Fabrication of Hollow Bulb Obturator with Maxillary Partial Denture for Congenital Cleft Palate Defect

ABSTRACT
Rehabilitation of congenital cleft palate defect improves the quality of life for the patient as normal as possible. Obturator size depends on defect's size and volume. The prosthesis should be easy to handle, simple to maintain, biocompatible, light in weight and conventional for future adjustments. This case report describes a cleft palate patient, which was rehabilitated with a hollow bulb obturator.

Keywords: Cleft palate, Hollow bulb obturator, Maxillofacial defects, Rehabilitation.


Source of support: Nil
Conflict of interest: None

INTRODUCTION
Man's need for artificial replacement of missing body parts undoubtedly dates back as far as humanity itself. Over the centuries, people have used their creativity and adapted the available materials for use in prosthetic restoration. The earliest attempts at obturator construction are credited to Ambrose Pare who, around 1530, described button-shaped obturators made of metal and sponge. As so often happens, Pare may not have been the first to perform these procedures, but he is one of the first to write about, describe and illustrate them. Prosthodontic rehabilitation for a congenital maxillary defect begins after full growth of patient. Alteration of physiologic functions, such as speech, mastication, deglutition and salivary control associated with ablative surgery requires timely prosthetic intervention.

Cleft palate is a condition in which the two plates of the skull that form the hard palate (roof of the mouth) are not completely joined. The soft palate defect also occurs in these cases cleft as well. In most cases, cleft lip is also present. Cleft palate occurs in about one in 700 live births worldwide. Cleft palate can occur as complete (soft and hard palates, possibly including a gap in the jaw) or incomplete (a ‘hole’ in the roof of the mouth, usually as a cleft soft palate). When cleft palate occurs, the uvula is usually split. It occurs due to the failure of fusion of the lateral palatine processes, the nasal septum and/or the median palatine processes (formation of the secondary palate).

The hole in the roof of the mouth caused by a cleft connects the mouth directly to the nasal cavity. According to GPT-8, obturator can be defined as a prosthesis to close a congenital or acquired tissue opening primarily of soft or hard palate. The present article is a case report explaining the rehabilitation of a patient who had undergone rehabilitation with hollow bulb obturator for congenital cleft palate defect.

CASE REPORT
A 46-year-old man reported to Department of Prosthodontics, Career Post Graduate Institute of Dental Sciences and Hospital, Lucknow, Uttar Pradesh, India, with a main complaint of missing teeth and difficulty in speaking. He had complains of hypernasality of voice, regurgitation of food in the nasal cavity and difficulty in eating (Figs 1A to C). The patient gave history of congenital soft cleft palate defect.

After examining intraorally, it was revealed that a subtotal defect of soft palate was present with partial edentulism, with respect to both arches. Mandibular movements were in normal range and tongue function was normal.

Treatment Plan
Our treatment objective was to provide prosthesis to obturate the defect to improve speech, deglutition and mastication, to restore facial contour and to replace the lost teeth. Maxillary and mandibular removable partial denture with maxillary definitive closed hollow bulb obturator was planned for the patient.
**Procedure**

In the present case, support was provided by remaining posterior teeth and palatal tissues. Retention was achieved by embrasure claps and anatomical undercuts. A gauze piece was packed in the defect and floss was tied to it for its retrieval. A perforated stock tray was selected and impression was made with irreversible hydrocolloid (Zelgan, Mittal Private Ltd) (Figs 2 and 3).

Primary cast obtained was used for fabricating custom tray for final impression using autopolymerizing resin. Border molding was done to record the soft tissue surrounding the defect using low fusing impression compound (Figs 4 and 5).

Details of the defect area were recorded using light body elastomeric impression material (3M ESPE Express STD, Germany) and the wash impression was completed using medium body addition silicone elastomer (Figs 6 and 7).

Master cast was obtained (Fig. 8). The cast was used to fabricate the bulb of the obturator. The defect area in the original cast was blocked out using plaster. On this cast, denture base and wax rims were prepared to record jaw relations, followed by try-in of wax-up denture. On the master cast, a double layer of modeling wax was adapted in the defect area (Fig. 9).

A hollow bulb obturator was fabricated along with the maxillary partial denture (Fig. 10). A lid for the bulb was prepared and attached to the open end of the bulb using autopolymerizing acrylic resin. The mandibular partial removable denture was fabricated using conventional technique (Fig. 11). Both the dentures were finished, polished and inserted in the patient’s mouth.

Post insertion results showed improvement in speech, mastication, swallowing and facial esthetics. The patient was satisfied with the prosthesis in the recall check-ups. Hygiene maintenance of the prosthesis was emphasized by home protocol instituted by the patient.

**DISCUSSION**

Obturator prosthesis is commonly used in rehabilitating the patients with congenital and acquired maxillofacial defects. The delivery of care for patients who are in transitions and for those in need of assessment, planning and ongoing management can be quite challenging. Congenital defects in maxilla results in communication between oral and nasal cavity affecting deglutition,
speech and facial esthetics. Along with these functional impairments, it can also be psychologically debilitating to the patient. In the 18th century, a French surgeon, Ambroise Pare, described Button obturator made up of ‘cuff link’ or ‘sponge’. In 1820, Delabarre used steel metal plate with wired metal bands clamped on teeth. This was the first artificial velum designed. In 1953, Ackerman fabricated hollow obturator prosthesis. Recent investigations have confirmed the effect of obturator prosthesis in terms of speech, swallowing and appearance. In 1978, Dr Mohammed Aramany presented a system of classification based on the relationship of the defect to the remaining teeth and the frequency of occurrence. Since the defect was not so large, the retention and stability of the
obturator was enhanced by making the obturator portion of the denture hollow. For improving stability, maximum extension of the prosthesis in all lateral directions was provided so that the defect itself would enhance stability of the prosthesis (Fig. 12).

CONCLUSION
The present case report describes the prosthodontic rehabilitation of a congenital maxillary defect in a patient, using definitive closed hollow bulb obturator, took care of the different domains of care, giving the patient an opportunity to live life as close to normal as possible. Teamwork enables the broader needs of patients and families to be addressed. The use of hollow bulb obturator design improves the patient comfort by decreasing the weight of prosthesis.

REFERENCES


