CASE REPORT

Rehabilitation of maxillary arch with attachment-retained mesh-reinforced single complete denture

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SUMMARY

Fabrication of conventional complete dentures was one of the most commonly advised treatment options to manage edentulous patients since many years. One of the commonly encountered challenging tasks in prosthodontics is a clinical situation in which patients have maxillary completely edentulous arches opposing mandibular natural dentition. This situation can be effectively managed by retaining some of the natural teeth as overdenture abutments. Tooth supported overdenture retained by attachments will improve retention, support and stability, and reduces rate of ridge resorption along with psychological benefits to the patients by providing tactile sensation. The present case report describes management of patients with edentulous maxillary arch opposing natural mandibular dentition-rehabilitated attachment-retained mesh-reinforced overdenture.

BACKGROUND

The present case was treated using a simplified approach to attain good prognosis by considering a few biomechanical factors in denture design.¹⁻⁴

CASE PRESENTATION

We present the case of a patient aged 55 years who presented with missing upper front and back teeth. His dental history revealed loss of teeth because of mobility. On intraoral examination, maxillary arch was reported to be partially edentulous with 13, 21 and 23 segments along with retained root pieces in 24, 25 and 28 regions. Mandibular arch had full complement of natural teeth except missing 41 (figures 1 and 2). On palpation, grade I mobility was reported in relation to 21.

INVESTIGATIONS

Diagnostic models and orthopantomogram were obtained.

Figure 2 Preoperative radiograph.

TREATMENT

Treatment was planned to preserve the remaining dentition and to fabricate prosthesis with improved retention, stability, support and patient's comfort. Oral prophylaxis was carried out to improve the periodontal health of the remaining natural dentition with localised curettage for 21. Root pieces in the region of 24, 25 and 28 were extracted.

Remaining teeth in maxillary arch, 13, 11 and 23 were selected to serve as overdenture abutments. Intentional root canal treatment was performed to facilitate tooth preparation. Localised curettage followed by reduction in the crown root ratio after tooth preparation resulted in reduced mobility of 11.

Both the canines were prepared to receive ball attachments to retain overdenture (figure 3). After root canal therapy, canal was enlarged using specific drills provided with attachments whose shape and size coincide with the radicular extension of the attachment (figures 4-6). After radicular preparation, attachments were cemented in the patient's mouth (figure 7). Master cast was duplicated and horseshoe-shaped wax pattern was designed on the refractory cast, relieving the retained abutment teeth (figures 7 and 8). Conventional procedure of complete denture fabrication was followed by relieving the portion of the ball attachment. During

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Figure 1 Preoperative photograph.

Figure 3 Tooth preparation.

Figure 4 Radicular attachments.

the denture insertion appointment, female portion of the attachments were picked up using autopolymerising resin (figure 9).

OUTCOME AND FOLLOW-UP

Preservation of natural teeth, incorporation of attachments, reducing the tissue coverage and metallic reinforcement in the present case report have shown to improve the final treatment outcome with good patient's satisfaction.

DISCUSSION

Planning the treatment according to the patient's dentition plays a key role in the successful outcome of the prosthesis. In the present case report, various factors were considered in designing the prosthesis to improve long-term success and patient's comfort.

The ball-type and socket-type attachments were selected to retain the denture as they were considered to be more appropriate resilient attachment mechanism among the available overdenture attachment designs.^{4 5} They were considered to be the best attachment design as they transfer minimal forces to the abutment teeth.⁶ As the attachments were used to retain the denture rather than peripheral seal, the tissue coverage was reduced by removing the palatal portion of the denture. This type of design helped in improving the tissue health and patient's comfort. A study conducted by Akeel *et al*,⁷ comparing the dentures with complete coverage and palateless dentures showed that patients were more comfortable with palateless dentures. Significant differences in the

Figure 5 Drills for radicular preparation.

Figure 6 Tooth preparation to receive attachments.

bite force were not reported between two types of dentures and they concluded that palateless dentures were as effective as dentures with full palatal coverage.

Central incisor was preserved to act like an indirect retainer preventing anteroposterior rotation of the denture along the fulcrum passing through the attachments during function. Localised curettage was performed to improve the periodontal health. Maxillary denture was reinforced with the metal framework to avoid fracture of the denture and to withstand the load from full complement of periodontally strong opposing natural dentition.^{8 9} Use of cobalt chromium base in the maxillary denture was also shown to reduce functional deformation and thrust to the supporting tissues that occur in anterior maxilla.¹⁰

Figure 7 Maxillary canines with attachments and central incisor with metal coping.

Figure 8 Maxillary metallic reinforcement: wax pattern and casted framework.

Figure 9 Postoperative photograph.

Learning points

- Overdenture prosthesis is more conservative, effective and clinically acceptable alternative to conventional complete dentures.
- Use of attachments at appropriate locations to retain the denture improves retention and patient's comfort.
- Metallic reinforcement of the denture improved the fracture resistance of denture base.
- Planning the treatment considering the biomechanics of the patient's oral tissues improves the prognosis of final prosthesis.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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