Denture tooth selection: size matching of natural anterior tooth width with artificial denture teeth.

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Abstract

In artificial teeth the mesiodistal dimension of anterior teeth is most important, for when the artificial teeth are too small, complete dentures fail to convey realism. The aim of this study was to determine the mesiodistal width of maxillary anterior teeth in natural dentition and commercially available artificial teeth set. The study sample consists of 75 males, 75 females and available anterior teeth sets of four brands. The results showed that the total mesiodistal width of anteriors in artificial denture teeth was smaller than total mesiodistal width in natural dentition of the study population.

Key Words: Teeth Selection, Anterior Tooth Width etc.

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Introduction

Fabrication of an esthetically acceptable artificial denture is one of the important considerations in prosthodontics. However with the advancement of prosthodontic science and introduction of the ‘dentogenic concept’ of tooth selection, very little or no importance is given to select the size of upper anterior teeth. In most instances artificial teeth that are similar in size to patient’s natural teeth are desirable(1).

Although the dental profession seeks to realistically replace the missing dentition, prosthetic teeth are smaller in size than the range of natural dentition(2). In artificial teeth the mesiodistal dimension of anterior teeth is most important, for when the artificial teeth are too small, complete dentures fail to convey realism(3).

Keeping in mind the inherent importance of mesiodistal width of maxillary anterior teeth, a study was planned to determine the mesiodistal width of maxillary anterior teeth in natural dentition and commercially available artificial teeth set. The main aim of the present study was:

- To measure the mesiodistal width of six maxillary anterior teeth in natural dentition.
- To measure the mesiodistal width of six maxillary anterior teeth in artificial denture teeth.
- To compare the anterior tooth width in natural and artificial denture teeth.
- To compare the anterior tooth width in natural dentition of males and females.

Materials and method

The materials used in this study were

- Perforated stock tray
- Alginate impression material
- Dental stone
- Dental plaster
- Base former
- Rubber bowl
- Straight spatula
- Curved spatula
• Artificial teeth sets
  The equipments used in this study were:
  • Cast trimmer
  • Vernier caliper
  • Vibrator
  • Stone dispenser
  • Plaster dispenser

  In keeping with the objectives of the study 75 males and 75 females were chosen. Criteria for selection of subjects were:
  • No restoration in anterior teeth
  • No history of orthodontic treatment
  • They were not having any facial deformities
  • No diastema in anterior teeth
  • All anterior teeth were present
  The natural six maxillary anterior teeth were measured individually i.e., mesiodistally using a Vernier caliper which was having finely pointed end that fits interdentally.

  Maxillary anterior artificial teeth sets of following four brands were chosen.
  • Premadent ®
  • Cavitax®
  • Rolex®
  • President®

  All the available mold of different sizes, of these brands was taken. The six maxillary anterior artificial teeth were measured individually, that is mesiodistally at greatest width using Vernier caliper.

  Results

<table>
<thead>
<tr>
<th>No</th>
<th>Gender</th>
<th>Range (mm)</th>
<th>Mean (mm)</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male</td>
<td>41.48-52.47</td>
<td>46.25</td>
<td>2.43</td>
</tr>
<tr>
<td>2</td>
<td>Female</td>
<td>39.40-51.60</td>
<td>45.16</td>
<td>2.21</td>
</tr>
<tr>
<td>3</td>
<td>Combined (M+F)</td>
<td>39.40-52.47</td>
<td>45.71</td>
<td>2.37</td>
</tr>
<tr>
<td>4</td>
<td>Cavitax</td>
<td>39.62-46.96</td>
<td>42.44</td>
<td>2.83</td>
</tr>
<tr>
<td>5</td>
<td>President</td>
<td>40.15-47.24</td>
<td>42.92</td>
<td>2.20</td>
</tr>
<tr>
<td>6</td>
<td>Rolex</td>
<td>39.88-47.33</td>
<td>42.33</td>
<td>2.38</td>
</tr>
<tr>
<td>7</td>
<td>Premadent</td>
<td>38.43-47.62</td>
<td>43.46</td>
<td>2.45</td>
</tr>
</tbody>
</table>

1 NS 2 VS 4.5.6  p < 0.05  1 vs 2 significant

Table 1 - Range of total maxillary anterior width, mean and standard deviation of natural dentition and artificial denture teeth

Discussion

The selection of six maxillary anterior teeth for edentulous patients is made primarily for esthetics and they must be in harmony with surrounding oral environment in term of size. The artificial substitutes must be actual reproductions of nature to completely satisfy their esthetic requirements in term of size. In most instances artificial teeth that are similar in size to patients natural teeth are desirable (1, 4).

