

AN INVESTIGATION IN TO THE CONCEPTS AND TECHNIQUES USED FOR ESTABLISHING POSTPALATAL SEAL IN UNDERGRADUATE DENTAL CURRICULUM

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ABSTRACT

A survey of Pakistani Dental Colleges was conducted to determine which concepts and techniques are currently prevalent in the teaching of establishing the postpalatal seal in the undergraduate dental curriculum.

A previous structured questionnaire from international article comprised seven multiple-choice questions, was distributed by mail and personal contact to 50 demonstrators and faculty members of Prosthodontics departments, of ten different (3 Government and 7 Private) Dental Colleges in the country. Of these, 42 teachers returned the completed questionnaire, yielding a response rate of 84%.

Results from this survey showed that 85.72% of the teachers were teaching a combination of phonation with other methods for determining the location of the vibrating line. The one vibrating line concept for establishing the postpalatal seal (PPS) was taught by 80.95.7% of teachers, 52.38% of these locate the posterior termination of the maxillary denture posterior to vibrating line. Carving the PPS in the maxillary master cast was taught by 83.33% of teachers. Most of the teachers 83.33% were teaching the students to carve the PPS to a depth of 1.0–1.5 mm in the maxillary master cast. Compressibility of the palatal tissues was a consideration during PPS carving for all of the teachers. The butterfly pattern was the most frequently (88.09%) described pattern for PPS carving.

No difference in Concepts and Techniques in the teaching of establishing postpalatal seal was evident from government and private dental colleges.

Key words: Survey, Concepts, Techniques, Postpalatal seal.

INTRODUCTION

A rise in the number of people requiring complete denture therapy over the next twenty years will remain despite an anticipated decline in the age-specific rates of edentulism.¹ Treatment of edentulous patients with complete dentures is a technically demanding task.² Physical forces of retention are particularly important in complete denture. These forces improve patient's ability to acquire the necessary skills to control new denture. The physical forces of retention

are created and maintained in the sulci by a valve-like seal between the ûange of the denture and the mucosa.³ This kind of seal can not be produced along the posterior border of the maxillary denture.⁴ Maxillary denture needs extension of the posterior denture base to produce a posterior palatal seal.⁵ An adequate post-palatal seal of a maxillary denture is essential for retention.⁶ Terminating the denture border on soft resilient tissues will allow the mucosa to move with the denture base during function and, thereby, maintain

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the denture seal.⁷ The postpalatal seal (PPS) area has been defined as the soft tissue area at or beyond the junction of the hard and soft palates on which pressure, within physiological limits, can be applied by complete denture prosthesis to aid in retention.⁸

The functions of the PPS of the maxillary complete denture include 1) Serves primarily in denture retention by making contact with anterior portion of the soft palate 2) Prevents air passage between the tissues and denture base 3) Prevents food accumulation between posterior border of denture and the soft palate 4) Reduces patients awareness about the area hence decrease gag reflex 5) Compensates for polymerization shrinkage of denture base resin 6) Make the sunken distal border of the denture less noticeable to the tongue.⁷ Modeling compound is often used to achieve the posterior palatal seal. Such a technique requires laboratory procedures that involve replacing the compound with resin.⁵ Another technique involves the addition of autopolymerizing resin onto the posterior palatal seal area directly in the mouth. Moreover, conventional autopolymerizing resin exhibits an unpleasant odor, heat-generation during polymerization and unreacted monomer that may cause oral tissue irritation.⁹⁻¹¹

Educational surveys have also been conducted to determine the postpalatal seal in complete denture¹². Rashedi and Petropoulos¹² conducted the most recent U.S. predoctoral prosthodontics survey on this topic in an effort to determine, which concepts and techniques were currently used for establishing the postpalatal seal for complete dentures in the undergraduate clinical curriculum. They concluded that large percentage of schools were teaching a combination of phonation with other methods for locating the vibrating line, 1 vibrating line concept for establishing the postpalatal seal, place the posterior termination of the maxillary denture on the vibrating line. Most of schools were teaching the students to carve the PPS and the depth of 1.0–1.5 mm in the maxillary master cast. Compressibility of the palatal tissues was a consideration during PPS carving. The butterfly pattern was the most frequently described pattern for PPS carving. Winland and Young¹³ described the most common PPS configurations used in U.S. dental schools. They concluded that, most schools were teaching the “butterfly on cast” technique and constructing their PPS by arbitrarily scraping the cast. Chen et al¹⁴ found similar results, that most dental schools were teaching students to carve the PPS in the maxillary cast and the most common pattern of the PPS taught was the butterfly

pattern. They described that most U.S. dental schools were teaching the phonation method or the phonation method in combination with other methods and one vibrating line concept for determining the location of the vibrating line.

