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Case report

Full-mouth rehabilitation in a patient with multiple caries: A case report

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ABSTRACT

Background: *Full-mouth rehabilitation of multiple caries can improve the quality of life. The selection of appropriate restorations on caries and teeth that have undergone post-endodontic treatment is critical to treatment success and enhances the quality of life.* ***Purpose:*** *This case report presents a full-mouth rehabilitation of a patient with multiple caries.* ***Case:*** *A 30-year-old man complained of multiple caries and pain in the posterior mandibular tooth, especially when eating and drinking (cold and hot), which interfered with his activities. The clinical examination found caries in teeth 16, 22, 24, 25, 26, 27, 36, 37, and 38 and a retained root of tooth 46. The percussion and biting tests were negative, while the sensibility test was positive.* ***Case Management:*** *Severe caries found in tooth 37 was managed with endodontic treatment and an indirect onlay restoration with lithium disilicate-based material. The retained tooth of 46 was extracted and restored with a partial denture. The other teeth, 16, 22, 24, 25, 26, 27, 36, 37, and 38, were treated by direct composite restoration. Holistic treatment was performed on all the problem teeth to support oral hygiene and was followed by dental health education.* ***Conclusion:*** *Full-mouth rehabilitation is essential for oral hygiene and can improve the quality of life. Education on maintaining oral hygiene is a must for protecting oral health.*

Keywords: *full-mouth rehabilitation; holistic treatment; multiple caries; quality of life*
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INTRODUCTION

According to the World Health Organization,[1] health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity. Education on the benefits of medical, psychological, and related knowledge is essential to achieving complete health. Community opinion and cooperation are critical in improving public health.[1] For decades, the study of the relationship between dental and general health has been an area of interest. There are several complex relationships between dental and general health.[2,3] According to the FDI World Dental Federation,[4] oral health is multifaceted. It includes the ability to speak, smile, smell, taste, touch, chew, swallow, and convey emotions through facial expressions confidently and without pain, discomfort, or craniofacial disease. It reflects physiological, social, and psychological attributes critical to the quality of life and a person's experiences, perceptions, expectations, and ability to adapt to circumstances.[4] Oral health is affected by systemic disorders, either directly through pathological pathways or indirectly through behavioral changes caused by the disease or its treatment.[2,3]

Since dental caries is the most common illness worldwide, it is a significant health problem. Based on the Global Burden of Disease Study 2016,[5] dental and oral health problems, especially dental caries, affect nearly half the world's population (3.58 billion people). The Indonesia Basic Health Research in 2018 stated that the prevalence of caries in Indonesia is 88.8%.[6] Thus, proper treatment is broadly beneficial to society.[6] Despite being relatively preventable, the disease is frequently found in populations with poor socioeconomic status, and its frequency has not diminished noticeably during the past thirty years. Social, psychological, and behavioral factors also influence disease development.[7] The prognosis for dental caries depends on

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the patient's general health, ability to maintain good oral hygiene, and the extent of dental caries. To avoid affecting an individual's quality of life, dental issues that interfere with their activities must be treated immediately.[7]

Recent studies have documented a "double burden of malnutrition": persistent undernutrition in rural regions and increasing overweight or obesity in urban areas.[8] Like dental caries, malnutrition has a multifactorial etiology, with diet as a common risk factor. The quality of life is known to be impacted by both. Untreated dental caries could affect someone's capacity to eat, preventing an appropriate intake of nutrients. The consequences of dental caries can influence the quality of life and a child's growth.[9–11]

Treatment plans can be divided into endodontic, periodontal, and restorative categories.[12,13] The first thing to be done in the patient interview is to assess the patient's chief complaint and the expected treatment outcome. A list of diagnoses is created based on the patient's chief complaints and the clinical examination results. Success rates and medical and dental history documentation need to be evaluated. Planning clinical procedures is essential, as errors in treatment planning and execution result in less-than-ideal outcomes. Patient goals and concerns should be the initial guiding principles in modern dentistry.[12,13]

