

CASE REPORT: TREATMENT OF CYSTIC LESION AND CARIES IN THE MAXILLARY ANTERIOR REGION UTILIZING COMPOSITE RESTORATION WITH PUTTY INDEX IN AN ADULT FEMALE

Endodontics

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ABSTRACT

Dental caries is a biofilm-mediated, diet modulated, multifactorial, non-communicable, dynamic disease resulting in net mineral loss of dental hard tissues [Fejerskov 1997; Pitts et al., 2017]. It is determined by biological, behavioural, psychosocial, and environmental factors. As a consequence of this process, a caries lesion develops. [1] The aesthetic impact of caries-induced damage on the anterior teeth can significantly affect an individual's performance and self-confidence. The patient's treatment in this instance was tailored to her preferences, as she was aware of the black discoloration on her anterior maxillary teeth. She expressed that her family, relatives, and friends frequently inquired about the discoloured appearance of her front upper teeth. The patient indicated that the condition of her anterior maxillary teeth had a negative impact on her self-esteem and social interactions. This case study provides a comprehensive account of the successful management of a cystic lesion and caries in the maxillary anterior region of a female adult patient. The treatment approach included performing an apicoectomy on tooth 12, conducting root canal treatment on teeth 11, 12, 13, 21, 22, and 23, and applying composite restoration using a putty index technique. The patient's condition necessitated a meticulous diagnosis, treatment planning, and restoration process. Through the utilization of a putty index, the tooth's natural morphology was accurately replicated during the composite restoration procedure, resulting in favorable functional and aesthetic outcomes.

KEYWORDS

Dental Caries, Cyst, maxillary anterior teeth, putty index, dental treatment, diagnosis, composite restoration.

INTRODUCTION:

The coexistence of cystic lesions and caries in the anterior region of maxillary poses difficulties in dental treatment, requiring a comprehensive approach to achieve successful outcomes. The report highlights the effective treatment of these conditions in a female adult patient. Procedures included caries excavation, root canal treatment, composite restoration, apicoectomy, cyst enucleation, and the utilization of a putty index technique.

Case Presentation:

A 37-year-old female patient presented with complaints of pain and aesthetic concerns in the maxillary anterior region. (Figure 1) Clinical examination revealed the presence of carious lesions affecting teeth 11, 12, 13, 21, and 23, in addition to a cystic lesion associated with the periapical area of tooth 12. Radiographic assessment confirmed the diagnosis of a cystic lesion and extensive caries involving the pulp chamber of the affected teeth.



Figure 1



Figure 2

Treatment Plan:

The plan of treatment consisted of the subsequent procedures:

1. Root canal treatment with 11, 12, 13, 21, 23
2. Light transmitting post with 11, 12, 21, 23
3. Composite core build up with 11, 12, 21, 23 using putty index.
4. Cyst enucleation and apicoectomy of 12
5. Removal of old PFM prosthesis with 22, RCT with 22, Composite core build up with 22
6. PFM Crown Prosthesis with 13, 12, 11, 21, 22, 23

Treatment Procedure:

Endodontic treatment: Initially, the teeth numbered 11, 12, 13, 21, and 23 underwent treatment. (Figure 2) The patient received a local

anesthetic infiltration utilizing 2% lidocaine and 1:100,000 epinephrine. Subsequently, the tooth was isolated with a rubber dam. Following the removal of all caries, an access cavity was prepared, and the working length of the canals was determined (Figure 3). All canals were prepared using hand files up to #80 and a 3% sodium hypochlorite irrigant. Subsequently, sterile paper points were employed to dry the canals, followed by filling them with gutta-percha and AH-26 sealer using the cold lateral compaction technique. (Figure 4).

Following that, the maxillary and mandibular teeth were anatomically impressed to facilitate the creation of study models and a diagnostic wax up. This was achieved by using modeling wax (Figure 5). Additionally, a putty index was prepared. Subsequently, the putty index was divided into two halves along the mesio-distal direction, resulting in palatal and labial halves. During the next appointment, the palatal half was assessed intraorally to ensure proper fit. This assessment served as a reference guide and would later be used as a rigid template for reconstructing the palatal surface. Shade selection was performed, followed by the application of bevels on the labial aspect of the teeth. These bevels served the purpose of removing unsupported enamel margins and increasing the surface area.

Teeth 11, 12, 21, and 23 underwent post space preparation, and light transmitting posts were secured in these teeth using resin-based cements. (Figure 6,7) Following, the exposed facial and lingual surfaces of the affected teeth were treated with 37% phosphoric acid for 15 seconds, followed by the application of a bonding agent (DENTSPLY, Spectrum). A thin layer of composite material was then placed in the palatal portion of the putty index. The index was carefully positioned palatally in the patient's mouth and cured for 30 seconds. (Figure 8) After removing the putty index, a rigid layer of composite material remained bonded to the teeth, serving as a reference guide for the subsequent placement of composite material. This is depicted in (Figure 9). Finally, a composite buildup was performed on the teeth (Figure 10). The patient's primary concern was aesthetics, which led to the decision to implement composite build-up, followed by an apicoectomy.

Surgical intervention: For enucleation of cystic lesion with tooth 12,

the apicoectomy procedure involved creating a sulcular incision from the distal of tooth 11 to the distal of tooth 13 (Figure 11). A trapezoidal mucoperiosteal flap was then raised, exposing the bone covering the apex of the tooth 12. The bone was removed, followed by curettage (Figure 12). The apex and root end were resected, and the area was sealed (Figure 13). Infected tissue was removed, and a retrograde filling with MTA was performed with tooth 12 (Figure 14). Finally, interrupted sutures were placed after the procedure.

