

The Anatomical Study of the Nasal Septum in North-East Thai Cadavers

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Background and objective: The nasal septum is composed of the perpendicular plate of ethmoid (PPE), the vomer (VB) and the septal cartilage (SC). The variations of nasal septum cadavers have been shown with differences among populations and they are important in clinical assessments of individual nasal surgery. These variant septums have not been documented in Thai populations. This study attempted to investigate the total and particular nasal septum area and the correlation among septum components in the North –East Thai cadaver specimens.

Methods: The fifty-four nasal septums of North-East Thai cadavers (35 males and 19 females) were carefully dissected, photographed and then measured the areas by using a reference ruler for calibration by Image-Pro Plus 2.0 software (Media Cybernetics, Silver Spring, USA) for the area analyses.

Results: The results showed that the total area of Thai nasal septum was $2,180.02 \pm 351.45 \text{ mm}^2$. Interestingly,

the areas of total nasal septum and of individual nasal septum components (PPE, VB, and SC) in males were significantly higher than those of females ($p < 0.05$). In males, the nasal septum area was $2,252.74 \pm 299.93 \text{ mm}^2$ whereas $2,046.08 \pm 409.80 \text{ mm}^2$ was of females. Individually the areas of PPE, VB, and SC of males were $842.42 \pm 119.44 \text{ mm}^2$, $576.93 \pm 119.82 \text{ mm}^2$, and $569.14 \pm 116.78 \text{ mm}^2$, respectively. In contrast to males, the areas of PPE, VB, and SC of females were $729.65 \pm 161.27 \text{ mm}^2$, $550.37 \pm 144.79 \text{ mm}^2$, and $500.16 \pm 136.63 \text{ mm}^2$, respectively.

Conclusion: The present study found that the nasal septum areas (both total and individual) of males were significantly larger than those of females. These results could be used as basic information in considerations of nasal septum surgery in The North-East Thai populations.

Key words: nasal septum; cadavers; perpendicular plate of ethmoid bone; vomer bone; septal cartilage

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Introduction

The nasal septum is built from the specific bones and a cartilage. These are perpendicular plate of ethmoid (PPE), vomer bone (VB) and the septal cartilage (SC)¹. The septum is an important structure that supports facial skeleton structure. In clinical significance, the septum area and its morphology are first considered before

performing of septoplasty, rhinoplasty, or facial reconstruction²⁻⁴. Many studies have been carried out on the development of the nasal septum in embryos⁴. In adults, it has been demonstrated the differences in the structural changes of nasal septum among individuals and populations^{4, 3}. In Thai population, the informations of nasal septum structure are still limited. Therefore, this study



aimed to investigate the relationships of total and individual nasal septum areas in both sexes of North-East Thai cadavers.

Methods

The fifty-four nasal septums of North-East Thai cadavers (35 males and 19 females), who donated the healthy bodies for anatomy department, faculty of medicine, Khon Kaen university were selected and gentle dissected to clearly demonstrate the medial nasal septum. The areas of total and each component of the nasal septum were photographed and measured as the median sagittal image using a reference ruler for calibration by Image-Pro Plus 2.0 software (Media Cybernetics, Silver Spring, USA) for the area analyses (Fig.1). The raw data were stored into a computer database and analyzed by using the SPSS for Windows (version 12.0; SPSS, Chicago, IL). The unpaired *t*-test was used to analyze the significant differences of sexes and the paired *t*-test was used to analyze the differences among areas of each component. In all analyses, *p* < 0.05 were considered to indicate statistic significance.

Results

This study showed that the average age of the nasal septum analyzed Thai cadavers was 66 years (ranged from 23 to 97 years); there are 67.85 ± 16.12 years in males and 64.31 ± 16.31 years in females. In addition, the total area of the nasal septum in both sexes was $2,180.02 \pm 351.45 \text{ mm}^2$ (Table 1). Interestingly the areas of total nasal septum and of each nasal septum components (PPE, VB, and SC (in males are significantly higher than those of females (*p* < 0.05). In males, the nasal septum area was $2,252.74 \pm 299.93 \text{ mm}^2$ whereas $2,046.08 \pm 409.80 \text{ mm}^2$ was of females. Individually the areas of PPE, VB, and SC of males were $842.42 \pm 119.44 \text{ mm}^2$, $576.93 \pm 119.82 \text{ mm}^2$, and $569.14 \pm 116.78 \text{ mm}^2$, respectively (Table 1).

