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Attitude, Management and Practice of Materials and Techniques for Measuring Posterior Palatal Seal Area with Dentists Working in Salah El-din

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Abstract

Background: The most crucial structure supporting the retention of maxillary complete denture is the posterior palatal seal area PPS. If it isn't properly recorded, the seal could break. Purpose: To find out the perception for materials techniques that employed for recording PPS and its importance among dental practitioners. Methods: 15 questions in a questionnaire about this area were prepared. 75 participants from different places. The data were analyzed using Excel for Microsoft 2013. Results: Percentages of answers about significance of PPS were showed 85.4%of participant lack the knowledge of how to locate vibrating line.70.6% they said that the anterior vibrating line triangle in shape. 60% answered positively about if soft palate classification affects the prognosis of the case. 41.4% were preferred conventional technique, 54,6% said that fluid wax technique is the least accurate technique and 76% said that between immovable and movable part of the soft palate is the position of posterior vibrating line, 46.6% preferred orb end of (dental T-burnisher), 68.6% said that they can do re-posdaming. 76% used indelible pencil, 48%said that CL I is the most common variation of soft palate. 58.6% said that retention increases with greater post dam, 34.6% selected hamular notch as the most compressible area, 50.6% said that the antero-posterior width of posterior palatal seal is 5-8mm. Finally, hamular notch and post palatal seal tale 65% for the question about the region of the PPS area. Conclusion: Techniques and materials for PPS registration differs between participants. The most favorable was a conventional method.

Introduction:

The work of the complete denture as well the patients' gratification are crucial [(1)]. Strong retention for maxillary complete prosthesis appears to depend primarily on a good posterior palatal seal [2]. Three limitations ensure the proper denture fit: a- the interior portion of the denture flanges tight apposition to the underlying tissues, b- the functional vestibular denture's flanges' size and shape (border seal) c-the exterior form of the denture flanges [3]. In the palatal vibration area, the underlying mucosa might be slightly compressed to improve the complete denture's retention , and it is called the "posterior seal" [4]. It is defined as "the soft tissues at or along the junction of the hard and soft palates on which pressure within the physiological limits of the tissues can be applied by a denture to aid in the retention of the denture" [5]. Another definition is that" the portion of the fleck surface of a maxillary complete denture, located at its posterior border, which places pressure, within physiologic limits, on the posterior palatal seal area of the soft palate". This seal ensures a close relationship of the denture base to the soft palate and mend the retention of the denture [3].

The importance of this area could be summarized as: 1) increase retention 2) This will reduce patient's gag reflex, 3) It reduces the food pilling up under the posterior area of the maxillary complete prosthesis. 4) It reduces uncomfortable for the patient by having a sunken posterior border which is less conspicuous to the tongue, 5) It gives the technician and dentist a distinct landmark for finishing the posterior border of the maxillary denture, 6) It provides a thick posterior border to counteract denture warpage [6,7].

There are four techniques to get a PPS area :1- Conventional technique: after the master cast is poured from final impression this method is used . A self-cured resin is constructed as a denture base [8] 2- Fluid wax technique : It is done immediately after the final impression and before pouring master cast, known as physiological method .Various wax types are available for this method are: Korecta wax , Iowa wax, H-L physiologic paste and Adaptol type. 3-Selective loading impression technique: by the green stick modeling compound, both PPS adaptation and the periphery border molding are completed [9]. 4-Arbitrary scraping cast technique. The mouth of the patient is inspected to see the anterior and posterior vibrating lines and on the master cast, make a mark ,this method is not physiologic and the least reliable [10].

The soft palate is the moveable part of the palatal anatomy, which is located behind the hard palate additionally its movement and size of displacement differences between people [11]. House was proposed 3 types of palate throat shapes according to the angle created between the soft and hard palates. 1) class I: the soft palate is slightly inclined downward around 10° angle in which mid-palatine raphae horizontal to the hard palate, 2) class II: the soft palate makes a downward tilt of around 45^{0} angle in relation to the hard palate and 3) class III: In relation to the hard palate, the soft palate bends downward at an angle of 70^{0}angle[12, 13]. The study's objective was to assess the dentist's knowledge and practice about the importance of the PPS area, also to know the practice and information of the dentist about material and method used to determine this area.

