

# Mean value of mesiodistal width and height of primary anteriors of mandible among Indian population

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## ABSTRACT

**Aim:** The aim of this research is to evaluate the mean value size of the mandibular primary anterior crown of children to document and provides a record of mandibular anterior deciduous crown sizes. **Objective:** Evaluation of the mean value size of the mandibular primary anterior crown of children is to document and provides a record of mandibular anterior deciduous crown sizes to ease the selection of crown size during clinical procedure for children who require such treatments. **Materials and Methods:** The study was conducted on a sample size of 21 pedodontic patients visiting Saveetha Dental College aged <7 years old. The height and width of anterior primary teeth were taken intraorally using k-files and measured with endo block. Moreover, mean value was calculated from the recorded measurement of central incisors, lateral incisors, and canines. **Results:** The mandibular incisors showed less variability in size than the mandibular canines. The greatest variability was seen in the mean height and width of the mandibular lateral incisors and mandibular canines. The mandibular lateral incisors showed the least variability of all the mandibular anterior teeth. **Conclusion:** This study highlighted mean value height and mesiodistal width of mandibular central incisors, mandibular lateral incisor, and mandibular canines in primary dentitions. This value is documented to ease the crown size selection during a particular treatment procedure.

**KEY WORDS:** Crown dimension, Deciduous, Mandibular anterior, Mesiodistal, Primary anterior

## INTRODUCTION

In pediatric dentistry, it is a responsibility of a pedodontist to maintain the primary teeth in children to improve the masticatory efficiency, facial esthetics, and alignment of the dental arches, which becomes frustrating in the presence of crown-size discrepancies.<sup>[1]</sup> It is essential for the clinician to know the size of individual tooth and groups of teeth, to make an adequate diagnosis and treatment plan.<sup>[2]</sup>

The pedodontic examination may be incomplete without a careful analysis of the patterns of mesiodistal crown size relationships of a primary tooth; hence, to improve the quality of available dental care, there is an urgent need for baseline data on the sizes of individual teeth.

Indications on mesiodistal dimensions are available on crown dimensions of the teeth of American

Caucasians<sup>[3]</sup> and their ethnic groups. The determination of ratios, indicative of how large the mandibular teeth are, has been suggested to be in relation to their lower counterparts<sup>[4]</sup> or to ratios which presumably indicate the correct amount of overjet or overbite.<sup>[5]</sup>

Hunter *et al.*<sup>[6]</sup> found teeth of males to be larger than those of females for each type of tooth in both the arches. Diesel *et al.*<sup>[7]</sup> reported differences in crown size patterns even among good occlusion cases. Jensen *et al.*<sup>[8]</sup> in their study found a combined mesiodistal width for males to be more as compared to females. Moorees *et al.*<sup>[9]</sup> in their study on incisor shapes and crowding found males to have slightly larger average teeth dimensions than females.<sup>[10]</sup>

Guidance of eruption and development of the primary, mixed, and permanent dentitions are an integral component of comprehensive oral health care for all pediatric dental patients. This guidance should contribute to the developmental of a permanent dentition that is in a stable, functional, and esthetically acceptable occlusion and normal subsequent

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dentofacial development. In early diagnosis, the success of treatment of developing malocclusions can have both short-term and long-term benefits while achieving the goals of occlusal harmony and function and dentofacial esthetics. Dentists have the responsibility in recognizing, diagnosing, and managing abnormalities in the developing dentition. Many factors can affect the management of developing dental arches and minimize the overall success of any treatment. A thorough clinical examination, appropriate pre-treatment records, differential diagnosis, sequential treatment plan, and progress records are necessary to manage any condition affecting the developing dentition.

The developing dentition should be monitored throughout the eruption. This monitoring at regular clinical examinations should include, but not be limited to, diagnosis of missing, supernumerary, developmentally defective, and fused or geminated teeth; ectopic eruption; space and tooth loss secondary to caries and periodontal and pulpal health of the teeth. The radiographic examination should be done, when it is necessary and feasible. Diagnosis of anomalies of primary tooth development and eruption should be made to inform the patient's parent and to plan and recommend appropriate intervention. This evaluation should be ongoing throughout the whole development of dentition, at all stages.

General considerations and principles of management in pediatric dentistry are the habits of non-nutritive sucking, bruxing, tongue thrust, and abnormal tongue position. An oral habit induces force to the teeth and dentoalveolar structures. The habits that frequently sufficient with duration and intensity may associate with dentoalveolar or skeletal deformations such as increase in overjet value, reduction of overbite, anterior or posterior crossbites, or long facial height. The duration of forces is more important than its magnitudes as the resting pressure from the lips, cheeks, and tongue have the large impact on tooth position and size; these forces are continuously maintained for a period of time. Non-nutritive sucking behaviors are considered normal in infants and young children. However, prolonged nonnutritive sucking behaviors have been reported to be associated with decrease in mandibular arch width, increase in overjet, and decrease in overbite, anterior open bite, and posterior crossbite.

