

Comparative evaluation of the lateral throat form and the border extension of mandibular complete denture in the distolingual region among the south coastal Karnataka population: An in vivo study

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Abstract

Background: The lateral throat form has profound influence on the denture success when it is meticulously utilized for retention and stability of complete dentures. Neil described 3 classes of lateral throat form with majority of edentulous patients having class I and class III being rare, but actual proportion is unknown.

Aims and objectives: To investigate the proportion of Neil's 3 classes of lateral throat form and to evaluate the difference in length of the lateral throat form between the dentures and the patients' actual anatomy.

Materials and methods: The lateral throat forms were classified by the patients' functional movements and the lengths of lateral throat form were measured by using a UNC periodontal probe intraorally as well as distolingual denture border extraorally.

Results: The proportion of Neil's class I lateral throat form was 77%, class II was 17% and class III was 6%. The mean difference between the length of lateral throat form and denture flange at the anterior edge of retromolar pad was 3.5 ± 1.2 mm in the right side and 3.2 ± 1.3 mm in the left side whereas at the posterior edge of retromolar pad it was 6.8 ± 1.7 mm in the right side and 6.8 ± 1.6 mm in the left side.

Conclusions: The majority of lateral throat forms among the patients were class I, followed by class II and class III the least. The difference between the length of lateral throat form and denture border was statistically significant ($p < 0.001$).

Key words: Distolingual border, Lateral throat form, Retromolar pad, Retromylohyoid fossa

Introduction

The lateral throat form, also known as retromylohyoid fossa, is the area situated at the distal end of the alveolingual sulcus. This area is bounded anteriorly by mylohyoid ridge and respective muscle attachment, laterally by pear shaped pad, posterolaterally by superior constrictor muscle, posteromedially by palatoglossus muscle and medially by tongue¹. To obtain a better peripheral seal in the mandibular complete denture, the distolingual flange should be extended to include this space with proper length and thickness.

The extension of mandibular denture into this area can resist horizontal forces², increase the border seal, prevent the tongue from returning to its polished surface, act as

displacing lever on the denture border³ and contribute to neuromuscular control.

As the oral anatomy is unique for every individual the length (depth) and width of the lateral throat form also varies among the different persons depending upon the tonicity, activity and attachment of the adjacent structures³. Neil described this important area and classified it into three types and noted that the dentures too could have three possible lengths depending upon it¹. The depth of lateral throat form can be measured by introducing a well calibrated periodontal probe⁴ or an implant depth gauge⁵ in the region opposite to anterior edge of retromolar pad when the patient is asked to

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protrude the tongue approximately 6 mm beyond the lower lip.

It has been proposed that most of the edentulous mouths have class I and II type of lateral throat forms and the class III are rare^{1,3,6,7} but exact proportion is unknown. Hence this study was to investigate the proportion of the 3 throat form classifications and to compare the length of the lateral throat form in patients' mouths of south coastal Karnataka to that of their dentures.

Materials and Methods

Intraoral data were collected from 30 patients who visited the Department of Prosthodontics, Manipal College of Dental Sciences, Mangalore for complete denture prosthesis; after obtaining the consent form duly signed by the patient. The study was approved by the Institutional Ethics Committee MCOCS, Mangalore.

The oral examination and classification of the lateral throat form were recorded according to Neil's classification. The patients were instructed to set the tongue into a relaxed position. Then the investigator put his finger lightly adapted to the patients' distal alveolingual sulcus, towards the lateral throat form. The patients were asked to protrude their tongue for 6 mm beyond the vermilion border of their lower lip (Fig. 1). The throat forms were classified into class I when the finger felt no appreciable movement and as class III when the finger was entirely displaced. When the finger felt intermediate functional movement, the throat form was classified as class II⁸.

In addition, a well calibrated UNC-15 periodontal probe was used to measure the lateral throat form⁴. Initially, a mouth mirror was used to hold the tongue away from the lateral throat form and the patients were instructed to protrude their tongue for 6 mm beyond their lower lip. At this time, the UNC-15 periodontal probe was used to adapt to the mouth floor and measure the length from the anterior and posterior edge of retromolar pad at both the right and left sides (Fig 2). After the oral examination, the corresponding areas of the patients' mandibular

complete dentures were measured (Fig. 3).

The data obtained were analyzed using the statistical software package SPSS (Statistical Package for the Social Sciences) version 11.5. Student's paired 't'-test and unpaired 't'-test were used for Intragroup and intergroup comparison. A p value < 0.05 was considered statistically significant.

Results

The results of current study showed that the proportion of Neil's class I lateral throat form to be 77%, class II lateral throat form 17% and class III lateral throat form 6% (Table 1).

The mean length of lateral throat form at the anterior edge of retromolar pad was found to be 15.1 mm (SD- 2.3 mm) in the right side and 15.2 mm (SD- 2.4 mm) in the left side. Similarly, the mean length of lateral throat form at posterior edge of retromolar pad was found to be 17.2 mm (SD- 2.8 mm) in the right side and 17.4 mm (SD- 2.7 mm) in the left side (Table 2).

