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CASE REPORT

Root Canal Treatment and Esthetic Rehabilitation of Maxillary Central Incisor with Inclination Correction : A Case Report

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ABSTRACT

Introduction: The permanent maxillary central incisor is an anterior tooth with a high risk of developing cavities. If left untreated, cavities can progress to pulp and periodontal diseases, which are indications for endodontic treatment, specifically root canal treatment (RCT). In cases where extensive damage occurs after RCT, a full crown is needed to ensure restoration durability and aesthetics. This can be achieved using a fiber post and a porcelain-fused-to-metal (PFM) crown.
Objective: to describe the root canal treatment and PFM crown restoration of tooth 21 with inclination correction to restore proper tooth function and achieve optimal aesthetics
Case: A 48-year-old female patient visited RSGMP UNIMUS, complaining of a cavity in her upper left front tooth. The diagnosis for tooth 21 was Acute Apical Endodontitis (AAE) with pulp necrosis and normal apical tissue. The planned treatment included root canal treatment followed by PFM crown restoration with fiber-reinforced composite (FRC) post support.
Outcome: The treatment results showed that the tooth functioned well and achieved good aesthetics.
Conclusion: Root canal treatment and PFM crown restoration of tooth 21 with inclination correction showed a high success rate. The patient reported no complaints, the PFM crown remained intact without discoloration, adapted well to the surrounding tissues, had a negative palpation test, and showed no signs of traumatic occlusion.

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INTRODUCTION

Dental abnormalities or damage are common due to a lack of public awareness about the importance of dental health and care. When abnormalities or damage occur in the anterior teeth, such as cavities in the central incisors, they can affect a person's aesthetics and self-confidence.[1] The permanent maxillary central incisors are the first teeth in the upper jaw, located on either side of the facial midline. These teeth are highly susceptible to caries, fractures, and other types of damage. One of the main causes of anterior tooth caries is dental crowding or malpositioned teeth.[2]

If left untreated, caries can progress to pulp and periodontal disease, eventually leading to periapical disease. Teeth with pulp and periodontal disease are indications for endodontic treatment, specifically root canal treatment (RCT).[3] RCT involves removing the vital or necrotic pulp from the root canal and replacing it with a filling material. This treatment aims to preserve the tooth for as long as possible in the oral cavity through three main stages, known as the Endodontic Triad: biomechanical preparation, sterilization, and hermetic root canal filling. These three steps play a crucial role in the success of root canal treatment.[4]

Post-endodontic restoration is essential to restore the tooth's aesthetic function and ensure the success of the root canal treatment.[5] The selection of post-endodontic restoration should consider its indications and the support from the remaining tooth structure and surrounding tissues. In cases where extensive damage occurs after root canal treatment, a full crown is often necessary to ensure restoration durability and aesthetics.[6] A fiber post and a porcelain-fused-to-metal (PFM) crown are among the restorative options used to reconstruct the aesthetics and structural integrity of teeth affected by severe caries, fractures, or wear due to aging.[7]

In dentistry, aesthetics aim to create beauty and attractiveness, boosting the patient's self-esteem and satisfaction with an essential part of their body, allowing them to feel expressive and socially valued. The condition of the teeth, especially the anterior teeth, plays a significant role in facial aesthetics.[8] If the alignment or condition of the anterior teeth is poor or irregular, facial attractiveness may also be compromised. The angulation of the central incisor crown determines the mesiodistal space it occupies, significantly influencing anterior aesthetics and posterior occlusion. The inclination of the maxillary and mandibular anterior crowns also has a significant impact on overbite and overjet.[9]

In cases of tooth malposition, clinical challenges that can arise include periodontal tissue damage, abnormal function, poor chewing, and excessive pressure on the gingiva.[10] With the loss of almost the entire tooth crown, it is very unlikely that this anterior tooth malposition can be corrected using fixed orthodontics. In the field of conservation science, the usual treatment is root canal treatment and replacement of the remaining healthy tissue with an artificial tooth crown made of all porcelain or PFM. This procedure involves changing the visual position of teeth without moving their roots (unlike orthodontics).

