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RESEARCH ARTICLE

FULL MOUTH REHABILITATION OF TURNER AND MISSIRLIAN CATEGORY I-WORN-OUT DENTITION - A CASE REPORT WITH SURGICAL, FUNCTIONAL AND ESTHETIC SUCCESS

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Severely worn-out dentition presents significant functional, aesthetic, and structural challenges, often impairing mastication, speech, and overall quality of life of the individual. This case report describes the full-mouth rehabilitation of a 58-year-old male patient diagnosed with Turner and Missirlian Category I wear, characterized by generalized attrition, loss of posterior support, and reduced vertical dimension of occlusion (VDO). A comprehensive treatment approach was adopted, integrating endodontic, periodontal, and prosthodontic interventions to restore function, stability, and aesthetics. The treatment plan involved a multidisciplinary approach, beginning with post and core restorations to reinforce structurally compromised teeth. Full-mouth surgical crown lengthening was performed to enhance retention for full-coverage crowns and optimize occlusal function. Prosthetic rehabilitation included fixed porcelain-fused-to-metal crowns supported by root canal-treated teeth and cast partial denture for posterior edentulous areas. The VDO was re-established using provisional restorations, ensuring patient adaptation before the final prosthesis placement. The patient was monitored over a one-year follow-up period, demonstrating improved function, aesthetics, and occlusal stability. This case highlights the importance of a systematic and evidence-based approach in managing severe tooth wear. By employing a structured treatment protocol, including gradual VDO increase, crown lengthening for improved retention, and the integration of fixed and removable prostheses, a predictable and long-term outcome was achieved. The rehabilitation successfully restored oral function and aesthetics while preserving remaining tooth structure, significantly enhancing the patient's quality of life.

Keywords: Attrition; Cast posts; Crown lengthening; Full Mouth Rehabilitation; Worn-out dentition; Vertical dimension of occlusion.

INTRODUCTION

Critically worn-out dentition is considered a debilitating condition from both functional and esthetic perspective of an individual which severely effects one's quality of life. In-vivo studies have suggested that the natural enamel undergoes a wear of about 0.3 mm in approximately 10 years, the excessive wear, leading to tooth structure loss results in deranged masticatory power, and speech impairment affecting the oral health and eventually the overall health of the individual[1]. Excessive wear can result in pathologies involving the pulp, occlusal derangement, impaired function and esthetics. In addition to hypersensitivity of teeth, one may even experience a compromised facial appearance due to reduced vertical dimensions of occlusion (VDO)[2], elicit higher propensity towards tooth fractures, and if not intervened, it may even lead to temporomandibular joint disorders and myofascial pain. The condition, thus, gradually results in a multitude of challenges owing to functional and aesthetic limitations. The masticatory impairment results in dietary restrictions, often leading to insufficient nutrition. Impaired speech, negatively impacts social interactions and well-being. The temporomandibular (TMJ) disorders may culminate in chronic pain, which further exacerbates discomfort and curb one's day-to-day activities.

The worn-out teeth may occur as a result of plethora of phenomenon, such as attrition, erosion, abrasion and even parafunctional habits such as bruxism and less frequently, congenital anomalies[3–6]. Attrition results from improper tooth-to-tooth contact due to conditions such as malocclusion or lack of posterior tooth support. Dental erosion is caused by enamel or dentin dissolution which frequently occurs in patients with acidic reflex, patients who often consume acidic foods and beverages. Abrasion occurs as a result of deranged mechanical forces due to injudicious tooth brushing techniques, and extensive use of highly abrasive toothpastes. The habit of bruxism has been significantly linked to extensive tooth-wear[7]. This habit can be diurnal or nocturnal, which may be triggered by occlusal interferences[8].

In addition, infrequent causes of tooth wear include chewing of tobacco, pipe smoking, biting objects like pen or pencil or holding them between the teeth. These less frequent habits are known to be associated with emotional stress. Moreover, the congenital anomalies have also been implicated as a causative factor for the accelerated wear of tooth structure. In conditions such as amelogenesis imperfecta, and dentinogenesis imperfecta, the calcified structures of teeth, namely, the enamel, and dentin soften, become friable, and when exposed to the oral cavity, they are subjected to rapid wear[9].