As preliminary evidence indicates that some changes resulting from sucking habits persist past the cessation of the habit, it has been suggested that early dental visits provide parents with anticipatory guidance to help their children stop sucking habits by age 36 months or younger. Bruxism, defined as the habitual nonfunctional and forceful contact between occlusal

surfaces, can occur while awake or asleep. The etiology is multifactorial and has been reported to include central factors (e.g., emotional stress, parasomnias, traumatic brain injury, and neurologic disabilities) and morphologic factors (e.g., malocclusion and muscle recruitment). The occlusal wear that may result from bruxism is important to differentiate from other forms of occlusal loss of enamel (e.g., erosion caused by diet or gastroesophageal reflux). Reported complications of bruxism include dental attrition, headaches, temporomandibular dysfunction, and soreness of the masticatory muscles. Evidence indicates that juvenile bruxism is self-limiting and does not persist in adults. The spectrum of bruxism management ranges from patient/parent education, occlusal splints, and psychological techniques to medications. Tongue thrusting, an abnormal tongue position, and deviation from the normal swallowing pattern, may be associated with anterior open bite, abnormal speech, and anterior protrusion of the mandibular incisors.

There is no evidence that intermittent short-duration pressures, created when the tongue and lips contact the teeth during swallowing or chewing, have a significant impact on tooth position. If the resting tongue posture is forward of the normal position, incisor displacement is likely, but if resting tongue posture is normal, a tongue thrust swallow has no clinical significance. Self-injurious or self-mutilating behavior (i.e., repetitive acts that result in physical damage to the individual) is extremely rare in the normal child. Such behavior, however, has been associated with developmental delay or disabilities, psychiatric disorders, traumatic brain injuries, and some syndromes. The spectrum of treatment options for developmentally disabled individuals includes pharmacologic management, behavior modification, and physical restraint. Reported dental treatment modalities include, among others, lip-bumper and occlusal bite appliances, protective padding, and extractions. Some habits, such as lip-licking and lip-pulling, are relatively benign in relation to an effect on the dentition. More severe lip- and tongue-biting habits may be associated with profound neurodisability due to severe brain damage. Management options include monitoring the lesion, odontoplasty, providing a bite-opening appliance, or extracting the teeth.

Research on the relationship between malocclusion and mouth breathing suggests that impaired nasal respiration may contribute to the development of increased facial height, anterior open bite, increased overjet, and narrow palate, but it is not the sole or even the major cause of these conditions. Obstructive sleep apnea syndrome (OSAS) may be associated with narrow mandible, crossbite, low tongue position, vertical growth, and open bite. History associated with OSAS may include snoring, observed apnea,

restless sleep, daytime neurobehavioral abnormalities or sleepiness, and bedwetting. Physical findings may include growth abnormalities, signs of nasal obstruction, adenoidal facies, and/or enlarged tonsils.

Ankylosis is a condition in which the cementum of a tooth's root fuses directly to the surrounding bone. The periodontal ligament is replaced with osseous tissue, rendering the tooth immobile to eruptive change. Ankylosis can occur in the primary and permanent dentitions, with the most common incidence involving primary molars. The incidence is reported to be between seven and 14% in the primary dentition. In the permanent dentition, ankylosis occurs most frequently following luxation injuries.

Ankylosis is common in anterior teeth following trauma and is referred to as replacement resorption. Periodontal ligament cells are destroyed and the cells of the alveolar bone perform most of the healing. Over time, normal bony activity results in the replacement of root structure with osseous tissue. Ankylosis can occur rapidly or gradually over time, in some cases as long as 5 years post-trauma. It also may be transient if only a small bony bridge forms then is resorbed with subsequent osteoclastic activity. Ankylosis can be verified by clinical and radiographic means. Submergence of the tooth is the primary recognizable sign, but the diagnosis also can be made through percussion and palpation. Radiographic examination also may reveal the loss of the periodontal ligament and bony bridging.

The aim of this study was to establish normative data of the mesiodistal crown dimensions of primary teeth among Indian populations in India. Evaluating the mean value size of the mandibular primary anterior crown of children to document and provide a record of mandibular anterior deciduous crown sizes to ease the selection of crown size during clinical procedure for children who require such treatments.