Mac Gregor (5) stated that one of the commonest prosthetic errors is to use artificial denture teeth which are too small, thus making them appear obviously false. This was also corroborated by various authors (2, 4, 6-11). If the anterior teeth are small, then the cuspsids are too near to the median line, thus resulting in narrowing of the intercuspid width and throwing the bicuspid into undue prominence, and the general effect is a mouth full of teeth (12). In artificial teeth the mesiodistal dimension of anterior teeth is most important, for when anterior teeth are too small, complete dentures fail to convey realism (3). The average mesiodistal width of maxillary canine was reported to be 7.72 mm by Begg (13), 7.95 mm in males and 7.53 mm in females by Moorrees (14) and 8 mm in right canine and 7.9 mm in left canine by Shourie (15). The result of present study showed that the mesiodistal width of right canine in natural dentition was ranging from 7.00 to 8.86 mm with a mean of 7.72 mm and
6.36 mm to 8.66 mm with a mean of 7.54 mm in males and females respectively.

The result of present study also showed that the mesiodistal width of left canine in natural dentition was ranging from 7.00 to 8.76 mm with a mean of 7.68 mm and 6.36 mm to 8.66 mm with a mean of 7.49 mm in males and females respectively. The mean mesiodistal width of right and left canine in natural dentition, found in present study, was within the range suggested by various authors like Ash Major M,(16) Babbar A.C.(17), Black G.V. (18), and Miyabara T (19). The results of the present study showed that the mesiodistal width of right canine in artificial denture teeth, that is in Cavitax was 6.54 to 7.81 mm, in President was 6.72 to 8.00 mm, in Rolex was 6.18 to 7.81 mm and in Premadent was 6.36 to 8.09 mm. The results of the present study showed that the mesiodistal width of left canine in artificial denture teeth, that is in Cavitax was 6.54 to 7.45 mm, in President was 6.81 to 8.00 mm, in Rolex was 6.45 to 7.72 mm and in Premadent was 6.36 to 8.18 mm.

Premadent was having the largest mean mesiodistal width among artificial right and left canine of the four brands, but it was smaller than left canine of natural dentition. The average mesiodistal width of maxillary lateral incisor was reported to be 8.8 mm for maxillary right central incisor and 8.9 mm for maxillary left incisor by Shourie (15) and 8.79 mm in males and 8.40 mm in females by Moorrees (14). MacGregor (21) stated that the width of most natural maxillary central incisor is over 8.5 mm and any tooth less than 8 mm is rare. The results of the present study showed the mesiodistal width of right central incisor in natural dentition was ranging from 7.36 to 9.96 mm with a mean of 8.60 mm and 7.36 to 9.83 mm with a mean of 8.45 mm in males and females respectively. The results of the present study also showed that the mesiodistal width of left lateral incisor in natural dentition was ranging from 5.56 to 8.16 mm with a mean of 6.89 mm and 4.46 to 7.93 mm with a mean of 6.46 mm in males and females respectively.

The mean mesiodistal width of right and left lateral incisor in natural dentition, found in present study, was within the range suggested by various authors like Ash Major M.(16), Babbar A.C.(17), Black G.V. (18), Miyabara T (19). and Wedelstaedt E.K (20). The results of the present study showed that the mesiodistal width of right lateral incisor in artificial denture teeth, that is in Cavitax was 5.54 to 7.00 mm, in President was 5.63 to 6.81 mm, in Rolex was 5.45 to 6.81 mm and in Premadent was 5.45 to 7.81 mm. The results of the present study showed that the mesiodistal width of the left lateral incisor in artificial denture teeth, that is in Cavitax was 5.36 to 7.45 mm, in President was 5.45 to 6.81 mm, in Rolex was 5.45 to 6.81 mm and in Premadent was 5.45 to 7.00 mm.

Premadent was having largest mean mesiodistal width among the artificial right and left lateral incisor but it was smaller than left lateral incisor of natural dentition. The average mesiodistal width of maxillary central incisor was reported to be 8.8 mm for maxillary right central incisor and 8.9 mm for maxillary left incisor by Shourie (15) and 8.79 mm in males and 8.40 mm in females by Moorrees (14). MacGregor (21) stated that the width of most natural maxillary central incisor is over 8.5 mm and any tooth less than 8 mm is rare. The results of the present study showed the mesiodistal width of right central incisor in natural dentition was ranging from 7.36 to 9.96 mm with a mean of 8.60 mm and 7.33 to 9.83 mm with a mean of 8.45 mm in males and females respectively. The results of the present study showed the mesiodistal width of left central incisor in natural dentition was ranging from 7.36 to 9.96 mm with a mean of 8.52 mm and 7.26 to 9.83
mm with a mean of 8.43 mm in males and females respectively.