Preventive strategies play a pivotal role in preventing the initiation or slowing down the progression of extensive wear. Periodic oral health check-ups aid early diagnosis and prompt treatment[10]. A thorough knowledge on judicious oral hygiene practices, including the use of non-abrasive toothpastes and proper brushing techniques can reduce the intensity of mechanical wear. Modification of dietary habits through counselling may be effective to minimise acidic food intake and additionally, addressing any underlying systemic conditions such as gastroesophageal reflux disease (GERD) can help prevent erosion[11]. Any further deterioration of tooth structure, due to severe wear can be prevented through restorative procedures including composite resin buildup, that tend to provide additional protective barriers against the same.

To date several therapeutic strategies have been tried for combating cases of severely worn-out dentition. Of all, the most comprehensive modality, which involves a multidisciplinary approach is the full mouth rehabilitation (FMR)[6,12].

The restorative techniques encompasses direct and indirect restorations with composite restorations, porcelain veneers, and even full coverage crowns. The prosthetic rehabilitation system comprises of the removable or fixed prostheses to restore normal occlusion with thorough occlusal adjustments for implementing the most ideal occlusal relationship so as to ensure utmost comfort and long-term stability for the patient. Several FMR philosophies are in concurrent practice, all of which aim to achieve one goal, which is the harmonious occlusal contacts, that will eventually maintain TMJ in health and prevent further tooth structure loss[13]. It is also mainly designed to re-establish the VDO which ensures the optimised adaptation in patients before the final prosthetic placements.

The present case report describes the full-mouth rehabilitation of a 58-year-old male patient diagnosed with Turner and Missirlian Category I wear[2,14]. The treatment plan involved a multidisciplinary treatment approach with periodontal plastic surgeries, fixed and removable prostheses to restore function, aesthetics, and occlusal stability.

Case Description

History

A 58-year-old male patient, presented with the primary complaint of missing teeth in the upper and lower right and left posterior regions for the past two years and severe attrition of the remaining dentition. He also reported difficulty in mastication with a gradual decline in his ability to chew solid foods. The patient was also concerned about the aesthetic deterioration of his teeth and the deranged facial appearance due to worn-out dentition. On eliciting the history, the patient reported a long-standing history of progressive tooth wear, which was first noticed approximately ten to twelve years ago. At first, it was non-attended as the condition did not interfere with his routine activities or his social well-being. However, the problem had gradually worsened over the past five years, accompanied by tooth hypersensitivity and difficulty in chewing. History also highlighted the fact, that he does not exhibit any parafunctional habits such as bruxism or nail-biting but admitted to consuming acidic foods and beverages more frequently. The patient also presented with non-contributory medical history, affecting oral health.

Clinical examination and diagnosis

The extraoral examination revealed a symmetrical facial structure with an ovoid facial form and a straight profile. There were no signs of lymph node enlargement, cutaneous ulcers, scars, or any exophytic growths. A thorough TMJ assessment showed no signs of pain, clicking sounds, or crepitus. Additionally, there was no observed dysfunction related to the TMJ or the muscles of mastication. The mandible exhibited no deviation, indicating normal function and alignment **(Figure 1A).**

A thorough intra-oral examination was conducted and was identified that the gingival health was generally satisfactory, with no clinical signs of inflammation. No signs of soft tissue pathology or other abnormalities were detected. On examining the hard tissues, there were multiple missing teeth. Generalized attrition was noted across all remaining teeth, especially in the anterior and posterior occlusal surfaces. The attrited teeth presented with sharp enamel edges and dentinal craters. There was no active dental caries, however, the remaining teeth had undergone root canal treatment, including 11, 12, 13, 17, 21, 22, 23, 27, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45, and 47. The clinical findings were confirmed with radiographic examination using orthopantomogram (OPG) **(Figure 1B-F).** Centric relation-centric occlusion discrepancy was observed when the patient was guided into the centric relation position using Dawson bimanual method. Extreme care was taken to determine for alterations in the VDO which consisted of the following steps. Firstly, the history of wear was identified and was found that the patient exhibited the habit of consuming more of acidic foods and beverages. Secondly, the interocclusal space was determined to be more than 4mm. Thus, the possible causes of wear was established to be majorly due to the frequent consumption of acidic foods, and secondly, due to the posterior interferences. The patient was diagnosed with Turner and Missirlian Category I tooth wear due to excessive wear with loss of VDO[14]. The diagnosis was confirmed based on clinical findings of generalized attrition and loss of posterior support, decreased lower facial height, functional impairment, and radiographic evidence of bone loss and extensive previous restorations. However, differential diagnoses was made to rule out other potential possibilities including GERD- associated erosive tooth wear, bruxism-related attrition, and severe abrasion due to improper tooth brushing habits. No evidence of parafunctional habits was found, and the wear pattern was consistent with occlusal overload.

