

Integrative Dental Management of Complex Patients: A Comprehensive Care Case Report

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ABSTRACT:

This Comprehensive Care Case (CCC) report represented a detailed diagnosis and treatment plan to manage a complex dental patient who came to the outdoor dental clinic of the Faculty of Dentistry, Arab Academy for Science, Technology, and Maritime Transport in Alamein (AAST). A 32-year-old female patient, had been presented with continuous dental pain, improper dental functions, and an aesthetic problem. The staff team, comprising specialists in different dental departments, supervised this case with the undergraduate student. Together, they have tailored a treatment plan that integrated cumulative phases. Outcomes were assessed through both radiographical and clinical metrics as well as patient-reported outcomes, demonstrating significant improvements in pain relief, dental functions, and aesthetics. This case illustrated the effectiveness of collaborative care models in addressing the complex clinical challenges with an optimum treatment plan that meets the patient's needs and satisfaction. It also highlighted the importance of departmental cooperation, social communication, and the role of the university in community service. The researchers' findings contribute to the growing body of evidence supporting comprehensive care strategies for complex patients, suggesting implications for clinical practice and future research.

KEYWORDS:

Comprehensive, Care, Endodontics, Fixed, Diagnosis, Treatment.

1. INTRODUCTION

The field of dentistry is increasingly recognizing the importance of integrative management in addressing the complex needs of patients with multifaceted health profiles. Complex patients often present with a combination of dental, medical, and psychosocial challenges that require a comprehensive approach to care. These challenges may include co-existing medical conditions, dental habits, and socioeconomic factors that influence treatment outcomes and patient compliance. ⁽¹⁾ This approach not only emphasizes the importance of oral health in systemic well-being but also involves a collaborative effort among dental professionals. By fostering interdisciplinary communication and teamwork, integrative management aims to create a correct diagnosis and a tailored treatment plan that address different treatment phases. ⁽²⁾ This case report focused on the integrative dental management of a complex young patient with severe oral pain and improper dental function and smile, illustrating how a comprehensive care approach can impact her life and lead to improved health outcomes. Through a detailed examination of the treatment process and outcomes, this report aimed to highlight the dental image before and after full mouth rehabilitation and emphasize benefits of collaborative care models in dentistry.

2. Cases and Methods

A 32-year-old female patient presented to the AAST outdoor dental clinic with severe pain in her anterior teeth. She reported additional pain during biting, particularly in the lower left quadrant, as well as sensitivity to cold stimuli in the posterior upper teeth. Clinical examination showed inflamed

edematous gingiva and calculus. Notable findings included carious lesion related to teeth #26 and #27 exhibiting pain in response to sweet stimuli. Cold and heat testing revealed prolonged pain related to teeth #11, #21, and #22, while pain at teeth #15 and #25 subsided shortly after stimulus removal. Percussion testing elicited pain on teeth #11, #12, #21, #22, and #33. Teeth #12, #13, and #14 presented with old, destructed crowns, while teeth #33, #34, and #43 had old crowns that needed replacement. A bilateral edentulous area was present in the mandibulate arch due to missing teeth #34, #35, #36, #37 #44, #45, #46, and #47. No sinus tract was observed in any teeth (Fig. 1). Radiographic evaluation showed a widened lamina dura related to teeth #11, #12 #15, #21, #22, and #25, in addition to a small apical radiolucency related to tooth #33. Based on these clinical and radiographic findings, tooth #33 was diagnosed with necrotic pulp and chronic apical periodontitis, while teeth #11, #21, and #22 were diagnosed with symptomatic irreversible pulpitis with acute apical periodontitis that need root canal treatment (RCT). Teeth #15 and #25 were deemed vital with hyperemic pulps. Full coverage crowns were required for teeth #11, #21, #22, #15, and #25 following RCT. Restorations were required for teeth #26 and #27. Additionally, teeth #12, #13, and #14 needed new separate crowns to prevent biological failure, and teeth #33, #34, and #43 required replacement with surveyed crowns for the metallic removable partial denture (RPD).

Treatment plan was designed, presented to the patient who agreed with an informed consent, and then applied based on the following phases: ⁽³⁾

Emergency phase: Emergency management was done for the acute pulpitis' symptoms in teeth #11, #21, and #22, focusing on pain relief through access cavities. Also, the painful residual root of tooth #28 was extracted.

