Utilization of the Neutral Zone Technique for a Maxillofacial Patient

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The use of a neutral zone technique to fabricate a more stable complete mandibular denture for a maxillofacial patient is presented. The technique incorporates an altered sequence from traditional denture fabrication, resulting in a shortened treatment period.

TO MAXIMIZE the stability and retention of mandibular dentures, previous reports, have recommended that posterior denture teeth be positioned directly over the crest of the edentulous ridge. This relationship of the teeth and alveolar ridge is important for the stability of the denture in function.

Successful **denture treatment in situations like this can become increasingly dependent on the position of the denture teeth and the external contours of the dentures. It is for these patients that the neutral zone concept becomes increasingly significant**

The neutral zone

is defined as the potential space surrounding the mandibular denture between the lips, cheeks, and the tongue. In theory, it is that area or position where the forces between the tongue and cheeks or lips are equal.

patients could not detect any difference in masticatory performance between their conventionally fabricated dentures and neutral zone dentures. Patients did report greater comfort and improved speech clarity with the dentures fabricated using the neutral zone technique compared with their conventionally prepared dentures. These studies suggest that the neutral zone strategy for denture fabrication may be helpful in certain edentulous situations

Clinical Report

A 65-year-old patient presented with a history of squamous cell carcinoma in the left mandibular molar area and tumor removal that resulted in a healed, continuity defect. Before the surgery, the patient had been wearing complete maxillary and mandibular dentures for the last 20 years. The patient did not wear his previous mandibular denture after surgery

Consultation Appointment and Treatment Planning

- ***The patient's chief complaint*** **was that he could not wear his previous dentures after the surgery and desired new denture treatment. A detailed examination was completed, and his previous dentures were evaluated for retention and stability. Extra-oral examination revealed asymmetrical lip retraction with reduced excursion on the left side of the face. This was not unexpected, given the patient's prior surgical history (ie, removal of tumor and muscle in the left mandibular molar area). Intraorally, the left mandibular region presented atypical anatomy with a reduced retro-molar pad area. A low mandibular alveolar ridge height was also evident**

First Appointment

The final maxillary impression was made using Type I impression compound The compound impression was removed from the oral cavity, and the borders were trimmed to a length 2 to 3 mm short of the active sulcus. Border molding was performed with a Type I impression compound and a final wash impression was made with a silicone impression material. A slightly overextended mandibular irreversible hydrocolloid impression was also made using a prefabricated impression tray

Laboratory Procedure

In the laboratory, the maxillary impression was beaded and boxed. Both impressions were poured in American Dental Association type III dental stone. A close-fitting custom mandibular impression tray was made from a light polymerization composite resin. The tray border was fabricated 2 to 3 mm short of the active sulcus. Metal loops for the retention of a compound rim were incorporated. A maxillary occlusal wax rim was formed over a record base made from clear autopolymerizing polymethylmethacrylate resin .

Custom mandibular impression tray with retentive components

Second Appointment **The maxillary occlusal rim was adjusted for proper esthetics, occlusal plane, phonetics, and support of the upper lip. Appropriate lines (midline, canine lines, smile line) were marked. The mandibular custom tray was adjusted intraorally to ensure that it was short of the active sulcus. A Type I impression compound ,was applied in the area of the mandibular ridge on the acrylic resin tray.**

Maxillary wax occlusal rim and mandibular compound occlusal rims in proper vertical dimension of occlusion

occlusal rim was positioned on the maxillary arch, and the occlusal portion of the rim was adjusted to the correct vertical dimension of occlusion, with the rims touching evenly. Simultaneous bilateral anterior and posterior occlusal contacts in centric relation were verified. The mandibular custom tray was then border molded without altering the occlusal relationship of the maxillary occlusal rim