Material and Methods

Between August 2022 to end of October 2022 This study was conducted among the dentist who were working at Salah EL-Din Governorate at different cities and districts like Tikrit, Samarra, Dujail and Balad. A questionnaire consisting of 15 questions (Table.1) was prepared to analyze the knowledge of anatomical landmarks and the surrounding structure, attitude and perception of material and methods used to determine the correct PPS area and its important role on successful complete denture. The gathered data was examined by (Microsoft Excel 2013).

Results

A total of 75 dentists (general practitioners and specialists) from Salah EL Din were included in this study and presented with the questionnaire (Table

1). Mean percentages of answers for all questions were conducted and presented in (Table 2) &(Fig 1).

Assessing the knowledge of importance of the PPS area (12%) answered the retention of denture, 8% answered reduce gag reflex, (17.4%) said it determines the posterior limit of denture, and remaining (62.6%) answered all above. While for knowing how to find where the anterior and posterior vibrating line (85.4%) said (Yes) and (14.6%) said (No). For the question concerning the shape of the anterior vibrating line, (70.6%) said the triangle in shape, (4%) answered rectangular shape, (20%) said oval shape and (5.4%) said cupid, s bow in shape.

In answering if the classification of soft palate affects the prognosis of the maxillary complete denture ,(60%) answered (Yes) while (40%) answered (No). The Participants were asked which technique they prefer, the highest percentage (41.4%) used conventional technique, while (12%) used fluid wax technique, (13.4%) used the arbitrary scraping, (16%) used Silver man technique, (10.6%) adding the PPS on extended denture and (6.6%) of participants chose techniques other than those mentioned. In answering of which the four method used to mark this area accurately , (14.6%) answered conventional technique, (14.6%) ,arbitrary scraping (54.6%) fluid wax technique and (16%) extended palate technique.

Another question was about the posterior vibrating line location, (76%) answered between immovable and movable part for soft palate while (24%) answered between immovable part of soft palate and hard palate. Answering which portion of the (dental T- burnisher)should be used when taking conventional method for recording the PPS area answers were (46.6%) for the orb end, (29.3%) for the smooth end while (24%)for the shaft end. In asking whether it's possible to do repos-damming in case of error in position at insertion appointment answers were (68.6%) (Yes) and (41.3%) (No). Participants answered how to determine the PPS area in the patient's mouth (14.6%) chose wax, (9.3%) the impression compound, while indelible pencil was (76%).

Typical modifications performed with various soft palate shapes according to classification and answers were: (48%) for Class one : A 3-4mm wide posterior palatal seal in the shape of a butterfly, (36%) for Class two: The posterior palatal seal is small ,measuring only 2-3mm wide whereas (16%) for Class three: The posterior vibrating line with a single beaded area . In answering the ratio of increase retention with the PPS area increase in width ,the percentage of answers were: (58.6%) said yes, while (41.3%) said No. Another question were: What region of the posterior palatal seal is most compressible, answers were (28%) for mid palatine raphe, (34.6%) for hamular notch whereas (22.6%) lateral part of the cupid's bow and (14.6) for all above. In asking about the posterior palatal seal, s anterior -posterior dimension , the percentage of answers were (50.6%) for (5-8mm), (20%) for (8-10mm), (21.3%) for 10-12mm and (8%)for 12-15mm. Assessing knowledge of regions making up a posterior palatal seal based on anatomical landmark, (65.4%) said hamular notch and post palatal seal, (20%) chose the pterygo maxillary seal and post-palatal seal, (8%)for maxillary tuberosity and post-palatal seal and (6.6%) for the pterygomaxillary seal and maxillary tuberosity.

Discussion

Good retention of the maxillary complete denture requires an adequate seal that mostly occurs on the tissues of the posterior border that are compressible. However, the inability of the maxillary complete denture to be retained is clearly visible and that could be caused by the incorrect use of physiological and anatomical landmarks and error is also present in the PPS area recording [14]. The majority of the participants had good knowledge about the significance of the PPS area 62.6% of the answers were true.

