دراسة البعد الدهليزي اللساني للدمى الخلفية في الجسور عند مرضى كلية طب الأسنان في جامعة دمشق

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الملخص

خلفية البحث وهدفه: هناك خلاف في جعل البعد الدهليزي اللساني للدمى مساوياً إلى البعد الأصلي أو تصغيره. هدفت هذه الدراسة إلى تحري هل البعد الدهليزي اللساني لدمى الأرحاء الأولى يُصَغَّرُ أم لا. وموقعها ضمن محور دعاماتها في الممارسة الحالية لطلاب ما قبل التخرج.

مواد البحث وطرائقه: شملت الدراسة 56 جسراً خلفياً معوضاً عن أرحاء أولى علوية أو سفلية. اِسْتُخدِمَ جهاز لقياس البعد الدهليزي اللساني للدمى ونظيراتها من الأرحاء الأولى الطبيعية كتقدير للبعد الدهليزي اللساني للأرحاء الأولى المفقودة، ووسائط تثبيتها ضمن الجسر. حُسِبَ الفرق بين القياسات في البعد الدهليزي اللساني.

النتائج: كان متوسط الفرق في البعد الدهليزي اللساني بين الدمى العلوية والأرحاء المناظرة 2,28 ملم (بتصغير قدره 20,38%)، وللدمى السفلية 2,11 ملم (بتصغير مقداره 19,58%).

الاستنتاج: يمكن الاستنتاج أنَّ الدمى المعوضة عن الأرحاء الأولى تصغر بمقدار الخمس تقريباً بالبعد الدهليزي اللساني، ممَّا يجعلها ضمن محور دعاماتها في الممارسة الحالية لطلاب ما قبل التخرج.

كلمات مفتاحية: البعد الدهليزي اللساني للدمى.

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An Analysis of the Buccolingual Dimension of the Pontics in Posterior Bridges

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Abstract

Background and aim: It is controversial whether to reduce the buccolingual (BL) dimension of pontic or not. The aim of this study was to investigate whether pontics of first molars were reduced in their BL dimensions and their position in the inter-abutment axes in the current practice of undergraduate students.

Methods: The investigation included 56 upper and lower posterior bridges replacing the first molars. A sliding calliper was used to measure the BL dimensions of pontics, their contralateral teeth as an estimation of the original BL dimension of original missing first molars, and their retainers in the bridges. The difference in BL dimensions were then calculated between the pontics, their contralateral teeth, and their retainers.

Results: The mean difference in BL dimension between pontics and their contralateral natural teeth for the upper first molar was 2.28 mm (20.38% reduction), and for the lower first molar 2.11 mm (19.58% reduction).

Conclusion: It can be concluded that molar pontics are constructed nearly one fifth narrower than their original buccolingual dimensions, which position them in the inter-abutment axes in the current practice of undergraduate dental students.

Key Words: Buccolingiual pontic dimension.

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Introduction:

Conventional bridges are prostheses made of artificial material, enabling patients to have long lasting, functional, phonetic and aesthetic restorations. One essential part of any bridge is the pontic which is defined as an artificial tooth on a fixed partial denture that replaces a missing natural tooth, restores its function, and usually fills the space previously occupied by the clinical crown.[1]

Bridges are individually constructed to adapt to the morphological and anatomical features of every patient. Correct dimensioning as well as a good selection of colour and shape is essential if a satisfactory result is to be achieved. The pontic is bounded by the adjacent abutments and opposing dentition. Thus the dimensions of the pontic in the mesiodistal, buccolinigual, and occluso-gingival dimension were explained in the textbooks.[2-5] In literature different opinions can be found about the buccolingual (BL) dimension of pontics. Three opinions exist regarding the occlusal surface of pontics. One advocates the reduction of the occlusal table dimensions[6-8]; another maintains normal occlusal width[9,10], whereas the third approach tends to minimize the significance of occlusal dimensions.[11-12]

On the other hand, pontics should be as straight a line as possible between the retainers to prevent any torquing of the retainers and/ or abutments. They should be slightly narrower than natural teeth, partly because of the effort to place them on inter-abutment axes and thus provide mechanical advantage.[4]

While it is difficult to know the original dimensions of the extracted or lost tooth, it is possible to estimated the original dimensions by measuring the contralateral natural tooth since teeth were found to be symmetrical to some extent in their buccolingual dimension.[13]

Since no information is available about how the current practice manage this issue when constructing pontics, the aim of this study was to investigate whether pontics of first molars were reduced in their BL dimension and their position between the retainers.

Materials and Methods:

Fifty six upper and lower posterior bridges replacing lower or upper first molars were examined over a period of four months in 2017. They were all constructed by dental technicians for the fifth year students at the Department of Fixed Prosthodontics, Dental Faculty, Damascus University. Only bridges with sound natural contralateral tooth (first molar) were included. The maximum buccoligual (BL) dimension of the pontic, contralateral natural tooth, mesial abutment (second premolar), and distal abutment (second molar) were recorded. This diameter is the greatest distance between the labial/buccal surface and the lingual/palatal surface of the tooth crown. It was measured directly with a sliding calliper held at right angles to the mesiodistal crown diameter of the tooth with digital output to 0.01 mm.

The difference in the buccolingual dimension between the pontic and contralateral tooth and adjacent abutment teeth were then calculated.

Two investigators measured the dimensions independently. Three measurements by either investigator were recorded for each dimension. The mean value of the six measurements was then calculated.

