Scholars Journal of Dental Sciences (SJDS) **ISSN 2394-496X (Online)**
Sch. J. Dent. Sci., 2014; 1(1):18-23 **ISSN 2394-4951 (Print)**

(An International Publisher for Academic and Scientific Resources)
www.saspublishers.com DOI: 10.36347/sjds.2014.v01i01.005

Case Report

Dynesthetic Rehabilitation to Minimize Mandibular Deviation for a Patient Following Segmental Resection

Aparna S. Kumar[1], Jyothi K. S.[2*]

[1]Postgraduate student, Department of Prosthodontics, Crown and Bridge and Implantology, Coorg Institute of Dental Sciences, Virajpet, Karnataka, India, affiliated to Rajiv Gandhi University of Health Sciences, Bangalore, India
[2]Professor, Department of Prosthodontics, Crown and Bridge and Implantology, Coorg Institute of Dental Sciences, Virajpet, Karnataka, India, affiliated to Rajiv Gandhi University of Health Sciences, Bangalore, India

***Corresponding author**
Dr. Jyothi K.S
Email: drjyothiksms@rediffmail.com

Abstract: Aggressive intraosseous lesions obliterate structures, including maxilla and mandible, which may require surgical management followed by prosthetic rehabilitation. Loss of continuity of the mandible destroys the balance and symmetry of the mandibular function, leading to altered mandibular movements and deviation of the residual fragment towards the resected side. Prosthetic management of surgical defects has always been a challenge for a prosthodontist. A thorough knowledge of post surgical anatomy and physiology is a prerequisite for the development of a successful prosthesis. Numerous prosthetic methods are employed to minimize deviation and improve masticatory efficiency which includes implant supported prosthesis, mandibular guide flange prosthesis and palatal based guidance restoration. This case report describes prosthodontic management of a patient who had undergone segmental mandibular resection with palatally oriented guidance (palatal ramp) prosthesis. The prosthesis helped the patient guide the mandible to facial symmetry which served the purpose of aesthetics and to hold the mandible in position without deviating to the surgical site during speech and mastication.
Keywords: intraosseous lesions, masticatory, mandibular

INTRODUCTION

Destructive and deep-seated intraosseous lesions often require resection involving mandible, floor of the mouth, tongue and also palate [1]. Surgical intervention often produces devastating effects on patients especially if the lesion is extensive or the treatment is aggressive. Defects thus acquired have a debilitating affect on speech, deglutition and mastication [2]. After mandibular resection, patients experience the loss of proprioceptive memory of the mandibular position and absent or scarred muscles on the surgical side, resulting in considerable rotation and deviation of the mandible upon closure, with the mandible deviating toward the surgical side [3-6]. The residual mandible deviating medially and superiorly will more or less be evident depending on the location and extension of the resection, the amount of the soft tissue and innervations involvements and the presence of remaining natural teeth [7].

The prognosis is further influenced and affected by soft tissue loss, which could augment the deviation of the mandible. Remedial measures such as physiotherapeutic exercises to retrain the mandibular movements along with hot and cold fomentation to the affected muscles could be helpful if begun at an earlier stage [7, 9]. Diverse clinical manifestations of disease conditions require the clinician to be able to identify the specific need of the patient and fabricate prostheses such as guide flange, wrought wire reinforced appliances or palatal based guidance prosthesis that enable the patient to occlude during chewing movements, thereby restoring oral function [10].

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 immediate postoperatively as intermaxillary fixation followed by an interim prosthesis to restore mandibular function. The primary goal is to re-educate mandibular muscles to re- establish an acceptable occlusal relationship for residual hemimandible, so that the patient can control adequately and repeatedly, opening and closing mandibular movements [11].

Removable guide flange prosthesis cannot be retained intraorally if only a few teeth remain in the sectioned mandible. Retention can be further compromised by surgical scarring. Early diagnosis and

initiation of therapy increases the success of treatment, but existing nature of soft tissue loss coupled with lack of patient motivation and cooperation could worsen the long term prognosis.

The purpose of this article is to highlight a prosthesis which permits use of the same device both for aesthetics and for mechanical correction of the mandible.

CASE REPORT

A 72 year old male patient with segmental mandibular resection done on his right side of the face was referred to the Department of Prosthodontics for rehabilitation of the deviated mandible. Patient complained of inability to direct the lower jaw to the midline, which resulted in loss of function of remaining natural teeth, an altered tongue position causing difficulty in speech and swallowing; and poor extraoral appearance which compromised the patient's social life.

