DETERMINATION OF JARABAK RATIO IN KUANTAN MALAY POPULATION: A PILOT STUDY

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INTRODUCTION

Lateral cephalometric radiograph (LCR) is useful in the assessment of hard and soft tissue relationship in anteroposterior and vertical dimension.[1] Jarabak ratio is a linear skeletal variable that calculates the ratio between posterior and anterior facial height in vertical assessment.[2]

OBJECTIVE

❖ 1) To determine the means of Jarabak ratio among skeletal Class I, II and III of Malay ethnics in Kuantan city of Pahang state, Malaysia.
❖ 2) To evaluate gender differences of Jarabak ratio among the different skeletal classes.

MATERIALS AND METHODS

➤ Retrospective study
➤ 180 pre-existing LCR
➤ October 2017 to October 2021
➤ Two private dental clinics in Kuantan city
➤ Skeletal Class I (ANB 1-5), II (ANB >5), III (ANB <1)[1]
➤ 90 males and 90 females
➤ Pure Malay ethnic group aged 20 to 40 years

➤ Ethical approval – IREC 2021-324
➤ The LCR were hand traced in a darkened room using:

| 0.3mm leaded propelling pencil | Acetate paper | Metal ruler | Light view box |

➤ The anatomic landmarks and measurements were calibrated with an experienced orthodontist.
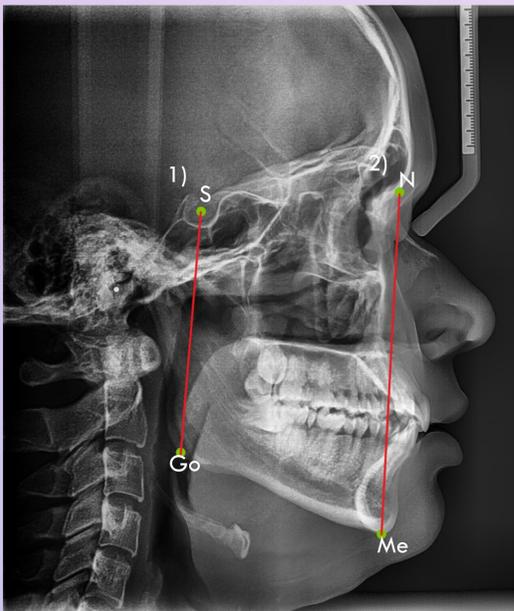➤ The variables measured were shown in Figure 1 and Table 1:

Figure 1. skeletal landmarks and measurement for Jarabak ratio

No	Variables	Indication
1)	Distance between Sella to Gonion (S-Go)	Posterior facial height
2)	Distance between Nasion to Menton (N-Me)	Anterior facial height

Table 1 . Skeletal variables and measurements for Jarabak ratio

$$\frac{\text{Posterior facial height}}{\text{Anterior facial height}} \times 100\%$$

Jarabak ratio formula

➤ The tracings of 18 LCRs were repeated two weeks apart to test for intra-examiner reliability using intraclass correlation coefficient (ICC).

➤ Independent t-test was applied to compare the differences among the genders.

RESULTS

Skeletal Class	Gender	Mean (Standard Deviation)	p value
I	Male	67.48 (4.62)	0.003
	Female	64.03 (4.01)	
II	Male	65.39 (5.61)	0.004
	Female	61.6 (4.11)	
III	Male	67.07 (5.83)	0.006
	Female	63.11 (4.97)	

Table 2 . Mean and standard deviation of Jarabak ratio

❖ The ICC score for the Jarabak ratio was 0.99 with $p < 0.001$, indicating a high degree of reliability.
❖ The mean and standard deviation of the Jarabak ratio for each skeletal class were stated in Table 2.

DISCUSSION

❖ It is well established that different ethnic groups have different facial patterns and characteristics.[3]
❖ For all skeletal classes of the Malay males, the mean Jarabak ratio is > 65% indicative of forward (horizontal) growth rotation.
❖ The Class II females showed a mean ratio of < 62%, indicative of backward (vertical) growth rotation.. However, for both Class I and III, the ratio for female Malays were within the normal range.
❖ The mean Jarabak ratio were significantly different between males and females for all skeletal classes (p < 0.05) supporting previous studies that sexual dichotomy is evident in facial dimensions.[2,3]

LIMITATIONS

• Retrospective study ➡ Good quality LCR
• Cephalometric errors ➡ Calibration and ICC
• Kuantan city only

CONCLUSION

In the Kuantan Malay population, the males showed forward mandibular growth rotation for all skeletal classes, whilst Class II females showed backward growth rotation. There were significant differences in the mean Jarabak ratio between gender for all skeletal classes. These findings can be used as a guide in diagnosis and treatment planning of orthodontic patients, especially for extraction decisions, anchorage planning and retention period.

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