Removable Partial Prosthesis (RPP) with acrylic resin flange for the mandibular guidance therapy

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Abstract

Objectives Patients undergoing hemimandibulectomy suffer from mandibular deviation.

The purpose of this article is to describe a new therapeutic possibility for the prosthetic management of these patients using only one device both for physiotherapy and eating.

Methods A 56-year-old man's pre-existing mandibular removable partial prosthesis was modified to use as a partial prosthesis as a device to correct mandibular deviation. In fact, two precision attachments matrix were inserted into buccal surface of partial prosthesis base and corresponding matrix were inserted into a transparent acrylic resin guide-flange.

Results In this way the patient can use only one prosthesis both for physiotherapy and eating simply inserting and removing the guide flange.

The transparent resin employ is important for the day by day use.

Conclusion This technique permits to use only one device both for mechanical correction of mandibular deviation and masticatory function while literature shows that two different devices are usually used in patients with mandibular deviation to satisfy both these functions.

Keywords Hemimandibulectomy · Mandibular deviation · Guide flange prosthesis

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Introduction

Surgical treatment for neoplastic lesions of the oral cavity often requires resection involving the mandible, floor of the mouth, tongue, and also palate [1]. Mandibular deviation due to loss of mandibular bone continuity in consequence of surgical treatment, and related altered muscle function will clinically result in facial asymmetry and malocclusion [1]. The residual mandible deviates medially and superiorly, and it will be more or less evident depending on the location and extension of the resection, the amount of soft tissue and innervations involvement, the presence of remaining natural teeth (the deviate mandibular movement is more evident in edentulous patients than in dentulous patients that have had a normal intermaxillary relationship) [1,2]. A

corrective device named 'guide flange prosthesis' is indicated to limit that clinical manifestation, also waiting for a prospective reconstructive surgical treatment, and it can be applied either immediate postoperatively as intermaxillary fixation or within 7 to 10 days after the resection as removable device, to restore mandibular function [2,3]. Some authors prefer to make irreversible hydrocolloid impressions of maxilla and mandible and a wax interocclusal centric relation record before surgical resective procedure [4].

The main thing is to re-educate mandibular muscles to re-establish an acceptable occlusal relationship (physiotherapeutic function) for residual hemimandible [5], so that the patient could control adequately and repeatedly opening and closing mandibular movements [6]. This is the beginning of accomplished prosthetic

rehabilitation using a removable prosthesis of which artificial teeth could warrant a stable occlusion. For better results the prosthetic management can be combined with an exercise program, that can be started 2 weeks after the surgery. The patient's chin and mandible moves away from the surgical side [2]. Another efficacious exercise is to chewing gum. It is generally accepted that there are fewer problems with the rehabilitation of partially edentulous patients than completely edentulous patients [1].

Literature shows varying basic design of prostheses used, that can be mandibular-based or palatal based anchored on natural teeth or denture flange [1,2,5,7].

The mandibular guide flange device for hemimandibulectomy patients presenting good natural teeth on the residual mandible fits generally over those teeth (base-plaque) and has a guide plane (flange splint)

Fig. 1 Intraoral view with mandibular removable partial prosthesis placed

Fig. 2 Intraoral view with maxillary removable partial prosthesis placed

Fig. 3 Mandibular removable partial prosthesis on dental cast with flexible repositioning key used to maintain the position of wax splint

Fig. 4 Intraoral view of metal plaque on which were soldered 2 patricis inserted into buccal surface of right denture base of mandibular removable partial prosthesis

Fig. 5 Clear acrylic resin splint with interim matrix

Fig. 6 Clear acrylic resin splint with definitive matrix

Fig. 7 Definitive acrylic resin splint inserted on mandibular removable partial prosthesis

Fig. 8 Device placed into oral cavity

extending into the maxillary buccal vestibule, riding on the buccal surfaces of several of the maxillary teeth. This is the mechanical system preventing the mandible from turning toward the resected side [6,8].

The success of mandibular guidance therapy depends on early beginning, the nature of the surgical defect, and the patient cooperation. This sort of therapy is most successful in patients whose resection involves only bone structures, and minimally tongue, floor of the mouth and contiguous soft tissues. The prognosis of mandibular guidance therapy also improves if radical neck dissection or radiation therapy is not applied [3]. Normally, patients can use a guide flange device all day except for at night and during the meals.

The purpose of this article is to describe a new therapeutic possibility for the

prosthetic management of hemimandibulectomy patients that foresees using only 1 device both for corrective mandibular movement therapy and masticatory function. This sort of device permits the use of the same prosthesis both for eating and for mechanical correction of mandibular deviation.