This case report aims to describe the root canal treatment and PFM crown restoration of tooth 21 with inclination correction to restore proper tooth function and achieve optimal aesthetics.

CASE

A 48-year-old female patient visited RSGMP UNIMUS, complaining of a cavity in her upper left front tooth. She had been experiencing this issue for the past two years. Initially, the tooth only appeared brownish, but over time, it became fragile and gradually broke apart. The condition worsened when the patient was on complete bed rest for six months due to a hot water burn, leading to infrequent tooth brushing. The cavity grew larger when she bit into hard food. However, she never felt pain or sensitivity in the affected tooth and had never sought treatment before. The patient felt self-conscious about her tooth's condition and wished to have it treated.

The patient's general health was good. Probing (-): No tactile response, Percussion (-): No abnormalities in the periodontal or periapical tissues, Palpation (-): No soft tissue fluctuation, Cold vitality test (CE) (-): No response to cold stimuli, Mobility (0º): No looseness detected. Extraoral examination showed no abnormalities. Intraoral examination revealed caries extending from the mesio-incisal area into the pulp chamber of tooth 21 (Figure 1). Clinical examination showed:.

Figure 1. Intraoral photo of tooth 21.

A periapical radiographic examination showed a radiolucent area on the mesio-incisal part extending into the pulp chamber. The image displayed one root, a single straight root canal, a normal periodontal ligament, a normal lamina dura, and normal alveolar bone and periapical structures (Figure 2). Based on the patient's history, clinical examination, and supporting tests, the diagnosis according to the American Association of Endodontists (AAE) for tooth 21 was Pulp Necrosis with normal apical tissue.

Figure 2. Periapical radiograph of tooth 21.

The planned treatment included root canal treatment followed by a Porcelain-Fused-to-Metal (PFM) crown restoration with Fiber Reinforced Composite (FRC) post support. The prognosis for this case was favorable. The stepback technique was chosen for root canal preparation. The advantages of this technique include more effective root canal cleaning, easier obturation, and a denser filling because the spreader can reach close to the apex, thus reducing apical leakage. The use of a fiber post in tooth 21 after RCT is based on the remaining hard tooth tissue, the diameter of the root canal in the cervical region, the length of the root still held by the alveolar bone, and as a support for the final restoration. The post length must leave a 4 mm apical seal to prevent apical leakage. Furthermore, the post length must be equal to the clinical or anatomical crown length, or 2/3 of the root length.

CASE MANAGEMENT

During the first visit, a subjective and objective examination was conducted, along with clinical photography and an explanation of informed consent for the planned procedure. The root canal treatment (Figure 3) began with isolation of the working area, followed by caries removal starting from the mesial side using a diamond round bur until all carious tissue was cleaned. An access opening was then performed using an endo-access bur from the incisal side

of tooth 21, perpendicular to the tooth's long axis, until the pulp chamber roof was perforated. Once the pulp chamber was open, exploration or negotiation was carried out using a #15 K-file to locate the root canal entrance via the orifice. If resistance was encountered during exploration, further instrumentation was halted. Pulp debridement was performed using a barbed broach with a pre-set rubber stop, inserted two-thirds into the root canal length, rotated 180º clockwise, and then pulled coronally. This step was repeated until all pulp tissue was removed. The canal was irrigated with 2.5% NaOCl solution and saline solution, then dried using paper points.