Management of problems in the oral cavity can be done with prevention and curative treatment. The etiology of the disease must be resolved so that the problem does not recur, and it depends on individual circumstances. One of the methods to control and manage risk factors from a prevention perspective is through health promotion. Health promotion aims to lower risk through thoughtful policies and actions focusing on the broader health determinants. The most inventive way to improve oral health and quality of life is through health promotion in the environments where people live, work, learn, and play.[14]

Full mouth rehabilitation of multiple dental caries can improve the quality of life. Dental caries treatment primarily involves removing decayed tooth structure and restoring the tooth with biocompatible materials. Full mouth rehabilitation requires procedures to produce a healthy, aesthetic, well-functioning, self-maintaining masticatory mechanism.[15] Dentistry has evolved from treating oral pain and disease to improving aesthetics and appearance to enhance someone's attractiveness.[16] This case report presents a patient with multiple caries in whom full mouth rehabilitation was done to improve his quality of life.

CASE

A 30-year-old male patient presented to the Dental Hospital, Faculty of Dentistry, Universitas Padjadjaran, with the chief complaint of multiple carious lesions in his mouth and pain in the posterior mandibular region, particularly during the consumption of hot and cold foods and beverages, which interfered with daily activities. The pain was spontaneous but could be alleviated by analgesics. The affected tooth had not previously been treated. The patient reported no history of systemic disease or allergies.

Initial intraoral examination revealed debris and calculus on the upper and lower jaws, multiple carious lesions in teeth 16, 22, 24, 25, 26, 27, 36, 37, and 38, and a retained root in tooth 46. The patient's primary complaint centered around tooth 37, where clinical examination identified caries in the disto-occlusal region. Tooth 38 was observed to be impacted (Figure 1). Due to the recurrent pain significantly affecting his ability to work, the patient wanted immediate dental treatment.

Figure 1. Intra-oral photograph at the initial examination. (A) dextra posterior side; (B) anterior side; (C) sinistra posterior side; (D) maxillary occlusal view and (E) mandibular occlusal view. The carious lesions were seen in multiple anterior and posterior maxillary and mandibular teeth (*), and the retained root was seen on tooth 46 (**).

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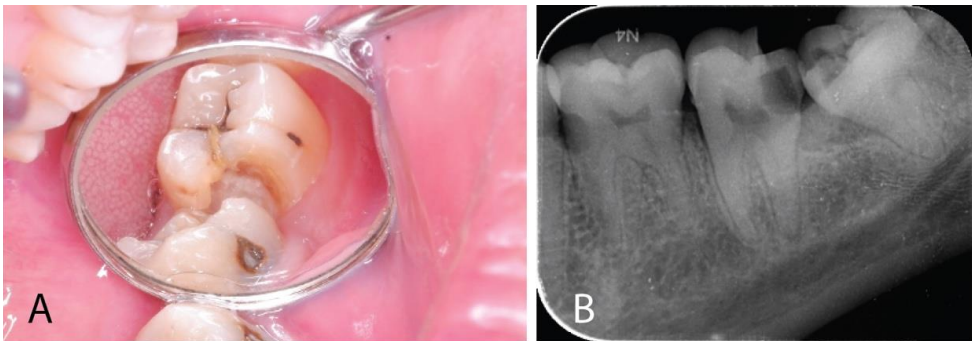

Figure 2. (A) A photograph of tooth 37 before treatment showed distal caries, and (B) periapical X-ray confirmed caries, seen as a radiolucency on the distal side of tooth 37 and an impacted tooth 38.