Figure 1. Clinical photographs of extra-oral and intra-oral examination

Figure 2. Orthopantomogram with attrition of the remaining dentition and evidence of RCT

Comprehensive Treatment Plan and Clinical Procedure for Full-Mouth Rehabilitation

A comprehensive treatment plan was formulated to ensure long-term stability, function, and aesthetics. Several treatment options were considered, including removable partial denture, overlay denture, and full-mouth composite resin build-up. However, these were ruled out in favor of a fixed rehabilitation plan that offered long-term stability, and predictability.

The selected approach involved post and core restorations to reinforce structurally compromised teeth and provide additional retentive support. Full-mouth surgical crown lengthening was performed to increase the crown height, ensuring optimal retention for full-coverage crowns and facilitate proper occlusal function and aesthetics. A combination of fixed and removable prostheses was planned with porcelain fused to metal crowns (PFM) supported fixed partial dentures for root canal-treated teeth and removable denture for the posterior edentulous areas. Implants were also recommended for the patient, but they could not be implicated in the treatment due to economic constraints of the patient.

After thoroughly explaining the treatment plan to the patient and obtaining written informed consent, the rehabilitation process was initiated. The initial step involved complete oral prophylaxis, followed by post and core restorations for additional reinforcement **(Figure 3A-C).** Surgical crown lengthening procedure was carried out in the mandibular arch which displayed an uneventful post-operative healing. **Figure 3D-I** shows the intra-operative procedure and its healing at 1 week follow-up. This ensured an increase in the crown height of approximately 2 mm which was sufficient for adequate retention of full coverage ceramic crowns. **Figure 4** shows the OPG after the placement of cast posts. This was followed by the re-establishment of appropriate VDO using the wax occlusal rims with a rise of 4mm **(Figure 5A)**, in-turn, followed by fabrication of fixed partial denture with PFM crowns placed in the maxillary region (teeth 13-23) and the mandibular region (teeth 35-47) **(Figure 5B-F).** Additionally, Co-Cr crowns were placed on teeth 18 and 27 with mesial occlusal rests over which the cast partial denture was supported. In order to restore the posterior edentulous sites, attachment-retained cast partial denture was fabricated for teeth 14-17 and 24-26 in the maxillary arch supported on the mesial occlusal rests on 18 and 27 respectively and precision attachment with respect to the corresponding premolars. Finally, a precision attachment denture was provided for teeth 36 and 37 in the mandibular arch **(Figure 6A-F).** Patient's adaptation to the increased VDO was monitored using provisional restorations for a period of three months and the absence of muscle tenderness, functional discomfort and temporomandibular joint discomfort ensured the patient's adaptation to the re-established VDO, before the placement of the final prosthesis. The patient was kept under regular maintenance protocol and four reviews were completed in a period of about one year **(Figure 7).**

Figure 3. A and B. Shows post space preparation; C. Cast posts cemented to their respective teeth; D-F, Surgical crown lengthening procedure in the mandibular arch; G-I, 1 week postoperative healing

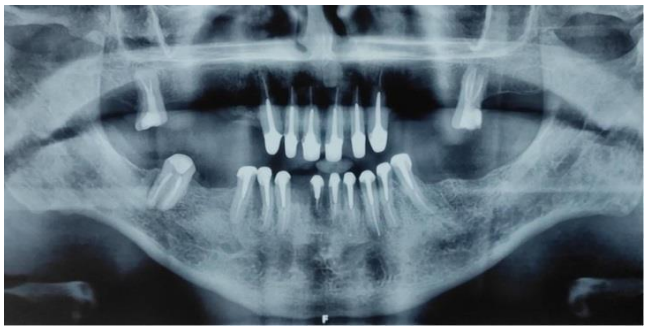

Figure 4. OPG showing cast posts placement

Figure 5. Wax occlusal rims showing increase in VDO of 4 mm; B and C, refinement of the cast posts; D-F, metal try-in

