	1460	1900	433	132,8	9	5
Dentist-2	3	9	5300	24:56 min	365	276	52	14,5	9	5
Dentist-3	2	6	11000	29:52 min	1095	154	24	10,4	6	5
Dentist-4	2	6	84000	11:58 min	1825	1100	72	46	6	5
Dentist-5	3	10	8400	01:28:38 min	730	130	0	11,5	10	5
Dentist-6	3	10	4800	51:42 min	365	80	3	13,1	10	5
Dentistry Student-1	2	4	34000	31:50 min	1095	759	186	31,05	4	1
Dentistry Student-2	1	3	198000	25:01 min	365	1600	0	542,4	3	1
Dentistry Student-3	3	9	68000	27:11 min	730	1600	165	93,1	9	5
Dentistry Student-4	3	10	23000	22:30 min	730	269	47	31,5	10	5
Dentistry Student-5	3	9	24000	01:25:00 min	365	480	15	65,75	9	5
Dentistry Student-6	1	3	7000	12:24 min	730	146	28	9,5	3	1
Dentistry Student-7	3	8	6300	16:04 min	730	60	7	8,6	8	4
Dentistry Student-8	2	7	31000	23:49 min	730	448	21	42,4	7	3
Dentistry Student-9	2	4	7500	37:53 min	730	207	42	10,2	4	2
Dentistry Student-10	2	6	6800	20:11 min	1460	87	21	4,6	6	3
Dentistry Student-11	3	8	25000	18:45 min	1095	427	112	22,8	8	4
Dental Technician-1	3	9	23000	19:58 min	730	434	29	31,5	9	5
Dental Technician-2	3	8	5100	23:29 min	730	97	2	6,9	8	5
Dental Technician-3	2	4	150000	19:12 min	2190	1000	65	68,5	4	4

*GQS: Global Quality Score

Table3: Video quality scores

VIDEO QUALITY	SCORE
1. Poor Qualıty	1(1-3 poınts)
2. Medium Qualıty	2(4-7 poınts)
3. Good qualıty	3(8-10 points)

Table 4: Numerical distribution of videos by uploader

Video Uploader	Number of videos	%
Dentist	6	30
Dentistry Student	11	55
Dental Technician	3	15

Table 5: Videos classified according to the uploader and quality scores

VİDEO UPLOADERS		TOTAL SCORES	QUALITY OF VİDEOS
Dentists	1	9*	3
	2	9*	3
	3	6	2
	4	6	2
	5	10*	3
	6	10*	3
Dentistry Students	1	4	2
	2	3	1
	3	9*	3
	4	10*	3
	5	9*	3
	6	3	1
	7	8*	3
	8	7	2
	9	4	2
	10	6	2
	11	8*	3
Dental Technicians	1	9*	3
	2	8*	3
	3	4	2

*Videos which have high quality scores.

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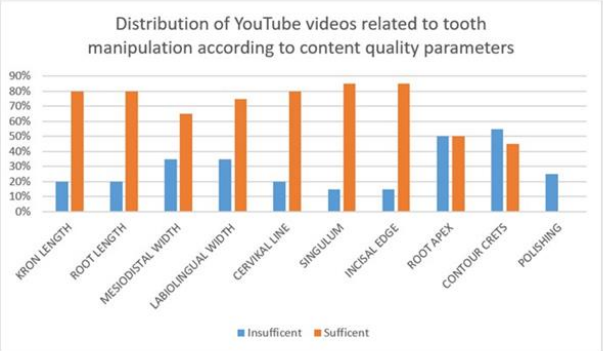

Figure 1: Distribution of YouTube videos related to tooth manipulation according to content quality parameters

Figure 2: Distribution of videos according to the quality of information they provide

Discussion:

According to the results the videos on YouTube™ about Maxillary Central tooth Sculpting are inadequate and/or misleading observation there was no difference between the number of views, likes, comments and viewing rates of YouTube videos related to maxillary central tooth sculpting and it was determined that the quality of the information content varied depending on the video uploader. Evaluated according to their quality, no significant difference was found between the parameters. The null hypothesis of the study is accepted.

In previous studies in the field of dentistry; oral hygiene (14), root canal treatment (17), buried upper jaw canine teeth (18), patients with cleft lip and palate (1) and the contents of the videos on the YouTube™ video platform related to their subjects were evaluated.

In the study conducted by Kaya et al. (19)in the evaluation of videos about oral devices for bruxism on YouTube, it was understood that when the videos were grouped as the source they were uploaded to, the reliability scores of the videos uploaded by health professionals were significantly higher than the other groups. In addition, 17 of the 60 videos examined (28.3%) were determined to be in the category of misleading videos.

In the study conducted by Yağcı et al.(20) evaluating YouTube as a source of information about digital dentistry, the content quality and demographic characteristics of their videos were studied and it was seen that the information about digital dentistry on the YouTube™ video platform was limited. In the study, it was concluded that it would be beneficial for dentists and academicians who are experts in the field of digital dentistry to take a greater role in sharing accurate information.

With the increasing use of the Internet, YouTube™ has become a frequently used website and video sharing platform to obtain information in the field of health. However, the fact that the videos shared on the YouTube™ video platform are not standardized in terms of content, the videos can be easily uploaded to the platform without being subject to control, and the fact that there is misleading / deceptive information about the subject in some videos leads to the questioning of the video content (21).

The content of the study shows a variable structure as it is made on the YouTube™ video platform, which has video results that are uploaded-deleted every day or that change according to subjective search criteria (keyword selection, interest, video watching times, etc.). The fact that the data collection method is instantaneous affects the results of the study. In addition, this study was carried out only on the YouTube platform, and it will contribute to the subject by examining other video sharing platforms.

As a result of the statistics of the scoring made by two different physicians, there was no significant difference between the raters and it was determined that there was a linear correlation.

The research data showing that there is no statistical difference in the viewing and popularity rates of useful and misleading videos, and a previous studies on this subject: YouTube as a source of information about digital dentistry, the content quality and demographic characteristics of their videos (20) and using website and video sharing platform to obtain information in the field of health (21) have supported that quality video cannot be selected by video viewers.

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In this study, it was concluded that when providing video access to dental students in order to support their pre-clinical education, they should pay attention to the fact that the video provider/uploader is a dentist, the storytelling of the uploader, and that the video content is sufficient and contains the necessary theoretical and practical information. Studies have shown that storytelling in clinical dental anatomy teaching is effective in increasing students' satisfaction and encouraging reflective learning (22), and that the connection between theory and practice in dental anatomy education is important and should be addressed together. (23)

Health academics and health institutions should increase the work on 'pre-clinical practice courses' and try to raise awareness by uploading more useful and systematic videos to the internet / YouTube.

The number of videos examined in this study creates a major limitation on the results. Results can be improved by examining and comparing more videos on various video sharing platforms. In addition, the evaluation of the suitability, usefulness of the videos by the preclinical dentistry students, who are the main audience, will affect the results.

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Odontoma: Report of Four Cases, İncluding One Giant Case

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Abstract

Odontomas are recognized as the most common, benign, mixed odontogenic tumors and typically present without clinical symptoms. The exact cause of odontomas is still unknown. They do not exhibit gender differences. Diagnosis of odontomas is usually incidental during radiographic examination, although in some cases they can lead to tooth eruption complications. Odontomas primarily consist of enamel and dentin, but they may also contain cementum and pulp tissue in various forms. Odontomas are considered to be a hamartoma rather than a true neoplasm. They are classified into two groups: complex and compound odontoma. If the tooth tissues within them are arranged randomly, they are referred to as complex odontoma; if they resemble the shape of teeth, they are called compound odontoma.

Case Report (HRU Int J Dent Oral Res 2023;3(3): 158-162)

Key words: Odontom, odontogenic tumor, hamartoma, neoplasm, dental tissues

Introduction

The term odontoma was first coined by Paul Broca in 1867 to describe odontogenic tumours and similar lesions. (1,2,3).Odontoma contains dental tissues such as dentin, enamel, pulp and cementum(16). Odontoma is the most common odontogenic tumour of the jaws. Odontomas are not considered a true neoplasm but a tumour-like malformation (16).Although various conditions such as genetics, local trauma, chronic inflammation have been suggested in the etiology of odontoma, the exact cause is still unknown.It is usually noticeable in the 20s(15). In most cases, they are discovered incidentally during routine radiological examination.Clinical symptoms may occur with delayed eruption. Persistent teeth were seen in our two cases.Odontomas are frequently associated with impacted teeth and may cause malposition, diastema, malformation and devitalisation of the adjacent tooth(17).If odontomas reach very large sizes, they can cause expansion and lead to facial asymmetry.It can be seen together with Gardner and Hermann's syndrome(12).

Odontoma is divided into complex and compound classifications. If it is formed similarly to tooth tissue, it is called compound odontoma; if enamel, dentin and cementum are irregularly combined, it is called complex odontoma. Complex odontoma is often seen in the mandibular molar region, while compound odontoma is often seen in the anterior maxilla (17,18).In almost all literature reviews, compound odontoma is more common than complex odontoma. This ratio is 2/1 (7,17,19).

In our 4 cases, three of them were compound odontomas and one was complex odontoma.

