

Original Article

Comparative Evaluation of Root Supported Over-Denture versus Root Supported Over-Denture with Precision Attachment

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ABSTRACT

Introduction: Over-denture treatment concept is about the removable complete denture that overlies retained teeth, tooth roots, or dental implants. This treatment option is not a recent concept, and has been successfully employed in existing tooth structures or retained roots to assist with complete denture treatment. The healthy periodontal ligament indicates healthy alveolar ridge morphology, whereas a diseased periodontal ligament, or its absence, is associated with inevitable time-dependent reduction in residual ridge dimensions. **Materials and methods:** A comparative study was conducted among a total of 38 patients who were treated and evaluated over the period of 18 months. Patients were divided into two groups, group A had 19 patients who opted for conventional root supported over-denture. Group B had 19 patients who opted for root supported over-dentures with precision attachment. **Results:** All the response were recorded manually and interpreted electronically. Out of 19 patients in group A, 5 patients (26%) complained of denture rocking and discomfort while chewing. 3 patients (16%) complained discomfort while speaking. None of the patients complained about the esthetics, problems with removal and insertion or cleaning and maintenance. Out of 19 patients of group B, 2 patients (11%) complained about discomfort while chewing, 1 patient (5%) patient complained about poor phonetics, 7 patients (37%) complained about difficulty in removal and insertion and 3 patients (16%) complained about difficulty in cleaning and maintaining oral hygiene. **Conclusion:** Root supported over-denture with precision attachment prosthesis are a simple and a cost effective alternative treatment to prefabricated attachments for enhancing the retention of tooth supported over-dentures. Also, the root supported over-denture with precision attachment are poor in terms of oral hygiene when compared with tooth supported over-dentures.

Keywords: Conventional over-dentures, Root supported over-dentures; Oral hygiene.

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INTRODUCTION

Over-denture treatment concept is about the removable complete denture that overlies retained teeth, tooth roots, or dental implants. This treatment option is not a recent concept, and has been successfully employed in existing tooth structures or retained roots to assist with complete denture treatment.^{1,2} The healthy periodontal ligament indicates healthy alveolar ridge morphology, whereas a diseased periodontal ligament, or its absence, is associated with inevitable time-dependent reduction in residual ridge dimensions.³ To avoid such a condition, two or more, retained teeth abutments are generally endodontic-ally treated and are used as abutments for an over-denture. The basic idea behind this is to distribute stress concentration between retained abutments and denture-supporting soft tissues and preservation of the

residual alveolar ridge.^{4,5} Retained root abutments can comparatively provide better retention, support, and stability to an over-denture and also provide unaltered proprioception which would otherwise be lost with conventional partial denture treatment. Various attachments might not be a popular choice among various dental professionals for reasons such as cost and reluctance to grasp the intricacies of their indications and applications. It is important to note, an attachment retained dental prosthesis can improve patient esthetics and improve function.⁶⁻⁸ Implant retained prosthesis is also another recent option but is sometimes not possible due to insufficient amount of bone or economic reasons. This article is focused on the comparative evaluation of the two over denture techniques, namely conventional

root supported over-denture and root supported over-dentures with precision attachment.

MATERIAL AND METHODS

A comparative study was conducted in department of dentistry, in our institute. A prior approval from the ethics board of our collage was taken. All patients were asked for a prior consent for the treatment and it's evaluation through the comparative study. A total of 38 patients were treated and evaluated over the period of 18 months. Patients were divided into two groups, group A had 19 patients who opted for conventional root supported over-denture. Group B had 19 patients who opted for root supported over-dentures with precision attachment. In group B patients, the custom made ball attachments (male component) and orthodontic separators (female component) were used as simple and very cost effective option to the use of prefabricated attachments. The separators used are small elastics which are very commonly used during the orthodontic treatment to maintain and create space between the teeth prior to placement of metal bands. The entire treatment for patients of both groups was completed in 2 months' time. For first three months all patients were evaluated for every 15 days, and later a monthly follow up was made for remaining 13 months. All patients were advised to follow post denture insertion protocol. All the patients were asked a series of questions, and were asked to evaluate the following statements depending on their experience with the denture. (a) Esthetically sound (b) any discomfort while chewing, (c) and discomfort while speaking, (d) and problems with removal or insertion, (e) ease of cleaning and maintenance. While clinical examination various factors were evaluated for every person; (a) stability, (b) retention, (c) phonetics and (d) oral hygiene. Ball attachments were made 1 mm larger than the inner diameter of the separators to maintain

