

A Cross-Sectional Retrospective Study to Measure Palatal Depth among Completely Edentulous Population in Central India

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Abstract

Background: The depth of the palatal vault has many clinical implications in the treatment modalities for complete and partial denture patients. The depth of the palate is related to denture retention and stability, speech, and swallowing and is significantly believed to play a role in cases of midline fractures of maxillary dentures. **Materials and Methods:** Four hundred male and female subjects were randomly selected from the city of Bhopal. In this study, alginate impressions of completely edentulous maxilla of all subjects were made. The impressions were poured in Type II gypsum product to obtained cast. The casts were then labeled with patient information. The palatal depth was measured using modified mechanical depth gauge. **Result:** The current research shows that moderate group of palatal depth revealed (48.5%) highest score as compare to deep (8%) and shallow (43.5%) group of palatal depth. Female shows highest score in moderate (49%) compared to males, while males were more in deep (11.5%) group of palatal depth as compare to females. The outcome of the present study confirms statistically significant difference between each category of palatal depth, that is, $P < 0.05$. **Conclusion:** The results were statistically analyzed and showed a prevalence of moderate palatal depth in both male and female population.

Keywords: Palatal vault, Flexural strength, Mid-palatine raphe, Depth gauge, Edentulous.

INTRODUCTION

The deepest and the most superior part of the palate is called palatal vault.^[1] The hard palate is made of palatine processes which joins to form mid palatine raphe.^[2] Hard palate forms the partition between the oral and nasal cavity. Depth of palatal vault varies among individuals. For better stability and retention of maxillary complete denture, one of the foremost requirement is to record the palatal vault and extension of the palate accurately.^[3] This study aims to measure and categorize palatal depth of completely edentulous male and female population in Central India.

MATERIALS AND METHODS

This cross-sectional retrospective study comprised 400 male and female subjects was randomly selected from the city of Bhopal. In this study, alginate impressions (Coltene Coltoprint WHALEDENT PVT. LTD.) of completely edentulous maxilla of all 400 subjects were made. Impressions were considered accepted, if all maxillary anatomical landmarks were recorded and then the impressions were poured in Type II gypsum

product (COLTENE WHALEDENT PVT. LTD.) to obtained cast. The casts were labeled with patient information. A lead pencil was used to mark the mid palatine raphe as a reference point.

Criteria for the sample selection

Inclusion

- Central India Bhopal population
- Completely edentulous (males and females subjects)
- Period of edentulous: 6 months–2 years.

Exclusion

- Those who have undergone any kind of corrective surgery
- Maxillary tori, cleft palate, carcinomas, fractures, and other pathologies involving oral cavity.

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Palatal depth measurement

Modified mechanical depth gauge (Jaibros Tools Private Ltd.) Figure 1 was used for the measurements. The instrument scale tip was modified for further accuracy Figure 2. The left and right first molar region and an intersection point on mid-palatine raphe were taken as reference points. Modified mechanical depth gauge measuring table was placed and stabilized over first molar region Figure 3. The scale was adjusted to palatal depth and the depth was measured and noted. The data were recorded and categorized in three different categories of palatal vault depth, that is, deep: 15.5–20 mm, moderate: 10.5–15 mm, and shallow: 5.5–10 mm.^[4] All the measurements were made in millimeter.

RESULTS

Statistical analysis was done with the help of SPSS Version 25. One-way ANOVA test was applied to check statistical difference between each category of palatal depth.

A total of 400 completely edentulous patients were included in the study out of which 200 were male and 200 were female. The current research shows that moderate group of palatal

depth revealed (48.5%) highest score as compare to deep (8%) and shallow (43.5%) group of palatal depth, as shown in Table 1 in which female shows highest score in moderate (49%) and shallow (46.5%) categories as compare to males, while males were more in deep (11.5%) group of palatal depth as compare to females [Graph 1]. The outcome of the present study confirms statistically significant difference between each category of palatal depth, that is, $P < 0.05$, as shown in Table 2. Deep (13) and moderate (12.38) category represent high mean value as compare to shallow (8.37) group of palatal depth while the total mean palatal depth of all the categories is 10.68 and standard deviation is 3.2 [Table 3].