Phase I: Scaling and root planning were performed, with supragingival scaling of the anterior region using a sickle scaler and the posterior region using a jacket scaler (Hu-Friedy, Chicago, USA). Subgingival scaling was accomplished in the anterior region with a 2R2L curette and in the posterior region with a 4R4L curette (Hu-Friedy, Chicago, USA).

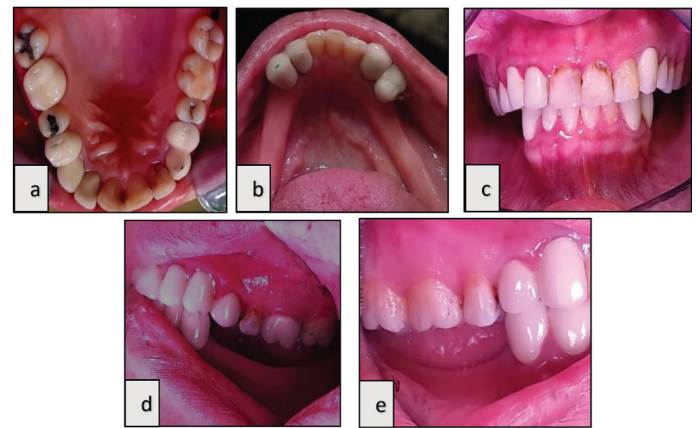


Fig. (1) showing: (a) The preoperative occlusal view of the upper arch. (b) The preoperative occlusal view of lower arch. (c) The preoperative frontal view. (d) The preoperative right lateral view (e) The preoperative left lateral view.

Phase II: Pre-prosthetic treatment involving the endodontic and restorative treatment was applied. For all dental procedures, local anesthesia was administered to each affected tooth using lidocaine 2% with adrenaline 1:80,000 (Onpharma, USA) and isolation was performed using a rubber dam (Kerr, USA). For restorative procedures, Carious lesions in teeth #26 and #27 were removed with round head burs (Brasseler, USA) and Midwest 245 Bur (Dentsply, Sirona, USA), followed by cavity preparation for composite restoration. Indirect pulp capping was applied in tooth #26 using MTA (ProRoot, USA) and resin-modified glass ionomer filling material (RelyX, 3M ESPE, USA). Teeth #26 and #27 were restored with composite restorations (Tetric EVO Ceram, Ivoclar, Switzerland) (Fig. 2). RCT was applied for teeth #11, #12, #15, #21 #22, and #33 across multiple visits. After removal of decay, access cavities were performed using round head and Endo Z burs (Dentsply Maillefer, Switzerland).

File #10 (Dentsply Maillefer, Switzerland) was utilized to establish canal patency and determine working lengths, that were then confirmed with an apex locator (Propex IQ, Dentsply Sirona, USA) and periapical radiographs (Xios XG Supreme, Dentsply Sirona, USA). The initial apical engagement file was selected based on the apical size of each canal, followed by canals preparation using the step-back technique. Each canal was disinfected using 2.5% sodium hypochlorite (Egyptian Petrochemicals Company Egypt), and lubricated using EDTA gel and solution (META-BIOMED CO., LTD, Korea) to remove smear layer. Canals were then dried with paper points and corresponding master gutta-percha cones (META-BIOMED CO., LTD, Korea) were applied. Obturation was performed in all canals using root canal resin sealer (ADseal, META-BIOMED CO., LTD, Korea) and lateral condensation technique. Old crowns for teeth #12, #13, #14, #43 #33, and #34 were removed using sectioning technique.

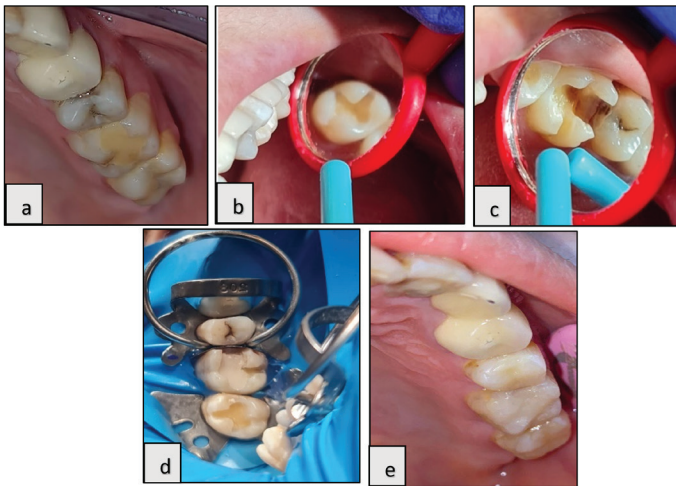


Fig. (2) showing: (a) The preoperative photo for tooth #26 and #27. (b) The cavity preparation for tooth #27. (c) The cavity preparation for tooth #26. (d) The rubber dam isolation for tooth #26 and #27. (e) The final composite restoration.

