

Measurements of nasal height and breadth on PMCT images of Malaysian Malays, Chinese and Indians

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Malay



Chinese



Indian

INTRODUCTION

- Ancestry affinity in forensic anthropology has focused rigidly only on the tripartite system of Caucasian (*White*), African (*Black*) and Mongoloid (*Asian*) cranial traits.
- Most of the methods were elaborated on non-metric traits using skeletal repositories of Western populations.
- Anthropologists have also noted variation in nasal index among different groups of people. However, baseline data for a Malaysian population are not readily available.

AIM



- To measure nasal height and nasal breadth from post-mortem computed tomographic (PMCT) images of Malaysian individuals to investigate intra- and inter-population variations.

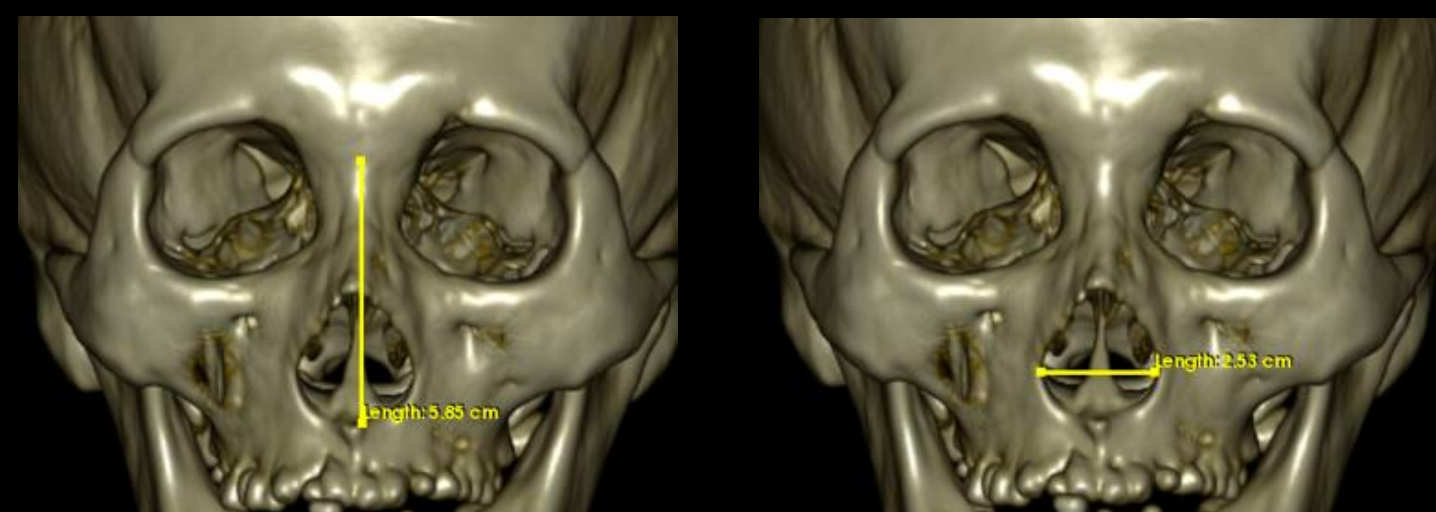
MATERIALS & METHODS

- A total of 300 anonymised skull scans of 1.0 mm slice thickness except for sex, age and ethnicity parameters were obtained from the National Institute of Forensic Medicine, Hospital Kuala Lumpur.
- The sample comprised of equal distribution according to sex (150 male; 150 female) and ethnic groups (100 Malay, 100 Chinese and 100 Indian).
- The age range for the male sample was 18 to 83 (mean: 47.27) years, and for the female sample, it was 19 to 92 (mean: 49.69) years.



