

Guidance Prosthesis for Mandibular Repositioning

ABSTRACT

Discontinuity of mandible after resection destroys balance and symmetry which leads to altered mandibular movements. A ram or guide plane to maxillary teeth that oppose the non resected side of mandible. With aid patient can achieve consistent closure to an intercuspal position. Good results were seen with patients wearing acrylic ramps. After several trials no tooth and soft tissue discomfort associated with guidance prosthesis has been expressed.

Statement and problem:

Discontinuity of mandible after resection destroys balance and symmetry which leads to altered mandibular movements. A ram or guide plane to maxillary teeth that oppose the non resected side of mandible. With aid patient can achieve consistent closure to an intercuspal position. The treatment described can be useful to preserve mandibular functions after partial resection and to minimise the complications with nocturnal deviation.

Material and method:

Patients with hemi-mandibulectomy selected with deviation of mandible and acrylic ramps made to bring intercuspal position.

Results :

good results were seen with patients wearing acrylic ramps. After several trials no tooth and soft tissue discomfort associated with guidance prosthesis has been expressed.

Conclusion:

The treatment described can be useful to preserve mandibular functions after partial resection and to minimise the complications with nocturnal deviation.

Introduction:

Types of mandibulectomy: unilateral rostral, bilateral rostral, segmental, caudal, and hemimandibulectomy

Indications: benign and malignant oral tumors involving bone or periosteum, mandibular fractures (for which primary repair is not possible or has failed), and osteomyelitis

When surgery includes a segmental mandibulectomy, masticatory function is compromised because of muscular imbalance that results from unilateral muscle removal, altered maxillomandibular relationship, and decreased tooth-to-tooth contacts. Although immediate mandibular reconstruction aims to restore facial symmetry, arch alignment, and stable occlusion, masticatory function often remains compromised.

Guide flange prosthesis(GFP) is a mandibular conventional prosthesis designed for the patient who is able to achieve an appropriate mediolateral position of the mandible but is unable to repeat this position consistently for adequate mastication.

Discontinuity of mandible after surgical resection destroys the symmetry of mandibular function, which lead to altered mandibular movements and deviation of residual fragment towards the defect side¹.the degree of deviation is dependent on several factors : extent of osseous and soft tissue loss, type of wound closure and use of adjunct procedures. In a discontinuity defect, the movement of residual mandibular segment is an uncoordinated action dictated by two features unique to specific defect and patient. Methods to minimize deviation include skin grafts and flaps for closure of wound, intermaxillary fixation at the time of surgery, guidance restorations and intensive physiotherapy to decrease fibrosis.

The success of these methods is influenced by the presence of remaining teeth in maxilla and residual mandible. Proprioceptive influence of remaining dentition greatly facilitates training the patient to maintain intercuspatal occlusal contacts. This can be aided by use of tooth supported guidance prosthesis. To facilitate training of the mandibular segment to maintain a more midline closure pattern, clinician have used a guide flange prosthesis.

The mandibular guide flange prosthesis is used primarily as an interim training device. This appliance is used in dentulous patients with non reconstructed lateral discontinuity defect who have severe deviation of the mandible towards the surgical side and are unable to achieve unassisted intercuspation on non surgical side.

The guide flange prosthesis is designed to restrict the patient to vertical opening and closing movements into maximum intercuspation. Over a period of time, this guided function should promote scar relaxation, allowing patient to make unassisted masticatory contact.

Aims and Objectives.

1. To guide mandible to unassisted maximum occlusal contacts.
2. Interim training device.

MANDIBULAR RESECTION PROSTHESIS

After adequate healing from mandibular resection, a maxillary acrylic resin prosthesis can be inserted.

Acrylic polymers, particularly poly(methyl) methacrylate and copolymers of methyl

methacrylate, are used extensively in the fabrication of intraoral prostheses. Clear autopolymerizing or heat-polymerizing acrylic

polymers are used for immediate surgical obturators; characterized autopolymerizing, heat-polymerizing or visible light-activated acrylic polymers are used.