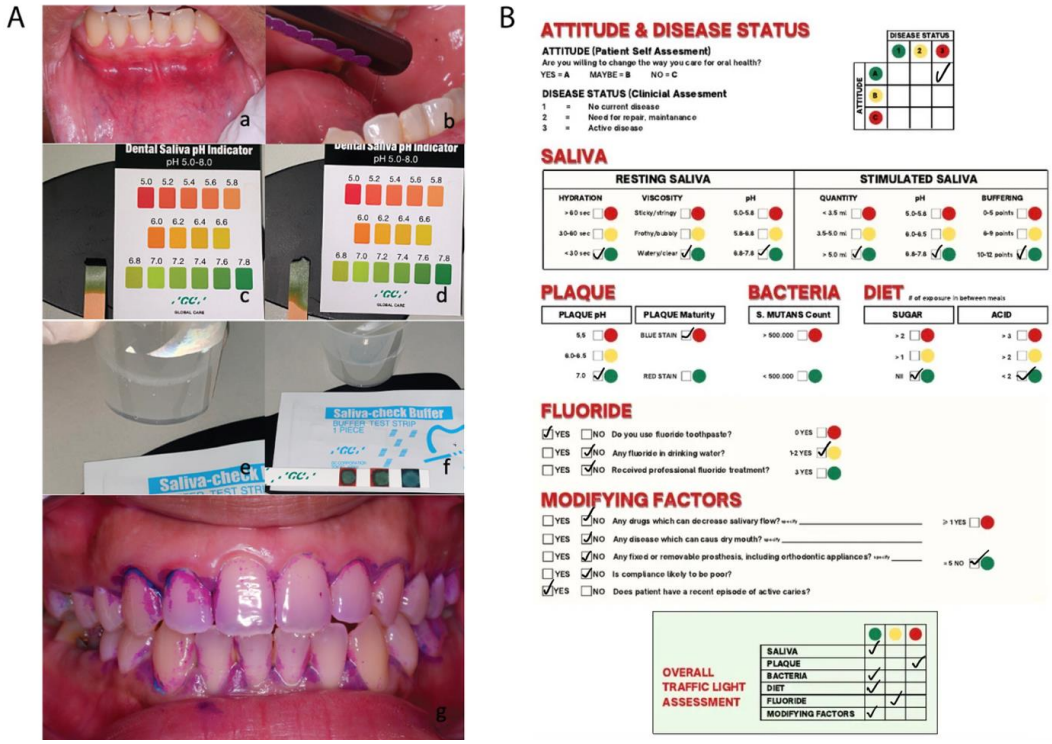

Figure 3. Traffic-light-matrix procedure step by step. The application of the plaque-disclosing gel showed a pink-red stain in almost all teeth, indicating high plaque formation (A). The overall assessment of oral health is seen in B.

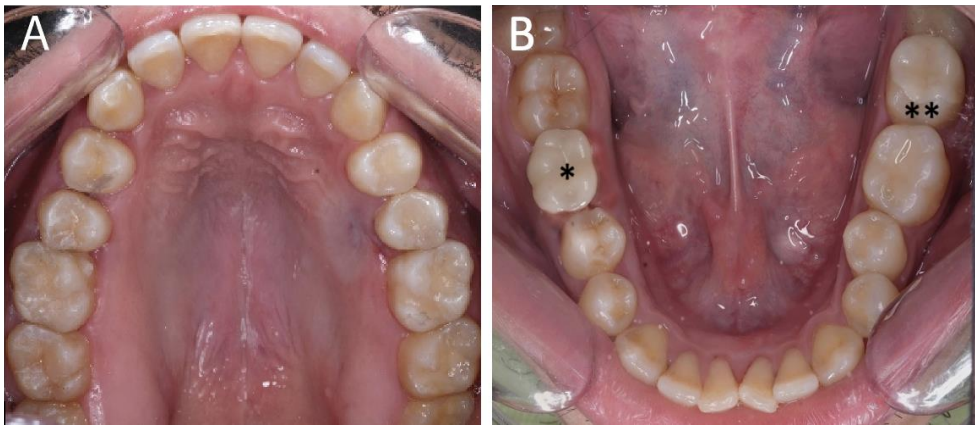

Figure 4. The result of full mouth rehabilitation. (A) maxillary occlusal view and (B) mandibular occlusal view. Note the removable denture for tooth 46 (*) and the onlay lithium disilicate-based material on tooth 37 (**).