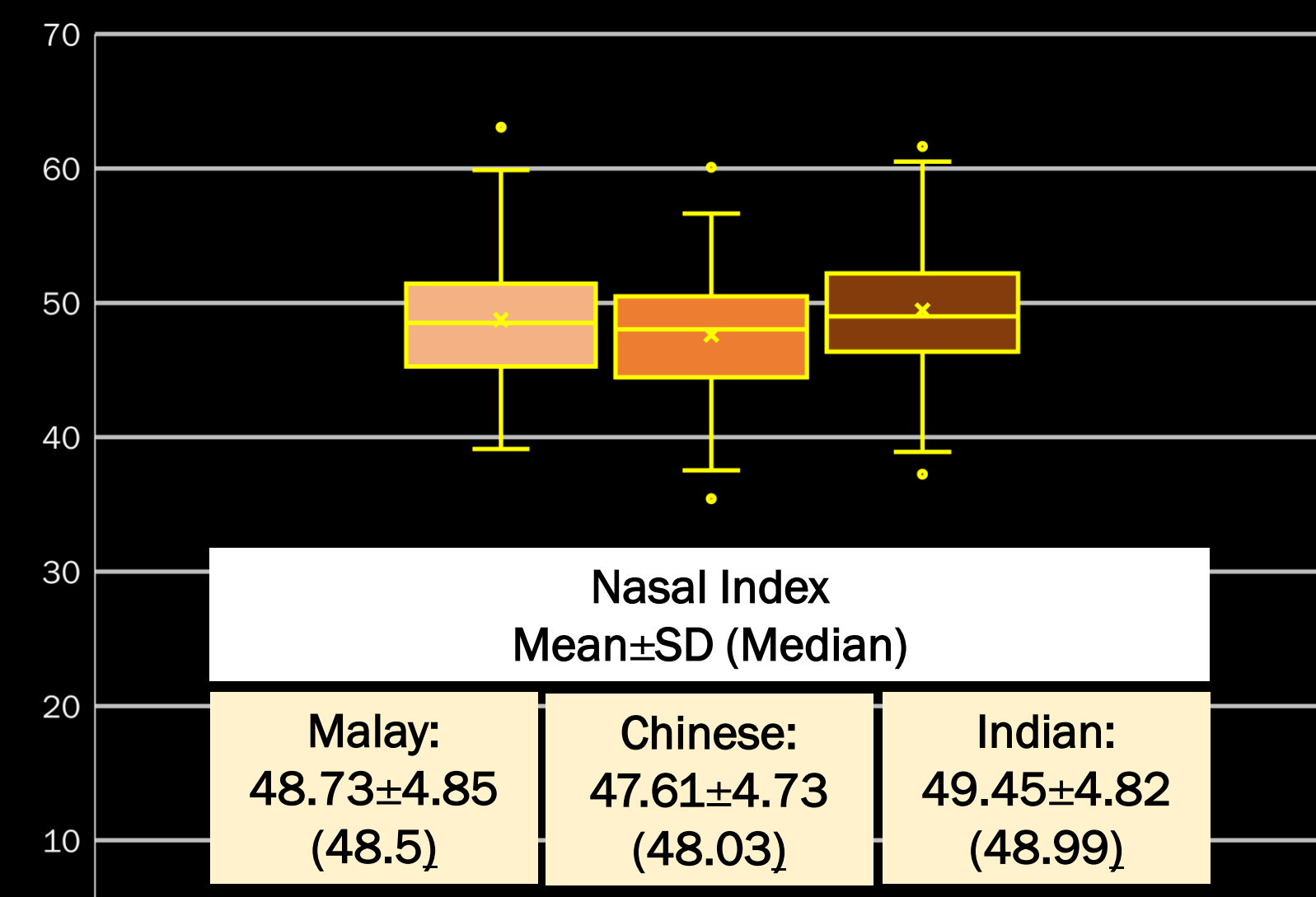
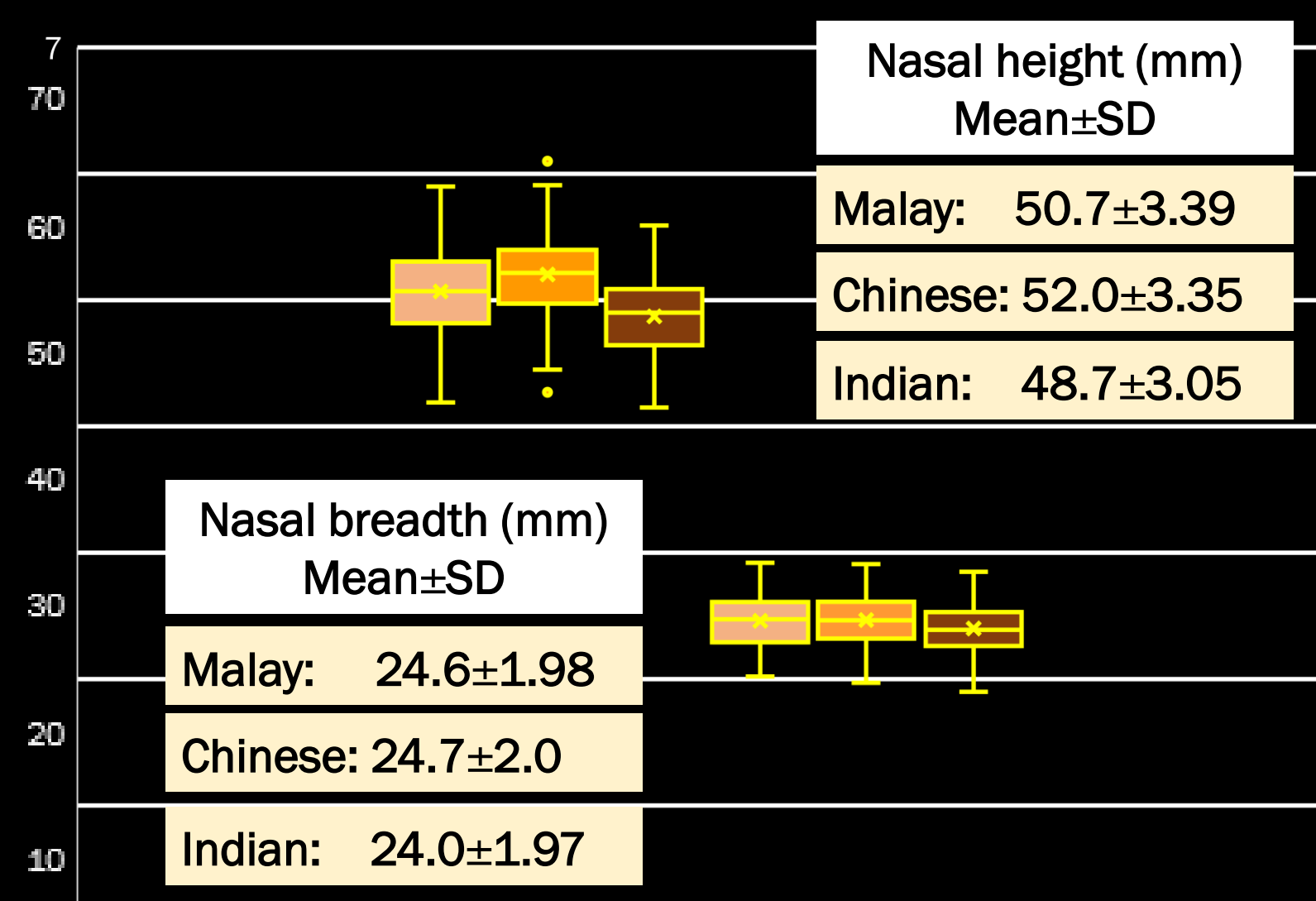
- The scans were reconstructed and visualised using *Horos* via volume rendering mode.

