

Gender Dependence In Mouth Opening Dimensions In Normal Adult Malaysians Population

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Abstract

While measurement of mouth opening is an important clinical examination in diagnosis and management of oral disease, data on non-Western populations are limited. This study was therefore conducted to determine the range of mouth opening in normal Malaysian male and female adults. A total of 34 dental students of Universiti Sains Malaysia (USM) were chosen randomly and their maximum mouth opening was measured after being asked to open their mouth sufficiently to accommodate three fingers. Measurement was performed from the edge of the upper incisor to the lower incisor using a caliper divider. The difference of median values between male (47.6 mm) and female (40.8 mm) were significant respectively, ($p < 0.05$). Thus the width of mouth opening in Malaysian student population is gender dependent although further study with a larger sample size and with other ethnic groups should be carried out, focusing on age.

Keywords: Mouth opening, dentistry.

Introduction

Mouth opening size is an important clinical parameter impacting on the diagnosis and management of oral diseases. Limited mouth opening can be associated with temporomandibular joint (TMJ) dysfunction syndrome, trauma, neuromuscular disorders, odontogenic infection, congenital and developmental anomalies and advanced oral malignancy^{1,2}. The range and mean of mouth opening of normal subjects have been studied previously by many researchers in different parts of the world³⁻⁵, but findings have varied greatly and data for Malay populations have not been published.

One approach to measure normal mouth opening is to ask subjects to open the mouths to

accommodate the width of three fingers. Peterson suggested that the range of mouth opening is 35 to 50 mm in adults⁶. Celic suggested that for measuring of mouth opening, millimeter ruler is sufficient as there were no scientific data which suggest that electronic jaw tracking system are better⁷.

The purpose of this study was to establish a normal range and mean of mouth opening and to compare the maximum mouth opening between adult males and females.

Materials and Methods

The study was cross sectional survey covering 34 USM Malay dental at the Dental Clinic of USM, Kubang

Kerian, Kelantan, Malaysia. The exclusion criteria for this study were no history of current infection, trauma or tumor and presence of an obvious congenital facial abnormality. In addition, subjects must be able to open their mouth to accommodate their three fingers. The subjects with missing both central incisors in either maxilla or mandible were excluded.

The sample size necessary for attainment of statistical significance at whatever level was calculated using the following formula:

$$N = (Z^2 * \sigma^2) / \Delta^2 \dots\dots\dots[1]$$

with N=sample size; σ = SD of mouth opening; Δ = precision; Z value = 1.96 for 95% CI.

In this study, σ value was 6.1 based on Agerberg study in 1974³. PS software was used to calculate the sample size based on comparisons of 2 means⁸. For this study, 17 subjects of males and 17 subjects of females were involved to detect the difference of 6 mm (maximum mandibular opening) with 80% power and $\alpha= 0.05$.

Subjects signed the informed consent before data collection. A spring divider was placed between the midpoint of the incisal edge of the maxillary central incisor and the incisal edge of the opposing mandibular incisor. After that, the opening of the spring divider will be measured with caliper. The data were analyzed using Mann Whitney test.

Results and Discussion

The results of mouth opening measurement in male and female subjects are illustrated in Figure 1 and 2, respectively. The non-parametric test was chosen because the sample size in each group was less than 30 and the data were not normally distributed. Statistical analysis revealed that the mean of mouth opening for the sample population was 45.64 ± 5.38 mm regardless gender. Table 1 shows the range of mouth opening for both gender (35.6 – 56.3 mm).

From the study regarding healthy adults in Nepal, the highest mouth opening was recorded at

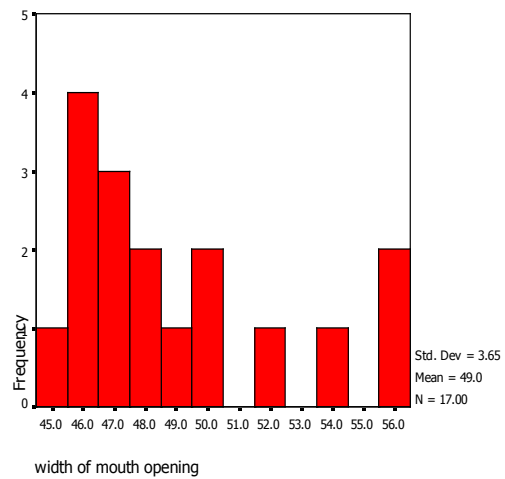


Figure 1. Histogram of Male's Mouth Opening Width.

Table 1. Comparing numerical variables between gender groups

Variable	Male (n=17) Median(IQR)	Female (n=17) Median(IQR)	Male (n=17) Range (Min-Max)	Female (n=17) Range (Min-Max)	Z Statistic	P value
Width of mouth Opening (mm)	47.60(5.00)	40.80(8.85)	11.30 (45.00-56.30)	14.70 (35.60-50.30)	-3.360	0.001

Mann-Whitney test for Z statistic and P value

younger age (18-30 year old) both in male (56.6mm) and female (51.0mm). Meanwhile the lowest mouth opening was found to be 47 mm in male aged 51-60 years old and 44.5 mm in female aged 61-70 years old. Thus the normal range of mouth opening for healthy adults in Nepal was 33.7-60.4 mm; 26.7 mm higher than the one found in this study. Overall the mean of mouth opening found in this study is less compared to Nepal population, which was 47.1 ± 6.7 mm³. This may be due to the age of the subject ranged from 15 to 70 year old male and female.

Zafar and Ummer found that the mean and range of mouth opening for male was 51.97mm (36.38 to 61.23mm) and for female was 47.86mm (35.84 to 59.76mm)⁵. From Cox and Walker's study, the mean opening recorded in male was 51mm and range was 34-61mm while the mean opening for female was 49.0mm and range was 38.0-64.5mm³. They concluded that the mean opening for the male and female did not differ significantly. However, from our study, the median of mouth opening recorded in male was 47.60mm (IQR=5.00) and range was 45.00-56.30mm while for female median was 40.80mm (IQR=8.85) and range was 35.60-50.30mm. The median mouth opening of male is significantly larger than female ($p < 0.05$). This shown that the mouth opening is associated with the gender.

The study by Gallagher and colleagues report the mean of maximum mouth opening for a representative sample of the Irish population (Age 25-34) to be 44.6 and 41.2 mm for males and females, respectively¹. The figure is nearer to our female sample (42.3mm) and less compare to our male sample (49mm). For the range mouth opening the Irish population (Age 25-34) have bigger range for both gender.

This study used 34 normal adults (USM dental student) of age group 19 to 29 years old as subjects. If compare to the study done by other research it is significantly less and does not covered all the age group. Besides, this research only covers one ethnic group, namely the Malay out of the multiracial groups in Malaysia. It is recommended to repeat this study to other ethnics group for comparison. More sample size needed for future project for more significance result.

In conclusion, the range of mouth opening for Malaysian population was 35.6 – 56.3mm. The

median of mouth opening for male is 47.6mm and median of mouth opening for female is 40.8mm. The median mouth opening of the male is significantly larger than female ($p < 0.05$). The mouth opening is associated with the gender. However, further study with a larger sample size should be done in future to look for the correlation of the mouth opening with the age, gender and racial.

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