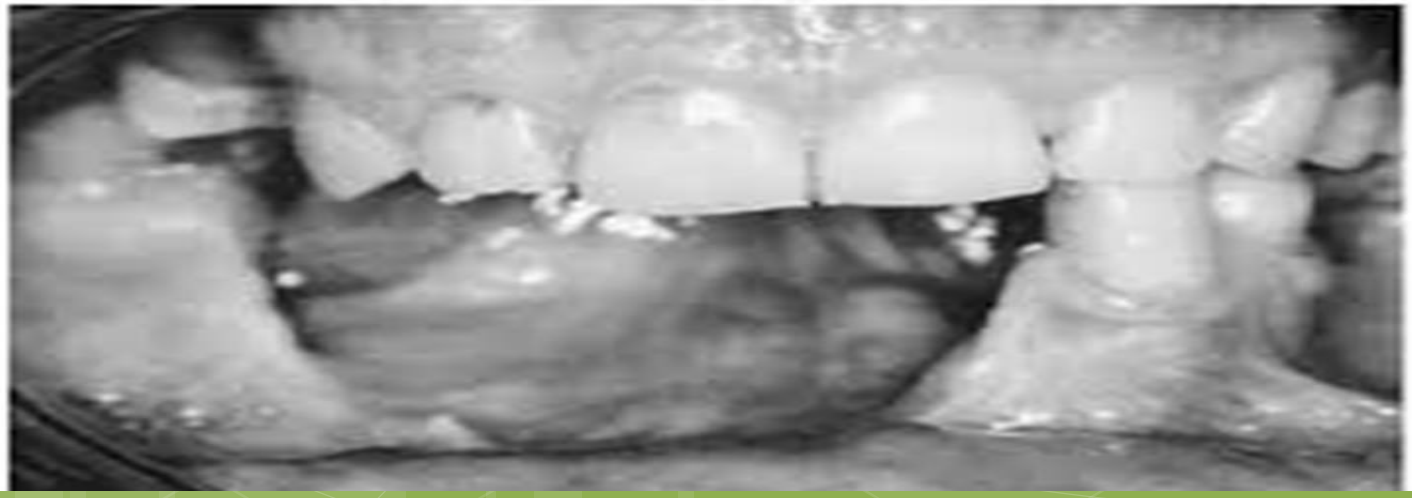
A closed mouth impression was made of the mandibular arch with a silicone impression. After adhesive was placed, impression material was positioned in the tray, and the patient was instructed to close gently against the opposing rim. The mandibular impression was completed, and an interocclusal record was made between the maxillary occlusal rim and the mandibular compound occlusal rim/border molded impression complex with a polyvinylsiloxane occlusal registration material .

The left mandibular acrylic resin teeth are also positioned slightly lingual to the crest of the ridge. This resulted from the patient's mandibular defect and asymmetric balance of muscular forces and their influence on the neutral zone technique

CLINICAL REPORT

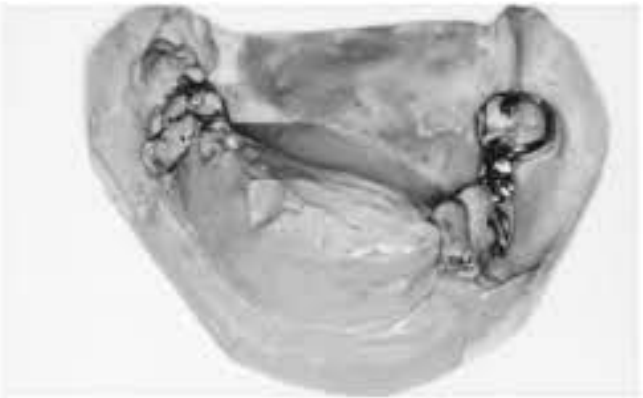
The patient complaint of enlargement of the right mandibular side. The diagnosis was multilocular cystic ameloblastoma, which is an aggressive, benign epithelial odontogenic tumor that has three different types. Cystic ameloblastoma is originated mostly from dentigerous cysts and rarely from other odontogenic cysts

Removable partial denture framework and rest seats were planned. It was decided that the use of a modified neutral zone technique would be appropriate for increasing function and stability, technique for mandibulectomy patients with anterior defects has been shown to improve esthetic, support of soft tissues, function and articulation



Final functional impression with zinc oxide impression material

View of the cast model showing the formation of the anterior edentulous region in neutral zone



Conclusion

The use of the neutral zone concept for denture fabrication has been advocated since the 1930s. Altered treatment sequencing, using a modified neutral zone technique for mandibular denture fabrication, was presented for a maxillofacial patient. This technique may provide a more stable and retentive complete lower denture and a shorter treatment time relative to conventional treatment for patients with severely resorbed ridges and/or mandibular defects