adequate frictional retention. Inner and outer diameter of the desired separator was 2.23 and 4.23 mm respectively. When it was stretched and extended by 1 mm, the outer diameter became 5.23 mm and the amount of frictional force applied for retention by the separator on the ball attachment was calculated with the help of a dontrix gauge. The amount of frictional retentive force provided by the prefabricated stud attachments are in the range of 3.2–11 N. The force was more than the retentive force provided by these custom ball abutments. All responses were manually recorded and later on interpreted electronically.

RESULTS

All the response were recorded manually and interpreted electronically. Out of 19 patients in group A, 5 patients (26%) complained of denture rocking and discomfort while chewing. 3 patients (16%) complained discomfort while speaking. None of the patients complained about the esthetics, problems with removal and insertion or cleaning and maintenance. (Graph 1) Out of 19 patients of group B, 2 patients (11%) complained about discomfort while chewing, 1 patient (5%) patient complained about poor phonetics, 7 patients (37%) complained about difficulty in removal and insertion and 3 patients (16%) complained about difficulty in cleaning and maintaining oral hygiene. No patient complained about appearance or esthetics. (Graph 2) When the patients were evaluated clinically, in group A, 3 patients had stability problem, 2 patients had retention problem, 3 patients had phonetics problem and no patient had oral hygiene issues. Whereas in group B, 2 patients had stability problem, 1 patient had retention problem, 1 patient had problem with the phonetics and 5 patients had oral hygiene issues (Table 1).

