

Measurement of distance between maxillary central incisors and incisive papilla in dentate individuals.

Running Title: Distance between maxillary central incisors and incisive papilla.

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ABSTRACT

Objective: To measure the distance amongst the incisive papilla's centre and posterior border to the incisal edge of the upper central incisors in dentate individuals.

Methodology: This descriptive cross-sectional study was conducted at Department of Prosthodontics at Isra Dental College, Hyderabad from May, 2020 to Feb, 2021. During study period, 200 patients aged between 20-40 years of either gender were included. Impressions and casts made. On the cast and distance measured and recorded for maxillary central incisor and incisive papilla with the help of vernier calliper.

Results: Mean distance between maxillary central incisive papilla's centre was 9.20mm while it was 12.47mm from upper incisor to the incisive papilla's posterior border. Distance among the maxillary central incisor to the incisive papilla's center and posterior border were significant statically in both genders.

Conclusion: While fabricating removable prosthesis, the results of current study may used as primary point for position of maxillary incisors.

Key words: Anatomical landmarks, Central incisors & Incisive papilla. Removeable prosthesis.

Introduction:

It is necessary to provide the prosthodontic services in the present days after natural teeth are lost, to provide effective mastication and aesthetics. For restoring the normal aesthetics which was lost due to the completely edentulous state of patients in complete denture prosthodontics, aesthetics is a very essential and demanding element. Teeth are organized in specific ordered method in complete dentures fabrication, to provide additionally capable biologically and functionally both. Various factors relating scientific and artistic principles are important for aesthetics part of complete denture fabrication.¹ In missing natural teeth, it's very tough to assemble the missing dentition in the exact previous position in complete denture prosthesis fabrication. However if teeth are arranged accurately based upon certain assessable factors then they are not only biologically workable but functionally stable as well, even then prosthesis cannot be exact substitute of natural teeth.^{2,3} Various factors play a major role in alignment of the artificial teeth which gives the natural appearance to the artificial restoration.⁴ Correct anterior teeth placement in completely edentulous patients also provided a pleasing lip support and aesthetics. For maxillary anterior teeth posi-

tion in complete denture construction, Incisive papilla is recognized as an important landmark.^{5,6} Incisive papilla is an essential, an immovable landmark and generally does not alter their position in grownup life.^{7,8} For complete denture fabrication, researchers used distance among incisor and incisive papilla as a biometric guide.^{9,10} Hickey et al¹¹, Martone¹² and Murry¹³ recommended that the maxillary central incisors incisal edges should be 8-10mm in front of the incisive papilla's center. McGee¹⁴ preferred 7.7mm for this measurement whereas Harpe'r¹⁵ recommended a value of 5-8mm for this distance. More comprehensive study was done by Johnson, who found that resorption was marked and prolonged lingually to the palate's anterior part during first 3 years.¹⁶ Watt and Likeman shown in their study that in the remodeling procedure, incisive papilla roams an average of 2.3mm upward and 1.6mm forward. Due to the association amongst incisive papilla and incisive fossa altered somewhat, the incisive fossa present somewhat posterior to incisive papilla in edentulous oral cavity. For compensation of these changes, it's recommended the usage of the incisive papilla's posterior border.¹⁶ Erlich an Gazit establish that this point was an average of 12-13mm anterior to the central incisor's labial surface.⁷

The aim of current research was to distinguish distance amongst incisive papilla to upper central incisor, can help for alignment of teeth in removable complete denture prosthesis. This will also lessen the patient's time and dentist's chair side efforts by permitting the dental laboratory technicians to set teeth in prosthesis according the association recognized among the anatomical landmarks and natural teeth^{14,18} especially when pre-extraction records are not present.

Objective:

To measure the distance amongst the incisive papilla's center and posterior border to the incisal edge of the upper central incisors in dentate individuals.

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Methodology:

This descriptive study conducted in the Department of Prosthodontics at Isra Dental College, Hyderabad, over the period of ten months, from May, 2020 to Feb, 2021. Sample includes 200 patients with complete eruption of permanent teeth from either gender; age ranges from 20 to 40 years. Patients presented with supra erupted teeth, in anterior teeth's endodontic or restorative procedures, orthodontic history, gross mal-alignment, tooth surface loss of teeth, swelling or damaged incisive papilla were excluded. A suitable maxillary metal perforated stock tray was selected for every individual. Maxillary impression was made with irreversible hydrocolloids. Dental vibrator was used for pouring of impressions with dental stone and permitted to set for one hour before being removed. Any defect in the cast such as air bubbles, voids or any damage on significant anatomical landmarks was exempt. Base former was used for cast base formation and were coded with pencil and marker. Recognized the incisive papilla in the model and then the incisive papilla and the incisal edge of the upper central incisor and were marked by the pencil on the cast. Distance among edge of upper central incisors and center of incisive papilla and distance among edge of upper central incisor and of incisive papilla's posterior border measurements were recorded with the help of vernier calliper. SPSS version 21 was used for data analysis. The significance level was set at <0.05%.