The prosthesis is modified to act guidance prosthesis by the addition of acrylic resin to form a ramp or guide plane palatal to the maxillary teeth oppose the non resected portion of the mandible. The ramp directs mandibular teeth into intercuspal position on closing.

With the aid the patient can achieve consistent closure to an intercuspal position



Guiding plane prosthesis

A positioning prosthesis can be made by extending a palatal flange inferiorly into lingual vestibule between lateral borders of tongue and lingual surface of mandible. This flange can be formed in mouth by autopolymerising resin.

While the resin is in early stages of polymerization, the patient is instructed to open the mouth to the extent necessary to prevent loss of alignment when in open position. It may be necessary to support the mandible during this opening to minimize deviation as mouth opens. Only the lingual surfaces of the mandibular teeth should contact the flange. Pressure indicating pastes, as well as response of the patient, can locate regions of soft tissue impingement.

Tooth contact must be preserved, while tissue contact must be relieved by adjusting the acrylic resin.

Patients History

A 42years old female patient reported to dept of Prosthodontics, Govt dental college, from the General surgery dept , PGIMS, Rohtak. The hemi-mandiblectomy was done by Surgeons as treatment for sq. Cell carcinoma and as result discontinuity defect had become troubleshooting problem with the deviation of mandible towards the surgical area. A revaluation of the periodontal and cries status was made.

The first phase of treatment was restoration of carious and conservative periodontal treatment. The second phase was to bring the proper occlusion of the remaining teeth with the use of guiding plane prosthesis. The guiding flange prosthesis is used primarily as interim training device.



Pre- operative photograpgh.



Positioning plane prosthesis.



Guiding flange made of acrylic resin.



lateral view with the positioning prosthesis.



Post- operative Intra-oral view.



Post-operative View.

Muscle pain and tautness of tissues in the surgerized site has been reported. Pressure indicating paste and patients response can locate the regions of soft tissue impingement. Tissue contact must be relieved by adjusting acrylic resin. The positioning flange should be relieved where necessary until the teeth are in intercuspal position with prosthesis in place.

OCCLUSAL CONSIDERATION

The specific approach to occlusal rehabilitation in discontinuity defect varies with the location and extent of defect and resultant deviation and torque

An ideal result is achieved when the patient can repeatedly approximate the maxillary and mandibular teeth without use of prosthesis.



Conventional fixed or removable prosthodontic can be provided for patients who are missing natural teeth but who have little or no problem in controlling the residual mandibular segment.

Patients who are edentulous in maxilla or mandible or both cannot be considered for guide flange prosthesis, because the extreme medio

lateral forces placed on these prosthesis can prevent maintenance of border seal and lead to denture instability.

Changing the occlusal surface of some posterior teeth and changing the incisal length might permit better efficiency, phonetics and cosmetics.

No articulator can produce the movements of an interrupted mandible. Therefore occlusion can be developed by with use of static centric position record that is not truly repeatable but reasonable for patient to achieve repeatedly. The position might subject to change at a later date if mandibular control activity improves or differs.

Discussion

Depending upon the location and extent of the tumor in the mandible, various surgical treatment modalities like marginal, segmental, hemi, subtotal, or total mandibulectomy can be performed.

Loss of mandibular continuity causes deviation of remaining mandibular segment(s) towards the defect and rotation of the mandibular occlusal plane inferiorly. Mandibular deviation toward the defect side occurs primarily because of the loss of tissue involved in the surgical resection.

A maximum number of healthy teeth should remain in maxilla and residual mandibular segment to achieve stable intercuspal position.

Adequate inter-maxillary fixation should be achieved at time of surgery. The degree of deviation seems to be inversely proportionate to length of time the mandible is fixed.

Preservation of hyoid muscle on resected side helps to stabilize the mandible and prevent gross deviation.