



EMBOUCHURE DENTURE: CASE REPORT

Prosthodontics

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ABSTRACT

Wind musical instrumentalists experience problems in holding the instrument mouthpiece after the loss of all natural teeth. Conventional complete dentures fabricated for the wind musicians may be subjected to tilting or dislodging forces during holding the mouthpiece. The prosthesis must be stable without being tilted or dislodged while playing the musical instrument. This clinical report presents the prosthetic rehabilitation of a completely edentulous patient who is a professional clarinet blower. The patient is a denture wearer since one year and he reported discomfort with his old dentures during playing clarinet. On consideration of musician's emphasis on function, playability and esthetics, fabrication of two sets of dentures was planned: (1) Conventional complete dentures and (2) Embouchure dentures. The embouchure denture is a modified complete denture included with features to improve denture stability and to ensure formation of correct embouchure during playing. The embouchure refers to the way the musician's lips, tongue, teeth, oral cavity, jaws and muscles of the face interact with an airstream from the lungs and throat, to produce quality tone, range, dynamics and endurance. The patient was satisfied with the quality of sound produced by using embouchure dentures and did not experience dislodging of dentures during clarinet blowing.

KEYWORDS

complete dentures, musicians, wind instruments, clarinet, embouchure

INTRODUCTION

Wind musical instrument players seeking dental treatment focus mainly on the effect of treatment on their ability to play wind instruments in addition to oral functions of chewing and swallowing. Changes in the oral cavity caused by the presence of a removable prosthesis significantly affects the performance of wind instrument players.^{1,2,3} Removable dental prostheses will be subjected to dislodging forces associated with intraoral holding position of instrument mouth piece.¹ The methods advocated by researchers for improving denture stability in musicians wearing complete dentures includes: (1) Use of Osseo integrated Ti implants, (2) Fabrication of a personalized embouchure using soft compressible acrylic over the denture to reduce soft tissue discomfort, (3) Construction of a special 'embouchure denture' for use during playing.¹ The embouchure denture is constructed with interlocking inclined planes and with a bite-opening customized to the position of the instrument.^{1,4,5} and (4) Mechanical appliances constructed on the dentures.⁶

This clinical report describes the procedure of fabrication of embouchure dentures for a completely edentulous, clarinet blowing musician.

CASE REPORT

A 56-year-old male musician, reported to the department of Prosthodontics, Vishnu dental college, Bhimavaram with a chief complaint of difficulty during clarinet playing with his old teeth set. No relevant medical history; past dental history reveals extraction of teeth five to six years back due to mobility and decay. Patient gave a history of upper and lower complete denture usage since five years. He was not satisfied with his dentures especially maxillary denture in terms of his appearance, speech and the quality of sound generated. Further, he reported lifting of dentures while holding the mouthpiece, inadequate lip seal around the mouthpiece leading to excess leakage of air and saliva during playing. On intraoral examination the patient had moderately formed residual ridges with class I ridge relation. A non-painful traumatic keratotic lesion was observed on labial mucosa of lower lip due to irritation from incisal edges of mandibular incisors [Figure-1(a)]. On examination of complete dentures, lack of retention and stability was observed and denture teeth were worn out, especially maxillary anterior teeth were in a distinctive shape corresponding to the upper surface of the mouthpiece [Figure-1(b)].



Figure-1(a): Chronic irritation on lower labial mucosa caused by incisal edges of mandibular anterior teeth

Figure-1(b): Holding position of clarinet mouth piece

To insure optimum oral health and quality sound production for the musician, a treatment plan was formulated that includes fabrication of two sets of complete dentures: Conventional complete dentures for routine use; and Embouchure dentures for Clarinet playing. The proposed treatment plan was explained to the patient and informed consent was obtained.

Technique:

The steps in conventional complete denture fabrication including primary impressions, border moulding, final impressions and jaw relation recording were carried out in a conventional way and mounted on the semi-adjustable articulator (HANAU Wide-Vue Arcon 183-2) using face bow (HANAU Springbow) transfer. Two sets of trial dentures were made by arranging artificial teeth following the principles of teeth arrangement. Balanced articulation was established to improve the stability of dentures. Conventional complete dentures were processed from the first set of conventional trial dentures and *embouchure dentures* were fabricated by the modification of conventional trial dentures during the stage of try in.

Modification of Trial dentures:

The *embouchure or vocational denture* was an expanded function conventional complete denture that integrates special vocational modifications.¹ The modification procedure was planned after careful observation of intraoral holding position of the instrument mouth piece [Figure-2].

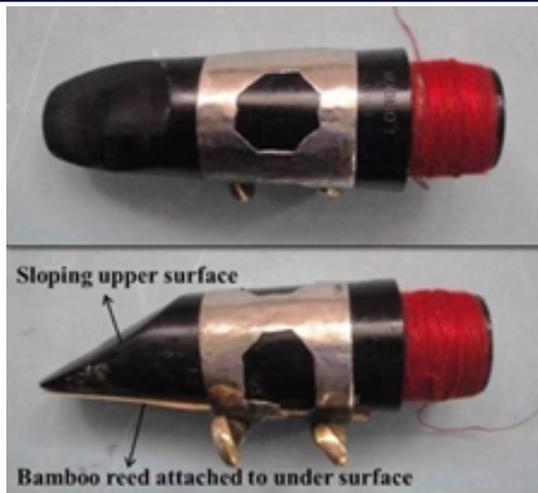


Figure-2: Clarinet mouth piece

The clarinet mouth piece was duplicated in dental stone from the putty impression. A reference line was marked on the stone mouth piece corresponding to the intraoral holding position of mouthpiece. The contour of upper surface of mouth piece was transferred to the conventional trial denture. The incisal edges of maxillary anterior teeth were contoured and mandibular central and lateral incisors were removed from the conventional trial denture to create bite opening customized to the position of mouth piece in maximum intercuspation [Figure-3(a,b)]. Bilateral centric occlusal contacts were verified in the trial dentures with the mouth piece in position. The modified trial dentures were verified intraorally and the patient was asked to blow the clarinet. The formation of correct embouchure was confirmed from the quality of sound heard during playing.²