Case presentation

Case 1:A 17-year-old male patient was referred to Harran University Faculty of Dentistry, Department of Oral and Maxillofacial Surgery in August 2023 due to a lesion incidentally noticed in the maxillary canine region.The patient had no significant medical history, facial asymmetry, or swelling, and was asymptomatic at the time of the visit.An orthopantomographic film was taken for radiological examination, which revealed a well-defined giant radiopaque lesion

surrounding the impacted canine tooth (Fig. 1). The lesion caused displacement of teeth 21 and 24 and resorption of the root of tooth 22 (Fig. 2).

Fig 1: Missing deciduous canine.

Fig 2: Giant radiopaque mass surrounding the tooth in the coel maxilla canine region seen on the orthopantomographic film taken before treatment.

A computed tomography (CT) scan was performed to better visualize the borders of the lesion, revealing its associated with the base of the nose (Fig 3).

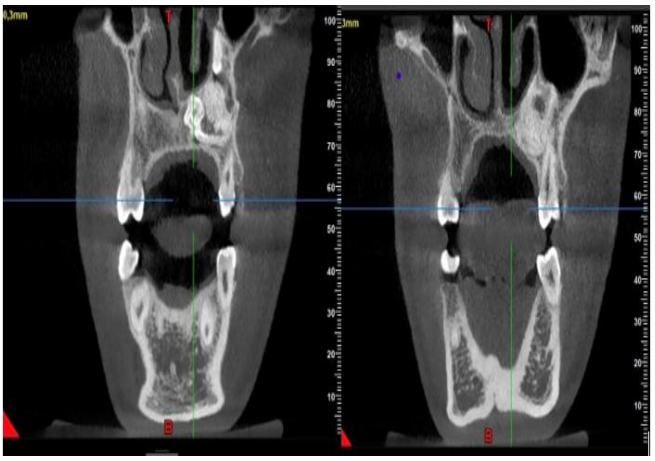

Fig 3: 3-dimensional computed tomography image.

Based on the clinical and radiographic findings, a preliminary diagnosis of complex odontoma was made and surgical treatment was indicated.Surgical removal was performed under general anesthesia using an intraoral approach .The lesion was found to be large and closely associated with tooth number 23, which failed to erupt. The flap was carefully removed after making the incision.The entire mass, along with the impacted tooth, was successfully surgically removed (Fig. 4). The remaining bone walls were checked for any residual lesion (Fig. 5). The flap was closed with vicryl suture without tension.The excised tissues were sent to the pathology department for histopathologic examination, which confirmed that the lesion was an odontoma. The patient was prescribed antibiotics, analgesics and mouthwash.She was advised to follow a soft diet. The suture was removed after 1 week.

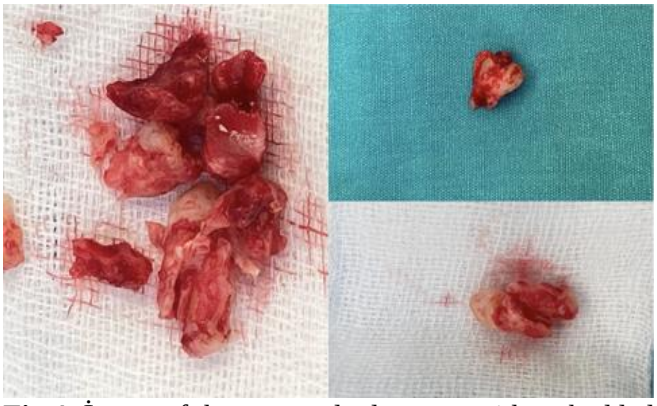

Fig 4: İmage of the removed odontoma with embedded canine.

Fig 5: Cleaned bone from the lesion.

Fig 6: Posttreatment panoramic radiograph.

Case 2:A 27-year-old female patient was referred to our clinic in October 2023 due to an incidental lesion in the left mandibular molar region. The patient had no significant medical history and was asymptomatic at the time of the visit.Radiographic evaluation revealed a well-defined radiopaque lesion above the mandibular canal associated with the root of the molar (Fig. 7).

Fig 7: Pretreatment panoramic radiograph

Based on the clinical and radiological findings, a preliminary diagnosis of a compound odontoma was made and surgical treatment was indicated. Surgical removal was planned under local anaesthesia. The odontoma, along with the tooth, was removed.The flap was closed with 3-0 silk suture without tension(Fig. 8). The tissues were sent to the pathology department for histopathologic examination, which confirmed that the lesion was an odontoma. Following surgery, the patient was prescribed antibiotics, analgesics and mouthwash. She was advised to follow a soft diet. The suture was removed after 1 week.

Fig 8: Surgically removed odontoma

Case 3:A 12-year-old boy presented to our clinic with the complaint of delayed eruption of his maxillary central teeth.In the medical history, it was found that the patient was in good health.A painless, hard mass in the buccal region of the oral cavity was clinically detected.The patient was asymptomatic during the visit. Radiographic evaluation revealed a well-defined radiopaque mass distinct boundaries in the anterior maxillary anterior region, obstructing the eruption teeth 11 and 21. Based on clinical and radiological findings, surgical treatment was recommended with a preliminary diagnosis of compound odontoma (Fig. 9).

Fig 9: Pretreatment panoramic radiograph

The lesion was successfully removed along with the tooth.The flap was closed with vicryl suture without tension.(Fig. 10) The excised tissues were sent

to the pathology department for histopathologic examination, which confirmed that the lesion was an odontoma. Following surgery, the patient was prescribed antibiotics, analgesics and mouthwash. She was advised to follow a soft diet.

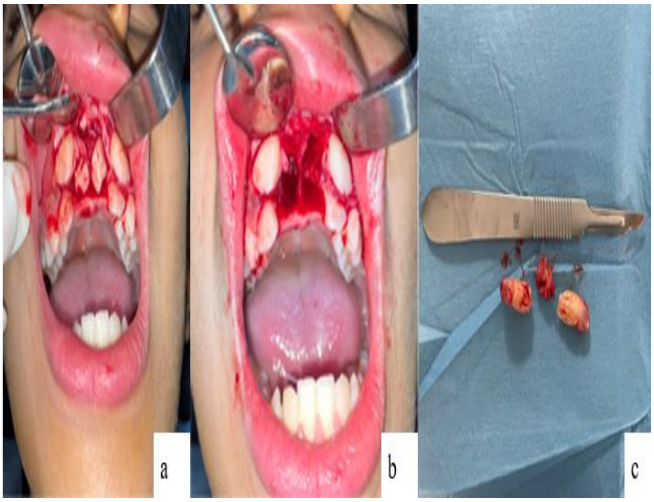

Fig 10(a,b,c): Surgially removed odontomes

Case 4: A 10-year-old girl presented to our clinic with a complaint of delayed eruption of teeth. We did not find any significant medical history during the patient's anamnesis. Intraoral examination revealed a mass in the buccal region. Radiographic evaluation showed tooth-like structures in the maxillary anterior region in a position that prevented the eruption of teeth (Fig. 11).


Fig 11: Pretreatment panoramic radiograph

Based on clinical and radiographic findings, the lesions were excised under general anesthesia with a preliminary diagnosis of compound odontoma, and sutured using resorbable suture material. The excised tissues were sent to the pathology department for histopathologic examination, which confirmed that the lesion was indeed an odontoma (Fig. 12).

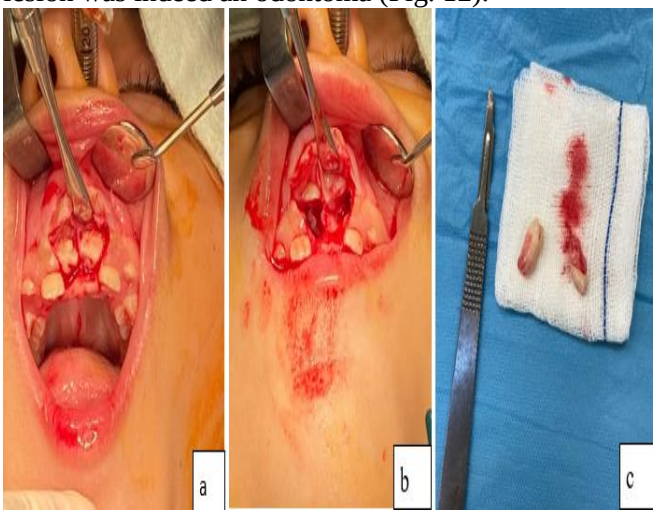

Fig 12(a, b,c): Surgially removed odontomes

Discussion

Odontoma is generally a symptom-free, slow-moving tumor. It is hamartomatous malformation composed of an untidy mass of both soft and hard textures of odontogenic origin. (14) It is the most common benign odontogenic tumor in the jaws with a rate of 22%(4). In a study by Escobar et al. 241 of 544 odontogenic tumors were odontomas with a rate of 44.3%. (5).

In a study by Santos et al. including 127 cases, the most common odontogenic tumor was odontoma with 50.40% (6). According to their morphologic and histologic characteristics, they are divided into 2 types: complex and compound.Compound type is 2 times more common than complex type (7,8). The compound form is more common in the anterior maxilla, while the complex form is more common in the posterior mandible (2). In our first case, the large odontoma we saw anteriorly in the maxilla was a complex odontoma contrary to this information.