The participants were asked about awareness from locating the anterior and posterior vibrating line most of them were

answered yes 85.4% while 14.6% were answered no, our result accepted with Biniti NS. *et al*.[15] in which the majority of the participant 57%were aware to find this area. Most of the participants did not own a good knowledge about the shape they said the triangle most common, while study by Biniti NS *et al.* 73% of the participants said the Cupid's bow in shape. Additional factors such as location and size obtained high percentage of the correct answers [15].

In accordance with Sudhakara V and Karthik K.[16], the PPS area is typically situated where the soft and hard palates meet . Other research was done by Pakistani dental colleges ,where it was found that most teachers used the phonation "ah" sound and other techniques to create vibrating lines[17]. The denture must be correctly adapted and a good seal must be created in order to ensure denture stability and retention that is acceptable with maximum depth at the center and zero depth at posterior and anterior areas. [18].

The results showed that 41,4% of the participants favors conventional technique to record the posterior palatal seal area while fluid wax obtained 12%. A very retentive denture base is provided by the conventional method is adequate, and the professional is capable of evaluating the retention of the finished prosthesis. As it's not a physiological approach, it has a greater tendency to over compress tissue(3). The fluid wax method prevents excessive tissue compression and in addition to improving retention at an early stage ,it is a physiological method [19].

Un the data 13,4%)used arbitrary scraping 16% used Silver man technique, 10,6% adding the PPS on extended denture, 54,6% aware of inaccuracy for the fluid wax technique and this result not accepted with Biniti NS. *et al.* [15] who stated that 42% of participants tend to utilize the arbitrary scraping technique to register the PPS, despite being the least reliable method it offers great possibilities for over post damming besides being un physiological.

According to Mishra S .et al. [20] the results of their survey indicates that most prosthodontic faculty members at Karnataka's dental colleges favor Boucher's traditional approach without master cast scoring (63%) for achieving maxillary PPS.

With regard to size of the antero-posterior width of posterior palatal seal, answered was 50.6% for (5-8mm) while 20% for (8-10mm) whereas 21.3% for 10-12mm and 8% for 12-15mm. In an earlier investigation ,Silverman assessed radiologically, histologically and clinically examining the posterior palatal seal, and his discovery was (8.0mm) is the highest average palatal seal· s posterior anterior width [9].

Conclusion

Techniques and materials for PPS registration differs between participants. The most favorable was a conventional method, and most materials used were similar. There is sufficient understanding for the particular parameters such as width and function of the PPS. Nevertheless, there is a lack of understanding of particular factors like size, shape, compressibility and landmarks. It is necessary to accentuate on this subject with the right education due to its significance for complete denture. Without awareness of this area, the likelihood of errors will increase, that will have an impact on the patient's contentment and the success of a complete denture prostheses.

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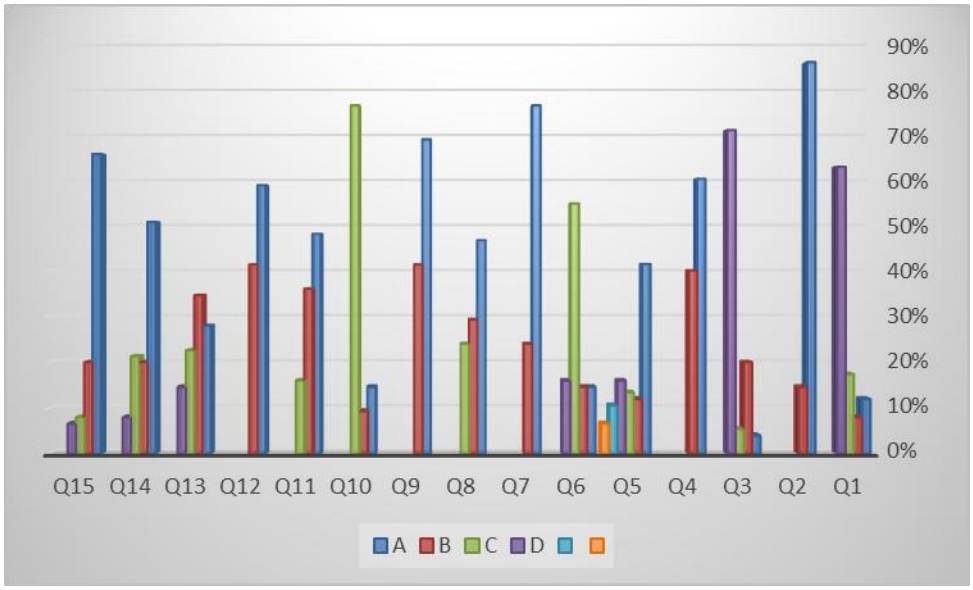

