

Modified Sectional Impression Technique - Clinical Report and Review

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Abstract

A good impression is a key to successful Prosthodontic treatment. Impression making becomes challenging when a patient has limited mouth opening due to oral submucous fibrosis or any other reason. This clinical report describes a quick and easy method for fabrication of a sectional custom impression tray, joined together with the help of die pins placed on the impression tray and die pin sleeves in an acrylic resin block. This sectional impression technique is simple, economical and easy to fabricate; with acceptable clinical result.

Keywords: Limited mouth opening, Microstomia, Oral submucous fibrosis, Sectional impression.

Introduction

Normal range of mouth opening in different population studies varies from 40-60mm, 41-43mm, and 47.1mm. The average intrinsic vertical mouth opening measures 40-50mm, an opening of 25-35mm is functional, and 10-24mm is severely limiting [1]. Severely restricted mouth opening, may occur as a result of intra or extra capsular pathology of the TMJ. Extra capsular causes of trismus include peritonsillar abscess, dental infections, noma, trauma to mouth closing muscles, mandibular nerve blocks, tetanus, cancer, microstomia, osteochondroma of the mandibular coronoid process, submucous fibrosis due to chewing betel nut and masticatory muscle tendon-aponeurosis hyperplasia [2-5].

In Prosthodontics, the loaded impression tray is the largest item requiring intraoral placement. During impression procedures wide mouth opening is required for proper tray insertion and alignment which is not possible in

patients with limited mouth opening. In cases where limited mouth opening is not manageable by surgeries and dynamic mouth opening devices, a modification of standard impression procedure is often necessary to accomplish this fundamental step in the fabrication of successful prosthesis [6].

This clinical report describes a quick and easy method for fabrication of a sectional custom impression tray along with a literature review.

Case Report: A 45 year female patient with limited mouth opening referred to the department of prosthodontics for replacement of missing teeth. On Clinical examinations following teeth were missing 11,12,21,22,23,35,36, 44, 45, and 46. She had a maximum mouth opening of 41mm horizontally and 22 mm vertically (Fig1). Past dental history revealed that she was diagnosed with oral submucous fibrosis, and undergoing treatment for past 6 months. Provisional removable partial denture was planned, followed by definitive prosthesis.

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Fig 1. Limited mouth opening

Preliminary impression: Perforated dentulous metal stock trays of the smallest size were selected and the flanges of the tray were reduced and an impression was obtained using irreversible hydrocolloid impression material (Jeltrate Plus, Dentsply caulk). Inadequate extension of the tray into the sulcus necessitated the need for final impression using sectional impression technique.

Sectional tray: A custom tray was fabricated on the diagnostic cast, with auto polymerizing resin (DPI-RR cold Cure, Mumbai) with wax spacer (The Hindustan Dental Products, India) to provide space for the elastomeric impression material. Two short die pins (Harald Nordin SA) were placed over the residual ridges and two long die pins close to the midline in maxillary custom tray and two short die pins were placed over the residual ridges in the mandibular custom tray (Fig 2). Pin parallelism was evaluated with a surveyor (Jelenko). Die pin sleeves were attached to the die pin and picked up in an acrylic resin block. The maxillary and mandibular special tray were sectioned using die cutting saw (universal mechanical saw 0.2mm OMEC TR-87), acrylic resin block with sleeve was used to reorient the sectioned impression trays (Fig 2).



Fig 2. Sectional Impression trays

Impression procedure: Sectional impression trays were tried in the mouth, adjusted and confirmed their orientation intraorally. After sectional border molding, with low fusing impression compound (DPI green stick compound, Mumbai) wax spacer was removed, tray adhesive (Caulk Tray Adhesive, Dentsply Caulk) was applied to facilitate retention of the elastomeric impression material to the custom tray and sectional impressions were made using Type 2: Medium –Body vinyl polysiloxane Impression Material (Reprosil, Dentsply Caulk.). The sectional impressions were re-oriented extra orally using acrylic resin block with sleeve (Fig 3). The subsequent protocol of provisional removable partial denture fabrication was followed. (Fig 4)

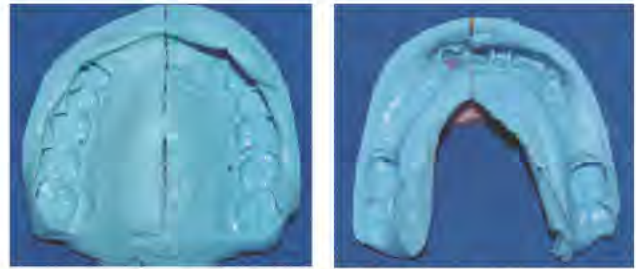


Fig 3. Final Impression



Fig 4. Pre-operative



Fig 5. Post-operative

Discussion

Pindborg JJ and Sirsat SM [7] described OSMF as a Chronic insidious disease affecting any part of the oral cavity and sometimes pharynx, although occasionally preceded by and or associated with vesicle formation, it is always associated with a juxta epithelial inflammatory reaction followed by fibro – elastic change of lamina propria with epithelial atrophy leading to stiffness of oral mucosa and causing trismus and inability to eat.