The first stage gives a radiolucent appearance due to very little calcification, the second stage is intermediate, and the third stage contains intense radiopacity surrounded by a very small radiolucent ring (14). Odontoma may be associated with eruption disorders and incorrect positioning of the teeth. (7,8). In two of our cases, the lesion was recognized at an early age due to persistent teeth.Impacted teeth are a common condition that most frequently affecting the mandibular third molars and maxillary incisors.

Clinical data should be correlated with radiologic findings and histologic evaluation in order to diagnose odontomatosis. (9). In all our cases, we supported the radiologic findings histologically and additionally examined them three-dimensionally with Computed Tomography (CT). The pathology results of all lesions in our case series were in line with the preliminary diagnosis made after clinical and radiologic examination.

Although radiographic diagnosis of compound odontomas is easy because they contain tooth-like structures, the differential diagnosis of complex odontoma should be made with lesions such as cementoma, osteoid osteoma and cemento-ossifying fibroma and supernumere teeth (10).

Odontomas are usually painless lesions that are detected incidentally (11). Recurrence is rare and does not discriminate gender.

Rarely encountered erupted odontomas were first described by Rumel et al.(13) . There are also cases of erupted odontoma in the Turkish literature. In our cases, erupted odontoma was not encountered.

Conclusion

Early diagnosis with clinical and radiographic evaluations followed by appropriate surgical intervention is critical for the elimination of persistent dental problems and prevention of pathologic complications.

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Ankylosed Primary Tooth Under the Premolar Germ: Clinical Findings and Treatment Planning

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Abstract

The impaction of primary teeth is not a common occurrence. In a patient who presented to our clinic, it was observed that the lower second primary molar was situated below the premolar germ. Considering information from previous studies, ankylosis in the primary tooth is presumed to be the underlying cause. After the extraction of the supernumerary tooth in the area, the patient will undergo long-term comprehensive monitoring.

Case Report (HRU Int J Dent Oral Res 2023;3(3): 163-165)

Key words: Ankylose, submerged, primary teeth, premolar.

Introduction

Tooth eruption refers to the process in which a tooth shifts from its typical location within the alveolar process to its functional placement in the oral cavity. (1). This phenomenon involves various tissue alterations, such as the resorption and apposition of alveolar bone, as well as the maturation of the root and periodontium. (1, 2). Abnormalities in these natural processes can result in impacted teeth, where impaction may be primary, indicating the tooth never emerges, or secondary, signifying that the tooth remains below the expected level even after eruption. (2). Factors at a local level that contribute to the impaction of primary teeth encompass trauma, ankylosis, congenital absence of permanent teeth, abnormalities in the periodontal membrane, odontomas, injuries affecting the periodontal ligament, premature eruption of the first permanent molar, insufficient eruption force, or a combination of these elements. (3, 4, 5). The frequency of impaction in primary teeth is considered rare (6), with unerupted and impacted premolar teeth being a common condition in children (7). Typically, impacted primary molars, particularly the mandibular second molar, are frequently affected, while the maxillary first molar is the least commonly impacted. The prevalence of impacted primary molars in children varies from 1.3% to 35% across different epidemiological studies. The exact cause of this condition remains unknown (8-11). However, recent histological and scanning electron microscopy (SEM) studies on extracted teeth have revealed that a significant proportion of these molars exhibit ankylosis. The specific cause of this ankylosis is uncertain, with genetics being identified as a contributing factor in a few cases. The rare occurrence of intraosseous inversion involves the primary tooth being positioned below the expected location of the permanent tooth. A review of the literature from the past two decades identified only four cases where unerupted primary molars were situated beneath the germ of the premolar. (12-15). Furthermore, there is a documented case of an ankylosed primary tooth with an unerupted permanent tooth positioned beneath it. (16).

Clinical Examination

A 12-year-old female patient visited the Şanlıurfa Oral and Dental Health Hospital for routine treatment. The patient had pain in the lower first permanent molar and no systemic diseases. Dental history obtained through anamnesis revealed no tooth infection or trauma. An informed consent form was signed by the patient's parent. Extraoral and intraoral clinical examination revealed the absence of the right mandibular primary molar and the presence of a supernumerary tooth resembling a premolar in the same area (Figure 1). Panoramic and periapical radiography showed that the right second primary molar had changed position with the germ of the permanent second premolar (Figures 2, 3).

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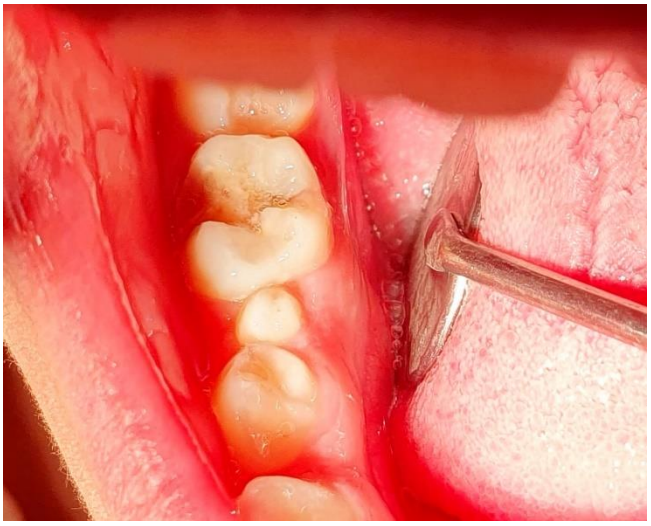

Figure 1

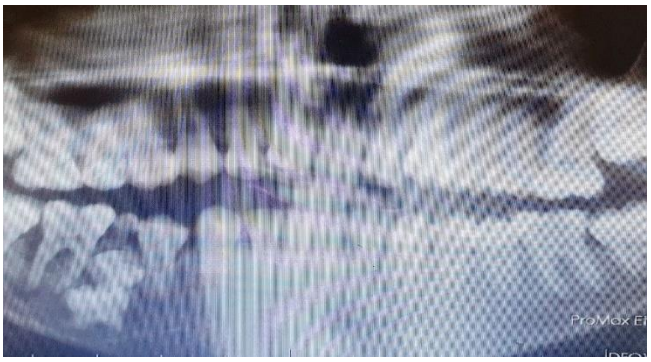

Figure 2

Figure 3

Treatment

The patient's painful lower right mandibular molar and supernumerary tooth were extracted (Figure 4). A follow-up appointment was scheduled for three months later to monitor the eruption status of the premolar and primary molar teeth. The patient was informed that the teeth might need to be extracted if they do not erupt spontaneously and that orthodontic treatment might be required in the future.

Figure 4

Discussion

The impaction of primary molars is relatively rare in children and affects only 2.5-8.3% of cases (17). Most reported cases of impaction in the literature are from permanent teeth. While the absence of primary teeth is rare, impaction of the second primary molars is more common than other impactions. Cases of impacted primary molars positioned beneath permanent premolars have only been reported as individual cases (18,19,20). The primary etiological factor is associated with the premature ankylosis of the second primary molars. It is established that the dental follicle of the upper permanent molars with larger crowns develops in the palatal region, while for lower molars, it develops in the lingual region. The active eruption of primary molars occurs once crown calcification is complete, and root calcification has commenced. Initially, the premolar tooth is situated near the roots and later assumes a position between the roots during normal development. (17). Nonetheless, the initiation of ankylosis in the primary tooth can disturb this coordinated progression. The premolar tooth may undergo development in a lingual direction towards the crown or eventually ascend in close proximity to the crown of the ankylosed primary molar. Consequently, the premolar's development initiates at the level of the occlusal plane and lingually, concluding the pre-eruption phase positioned at the apical region of the roots of the primary molars. (20).

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Conclusion

The incidence of impaction in primary teeth is very rare. In the case we studied, the impaction of the primary tooth beneath the premolar germ suggests the possibility of ankylosis. This case underscores the importance of radiological examination. Necessary appointments have been made for the patient's long-term follow-up.

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Süt Dişi Endodontik Tedavisinde Alternatif Bir Yaklaşım: Lezyon Sterilizasyonu ve Doku Tamiri Tekniği

An Alternative Approach in Primary Teeth Endodontic Treatment: Lesion Sterilization and Tissue Repair Technique

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Özet

Süt dişleri çiğneme, konuşma, estetik ve daimi dişlerin yerinin korunması için gereklidir. Süt dişlerinde endodontik tedavinin başarısı etkin irrigasyon ve obturasyon ile kök kanal sistemindeki mikroorganizmaların elimine edilmesine bağlıdır. Çocuk hastada her zaman ideal endodontik tedavi yapmak mümkün değildir; bu durumda lezyon sterilizasyonu ve doku tamiri yaklaşımı alternatif bir teknik olarak düşünülebilir. Bu teknik süt dişlerinde apse, mobilite, fistül ve furkasyon bölgesinde radyolüsensi varlığında uygulanabilir. Teknik, kök kanal sistemini dezenfekte etmek için üçlü antibiyotik patın (metronidazol, minosiklin, siprofoksasin) kullanılmasına dayanmaktadır.
Bu çalışmanın amacı süt dişlerine uygulanan lezyon sterilizasyonu ve doku tamiri tekniğinin endikasyonlarını, kontrendikasyonlarını, tedavide kullanılan materyalleri ve tedavi protokolünü gözden geçirmektir.