The conduction of such surveys has one common goal of informing the educators and practitioners of the various trends that are in practice at a specific time period. The information obtained is of tremendous help for the evaluation of the existing situation and for better planning for future courses and procedures in bringing improvement in a specific area of the practice and teaching of the specialty of Prosthodontics. In the recent past, many new dental colleges have come in to existence in the various parts of the country. Concurrently a great diversity in the faculty at all the dental schools in terms of educational qualifications could be seen. These might in turn reflect differences in the teaching and practices in the respective dental colleges. Keeping this in mind, as well as the fact that no past attempt for investigating the various aspects pertaining to postpalatal seal, in terms of concepts and techniques used in the various dental colleges in the country, the present study was designed to report about the diversity of the concepts and techniques that are employed for establishing postpalatal seal in complete denture. This information will hopefully not only act as an update on the situation but it may also prove of help toward planning for teaching and clinical practices that are current and well informed.

METHODOLOGY

For the purpose of this study, in 2010, a previous specifically structured questionnaire from the International article¹² was distributed by mail and personal contact to 50 demonstrators and faculty members of Prosthodontics department of ten different Pakistani Dental Colleges (3 Government and 7 Private). In case of mail distribution, sufficient copies of the proformas along with covering letters were sent to senior colleagues in the college, they were requested to distribute proformas among the concerned Demonstrators and faculty members to return the completed questionnaires as early as possible with a note of thanks for cooperation on their side. Self addressed pre-stamped envelopes for returning the filled proformas were also appended to each letter. A total of 42 Demonstrators and faculty members (13 from Government and 29 from Private) responded, yielding a response rate of 84%. Before framing of questionnaire, the text of each statement was assessed by all authors for

clarity and importance and to arrive at a mutual agreement.

The survey comprised 7 multiple-choice questions and each respondent had to select appropriately by putting tick mark responses that they were applying in routine for establishing postpalatal seal. The option of providing a specific answer other than the listed choices was also available for each question. The questionnaire focused on aspects pertaining to the use of the different concepts and techniques for establishing postpalatal seal. Obtained data was carried out with SPSS version 11.0. Proportions and percentages etc were calculated.

RESULTS

Out of the total 50 given proformas, 42 (13 from government and 29 from private) were returned making an 84% study response.

Most of the Demonstrators and Faculty members 36 (85.72%) were teaching a combination of phonation with other methods, such as the fovea palatinae as

compared to 6 (14.29%) using phonation method for determining the location of the vibrating line (Table-1).

Most teachers 80.95% were teaching the concept of one vibrating line, 52.38% of these teachers locate the posterior termination of the maxillary denture posterior to vibrating line and 28.57% on the vibrating line. However, 19.04% teachers were currently teaching the two vibrating line and all of them locate the posterior termination of the maxillary denture on the posterior flexion line (Table-1).

In this study, most teachers 83.33% reported teaching carving of the postpalatal seal in the maxillary master cast. However, 16.67% teachers reported incorporating the postpalatal seal in the final impression (Table-1).

Most teachers 83.33% were carving the postpalatal seal to a depth of 1.0–1.5 mm as compared to 16.67% teachers 0.5-1.0mm considering the depth of the compressible tissue (Table1).

TABLE 1: POSITIVE RESPONSES GIVEN TO ASPECTS PERTAINING TO ESTABLISHING POSTPALATAL SEAL CONCEPTS AND TECHNIQUES BY PARTICIPATING DEMONSTRATORS AND FACULTY MEMBERS (N = 42)

| Aspects of Establishing Postpalatal Seal | “Yes” Responses of Participants of Various Dental Institutes | | |
|---|--|------------------|----------------|
| | Government (13n) | Private (29n) | Total (42N) |
| 1. Methods for locating vibrating line. | | | |
| a. Phonation and fovea palatine. | 8(19.05%) | 28(66.67%) | 36(85.72%) |
| b. Phonation | 3(7.14) | 6(14.28%) | 6(14.28%) |
| 2. Number of vibrating lines. | | | |
| a. One line | 7(16.67%) | 27(64.28%) | 34(80.95%) |
| i) Termination of maxillary denture posterior to vibrating line | 4(9.52%) | 18(42.86%) | 22(52.38%) |
| ii) Termination of maxillary denture on vibrating line | 3(7.14%) | 9(21.43%) | 12(28.57%) |
| b. Two | 5(11.90%) | 3(7.14) | 8(19.04) |
| i) Termination of maxillary denture posterior to flexion line | 5(11.90%) | 3(7.14) | 8(19.04) |
| 3. Carving postpalatal palatal seal on the maxillary cast | | | |
| a. Yes | 11(26.19%) | 24(57.14%) | 35(83.33%) |
| b. No (incorporating in the final impression) | 2(4.77%) | 5(11.90%) | 7(16.67%) |
| 4. Depth of carved postpalatal seal. | | | |
| a. 1.0-1.5mm(consider compressible tissue) | 12(25.57%) | 23(54.76%) | 35(83.33%) |
| b. 0.5-1.0mm(consider compressible tissue) | 1(2.38%) | 6(14.28%) | 7(16.67%) |
| 5. Shape of postpalatal seal. | | | |
| a. Butterfly | 11(26.90%) | 26(61.90%) | 37(88.10%) |
| b. According to palpation | 2(4.76%) | 3(7.14%) | 5(11.90%) |

The butterfly pattern was the most frequently 88.09% described post palatal seal pattern carved in the maxillary master cast. Remaining teachers 11.91% were carving the shape of postpalatal seal according to palpation (Table-1).

