



A MODIFIED TECHNIQUE FOR THE FABRICATION OF MAXILLARY CUSTOM TRAY TO ELIMINATE THE DISTANCE BETWEEN THE FIRST MADE RELIEF HOLE AND THE INCISIVE PAPILLA- A CLINICAL STUDY

Prosthodontics

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ABSTRACT

Aim- to describe a technique for placement of the relief holes in the maxillary custom tray so that there is reduced pressure on the incisive papilla. **Methodology-** Students were asked to make the relief holes according to their own judgement. The distance between the first relief hole and the incisive papilla was measured with the help of a divider and scale.

Statistical analysis- 25% students have made the first relief hole at a distance of less than 5.5 mm from the incisive papilla. 75% of the students have marked the first relief hole at a distance of less than 12mm from the incisive papilla. P value is 0.0001 i.e. <0.05

Conclusion- A modified technique to fabricate the custom tray has been described which will help to reduce the discrepancy between the relief hole and the incisive papilla during impression making. This in turn will help reduce the compression on the incisive papilla.

KEYWORDS

INTRODUCTION

Boucher recommended the use of the selected pressure technique for impressions of edentulous residual ridges.¹ Histologically, compact bone, in combination with the tightly attached mucous membrane, makes the crest of the maxillary residual ridge most suitable to provide primary support for the maxillary denture.² The soft tissue covering the hard palate varies significantly in consistency and thickness among different locations.³ Anterolaterally, the submucosa of the hard palate contains adipose tissue, and posterolaterally, the submucosa contains glandular tissue. These tissues should be recorded in a resting condition, because when displaced in the impression procedure, these tissues tend to return to their normal form within the completed denture base, creating an unseating force on the denture or soreness.^{4,5}

The submucosa in the region of the median palatal suture of the maxillary bones is extremely thin, and the mucosal layer is almost in contact with the underlying bone.⁶ Keratinized, firm masticatory mucosa can resist functional and normal loads while non-keratinized alveolar mucosa and submucosa with slight thickness cannot tolerate such loads. Areas such as incisive papilla and mid-palatal raphe have low stress bearing ability and loads applied to them must be minimal to minimize trauma.⁷

The incisive papilla overlies the incisive canal (also referred to as the nasopalatine canal or anterior palatine canal) which is a bony conduit of the maxillary bone connecting the nasal and oral cavities.⁸ Neurovascular structures traversing this canal include the nasopalatine nerve providing sensory input to the pterygopalatine ganglion, from the mucosa of the hard palate and gingiva around the incisors up to the canine teeth and a vascular anastomosis between the posterior septal branch of the sphenopalatine artery and the greater palatine artery.⁹

In clinical practise, we record the maxillary final impression by using the selective impression technique as given by Boucher. Literature has shown various techniques for the fabrication of the spacer design in order to achieve this selective pressure on the maxillary edentulous ridge. Boucher, based on selective-pressure technique, advocated the placement of 1 mm base-plate wax on the entire basal seat area except posterior palatal seal (PPS) area.¹⁰ Morrow, Rudd, and Rhoads, based on minimal-pressure technique, recommend blocking out undercut areas with wax and then adapting a full wax spacer 2 mm short of the resin special tray border all over. Then they recommend placement of three tissue stops (4 * 4 mm) equidistant from each other.¹⁰

Sharry, based on minimal-pressure technique, recommends adaptation of a layer of base-plate wax over the whole area outlined for tray (even in PPS area). He recommends the placement of four tissue stops (2 mm in width located in molar and cuspid after regions).¹¹ Bernard, based on selective pressure technique, recommends a layer of pink base-plate wax (about 2 mm thick) attached to the areas of the cast that usually have the areas of softer tissues; he recommends the placement of wax spacer all around, except the posterior part of the palate, which according to him are at high angles to the occlusal forces.

Mac Gregor, based on selective pressure technique, recommends placement of a sheet of metal foil in the region of incisive papilla and midpalatine raphe.¹³

Neill recommends the adaptation of 0.9 mm casing wax all over except PPS area.¹⁴

Relief is defined as "the reduction or elimination of undesirable pressure or force from a specific region under a denture base".¹⁵ The main aims are to protect the mucosa under the denture base and to prevent the occurrence of pain, denture instability, denture fracture, and nerve and blood vessel compression. Another objective of relief is to provide space in the tray that will be filled with the impression material. In previous reports, it has been pointed out that providing relief can result in a uniform distribution of pressure in that particular area.¹⁶

On completion of border moulding, the spacer wax is removed and relief holes are made with # 6 round bur which corresponds to 2 mm in diameter. The final impressions are then made with zinc oxide eugenol, silicones, etc.