Results:

The sample consisted of 56 posterior bridges in 56 patients in upper and lower jaws replacing the first molar. Measurementsof buccolingual dimension of the pontic and contralateral tooth are presented in (Table 1).

Table 1: The difference in buccolingual dimensions of pontics and their contralateral natural tooth.

Positin	N	BL dimension of pontic	BL dimension of contralateral tooth	Mean Difference	Percentage of Difference
Upper	16	8.91	11.20	-2.28	-20.38%
Lower	40	8.69	10.81	-2.11	-19.58%

The mean BL dimension of the upper first molar pontics was 8.91, compared to 11.20 mm of contralateral natural teeth. On the other hand the BL dimension of the lower first molar pontics was 8.69, compared to 10.81mm for their contralateral natural teeth.

The mean difference in BL dimension between pontics and their contralateral natural teeth for the upper first molar was 2.28 mm with a percentage of 20.38%, and for the lower first molar 2.11 mm (19.58%).

Table 2: The difference in buccolingual dimensions of pontic, adjacent mesial tooth and adjacent distal tooth.

Position	N	BL dimension of molar pontic	BL dimension of second premolar retainer	BL dimension of second molar retainer
Upper	16	8.91	9.62	11.73
Lower	40	8.69	8.76	10.79

The mean BL dimension of upper second molar retainers (11.73mm) and that for upper second premolar retainers (9.62mm) were more than that of the pontics (8.91). Similarly the mean BL dimension of lower second molar retainers (10.79 mm) was more than that of the pontics (8.69). However, the lower second premolar retainers (8.76 mm) had nearly the same dimensions as that of the pontics (8.69 mm) (Figure1).

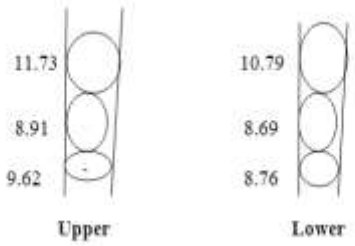

Figure 1: Illustrative figure that shows the inter-abutment axes in BL dimensions of pontics and reatainers for upper and lower posterior teeth

Discussion:

Teeth have been found to be symmetrical in their BL dimension[13].The BL dimension of pontics were compared to their contralateral natural teeth in order to calculate how much they were reduced. The BL dimension of first molar pontics in the current study has been found to be reduced to nearly one fifth of its contralateral/ original tooth dimension.

This finding correspond to previous recommendations as reducing the width ranging from one fifth to one third the normal buccolingual dimension is specified to control the force on the abutment teeth.[6-8,14,15]

Posterior pontics were suggested to be narrowed buccolingually by twenty to thirty per cent measured between the tips of buccal and lingual cusps. This reduction in dimension was thought to decrease the forces of torque on the abutments, particularly in eccentric excursions and also allow a more "self-cleansing" pontic to be placed. However, anterior pontics are not modified for occlusal purposes.[16,17]

Some generally accepted guidelines for bridge design modeling were offered. The occluding surface of the pontic should be reduced either by 10% if only one tooth is to be replaced, or by 20 or 30% if two or three teeth are to be replaced.[8]

Pontics may also be somewhat narrower at the expense of lingual surfaces in an effort to avoid formation of uncleansable, overhanging shelves that could otherwise overlie the lingual aspects of edentulous ridges. Narrowing the pontics may not be practical if efforts are being made to maintain occlusal contact on cusps or fossa.[4]

Pontics should be slightly narrower than natural teeth, partly because of the effort to place them on inter-abutment axes and thus provide mechanical advantage.[4] In the current study, pontics were found to be as straight a line as possible between the retainers. This finding correspond to the recommendation of to prevent any torquing of the retainers and/ or abutments.

Rosenstiel(2006) contradicted the reduction by stating that harmful forces are more likely to be encountered if fixed partial denture is loaded by the accidental biting on a hard object or by parafunctional activities such as bruxism, rather than by chewing of foods of uniform consistency. These forces are not reduced by narrowing the occlusal table. In fact, narrowing the occlusal table may actually impede or even preclude the development of a harmonious and stable occlusal relationship. Like a malposed tooth, it may cause difficulties in plaque control and may not provide proper cheek support. For these reasons, pontics with normal occlusal widths (at least in the occlusal third) are generally recommended. One exception is if the residual alveolar ridge has collapsed buccolingually. Reducing pontic width may then be desired and would thereby lessen the lingual contour and facilitate plaque control measures. Earlier reports also suggested to maintain normal occlusal width to provide a soft-tissue protective mechanism during mastication and to provide adequate occlusion with the opposing arch.[9,10] It was emphasised that the occlusal surface of the pontic should resemble the occlusal surface of the tooth it replaced. Otherwise, it may not provide sufficient contact to stabilize the occlusal relationships of its opponents. In some cases, when occlusal stability is less important (for example when the pontic is opposed by another bridge), the pontic may be made narrower buccolingually to improve access for cleaning.[5]

On the other hand some reports minimize the significance of occlusal dimensions have pointed out the importance of the proprioceptive mechanism in

regulating the occlusal force. It is believed that this mechanism can automatically control the occlusal force, regardless of the dimension of the opposing occlusal table.[11,12,18]

Conclusions:

It can be concluded that molar pontics are constructed one fifth narrower than their original buccolingual dimension which positioned them in the inter-abutment axis

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