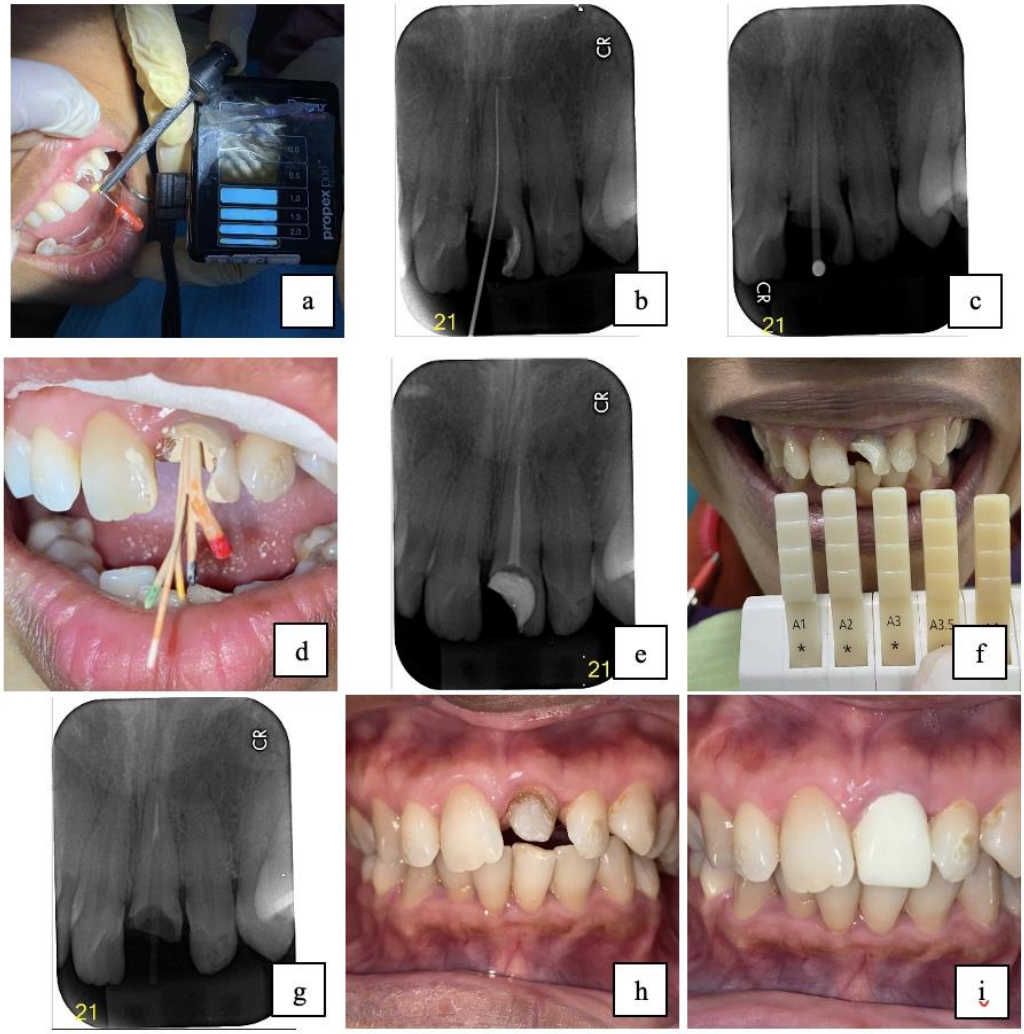

Figure 3. (a) Working length measurement using an apex locator, (b) Initial apical file (IAF) radiograph, (c) Trial of ProTaper gutta-percha, (d) Root canal obturation, (e) Radiographic result of root canal obturation, (f) Shade selection for the jacket crown, (g) Radiographic result of gutta-percha reduction and fiber post try-in, (h) Core build-up, (i) Placement of the temporary crown.

The Initial Apical File (IAF) was determined as the largest file that could fit the canal up to the working length. The IAF was identified by gradually increasing the file size until a tug-back or resistance was felt at the apical constriction (1/3 apical). In this case, #25 K-file

was determined as the IAF. Working length measurement was performed using: Direct radiographic observation: The radiographic tooth length minus 1 mm (23 mm – 1 mm = 22 mm). Apex Locator using #25 K-file, which indicated a 21 mm working length. A periapical radiograph was then taken. The orifice was sealed with eugenol-soaked cotton, followed by a temporary filling with zinc phosphate cement.