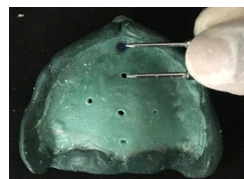
STATEMENT OF PROBLEM- It has been observed that the relief hole is never placed over the incisive papilla due to limitations in the custom tray design, as a result of which, this area is displaced excessively during final impression making.

Just METHODOLOGY-

Patients with edentulous well formed rounded ridges, flabby ridges, resorbed ridges have been included in the study.

Patients with immunocompromised health status, palatal tori, or combination syndrome have not been included in the study.

A double blind study was conducted in the Department of Prosthodontics in which Undergraduate and post graduate students participated. The students were asked to complete the border moulding of the maxillary custom tray and to make the relief holes using the #6 round bur. After completion of border moulding and making of the relief holes, incisive papilla area was marked on the custom tray with an indelible pencil



The distance between the first marked relief hole and the incisive papilla was measured with the help of a divider and scale.

30 such samples were obtained. The data collected was tabulated as follows:

Sample number	Discrepancy in mm
Sample 1	8
Sample 2	6
Sample 3	9
Sample 4	10
Sample 5	12
Sample 6	13
Sample 7	9
Sample 8	4
Sample 9	16
Sample 10	13
Sample 11	9
Sample 12	12
Sample 13	22
Sample 14	9
Sample 15	8
Sample 16	4
Sample 17	8
Sample 18	6
Sample 19	4
Sample 20	10
Sample 21	13
Sample 22	9
Sample 23	4
Sample 24	6
Sample 25	3
Sample 26	4
Sample 27	6
Sample 28	8
Sample 29	12
Sample 30	4

Statistical data was analysed using SPSS software.

RESULT-

N=30	Mean=8.7	Standard Deviation =4.228	Standard Error Mean = 0.772
CI= 95.0%	T= 11.27	P=0.0001<<0.05	
N= 30	MEAN= 8.7	Median=8.5	
Minimum= 3	Maximum=22	Q1= 5.500	Q3= 12

The statistical analysis proves that there is an average of 8.7mm discrepancy with a minimum of 3mm and a maximum of 22mm discrepancy.

25% students have made the first relief hole at a distance of less than 5.5 mm from the incisive papilla. 75% of the students have made the first relief hole at a distance of less than 12mm from the incisive papilla. P value is 0.0001 i.e. <<0.05.

DISCUSSION-

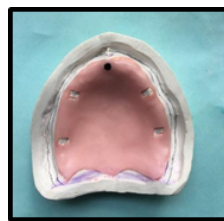
In routine clinical practise, it has been observed that there is always a discrepancy between the first made relief hole and the incisive papilla. This causes excessive displacement of the incisive papilla and has its adverse effects.

This discrepancy is caused due to the limitation in tray handle design. The tray handle is placed at a 45 degree angulation, in the incisive papilla region.

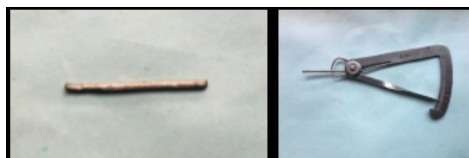
As a result, the relief hole to be made does not traverse the tray handle and hence is never placed on the incisive papilla. To overcome this limitation, an alternative technique for fabrication of the custom tray has been proposed.



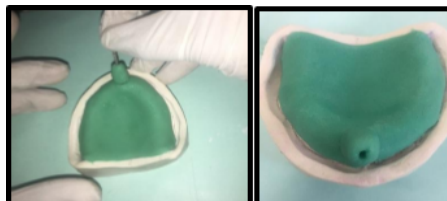
Preliminary impression is made with Medium fusing Impression Compound and primary cast is poured with dental plaster



0.5mm Spacer wax is adapted on the cast and the Incisive papilla area is marked as a reference



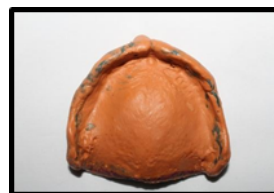
Sprue wax is casted and finished and polished such that its diameter is 2 mm corresponding to the diameter of #6 round bur used for making relief holes.



Tray compound is used to make the custom tray and the casted sprue wax is used to create a channel which passes from the handle to the spacer wax.



Border moulding is done using low fusing impression compound (green stick compound). Care is taken to block the channel with a drop of wax so as to create complete seal while border moulding. After completion of border moulding relief holes are made (3 on the median palatal raphe and 2 on the posterolateral slopes of the hard palate.)



Final impression is made with Zinc Oxide Eugenol paste. Incisive papilla is recorded in a minimum compression state

CONCLUSION-

Normally, discrepancy is created while making the first relief hole. This study shows that almost every time a final impression is made, incisive papilla is recorded in a compressed state due to lack of relief. The proposed technique for fabrication of custom tray enables the final impression material to flow out of the channel made."

This will ensure that the incisive papilla is recorded in a state of minimum compression.

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