A MODIFIED VITAL AND NON VITAL ROOT SUB MERGENCE CONCEPT FOR OVER DENTURES; A CASE REPORT

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Abstract

The shape and size of the alveolar ridge change when the natural teeth are removed. The alveoli become mere holes which begin to fill up with new bone, but at the same time the bone around the margins of the tooth sockets begins to shrink away. The shrinkage or resorption is rapid at first and then continues at a reduced rate throughout life. Ridge resorption occurs both in patients who wear dentures and those who do not. Some patients have little or no RRR over a long period of time while other patients have gross RRR in a very short period of time. The inevitable residual ridge resorption has been approached with different established scientific philosophies to bring about an effective modification and longevity in denture retention. Overdenture as a treatment option is not new and several criteria have to be fulfilled to plan a successful overdenture treatment plan. The following case report was planned following an old concept of retaining submerged vital and non vital roots but with a different approach.

Key words- vital, non vital root, sub-mergence, over dentures

Introduction

One of the most challenging tasks in the course of prosthodontic rehabilitation is restoration of a completely edentulous lower arch with severe resorption. This is true even in cases of long standing edentulous arches with a longer span of missing teeth. Residual ridges could show lesser resorption if atleast few teeth or teeth roots could be retained through endodontic treatment. A lesser resorbed ridge will definitely help in lesser resorption and hence better retention of the prosthesis as well as an enhanced stability and support.

Residual Ridge Resorption

Residual ridge resorption has been considered as an inevitable consequence after extraction of the teeth. There is a gradual loss of the alveolar bone due to the pattern of bone remodeling. In spite of the availability of newer treatment modalities like endodontic restoration and periodontic procedures for preservation of the remaining teeth they are not feasible for the patients in severe stages where restoration might not be possible. The only reliable method of preserving the remaining bone is by maintaining the functional health of the teeth. Over the years, many studies showed that roots which are fractured and left behind during extractions are retained into the alveolar bone with no evidence of pathosis. Over denture as a treatment option was developed in an effort to preserve the remaining alveolar bone by retaining the natural teeth or roots. In over denture treatment, the teeth selected as abutments are prone to caries and periodontal disease over a period of time. Hence evolved the vital or non vital root submergence concept. After a thorough radiographic and clinical examination, few teeth without pathosis are retained that eventually are surgically submerged in the alveolar ridge. After healing, the over denture with remaining vital or non vital teeth preserve the integrity of the bone, making the treatment an effective and successfull preventive prosthodontic treatment. (1)

Case Report

A septuagenarian male patient visited the out patients section of the Department of Prosthodontics and Crown & Bridge of New Horizon Dental College with a chief complaint, which was his desire to get a denture for his edentulous mouth.

On examination, it was found that the patient was completely edentulous in the upper arch and only two teeth with gingival recession and grade I mobility remained in the lower arch which were 34 and 35. (Fig. I & Fig. II) The remaining arch in the lower jaw except for the retained premolars showed severe resorption which indicated that except for implant supported dentures, achieving retention of the lower dentures would be a challenging task in itself.

Since the teeth were not in a strategically good position for a partial removable denture or an overdenture, the first set of advice given to him was to get his remaining teeth extracted and

to get a complete denture fabricated though the lower denture would not be perfect in retention. Else a case of implant supported prosthesis could be an option if diagnostic radiological investigations would support the procedure, since bone volume was compromised.

The patient counter reported that he was a patient of diabetes mellitus and had additional regular medications for cardiac ailments. So he wanted a treatment possibility that would help him balance all his problems.

Fig. I

Fig. II

Hence a treatment was planned to go for a single complete denture of the upper arch and a tooth supported over denture of the lower arch with 34 and 35 as the supporting teeth with expectation that if at least roots of the teeth could be retained after endodontic treatment, atleast a portion of the lower arch could be saved from fast resorption and the lower denture would have a somewhat enhanced life.

The teeth after endodontic treatment showed little better outcomes as the tenderness was gone and mobility was reduced. The post operative radiograph of the treated teeth showed presence of no periapical pathologies though severe recession of the gingiva was noted with almost 2/3rd portion of both the teeth being out of the bone (Fig. III).

Fig. III

Fig. IV

The plan was not to go for coventional abutment preparation and coping fabrication. The teeth were cut at the level of the gingiva at the ridge and restored with light cured composite resin. Sharp margins were adjusted so that the adjoining gingival tissue was not harmed(Fig. IV). Thus a lower ridge was prepared with reduced resorption of a segment. The remaining procedures were conventional ones as followed in case of complete dentures.

