

Comparison of Two Preformed Molar Bands for Better Fit on Primary Second Molars in Gandhinagar City Population: A Cross Sectional Study

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ABSTRACT

Aim: To compare the preformed molar band for better fit and to evaluate the most frequent size on primary second molars.

Materials and methods: A Total 80 Primary Molars were selected and divided into 2 groups of 40 each Maxillary & Mandibular Second Primary Molar. Mesio-Distal dimensions of 2 preformed molar bands (GROUP1-SLR Economy & GROUP2-Caption Ortho) & Primary second molars were measured using a digital caliper with 0.01 mm precision on casts. Data were assessed using IBM SPSS 20 WINDOWS statistical software.

Results: There was significant difference in Mesio-Distal dimensions of Caption Ortho bands & Primary 2nd Molars ($P < 0.001$) while it was not significant for SLR Economy bands ($P = 0.054$ and $P = 0.307$). Size 31+ of SLR Economy bands was the most frequent finding.

Conclusion: In studied population, SLR Economy Preformed Bands showed best fit in primary maxillary second molar.

Keywords: Preformed Bands, Primary Molars, Mesio Distal dimension.

INTRODUCTION

Primary dentition plays an important role in development of occlusion. It helps in speech, mastication, aesthetics and the prevention of deleterious habits and aids in the guidance and eruption of permanent teeth. Exfoliation of deciduous teeth and eruption of permanent teeth is a normal physiological process. Whenever this normal process is disrupted, due to factors like early loss of primary teeth, proximal carious lesions etc, it usually leads to mesial migration of teeth. This results in loss of the arch length which may manifest as malocclusion in permanent dentition in the form of crowding, impaction of permanent

teeth, supra eruption of opposing teeth¹. Preservation of primary teeth in the arch till it exfoliates serves as the best space maintainer for the erupting permanent dentition. However, if premature extraction or loss of tooth is unavoidable due to extensive caries or other reasons, the safest option to maintain arch space is by placing a suitable space maintainer².

In order to maintain space created by unilateral /bilateral premature loss of primary teeth on either side a fixed type of space maintainer is indicated. Amongst various fixed space maintainers available Band and Loop type of space maintainers is the most used one. The introduction of preformed

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bands has played an important role in fabrication of space maintainers as it reduces the chair side time, provides better accuracy and requires less patient cooperation. Different preformed bands in terms of size, shape and contour have been introduced to the dental market by different manufactures including 3M Co, SLR Economy and Caption Ortho available with varied range of size so selecting a proper preformed molar band is difficult. To our best of knowledge, no such similar study has been previously conducted, So this ex-vivo study was conducted to assess the dimensions of commercially available preformed molar bands and the deciduous molars of Gandhinagar city population, to know the better fit and most frequent size of studied preformed molar bands.

MATERIALS AND METHODS

The proposed study was conducted as a cross sectional design. Prior permission and consent was obtained from ethical committee of institution & participant's parents. 80 primary molars were selected in age group of 4-12 years children which were referred to the Karnavati School of Dentistry.

The sample size was calculated using the formula:

$$\text{Sample size} = 2 * (Z_{\alpha/2} + Z_{1-\beta})^2 / (m_1 - m_2 / \sigma)^2$$

Where $Z_{\alpha/2} = 1.96$

$Z_{1-\beta} = 0.84$

$m_1 = \text{mean of group 1} = -0.0491$

$m_2 = \text{mean of group 2} = -0.1869$

$\sigma = \text{standard deviation} = 0.22$

So, final sample size was 80. Per group sample size was 40.

A) Inclusion criteria:

1. Children aged between 4-12 year.
2. Children attending the OPD of Karnavati school of dentistry and residing in Gandhinagar city.
3. Healthy maxillary and mandibular second primary molars.
4. Healthy child free from any systemic disease

B) Exclusion criteria:

1. Children with caries & restoration in maxillary and mandibular second primary molars.

2. Maxillary and mandibular second primary molars having anomalies.
3. Children with systemic disease

Based on the medical history of children provided by their parents, those suffering from a systemic disease or children with premature birth were excluded from the study. A clinical examination was carried out and the teeth with caries, restorations, hypoplasia or other dental anomalies were excluded from the study. Alginate Impressions (Dental Zhermack Tropicalgin) were taken of both dental arches of children & casts were poured with the dental stone (Figure 1). Casts were poured within 10-15 minutes to avoid any dimensional distortion. A total of 80 primary molars were further divided into 40 maxillary second primary molars and 40 mandibular primary molars. Each group was further classified according to 2 commercially available company (GROUP1-SLR Economy & GROUP2-Caption Ortho). (Figure 2)



Fig 1: Study models.

