

Pont's Index As Applied On Indians

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Pont,⁸ in 1909, suggested a method for predetermining the ideal dental arch width from the combined mesiodistal width of the four maxillary incisors. His method is popularly known as Pont's Index. However, he emphasized that only measuring teeth for predetermination of arch width was not sufficient and one must see the facial profile, Angle's classification, midline and relationship of one jaw to the other.

He established constant ratios between tooth sizes and arch widths which were known as the premolar index and molar indices. His indices were determined by dividing the sum of the incisal widths $\times 100$ by the respective arch widths. The premolar arch width was taken from the first premolar of the left side to the right side at the distal end of its occlusal groove. The molar arch width was taken from the maxillary left first permanent molar to the same of the right at its mesial pit on the occlusal surface.

Based on an ideal occlusion sample, the values of 80 and 64 were calculated by him for the premolar index and the molar index, respectively. He also prepared a prediction table from which the ideal first premolar arch width and the ideal intermolar width could be read directly after finding the mesiodistal diameters of the maxillary incisor teeth.

Pont did not indicate the number of subjects used in his study but he stated, "I must warn you that my re-

search has been made exclusively on the jaws of the people of the French race and I would be much pleased if, at a later date, others of my colleagues could verify the correctness of this on other races." All his measurements and predictions were related to the maxillary dental arch only.

Lavelle³ concluded that tooth size variation was seen in his study on Caucasoids, Negroids and Mongoloids. Cotton, Takano and Wong⁴ also found that there are definite racial variations in the position and size of the maxilla and mandible, the size of the cranial base, the anterior and the posterior facial heights, and the gonial angle.

The present study was conducted to ascertain whether or not Pont's Index can be used reliably on North Indians and to establish the norms for the same.

REVIEW OF LITERATURE

Smyth and Young⁹ found that the relationship between tooth size and arch width was below an 'r' value of + 0.4 which was statistically insignificant; they did not agree with Pont's Index.

Greve³ critically analyzed the validity of the index. In 102 dentitions with perfect occlusion he found that only a low coefficient of correlation existed between the sum of the mesiodistal crown diameters of the incisors and arch widths. They were statistically insignificant. Korkhaus⁵ proposed index values of 84 and 65 rather than Pont's original values of 80 and 64. White, Gardiner and Leighton¹¹ were in favour of Pont's

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Index and mentioned that it can give an approximate indication of the degree of narrowness of the dental arches in a case of malocclusion. Barnes¹ stressed the use of Pont's Index as a diagnostic method for further expansion of deciduous dental arches.

Stifter¹⁰ concluded by his study on Navaho Indians that there was a significant correlation existing between the combined incisor widths and the molar and upper premolar widths in *ideal* occlusions, but not in normal occlusions. Worms¹² evaluated Pont's Index by studying ninety-one Navaho children with ideal occlusion. He indicated that the reliability of the index as a diagnostic tool in orthodontics is highly questionable.

Joondeph et al.⁴ concluded that measuring mesiodistal width of four incisors to predetermine the maxillary arch width was of no value in orthodontic diagnosis.

MATERIAL AND METHODS

The present study was limited to dental models of normal occlusions.

One hundred sets of dental models from North India were studied. Analysis was carried out with similar measurements and armamentaria as used by Pont. No consideration was given to age and sex. Presence of a complete permanent dentition except for third molars, with no apparent attrition of teeth, was essential for the study. Cases with obvious diastema, reverse curve of spee, abnormal buccal or lingual tipping of teeth, crossbite relationship, peg-shaped lateral incisors or other anomalies were not considered; however, some cases did have slight rotations or extremely small interproximal spaces.

All measurements were made directly on study models with the help of a Helios caliper having a minimal count of 0.02 mm. The collected

data were subjected to statistical analysis for the purposes of finding the coefficient of correlation and coefficient of regression between incisor widths and arch widths.

OBSERVATIONS

The figures reflected by cases here ranged from 25.28 mm to 33.64 for the combined mesiodistal widths of the maxillary central and lateral incisors with a mean of 29.85 mm. For premolar arch width the range was 31.58 mm to 41.00 with a mean of 36.63 mm. Similar values for intermolar width were found to be 38.82 mm to 52.14 mm and 45.68 mm, respectively.

Pont's premolar index and molar index were calculated. For premolar index and molar index, the mean values were 81.66 and 65.44, respectively. Coefficients of correlation were established between combined maxillary incisor widths to premolar arch width and to molar arch width. The values obtained, 0.4622 and 0.4864, were found to be highly significant at the $p = <.001$ level.

Coefficients of regression (r) were also calculated to predict the premolar arch width and molar arch width only by knowing the combined maxillary incisor widths, which were 0.18597 and 0.74497, respectively. Regression equations for prediction of arch widths were derived from the formula.

$$1. \text{Premolar arch width} = 0.18597 ('S' - 29.85) + 36.63$$

$$2. \text{Molar arch width} = 0.74497 ('S' - 29.85) + 45.68$$

Where 'S' is the combined maxillary incisal width.

By regression equation a table was prepared to predict the probable arch width from the combined mesiodistal widths of maxillary incisors (Table I).

DISCUSSION

TABLE I
PREDICTION OF ARCH WIDTHS (MM)

'S'	Premolar Width	Molar Width
25	35.73	42.07
26	35.91	42.81
27	36.10	43.56
28	36.29	44.30
29	36.47	45.05
30	36.66	45.79
31	36.84	46.54
32	37.03	47.28
33	37.22	48.03
34	37.40	48.77

A significant and definite correlation between the widths of four maxillary incisors and arch width found in the present study indicates parallelism with Pont's figures. Premolar index and molar index were found to be 81.66 and 65.44 as compared with Pont's original 80 and 64. As Pont's sample was entirely composed of persons of French nationality, the differences observed may possibly be due to the fact that North Indians have a different racial inheritance.

Although statistical evaluation revealed that Pont's Index was reliable to use, it had such a great range that it would be fallacious to assume that every case will be in the same order as predicted by the index. On the other hand, Pont's Index can be used as a target to achieve when working toward the ideal.

CONCLUSIONS

One hundred dental models of normal occlusion were evaluated to check the reliability of Pont's Index on a North Indian population. It was concluded by the present study that significant correlations were found to exist between the combined maxillary incisor widths and the maxillary in-

termolar and interpremolar arch widths.

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