Primary impression of the upper arch was made with impression compound (Type I impression material).(Fig. V)For the lower arch an impression was initially made with compound and then a pick up was made with alginate impression material. (Fig. VI).

Fig. V

Fig. VI

Border moulding and final impression was also done conventionally with Green Stick impression material and light body addition silicone impression material. (Fig. VII)

Fig. VII

Maxillomandibular relation (Fig. VIII) was made conventionally and the final try in dentures showed promising results. (Fig. IX, Fig. X & Fig. XI)

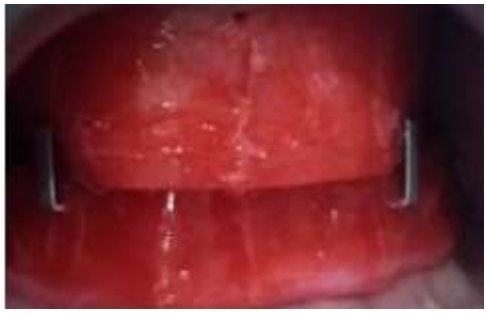

Fig. VIII

Fig. IX

Fig. X

Fig. XI

After insertion the denture was well adapted and specifically the lower denture was well retained and stable. (Fig. XII, Fig. XIII, Fig. XIV) The patient was happy and satisfied with the treatment. (Fig. XV)

Fig, XII

Fig. XIII

Fig. XIV Fig. XV

Discussion

Preserving the remaining bone can be achieved by maintaining the functional health of the teeth [2]. In over denture treatment, the abutment teeth are prone to caries and periodontal disease. Hence evolved the vital or non vital root submergence concept [3]. After a thorough radiographic and clinical examination, teeth are submerged in the alveolar ridge making it a preventive Prosthodontic treatment [4]. The vital and non vital root submergence treatment is established as an important and effective alternative for patients with compromised oral health conditions [5]. The main aim to retain the remaining teeth in this case was that the use of retained roots helped in preserving the integrity of the residual alveolar ridge in the region [6]. So at several points of the principle of vital or non vital root submergence concep there was deviation and simple procedures were opted for preserving the remaining teeth. The advantages of this treatment plan can be listed as –

- Preservation of the alveolar bone which enhances the retention of dentures.
- Vertical dimension of occlusion is maintained.
- The average tactile perception to load was increased than that of natural teeth.

This treatment was advantageous than over dentures with attachments, as presence of attachments decreases the intra arch space making teeth arrangement difficult. In this method, there was no criterion for preservation of teeth unlike conventional over dentures where the configuration or location of the teeth has to be considered. Hence, any number of teeth could be preserved. It is comparatively inexpensive and maintenance procedure like application of fluoride on the remaining natural teeth is not required as in conventional over denture treatment [7]. In 1959, Simpson examined a number of retained roots in humans and suggested that root fragments, which were originally unaffected, could be safely left in position [8, 9]. Preserving the teeth or the roots preserves the periodontal ligament [10]. The first published report of intentional root submersion was by Bjorn in 1961 [10]. In 1970, Howell reported a clinical study of submerged endodontically treated roots, some of which had been under observation for more than 10 years [11]. In 1973, Herd reported on 228 retained roots from 171 patients [12]. He found that 163 of these roots had vital pulp tissue with no inflammation. Howell's purpose was an attempt to preserve alveolar bone. He claimed there was no apparent loss of bone in this long-term study and appears to be the first to utilize this technique for bone preservation under complete dentures. In 1973, Sander discussed the advantages of root retention for the maintenance of alveolar bone. He cited the main disadvantage of root submersion was the reduction in height of the vestibule [13].

Conclusion

The idea of retaining the slightly mobile premolars unilaterally was based on the fact that post endodontic treatment reducing the tooth roots to the level of the mucosa would not further disturb the mobility of the teeth and at the same time the roots would help maintain the integrity of the ridges and prevent resorption in that region. To avoid the drawbacks of vital and non vital submerged roots like periapical pathology and secondary caries to name a few, the teeth wer treated endodontically. Hence by this method the functional aspects of a proper complete denture were achieved to some extent and the patient satisfaction was obtained by avoiding any extractions or costly surgical procedures.

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