A detailed history revealed that the patient reported to the Department of Maxillofacial surgery two years back with a complaint of decayed teeth with pus discharge, swelling extraorally on the right side and pain in relation to the lower right back tooth region. Medical history revealed that he was a known diabetic and hypertensive under medication for over a decade. The radiographic diagnosis and histopathological reports were correlated with clinical findings and finally diagnosed as chronic sclerosing osteomyelitis of the right body of the mandible.

Once the diabetes and hypertension was brought under control the patient was opted to be treated surgically considering the aggressiveness of the lesion. During the surgery periodontally weak teeth from maxillary and mandibular arches were extracted along with the affected segment involving distal to the canine (43) to the angle of the mandible (Fig. 1).

Clinical examination

A comprehensive assessment of the extraoral soft and hard tissues revealed a discontinuity of soft tissue form on the right side of patient and deviation of mandible towards the affected side causing facial irregularities (Fig. 2). Intraoral examination revealed presence of 11,21,22,24,25,26,38,35,34,33,32,31,41,42 and 43. 43 and 22 were extracted due to periodontal breakdown and pain. Radiograph revealed impacted 23 and it was decided not to surgically remove it as it did not interfere with the rehabilitation. The patient was able to achieve an approximate mediolateral position of mandible, but it seemed unacceptable as it was a false occlusion created due to the supraeruption of 25 and 26 of maxillary arch.

Prosthodontic procedures

A stainless steel stock dentulous tray (modified by trimming the region distal to the 43 region) and irreversible hydrocolloid (Algitex, DPI Dental Products of India) were used to record the preliminary diagnostic impression of mandibular arch. The individual anatomic variation prevented the use of a full arch stock impression tray. The modified tray was contoured at the borders using utility wax strips to ensure an accurate full arch diagnostic cast with minimal patient discomfort. Alginate was used to obtain a negative replica of the opposing maxillary arch also and the diagnostic impressions were poured in dental stone (Kalstone, Kalabhai Karson, Mumbai, India). The casts were then articulated on a semiadjustable articulator (Hanau Wide-Vue Arcon, Whipmix, USA) with wax interocclusal records. A wax stop made with modelling wax (Hindustan Dental Products, Hyderabad) was placed on the sectioned segment of the mandible where denture base was extended, to act as a vertical stop during jaw relation and stabilize the casts on the articulator.

On the diagnostic cast the amount of occlusal reduction required for the supraerupted teeth was decided. To attain an acceptable plane it was also decided to retain the remaining teeth to aid in retention of the prosthesis. 11, 21, 25 and 26 were planned for intentional root canal treatment.

Intraoral examination revealed 11 and 21 with acrylic crowns which were poorly fabricated. In these teeth the preparation was refined to receive porcelain fused to metal crowns for aesthetics. 25 and 26 were occlusally reduced as planned on the diagnostic casts to attain an acceptable vertical dimension of occlusion at patient's comfort and freedom of movement laterally which allowed the patient to approximate his mandible almost to midline. Once the tooth preparation was complete wax records were obtained at an acceptable vertical dimension of occlusion which would be attained with crowns.

These records provided space for fabrication of the planned fixed restorations. Thus the anterior teeth (11, 21) were rehabilitated with metal ceramic crowns with porcelain facing considering aesthetics and posterior teeth (25, 26) were rehabilitated with cast metal crowns considering the patients preference to function and economic status. After the crowns were cemented, impressions of both maxillary and mandibular arches were made using irreversible hydrocolloid to facilitate fabrication of special tray. Border molding was done using high viscosity polyvinylsiloxane (3M ESPE Soft Putty, 3M ESPE India) and final impressions were made with low viscosity polyvinylsiloxanes (Express^{TM} XT, 3M ESPE, India), the definitive cast was poured with Type IV gypsum (Kalrock, Kalabhai Karson, Mumbai, India).

