



## Case Report

## Aesthetic and Functional Rehabilitation of a Patient with Generalized Tooth Wear

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## ARTICLE INFO

## Article history:

Received 10.06.2021

Accepted 06.08.2021

Published 07.09.2021

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10.38138/JMDR/v7i2.2.6.3

## ABSTRACT

Tooth wear alternatively known as Tooth Surface Loss (TSL) is becoming a considerable health problem around the world with an upsurge in prevalence. Management of these patients is a significant challenge in dental profession. Accurate diagnosis is vital with the help of detailed history, examination and appropriate investigations. Identification of possible etiologies supplemented by preventive measures plays a major role in management. Further, minimally invasive treatment strategies should always be promoted. Comprehensive care even with simple restorative and prosthetic techniques can successfully satisfy aesthetic and functional demands of the worn dentition.

**Keywords:** Adhesive restorations; Comprehensive management; Free-end saddles; Reorganized approach; Tooth wear

## 1 INTRODUCTION

There is an increased tendency for tooth wear at old ages. According to a study, the prevalence of severe tooth wear was reported as 15% among 70 years old patients compared to 3% for 20 years old patients.<sup>(1)</sup> However, this condition has become a considerable dental health problem among the young and the old in many parts of the world. Compromised dental attractiveness or functional problems are common with this cohort of patients.

Management of all forms of TSL should be carried out with the prime concern of preventing further damage to the teeth, as well as to protect and rehabilitate the already compromised dentition. Extensive restorative rehabilitation either with confirmatory or reorganized occlusal approach is necessary. With the advancements in adhesive dentistry, there is a paradigm shift in the management where using adhesive materials such as direct composite resins is more often.

The following case report presents comprehensive management of a patient presenting with generalized tooth wear

predisposed by loss of posterior occlusion. Management was carried out using a combined approach with conventional and adhesive restorations.

## 2 CASE REPORT

A 68-year-old man was referred to the Restorative Dentistry clinic, and his complaints were recurrent swelling and pain in relation to lower teeth, poor esthetics and reduced chewing ability.

He was diabetic for the last 17 years. He used to brush teeth twice daily using a tooth brush with medium textured bristles and a fluoridated toothpaste in a vigorous manner. He did not use inter dental cleaning aids or abrasive tooth pastes. Insight into the history did not reveal any para functional habits such as bruxism. Extra orally the facial appearance revealed mandibular over closure with reduced lower facial height.

He presented with a full complement of teeth in the upper arch which showed varying degree of tooth wear and partially dentate lower arch, generalized gingival recession

and grade I furcation involvement on 26 (Figure 1). Bilaterally all lower molar teeth had been extracted due to caries about 15 years ago. All the teeth except upper molars were with attrition. Teeth 17, 16, 26 and 27 were over erupted. Cervical abfraction / abrasion lesions were seen on 14, 15, 16, 24, 25, and 26. Lower four incisors were worn lingually up to the gingival margin and lower lateral incisors showed grade II mobility. Further, 45 was tender to percussion.



Fig. 1: Pre-operative view of teeth

Teeth 45, 33, 34 and 35 gave negative response to sensibility test using an electric pulp tester. Bilateral lower residual alveolar ridges were highly resorbed and lateral spreading of tongue was evident. Periapical radiolucent areas were evident in relation to 31, 32, 41, 42, 33, 34 and 35 (Figures 2 and 3A & C).



Fig. 2: Pre-operative DPT

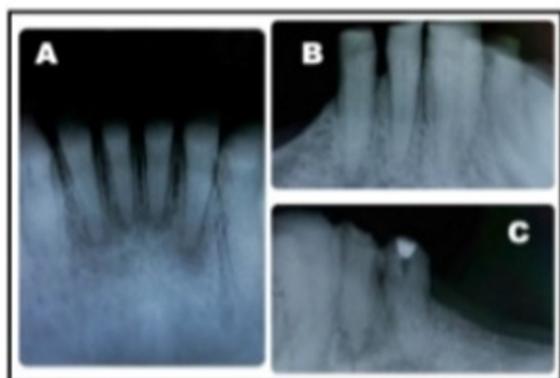


Fig. 3: Pre-operative IOPA A) 32, 31, 41, 42 B) 44, 45, C) 34, 35

Clinical information gathered from history, examination and investigations were used in arriving at the diagnoses