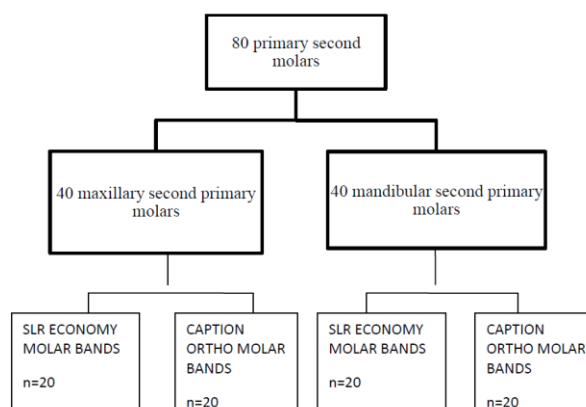


Fig 2: Study design.

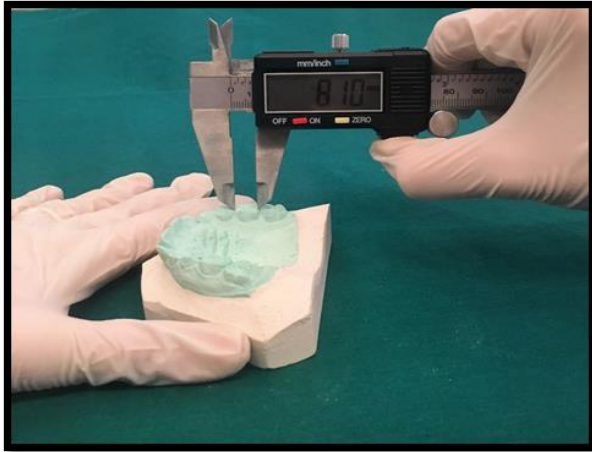


Fig 3: Mesio-distal width of maxillary 2nd primary molar.



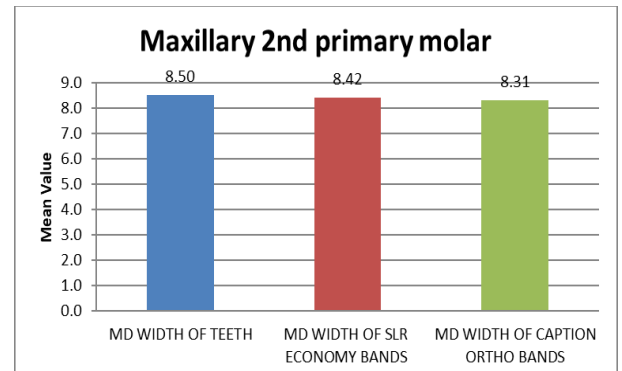
Fig 4: mesio-distal width of preformed slr economy molar bands.



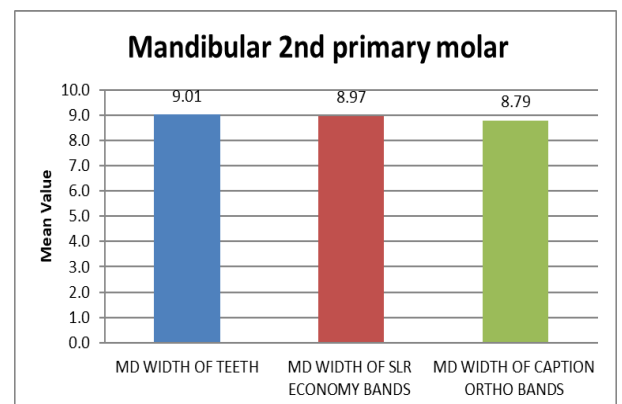
Fig 5: mesio-distal width of preformed caption ortho bands.

Half the teeth in each group were from the right and the other half from the left quadrants. A digital caliper (Tiny Deal 150mm SS Digital Vernier Caliper Vernier with LCD Display) was calibrated and used

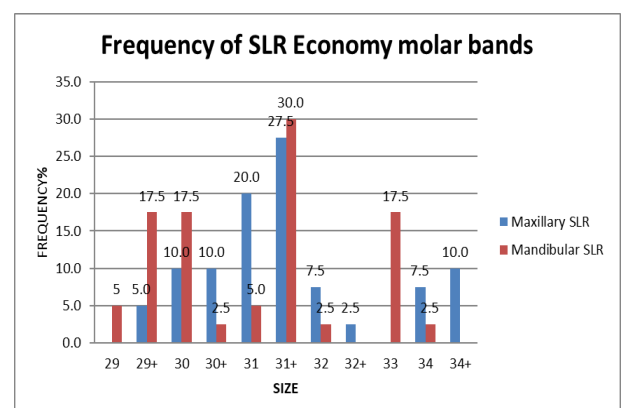
to assess the MD dimensions of teeth with 0.01 millimeter precision. The greatest distance between the midpoints of the mesial and distal marginal ridges was measured as the MD dimension of each tooth (Figure 3).



