



EVALUATION OF SHAPES OF RETROMOLAR PADS IN KASHMIRI EDENTULOUS PATIENTS – A CROSS SECTIONAL STUDY

Prosthodontics

Dr. Nazia Majeed Zargar

Assistant Professor, Department of Prosthodontics, Government Dental college, Srinagar

Dr. Mohammad Arif Lone*

Lecturer, Department of Prosthodontics, Government Dental college, Srinagar
*Corresponding Author

Dr. Adil Fayaz

Post Graduate Student, Department of Prosthodontics, Government Dental college Srinagar

ABSTRACT

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. The aim of this study was to evaluate the different anatomic shapes of retro-molar pads in completely edentulous patients in Kashmiri populations. The evaluation of the shape of retromolar pads was done in 90 patients who had reported to the department for the complete denture fabrication. The analysis of the retromolar shapes was done indirectly on the master casts obtained from the denture fabrication procedures. According to shapes of retromolar pads Table 1 shows 55% were pear shaped, 15.5% were round and 29.4% were triangular shaped. The variation in different shapes of retromolar pad was not significant in Kashmiri population.

KEYWORDS

INTRODUCTION

The retromolar pad is a tissue mass formed by thin non-keratinized mucosa and loose glandular connective tissue, posterior to the retromolar papilla. This pad covers underlying bone with surrounding attached muscle fibers^{1,3}. Sicher described retromolar pad as a triangular soft elevation of mucosa that lies distal to third molar¹. The retromolar pad, also called piriformis papilla, is a mucosal elevation located in the retromolar area covering the retromolar triangle⁴. After molar loss, the bony alveolar process and surrounding soft periodontal tissues remodel, mainly resorb, and blend with the retromolar pad^{3,5,6}. It comprises of non-keratinized loose alveolar tissue covering the glandular tissues, fibers of buccinator muscle, fibers of superior constrictor muscle, fibers of pterygomandibular raphe and the terminal part of the tendon of temporalis muscle.

The bony residual ridge, attached muscles, and covering mucosa occupy the mandibular edentulous retromolar region. The bony mandible is connected by muscle fibers to adjacent structures (cranium, tongue, cheeks, hyoid bone), which are important for diverse functions, such as mastication, swallowing, deglutition, and speaking. Therefore, the anatomic foundation of the supporting tissues and the various muscular activities of the cheeks, lips, and tongue are important features of denture function⁷⁻¹⁵.

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 base¹⁶. The mandibular removable denture should be designed to cover the retromolar ridge tissues. The form of the ridge determines the upper and intaglio surfaces of the denture base. The reflection and resiliency of the muscle fibers attached to the mandible at the floor of the mouth shapes the contour of the facial and lingual borders of mandibular dentures^{8,12-14}.

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 patients⁷.

The aim of this study was to evaluate the different anatomic shapes of retro-molar pads in completely edentulous patients in Kashmiri populations.

MATERIALS AND METHODS

This cross-sectional study was conducted at the Department of Prosthodontics, Crown & Bridges, Government Dental College & Hospital, and Srinagar on 90 completely edentulous patients involving both the male & female patients. The evaluation of the shape of retromolar pads was done in all these who had reported to the

department for the complete denture fabrication.

Inclusion criteria:

1. Completely edentulous male & female patients aged 55-75 years.
2. Patients with well formed mandibular ridges.
3. Patients with no neuromuscular abnormalities.

Exclusion criteria

1. Completely edentulous patients below & above the selected age group.
2. Patients with resorbed ridges.

The impressions of the patients were adequately recorded. The analysis of the retromolar shapes was done indirectly on the master casts obtained from the denture fabrication procedures. The retromolar pads on the mandibular casts were defined by a single operator using a pencil. The length & width of the retromolar pads in every individual casts were measured using a caliper. The variation in shapes of the retromolar pads was found on the left and the right side & three groups were formed based on its shape – Pear shape, Round shape & Triangular shape.

The comparison of the mean length & width of the retromolar pad area on the right & the left sides was done and correlated with the different shapes of the retromolar pads.

RESULTS

Statistical analysis was done using SPSS version 20.0. 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.

According to shapes of retromolar pads Table 1 shows 55% were pear shaped, 15.5% were round and 29.4% were triangular shaped.

The variation in different shapes of retromolar pad was not significant in Kashmiri population.

SHAPE	SIDE		TOTAL	p-VALUE
	LEFT	RIGHT	TOTAL	
Pear shaped	50 55.5%	49 54.4%	99 55%	0.894
Round shaped	13 14.4%	15 16.6%	28 15.5%	
Triangular shaped	27 30.0%	26 28.8%	53 29.4%	
Total	90 100%	90 100%	180 100%	

Based on Chi-square test, comparison of various shapes of retromolar pads was done.

DISCUSSION

Gender, genetics, systemic conditions, tooth loss sequence, length of edentulous time, denture wear, and other unknown factors influence the chronic remodeling process of the edentulous jaws¹⁸⁻²⁰. Bone resorption in mandibular arch do not progress beyond mylohyoid ridge, buccal shelf and their associated muscles, even the additional muscles that surround the mandible do limit the chronic bone resorption^{2,5}. 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 patient²¹.

When a mandible complete denture is manufactured, the marginal seal is essential for the stability of the apparatus; one of the most important anatomical elements contributing to the subsequent sealing is the retromolar pad²². According to Abe *et al.* (1997), medial pterygoid muscle can be inserted in this area, causing instability and mucosal lesions²³.