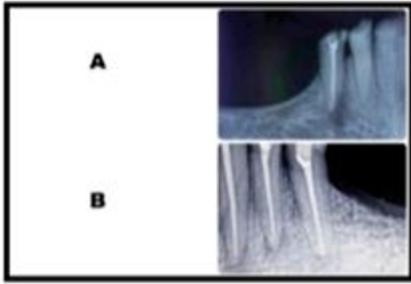
of severe generalized tooth wear with loss of occlusal vertical dimension, chronic apical periodontitis of 31, 32, 33, 34, 35, 41 and 42, grade I furcation of 26, dento-alveolar compensation and acquired loss of teeth- 36, 37, 38, 46, 47, 48. Since the patient was in acute pain the pulp of 35 was extirpated and non-setting  $\text{Ca(OH)}_2$  dressing was placed as an emergency management. Occlusal and facebow registration were done for diagnostic purpose using wax record blocks and silicone bite registration paste. Even though he did not show a stable centric occlusion, manipulation into the Retruded Contact Position (RCP) was possible without difficulties. He had dramatic loss of Occlusal Vertical Dimension (OVD) with 7mm of Inter Occlusal Clearance (IOC), which could be due to missing lower posterior teeth and generalized tooth wear. A 3mm of IOC was accepted, considering aesthetic improvement as well as functional need. Reorganization of existing occlusion to achieve new Inter Cuspal Position (ICP) at his RCP with canine protected occlusion was planned. Upper and lower casts were mounted on a semi adjustable articulator using occlusal and face bow registration records. Then, the diagnostic wax-up was fabricated according to the desired occlusal scheme ensuring to achieve bilateral canine guidance and esthetics needs (Figure 4). The importance in maintenance of high standard of oral hygiene especially for restored dentition was emphasized. Full mouth scaling and polishing was carried out to aid in oral hygiene practices. End-tufted tooth brush was introduced to clean the furcation area. Apart from occasional use of fizzy drinks no other contributory factors were identified in the three day diet chart. Lack of posterior tooth support, overuse of his remaining teeth for long term and overzealous tooth brushing were concluded as the possible aetiology of pathological tooth wear in this patient.



Fig. 4: Diagnostic wax-up

Teeth 31, 32, 41 and 42 were considered for extraction due to poor long term prognosis and patient's factors. Abrasion lesions were restored with resin composites. Meanwhile, root canal treatment of 45, 33, 34, and 35 were completed (Figure 5).

An acrylic removable partial denture for lower arch was provided using contemporary method as an interim



**Fig. 5:** A) Periapical radiographs of 45 after RCT B) periapical radiographs of 33, 34 and 35 after RCT

prosthesis with the purpose of training in new occlusion, with an increased OVD to have an IOC of 3mm at RCP as planned in diagnostic wax-up. Then, Silicone indices of the diagnostic wax-up was used as a guidance for buildup of composite of both upper and lower teeth to achieve the planned occlusal scheme (Figure 6).



**Fig. 6:** Front view of teeth in occlusion with the interim prosthesis

During review visits over the next 3 months it was observed that the patient was comfortable and happy with his new look. The next phase of definitive restorations was carried out by providing surveyed crowns for 34, 35 and 45 (Figure 7).



**Fig. 7:** Lower occlusal view after cementation of surveyed crowns

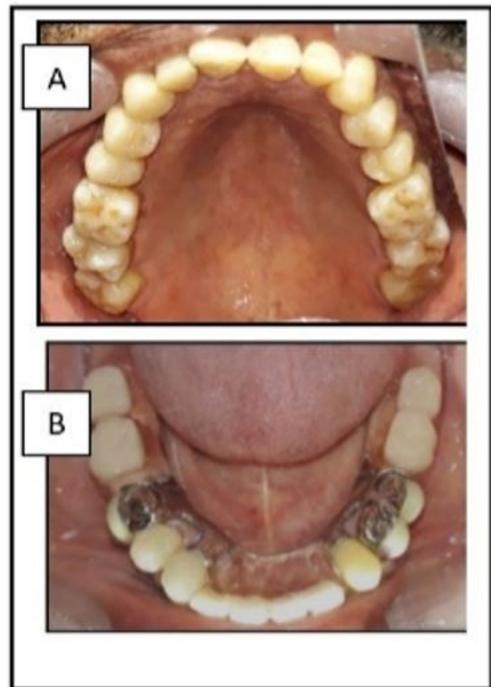
Teeth 33 and 43 were prepared for the planned cingulum rest seats. Definitive impression was taken for the fabrication

of metal framework. Subsequently an altered cast impression was recorded with light body silicone after checking the framework for proper fit (Figure 8).