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CASE MANAGEMENT

In this patient, a comprehensive full-mouth rehabilitation was undertaken, addressing dental caries and gingival and periodontal issues. The initial treatment prioritized the patient's chief complaint, which centered on the most extensive and painful carious lesion in tooth 37. Clinical examination revealed disto-occlusal caries in tooth 37, with negative findings on percussion, palpation, and biting tests, grade 1 mobility, and a positive response to thermal testing (Figure 2A). A periapical X-ray exhibited a radiolucent image extending from the disto-occlusal region to the dental pulp, characterized by an enlarged periodontal space, disrupted lamina dura, and decreased alveolar bone crest (Figure 2B). The clinical examination and periapical X-ray findings established the diagnosis as symptomatic irreversible pulpitis with asymptomatic apical periodontitis. The treatment approach involved non-surgical endodontic therapy. The patient was counseled about the treatment plan. He agreed and signed the informed consent.

The endodontic treatment began with aseptic procedures and the administration of anesthesia for patient comfort. A rubber dam was placed meticulously to ensure optimal isolation of the treatment area. During the initial visit, cleaning and shaping were done using rotary instruments, followed by intracanal medication with calcium hydroxide.

The patient reported no discomfort during a subsequent visit, and a Traffic Light Matrix (TLM) assessment was done for caries risk within the patient's oral cavity. The TLM assessment encompasses various parameters. Resting saliva analysis indicated high hydration (less than 30 seconds), with normal saliva viscosity characterized by a watery and clear appearance (Figure 3A a and b). Resting saliva exhibited a pH level of 7.6 (Figure 3A c), while stimulated saliva showed a pH level of 7.4 (Figure 3A d). The quantity of stimulated saliva exceeded 5 mL at the 5-minute mark (Figure 3A e). Normal saliva buffering ability was confirmed, achieving a cumulative score of 11 points (Figure 3A f). Application of plaque-disclosing gel revealed predominantly pink plaque, indicating fresh plaque, with sporadic blue sections indicating mature plaque (Figure 3A g). There was plaque and calculus on the upper and lower jaws.

The patient reported sugar and acid exposure between meals once a day, daily coffee consumption, and twice-daily fluoride exposure through toothpaste. Threshold values for the collected data were denoted using a traffic-light-color code (red-high, yellow-medium, and green-low) to convey varying levels of risk. The result was green, indicating a low risk of caries (Figure 3B).

Plaque and calculus were removed with scaling, and root planning was done to improve oral hygiene. At the third visit, the treatment on tooth 37 was continued with obturation using AH Plus Bioceramic Sealer and post-endodontic onlay restorations with lithium disilicate-based material.

The carious lesions in teeth 16, 22, 24, 25, 26, 27, and 38 were diagnosed as reversible pulpitis with normal apical tissue. These lesions were successfully managed with direct composite restorations using an incremental technique. The intervention was done promptly to halt the progression of caries and prevent further disruptive complaints. The retained root in tooth 46 was diagnosed as pulp necrosis with asymptomatic apical periodontitis, and tooth extraction was performed, followed by the placement of a Valplast partial removable denture to restore function and aesthetics. The final treatment outcomes are depicted in Figure 4. After completing the treatment, the patient received dental health education to promote oral health maintenance and better dental hygiene practices to minimize the risk of recurrent dental caries.