Figure (1): Clustered bar graphs showing mean percentages of all questions answered in this study

Table(1): Questionnaire

1. According to your clinical information, the PPS significance in:
a. Retention of maxillary denture
b. Reduce gag reflex
c. Determine the posterior limit of maxillary denture
d. All above
2. Do you know where the posterior and anterior vibrating lines are?
a. No b. Yes
3. How is the shape of anterior vibrating line?
a. Rectangular in shape c. Cupid's bow in shape
b. Oval in shape d. Triangular in shape
4 . Are the classification of the soft palate effect on the prognosis of the maxillary denture?
a. No b. Yes
5.Which method did you prefer to use when register the PPS?
a. Conventional method b. Fluid wax method
c. Arbitrary scraping of master cast d. Extended palate technique (Silverman)
e. Adding PPS to extending denture f. other methods:
6. Which of the four techniques listed below is least accurate for marking the PPS?
a. Conventional method c. Arbitrary scraping method
b. Fluid wax method d. Silverman method
7. Location of posterior vibrating line :
a. Between movable and immovable part of soft palate
b. Between hard palate and movable part of soft palate
8. When recording pps with the conventional method , which section of the (dental T-burnisher) do you choose?
a. an orb end c. a shaft end
b. a smooth end
9. Can you do repos-damming in case of error in position at insertion appointment?
a. Yes b. No
10. We determine the post dam area in patient mouth by using

a. sheet wax
b. green stick(Impression compound)
c. Indelible pencil

11. According to classification , the most prevalent modifications employed with various soft palate shapes.

a. Class one : A posterior palatal seal in a butterfly in shape with 3-4mm wide.
b. Class two: measuring only 2-3mm wide and pps is small
c. Class three: The posterior vibrating line with a single beaded area

12. When the pps area increase in width ,retention will increase

a. Yes b. No

13. What region of the posterior palatal seal is most compressible?

a. Mid-palatine raphe c. Lateral side of the cupids bow
b. the notch of hamular d. All above

14 . Posterior palatal seal \anterior -posterior dimension

a. 5-8 mm c. 10-12 mm
b. 8-10 mm d. 12-14 mm

15. What two areas comprise the posterior palatal seal according to anatomical landmarks?

a. post-palatal seal and hamular notch
b. The Pterygomaxillary seal and post-palatal seal
c. Maxillary tuberosity and post-palatal seal
d. maxillary tuberosity and the pterygomaxillary seal

Table (2): Mean percentages of answers

	A	B	C	D	E	F
Q1	12%	8%	17.4%	62.6%		
Q2	85.4%	14.60%				
Q3	4%	20%	5.4%	70.6%		
Q4	60%	40%				
Q5	41.4%	12%	13.4%	16%	10.6%	6.6%
Q6	14.60%	14.60%	54.60%	16%		
Q7	76%	24%				
Q8	46.6%	29.3%	24%			
Q9	68.6%	41.3%				
Q10	14.6%	9.3%	76%			
Q11	48%	36%	16%			
Q12	58.6%	41.3%				
Q13	28%	34.6%	22.6%	14.6%		
Q14	50.6%	20%	21.3%	8%		
Q15	65.4%	20%	8%	6.60%		

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