Results:

Among 200 patients, females were 100 and male patients were also 100. For comparison of the mean variances in distances amongst incisive papilla's centre to upper central incisor and incisive papilla's posterior border to the maxillary central incisor in both genders' female and male models, performed t-test and significant p value is <0.05.

Mean distance from maxillary central incisor to the incisive papilla's center was 9.20mm and SD was 2.21mm shown in table 1. Mean distance from maxillary central incisor to incisive papilla's center in male was 7.54mm and in female 8.92mm as shown in table 2. When, as a reference point the incisive papilla's posterior point was used, its mean distance from maxillary central incisor was 12.47mm SD±2.32mm as shown in table 1. The variance among the mean value 10.95mm in male and 12.04mm in female was significant statistically in Table 3.

Table 1. Distance between maxillary central incisor and incisive papilla.

	Mean (mm)	±SD
Maxillary central incisor and center	9.20	2.21
Maxillary central incisor and posterior border of inci-	12.47	2.32

Table 2. Distance between upper central incisor and centre of incisive papilla in both genders.

Gender	Mean (mm)	SD	p value
Male	7.54	2.02	0.04
Female	8.92	1.52	

Table 3. Distance between upper central incisor and posterior border of incisive papilla in both genders.

Gender	Mean (mm)	±SD	p value
Male	10.95	2.03	0.008
Female	12.04	2.02	

Discussion:

Prosthodontists treating a huge number of partially and completely edentulous patients on daily basis and recognizing that there are many patients who are esthetical, functional or both requirements are so often difficult to satisfy. Though, for providing proper teeth alignment in most of the edentulous patients, preliminary point is a simple objective technique involving anatomical measurements. This is very valuable for the complete denture fabrication in absence of previous denture or dental records.^{10, 25}

In prosthetic dentistry, importance of the association among the incisive papilla and the upper central incisors is that it offers guidelines for artificial teeth arrangement in removable complete denture fabrication.¹⁴⁻¹⁷ Hence it is essential during measurements, to orientate the models in consistent method so that the outcomes can be usefully achieved when arranged artificial teeth in complete denture bases.¹⁸ In this study for horizontal measurements, as important anatomical landmarks incisive papilla's center and posterior border were used. During the extraction of upper anterior teeth, resorption occurs after extraction; incisive papilla's anterior border may be damaged or affected. The incisive papilla's center and posterior border will be more probably persistent. Hence, the incisive papilla's center and posterior border were used as orientation facts in this current research.⁷

The outcome got in current study was 9.20mm of mean distance from maxillary central incisor to incisive papilla's center. This number comes in the acclaimed range of 8 to 10mm, it is comparable to the finding of Marvroskoufis and Ritchie 10.2 and Sawris 8.50mm¹⁸

The mean distance from maxillary central incisor to incisive papilla's posterior point is 12.47mm which is not constant to the previous studies, as in Jordanian, Amin and Gnzawi, it was 12.93mm¹⁹, in Ortman and Tsao, it was 12.45mm¹⁴ and in Grave and Becher⁶, it was 13.17mm.

During current study, we identify significant gender difference for the distance amongst maxillary central incisor and incisive papilla's center as well as posterior border; a finding in contrast to other studies.^{18,20-24} This finding may be due to alterations in pre-maxillary prominence, incisive papilla's length or arch forms.

Jatala UW, Bashir AF, Yazdanie N²⁶, concluded in their study that the distance of Central Incisor and Incisive Papilla in dentate objects differs according to the arch form. The mean distance was documented maximum for ovoid arch followed by tapering arch and minimum for square arch. These results are contrary from the results of earlier studies which were presented on assessing the maxillary arch forms by Kook²⁷ and Nakatsuka.²⁸ In the study of Nakatsuka's, the maximum common arch form was round square arches while Kook measured square arches were frequent. Therefore the outcome of current study can be useful in the patients to replicate the associations recognized among the Oro-facial tissues and the natural teeth alongside with usage of phonetic tests, biometric guides. In construction of occlusal wax rims, practice of these ana-

tomic landmarks by lab technician deprived of opportunity of seeing the patient, so that they estimated the ending location of the artificial teeth. This will benefit to minimize the dentist and the patients clinical time.

Conclusion:

In limits of present research, it can be established that the in arrangement of anterior teeth in removable prosthesis, gender has substantial influence on the association of the upper central incisors and the incisive papilla.

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