

# **Determination of Normal Overall Ratio and the Effects of Premolar Extractions on the Overall Tooth-Size Discrepancies in Iraqi Sample**

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# *Abstract*

Bolton's method of diagnosing tooth size discrepancies by analyzing the mesiodistal tooth size ratio between the maxillary and mandibular teeth has been widely used in scientific studies since its publication, to be a good indicator for evaluating the degree of inter-maxillary tooth size harmony, but the possibility of ethnic variation of these values should be examined.

The first aim of the study was to establish the normal overall and anterior tooth size ratios of Iraqis by clinical examination of 2000 students (aged 15 –25 years) to select 115 subjects (58 males and 57 females) with normal occlusion. The second aim was to investigate the effect of premolar extractions on the excess tooth size discrepancy on 132 subjects with malocclusion (75 males and 57 females).

Upper and lower study models were made to all the subjects with normal and malocclusion groups. The mesiodistal crown dimension of all the permanent teeth except second and third molars were measured by a digital vernier with contumely sharpened tips on study casts.

For the normal occlusion group the anterior ratio was  $77.544 \pm 2.121\%$  and overall ratio was  $91.482 \pm 1.682\%$ . Males had significantly larger mesiodistal crown diameters than females, with no-significant gender difference for both the overall and anterior ratios. After removing the four first premolars, the normal Overall ratio after extraction was  $90.03 \pm 1.535\%$ .

According to the normal overall ratios, the subjects of malocclusion group were divided into three subgroups (Low, Medium, and High). Four combinations of hypothetical tooth extractions were carried out: all first premolars, upper first and lower second premolars, upper second and lower first premolars, and all second premolars.

For the malocclusion group, the overall ratio decreased in every malocclusion subgroups after extraction of any combination of premolars especially in combinations Exo.54s and Exo.55s with no statistically significant difference between genders for overall ratio. The mesiodistal crown diameters of the lower four incisors were significantly larger in malocclusion group than in normal occlusion group.

After extraction the excess tooth size discrepancies decreased with Exo.44s in 'Low subgroup', remained relatively constant in 'Medium subgroup', and decreased in all extraction combinations being least in Exo.55s in 'High subgroup'.