

## DETERMINATION OF RECORD RIM HEIGHT FOR COMPLETE REMOVABLE DENTAL PROSTHESIS BY ASSESSMENT OF ANATOMICAL LANDMARKS IN DENTULOUS INDIAN POPULATION

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### ABSTRACT

**Aim:** To determine the record rim height for complete removable dental prosthesis by assessment of anatomical landmarks in dentulous Indian population. **Methods and Material:** Functional impressions were made for two hundred dentulous subjects (n=200) and dental stone casts were fabricated. The permanent canines and first molars were selected as reference teeth. The canine cusp tip, mesio-palatal cusp tip of permanent first molar and the functional sulcus depth were considered as reference points. The measurements between reference points for each of the reference tooth were recorded with a digital vernier caliper and the mean was used to determine the average record rim height for the Indian population. **Statistical analysis used:** The values obtained were subjected to t-test and interpreted at 95% confidence level. **Results:** The reference point measurements for each reference tooth was found to be statistically significant with  $p < 0.05$  except for maxillary left canine. The measurement values obtained were comparatively lesser than those suggested by previous studies. **Conclusions:** In the fabrication of complete removable dental prosthesis for Indian population, the pre-determined height of maxillary anterior and posterior record rim can be kept as 19-20 mm and 14 - 15 mm respectively. The pre-

determined height of mandibular anterior and posterior record rim can be kept as 14 mm and 12-13mm respectively.

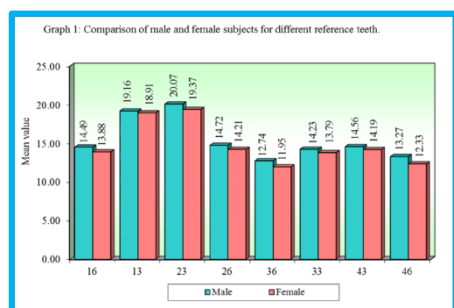
**KEYWORDS:** Record rims; occlusal rims; vertical dimension; jaw relation

### INTRODUCTION

Recording jaw relation is a crucial step in fabrication of complete denture prosthesis. Jaw relation is any spatial relationship of the maxillae to the mandible.<sup>[1]</sup> The recording procedure is accomplished by measuring vertical jaw relation, horizontal jaw relation with / without orientation jaw relation. Vertical jaw relation/vertical dimension is the distance between two selected points, one on a fixed and one on a movable member.<sup>[1]</sup> This jaw relation determines height of the face at occlusion and at rest. Vertical dimension assessment is an essential requirement to determine the horizontal jaw relation. It is imperative to make the procedure of jaw relation quick and convenient to record accurate horizontal jaw relation. To serve the purpose, wax rims are fabricated with average measurements as per recommended by Western authors.<sup>[2-5]</sup> However, due to ethnic and racial divergence, same measurements may not be applicable to the Indian population. Hence, this study is an attempt to determine the record rim height for fabrication of removable dental prosthesis by assessment of anatomical landmarks in dentulous Indian population.

**Table 1: Comparative measurements for male and female subjects**

Tooth no.*	MALE (n=100)			FEMALE (n=100)			p-value	Sign- ificance	MALE +FEMALE (n=200)		
	Min. \$	Max. #	Mean	Min. \$	Max. #	Mean			Min. \$	Max. #	Mean
16	12.43	17.26	14.49	11.86	16.23	13.88	P<0.05	S	11.86	17.26	14.18
1 3	16.34	21.09	19.16	15.88	20.82	18.91	P<0.05	S	15.88	21.09	19.03
2 3	17.02	21.41	20.07	16.14	23.16	19.37	P>0.05	NS	16.14	23.16	19.72
2 6	12.73	18.28	14.72	12.11	16.87	14.21	P<0.05	S	12.11	18.28	14.46
3 6	10.17	14.63	12.74	10.21	13.55	11.95	P<0.05	S	10.17	14.63	12.34
3 3	12.10	16.89	14.23	12.14	15.62	13.79	P<0.05	S	12.93	16.89	14.01
4 3	12.46	15.78	14.56	11.64	16.27	14.19	P<0.05	S	11.64	16.27	14.33
4 6	11.49	15.32	13.27	11.23	14.16	12.33	P<0.05	S	11.23	15.32	12.80