DISCUSSION

Oral health affects general health and influences a person's quality of life. Thus, if oral health problems interfere with activities, they must be treated immediately. The chief complaints are significant in a dentist-patient relationship. When a patient comes with a complaint, the dentist should be able to get as much information as possible and also discuss the treatment plan.[12]

The examination must focus on reaching a correct diagnosis, and this includes the chief complaints, medical history, dental history, objective assessment such as general condition, vital signs, extraoral examination, intraoral examination, and aesthetic evaluation, and supporting investigations such as periapical or panoramic X-rays and caries risk evaluation.[17]

Dental caries is best described as a chronic multifactorial lifestyle disease where a patient's commitment to medical advice on nutrition, lifestyle, and oral care practices is essential. Severe dental caries can impact general health through a range of mechanisms. Tooth loss can affect masticatory function, affecting food selection and nutrition changes. Dental pain can cause significant morbidity and alterations in lifestyle as certain types of foods and mandibular movements may be avoided. It may also disrupt sleep and affect work performance.[18] All dentists should incorporate caries risk assessment into their clinical practice and use risk-based caries management protocols to make diagnostic, preventive, and restorative recommendations for their patients.[17]

TLM inspection in this patient showed green indicators in most examinations, which meant the patient had a low caries risk. However, the intra-oral evaluation indicated multiple caries in his mouth.[18] However, the plaque maturity check using the tri-plaque ID gel showed blue/purple plaque areas, indicating thick plaque deposits. These areas had not been cleaned for more than 48 hours, and a complex biofilm had developed.

Dental plaque is a structurally and functionally organized biofilm. Plaque forms in an ordered way and

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has a diverse microbial composition that, in health, remains relatively stable over time (microbial homeostasis). There is a shift toward community dominance in dental caries by acidogenic and acid-tolerating species such as mutans streptococci and lactobacilli. However, other species with relevant traits may be involved. Strategies to control caries could include inhibition of biofilm development (e.g., prevention of attachment of cariogenic bacteria, manipulation of cell-signaling mechanisms, and delivery of effective antimicrobials), or enhancement of host defenses.[19]

Dental biofilm is the primary etiology for dental caries, gingivitis, and periodontitis.[20] Mechanical removal of dental biofilm by regular brushing, flossing, and chemical cleaning with antimicrobial mouthwash can prevent caries formation. These procedures are fundamental for controlling dental biofilms because they can be applied without surgical intervention.[20,21] However, adequate cleaning of hard-to-reach areas and the gingival margin is difficult even in well-trained patients. Brushing and interdental cleaning is especially difficult for elderly patients with physical or mental limitations, malposed or isolated teeth, bridgework, or orthodontic appliances. Flossing and interdental brushing have been considered essential to oral health. Systematic reviews and meta-analyses suggest that flossing and tooth brushing may be associated with a slight reduction in dental biofilm.[20]

In addition to the factors in the TLM assessment, tooth anatomy is one of the causes of caries. The first place to develop caries on a permanent tooth is the occlusal portion of the first permanent molar. In addition, proximally touching surfaces between two adjacent teeth are more likely to develop caries. Partially erupted teeth may also provide a more hospitable environment for bacterial accumulation than fully erupted teeth. Partially erupted teeth not participating in mastication are also susceptible to caries. Bacterial biofilms on the teeth usually create a high-risk environment for caries.[22] Understanding dental anatomy is essential to guide preventive treatments and oral health hygiene.[22]

Restorations are not the "ultimate solution" to cavities; clinicians should approach the problem from a biological perspective. This outlook prevents restoration failure due to repeated caries cycles.[23] In addition to curative treatment to stop disease progression, the primary etiology of oral problems must also be treated. One of the preventive actions that can be taken is to apply fissure sealants on teeth with a deep pit and fissure anatomy so that they do not develop active caries. Routine examination every six months is one of the crucial factors in early detection of caries in the oral cavity, and prevention can be performed immediately.[18]

For patient comfort, the first visit with our patient started with aseptic measures and local anesthesia in tooth 37. Next, a rubber dam was placed to isolate the work area. Endodontic treatment began with creating access on tooth 37, followed by pulp extirpation, cleaning, and shaping. During the cleaning and shaping process, optimal root canal irrigation was carried out using 2.5% sodium hypochlorite, the ionization of which produces hypochlorous acid and hypochlorite ions with antimicrobial activity. The intracanal medication used was calcium hydroxide, which optimally provides a highly alkaline environment with a pH value of 12, has anti-inflammatory actions, neutralizes acid and exotoxin, and induces cell differentiation, ultimately leading to periapical healing.[24,25] When the patient no longer complained, the root canal was obturated with an AH Plus Bioceramic Sealer. After the endodontic restoration, a definitive onlay restoration was done using lithium disilicate material. After resolving the chief complaint, a holistic treatment to improve oral hygiene was implemented.