Review (HRU Int J Dent Oral Res 2023;3(3): 166-172)

Anahtar Kelimeler: Nekrotik süt dişleri, pulpektomi, üçlü antibiyotik patı.

Abstract

Primary teeth are necessary for chewing, speaking, aesthetics and maintaining the place for the permanent teeth. The success of endodontic treatment in primary teeth depends on the destruction of microorganisms in the root canal system with effective irrigation and obturation. It is not always possible to perform ideal endodontic treatment in a pediatric patient; in this case, lesion sterilization and tissue repair approach can be considered as an alternative technique. This technique can be applied in primary teeth in the presence of abscess, mobility, fistula and radiolucency in the furcation region. This technique is based on the use of triple antibiotic paste (metronidazole, minocycline, ciprofoxacin) to disinfect the root canal system.
The aim of this study is to review the indications, contraindications, materials used in treatment and treatment protocol of lesion sterilization and tissue repair technique applied to primary teeth.

Review (HRU Int J Dent Oral Res 2023;3(3): 166-172)

Key words: Necrotic primary teeth, pulpectomy, triple antibiotic paste.

Giriş

Süt dişleri, oklüzyon gelişiminde belirleyici bir rol oynamaktadır. Bu nedenle süt dişlerinin fizyolojik eksfoliyasyonuna kadar geçen sürede sağlıklı bir şekilde korunarak ağızda tutulması çocuk diş hekimliği alanındaki temel amaç olarak karşımıza çıkmaktadır. Aksi durumda süt dişlerinin erken kaybı; ektopik sürme, sürme sırasının değişmesi, yer kaybı, zararlı alışkanlıkların gelişimi, çiğneme ve konuşma fonksiyonunda bozukluk gibi çeşitli komplikasyonlara yol açabilir (1,2). Bu komplikasyonlardan kaçınmak için süt dişlerinin korunması oldukça önemlidir. Özellikle çiğneme

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fonksiyonunun devamı ve enfeksiyonların önlenmesi açısından süt dişlerinin tedavileri uygun şekilde yapılmalıdır (2,3).

Rutin diş hekimliği pratiğinde klinisyenler tarafından süt dişlerinde pulpa tutulumu olan derin çürük lezyonlarında pulpotomi veya pulpektomi şeklinde pulpa tedavileri tercih edilmektedir (4). Ancak süt dişlerinde ilerlemiş çürük nedeniyle pulpa tutulumu sonrası görülen periradiküler patoloji gelişimi sonucu pulpektomi gibi konvansiyonel endodontik uygulamalarda sıklıkla başarısızlıkla karşılaşılabilmektedir (5). Bununla birlikte pulpektomi; yaygın kök rezorpsiyonu, kemik rezorbsiyonu, yetersiz periodontal doku desteği, furkal radyolüsensi ve/veya çocuğun kooperasyonundaki zorluk gibi faktörler nedeniyle kontrendike olduğunda dişin çekimi tek tedavi seçeneği olarak düşünülmektedir (1,5). Bu durumda oluşabilecek yer kaybını önlemek için yer tutucu uygulaması gerekebilir (6).

Konvansiyonel kök kanal tedavisi (pulpektomi)

Konvansiyonel kök kanal tedavisi olarak bilinen pulpektomi, pulpa nekrozu veya geri dönüşümsüz pulpa iltihabı olan süt dişlerinin tedavisinde manüel veya döner aletlerle kök kanallarının debridmanı ve şekillendirilmesi ile antimikrobiyal irrigasyon solüsyonları kullanılarak kök kanal sisteminin dekontamine edilmesini amaçlayan altın standart bir tedavidir (7).

Başarılı bir şekilde dezenfekte edilmiş ve restore edilmiş süt dişleri doğal yer tutucu olarak düşünülebilir. Buna karşın süt dişlerinin endodontik tedavisindeki zorluklar; tipik morfolojileri nedeniyle kıvrımlı kök kanallarına, dallanmalara, aksesuar kanallara ve enfeksiyonun yayılmasını kolaylaştıran geniş medüller kemik boşluklarına sahip olmalarıdır. Ayrıca süt dişlerinde fizyolojik kök rezorpsiyonu nedeniyle apikal kapanma olmaması sonucu kök uçlarında hermetik bir tıkama

sağlanamayabilir. Gelişmekte olan kalıcı diş germinin süt dişlerinin köklerine yakınlığı da endodontik tedavi için engel oluşturmaktadır (5,8,9).

Lezyon Sterilizasyonu ve Doku Tamiri Tekniği

Diş pulpasında görülen enfeksiyonlar aerobik ve anaerobik patojenler kaynaklı polimikrobiyal enfeksiyonlardır. Kök kanal tedavisinin başarısı, etkin bir şekilde kök kanal sisteminin dezenfeksiyonu ile patojen mikroorganizmaların yok edilmesine bağlıdır (10). Kök kanal sisteminin geleneksel kemomekanik yöntemlerle temizlenmesine rağmen bazen mikroorganizmalar yeterli düzeyde uzaklaştırılamazsa tedavi başarısızlıkla sonuçlanabilir (11). Bu durumlarda 1990 yılında Hoshino tarafından tanımlanan süt dişlerine hiçbir mekanik enstrümantasyon yapılmadan uygulanan alternatif bir biyolojik yaklaşım olan LSTR (Lezyon Sterilizasyonu ve Doku Tamiri) tekniği, özellikle pulpektominin kontrendike olduğu süt dişleri için alternatif bir tedavi yöntemi olarak değerlendirilebilir (4). Temel olarak bu tedavinin etki mekanizması, tüm patojenik bakterileri kök kanal sisteminden uzaklaştırarak lezyonu çeşitli ilaçlarla sterilize etmek ve bakteri yükünün azaltılarak konağın doğal savunma sistemi ile onarımın sağlanmasıdır (5,12). Özellikle kronik enfekte süt dişlerinin başarılı endodontik tedavisi ve prognoz; karmaşık kök kanal sistemi, fizyolojik kök rezorpsiyonu nedeniyle apikal kapanmanın olmaması nedeniyle mekanik debridmandaki ve hermetik bir sızdırmazlık elde etmedeki zorluk, gelişmekte olan daimi diş germlerinin süt dişlerinin köklerine yakınlığı, enfeksiyonun yayılmasını sağlayan geniş medüller kemik boşluklarına sahip olması ve enfeksiyonun polimikrobiyal doğası nedeniyle zor olduğu için LSTR tekniği bu durumlarda alternatif bir tedavi yaklaşımı olarak düşünülebilir(5,13-16).

LSTR tekniğinde temel amaç antibakteriyel ilaçların kombine kullanılması ile pulpal ve periradiküler lezyonların dezenfeksiyonunun sağlanmasıdır (17). Bu teknik 2004 yılında Japonya'da bulunan Niigata Üniversitesi Diş Hekimliği Fakültesi'nde geliştirilmiştir (5). LSTR tekniği uygulanarak yapılan tedavilerde, kök kanal sistemi kaynaklı enfeksiyonun kontrolü endodontik tedavinin ana amacı olan kök kanal sistemindeki mikrobiyal yükü azaltılarak sağlanmaktadır (18). Mikrobiyal yükün azaltılması, kök kanal sisteminin obturasyonundan önce ve uzun dönemde gelişebilecek periapikal patoloji olasılığını azaltmak için önemlidir. Konvansiyonel kök kanal tedavisinde kök kanallarında bulunan mikrobiyal yük, kanal duvarındaki dentinin eğelerle mekanik olarak çıkarılması ve kanalların irrigasyon solüsyonları ile kimyasal olarak dezenfeksiyonun sağlanması ile ortadan kaldırılır (13,18). Kök kanal sistemindeki rezidüel mikroorganizmalar bazen periapikal komplikasyonların tekrarlamasına neden olabilir. Bu durumda endodontik tedavinin başarılı bir şekilde sonuçlanması için bakterilerin tamamen yok edilmesi sağlanmalıdır. Enfekte kök kanalının mikrobiyal florası, aerobik ve anaerobik bakterilerden oluşur (19). Bu nedenle, konvansiyonel kök kanal debridmanına ek olarak farklı türdeki bu mikroorganizmaların yükünü azaltabilen antibiyotikler veya antiseptikler ile elde edilen sterilizasyonun yaklaşık %20-40 oranında tedavinin

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etkinliğini artırdığı bildirilmiş ve çeşitli ilaçlar tartışılmıştır (20).

LSTR tekniği, konvansiyonel kök kanal tedavisine göre daha basit ve hızlı olmasının yanı sıra periapikal lezyonu olan dişler için bile çoklu tedavi seansı gerektirmemesi nedeniyle potansiyel olarak pulpektominin yerini alacak bir seçenek olarak önerilmiştir (5). LSTR aynı zamanda "enstrümantal olmayan endodontik tedavi" olarak da bilinir ve kök kanallarının mekanik olmayan enstrümantasyonundan ve kök kanallarının girişine antibiyotik karışımı hazırlanarak yapılan bir patın yerleştirilmesi ile uygulanır (21).