The mean mesiodistal width of right and left central incisor in natural dentition, found in present study was within the range suggested by various authors like Ash Major M (16), Babbar A. C (17), Black G. V (18), Miyabara T (19), Ballard A.,(22), R.,Mavroskoufis F. (23), McArthur D. Ray (24). The results of present study showed that the mesiodistal width of right central incisors in artificial denture teeth that is in Cavitax was 7.36 to 9.08 mm, in President was 7.45 to 9.00 mm, in Rolex was 7.45 to 9.09 mm and in Premadent was 7.27 to 9.00 mm. The results of present study showed that the mesiodistal width of left central incisors in artificial denture teeth that is in Cavitax was 7.36 to 9.08 mm, in President was 7.45 to 8.81 mm, in Rolex was 7.45 to 9.09 mm and in Premadent was 7.07 to 9.00 mm.

Premadent was having the largest mean mesiodistal width among artificial right and left central incisor of four brands, but it was smaller than left central incisor of natural dentition. The average width of maxillary six anteriors was reported to be 45 mm by Sears(5). MacGregor(21) found that the combined width of maxillary six anterior teeth is normally 46 mm or more and anything less than 45 mm is very unusual. Landa (25) had stated that "As a general guide, upper anterior teeth whose overall width as listed on tooth selection chart in less than 48 mm, are relatively small teeth. Those listed as over 52 mm are relatively large teeth". The results of the present study showed that the total anterior width in natural dentition was 45.71 mm. In males it ranged from 41.48 to 52.47 mm with a mean of 46.25 mm where as in females it ranged from 39.40 to 51.60 mm with a mean of 45.16 mm.

The mean anterior width in natural dentition, found in present study, was within the range suggested by other authors like Ash Major M(16) and LaVere Arthur M(8). The results of present study showed that the total anterior width in artificial denture teeth that is in Cavitax was 39.62 to 46.96 mm with a mean of 42.44 mm, in President was 40.15 to 47.24 mm with a mean of 42.92 mm, in Rolex was 39.88 to 47.33 mm with the mean of 42.33 mm and in Premadent was 38.43 to 47.62 mm with the mean of 43.46 mm.

Premadent was having the largest mean total anterior width among artificial teeth of four brands, but it was smaller than mean total anterior width in natural dentition. The results of the present study also showed that 5.4% of males and 1.3% of females were having the total anterior width in between 51.01 to 54.00 mm, whereas no artificial denture teeth were having the total anterior width in between 51.01 to 54.00 mm. In males 17.3% and in females 8% were having the total anterior width in between 48.01 to 51.00 mm, whereas no artificial denture teeth were having the total anterior width in between 48.01 to 51.00 mm. The results of the present study showed that the mesiodistal width of maxillary anterior denture teeth are predominantly in the smaller sizes, and the mesiodistal width of maxillary anterior natural teeth are predominantly in the larger sizes. This was also corroborated by other authors like Ash Major.M (16), Lavere Arthur.M (8), McArthur.D.Ray (9) and Wood Head.C.M (11), Walmsley (10) stated that the average width of anterior teeth in maxillary arch, from distal canine to distal canine, has been measured as 41.9 to 51.1 mm (average 48.7 mm). The majority of the people have a width of over 45 mm, yet many commercial moulds are available which have a width of less than 41 mm.
Some authors have cited the reasons for using smaller mesiodistal width artificial teeth. Hardy (12) stated that the use of small teeth is probably largely due to inertia, for some time the use of a tooth of proper dimensions necessitates some grinding of ridge lap to place it properly in position, small teeth need no grinding so small teeth are used.

McArthur (24) stated that small teeth are more used because most of the manufacturers supplies small size anterior tooth molds, (probably because of the manufacturer's elimination of little-use molds). McArthur (26) stated that with aging the proximal wear will take place and therefore in older age there will be narrowing of teeth. But maximum proximal wear is approximately 0.1 mm on each surface that is decrease in mesiodistal width of maxillary anterior teeth from canine to canine will be approximately by 1.2 mm due to proximal wear. But this reduction in mesiodistal width is not sufficient to justify the selection of artificial teeth which are very much narrower compare to their natural predecessor.

Conclusion

The mesiodistal width of anteriors in artificial teeth is smaller than the mesiodistal width of anteriors in natural dentitions. If the artificial teeth are smaller than the natural teeth, the persons charm, dignity or beauty will be compromised.

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References


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