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Original Article

Dentistry Section

Assessment and Evaluation of Anatomic Variations of Retromolar Pad: A Cross Sectional Study

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ABSTRACT

Introduction: The retromolar pad also called piriformis papilla is a mucosal elevation located in the retromolar area covering the retromolar triangle. After molar loss, the bony alveolar process and surrounding soft periodontal tissue remodel, mainly resorb and blend with retromolar pad. It is a key intraoral landmark in prosthodontics.

Aim: The aim of this in-vitro study was to analyze the various anatomical shapes and sizes of retromolar pad in 150 completely edentulous patients between 55 to 70 years of age group.

Materials and Methods: The study was conducted on 150 completely edentulous patients. The shapes of retromolar pad on the left and right side were seen and divided into pear, triangular and round shape. The comparison of the mean longitudinal diameter and transverse diameter on the right and left sides was done. The data was evaluated statistically. The chi-square test was used for the comparison between the proportions with the help of standard deviation, t-test was used for comparison between the left and the right side and ANOVA test was used for comparison between the various shapes of the retromolar pads.

Results: The result showed that there was statistically significant difference among different shapes of retromolar pad and there was significant difference in mean transverse and longitudinal diameter on right and left side, the mean value of the longitudinal diameter on left and right side was 8.81 and 8.69 whereas the mean value of the transverse diameter on left and right side was 6.79 and 6.82 respectively and p-value obtained for both was 0.550 and 0.814 respectively.

Conclusion: The study conclude that there are three different shapes of retromolar pad among which pear and triangular shaped retomolar pad provides more stability in lower denture because of increase surface area.

Keywords: Border seal, Dimension, Shape, Stability

INTRODUCTION

The retromolar pad is a mass of soft tissue located at the posterior end of the mandibular alveolar ridge. This pad covers the underlying bone with surrounding attached muscle fibers. Sicher described retromolar pad as a triangular soft elevation of mucosa that lies distal to third molar [1]. It comprises of non-keratinized loose alveolar tissue covering the glandular tissues, fibers of buccinator muscle, fibers of superior constrictor muscle, fibers of ptergomandibular raphe and the terminal part of the tendon of temporalis muscle. After the loss of molars the bony alveolar process and surrounding soft tissues remodels, resorbs and blends with retromolar pad [2]. The bony residual ridge, attached muscles and covering mucosa occupy the mandibular edentulous retromolar region. A removable denture base should cover the retromolar pad not only to provide proper basal seal but it also aids in stability of the denture by adding another plane to resist movements of the base [3]. According to Wright the retromolar pad is a relative stable posterior landmark even in patients with advanced ridge reduction [4]. Apart from this it is a good landmark for the orientation of occlusal plane in edentulous patients as its position remains constant even after extraction of natural teeth, therefore retromolar pad plays a significant role in determining the occlusal plane. According to Ismail and Bowman occusal plane terminate posteriorly in the middle of the upper third of the retromolar pad [5]. Wright showed that the mandibular first molar is usually at the level corresponding to two third of the way of retromolar pad [6]. So retromolar pad area plays a vital role and is a major landmark in fabrication of removable prosthesis but still there is reliable but insufficient information on different bone, mucosa, muscle tissue forms, shapes, sizes and distribution at the mandibular regions in edentulous patients [7-9]. When mandibular complete denture is made, marginal seal is essential for its stability, one of the most important anatomical element contributing its seal is retromolar pad. The various shapes and sizes of retromolar pad may also influence the stability and peripheral seal provided by mandibular denture.