Bu bilgiler ışığında LSTR tekniği ile başarıyla dezenfekte edilmiş ve restore edilmiş süt dişlerinin doğal yer tutucu olarak hizmet edebileceği düşünülebilir.

Tablo 1: LSTR tekniğinin avantaj ve dezavantajları

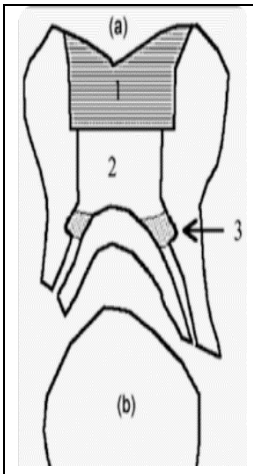
LSTR tekniğinin avantajları şu şekilde sıralanabilir (5,22,23):
• Geleneksel pulpa tedavisinden daha kolay ve teknik hassasiyet daha azdır. • Klinik uygulama süresi daha azdır ve tek seansta tedavi tamamlanır. • Mekanik enstrümantasyon yapılmadığı için kök kanallarının doldurulmasına gerek yoktur. • Endodontik tedavilere göre daha ekonomiktir. • Geleneksel pulpektomi endikasyonu olmayan ve çekim gerektiren süt dişleri (periradiküler tutulumu ve aşırı kök rezorpsiyonu olan dişler) için alternatif bir tedavi yöntemidir.
LSTR tekniğinin dezavantajları şu şekilde sıralanabilir (24):
• LSTR tedavisinde kullanılan ilaçların sistemik absorpsiyonu ve ilaç direnci değerlendirilmediği için uzun dönem etkileri belirsizdir. • Antibiyotiklerin toz haline getirilmesi ve oranlanması için standartlaştırılmadığı için aşırı antibiyotik kullanımına neden olabilir. • Minosiklin, minede renk değişikliğine neden olmaktadır. Ancak bu, minosiklin yerine klindamisin gibi farklı antibiyotik preparatı kullanılarak elimine edilebilir. • Antibiyotik patı radyograflarda radyolüsent görüntü vermektedir. Bu durum karışıma iyodoform ilavesiyle çözülebilir.

Tablo 2: LSTR tekniğinin endikasyon ve kontrendikasyonları (12,24)

LSTR tekniğinin endikasyonları
• Kanal tedavisi için yeterli kooperasyonun kurulamadığı çocuklar • Ebeveynlerin diş çekimini istememesi • Ağrılı ve perküsyon hassasiyeti olan süt dişleri • Grade I ve II mobilitesi olan süt dişleri • Akut apseli veya fistülü olan süt dişleri • Furkasyon alanında radyolusensi varlığı • Hemofilisi olan çocuklarda devital süt dişleri varlığında çekime alternatif olarak • Nekrotik pulpalı ve tam gelişmemiş köklere sahip süt dişleri
LSTR tekniğinin kontrendikasyonları:
• Antibiyotik patının bileşenlerine karşı alerji • Enfektif endokarditli çocuklarda • Eksfoliasyon zamanı yaklaşan süt dişleri • Pulpa tabanı perfore olmuş süt dişleri • Yeterli koronal sızdırmazlığın mümkün olmadığı aşırı madde kaybı olan süt dişleri • Aşırı internal veya eksternal kök rezorbsiyonu varlığı • Altta yatan diş germini içeren furkasyon bölgesinde aşırı kemik kaybı

LSTR tekniğinin klinik uygulaması

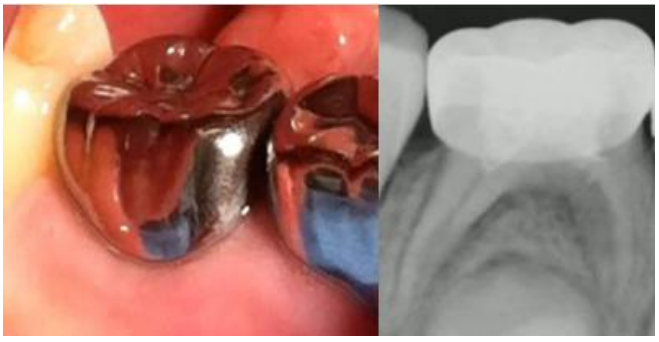
LSTR tekniğinde lokal anestezi ve rubber dam izolasyonu altında çürük temizlenip endodontik giriş kavitesi açılarak nekrotik koronal pulpa dokusu çıkarılır, ardından salin ve sodyum hipoklorit ile irrigasyon yapılır. Etilendiamintetraasetik asit (EDTA), smear tabakasını kaldırarak dentin tübüllerini genişleterek antibiyotiklerin tübüllere daha derin nüfuz etmesine izin verebileceği için daha iyi bir seçimdir. Kanama etkili bir hemostatik ajan olan sodyum hipoklorit kullanılarak kontrol altına alınabilir. Daha sonra kanal ağzında 2 mm derinliğinde ve 1 mm genişliğinde rond frez kullanılarak üçlü antibiyotik patının yerleştirileceği kavite hazırlanır. Uygun şekilde pat kaviteye yerleştirilerek cam iyonomer siman ile kalıcı restorasyon yapılır ve ardından paslanmaz çelik kuron yerleştirilir (5,25).



Şekil 1: 1.Kalıcı restorasyon
2.Cam iyonomer siman
3.Üçlü antibiyotik patı
(a) süt dişi, (b) kalıcı diş

Şekil 1: LSTR tekniğinin klinik uygulaması

Şekil 2: Tedavi öncesi klinik ve radyografik görüntü



Şekil 3: Tedavi sonrası klinik ve radyografik görüntü LSTR tekniğinde kullanılan antibiyotik patı kullanımı

Sato ve ark. kök kanallarının çeşitli antiseptik ve/veya antibiyotik ilaçlarla dezenfeksiyonu, geleneksel kök kanal debridmanının yaklaşık %20-40'ı kadar ek dezenfeksiyon sağladığını bildirmişlerdir (13). Bu nedenle bazen nonvital enfekte süt dişlerinde enfeksiyonu kontrol altına alabilmek için antibakteriyel ilaçların kullanımı gerekir (13,26). Bu nedenle LSTR tekniğinde en önemli basamak üçlü antibiyotik patının hazırlanmasıdır (27).

Enfekte kök kanalının bakteriyel yapısının karmaşık özellikte olması bu polimikrobiyal enfeksiyonun tedavisinde tek bir antibakteriyel ilacın etkili olmayacağını düşündürmektedir. Bu nedenle çeşitli ilaç kombinasyonları denenerek araştırmalar yapılmıştır (28-30).

Prabharkar ve ark. süt dişlerinde mekanik olmayan enstrümantasyon ve antibiyotik pat uygulaması ile tedavi ettikleri süt dişlerininde radiküler pulpa dokusu çıkarılan ve çıkarılmayan grupları karşılaştırmışlardır. Bu çalışmada klinik ve radyografik başarının 1 yıllık takibinde radiküler pulpa dokusunun çıkarıldığı grupta %83.3 kemik rejenerasyonu gözlenirken, radiküler pulpa dokusunun çıkarılmadığı grupta %36.7 kemik rejenerasyonu gözlenmiştir (31).

Takushige ve ark. üçlü antibiyotik patı kullanılarak uygulanan LSTR tekniğinin başarısını değerlendirdikleri çalışmalarında yüksek oranda klinik semptomların kaybolduğunu, sinüs yolunun kapandığını, apsenin iyileştiğini ve daimi dişlerin sorunsuz bir şekilde sürdüğünü gözlemlemişlerdir (5).

Agarwal ve ark. üçlü antibiyotik patı kullanarak uyguladıkları LSTR tekniği ile çinko oksit öjenol kullanılarak uyguladıkları pulpektominin klinik etkinliğini değerlendirdikleri çalışmalarında 1 aylık klinik değerlendirmede pulpektomi grubunda %100 başarı gözlenirken LSTR grubunda %70 başarı gözlenmiştir. 12 ayın sonunda, LSTR grubu, ZOE pulpektomi grubuna kıyasla daha düşük bir başarı göstermiştir(32).

Gupta ve ark. nekrotik süt molar dişinde metronidazol, minosiklin ve siprofloksasin içerikli antibiyotik patını kullanarak uyguladıkları LSTR yaklaşımı ile kooperasyon göstermeyen hastada klinik ve radyografik başarı sağlamışlardır (33).

Trairatvorakul ve ark. süt mandibular molar dişlerin mekanik enstrümantasyon yapmadan üçlü antibiyotik kullanarak yaptığı çalışmasında klinik ve radyografik başarı oranlarını değerlendirmiştir. Bu tedavi yönteminin klinik başarı gösterdiği, ancak 2 yıllık takipte radyografik başarının düşük olduğu sonucuna varmıştır. Bu nedenle, üçlü antibiyotik patı kullanılarak yapılan tedavinin uzun süreli bir tedavi olarak geleneksel pulpektominin yerini alamadığı düşünülebilir (34).