During the second visit, biomechanical preparation was performed using the Step-back technique. Preparation began with the initial IAF (K-file #25) at 20 mm working length, using a quarter to half clockwise rotation and pull-stroke movement. For apical preparation, the following files were used: K-file #25, #30, #35, and #40, Irrigation was performed after each file change using 17% EDTA, 0.9% NaCl, and 2.5% NaOCl. For body canal preparation, the Master Apical File (MAF) was selected as four sizes larger than the IAF: K-file #45, #50, #55, and #60, The working length was reduced by 1 mm with each file change. Irrigation and recapitulation with previous file sizes were performed after each step. After root canal preparation, the canal walls were smoothed to form a tapered funnel shape using an H-file (Hedstrom file), two sizes larger than the final K-file used. In this case, an H-file #45 was used at an initial 20 mm working length. Final irrigation was performed with 0.9% NaCl, and the canal was dried with paper points. Next, intracanal medication was applied using calcium hydroxide (CaOH) powder and liquid (glycerin), mixed into a paste and applied to the canal walls using a lentulo spiral. The cavity was sealed with cotton and temporarily filled with zinc phosphate cement. The medication was observed for 10–14 days.

During the third visit, a gutta-percha trial fitting was performed using F2 protaper gutta-percha at a 20 mm working length. The gutta-percha was marked at the confirmed working length, and a periapical radiograph was taken. The root canal was obturated using the lateral condensation technique: Isolation of the working area was maintained. The root canal, primary gutta-percha, and accessory gutta-percha cones were coated with sealer (Endomethasone + Eugenol) using a lentulo spiral. The F2 primary gutta-percha cone was inserted into the root canal up to the working length. Lateral condensation was performed using a spreader to compact the filling material. The remaining space was filled with accessory gutta-percha cones (#40, #35, #20, and #15) until the canal was densely packed. Excess gutta-percha was cut 2 mm below the orifice using a heated plugger. The orifice was sealed with 1 mm of GIC lining, followed by a temporary filling with zinc phosphate cement.

A post-obturation check-up was conducted. First, the jacket crown shade selection was performed using the Vitapan Shade Guide, with A2 being the shade chosen by the operator and approved by the patient. A bite record was then created using a sheet of red wax, which the

patient bit into during centric occlusion. A study model impression was taken before crown preparation. A periapical radiograph was then taken to assess the root canal obturation, which showed a hermetic root canal filling.

The crown preparation was carried out. First, isolation was performed, followed by gingival cord placement. Proximal preparation was started using a long thin tapered bur, placed between the contact points of the tooth, parallel to the tooth axis, with the bur tip positioned at the gingival crest (1–1.5 mm). Labial preparation was done by creating three depth grooves (mesial, middle, and distal) using a tapered bur (±1.25 mm) at a 0.5 mm distance from the cervical margin. The grooves were then prepared using a round-end tapered bur (±1.25 mm) along the tooth axis, forming a chamfer finishing line. Incisal preparation was performed using a flat-end tapered bur, ensuring that the tooth no longer contacted its antagonist. Palatal preparation was done using a tapered bur (±1 mm) while maintaining anatomical contours. The final cervical preparation and finishing line were completed with a round-end tapered bur, ensuring a chamfer finishing line. A temporary crown was then fabricated and cemented using zinc phosphate cement.

