Factors affecting Maximum Mouth Opening In an Ethnically-Heterogeneous population: What is the new normal?

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Introduction

- Trismus has been known to reduce masticatory efficiency, oral hygiene, and cohesive bolus formation especially in the head and neck population.1
- A maximal mouth opening (MMO) of < 35 mm is used in the diagnosis of trismus regardless of age, height, weight gender or ethnicity. MMO is defined as the intercomissural distance.2
- Given the relative importance of MMO to masticatory function, the demographic variation of MMO in an ethnically-diverse population remains unstudied.3
- Other studies have suggested the ability to place 3-4 fingers vertically between the frontal incisors (MMOfingers) as a subjective measurement of MMO. We sought to investigate this in our healthy, ethnically-diverse population of 330 participants.

Objective

- Aim 1: To determine the relationship between the demographic factors of age, gender, height and weight and maximum mouth opening in an ethnically-heterogeneous population of 330 participants.
- Aim 2: To report normative values of average maximum mouth opening as a function of Body Mass Index (BMI).

Participants

330 participants (171 males, 159 females, Range: 18 - 86 years; Mean ± SD: 42.13 ± 18.53 years) completed the study.

Exclusionary criteria

- A history of any surgery that would impact jaw range of motion
- A disorder of the temporomandibular joint
- A history of head and neck cancer

Exclusionary criteria

Methods

- Three TheraBite measurement (MMO)
- MMOfingers
- Weight obtained
- Four raters took these measurements

Statistical Analysis

A multiple backward step-wise regression model was used to determine the relationship between the demographic variables (age, gender, height, and weight) and MMO.

Relationship between demographic factors and MMO

- Age, weight and height are significant predictors of MMO (Table 1).
- These factors account for 20% of the variation in MMO.

<table>
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<th>Beta Coefficient</th>
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<th>p value</th>
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<td>.001*</td>
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<td>.010</td>
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<td>.001*</td>
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<tr>
<td>Age</td>
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<td>.020</td>
<td>-3.237</td>
<td>.001*</td>
</tr>
</tbody>
</table>

*All predictors are significant at p < .01.

Table 1: The statistical results of the final regression model. (Independent variable: MMO)

Normative values of average MMO as a function of BMI

As height and weight were significant predictors of MMO, we reported our normative for average MMO as function of the composite score of height and weight – Body Mass Index.

Results

- MMO decreased with increasing age. This may be due to sarcopenia or age – related muscle atrophy in the lateral pterygoid muscle.2,3
- MMO increased with increasing weight. Other studies in ethnically homogenous populations have reported a potential association between MMO and weight.4,5
- MMO increased with increasing height. Longer mandibular length has been associated with both increased MMO and increasing height and may contribute to this association.4,7,8
- MMOfingers: Given that 95% of participants in our study successfully place 3 fingers in their mouth irrespective of their age, weight and height, this measure has potential in identifying normal maximum mouth opening in the absence of objective measurement tools.

Conclusions

- In the present study, we found that demographic factors such as age, height and weight were significant predictors of average Maximum Mouth Opening in an ethnically-diverse American population of 330 adults.
- Future research can identify if MMOfingers is sensitive in the diagnosis of trismus.

Discussion

References


MMOfingers (Maximum Mouth Openings for Fingers)

Nearly 95% of the participants in our study successfully placed 3 or more fingers in their mouth.

Fig 1:

Fig 2: Pie chart of MMOfingers results