Denture bases were fabricated with autopolymerising acrylic resin (DPI Cold Cure, Dental Products of India); occlusal rims were made and jaw relation was recorded. During jaw relation modelling wax was moulded to the

shape of a ramp and placed on the palatal surface of the maxillary denture base. The patient was trained repeatedly to guide his mandible as much as laterally as possible to get his remaining teeth into occlusion and coincide with the midline while the ramp was modified along the path of closure of mandible. The paths of the lingual surface of the mandibular teeth in function were obtained over the wax ramp each time patient occluded. This relation was transferred to the articulator. Teeth arrangement was done, trial denture bases were then tried in the patient's mouth. During try in, again the palatal ramp corresponding to 24, 25, 26 was verified to confirm path of closure. The trial denture bases were then incorporated with clasps; during wax up, the buccal flanges of the mandibular denture were extended labially and buccally to attain maximum encirclement of the slopes of mandibular ridge for retention. Then the trial dentures were processed into heat polymerised acrylic resin (DPI Heat Cure, Dental Products of India) trimmed, polished (Fig 3) and delivered to the patient.

The patient was trained and educated about the use, maintenance and limitations of the prosthesis. It was verified intraorally to check extension of denture flanges, fit and occlusion (Fig 4A and Fig 4B). The path of mandibular closure against the palatal ramp was also confirmed (Fig 5). The resultant prosthesis was aesthetically acceptable (Fig 6) and the patient was able to guide his mandible into occlusion with minimum effort.

Fig. 1: Orthopantomograph showing segmental mandibular resection

Fig. 2: Extra oral view showing deviation towards right side

Fig. 3: Completed definitive prosthesis

Fig. 4: Intraoral view of prosthesis in occlusion A) Left side

Fig. 4 B: Right side

Fig. 5: Intraoral view of palatal ramp prosthesis

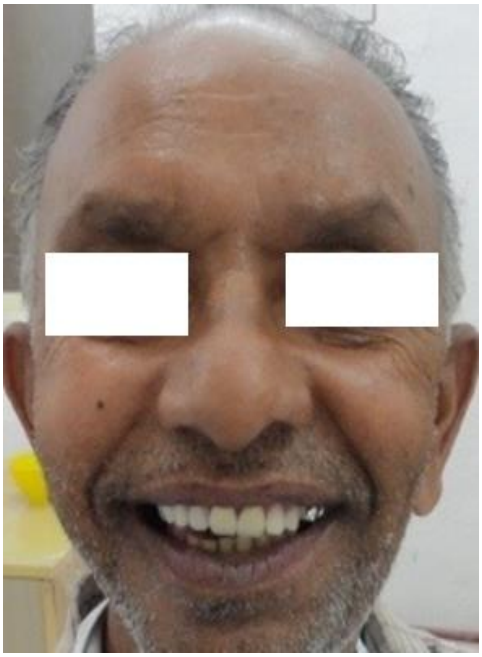

Fig. 6: Extra oral view showing markedly improved aesthetics in occlusion

DISCUSSION

This article highlights the functional and aesthetic rehabilitation of a patient who had undergone resection without surgical reconstruction due to his general health status that limited further surgical procedures. Past researchers have found that fabrication of modified removable acrylic resin prosthesis was a beneficial adjunct to improving mastication, aesthetics and phonetics as the patients were able to position the mandible correctly during function. Apart from this, guide flange and palatal ramp prosthesis are most successful in patients where resection involves only bony structures with minimal sacrifice of tongue, floor of the mouth and adjacent soft tissues [3, 8, 12, 13]. Rehabilitation reduces the unavoidable sequel resulting from extensive mandibular resection like muscular contraction, mutilation of occlusal plane and loss of function [13].

The success varies and depends upon the nature, size and site of the surgical defect, a comprehensive knowledge of the stomatognathic system by the clinician, a methodical co-ordination of the surgeon and the prosthodontist to initiate the guidance therapy, patient's expectation and cooperation among others. Amendments to these basic principles are resolved on an evidence basis and subject to unique residual tissue characteristics, masticatory muscle dynamics and knowledge of mandibular movements [13].

As described in this case report, the palatal based guidance prosthesis consisted of a removable partial denture prosthesis framework, with a palatal ramp extending medially and inferiorly on the palatal aspect of bicuspids and molars on the non defective side. This ramp engaged the natural and artificial teeth in the mandibular arch during closure, thereby guiding the mandible to an appropriate intercuspal position.