The hallmark of the disease is submucosal fibrosis that affects most of the parts of oral cavity, pharynx and upper third of the oesophagus. The factors that have been discussed as possible etiological factors to date are areca nut, capsaicin in chillies, micronutrient deficiencies of iron, zinc and essential vitamins. In addition, a possible autoimmune basis to the disease with demonstration of various auto-antibodies and an association with specific HLA antigens has been proposed [8].

Microstomia / limited mouth opening poses a great challenge during each step of prosthetic rehabilitation especially during impression making. Several methods of constructing sectional impression trays have been discussed in literatures.

Luebke [9] described a sectional impression procedure for dentulous patients by using two plastic sectional impression trays assembled with Lego building blocks and autopolymerising resin. **Whitsitt and Battle [10]** introduced a procedure for primary impressions of dentulous arches using putty silicone as a flexible tray, washed with light body silicone to obtain more detail.

Heasman et al [11] modified a procedure for making final impressions of dentulous arches by using 2 sectional acrylic resin impression trays joined together with 2 fins. **Moghadam** [12] advocated a practical procedure to obtain maxillary primary casts of dentulous patients. Two identical perforated stock trays are cut symmetrically, leaving their own handles attached. The trays are cut minimally in width to allow their insertion into the oral cavity with ease. **Supoj Dhanasomboon et al** [13] suggested that after making elastomeric impression, complete the first pour using dental stone leaving a portion of the dental arch in the sectional tray uncovered. Then retrieve the cast from the impression, wet it and place it in the other portion of the sectional impression and complete the second pour.

Chikahiro Ohkubo [14] described the use of complete arch stainless steel tray, which was sectioned into right and left halves that are reconnected by dowel plug and locking nut on the tray handle. **Chikahiro Ohkubo** [15] used two half-tapered handles of sectional individual tray rigidly connected by sliding resin cover. **Roberto Benetti, Aldo Zupi** [16] described a technique in which custom tray was fabricated with light-polymerized acrylic resin. Using a thin cutting disk, the tray was sectioned along the midline from the posterior border to the anterior border of the handle. On one of the sections, a stepped butt-joint was prepared. This section was then refitted on the cast and coated with a tinfoil substitute. Additional tray resin was added over the butt joint of the first section and joined at the edged portion of the second section so that the right and left sections would then be able to be detached and joined together in the original position.

Onur Geckili [17] described a technique in which custom impression tray was sectioned mesiodistally along the middle of the palate. A tungsten carbide bur was divided into 3 pieces of equal length. One of the bur sections was placed on top of the right alveolar crest region, and another on top of the left alveolar crest region of the tray. The third bur section was placed in the palatal midsection of the tray. All of the bur sections were fixed to the tray using autopolymerising acrylic resin. A surveyor was used to position the 3 bur sections so that they were parallel to each other. The acrylic resin tray and the 3 bur sections were lubricated with petroleum jelly and a second tray, using the same acrylic resin, was fabricated to slide on the bur sections of the first tray.

Anupama. P D. et al [18] introduced a simple method where in acrylic blocks snap in buttons and acrylic blocks were used for stabilising the sectioned impression trays.

Shivasakthy M, Syed Asharaf Ali [19] described customization of the stock tray. The sectioned stock trays were reassembled by means of press buttons attached to the stock trays. **Chethan Hegde et al** [20] have given a new design modification of custom trays. The mandibular custom tray is sectioned into two halves, auto polymerizing acrylic resin is used to make handles such that they have fins for re-approximation and at the same time the handle is bent for proper grip, a steel tubing is incorporated in one half of the tray handle. Care is taken to see that acrylic does not flow into the tubing. A separate acrylic block with a metal pin or a piece of bur at one end to engage the metal tubing and a bend to lock the handle of other half of tray such that it can withstand weight of stone material without the two sections of impressions being separated.

Smitha Ravindran et al [21] used a plaster index for re orienting the sectioned impression trays. After the fabrication of custom tray, a thin layer of petroleum jelly was applied on the non-tissue surface of the impression tray and the tray was immersed into a mix of Type II Dental stone to form an index.

K. Aswini Kumar et al [22] used magnets placed on the handle of stock trays for assembling the sectioned impression trays. After pouring the cast from the stock tray, stock tray was sectioned, magnets were placed on the handle and metal keeper was incorporated in the resin block facing the sectioned portion of the tray.

Cenk Cura, H. Serdar Cotert [23] described a technique in which autopolymerising acrylic resin and metal pins were fitted symmetrically and parallel to the midline on custom tray. In the mandibular tray, the long pins were placed close to the distal and the short pins close to the midline; in the maxillary tray, the short pins were placed over the residual ridges and the long pins close to the midline. The acrylic resin trays were lubricated with petroleum jelly and an acrylic resin block with a 4- 5mm cross-section that slid tightly on the pins was prepared. The trays were cut into 2 pieces with a steel disc and then joined with the acrylic resin block, which slid onto the parallel pins.

Similar sectional impression technique was used in this clinical report, with the refinement of technique. Instead of using simple metal pins, more precise die pins were used along with die pin sleeve in the acrylic resin block for re-orientation of sectioned impression trays. This modification helps in the precise and accurate re-orientation of impression trays outside the mouth, after making impression.

Conclusion

Use of sectional tray with die pin and die pin sleeve in acrylic resin block as a mechanism for re-orientation gives precise and predictable result in impression making for patients with limited mouth opening.

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