In contrast to males, the areas of PPE, VB, and SC of females were $729.65 \pm 161.27 \text{ mm}^2$, $550.37 \pm 144.79 \text{ mm}^2$, and $500.16 \pm 136.63 \text{ mm}^2$ (Table 1). Significantly, the areas of total nasal septum and three nasal components of the total nasal septum in males were higher than those of females as shown in the Table 1. These results agreed with previous works^{3,4} that septum

Table 1 Comparison of the areas of each component of the nasal septum

Sexes	PPE (mm^2)	Vomer (mm^2)	Septal cartilage (mm^2)	Total nasal septum(mm^2)
Man	842.42 ± 119.44^a	576.93 ± 119.82	569.14 ± 116.78	$2,252.74 \pm 299.93^a$
	0.37^b	0.26^b	0.24^b	1
Woman	729.65 ± 161.27^a	550.37 ± 144.79	500.16 ± 136.63	$2,046.08 \pm 409.80^a$
	0.37^b	0.27^b	0.24^b	1
Average	802.74 ± 144.70	567.58 ± 128.43	543.48 ± 126.29	$2,180.02 \pm 351.45$
	0.36^b	0.26^b	0.25^b	1

^a Significant between male and female *p*<0.05

^b Ratio to the area of the total septum, PPE, perpendicular plate of ethmoid.

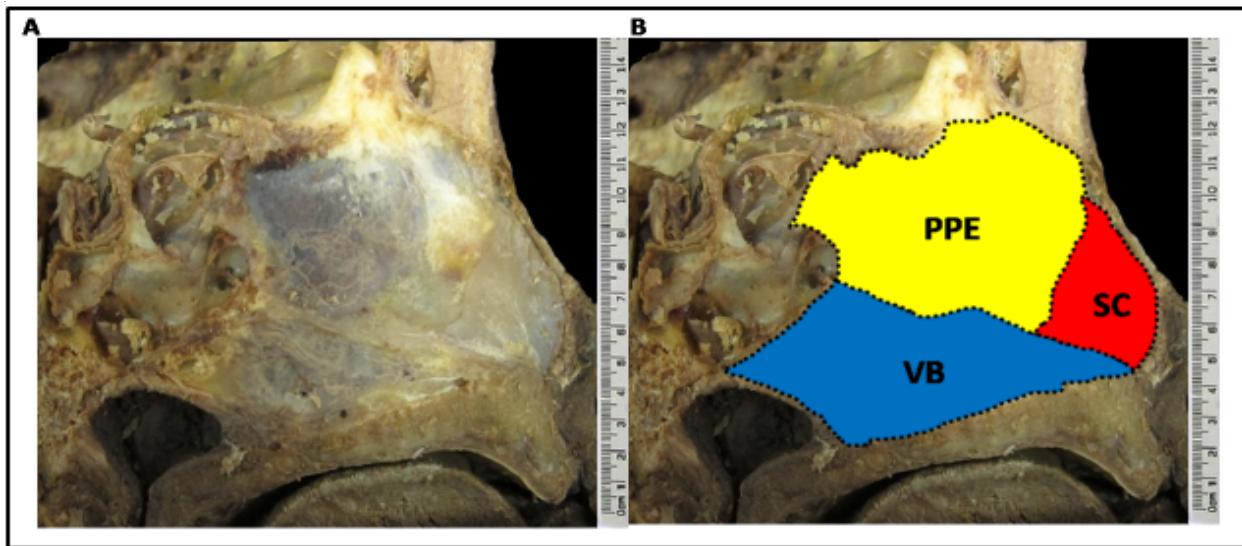


Figure 1 A) Image showing cadaveric nasal septum in medial aspect

B) Illustration of individual nasal septum components

(PPE: perpendicular plate of ethmoid bone, VB: vomer bone, SC: septal cartilage)

area of males is greater than of females. The trend of all results is still comparable to our previous report that analyzed only ten Thai cadaveric specimens⁵.

Conclusion

The present study found that the nasal septum areas (both total and individual) of males were significantly larger than those of females. This information of anatomical nasal variations may extremely valuable for the nasal surgeon to carefully consider before or during the surgery process. To our knowledge, this also provided basic information about the nasal septum morphometry in Thai population for anatomical study.

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