## MATERIALS AND METHODS

The study was conducted on a sample size of 100 pedodontic patients visiting Saveetha Dental College aged <7 years old. The height and width of anterior primary teeth were taken intraorally using k-files and measured with endo block. Moreover, mean value was calculated from the recorded measurement of central incisors, lateral incisors, and canines.

## RESULTS

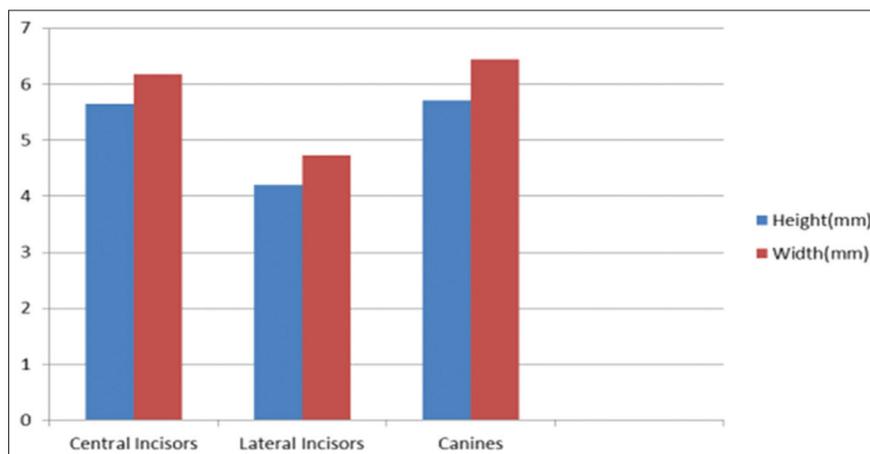
The mesiodistal crown dimension of primary anterior teeth for males and females in upper arches is given in [Table 1]. The mean mesiodistal crown dimension of the primary dentition in the mandibular arch, the mean width of the crowns of the central incisors (6.71 mm) was larger than the mean width of the crowns of the lateral incisors (4.73 mm). The mean height of the mesiodistal dimension of mandibular canine was larger (5.71 mm) than that of the central incisors (5.64 mm) and the mean width and height mandibular lateral incisor has the least dimension (4.21 mm mean height and 4.73 mm mean width).

## DISCUSSION

As compared to other ethnic groups, no measurements of tooth sizes have been made on the primary dentition of an Indian population.<sup>[11]</sup> This study was conducted to provide normative data on the mesiodistal height and width measurements as shown in Graph 1. The results

**Table 1: Tabulated mean value height and width of anteriors of primary dentition**

	Mean height (in mm)	Mean width (in mm)
Mandibular central incisors	5.64	6.71
Mandibular lateral incisors	4.21	4.73
Mandibular canines	5.71	6.44



**Graph 1:** The mean value of height and width of anterior deciduous teeth of mandible

of this study agree with those of a smaller sample reported by Show *et al.*<sup>[12]</sup> that the central incisors were larger than the lateral incisors mandibular arch in primary dentitions. The mandibular incisors showed less variability in size than the mandibular canines. The greatest variability was seen in the mean height and width of the mandibular lateral incisors and mandibular canines. The mandibular lateral incisors showed that the least variability of all the mandibular anterior teeth as is evident in Table 1.

It is imperative to emphasize the mean width of the mandibular canine and incisor teeth to the mean height of the mandibular canine and incisor teeth, pedodontic therapy for spacing limitations and maintaining the alignment of purpose makes this relationship a matter of prime concern if one is to avoid malocclusion during eruptions of permanent mandibular teeth.<sup>[13,14]</sup>

The importance of tooth measurement and its application in diagnosis and clinical dentistry has been well emphasized in the past. Some of the more common types of malocclusion are basically due to discrepancy between inadequate spacing and size of the dental arches.<sup>[15]</sup> This discrepancy may be reflected clinically as impaction or crowding of the teeth if a combination of inadequate spacing for permanent tooth to erupt and a short dental arch length exists.<sup>[16]</sup> On the other hand, it may result in spacing and diastema between the teeth if the arch length is more and spacing is less.<sup>[17]</sup> In either case, it is the space problem, which is of great interest to the general dentist, as well as to the pedodontist and orthodontist in diagnosis and treatment planning.<sup>[18,19]</sup> The tooth size ratio also contributes a great deal to balanced occlusion, facial harmony, and esthetics even though in pediatric patients.<sup>[20,21]</sup>

## CONCLUSION

This study highlighted mean value height and mesiodistal width of mandibular central incisors, mandibular lateral incisor, and mandibular canines in primary dentitions. This value is documented to ease the crown size selection during a particular treatment procedure.<sup>[22-24]</sup>

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