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 denture²⁴.

According to Wright the retromolar pad is a relative stable posterior landmark even in patients with advanced ridge reduction²⁵. 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 occlusal plane terminate posteriorly in the middle of the upper third of the retromolar pad²⁶. Wright showed that the mandibular first molar is usually at the level corresponding to two third of the way of retromolar pad²⁷.

In a 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)²².

The pear and triangular shaped retromolar pad offers better stability in lower denture because of more surface area available as compared to round shaped retromolar pad which has less surface area.

CONCLUSION

Assessment of retromolar pads in edentulous subjects showed a great variation in shapes between different subjects & also within the same subject on the right & left side of the mandibular arch. The dominant shape observed being pear shaped which is quite favorable for the stability of lower denture.

REFERENCES

1. Sicher H, DuBrull E: Oral Anatomy. St. Louis, MO, Mosby, 1970, pp 179-181
2. Martone AL, Edwards LF: Anatomy of the mouth and its related structures. J Prosthet Dent 1962;12:817-834
3. The Glossary of Prosthodontic Terms. Eight Edition. The Academy of Prosthodontics. J Prosthet Dent July 2005;94:69
4. Taieb, F. & Carpentier, P. Anatomy of the maxillary and mandibular retromolar area: effect on complete dentures. 2. The mandibular retromolar region. Cah.Prothese, 67:112-9, 1989.
5. Pendleton EC: The minute anatomy of the denture bearing area. J Am Dent Assoc 1934;21:488-497
6. Gruber H, Solar P, Ulm C: Maxillomandibular anatomy and patterns of resorption following atrophy, in Watzek G (ed): Endosseous Implants. Scientific and Clinical Aspects. Chicago, IL, Quintessence, 1993, pp 29-62
7. Brill N, Tryde G, Cantor R: The dynamic nature of the lower denture space. J Prosthet Dent 1965;15:401-418
8. Tryde G, Olsson K, Jensen SA, et al: Dynamic impression methods. J Prosthet Dent 1965;15:1023-1034
9. Pietrokovski J, Chapman R: Foundation for the removable denture. Part I. The residual ridge. Refuat Hapeh Vehashinayim 1977;26:21-26
10. Pietrokovski J, Mersel A: The foundation for removable partial dentures. Part II. The adjacent structures. Compend Contin Educ Dent 1982;2:93-104
11. Falschussel GKH: Zahnärztliche implantologie. Wissenschaft und Praxis. Berlin, Quintessence, 1986: 34-85, 241-247
12. Davis DM. Developing an analogue/substitute for the mandibular denture bearing area, in Zarb GA, Bolender CL, Eckert S, et al (eds): Prosthodontic Treatment for Edentulous Patients. St. Louis, MO, Mosby, 2004, pp 232-251
13. Carr AB, McGivney GP, Brown DT: Support for the distal extension denture base, in: Carr AB, McGivney GP, Brown DT(eds): McCracken's Removable Partial

14. Prosthodontics. St. Louis, MO, Mosby, 2004, pp 287-299
15. Rahn AO, Heartwell CM: Anatomy and Physiology. Textbook of Complete Dentures. Philadelphia, PA, Lea & Febiger, 1993, pp 1-46
16. The Amheim Consensus on Preprosthetic Surgery. Amheim, Holland: The European Prosthodontic Association Meeting Booklet, 1989: 2-17
17. Winkler S. Editor: Essentials of complete denture prosthodontics, Philadelphia 1979, W.B. Saunders Co.
18. Worthington P, Rubenstein JE. Problems associated with the atrophic mandible. Dent Clin North Am. 1998; 42:129-60.
19. Pietrokovski J, Harfin J, Levy F: The influence of age and denture wear on the size of edentulous structures. Gerodontology 2003;20:100-105
20. Klemetti E: A review of residual ridge resorption and bone density. J Prosthet Dent 1996;75:512-514
21. Xie Q, Ainamo A, Tilvis R: Association of residual ridge resorption with systemic factors in home-living elderly subjects. Acta Odontol Scand 1997;55:299-305
22. Celebric A, Valentic M, Kraljevic K. A study of the occlusal plane orientation by intra-oral method (retromolar pad). J Oral Rehabil. 1995;22(3):233-36.
23. Bernarda L.F, Ivan S.G, Mario C.L, Catherine S.M. Biometrics study of retromolar pad. Int J Odontostomat. 2008;2(1):39-42.
24. Abe, S.; Iida, T.; Ide, Y.; & Saitoh, C. An anatomical study of a muscle bundle separated from the medial pterygoid muscle. Cranio, 15(4):341-4, 1997.
25. E.G.R. Soloman. A critical analysis of complete denture impression procedure: contribution of early prosthodontics in India. J Indian Prosthodont. Soc 2011; 11(3):172-82.
26. Wright C.R. Evaluation of the factors necessary to develop stability in mandibular dentures. J Prosthet Dent. 1966; 16:414-30.
27. Ismail. Y.H. and Bowman J.F. Position of the occlusal plane in natural and artificial [5] teeth. J Prosthet Dent. 1968;20:407-11.
28. Wright W.H. Selection and arrangement of artificial teeth for complete prosthetic [6] dentures. J Am Dent Assoc. 1936;23:2291-307.