- Measurements were taken using the measuring tool.



- The nasal height is measured from nasion to the lowest point on the border of nasal aperture¹.
- The nasal breadth is the maximum breadth of the nasal aperture¹.
- The nasal index was calculated using the equation $([\text{Nasal breadth} / \text{Nasal height}] \times 100)$.
- Precision test: Four CT images were selected. The nasal height and nasal breadth were measured on four separate occasions, with one-day gap between each re-assessment.

MAIN FINDINGS



Dimension (mm)	Malaysians	Filipinos ²	Japanese ³	Thais ³	Thais ⁴
Nasal height	M: 51.76±1.18 F: 49.19±0.99	-	52.2±5.63	55.1±3.98	M: 52.1±3.47 F: 48.2±2.57
Nasal breadth	M: 24.99±3.5 F: 23.87±3.9	M: 26.7±1.89 F: 26.0±1.63	24.9±1.85	26.2±1.99	M: 27.5±1.84 F: 27.0±1.88

- Measurements were highly precise: TEM <1.0; rTEM <5%; R>0.75.
- Measurements were significantly greater in males when compared to females (p<0.001).
- Nasal dimensions and indices of the Malaysian sample are widely similar and of moderate size (*mesorrhine*); they accord to other Asian populations which suggest the predicted population similarities in terms of genetics and geographic locations.
- This study illustrates the potential contribution of the baseline measurements in forensic practice and provides valuable data regarding ancestry affinity within Asian populations.

REFERENCES

1. Langley NR, Jantz LM, Ousley SD, Jantz RL, Milner G. 2016. Data Collection Procedure for Forensic Skeletal Material 2.0. The University of Tennessee, Knoxville, Tennessee USA.
2. Go MC, Jones AR, Algee-Hewitt BFB, Dudzik B, Hughes CE. 2019. Classification Trends among Contemporary Filipino Crania Using Fordisc 3.1. *Forensic Anthropology*; 2(4): 1-11. doi: 10.5744/fa.2019.1005
3. Kongkasuriyachai NP, Prasitwattanaseree S, Case T, Mahakkanukrauh P. 2020. Craniometric estimation of ancestry in Thai and Japanese individuals. *Australian Journal of Forensic Sciences*, doi: 10.1080/00450618.2020.1789219
4. Techataweewan N, Hefner JT, Freas L, Surachotmongkorn N, Benchawhattananon R, Tyles N. 2021. Metric sexual dimorphism of the skull in Thailand. *Forensic Science International: Reports*, 4(100236):1-12.