LSTR tekniğinde sıklıkla kullanılan üçlü antibiyotik patı makrogol ve propilen glikol taşıyıcı ile hazırlanan siprofloksasin, metronidazol ve minosiklin karışımından oluşmaktadır (4). Nitroimidazol grubundaki metronidazol, DNA'ya bağlanarak gram pozitif ve gram negatif anaeroblara karşı etki gösterir.

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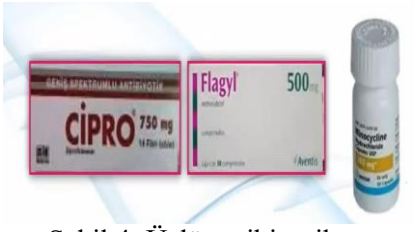
Florokinolon grubundaki siprofloksasin, DNA giraz inhibisyonu ile gram-negatif mikroorganizmalara etki gösterir. Minosiklin ise protein sentezini, kollajenazları ve matris metalloproteinazı inhibe ederek etki gösteren geniş spektrumlu bir antibiyotiktir. Gram pozitif ve gram negatif mikroorganizmaları ve spiroketleri yok eder. Minosiklinin dezavantajı olan dişlerde renk değişikliğinin çözümü olarak amoksisilin, sefaklor, sefroksadin, fosfomisin veya rokitamisin gibi antibiyotikler kullanılabilir (13). Özellikle anaerobik mikroorganizmalara karşı geniş antibakteriyel spektrumu nedeniyle, metronidazol lezyonların dezenfeksiyonunda tercih edilmekle birlikte metronidazole eklenen ilaç kombinasyonları; çürük dentin, enfekte pulpa dokusu, kök kanal dentin duvarlarının ve plakta bulunan bakterilerin kısmen veya tamamen yok edilmesinde etkili olduğu düşünülmektedir (35-37).



Şekil 4: Üçlü antibiyotik patı

Tablo 3: Üçlü antibiyotik patının hazırlanışı

LSTR tekniğinde kullanılan üçlü antibiyotik patı şu şekilde hazırlanmaktadır (38):
• **Her ilacın enterik kaplamasının/kapsülünün çıkarılır.**
• **İlacın her biri toz haline getirilir, nem ve ışığa maruz kalmasını önlemek için hava geçirmez kapta saklanır.**
• **Tozlar 1:1:1 oranında karıştırılır.**
• **Taşıyıcılar 1:1 oranında karıştırılır.**
• **Hazırlanan antibiyotik tozu taşıyıcı karışımı ile 7:1 oranında karıştırılır.**

Tablo 4: Üçlü antibiyotik patında bulunan medikamanlar

Literatürdeki çalışmalarda kullanılan diğer medikaman kombinasyonları şu şekildedir:
• **Metronidazol, Siprofloksasin, Amoksisilin(18)**
• **Siprofloksasin ve Metronidazol(39)**
• **Neomisin, Polimiksin, Nystatin(40)**
• **Siprofloksasin, Minosiklin, Tinidazol(3)**
• **Siprofloksasin, Ornidazol, Minosiklin(41)**

LSTR tekniğinde kullanılan bu ilaçların her birinin kendine göre avantaj ve dezavantajları bulunmaktadır. Bu nedenle başarılı klinik ve radyografik sonuçlara ulaşmak için in vitro ve in vivo çalışmalarda etkili antibiyotiklerin değerlendirilmesi önemlidir. Böylece kök kanal sistemlerinin etkin bir şekilde sterilizasyonunun sağlanması için uygun antibakteriyel ilaçların seçimi tedavinin prognozunu olumlu yönden etkileyebilir.

Üçlü antibiyotik patın etkinliğinde önemli faktörler

• İlaç miktarı: Antibiyotik miktarının yeterli sterilizasyonu sağlayacak düzeyde olması tedavinin başarısı açısından önemlidir. Antibiyotiklerin yetersiz konsantrasyon ve miktarda kullanılması mikroorganizmaların tam olarak elimine edilememesine neden olur. Özellikle rejeneratif tekniklerin uygulandığı durumlarda antibiyotiklerin kanaldan periapikal olarak diffüze olabilme ve sterilizasyon yapabilme özelliğine sahip olması gerekir (42).

• Biyouyumluluk: Kök kanallarında kullanılan ilaçlar, antimikrobiyal özelliklere sahip olmalarına rağmen sağlıklı hücrelere en az zararı vermeli ve hastada herhangi bir hassasiyet/allerji oluşturmamalıdır (43).

• **Smear tabakası:** Smear tabakasının varlığı, irrigasyon solüsyonlarının difüzyonuna karşı bir bariyer görevi görür. Bu nedenle smear tabakasının kaldırılması, antibiyotiklerin dezenfeksiyon sağlaması için uygun difüzyonu göstermesinde önemlidir. Bu amaçla EDTA (etilen diamin tetra asetik asit) ve ultrasonik irrigasyon aletleri kullanılarak dentin tübüllerinin açılıp penetrasyonu artırması sağlanabilir (43).

• **Enfeksiyon varlığı:** Pulpal enfeksiyon polimikrobiyal özellikte olduğu için enfeksiyona neden olan mikroorganizmaların eliminasyonu için antibiyotiklerin kombine kullanılması gerekir (30).

Pulpa nekrozu ile birlikte periapikal lezyonu olan süt dişlerinde tedavi prognozu ile sağkalım daha düşüktür (21). Bu gibi durumlarda, kök kanal sisteminde dezenfeksiyon ve smear tabakasının kaldırılmasını amaçlayan irrigasyon solüsyonlarının kombine kullanımı tedavilerin başarı oranlarını artırabilir (44,45). Buna

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karşın, irrigasyonun uygulanmadan uygulanan LSTR tekniğinin değerlendirildiği bir araştırmada özellikle periapikal lezyonlu dişlerde klinik prognoz olarak ağrı ve perküsyona duyarlılık açısından iyileşme sağlandığı bildirilmiştir (46). Başka bir araştırmada ise pulpektomi veya LSTR tekniğinde başlangıçta pulpa nekrozu olan dişlerde sağkalım oranlarının, geri dönüşümsüz pulpa iltihabı olan dişlere kıyasla önemli ölçüde daha düşük olduğu bildirilmiş ve smear tabakasının çıkarılmasının tedavi başarısını artırdığı sonucu desteklenmiştir (47).

Endodontik tedavinin başarısı için restorasyon-diş arayüzündeki mikrosızıntıyı önleyen restoratif materyal kullanımı gerekmektedir (7). LSTR tekniği sonrası kompozit rezin restorasyon uygulanan bir araştırmada takipler sırasında görülen olumsuz sonuçlar restorasyonun başarısızlığı ile ilişkilendirilmiştir (47). Bu araştırma, restoratif başarısızlığın endodontik tedavilerin performansını etkileyebileceği bilindiğinden önemlidir (48). Ayrıca, süt dişlerini için tercih edilen restoratif materyal tipinin ve geçici - nihai restorasyon arasındaki sürenin LSTR tekniğinin başarısını etkilediğini bilinmektedir(49). LSTR tekniği sonrası restoratif materyal olarak paslanmaz çelik kronun tercih edildiği bir araştırmada klinik başarı yüksek bulunmuştur (21). LSTR tekniğinin klinik ve radyografik sonuçların dikkate alındığında, LSTR tekniği ile elde edilen radyografik başarı oranlarının klinik başarı oranlarından daha düşük görülmüştür. Bu durum, LSTR tekniğindeki başarısızlıkların çoğunlukla radyografik sonuçlar ile ilişkili olduğunu açıklamaktadır (49). Qadeer ve ark., pulpektomi ile karşılaştırıldığında LSTR ile tedavi edilen dişlerde periapikal radyolusensideki azalmanın istatistiksel olarak daha yüksek olduğunu bildirmişlerdir, ama bu sonuç çalışmanın 6 aylık kısa takip süresi nedeniyle dikkatle yorumlanmalıdır (50). Bu bilgiler ışığında, LSTR ile tedavi edilen hastaların radyografik takibi tedavini prognozu açısından oldukça önemli olduğu vurgulanmalıdır.

Sonuç

LSTR tekniği ile kök kanal sisteminin dezenfeksiyonu amacıyla üçlü bir antibiyotik karışımının uygun taşıyıcılarla uygulanması özellikle uzun süre ve hasta kooperasyonu gerektiren çocuk diş hekimliği alanı için alternatif bir biyolojik yaklaşım olarak düşünülebilir. Özellikle nekrotik süt molar dişlerinin tedavisinde davranış yönlendirme sorunları, sınırlı ağız açıklığı, kök kanal sisteminin karmaşıklığı nedeniyle çocuklarda semptomların giderilmesi için basit, zaman kazandıran, uygun maliyetli bir yöntemdir. Buna karşın bu tekniğin altta yatan kalıcı diş germine verebileceği hasar, çocuklarda büyüme ve gelişme üzerindeki etkisi, aynı anda sistemik antibiyotik kullanımının gerekliliği gibi konular ile ilgili etkiler belirsizdir. Bu nedenle, vaka seçimi ve daha etkin tedavi için gelecekte uzun vadeli çalışmalar önerilmektedir.