DISCUSSION

This survey was conducted in the local dental institutes in the country with participants being demonstrators and faculty members of Prosthodontics department. The concepts and techniques taught by them to undergraduate students regarding establishing postpalatal seal, when making complete denture. This kind of several surveys have been conducted in different countries of the world regarding the concepts and techniques used for establishing postpalatal seal in maxillary dentures.¹² This kind of survey was the first survey in this country to determine which concepts and techniques are currently prevalent in the teaching of establishing postpalatal seal in the predoctoral clinical curriculum.

In our study 85.72% of the teachers were teaching a combination of phonation with other methods for determining the location of the vibrating line. These findings are in agreement with survey done by Rashedi and Petropoulos¹², who showed that more than 94% dental schools in U.S. were teaching to students a combination of phonation with other methods for determining the location of the vibrating line.

Majority of teachers 80.95% were teaching the concept of one vibrating line, 52.38% of these locate the posterior termination of the maxillary denture posterior to vibrating line in present study. This was similar to the results of Rashedi and Petropoulos¹², who showed that more than 77% dental schools were teaching the 1 vibrating line concept locate the posterior termination of the maxillary denture on the vibrating line.

Carving the PPS in the maxillary master cast was taught by 83.33% of the teachers in present study. These results are in agreement with studies of Chen et al¹⁴ and Jagers et al¹⁵, that showed 87.5% and 88% of schools carving the PPS in the maxillary cast, respectively. These results are also in agreement with similar type of studies done in U.S, where majority of dental schools 95% were teaching to carve postpalatal seal in maxillary cast.¹²

Most of the teachers 83.33% were teaching the students to carve the PPS to a depth of 1.0–1.5 mm in the maxillary master cast. The compressibility of the palatal tissues was a consideration during PPS carving

for all of the teachers in this study. This was similar to the results of Rashedi and Petropoulos¹², and Chen et al¹⁴, which showed that 91% and 93.9% of schools consider the compressibility of the tissues respectively, when carving the PPS in the maxillary master cast.

The butterfly pattern was the most frequently 88.09% described pattern for PPS carving in present study as compare to 11.9% of colleges were carving the shape of postpalatal seal according to palpation. These results are in agreement with similar type of study recently done in U.S, where majority of dental schools 75% were teaching butterfly pattern in maxillary master cast.¹²

Generally, no difference in concepts and techniques in the teaching of establishing postpalatal seal were evident from government and private dental colleges.

REFERENCES

- 1 Douglass C. Will there be a need for complete dentures in the United States in 2020?. *J Prosthet Dent* 2002; 87:5-8.
- 2 Zarb GA, Bolender CL. *Prosthodontic Treatment for Edentulous Patients*. 12th ed. St Louis, MO, Mosby, 2004. pp 211-51.
- 3 Recording Jaw Relations – Clinical Procedures In: Basker RM, Davenport JC. *Prosthetic treatment of the edentulous patient*. 4th ed. Blackwell Munksgaard:2002:172-202.
- 4 MacGregor AR. Applied anatomy. In: Fenn, Liddel and Gimson's *Clinical Dental Prosthetics*. 3rd ed. Butterworths;1989:5-24.
- 5 Sato Y, Hosokawa R, Tsuga K, Yoshida M. Immediate maxillary denture base extension for posterior palatal seal. *J Prosthet Dent* 2000; 83:371-73.
- 6 Chang BWM, Wright RF. Accurate location of postpalatal seal area on the maxillary complete denture cast. *J Prosthet Dent* 2006;96:454-55.
- 7 Appelbaum M. The posterior palatal seal. In: Sheldon Winkler, *Essential of complete denture prosthodontics*. 2nd 107-22
- 8 Glossary of Prosthodontic terms. 7th Ed .St Louis: CV: Mosby, 1999.
- 9 Bunch J, Johnson GH, Brudvik JS. Evaluation of hard direct relinings. *J Prosthet Dent* 1987;57:512-19.
- 10 Arima T, Murata H, Hamada T. Properties of highly cross-linked auto polymerizing relining acrylic resins. *J Prosthet Dent* 1995;73:55-59.
- 11 Bohnenkamp DM. Traumatic stomatitis following an intraoral denture relining: a clinical report. *J Prosthet Dent* 1996;76:113-14.
- 12 Rashedi B, Petropoulos VC. Current Concepts for Determining the Postpalatal Seal in Complete Dentures. *J Prosthodont* 2003;12:265-70.
- 13 Winland RD, Young JM: Maxillary complete denture posterior palatal seal: Variations in size, shape, and location. *J Prosthet Dent* 1973;29:256-61.
- 14 Chen MS, Welker WA, Pulskamp FE, Crosthwaite HJ, Tanquist RA. Methods taught in dental schools for determining the posterior palatal seal region. *J Prosthet Dent* 1985;53:380-83.
- 15 Jagers JH, Javid NS, Colaizzi FA. Complete denture curriculum survey of dental schools in the United States. *J Prosthet Dent* 1985;53:736-39.