On the sixth visit, gutta-percha reduction was performed. The operator calculated the post length, which is the initial working length (WL) or endo WL, leaving 4 mm of gutta-percha. Thus, the post length (PL) = WL (after preparation) – 4 mm (15 mm – 4 mm = 11 mm). The obtained post length was 11 mm. The operator isolated the working area, then proceeded with gutta-percha reduction using Gates Glidden drills (GGD) no. 1-3 according to the post length (11 mm), marked with a rubber stop. After each GGD change, irrigation with 0.9% NaCl was performed and dried with paper points. Next, the root canal was widened using Peeso reamers, starting one size below the GGD, i.e., no. 2-3, with a post length of 11 mm marked with a rubber stop. Irrigation with 0.9% NaCl was repeated and dried with paper points. Subsequently, the appropriate post size matching the root canal diameter was determined, and the post was tried in the root canal. A periapical radiograph was taken to assess the fit of the post within the root canal. The selected post was a no. 1 fiber post (fiber post, yellow color) with a length of 13 mm.

Post cementation was carried out by first isolating the working area, irrigating the root canal with 0.9% NaCl, and drying it with paper points. Etching was applied using 37% phosphoric acid on the clinical crown surface with a microbrush for 15 seconds, then rinsed with water and dried with an air syringe for the crown and paper points for the root canal. Next, bonding was applied using a microbrush on the tooth crown, root canal, and post for 10 seconds, followed by air-drying and light-curing for 10 seconds. The resin cement (Allcem, dual cement)

was manipulated and inserted into the root canal using a lentulo. The fiber post was also coated with resin cement and inserted into the root canal (with 1-3 in-out movements). Excess material was removed, the post was fixed, and light-curing was performed for 40 seconds from the incisal, labial, and palatal sides.

The core build-up was performed using A3 shade packable resin composite to shape the tooth. The resin composite was applied layer by layer, with each layer being light-cured. Subsequently, the occlusion was checked to assess the remaining space available for the thickness of the jacket crown. Finishing and polishing were then carried out. Next, an impression was taken using the double impression technique with putty and light-body materials in a one-step method. After the patient's oral cavity was accurately impressed, a temporary crown was cemented using zinc phosphate cement. The negative impression was filled with type III dental stone, and the working model was sent to the laboratory for the fabrication of a Porcelain-Fused-to-Metal (PFM) jacket crown in shade A2.

On the seventh visit, the patient came for the cementation of the jacket crown (Figure 4). The operator conducted subjective and objective examinations on the patient. The patient reported no complaints, and no abnormalities were observed during the objective examination. The temporary crown was also found to be intact. The operator removed the temporary crown and performed a try-in of the Porcelain-Fused-to-Metal (PFM) jacket crown on tooth 21, paying attention to inclination, occlusion, contact with the opposing tooth, marginal fit, contour, and embrasure. An inclination correction was performed because tooth 21 was in a mesiopalato torsiversion position, so the PFM jacket crown was positioned more labially to avoid overlapping with tooth 11. Before crown cementation, a gingival cord was placed and left for 3-5 minutes, after which it was removed. Next, the PFM crown was cemented using Type I Glass Ionomer Cement (GIC) (Lutting). The cement material (liquid and powder in a 1:1 ratio) was manipulated on a paper pad using an agate spatula, then applied to the fitting surface of the crown. The jacket crown was cemented using a plastic filling instrument with in-out movements to avoid the formation of pores, and then inserted onto tooth 21. Excess cement around the jacket crown was cleaned before it hardened, and the proximal areas were cleaned using dental floss. The patient's occlusion was checked with articulating paper.

Post-treatment patient education included brushing teeth at least twice a day, avoiding biting hard foods with the front teeth as they are no longer natural teeth, rinsing with water after consuming colored foods or beverages to prevent discoloration, and scheduling a follow-up appointment in one week.