Methods

A 56-year-old man, came to the Dental Prosthesis Service with outcomes of left mandibular portion hemimandibulectomy. The patient was not financially sound. No intermaxillary fixation was applied at surgical time. From a dental point of view the patient had within first right to first left mandibular premolar; the surgical side was

beside the first left premolar. Both right and left first premolar and canine were gold resin fixed partial dentures. The patient wore a mandibular removable partial prosthesis with two Ackers clasps both on first right and left premolar and two denture bases of which the left with one resin molar and the right with two resin molars (Fig. 1). Right maxillary central, lateral and canine and left central incisor were also gold resin fixed partial dentures while first left molar was natural tooth. The patient wore a maxillary removable partial denture made with an antero-posterior band, circumferential clasp on the first left molar and simple clasps on the right canine and left central incisor with one rest on their palatine surface. Three resin premolars and two resin molars were on the right denture base, and resin lateral incisor, canine and first premolar were on the left denture base (Fig. 2).

The patient showed a mandibular deviation toward the osseous defect side, so a modification on mandibular removable partial prosthesis was scheduled to correct mandibular deviation movements. Occlusal contacts on right side were good when mandible was moved into centric occlusion position, so it was not necessary to replace artificial teeth.

A wax splint (Beauty Pink; Moyco Industries Inc, Philadelphia, Pa), modelled in oral cavity while the patient leaded to the centric occlusion, was realized solidly with buccal surface of right denture base and then processed in transparent acrylic resin (Leocryl, Leone S.p.A., Florence, Italy) using an hydromuffole for 15 min at 40°C and pressure of 6 bar (Ivomat IP3, Ivoclar Vivadent, Schaan, Liechtenstein) (Fig. 3). The modification consisted of placing two cylindrical rubbing attachments (Conod, Cendres and Métaux Italia S.r.L., Milan, Italy), of which patrix diameter was 1.8 mm and total height 3.0 mm, and matrix base diameter was 2.4 mm and total height 2.7 mm. The two patrix, initially made active with own key, were soldered at the ends of a rectangular metal plaque (Pa-Ag-Au-Cu-Zn alloy) 10 x 5 mm and 0.5 mm thickness, that was then inserted into buccal surface of right denture base of mandibular removable partial prosthesis (Fig. 4). The mandibular removable partial prosthesis, so modified, was positioned into oral cavity and the two analogues of matrix of two attachments were placed on patrix of attachments. Two cavities were realized on resin splint corresponding to the position of attachments (Fig. 5). Cold resin curing (Vertex Self Curing, Vertex-Dental BV, Zeist, The Netherlands) was placed on it and then the resin splint was inserted in oral cavity. After acrylic resin polymerization, the resin splint with analogues inserted was removed from mandibular prosthesis and polished. The

analogues were then replaced by definitive matrix (Fig. 6–7).

After one week mandibular movements were already improved. Check-ups were once a fortnight for three months. During some of these check-ups it was necessary to rebase the acrylic resin splint with hard wax (Beauty Pink, Moyco Industries Inc., Philadelphia, U.S.A.) to fill the gap between lingual surface of splint and buccal surface of maxillary corresponding teeth (Fig. 8). The gap was in function of intermaxillary relationship modification induced by prosthetic treatment.

Results

In this way the patient can use only 1 mandibular prosthesis both for physiotherapy and eating simply inserting and removing the guide flange. This device permit to patient to uses the pre-existing partial prosthesis.

Conclusion

The prosthetic management was modifying a pre-existing mandibular removable partial prosthesis to correct mandibular deviation. Two precision attachments were inserted into buccal surface of denture base with their patrix, and corresponding matrix were inserted into the transparent guide flange. The patient can therefore use only 1 mandibular prosthesis both for physiotherapy and eating simply inserting and removing the guide flange.

References

1. Aramany MA, Myers EN (1977) Intermaxillary fixation following mandibular resection. *J Prosthet Dent* 37(4): 437–444
2. Schneider RL, Taylor TD (1986) Mandibular resection guidance prostheses: A literature review. *J Prosthet Dent* 55(1): 84–86
3. Fattore L, Marchmont-Robinson H, Crinzi RA, Edmonds DC (1988) Use of two-piece Gunning splint as a mandibular guide appliance for a patient treated for ameloblastoma. *Oral Surg Oral Med Oral Pathol* 66(6): 662–665
4. Robinson JE, Rubright WC (1964) Use of a guide plane for maintaining the residual fragment in partial or hemimandibulectomy. *J Prosthet Dent* 14(5): 992–999
5. Desjardins RP (1979) Occlusal considerations for the partial mandibulectomy patient. *J Prosthet Dent* 41(3): 308–315
6. Desjardins RP, Laney WR (1977) Prosthetic rehabilitation after cancer resection in the head and neck. *Surg Clin North Am* 57(4): 809–822
7. Ohtake K, Nakajima T (1993) A simple appliance for controlling mandibular movement following segmental resection. *J Oral Maxillofac Surg* 51(9): 1048–1049
8. Ackerman AJ (1955) The prosthetic management of oral and facial defects following cancer surgery. *J Prosthet Dent* 5: 413–432

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