



The prosthodontist's role in restoring the aging dentition: a case report

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ARTICLE INFO

Article history:

Received: 24 October 2013;

Received in revised form:

25 November 2013;

Accepted: 5 December 2013;

Keywords

Over Dentures,
Tooth Supported Denture.

ABSTRACT

Complete overdenture treatment uses a removable complete denture that overlies retained teeth, tooth roots, or dental implants. Those teeth that would have gone for extraction can frequently be retained by improving their crown-root ratio. These teeth, because of periodontal disease, have lost about two-third of their bony support and have a very unfavourable crown-root ratio. If endodontic therapy is performed on the retained teeth followed by reduction, the crown-root ratio can be greatly improved. An overdenture can be made that is supported by both teeth and residual alveolar ridge. Such treatment provides potential benefits by reducing residual ridge resorption, improves prosthesis retention and stability, and increased patient satisfaction. The overdenture concept may be used on complete, immediate or partial dentures.

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Introduction

Any mandibular complete denture relies on the successful influences of prosthetic retention and stability to achieve a satisfactory treatment outcome^{1,2}. Redford et al³ demonstrated that more than 50% of conventional mandibular complete dentures have problems with retention and stability and also mandibular complete dentures produce significantly more patient problems than maxillary dentures, primarily because of poor prosthesis retention⁴.

The use of tooth-supported overdentures is a common form of treatment. An overdenture may be defined as "A denture, the base of which covers one or more prepared roots or implants"⁵ or "A complete or removable partial denture that covers and rests on one or more remaining natural teeth or roots or a prosthesis that covers and is partially supported by natural teeth, tooth roots or dental implants or a prosthesis covering the occlusal surfaces of the teeth or the over lay of artificial teeth on the surface of natural teeth to improve occlusion, arch form and/or esthetics – super imposed prosthesis".

This article will use the term overdenture to refer to tooth-supported prostheses and not implant-supported prostheses which are not within its scope.

There are many documented advantages to the retention of roots for supporting a denture.⁶

1. Preservation of alveolar bone
2. Preservation of proprioceptive mechanism
3. Better support and stability
4. Increased retention
5. Patients acceptance
6. A simple approach to problematic patient
7. Convertibility to conventional complete denture
8. Post insertion problems are minimal
9. Proprioceptive feedback

However, there are disadvantages of using teeth for overdentures:

1. Caries susceptibility
2. More expensive
3. Encroachment of inter occlusal distance
4. Presence of bony undercuts
5. Surgical intervention usually not possible
6. Fracture of the denture base
7. More bulky
8. Removable prosthesis

The long-term success of using teeth as overdenture abutments has been well documented.^{7, 8}. Toolson and Taylor⁷ showed that, over 10 years, 66 out of 77 abutments survived and, of the 11 that failed, six were due to secondary caries. Hence caries control is very important in the assessment of overdenture abutments. Crum and Rooney⁸ undertook a study with two groups of men. The first group were provided with complete upper and lower prostheses and the second had a complete upper and lower overdenture retaining the canine roots. Over a 5- year period there was a loss of 5.2 mm of alveolar bone in the former compared to 0.6 mm in the later group.

Case Report

This 55-year-old female reported to the Department of Prosthodontics with the chief complains of loose removable partial denture and difficulty in speaking and eating food. She presented just with the canines remaining in the lower arch supporting an acrylic removable partial denture. She wore the removable partial denture for over six months and was not satisfied and required a definitive treatment. There were no probing depths, although there had been some attachment loss with good oral hygiene. The maxilla was also partially edentulous with 11 and 14 remaining in the first quadrant and 21, 24 and 25 remaining in the second quadrant which also

needed replacement (Figure 1). Periapical radiographs of bilateral lower canines revealed that there were no signs of periapical infection.

Various treatment options for the present case were

1. A fixed- conventional bridge with 31, 32, 33 and 41, 42, 43 a bilateral free-end saddle partial denture to 34, 35, 36, 37 and 44, 45, 46, 47
2. An implant and tooth-supported fixed or removable prosthesis.
3. An overdenture with or without attachments

The first option was excluded owing to the fact that the roots of the canines were short, and to retain a bridge or crowns and a partial denture would place unfavourable stresses that may lead to their early loss. Then the patient was explained about the implant supported prosthesis and the surgery involved in the placement of implants for which she refused. Finally she agreed for root canal treatments in relation to 33 and 43 followed by fabrication of a complete overdenture.

Treatment

Tooth-borne overdenture abutments were prepared using a short, dome-shaped contour which were hemi spherically rounded in all dimensions just above the mucosa (figure 2). These preparations were endodontically treated in advance. After restoration of the endodontically treated teeth, the rounded cast copings were fabricated and luted over the exposed root surfaces (Figure 3). A 'pick-up' impression was then made in a special tray made with correct extension for a complete denture (Figure 4). The maxillary arch was restored with a removable partial denture and the mandibular with overdenture (Figure 5). The patient was satisfied with the treatment and the retention of the prosthesis was good. The oral hygiene and dietary instructions with regards to caries control were reinforced. Routine follow-ups were made once in three months. The prosthesis is in function for about 3 years now with no complaints.



Discussion

The use of roots as overdenture abutments is beneficial to the patient. The psychological aspects of patients losing teeth should not be underestimated and has been well documented⁷. The retention of alveolar bone is also an important factor. This is especially so if a complete denture is opposed to a natural dentition. There is an added expense in the cost of endodontics (if not already carried out) and the cost of the post/diaphragm/attachment. Therefore, careful selection of abutments is important. The first decision to be made must be whether to retain the teeth as Overdenture abutments and then to

assess whether attachments can be used and will be beneficial. The abutments should have the following qualities:

1. Little or no mobility.
2. Good root length with little attachment loss.
3. Absence of periodontal disease
4. Endodontically treatable.

The prognosis of other remaining teeth, the caries susceptibility, and patient attitude to treatment should be assessed. Another important aspect of the treatment is the space requirement. From the root face, a minimum of 1 mm of polymethylmethacrylate is required. In this case, there was only just enough room and so, on clinical examination, emphasis on space requirement is an important factor. If the acrylic is too thin it will fail mechanically.

The likely cause of failure of overdenture abutments is secondary caries or periodontal disease. A regimen of oral hygiene instruction, dietary control and regular maintenance visits should be prescribed. As with all prostheses, the patients need regular review appointments.

Hence a proper diagnosis, education and motivation to the elderly patients can get the smile back on their faces by prosthodontists.

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