The mean length of denture flange at the anterior edge of retromolar pad was found to be 11.6 mm (SD- 2.1 mm) in the right side and 12.06 mm (SD- 2.2mm). Similarly, the mean length of denture flange at the posterior edge of retromolar pad was found to be 10.4 mm (SD- 2.2 mm) in the right side and 10.6 mm (SD- 2.1 mm) in the left side (Table 3).

The comparison between the mean lengths of lateral throat form and the lengths of denture flanges in the corresponding regions showed statistically very highly significant difference (p< 0.001). The mean difference in length was found to be 3.5 mm (SD- 1.2 mm) in the right side and 3.2 mm (SD- 1.3 mm) in the left side at the anterior edge of retromolar pad. Similarly, the mean difference in length was found to be 6.8 mm (SD- 1.7 mm) in the right side and 6.8 mm (SD- 1.6 mm) in the left side at the posterior edge of retromolar pad (Table 4 and Graph 1).

Table 1: Proportion of Neil's classification

Classification	Frequency	Percentage
Class I	23	77
Class II	5	17
Class III	2	6

Table 2: Length of lateral throat forms in different regions

Particulars	Number	Minimum (mm)	Maximum (mm)	Mean (mm)	Std deviation
RA_M	30	10.00	20.00	15.1	2.3
LA_M	30	9.00	20.00	15.2	2.4
RP_M	30	9.00	21.00	17.2	2.8
LP_M	30	10.00	21.00	17.4	2.7

RA_M – lateral throat form in the anterior edge of right retromolar pad

LA_M – lateral throat form in the anterior edge of right retromolar pad

RP_M – lateral throat form in the posterior edge of right retromolar pad

LP_M – lateral throat form in the anterior edge of right retromolar pad

Table 3: Length of denture flanges in different regions

Particulars	Number	Minimum (mm)	Maximum (mm)	Mean (mm)	Std deviation
RA_D	30	7.00	15.00	11.6	2.1
LA_D	30	6.00	15.00	12.06	2.2
RP_D	30	6.00	14.00	10.4	2.2
LP_D	30	6.00	14.00	10.6	2.1

RA_D – denture flange in the anterior edge of right retromolar pad

LA_D – denture flange in the anterior edge of right retromolar pad

RP_D – denture flange in the posterior edge of right retromolar pad

LP_D – denture flange in the anterior edge of right retromolar pad

Table 4: Comparison of mean lengths of lateral throat form and denture flanges

Particulars	Paired differences		t value	p value
	Mean	Std. deviation		
RA_M – RA_D	3.5 mm	1.2 mm	15.164	0.001
LA_M – LA_D	3.2 mm	1.3 mm	13.747	0.001
RP_M – RP_D	6.8 mm	1.7 mm	22.313	0.001
LP_M – LP_D	6.8 mm	1.6 mm	23.404	0.001

RA_M – lateral throat form in anterior edge of right retromolar pad

LA_M – lateral throat form in anterior edge of left retromolar pad

RP_M – lateral throat form in posterior edge of right retromolar pad

LP_M – lateral throat form in posterior edge of left retromolar pad

RA_D – denture flange in anterior edge of right retromolar pad

LA_D – denture flange in anterior edge of left retromolar pad

RP_D – denture flange in posterior edge of right retromolar pad

LP_D – denture flange in posterior edge of left retromolar pad

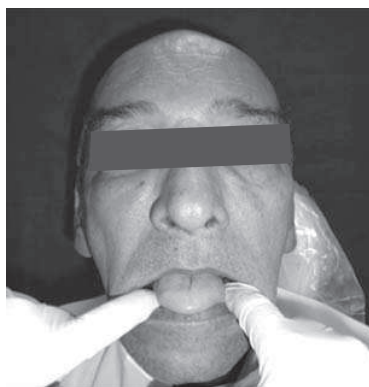


Fig 1: Examination of lateral throat form



Fig 2: Intraoral measurement of lateral throat form with UNC-15 periodontal probe