AIM

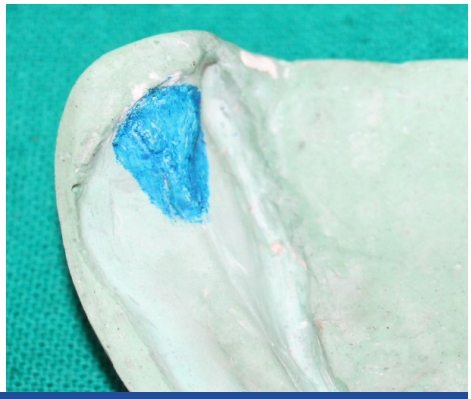
The aim of this study was to access the various anatomic variations of retromolar pad in 150 completely edentulous patients in semi urban population of Meerut, India.

MATERIALS AND METHODS

This cross-sectional study was conducted at the Department of Prosthodontics, Kalka Dental College, Meerut, India, on 150 completely edentulous patients both male and female. Analysis of retromolar pads was done for 150 completely edentulous patients who reported to the department for the fabrication of complete denture. The inclusion criteria were as follows: Completely edentulous male and female patients ranging from 55 to 70 years of age (this age group was selected as maximum patients reported to the department were ranging between this age group), patients with well formed mandibular ridges, impressions which were properly extended covering retromolar pad area, patients with well neuromuscular coordination. The following were excluded from study: Patients who were not in that particular age group, impressions which were short of retromolar pad area and hemimandibulectomy cases. Analysis was done indirectly on the master cast made after final impression. In each model a single operator defined the retromolar pad (left and right side) with a pencil and then determined the longitudinal and transverse diameter using a manual caliper. The variation in shapes of retromolar pad

[Table/Fig-1]: Oval/ pear shape of retromolar pad.

[Table/Fig-2]: Round shape of retromolar pad.



[Table/Fig-3]: Triangular shape of retromolar pad.

on the left and right side was also seen and was divided into three groups: Pear shape [Table/Fig-1], Round shape [Table/Fig-2] and Triangular shape [Table/Fig-3].

The comparison of the mean longitudinal diameter and transverse diameter of retromolar pad area on the right and left sides was done and were correlated with respect to the different shapes of the retromolar pad.

STATISTICAL ANALYSIS

Statistical analysis was done using SPSS version 16. Retromolar pads of patients (left and right side) were analyzed. The chi-square test was used for the comparison between the proportions with help of standard deviation, t-test was used for comparison between the left and the right side and the ANOVA test was used for comparison between the various shapes of the retromolar pads.

RESULTS

According to shapes of retromolar pads [Table/Fig-4] shows 51.3% were pear shaped, 14.3% were round and 34.3% were triangular shaped.

The independent t-test was used for the comparison of the mean longitudinal diameter and transverse diameter on the right and left sides. The difference between mean longitudinal diameter and transverse diameter on the right and left sides was statistically not significant (p-value>0.05) [Table/Fig-5]. There was a significant difference in the mean transverse and longitudinal diameter on the right and left sides when correlated with respect to the different shapes of the retromolar pad (p-value<0.05). Results are summarized in [Table/Fig-6].

Shape	Side		Total	p-value
	Left	Right		
Pear	78	76	154	0.934
	52.00%	50.70%	51.30%	
Round	22	21	43	
	14.70%	14.00%	14.30%	
Triangular	50	53	103	
	33.30%	35.30%	34.30%	
Total	150	150	300	
	100.00%	100.00%	100.00%	

[Table/Fig-4]: The chi-square test was used for the comparison of various shapes of retromolar pad.

	Side	Number	Mean	Std. Deviation	p-value
Longitudinal Diameter	Left	150	8.81	1.88	0.550
	Right	150	8.69	1.82	
Transverse Diameter	Left	150	6.79	1.12	0.814
	Right	150	6.82	1.14	

[Table/Fig-5]: T-test was used for comparison between longitudinal and transverse diameter on left and right side.