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A CURRENT PERSPECTIVE ON NOVEL METHODS FOR DETERMINING DENTAL AGE IN THE NEW GENERATION: A REVIEW

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Abstract

In forensic odontology, dental findings play a significant role in determining age and gender. Due to their anatomical structures and durability, teeth have a critical function in identification, even when exposed to mechanical, chemical, and physical effects. However, most of the estimated dental age determination methods are generally invasive, costly, and require procedures like tooth extraction. Additionally, misinterpretations can occur in 2-dimensional imaging due to distortions and magnifications. Recently, three-dimensional imaging technologies, especially Cone Beam Computed Tomography (CBCT), Computed Tomography (CT), and micro-CT, are being used to investigate the potential relationship between the volumetric data of the tooth and pulp and age. CBCT allows researchers to comprehensively evaluate pulp changes and explain the relationship between chronological age and pulp volume. With the 3D images obtained by CBCT, the volumetric measurements of the tooth and pulp can be objectively evaluated and can be used as a criterion for estimated dental age. This review aims to identify, investigate, and summarize the most reliable, practical, and accurate methods for age estimation based on current data and methods.

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Keywords: Age determination methods, forensic dentistry, cone beam computed tomography (CBCT).

Introduction

In forensic analyses, estimating age and gender holds critical importance for obtaining information about an individual's biological profile. Such estimates are a commonly utilized method in civil law and for immigrants with incomplete identity information. Similarly, in criminal law, age estimation is employed to determine whether an individual is an adult and, in this context, to establish criminal responsibility (1). In cases of suspicious death, infant mortality, and individuals with mental health issues, determining age may be mandatory. Moreover, in developing countries where population records are insufficient, accurately determining individuals' age bears significant importance (2). Forensic dentistry plays a critical role in identifying individuals whose identity cannot be determined and focuses on examining teeth to identify characteristics such as age, gender, and ethnic origin of living or deceased individuals. Teeth can contain essential information about an individual's identity. Dentists can play a crucial role in issues like medical malpractice, neglect, child abuse, and the use of dental records for diagnostic purposes (3). Teeth, due to their anatomical

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structures and robustness, resist mechanical, chemical, and physical factors, serving a critical function in identity determination (4). In the field of forensic dentistry, 2-dimensional radiographic techniques commonly used can result in errors such as magnification and distortion. Due to these issues, modern three-dimensional imaging methods like Cone Beam Computed Tomography (CBCT) have begun to be preferred for dental age estimations. CBCT allows for obtaining more detailed and clear images compared to traditional radiographic methods, which enables a more detailed evaluation of the morphological features of the teeth. Therefore, in forensic dentistry practice, CBCT is recognized as a prominent method for identity and age determination (5). Research on dental age determination using dental radiographic images demonstrates variability specific to community and individual. Radiological age determination studies vary among different populations. Moreover, 2-dimensional images tend to be insufficient in providing volumetric information about teeth, escalating the need for 3-dimensional imaging technologies. The 3-dimensional images obtained through CBCT can create objective age estimation criteria through tooth and pulp volume measurements. Therefore, the aim of this review is to investigate and summarize the applicability of determining the most reliable, practical, and accurate methods in age estimation.

Dental Age Estimation Methods

Dental age estimation is a method used in various fields. It is commonly used in areas related to maxillofacial growth, particularly in pedodontics and orthodontics. This method is carried out by comparing the radiographic developments of the teeth with a certain standard. These standards are determined as a result of studies conducted on many individuals and show how much tooth development has been completed according to a certain age. The development process of the teeth shows differences according to different age groups, and therefore dental age estimation is an important tool in determining age. Factors such as tooth eruption dates or the degree of tooth calcification are among the other methods used in dental age estimation. The accurate application of these methods can assist in obtaining accurate and definitive results in forensic medicine and other health fields (6). Methods used in estimating dental age are categorized into 4 classes: clinical, radiological, histological, and physical-chemical analysis methods. The clinical method relies on the current condition and visibility of the teeth in the mouth, while the radiological method determines the development stage of the teeth through radiographic examinations. The histological method involves examining tooth materials under a microscope and is frequently used, particularly in evaluating post-mortem cases. In the physical and chemical analysis method, age estimation is facilitated by evaluating changes in ion levels in the teeth. The effective utilization of these methods holds significant importance in forensic medicine practices and the field of forensic dentistry (7).

Panoramic radiographs, which are frequently used for dental age estimation, are widely utilized in determining dental age because they display all the teeth in a single image and are easily accessible. Particularly in children, panoramic radiographs are often preferred due to the difficulties and distortion risks of intraoral radiography (8).

Various methods are used for dental age estimation, and the most popular among them are radiographic methods. These include different techniques like Demirjian's(9), Willems's(10), and Cameriere's methods. Panoramic radiography is often preferred in children due to its accessibility and the ability to display all teeth in a single image. These methods are among the most reliable methods used in estimating dental age. However, each method has its own advantages and disadvantages, and the method to be preferred can vary depending on the dentist or specialist's experience (11, 12). In a review, an examination found that there is a high rate of variability in age estimation in forensic dentistry, suggesting that for a more reliable age estimate, several of all possible techniques should be used together (13).

Traditional 2-dimensional dental radiography techniques, although frequently used in dental practice, have given way to three-dimensional imaging systems, especially Cone Beam Computed Tomography (CBCT), with modern technological advancements. CBCT allows for a more detailed and 3-dimensional examination of the orofacial area and teeth (14).

Recently, with the widespread use of 3-dimensional images in clinical dental practice, the potential relationship between dental age and pulp volume is being investigated. Thanks to Cone Beam Computed Tomography (CBCT), 3-dimensional images of teeth can be obtained without magnification and distortion. CBCT

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is used as an important tool in providing objective data of pulp and tooth volume values for age estimation (15).

Methods of Estimating Dental Age Based on Pulp and Tooth Volume

Teeth undergo physiological processes that vary according to age. Another significant physiological change that occurs after root development is completed with age is the accumulation of secondary dentin. This situation leads to a reduction in the volume of the pulp chamber, which is a criterion used for calculating the estimated dental age. Additionally, the pulp may recede due to mechanical stimuli or aging. With aging, the decrease in the volumetric size of the pulp becomes more prominent due to the increase in collagen fibers (16, 17). Different methods can be used to examine the size of the pulp chamber with tooth sections or radiographs, and can be used in determining dental age. However, the drawback of radiographs is that they are 2-dimensional, preventing the simultaneous evaluation of mesio-distal and bucco-lingual dimensions (18). Among 2-dimensional techniques to measure the volume of the pulp chamber are periapical and panoramic radiographs, while 3-dimensional techniques include computer tomography, micro-CT, and CBCT (Cone Beam Computed Tomography). CBCT has advantages such as not causing magnification, providing more detailed information, having fewer artifacts, and having a lower radiation dose than CT (19). The advancement of technology has increased the demand for 3-dimensional volumetric measurements, enabling us to better understand the accumulation of secondary dentin in teeth. Researchers have published studies related to determining the estimated dental age by calculating tooth and pulp volume measurements using micro-CT and CBCT images (20).

In recent times, 3D imaging technologies, particularly CBCT, CT, and micro-CT, have been utilized to explore the potential relationship between the tooth and pulp volume ratio and age. It has been indicated that the pulp/tooth volume ratio of single-rooted teeth might be more suitable for the analysis of estimated dental age. Nonetheless, further studies are needed in this area, and regression formulas may yield different results due to the different geographic origins or age distributions of the population (21). Moreover, it has been reported that estimating age from the permanent 1st molars, which have multiple roots, could also be a valid option (22). Previous research demonstrates that the CBCT technique possesses sufficient accuracy to evaluate the anatomy of the pulp cavity of teeth and can be used as a non-invasive method since it does not require tooth extraction. CBCT is recognized as the method providing the most accurate and clear results for measuring tooth volume (23).

If examples from literature studies in this field are to be provided; Vandevoort et al., in 2004, developed a volumetric analysis software using micro-CT to estimate the pulp/tooth volume ratio of single-rooted teeth of different shapes, and based on the results of the research, its relationship with age has been defined and it has been suggested as a usable method in dental age calculation (24). Aboshi et al., have measured 40 mandibular premolar teeth in 4 segments as the crown of the tooth, and the cervical, middle, and apical thirds of the root, using data obtained from micro-CT images. According to the obtained pulp/tooth volume ratios, it has been reported that the correlation with age is stronger in the cervical region of the root compared to other segments and decreases towards the apex area (25). In the research conducted by Someda et al., volumes have been calculated by taking slices of 155 mandibular incisor teeth with micro-CT, and regression models have been created. The standard deviation has been determined as 10.26 years for men and 8.09 years for women, and it has been determined that the estimated dental age for women contains a higher accuracy rate compared to men. However, it has been emphasized that different equations need to be formed for both genders (26).

In Yang et al.'s research, a linear regression relationship between tooth-pulp volume ratios and chronological age was found, and the standard error between estimated dental age and chronological age was determined to be ±8.3 years (27).