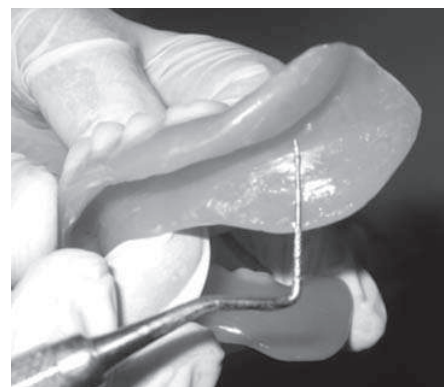
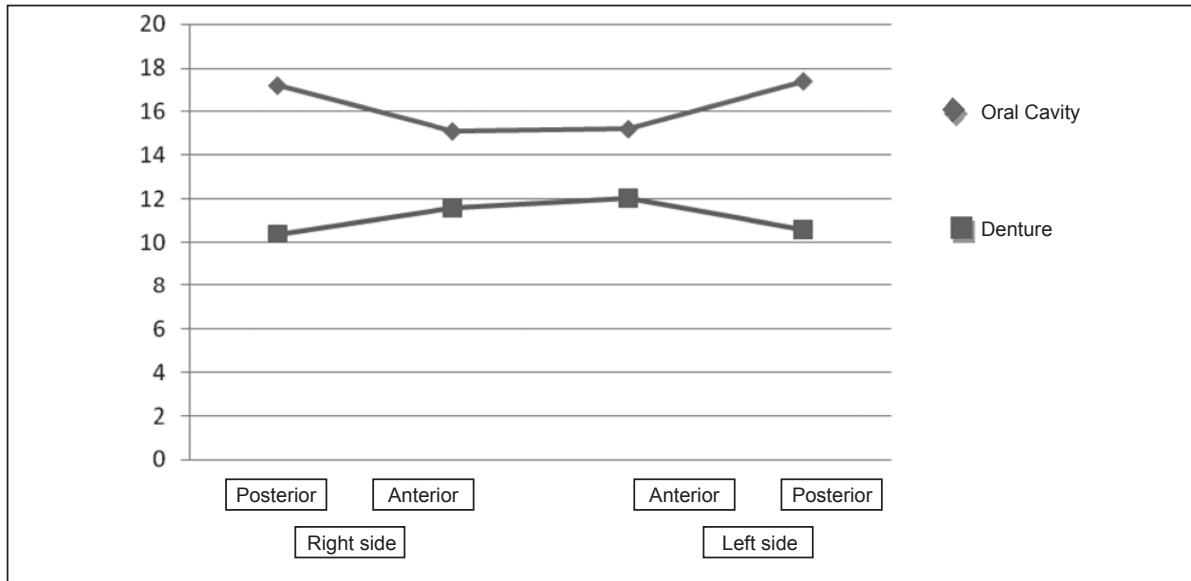


Fig 3: Measurement of denture flange length using UNC-15 periodontal probe



Graph 1: Difference at anterior and posterior edge of retromolar pad between the oral cavity and dentures

Discussion

The lateral throat form is a potential space located in the distolingual region of the mandibular denture bearing area and becomes important for Prosthodontists as it provides with the peripheral seal and thus retention and stability for mandibular complete denture which in turn leads to patients' comfort and satisfaction. With the variation of intraoral anatomy the types of lateral throat form also vary in shapes and sizes. In this in vivo study, class I lateral throat form was about 5 times more common (77%) than class II (16%) and class III was rare (7%). These results corresponded to the Neil's⁹ description and the studies by Hang PS et al.⁵ and Williams et al.¹⁰. These data can be a useful guideline for clinician to select the stock trays as well as fabricate a proper custom tray for majority of patients.

The border extensions of mandibular complete denture in the distolingual region, particularly in the lateral throat form was found to be significantly shorter than the available space ($p < 0.001$), that is usually not approached and included due to improper impression technique and border moulding with over-reduced custom tray borders. The amount of depth that could be included in the studied dentures without interfering with the muscular movement was about 3 mm and 7 mm at the anterior region and posterior region of retromolar pad respectively. This is a potential space usually filled with mucosal linings over the superior constrictor muscle and palatoglossus muscle. The impressions made with relatively soft materials like alginates with inadequately extended stock trays result in primary casts that lack the proper depth in that region and the custom trays

fabricated in such casts will have shorter distolingual flange which in turn result in significantly shorter denture border¹. The inclusion of this space with the proper border extension of the mandibular dentures provide added retention, stability and support for the prostheses^{1-3,8,11-13}. The stable and retentive prostheses provide physical and psychological comfort; patients' satisfaction for the prosthesis increases and is reiterated^{2,8,14}.

Hence, it is recommended to measure the depth of the lateral throat form in the patients' mouth carefully to select a stock tray of adequate flange extension or modify it accordingly to obtain good primary casts over which custom tray can be fabricated to record this region in the final impression. The well calibrated periodontal probe or implant depth gauge can be used to measure the length (depth) of lateral throat form intraorally and the instrument can be used to measure the extension of the tray border and modify them accordingly^{4,5}.

Limitations of the study

The more reliable and objective technique of classification of the lateral throat form should be developed as the method used in this study was entirely subjective and sometimes inconsistent between the examiners. The relatively short sample size and the inclusion of relatively healthy residual ridge in this study may not represent the other scenario that occur in the case of resorbed ridges, patients with oral submucous fibrosis or other degenerative and fibrotic conditions that restrict the movement of the floor of the mouth. Hence, the detailed study with further tools of examination may be required to draw definitive conclusions in those instances.

Conclusion

Within the limitations of this study, the following conclusions could be drawn:

1. The majority of the lateral throat forms among the patients of south coastal Karnataka were class I, followed by class II and the class III were rare.
2. Extension of denture border in the distolingual region was found to be more in class I lateral throat form compared as class II and least for class III.
3. Statistically significant differences were revealed between the length of the lateral throat form in patients' mouth and their mandibular complete dentures.
4. Retention, stability and support for the dentures were better for class I lateral throat form in most cases and class III lateral form the least. Class II throat forms had moderately retentive and stable complete dentures.
5. It is advisable to measure the depth of lateral throat form to select properly extended stock trays for primary impression or to properly extend the custom tray to record the lateral throat form.

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