Use of intermaxillary fixation and splinting has also been advocated to minimize mandibular deviation. Any such prosthesis then has to be supplemented with an appropriate physiotherapeutic measure to ensure success of treatment. Implant supported prosthesis can also be considered for functional and aesthetic rehabilitation. As mentioned earlier the patient's health status prevented any further surgical procedures, hence the option of use of implants had to be eliminated. The use of any guidance therapy depends on the presence of remaining natural teeth, as the subsequent anchorage obtained guides and reprograms mandibular movements [13].

In this patient maximum possible teeth were retained for the purpose of retention and proprioception for the patient. Meticulous impression procedures ensured maximum depth and width of the denture flanges within physiologic limits of tissue tolerance thereby enhancing denture stability. Vinylpolysiloxane impression material mixed in an automix dispenser provided ease of handling, excellent flow and rapid setting, all of which allowed an impression that recorded fine detail with minimum discomfort to the patient. Utilization of the labial and buccal slopes of the mandibular ridge provided bracing during closure. Wrought wire retainers were not prescribed to avoid excessive flexibility and disengagement of prosthesis from the selected soft tissue undercuts during mandibular closure. This also simplified any future adjustments required in terms of relining or rebasing as the master cast was duplicated and preserved to serve any short term repair procedures. Hence the resultant prosthesis provided comfort and sufficient function and the patient was able to achieve functional intercuspation immediately after the insertion of the prosthesis.

CONCLUSION

Severe deviation of the mandible on closure complicates speech, articulation and mastication. Such a clinical presentation is often compounded by loss of oral soft and hard tissues leaving debilitating effects on the maxilla and mandible, which often require surgical management and prosthodontic therapy. This article described the prosthodontic management of a patient with hemimandibular defect complicated by postsurgical mandibular deviation towards the surgical side. The fabrication and use of palatal based guidance (palatal ramp) prosthesis permitted the mechanical and aesthetic correction of mandibular deviation. The intraoral prosthesis restored not only speech, mastication and intraoral dental articulation but also proved to be a useful addition to rehabilitate extraoral aesthetics and general well being of the patient.

REFERENCES

1. Aramany MA, Myers EN; Intermaxillary fixation following mandibular resection. J Prosthet Dent., 1977; 37(4): 437-444.
2. Chhuchhar L, Gandhewar MA; Guide flange prosthesis for management for a hemimandibulectomy patient – a clinical case report. Journal of Dental and Medical Sciences. 2013; 8(6): 23-25.
3. Beumer J III, Curtis TA, Marunick MT; Maxillofacial rehabilitation: Prosthodontic and surgical consideration. St. Louis, USA: Ishiyaku Euro America, 1996.
4. Taylor TD; Clinical maxillofacial prosthetics. Chigaco: Quintessence, 1997.
5. Olson ML, Shedd DP; Disability and rehabilitation in head and neck cancer patients after treatment. Head Neck Surg., 1978; 1(1): 52-58.
6. Curtis DA, Plesh O, Miller AJ, Curtis TA, Sharma A, Schweitzer R *et al*.; A comparison of masticatory function in patients with or without reconstruction of the mandible. Head Neck, 1997; 19(4): 287-296.
7. Schneider RL, Taylor TD; Mandibular resection guidance prostheses: A literature review. J Prosthet Dent., 1986; 55(1): 84-86.
8. Agarwal S, Praveen G, Agarwal SK, Sharma S; Twin Occlusion: A solution to rehabilitate hemimandibulectomy patient- a case report. J Indian Prosthodont Soc., 2011; 11(4): 254-257.
9. Robinson JE, Rubright WC; Use of a guide plane for maintaining the residual fragment in partial or hemi-mandibulectomy. J Prosthet Dent., 1964; 14(5): 992-999.
10. Prencipe MA, Durval E, De Salvador A, Tatini C, Roberto B; Removable partial prosthesis (RPP) with acrylic resin flange for the mandibular guidance therapy. J Maxillofac Oral Surg., 2009; 8(1):19-21.
11. Desjardins RP; Occlusal considerations for the partial mandibulectomy patient. J Prosthet Dent., 1979; 41(3): 308-315.
12. Prakash V; Prosthetic rehabilitation of edentulous mandibulectomy patient: A clinical report. Indian J Dent Res., 2008; 19(3): 257-260.
13. Kumar P, Jain C, Kumar A, Singh HP; Prosthodontic management of mandibular deviation using palatal ramp appliance. J Med Allied Sci., 2012; 2(2): 77-80.