In a study conducted by Star et al., in dental age estimations made with CBCT, the standard error rates for canine, incisor, and premolar teeth were determined to be 13.10 years, 12.86 years, and 8.44 years, respectively. In the same study, no significant difference was found between males and females in these estimates (28).

In another study, an estimated dental age model was created based on the pulp volumes of the upper and lower first molar teeth of Chinese individuals. The study found a logarithmic relationship between pulp volume and estimated dental age, and this relationship could vary depending on gender and tooth position (22).

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A meta-analysis has shown an inverse correlation between age and the volume of the pulp chamber with CBCT data. The mandibular first molar tooth has the strongest correlation, while the third molar tooth has the weakest. Additionally, this relationship is more pronounced in women than in men (29).

3D Software Programs Used for Dental Imaging and Evaluation

In addition to sectional and volumetric imaging techniques, 3D modeling software supports volume calculations. The boundaries of tissue can be determined manually through density differences, a process referred to as "segmentation." Segmentation involves grouping pixels and voxels. Volume measurements can be made manually, automatically, or semi-automatically based on grayscale differences (30, 31).

Cone beam computed tomography (CBCT) images are analyzed using specialized software. This software includes sectional imaging programs such as OnDemand3D (CyberMed, Seoul, Korea), InVivo-Dental (Anatomage, San Jose, Calif), Mimics Innovation Suite (Materialise, Leuven, Belgium), Dolphin3D (Dolphin Imaging & Management Solutions, Chatsworth, Calif), 3D Slicer (http://www.slicer.org), 3D Doctor (Able Software Corp, Lexington, MA, USA), ITK-SNAP (www.itksnap.org), I-Dixel (J. Morita Mfg. Corp), and MATLAB (The MathWorks, Inc., Natick, MA, USA). These programs, in addition to allowing for tooth and pulp volume measurements, facilitate 3D modeling processes. With the advancement of medical imaging techniques, when CBCT is used for tooth and pulp volume, a DICOM format has been established for data management. This format stores patient and device information, scanning details, and sectional data. A key feature of CBCT software is its ability to organize and rearrange the acquired data in DICOM format (32-34).

CONCLUSION

Evaluations conducted regarding dental age determination necessitate volumetric examinations to obtain the most objective result. Therefore, using cone beam computed tomography (CBCT) images, pulp and tooth volumes can be measured and an objective criterion can be established for dental age determination. With the widespread use of 3D images in clinical dental practice, it becomes evident that more research is needed to investigate the potential relationship between age and pulp volume and to contribute to developments in this field.

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Evaluation of the Relationship Between Oral and Dental Health and Dental Anxiety Levels in Children: A Review

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Abstract

Regular dental visits facilitate early diagnosis and treatment of oral and dental diseases. It has been shown that patients who regularly visit the dentist have a much healthier oral environment compared to those who do not visit regularly and only go to the dentist when necessary. Dental anxiety is a challenging situation for both the patient and the dentist. The patient's negative attitude towards treatment leads to avoidance of dental procedures. This is a significant barrier to carrying out necessary treatments at the right time and in an ideal manner. Our literature review concluded that children experiencing dental anxiety have worse oral and dental health compared to those who do not. Implementing correct behavioral guidance techniques to prevent dental anxiety will also positively contribute to the patient's oral and dental health.

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Keywords: Oral health, children, anxiety.

Introductıon

The Importance of Oral and Dental Health

Oral and dental health is known as one of the most crucial factors directly affecting an individual's overall health. Disorders in the oral region can restrict a person's life in every aspect, leading to a decline in quality of life (1). Problems affecting oral and dental health in children include dental caries, gum diseases, traumatic dental injuries, and oral pathologies arising from systemic diseases.

The primary factor in the deterioration of oral and dental health has been shown to be microbial dental plaque (2, 3). The attachment of microbial dental plaque, which has a complex content, to tooth surfaces and its failure to be effectively removed lead to the toxic products of the microorganisms in the plaque deteriorating oral health. Although microbial dental plaque is shown as the primary factor in the etiology of dental caries, it is mentioned that factors such as gender, age, ethnic origin, habits, systemic diseases, socioeconomic and cultural situations can also affect oral health status (4).

Definition of Dental Anxiety

Many children describe a visit to the dentist as stressful. Meeting unfamiliar adults and authorities, hearing strange noises, having to lie down, and fearing pain can all be stress-inducing for a child. Therefore, behavioral management problems and fear reactions are common in pediatric dental clinics. Dental anxiety is defined as the concern about horrific events occurring during dental treatment and the associated loss of control (5). The prevalence of dental fear, dental anxiety, and behavioral management problems varies in different populations but is estimated to affect 9% of children and adolescents worldwide (6). In a study investigating the level of dental anxiety in Turkish children, it was found that 30% of children aged 3-6 and 11% of children aged 7-12 had dental anxiety (7).

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Dental anxiety is expressed as a feeling of worry in the face of dental procedures, independent of any external stimulus (8). Dental anxiety, which can occur at any stage of life, usually first appears in early childhood and adolescence (9). This anxiety, starting in these periods, continues into adulthood, leading to avoidance of dental treatments and consequent deterioration in oral and dental health (10). It has been indicated in a study that individuals experiencing dental anxiety are less likely to attend dental check-ups, and are more likely to postpone or cancel appointments (11).

The Relationship Between Dental Anxiety Levels and Oral and Dental Health in Children

Patients with dental anxiety are unable to fully benefit from dental services due to their avoidance of treatment. Consequently, it is inevitable that anxious patients frequently experience dental problems. Their avoidance of dental treatments leads to poor oral hygiene. Knowing this creates feelings of shame, guilt, and inferiority complex in the person. An anxious individual with these feelings continues to avoid visiting the dentist, which in turn increases their dental anxiety, creating a vicious cycle (12). Additionally, there are studies indicating that dental anxiety affects the quality of life related to oral health (13).

Research in different populations shows that individuals with dental anxiety have difficulty going to the dentist (14). Regular dental visits facilitate early diagnosis and treatment of oral and dental diseases. It has been shown that patients who regularly visit the dentist have a much healthier oral environment compared to those who do not visit regularly and only go to the dentist when necessary (15).

Although there are few studies on the effects of dental anxiety on oral and dental health, the existing research indicates that individuals experiencing dental anxiety have worse oral and dental health conditions compared to those who do not experience such anxiety. It has been reported that these individuals have a higher number of decayed and missing teeth, and fewer restored teeth (11,16).

In one study, children with DMFS scores ≥ 2 showed a higher rate of dental anxiety compared to children with no cavities, and children with no previous dental treatment experience had 70% more dental fear (17). Another study indicated that children aged 5-12 with at least one active cavity experienced higher levels of dental anxiety compared to those without cavities (18).

Dental anxiety is seen as one of the reasons for the deterioration of oral and dental health in many societies. Peretz and Eftrat have noted that dental fear hinders the ideal execution of dental treatments and the dentist's ability to work comfortably (19,20). Dental fear and anxiety can be both a cause and a consequence of poor oral health (21). Anxious patients avoid dental procedures, negatively impacting their oral health. Knowing this leads to feelings of shame and guilt. An anxious individual with these feelings continues to avoid visiting the dentist, which in turn increases their dental anxiety, creating a vicious cycle (12).

Kruger et al. in their study reported that dental anxiety could be a significant risk factor for dental caries and poor oral health (16). In our country, a study by Oba et al. on children aged 7-11 showed a positive correlation between dental anxiety levels and dmft+DMFT scores (22). A study by Schuller et al. indicated that individuals with high levels of dental anxiety had more decayed and missing teeth and fewer filled teeth (11). Münevveroğlu et al. reported a similar relationship between children's dmft+DMFT scores and dental anxiety levels, showing that children who fear dental procedures more have worse oral health (23). In a study by Bedi et al., it was reported that children with high dental anxiety levels were 62% more likely to lose at least one tooth due to decay compared to those without dental anxiety. Furthermore, the number of fissure sealants and filled teeth in children experiencing dental anxiety was significantly lower compared to those without anxiety. This was thought to be associated with the behavior of individuals with dental anxiety to cancel, postpone dental appointments, or avoid dental procedures until experiencing severe pain (24). Similarly, a study in our country found that dmft+DMFT values were higher in patients with high dental anxiety, establishing a statistically significant relationship (25). However, there are also studies in the literature that argue there is no relationship between an individual's level of dental anxiety and their oral health status (26,27). A study by Taani et al. in Jordan showed no statistically significant relationship between a child's level of dental anxiety and their oral health status (26). Similarly, a study in Singapore highlighted that a child's level of dental anxiety could not be an indicator of their oral health status (27).

According to the results obtained from literature studies, it can be considered that the oral and dental health of a child experiencing dental anxiety may not be

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much worse than their peers in the early stages, but it can deteriorate over time due to their negative attitude towards dental procedures. Oral health will progressively worsen if necessary dental treatments are postponed or not performed due to anxiety.

It has been shown that a person with a high level of dental anxiety experiences a decline in the quality of life due to the negative impact on their oral and dental health. Therefore, especially in children, identifying and eliminating dental anxiety is of great importance in improving quality of life. Research indicates that if this condition is not prevented, it may be passed on to future generations.

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