DISCUSSION

Data from the past researches confirm that there is negative influence of aging and estrogen on maxillary bone in females.^[5] Hegde and Patil reported that there was a greater palatal distortion with increase in palatal height accompany tooth movement toward outward and buccal direction during denture processing.^[6] The individuals with high or narrow palate more commonly have speech disorder and a hypernasal speech.^[7] Palatal vault depth significantly affects flexural strength of heat cure resin. Researches show best flexural



Figure 1: Depth gauge

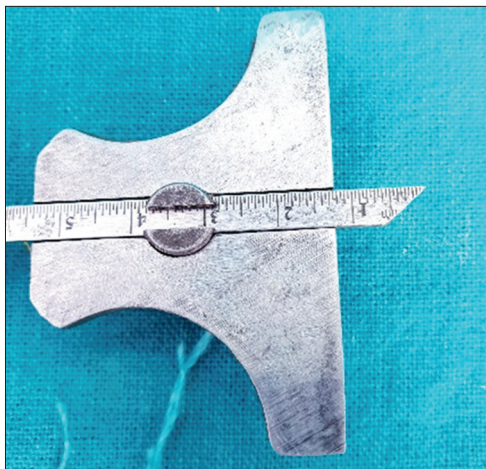


Figure 2: Scale tip was modified

Table 1: Scores of each category of palatal depth and its distribution according to gender

Palatal depth	Gender		Total, n (%)
	Male, n (%)	Female, n (%)	
Deep	23 (11.5)	9 (4.5)	32 (8)
Moderate	96 (48)	98 (49)	194 (48.5)
Shallow	81 (40.5)	93 (46.5)	174 (43.5)
Total	200 (50)	200 (50)	400 (100)

Table 2: Difference between palatal depths by applying ANOVA test

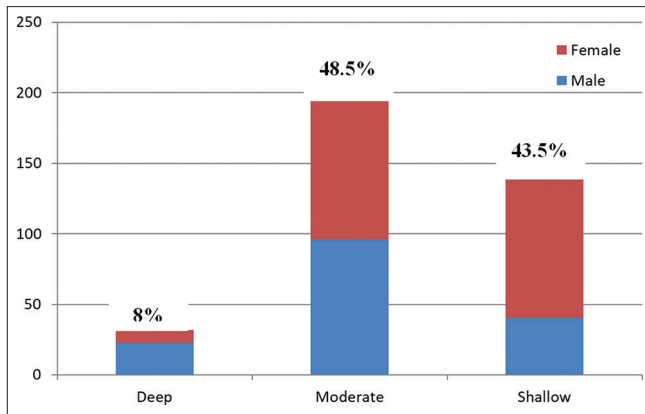
Categories	Sum of squares	DF	Mean square	F- value	P-value
Between various palatal depth	1.743	2	.872	3.522	.030
Within various palatal depth	98.257	397	.247		
Total	100	399			

DF=Degree of freedom, Significant at $P \leq 0.05$

Table 3: Mean and standard deviation of each category of palatal depth

Palatal depth	Number	Mean	±SD
Deep	32	13	5.7
Moderate	194	12.38	1.7
Shallow	174	8.37	2.2
Total	400	10.68	3.2

SD: Standard deviation



Graph 1: Scores of individual group of palatal depth in the study sample ($n = 400$)



Figure 3: Palatal depth measure

strength with medium palatal vault and a faired or least with shallow.^[8] Fracture liability of the maxillary denture is more in male compared to female.^[9]

CONCLUSION

This study concluded that most of the sample studied had moderate palatal depth for male and female and results were statistically significant.

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