**Fig. 8:** Altered cast impression of the lower distal saddles

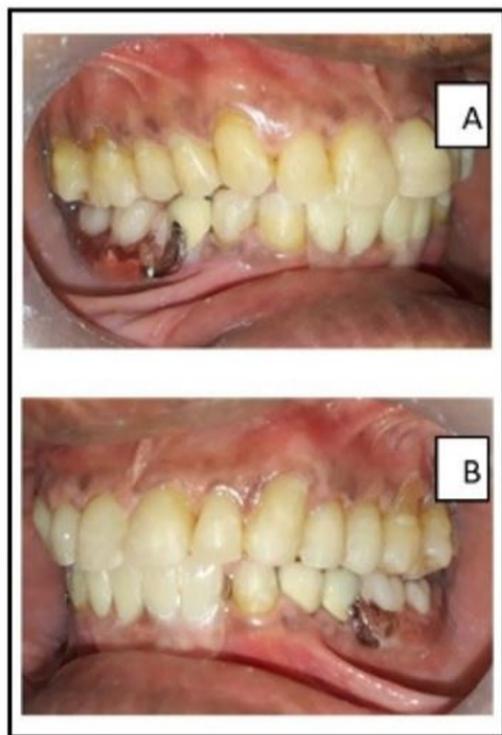
The lower metal denture was delivered. Patient was emphasized on meticulous oral hygiene, post denture delivery instructions and importance of maintenance care. Finally, a soft splint was provided for night wear for protection of the restorations. The patient is on regular review and he was satisfied with the outcome (Figures 9, 10 and 11).



**Fig. 9:** Post-operative occlusal views A) Upper arch B) Lower arch

### 3 DISCUSSION

In the presence of appropriate posterior stability, the occlusal forces will distribute over a wide area whereas lack of



**Fig. 10:** Post-operative lateral views A) Right side B) Left side



**Fig. 11:** Post-operative facial view of the patients with a smile

posterior support subjects the remaining anterior teeth to be overloaded exposing them to an increased potential for attrition. According to Turner and Missirilian, loss of posterior support is the main cause for loss of OVD.<sup>(2)</sup> But as mentioned in a recent publication there is little evidence to believe that reduced number of occluding teeth leads to increased tooth wear.<sup>(3)</sup> However, this patient presented with lost lower molars compromising his occlusion, loss of OVD and habitual edge to edge incisal relationship which in turn may have predisposed towards pathological tooth wear.

When the entire occlusal scheme needs to be changed to create a new and stable position a reorganized approach is considered.<sup>(4)</sup> Determination of the desired increase in OVD will depend on the space necessary to achieve functionally stable, aesthetic dental restorations with an acceptable IOC.<sup>(5)</sup> The patient's adaptability and tolerance on new occlusion can be assessed by using removable appliances such as full coverage acrylic occlusal splints. However due to factors other than increased OVD, this could act as a source of maladaptation itself.<sup>(6)</sup> As reported by Poyser et al, composite restorations placed at an increased OVD have 94% of survival rate after two years of period.<sup>(7)</sup> Therefore in this case, a removable partial denture in acrylic was used as an interim prosthesis to establish the posterior occlusion at the proposed OVD and then the other worn teeth were built up with resin composite to stabilize the new occlusion. This step was also considered as a preventive measure in controlling further wear of tooth substance in this patient. Direct composite restorations offer conservative and aesthetically acceptable restorations with minimal long term pulpal or structural complications.<sup>(8)</sup> Hemmings et al showed that direct composite resin restorations placed in a minimum thickness of 2 mm or more reported short to medium term performance.<sup>(9)</sup>

A systematic review based on the management of severe tooth wear concludes that the preferred treatment modality is inconclusive regarding whether to use direct or indirect technique.<sup>(10)</sup> The amount of existing tooth substance, tooth position and forces on loading will be considered in designing of definitive restorations.<sup>(11)</sup> However, it is advised to depend on minimal invasive options wherever possible. Yet, teeth with substantial loss of tooth substances are necessary to be restored with extra coronal restorations. So, 34, 35 and 45 loss were restored with conventional full coverage crowns with minimal occlusal reduction.

Replacement of missing teeth improves patient's functional and esthetic demand of the dentition. Implant supported prosthesis while giving great patient satisfaction carry financial and surgical burden making this solution impossible in certain situations. Where the saddle area is a long span or multiple, removable partial dentures appear to be a better option. RPI system and the altered cast technique are effective ways to overcome the possible problems of instability.<sup>(12,13)</sup> Full mouth rehabilitation was successfully carried out in a simple and cost effective manner to provide desired functional and aesthetic outcome.

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