Graph 1

## MATERIALS AND METHODS

Two hundred dentulous subjects; n=200 (100 males, 100 females) were examined. All the subjects were above 40 years of age with definite occlusal plane and presence of all permanent canines and first molars. Subjects with moderate to severe malocclusion and periodontal diseases, generalized attrition, para-functional habits, extruded canine (s), molar (s) and/or with any developmental anomaly were excluded from the study. Functional impressions of both maxillary and mandibular arches were made using irreversible hydrocolloid impression material (Marieflex, Septodont Health Care India Pvt. Ltd) and dental stone (Type III) casts were fabricated. The permanent first molars (teeth no.-16, 26, 36 and 46) and canines (teeth no.-13, 23, 33 and 43) were selected as reference teeth. The canine tip, mesio-palatal cusp tip of permanent first molars and their corresponding functional sulcus depth were considered as reference points for each of the reference teeth mentioned. The deepest portion of sulcus depth of each reference tooth was marked with an indelible pencil as the functional sulcus depth on the dental stone cast. Using a digital vernier caliper, measurement

between the reference points were made by a single operator. Verification of the accuracy and repeatability of the measurements were accomplished by performing five repeated measurements and the mean was calculated for each subject. The values obtained were subjected to t-test for statistical analysis and interpreted with  $p < 0.001$  as highly significant (HS);  $p < 0.05$  as significant (S) and  $p > 0.05$  as non-significant (NS). The measurements were used to determine the average record rim height for fabrication of complete removable dental prosthesis for Indian population.

## RESULT

Table 1 shows comparison of measurements of the various reference teeth for male and female subjects; their minimum, maximum and mean values and significance value (p-value). Graph 1 is a bar graph showing comparison of male and female subjects for different reference teeth.

## DISCUSSION

The aim of jaw relation in treatment of edentulous patients is to facilitate adaptation of complete dentures to the rest of the masticatory system. For this goal to achieve, vertical dimension at occlusion and at rest is necessary to determine that is stable with occlusal contacts and harmonious with existing TMJ, masticatory muscles, surrounding soft tissues and musculature. To accomplish quick and accurate jaw relation record, occlusal rims/ record rims are fabricated with predetermined measurements. It is imperative that the predetermined measurements of the record rims should simulate the clinical conditions. Closer it resembles the actual clinical condition, faster and accurate is the procedure.

Such record rims have been made with the measurements as suggested by Western authors, which may not be applicable to Indian population owing to ethnic and racial differences. Literature review reveals no study done in this field for the Indian population. In the present study, all permanent first molars and canines were taken as reference teeth. The record rims have been measured for anterior and posterior height. Hence, the measurements from the functional sulcus depth to the canine tip determined the anterior height. Similarly, the measurements from the functional sulcus depth to the mesio-palatal cusp tip determined the posterior height. To obtain functional sulcus depth, functional impressions were made using irreversible hydrocolloid and the measurements between the reference points were recorded. In the present study (Table 1, Graph 1); the mean measurements obtained for male and female subjects for each reference tooth was found to be less as compared to the measurements suggested by Western authors.<sup>[2-5]</sup> Maxillary anterior dimensions were found to be 19-20 mm for male subjects and 19 mm for female subjects. The results are in accordance to Boucher<sup>[4]</sup> but in contrast to Janieson (1965),<sup>[5]</sup> Rangarajan<sup>[6]</sup> and Nallaswamy<sup>[7]</sup> who stated this measurement as 22 mm. Similarly, the posterior maxillary height in the present study was found to be around 14 - 15 mm, way away from the measurements given by previous authors. One reason for such a difference could be attributed to the fact that functional sulcus depth was considered for this research project and no such evidence is present in the literature for previous studies. All the measurements for maxillary reference teeth except for left canine (23) were found to be significant with  $p < 0.05$ . The mean measurements (Table 1, Graph 1) obtained for mandibular arch for both male and female subjects in the anterior and posterior region were found to be in range of 14 mm and 12-13 mm respectively. This, in contrast to previous studies is less as compared to other authors<sup>[4,5-7]</sup> who advocate this measurement as 18 mm. Conventionally, the mandibular posterior record rim height has been considered to be anterior two - third the height of the retromolar pad. But, at times, retromolar pad is ill - defined and cannot be used to determine posterior

mandibular record rim height. In such a situation, 12-13 mm dimension as described in this article can be a valid alternative to determine posterior mandibular record rim height. All the measurements for mandibular reference teeth, with no exception were found to be statistically significant with  $p < 0.05$ .

### CONCLUSION

Within the limitations of this study, in the fabrication of complete removable dental prosthesis for Indian population, the following conclusions were drawn:

1. The pre-determined height of maxillary anterior and posterior record rim can be kept as 19-20 mm and 14 - 15 mm respectively.
2. The pre-determined height of mandibular anterior and posterior record rim can be kept as 14 mm and 12-13 mm respectively.

### CONFLICT OF INTEREST & SOURCE OF FUNDING

The author declares that there is no source of funding and there is no conflict of interest among all authors.

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