Figure 6. A, Final prosthesis; B-F, Post-operative view after full mouth rehabilitation

Figure 7. One year post-operative OPG showing successfully restored oral function through systematic FMR

DISSCUSION

Management of a case with severely worn out dentition along with loss of vertical dimension, presents numerous challenges to the clinician[15]. The primary objective of the current treatment plan was to restore function and aesthetics, without compromising the occlusal harmony, also while assuring long-term stability and durability of the intended treatment strategy. The present case encompassed a multidisciplinary approach, including endodontic therapy, periodontal therapy, and prosthetic replacements, which comprehensively strived to accomplish a successful full mouth rehabilitation. This approach was in accordance with previous literature of successful and stable rehabilitation[1,9].

The most important challenge in the current case was evaluation of the VDO, which was systematically analysed and gradually implemented. The use of provisional prosthesis for monitoring the patient's adaptation for about three months was the key in attaining the most possible and stable functionality. This was in accordance with the interim time period as reported by a previous study[1]. Evidence suggest that, VDO, which is arbitrarily estimated without a systematic evaluation, could eventually result in multiple complications. In addition, the interim period for patients adaptability could be modified according to the patient's situation[1]. A previous study has also suggested that controlled increase in VDO could result in positive neuromuscular adaptation when done gradually[9].

Another commentative challenge in this case was the management of short clinical crowns, which could severely affect the retention of restorations, if not cared for. To address this, surgical crown lengthening was performed to provide sufficient coronal structure for retention of prosthetic restorations. Previous reports from literature have immensely supported crown lengthening to be the most effective way to enhance retention and thus, longevity of full-coverage restoration[16–18]. Seol *et al.*, in their study have also demonstrated the effectiveness of combining surgical crown lengthening with full-mouth rehabilitation to restore occlusal function and aesthetics[17]. Kumar *et al.*, and Gupta *et al.*, have previously highlighted the role of cast post-and-core restorations in cases where structural integrity is compromised[19,20]. The present case adopted a similar approach by using cast post-and-core to reinforce weakened teeth before final crown placement.

Additionally, occlusal stability was ensured by implementing a mutually protected occlusal scheme, which has been recommended in the literature as an optimal approach for rehabilitating severely worn dentition[9]. The final restorations were fabricated using porcelain-fused-to-metal crowns, balancing durability and aesthetics. Previous study has also reported that PFM crowns serve as the most viable option for restoring the form and function of teeth while enhancing esthetics and comfort [21]. Moreover, removable cast partial denture was an absolute indication in the present case which in turn, exhibited a positive impact on the successful outcome of rehabilitation. Such removable prostheses are frequently recommended in cases where, fixed options are contraindicated or when they are expected to yield suboptimal clinical results[15].

A key aspect of this case was the gradual increase in VDO using provisional restorations, which allowed neuromuscular adaptation and prevented complications. Additionally, surgical crown lengthening provided adequate retention for full-coverage crowns, improving prosthetic longevity. The integration of fixed and removable prostheses addressed occlusal stability and patient-specific needs. By following a structured protocol and leveraging evidence-based techniques, a predictable and durable outcome was achieved.

CONCLUSION

The successful management of severely worn-out dentition requires a structured, multidisciplinary, and evidence-based treatment approach. This case emphasized the importance of a comprehensive assessment, including VDO evaluation, occlusal analysis, and patient adaptation monitoring. The combination of endodontic, periodontal, and prosthetic interventions ensured functional rehabilitation, long-term stability, and aesthetic enhancement. This case underscores the significance of individualized treatment planning, meticulous execution, and long-term follow-up in restoring function and aesthetics in patients with severe tooth wear.

Declarations

Acknowledgment

Nil

Conflict of interest

The authors declare no conflict of interest

Financial disclosures

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