Phase III: Prosthetic treatment was applied for teeth #11, #21, #12, #13, and #33. Posts and cores for these teeth were executed using corresponding sizes of Gates Glidden, along with the post and core kit (Dentsply Sirona, USA). The selected posts were cemented using self-etching/self-adhesive resin cement (Panavia, Kuraray Noritake), followed by a buildup using composite resin (Filtek™, 3M™ ESPE, USA). Subsequently, preparations were made for teeth #15, #14, #13, #12, #11, #21, #22, #25, #33, #34, and #43 using Midwest TR burs (Dentsply, Sirona, USA) and retraction cord was applied (3M™ ESPE™, USA). Secondary impressions were taken using condensation silicone (Zhermack Zetaplus, Germany) and provisional crowns were fabricated and placed (TempBond, Kerr® USA). Porcelain-fused-to-metal (PFM) crowns were tried-in and then finally cemented using dual cure resin cement (Fuji IX, GC Corporation, Japan). After the final insertion of the surveyed crowns for teeth #33, #34, and #43, secondary impressions were taken for the fabrication of a metallic removable partial denture (RPD) using medium body (Imprint™ 3 – 3M, USA). This process included a metal try-in, jaw relation verification, acrylic try-in, and ultimately the final insertion (Fig. 3).



Fig. (3) showing: (a) The preparation for abutment teeth #11, #21, #22. (b) The secondary impression for maxillary teeth. (c) The final insertion. (d) The secondary impression for mandibular RPD. (e) The final insertion for mandibular RPD.

Phase IV

Maintenance and follow-up were performed. Gingival health, success of restorative treatment, tissue response to the fixed and removable prosthesis, and general oral hygiene were all monitored.

Results and follow-ups

After completing the restorative and RCT in each tooth, the related tooth showed an immediate pain relief. While the pain upon biting was relieved after about one month following the treatment. Also, after one month, teeth with widened periodontal space had appeared with normally healed lamina dura surrounding their roots in the follow up radiographs. Additionally, teeth with apical radiolucences showed obvious decreasing in the size of the apical lesions after one month of follow up, indicating a progressive apical healing. In relation to prosthetic treatment, the related gingiva was showed to be completely healed, while prosthesis function, aesthetic and patient satisfaction were perfectly measured and appeared (Fig 4).

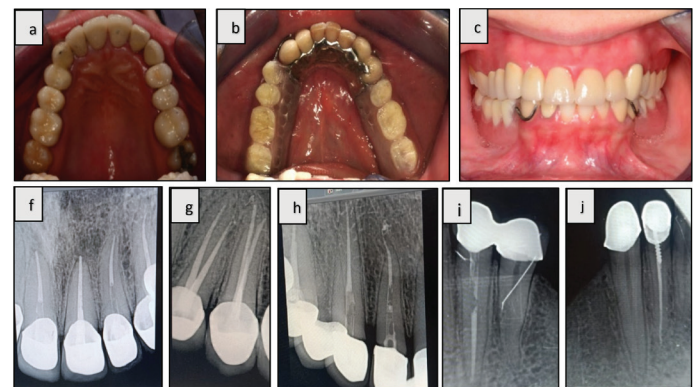


Fig. (4) showing: (a) The postoperative occlusal view of maxillary arch. (b) The postoperative occlusal view of mandibular arch. (c) The postoperative frontal view. (d) The postoperative right lateral view. (e) The postoperative left lateral view. (f) The follow-up radiographs for teeth #11, #21 and #22. (g) Tooth #25. (h) Teeth #12 and #13. (i) Teeth #33 and #34. (j) Tooth #43.

