"Odontometrics:" A need for anthropological data

Teeth provide excellent material in populations for anthropological, genetic, odontologic, and forensic investigations. The study of human tooth size variation is called "Odontometrics," and it plays a very important role in routine clinical practices also. Tooth morphometry is said to be influenced by physiological, pathological, cultural, environmental, genetic, and racial factors. The measurements of tooth are introduced to the first-year BDS students, during their tooth-carving sessions as a part of their academic curriculum. It helps the students to know the individual tooth from all aspects including the structural morphology. Odontometrics usually involves linear and diagonal measurements.[1] Mesiodistal (MD) and buccolingual (BL) diameters, crown length, and root length are considered as linear measurements. When the measurements are taken from corner to corner of a tooth, it is termed as diagonal measurement.[2] The tooth size standards are used in age estimation and gender determination cases, and above all there is no such thing as "typical tooth." The study of tooth forms is achieved by measurements, especially the width and height.[3] The measurement table under each tooth in the Wheeler's Textbook of Dental Anatomy is being followed since generations in dentistry as reference for tooth measurements. There is a huge lacuna of odontometric data from population-based studies. However, there are studies on odontometrics but with the aim of only identifying the sexual dimorphism in tooth. Currently, there is a need for odontometric data of Indian population, which has to be addressed through the contributions from clinical dentistry.

Dental surgeons extract teeth during their routine dental practice and as soon as the tooth comes out "fully" from the socket, there is a huge "sigh of relief." The extracted tooth immediately reaches its *in vitro* destination – the "yellow-colored" plastic solid waste management bag. It carries along with it the valuable morphometric information which in most of the time goes unrecorded.

Let us consider for example, in our country with nearly 310 dental colleges, working 25 days a month and with an average of 50 extractions per day, would be extracting more than 46 lakhs teeth in a year. These do not include the grossly decayed, fractured, or worn-out teeth as they do not contribute any valid odontometric informations. The implementation of the recording of measurements of those informative extracted teeth using standardized protocol would provide huge anthropometric data for valuable application in clinical dentistry (prosthodontic tooth selection, implant selection, root canal treatments, etc.) and in dental anthropology (sex determination, racial determination, etc). The same protocol may be applied for individual clinical practice, in order to supplement the data gathered from the dental institutes.

The simple practice of odontometrics does not require highly sophisticated technology. The measurements can be done using plastic rulers, Boley's gauge, ABFO No. 2 scale, or by a digital Vernier caliper. Dental practitioners could also go for such abovementioned basic equipments, when an investment on high-end equipments is being planned.

These tooth measurements would help us solve or understand several questions related to population relationships, hereditary components, and evolutionary dynamics apart from gender variations. Some teeth exhibit mirror imaging with relation to size and morphology between the right and left sides of the arch (antimere). However differences in the number of cusps and occlusal grooves also are sometimes observed in such teeth. The dental surgeons extracting the premolars as a part of orthodontic treatment planning can compare the right- and left-sided premolars in all aspects after extracting them, record the details, and also can aim at the sexual dimorphism analysis at a later stage. Sexual dimorphism of canines has been elaborated in various population studies. In one of our ongoing studies, we have found variation in the cusp size, cusp number, and occlusal groove patterns in mandibular second premolars and maxillary second molars when the right- and left-sided teeth were compared. The mean BL dimension of the crown in our study was 7.7 mm (8.0 mm in Wheeler's Textbook)[4] and the BL dimension in the maxillary second molar was 10.2 mm (11.00 mm in Wheeler's Textbook).

It is usually observed that male teeth are 2%–6% larger than those of females, and this dimorphism is more pronounced in canine dimensions. The size of one tooth is not dependent on the size of all the other teeth as there exists a high degree of dimensional intercorrelation. Even in monozygotic twins,

because of environmental factors, some differences in tooth structure exist, just like the asymmetry between the right and left sides of dentition.

There is a need to measure the extracted intact or minimally damaged tooth in all aspects and to maintain a record of them even by the general dental practitioners. The dental institutes or more specifically the oral surgery departments should make it mandatory for the students to correctly record at least the basic measurements such as crown height, root length, and labiolingual/BL and MD dimensions of the crown of the entire extracted tooth and maintain a central repository of the data. Collection of data from several sources may facilitate the generation of population-based odontometric data. The value of such data may be useful for clinical interventions and also may supplement the anthropological and forensic identifications.

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