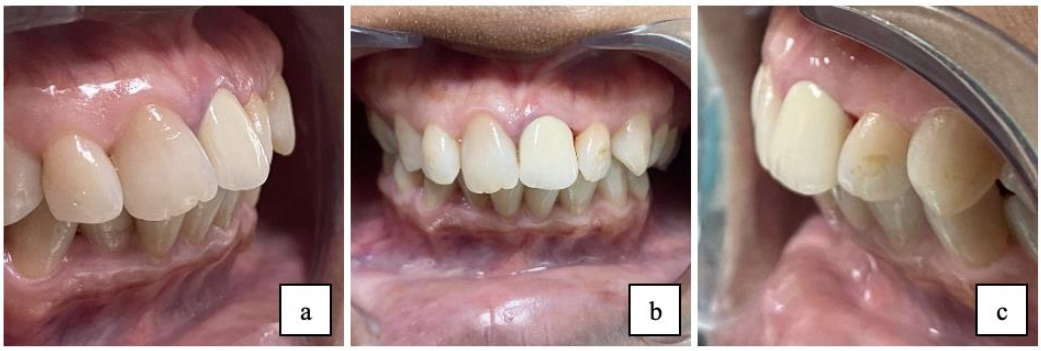

Figure 4. (a) Inclination of the PFM jacket crown viewed from the right side, (b) Facial side, (c) Left side.

On the eighth visit, the patient came for a follow-up check one week after the cementation of the PFM jacket crown. Subjective and objective examinations were conducted to evaluate tooth 21. During the subjective examination, the patient reported no complaints. The objective examination revealed that the PFM jacket crown on tooth 21 was intact, with no discoloration, good adaptation to the surrounding tissues, negative palpation test results, and no traumatic occlusion. The treatment outcome showed that the tooth was functioning well and had achieved the desired aesthetics.

DISCUSSION

Root canal treatment is a procedure for treating pulp diseases by removing vital or necrotic pulp from the root canal and replacing it with a filling material to prevent recurrent infections. The goal of root canal treatment is to prevent the spread of disease from the pulp to the periapical tissues and to restore the affected tooth so that it can be biologically accepted by the surrounding tissues.[11] Root canal treatment consists of three main stages: biomechanical preparation (cleaning and shaping), sterilization, and root canal obturation. Biomechanical preparation involves removing the pulp tissue through extirpation of both vital and necrotic tissues. In this case, the step-back technique was chosen for root canal preparation due to its advantages, such as more effective cleaning, easier obturation, and denser filling, as the spreader can reach near the apex, reducing the risk of apical leakage.[12]

Ideal root canal preparation involves four steps: determining the direction of the root canal, cleaning the canal, shaping the canal, and preparing the apical region. This process is followed by instrumentation, irrigation, sterilization, and obturation.[13] A hermetic root canal obturation is crucial for the success of the treatment, which can be achieved by proper preparation and sterilization. The purpose of obturation is to prevent the entry of

microorganisms into the canal through the coronal area, inhibit the growth of any remaining microorganisms, and block the entry of tissue fluids into the pulp through the apical foramen, which could serve as a medium for bacterial growth. In this case, the lateral condensation technique was used for obturation.[14] This technique is commonly applied due to its advantages in controlling the placement of gutta-percha and its cost-effectiveness.[15]

Post-endodontic restoration depends on the remaining tooth structure, functional needs of the patient, tooth position, and root canal morphology. For anterior teeth, as in this case, tooth 21 met the criteria for post placement due to insufficient remaining coronal tooth structure for other types of restorations. Additionally, tooth 21 showed no active inflammation, negative response to percussion after treatment, no periodontal abnormalities, no signs of infection, fistula, mobility, or swelling, and adequate bone support with no root fractures.[12] Fiber posts, which have an elasticity modulus similar to dentin, can effectively absorb pressure, preventing root fractures. They also bond adhesively to the root canal walls and have a transparent appearance, providing excellent aesthetics. Furthermore, fiber posts can be easily removed if endodontic retreatment is needed.[16] The next step in the procedure was core build-up, which reconstructs the lost tooth structure. Core build-up functions to replace missing tooth structure, strengthen the tooth, support the crown, restore physiological and aesthetic function, and reduce the risk of fractures.