3. Discussion

In this comprehensive care case report, the integrative dental management of a complex dental patient presented with multiple diagnostic pictures was highlighted and a comprehensive treatment strategy was applied. The patient's symptoms, including severe pain in the anterior teeth and sensitivity to biting and cold, were indicative of significant underlying dental pathology, necessitating a multi-phase approach to care. Suitable treatment plan was discussed and tailored based on a careful diagnosis included both clinical and radiographic findings. (4) These findings underscored the necessity of integrating clinical and radiographic evaluations to formulate an effective treatment plan. (4) The thorough

clinical examination revealed extensive carious lesions and symptomatic irreversible pulpitis in several teeth, emphasizing the importance of early detection and intervention in complex dental cases. The radiographic findings, including apical radiolucencies and widened lamina dura, were critical in diagnosing necrotic pulp and chronic apical periodontitis.⁽⁵⁾ These findings underscore the necessity of integrating clinical and radiographic evaluations to formulate an effective treatment plan which was cumulatively structured into four distinct phases, each addressing specific needs of the patient.⁽²⁾ In the emergency phase, an immediate management focused on alleviating acute symptoms and extracting of painful residual roots was essential to prevent further complications and to provide the patient with prompt relief.

While phase I was a foundational phase aimed to address periodontal health, which is crucial for the long-term success of restorative and endodontic procedures.⁽⁶⁾ The use of specific instruments for both supragingival and subgingival scaling ensured thorough plaque removal and preparation of the periodontal tissues for subsequent treatments.⁽⁶⁾ On the other hand, phase II including the endodontic and restorative treatment in a multi-visit approach allowed for careful management of each affected tooth. The proper isolation⁽⁷⁾ canal cleaning, shaping and obturation⁽⁸⁻¹⁰⁾ as well as the use of modern materials, such as MTA for indirect pulp capping and composite resin restorations,^(11,12) demonstrated a commitment to preserving tooth structure while effectively managing carious lesions.⁽¹³⁾ Furthermore, the Prosthetic treatment in phase III showed the integration of fiber posts and cores with PFM crowns and surveyed crowns for the RPD, which additionally reflected a comprehensive approach to restoring function and aesthetics.

Fiber posts are tooth-colored, making them more aesthetically pleasing, in addition to the approximate resiliency of the post to the dentin structure, which reduces the risk of tooth fracture compared with metallic posts.⁽¹³⁾ Although zirconia offers superior strength and durability for dental crowns, its hardness could cause wearing of the opposing teeth, especially with small-sized anterior mandibular teeth, as shown in this case. Thus, PFM crowns were used as they were affordable with required shades and strength due to the metal substructure.⁽¹⁴⁾ Additionally, the patient already had old PFM crowns with no need for remake. As the patient had large bilateral edentulous areas with a low level of bone density as the teeth were extracted many years ago, RPD was the choice rather than implants. Implants also needed a longer time for tissue healing, which was not suitable with the patient's time and availability. In addition, RPDs are less invasive replacements with lower cost and affordability.⁽¹⁵⁾ This phase highlighted

the importance of collaboration among various dental disciplines to achieve optimal results.^(16,17) Finally, in phase IV, regular follow-ups were pivotal in evaluating the success of the treatment and ensuring ongoing oral health. Monitoring gingival health, the condition of restorations, and the patient's overall oral hygiene practices are integral to sustaining treatment outcomes.⁽¹⁸⁾

4. Conclusions

This case report underscores the critical importance of a comprehensive and systematic approach in managing complex dental cases. Multiple pathologies, including pulpitis, apical periodontitis, and extensive carious lesions were included. Multi-phase approach including emergency management, periodontal, endodontic, and prosthetic treatment, resulted in significant improvement in the patient's oral health. Post-treatment evaluations indicated successful pain relief, improved periodontal health, and patient satisfaction with aesthetic outcomes. Thus, important insights have been drawn throughout this case management:

- Both clinical and radiographic examinations are crucial for accurate diagnosis and tailored treatment strategy.
- The phased treatment approach is essential for sequencing interventions to address the patient's immediate concerns while also laying the foundation for long-term oral health.
- Successful outcomes are achievable through the coordination of various dental specialties, which highlights the value of a comprehensive care model in complex cases management.
- Ongoing follow-up was recommended, emphasizing the need for continued diligence to prevent future complication.

This case report could be also a valuable resource for dental professionals, as it illustrated the clinical decision-making process and the stepwise implementation of evidence-based treatment strategies to manage a comprehensive care case. The detailed documentation of the various phases of care and the favorable outcomes underscores the importance of a thorough, patient-centered approach in achieving successful long-term results.

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Conflict of Interest

No conflict of interest was present.

Ethical approval:

All procedures performed in this case report involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. An informed consent was obtained from the patient before application of any dental procedure.

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