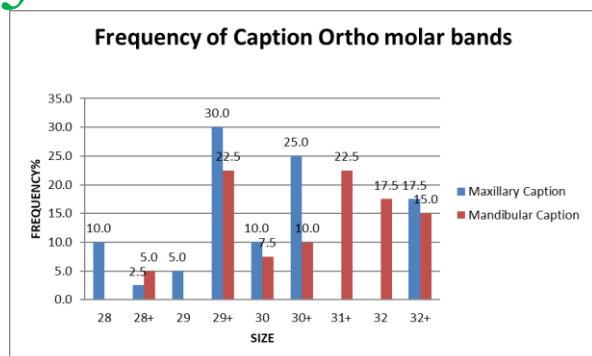
Graph 1: Comparison of mesio-distal width of teeth with two preformed bands in maxillary 2nd primary molar.



Graph 2: Comparison Of Mesio-Distal Width Of Teeth With Two Preformed Bands In Mandibular 2nd Primary Molar.



Graph 3: frequency of slr economy molar bands in maxillary and mandibular 2nd primary molars.



Graph 4: frequency of caption ortho molar bands in maxillary and mandibular 2nd primary molars.

For measuring the dimensions of preformed bands of SLR Economy(Figure 4) & Caption Ortho(Figure 5) internal diameter of band was measured using digital caliper(Tiny Deal 150mm SS Digital Vernier Caliper). Data were assessed using IBM SPSS 20 WINDOWS statistical software. T- TEST with probability levels of $P < 0.05$ were considered statistically significant. According to the values obtained the most frequent size and better fit of preformed molars bands were assessed for primary 2nd molar.

RESULTS

On comparison of mesio-distal width of teeth with two preformed bands in maxillary 2nd primary molar,(graph 1) there was no significant difference in SLR Economy bands($P=0.054$) but it was significant with ortho caption bands ($P<0.001$). Also significant difference was found with ortho caption bands ($P<0.001$) as compared to SLR economy bands ($P=0.307$) with respect to mesio-distal dimension of mandibular second molar (graph 2).

When comparing the frequency of both the bands (graph 3), 31+ size of SLR ECONOMY bands was most common size in both second primary molars in the studied population of Gandhinagar. 29+ size was the most frequent size of ortho caption band (graph 4) in both the second primary molars in studied population of Gandhinagar.

DISCUSSION

First primary molars are most prone to caries and have greater frequency of premature loss/extraction. However, if premature extraction or loss of tooth is unavoidable due to extensive caries or other reasons, the safest option to

maintain the arch space is by placing a space maintainer. Conventional banding procedure is time consuming and requires expensive armamentarium and is sometimes painful. With the introduction of preformed bands, banding molars have become easier, faster and are better preferred by both dentist and children. Banding of second molar for band and loop space maintainer becomes inevitable to fabricate space maintainer in relation to first molar in cases where first permanent molar has not erupted.

Tooth size and shape vary according to gender, race, ethnicity and different population. This can affect the selection of appropriate preformed molar band. Preformed molar bands with best fit to the molar can ensure proper retention and least tendency for disintegration of cement. Nayak et al stated that Conventional band pinching method has following disadvantages viz tendency for disintegration of cement, inability to prevent rotation or tipping of adjacent teeth, increased chairside and laboratory time, so the introduction of prefabricated bands has evolved for saving time.⁷

Various studies have been carried out to measure tooth size in different populations all over the world. A variability of relationship between the measurements was found in each molar in Spanish population where the lower first molars had less variability than upper first molars in regards to mesio distal and Buccolingual sizes, but were variable in height.³ Afshar et al in his study, Compared the Primary Molar Crown Dimensions with Stainless Steel Crowns in a Sample of Iranian Children and concluded that the best adaptation was seen in second lower molars and the least adaptations were seen in first and second upper molars.¹

As we have seen morphological variations of primary molars according to different populations of world, so this study focuses on how much acceptability exist among different commercially available preformed bands in Gandhinagar population. In our study, two commercially available preformed molar bands of SLR Economy & Caption Ortho were compared with the primary second molar. In the studied population, mesio-distal width of maxillary second molar was found to be in the range of 7.54mm-9.28mm and mandibular second molar was 8.54mm-10.1mm. Based on the

standard error of the mean obtained for each molar, Lower second molars were less variable than upper second molars in regard to mesio-distal size. There was significant difference in maxillary and mandibular ortho caption bands ($p < 0.05$) while non significant difference in both SLR Economy bands with primary 2nd molar, making SLR bands more preferable for studied population.

CONCLUSION

In studied population, SLR Economy Preformed Bands showed best fit in primary maxillary second molar & 31+ size was the most common. Knowledge of dimension and variations in tooth and available preformed molar bands can help the operator to select the most appropriate preformed molar bands easily, thereby reducing the chair side time and inventory and making it more child and dentist friendly.

CONFLICT OF INTEREST

No potential academic conflict of interest relevant to the above article was reported.

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