	S no.	Right	Mean	Std. Deviation	Anova	Sig. (p-value)	Post-hoc comparison
Left side - Longitudinal Diameter	1	Pear	9.21	1.66	29.345	0.000*	1, 3>2
	2	Round	6.40	0.73			
	3	Triangular	9.26	1.78			
Left side - Transverse Diameter	1	Pear	7.28	1.01	23.117	0.000*	1>2, 3 3>2
	2	Round	5.81	0.63			
	3	Triangular	6.45	1.07			
Right side - Longitudinal Diameter	1	Pear	9.03	1.63	23.614	0.000*	1, 3>2
	2	Round	6.47	0.98			
	3	Triangular	9.08	1.73			
Right side - Transverse Diameter	1	Pear	7.33	1.02	25.693	0.000*	1>2, 3 3>2
	2	Round	5.74	0.66			
	3	Triangular	6.51	1.03			

[Table/Fig-6]: ANOVA was used for correlation between transverse and longitudinal diameter with respect to different shapes of retromolar pad.
*p<0.05

DISCUSSION

Remodeling of edentulous jaws is influenced by the gender, genetics, systematic conditions, sequel of tooth loss, length of edentulism time, denture wear and other unknown factors [10]. After molar loss, the bony alveolar process and surrounding soft periodontal tissue remodel, mainly resorb, and blend with retromolar pad [11]. Bone resorption in mandibular arch do not progress beyond mylohoid ridge, buccal shelf and their associated muscles, even the additional muscles that surround the mandible do limit the chronic bone resorption [7, 8]. This makes retromolar pad a stable clinical landmark for the posterior extension of denture, providing support and stability to the mandibular denture and there is high correlation between height of the retromolar pad and real occlusal plane in edentulous patient [12].

The present study was done to analyze the distribution of various anatomic shapes and sizes of retromolar pad in completely edentulous demographic population of Meerut.

This study showed variations in the anatomic shapes and dimensions of the retromolar pad in the edentulous mass. Great variability in the shapes of retromolar pad could be seen. There was not a major difference in dimensions of the retromolar pad on the left and right side but there was a significant difference in the mean transverse and longitudinal diameter on the right and left sides when correlated with respect to the different shapes of the retromolar pad. The pear and triangular shaped retromolar pads had a larger diameter as compared to round shaped pad.

Different shapes of retromolar pad helps in stability of lower denture by providing surface area, larger diameter contributes to broader surface area and better distribution of functional forces per unit area and plays a significant role in stability of lower denture [13]. It can be suggestive that patients with pear and triangular shaped pads may have increased stability and better border seal of lower denture with decreased rate of resorption as compared to patients with round shaped pad especially in cases of resorbed ridges. According to accepted clinical findings, most residual ridge resorption occurs in the alveolar process, the part of the mandible where the roots of the teeth were situated, and the basal portion remains more intact [14]. Study done by Bernarda on 81 retromolar pads which were identified and measured (right N=38, left N=43), the maximum transverse diameter had an average of 7.94mm (SD 2.09), while the maximum longitudinal diameter average was 11.202mm (SD 2.5089) and according to the shape, 53.1% were classified as oval (N=43), 29.6%, as rounded (N=24), and 17.3% as triangular (N=14) [15]. The pear and triangular shaped retomolar pad provides more stability in lower denture because of increased surface area as compared to round shaped retromolar pad which has less surface area.

To conclude, we can say that the size and shape of retromolar pad may vary in different population and also play a significant role in the stability of lower denture.

LIMITATION

Further studies can be done on different shapes of retomolar pad in different areas of population as the literature available is less. Clinical studies are necessary to further evaluate the relationship between different shapes of retromolar pad and occusal plane. Thus it appears that retromolar pad is a stable clinical landmark for lower denture and helps in providing support and stability. It also plays a major role to determine the occlusal plane.

CONCLUSION

Analysis of retromolar pad showed a great variation in shapes and dimensions in this demographic population. The difference between mean longitudinal diameter and transverse diameter on the right and left sides was not significant but there was a significant difference in the mean transverse and longitudinal diameter on the right and left sides when correlated with the different shapes of the retromolar pad.

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