3. Following the removal of the old PFM prosthesis along with tooth 22, root canal therapy was performed on the same tooth. Finally, teeth 13, 12, 11, 21, 22, and 23 were prepared for crowns, and a PFM prosthesis was then utilized for the restoration process. (Refer to Figure 15,16)

Outcome:

Postoperative assessment demonstrated the successful resolution of the cystic lesion, efficient eradication of caries, and satisfactory restoration of teeth 11, 12, 13, 21, and 23 using PFM prosthesis. The patient expressed enhanced functionality, improved aesthetics, and overall contentment with the treatment outcome during subsequent follow-up appointments.



Figure 3

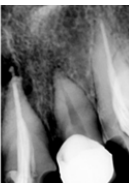
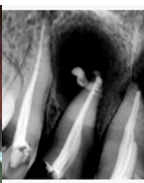


Figure 4



Figure 5

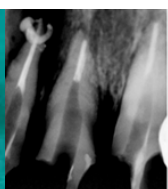


Figure 6



Figure 7



Figure 8



Figure 9



Figure 10



Figure 11



Figure 12



Figure 13



Figure 15

Figure 14



Figure 16

DISCUSSION:

Dental caries have now become a public health problem regardless of age. Though dental caries has been found to affect young children, it also tracks across adolescence, adulthood, and into later life persisting as a chronic and progressive condition.^[2] Majority of the epidemiological studies done in Nepal have been conducted mainly on children rather than adults.^[3]

Root canal therapy is a sequence of treatments for the infected pulp of a tooth which results in the elimination of that infection and the subsequent protection of the decontaminated tooth from future microbial invasion.^[4] It involves the removal of the infected pulp, the subsequent shaping, cleaning, decontamination of the hollow tooth core and obturation.^[5] The procedure has a high success rate, although persistence of symptoms or infection recurrence can occur in 10% to 15% of cases. Tooth survival over 2-10 years following initial root canal treatment was shown in a symptomatic review to range between 86% and 93%. In many cases of infection or symptom recurrence, a second root canal treatment (root canal retreatment) is considered. Apicoectomy is usually needed when root canal retreatment is not successful, and is a procedure in which the root tip, or apex, is removed along with the infected tissue, then a root end filling (retro filling) is placed to seal the area. Factors associated with a better chance of success of apicoectomy include patients ≤ 45 years old, upper anterior or premolar teeth, cases without preoperative pain, lesions without periodontal involvement, absence of perforating lesions, and teeth with only one periapical surgery- In the case of apicoectomy failure, the tooth may need to be extracted.^[6]

Cyst is defined as a pathological cavity that is usually lined by epithelium and which has a centrifugal, expansive mode of growth.^[7] Periapical cysts are commonly treated with non-surgical endodontic (root canal) therapy. If the tooth remains symptomatic after endodontic therapy, surgical endodontic therapy or extraction will be required. Surgical endodontic therapy, apicoectomy (removing the root apex), and curettage of the cyst produces reliable bone healing. Extraction with curettage or enucleation of the socket is also effective at eliminating the occurrence of a residual cyst. Overall, surgical endodontic therapy results in 95% bone healing compared to 66% bone healing with non-surgical treatment.^[8]

Composites resins have become the first choice for direct anterior and posterior restorations. The great popularity is related to their esthetic appearance and reduced need of sound tissue removal as compared with former treatments. Several studies have demonstrated that composite restorations may last long in clinical service. Composite restorations have demonstrated a good clinical performance with annual failure rates varying from 1% to 3% in posterior teeth and 1% to 5% in anterior teeth.^[9]

The direct composite restoration can be done by the conventional free-hand layering technique, putty index technique or custom template technique.^[10] Free hand layering technique has been the most commonly performed in clinical practice in a single appointment however; it is a skill-based procedure with no palatal guide or other reference.^[11] Putty Index Technique on the other hand is done in two appointments, requiring an impression, lab procedures and creation of a palatal guide initially.^[12] The putty index technique is a simple and economic alternative to direct restorative technique. The putty index perfectly defines the sagittal dimensions, the length, the incisal edge position, the incisal thickness, mesial and distal line angles, and the labial curvature of the desired final restoration. This helps in simplifying the restorative procedure, thereby allowing the clinician to fully concentrate on the application of composite layers. Through this technique, restoration of a single tooth as well as multiple teeth can be done, achieving satisfactory results with a lower demand for practitioner skill and dexterity.^[13]

A comprehensive treatment approach that combines surgical intervention and restorative procedures is necessary for managing concurrent cystic lesions and caries in the maxillary anterior region. To ensure accurate replication of tooth morphology and contour, the use of a putty index is recommended. The technique not only enhances functional outcomes but also contributes to improved aesthetic results.

CONCLUSION:

This case report demonstrates the successful management of a cystic lesion and caries in the maxillary anterior region of an adult female patient using composite restoration assisted by a putty index technique. The integrated treatment approach led to favorable functional and aesthetic outcomes, highlighting the efficacy of the described protocol in similar clinical scenarios. Further research and long-term follow-up studies are warranted to validate the sustainability of these treatment modalities.

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