Table 1: Number of patients with various problems of GROUP A

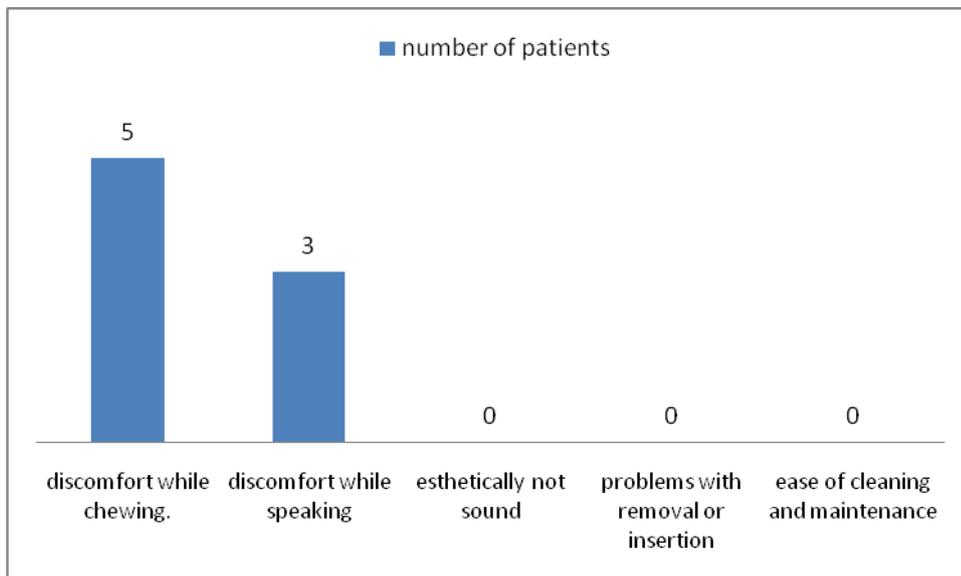


Table 2: Number of patients with various problems of GROUP B

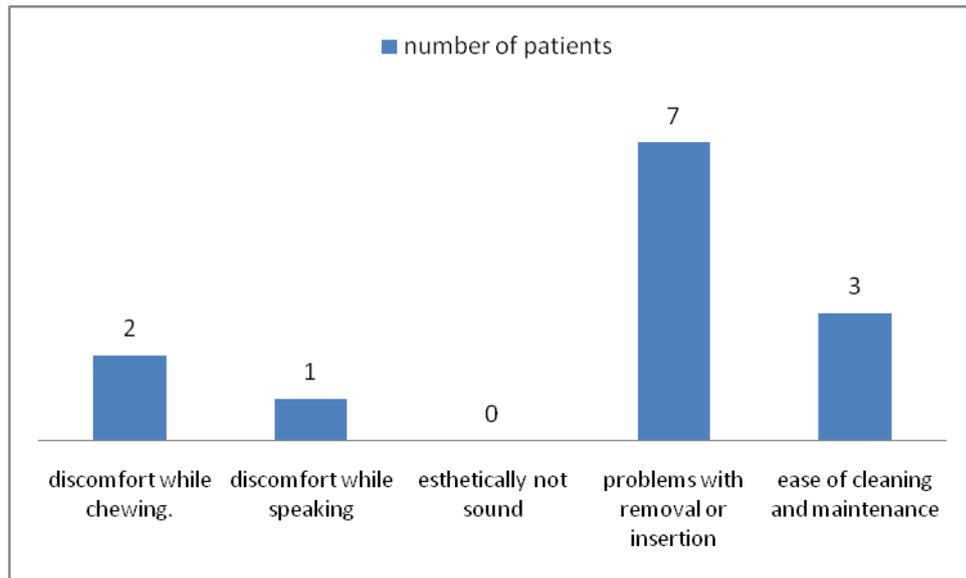


Table 1: Comparison of Group A and Group B Clinical Problems

Clinical Problems	n GROUP A	n GROUP B
Stability	3	2
Retention	2	1
Phonetics	3	1
Oral Hygiene	0	5

DISCUSSION

A number of attachments are available and are widely used with removable partial/complete denture prosthesis, segmented fixed prosthesis, and implant supported prosthesis. It is interesting to know that, no single attachment is perfect for every case. Therefore, it becomes crucial to understand that the appropriate attachment should be selected for each individual situation. Thus, by simply analyzing the study models and radiographs, the practitioner can make conclusive diagnosis, each of which will determine the final attachment selection. This is a viable alternative option for the patients with few retained teeth and also who are not prepared to undergo surgical procedure and economics involved with implant placement. In group B patients, the custom made ball attachments (male component) and orthodontic separators (female component) were used as simple and very cost effective option to the use of prefabricated attachments. The separators used are small elastics which are very commonly used during the orthodontic treatment to maintain and create space between the teeth prior to placement of metal bands. Earlier, Teflon discs were used for the matrix but they are only available in the form of solid cylinders. Yet, the central hole was made manually by the lab technician according to the diameter of the male component. It often leads to dimensional inaccuracy and decreased retention. In comparison, separators are very easy to use since a specific diameter of required

dimensions is available and there is no need of cutting or altering a central hole.⁹ Ball attachments were made 1 mm larger than the inner diameter of the separators to maintain adequate frictional retention. Inner and outer diameter of the desired separator was 2.23 and 4.23 mm respectively. When it was stretched and extended by 1 mm, the outer diameter became 5.23 mm and the amount of frictional force applied for retention by the separator on the ball attachment was calculated with the help of a dontrix gauge. A dontrix gauge is an orthodontic appliance that is used to measure elastic forces for different orthodontic movements.¹⁰ The amount of frictional retentive force provided by the prefabricated stud attachments are in the range of 3.2–11 N. The force was more than the retentive force provided by these custom ball abutments.^{11,12} Therefore, such amount of force is not likely to be detrimental to the abutments and also at the same time provides sufficient amount of retention to the denture.

CONCLUSION

Root supported over-denture with precision attachment prosthesis are a simple and cost effective alternative treatment to the use of prefabricated attachments for enhancing the retention of tooth supported over-dentures. Also, the root supported over-denture with precision attachment are poor in terms of oral hygiene maintains at all times when compared with tooth supported over-dentures.

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