Caries in other teeth with no complaints were also treated immediately, so the development did not reach the pulp. Teeth 16, 22, 24, 25, 26, 27, and 38 were treated with direct composite restoration to remove carious tissue and preserve the remaining tooth. When treating dental caries, dentists should take a conservative approach. To optimize patient outcomes, professionals from other dental disciplines should quickly identify early carious lesions and make the necessary referrals.[26]

Dental caries that are not adequately treated will progress into the pulp and damage the tooth structure, as in tooth 46, where the tooth's root was involved. The remaining teeth must be extracted and replaced with a fabricated denture because, in principle, the adjacent teeth will move to the edentulous ridge. Dentures should be put in place immediately to prevent harming the proper positioning and balance of the teeth in the oral cavity. The majority of patients who come to the dentist have a chief complaint. The chief complaint should be treated immediately, and the dentist should be able to obtain precise information to plan treatment. Full mouth reconstruction consists of therapies that will improve the state of health and the condition of the supporting structures by improving tooth relationships. Equalization of the forces acting on the supporting structures is the fundamental goal of all oral rehabilitation techniques, even though they are all performed on dental units.[15]

Even though the aesthetic results obtained may not meet the highest standards of dental perfection, it is a valuable method of protecting teeth from future loss of tooth structure. It improves the patient's perception of aesthetics and fits in with the concept of the pragmatic aesthetic.[16]

The oral cavity's overall health condition was finally evaluated. After completing all treatments, the patient was instructed to maintain his oral health daily. Oral health is maintained if the person has a strong desire and carries it out with a sense of responsibility. Full-mouth rehabilitation in patients with multiple caries must be carried out holistically and continuously with a sense of responsibility. A pleasant smile is one of the best characteristics of human nature and can create an aura that enhances the beauty of the face. A healthy oral cavity affects physical and mental health, making people feel confident and more productive.

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The main complaint was successfully resolved with pain management so that the patient felt comfortable during treatment. After all the complaints in the oral cavity are resolved, the teeth can function adequately to produce a healthy, aesthetic, well-functioning, self-maintaining masticatory mechanism. A healthy oral cavity creates a healthy body, improving the quality of life.