Anterior teeth that have undergone root canal treatment with extensive structural loss where less than 50% of the healthy structure remains require a final restoration using a crown restoration supported by a post and core.[17] A jacket crown is a fixed restoration in the form of a full-coverage crown cemented onto the tooth, covering the entire clinical crown surface. The appearance of anterior teeth is crucial, as it supports aesthetics and self-confidence. In this case, a Porcelain-Fused-to-Metal (PFM) crown was chosen. PFM crowns are an optimal choice because they are durable, have good clinical performance, provide excellent aesthetics, and are cost-effective. However, one downside of PFM crowns is their translucency, which does not perfectly match that of natural vital teeth. PFM crowns tend to appear more prominent because their labial surface reflects morelight than it transmits.[18]

Restoring anterior teeth with a history of individual tooth malposition requires careful consideration to ensure that the cementation of the jacket crown results in good aesthetics. One of the indications for crown restoration with a post is to correct tooth inclination within specific limits. Inclination correction refers to the tendency of a tooth to tilt in the labiolingual or palatal direction along the crown's long axis but not along the entire tooth's long axis.[9] In

this case, inclination correction was performed in the labial direction on the mesial side, ensuring that tooth 21's mesial position no longer overlapped with the mesial side of tooth 11. As a result, the positions of teeth 11 and 21 became aligned after the inclination correction was performed.

Treatment limitations in this case were the difficulty in performing core buildup and preparing the patient's tooth margins to ensure a straight and precise tooth inclination. The patient's teeth, which tend to have gradations in color, made shade selection difficult. Furthermore, the limited number of journals or case reports on correcting tooth inclination using fixed dentures made this case particularly challenging. As is well known, patients with pulp necrosis with normal periapical tissue and malpositioned individual teeth can lead to the risk of gum inflammation due to PFMs that are difficult to clean. Furthermore, the inclination of natural teeth is designed to withstand vertical loads. When changing the direction of these loads, the crown experiences a lever force. This can easily cause the cement to loosen or risk fracture of the tooth root. Very careful occlusion adjustments are required to prevent trauma to the tooth during mastication.

The success of this root canal treatment was influenced by the patient's strong motivation, as she recognized the importance of her oral health before the condition worsened. Additionally, the patient's cooperation in attending multiple treatment visits at RSGMP UNIMUS contributed to the optimal outcome. Regular evaluation and follow-ups for the root canal treatment and PFM crown restoration were conducted to ensure that the primary goal of the treatment restoring the tooth's function and achieving aesthetics was successfully met.

CONCLUSION

The root canal treatment and PFM crown restoration of tooth 21 with inclination correction showed a high success rate. This was indicated by the absence of patient complaints, the intact condition of the PFM crown, no discoloration, good adaptation to the surrounding tissues, a negative palpation test, and the absence of traumatic occlusion.