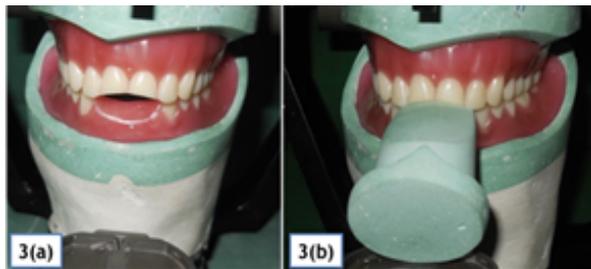


Figure-3(a,b): Modified trial dentures with anterior bite opening to accommodate Clarinet mouth piece

Denture processing was carried out in conventional manner. The final conventional and embouchure dentures [Figure-4] were again evaluated at the denture insertion appointment and the musician was satisfied with the final outcome of embouchure dentures. Long term recall visits were scheduled after 6 months, 1 year and 5 years and it was noticed that the size of keratotic lesion on lower labial mucosa was decreased gradually. During 5-year follow-up visit, the musician reported slight leakage of air during blowing, which may be caused by wear of the resin. Self-cure acrylic resin was added to the mandibular anterior region to compensate for the wear of the resin [Figure-5].



Figure-4: Embouchure or vocational dentures



Figure-5: Healed lesion on labial mucosa; intraoral view of embouchure dentures after 5-years

DISCUSSION

The *embouchure* is the use of facial muscles and shaping of the lips to the mouthpiece of wind instruments.^{1,7} The word *embouchure* is of French origin and is related to the root word "*bouche*" means 'mouth'. The creation of correct embouchure allows the musician to play the instrument at its full range with a full, clear tone and without strain or damage to orofacial muscles.^{2,8,9} The action of orofacial muscles aids in correct positioning of mouth piece to oral commissure and maintains tight lip seal preventing leakage of air.^{7,8,9} Musculature of tongue acts as valve to control air flow with teeth and jaws supporting the soft tissues.⁹ Completely edentulous musicians might face difficulty in formation of correct embouchure as the teeth were lost over which the orofacial muscles would stretch.⁷ This indicates there is a definite need to replace the lost orofacial structures with appropriate prosthesis.

Clarinet is a single reed wind musical instrument with a wedge shaped mouth piece that has a single bamboo reed attached to its underside [Figure-2]. The Clarinet embouchure is formed by resting the reed upon the lower lip, maxillary anterior teeth rest on top of the mouthpiece.¹ The corners of mouth are brought inwards to create a seal and the position of tongue plays a vital role in controlling the air stream blown by the musician.¹⁰ In case of musicians playing single reed wind instruments (Clarinet and Saxophone), chronic irritation to the lower labial mucosa can occur because of the playing position of the instrument, which can interfere with formation of correct embouchure.¹² It has been reported that mouth lesions may account for loss of embouchure control in 18% of wind instrument players.¹⁰

Mandibular incisors were removed from the mandibular embouchure denture to prevent irritation to lower labial mucosa. In the process of customizing anterior bite opening, self-cure acrylic resin was added to the mandibular anterior region that enables formation of a seal around lower surface of mouth piece. The incisal edges of maxillary incisors were modified such that the contour of incisal edges corresponds to the upper surface of clarinet mouth piece. This modification was done to distribute the pressure across the anterior residual ridge.¹¹ To ensure formation of correct embouchure without compromising stability of dentures, anterior bite opening customized to the position of the instrument at maximum intercuspation was planned. Embouchure dentures with interlocking inclined planes were reported in the literature^{1,4}, but posterior teeth were arranged in the present embouchure denture design.

The magnitude of adverse forces on the supporting tissues depends on the duration of practice sessions. The use of special embouchure denture while clarinet playing might reduce these adverse forces on anterior region of residual alveolar ridges and helps in preserving the health of supporting tissues. Treatment planning including only embouchure denture might be objectionable to patient as the presence of anterior bite opening may compromise esthetics and phonetics. To overcome this problem, additional set of conventional complete dentures were fabricated.

The quality of sound generated during playing a wind musical instrument can be evaluated by two objective methods.³ Psychoacoustic analysis based on the parameter of loudness with an acoustic workstation and by using performable range analysis with Voice Range Profile (VRP) software (KayPentax). These methods can help dentists while planning prosthetic treatment for wind instrument players. However, in the present case report the quality of sound generated was assessed mainly from the subjective satisfaction expressed. The embouchure dentures fabricated in this case were successful in meeting the special challenge of denture wearing musician.

CONCLUSION

The restorative dentist must understand the limitations of removable

prostheses in wind instrument players. Importance should be given to correct formation of embouchure, with minimal soft tissue discomfort and improved denture stability. The embouchure denture design used in the present case can be indicated for completely edentulous, wind instrument players to improve the denture stability and their professional satisfaction.

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