REFERENCES

1. World Health Organization. Basic documents. 49th ed. Geneva: World Health Organization; 2020.
2. Sabbah W, Folayan MO, El Tantawi M. The link between oral and general health. Int J Dent. 2019; 2019: 1–2.
3. Dörfer C, Benz C, Aida J, Campard G. The relationship of oral health with general health and NCDs: a brief review. Int Dent J. 2017; 67(Suppl 2): 14–8.
4. Glick M, Williams DM, Kleinman D V, Vujicic M, Watt RG, Weyant RJ. A new definition for oral health developed by the FDI World Dental Federation opens the door to a universal definition of oral health. Am J Orthod Dentofac Orthop. 2017; 151(2): 229–31.
5. Dye BA. The Global Burden of Oral Disease: Research and public health significance. J Dent Res. 2017; 96(4): 361–3.
6. Badan Penelitian dan Pengembangan Kesehatan. Riskesdas 2018. Laporan Nasional Riskesdas 2018. Jakarta: Kementerian Kesehatan Republik Indonesia; 2018. p. 582.
7. Schwendicke F, Dörfer CE, Schlattmann P, Page LF, Thomson WM, Paris S. Socioeconomic inequality and caries: A systematic review and meta-analysis. J Dent Res. 2015; 94(1): 10–8.
8. Popkin BM, Corvalan C, Grummer-Strawn LM. Dynamics of the double burden of malnutrition and the changing nutrition reality. Lancet. 2020; 395(10217): 65–74.
9. Mishu MP, Hobdell M, Khan MH, Hubbard RM, Sabbah W. Relationship between untreated dental caries and weight and height of 6- to 12-year-old primary school children in Bangladesh. Int J Dent. 2013; 2013: 1–5.
10. Chakravathy KP, Thippeswamy HM, Kumar N, Chenna D. Relationship of body mass index and dental caries with oral health related quality of life among adolescents of Udupi district, South India. Eur Arch Paediatr Dent. 2013; 14(3): 155–9.
11. Singh S, Talmale P. Impact of dental caries and nutritional status on oral health related quality of life in young Indian adolescents. J Oral Biol Craniofacial Res. 2023; 13(4): 506–10.
12. Rahmatillah R, Erlita I, Maglenda B. Effect of different final irrigation solutions on push-out bond strength of root canal filling material. Dent J. 2020; 53(4): 181–6.
13. Peeters HH, Judith ET, Suardita K, Mooduto L. Visualization of bubbles generation of electrical-driven EndoActivator tips during solutions activation in a root canal model and a modified extracted tooth: A pilot study. Dent J. 2022; 55(2): 71–5.
14. Petersen PE. Improvement of global oral health--the leadership role of the World Health Organization. Community Dent Health. 2010; 27(4): 194–8.
15. Kaur M, Singh H, Dhillon JS. Full mouth rehabilitation : A smooth pathway for complex journey innovative management of anxious dental patients view project. Cent India J Dent Sci. 2016; 7(3): 14–20.
16. Padmanabha PS, Arul PT, Geeta IB. Full mouth rehabilitation of adult rampant caries with pragmatic approach. J Oper Dent Endod. 2017; 2(2): 88–92.
17. Alghamdi N. Endodontic management of type I maxillary first molar with two palatal roots using cone-beam computed tomography. Dent J. 2024; 57(1): 1–3.
18. Abiddinda, Agustin WS, Rinastiti M, Ratih DN. Management missed canal tooth and broken file using ultrasonic instrument. Dent J. 2023; 56(4): 255–60.
19. Marsh PD. Dental plaque as a biofilm and a microbial community – implications for health and disease. BMC Oral Health. 2006; 6(S1): S14.
20. Takenaka S, Ohsumi T, Noiri Y. Evidence-based strategy for dental biofilms: Current evidence of mouthwashes on dental biofilm and gingivitis. Jpn Dent Sci Rev. 2019; 55(1): 33–40.
21. Ray RR. Dental biofilm: Risks, diagnostics and management. Biocatal Agric Biotechnol. 2022; 43(11): 102381.
22. de Paiva MAA, Leite DFBM, Farias IAP, Costa A de PC, Sampaio FC. Dental anatomical features and caries: A relationship to be investigated. In: Dental Anatomy. IntechOpen; 2018.
23. Walsh L, Brostek A. Minimum intervention dentistry principles and objectives. Aust Dent J. 2013; 58(S1): 3–16.
24. Berman LH, Hargreaves KM. Cohen's pathways of the pulp. 12th ed. Elseiver; 2020. p. 992.
25. Pribadi N, Sukaton S, Sampoerno G, Sylvia S, Kurniawan HJ, Safitri M, Mustika R. The aesthetic management of a midline diastema with direct composite using digital smile design, putty index and button shade technique: A case report. Dent J. 2022; 55(1): 44–8.
26. Innes NPT, Frencken JE, Bjørndal L, Maltz M, Manton DJ, Ricketts D, Van Landuyt K, Banerjee A, Campus G, Doméjean S, Fontana M, Leal S, Lo E, Machiulskiene V, Schulte A, Splieth C, Zandona A, Schwendicke F. Managing carious lesions: Consensus recommendations on terminology. Adv Dent Res. 2016; 28(2): 49–57.

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