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REFERENCES

1. Talli, R., & Ilmi, A. A. (2022). Prosedur Pembuatan Jacket Crown Berbahan IPS E-Max Press Pada Gigi Incisivus Centralis Regio Maxilla Sinistra. Indonesian Health Journal, 1(1), 35-47.
2. Obi, A. L., & Variani, R. (2021). Pengaruh gigi anterior atas yang berjejal terhadap status kebersihan gigi dan status karies gigi pada mahasiswa. Jurnal Cakrawala Ilmiah, 1(3), 355-362.
3. Yulistina., Sultan Amin Yasin., Arsad., Rezki Dirman., & Rahmah. (2023). Hubungan Tingkat Pengetahuan Pasien dengan Minat Perawatan Saluran Akar Gigi di Poli Gigi RS Daerah Beriman Balikpapan 2023. Journal of Pharmaceutical and Health Research, 4(2), 297-302.
4. Kartinawanti, A. T., & Asy'ari, A. K. (2021). Penyakit pulpa dan perawatan saluran akar satu kali kunjungan. JIKG (Jurnal Ilmu Kedokteran Gigi), 4(2), 64-72.
5. Wiratama, I. P. (2021). Perawatan Saluran Akar Satu Kali Kunjungan Dengan Restorasi Full Coverage Pada Gigi Premolar Kedua Kiri Rahang Bawah: Laporan Kasus. SONDE (Sound of Dentistry), 6(1), 34–44. DOI: https://doi.org/10.28932/sod.v6i1.3794
6. Silva G, Castilhos E, Masotti A, Rodrigues S. (2012). Dental Esthetic Self-perception of Brazilian Dental Students. RSBO; 9(4): 375 – 381.
7. Kalalo, W. W., Johanna, A., & Supit, A. S. (2022). Restoration of post root canal treatment. e-GiGi, 10(1), 75-80. DOI: https://doi.org/10.35790/eg.v10i1.38207
8. Brahmanta, A. (2021). Potensi Terapi Hiperbarik Oksigen Dalam Ortodonti: Percepatan Pergerakan Gigi. Airlangga University Press.
9. Febrianifa, E., & Hadriyanto, W. (2016). Restorasi pasca one visit endodontik dengan perbaikan malposisi dan selective Contouring. MKGK (Majalah Kedokteran Gigi Klinik) (Clinical Dental Journal) UGM, 2(1), 32-38.
10. Fitria, I., Gunawan, G., Al Annuri, Q. F., & Rifani, A. (2022). Fixed Prosthodontic Treatment of Patient with Anterior Deep Bite-A case report. Andalas Dental Journal, 10(2), 92-97. DOI: https://doi.org/10.25077/adj.v10i2.226
11. Wong, J., Manoil, D., Näsman, P., Belibasakis, G. N., & Neelakantan, P. (2021). Microbiological aspects of root canal infections and disinfection strategies: an update review on the current knowledge and challenges. Frontiers in Oral Health, 2, 672887.
12. Sidiartha, I. G. A. F. N., & Parama, P. W. (2020). Management Of Ellis Fracture Class III On 11 With Pulpectomy and Core Crown Restoration. Interdental Jurnal Kedokteran Gigi (IJK G), 16(2), 28-35.
13. Widyastuti, N. H., & Nurhabibah, G. (2021). Nonvital Root Canal Treatment of Necrotic Maxillary Left Lateral Incisor: A Case Report. Proceeding ISETH (International Summit on Science, Technology, and Humanity), 19-24. DOI: https://doi.org/10.23917/iseth.324
14. Soedjono, P., Mooduto, L., dan Setyowati, L. (2019). Penutupan apeks pada pengisian saluran akar dengan bahan kalsium oksida lebih baik dibanding kalsium hidroksida, Jurnal PDGI, vol. 58, No. 2.
15. Sidiartha, I. G. A. F. N., & Sutela, I. G. M. Y. (2020). Penatalaksanaan Restorasi Komposit Kelas Iv Dan Pasak Richmond Pasca Perawatan Saluran Akar. Interdental Jurnal Kedokteran Gigi (IJKG), 16(1). DOI: https://doi.org/10.46862/interdental.v16i1.684
16. Faizarani, M., & Prisinda, D. (2021). Pre endodontic build-up with canal projection technique on maxillary lateral incisors with extensive crown damage. Jurnal Kedokteran Gigi Universitas Padjadjaran, 33(2), 101-111. DOI: https://doi.org/10.24198/jkg.v33i2.29521
17. Pedrollo Lise D, Van Ende A, De Munck J, Umeda Suzuki TY, Cardoso Vieira LC, Van Meerbeek B. Biomechanical behavior of endodontically treated premolars using different preparation designs and CAD/CAM materials. J Dent. 2017;59:54-61.
18. Dewi, R. R., Hartomo, B. T., & Ashar, F. (2021). Porcelain fused to metal in vital crown with extensive caries at dentin depth: A case report. Makassar Dental Journal, 10(1), 24-28.