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ANTHROPOLOGICAL STUDY: RHOMBOID FOSSA AND RHOMBOID WITH MAXILLARY NERVE IN EPIPHYSIS PREVALENCE AND FRACTURE CONFIGURATIONS: A SYSTEMATIC REVIEW

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ABSTRACT

The rhomboid fossa of clavicle is used to determine the age and sex in anthropology and forensic sciences. The variant types of rhomboid fossa on inferior surface have been reported in many races except in Thais. This study therefore was aimed at classifying the types of the rhomboid fossa in Northeastern Thais. Additionally, it was found that the percentage of Type 4 was much greater than that of female compared to other types. This incidence of rhomboid fossa types especially Type 4 may be a basic knowledge to be used in sex identification. The high incidence of rhomboid fossa in both sexes of Northeastern Thai clavicles was Type 3.

INTRODUCTION

The skeletal bone remains of unidentified human can be found in many places around the world including Thailand. Skeletal remains are available for forensic identification such as sex, age, stature, and ancestry. They were used for sex estimation such as pelvis, skull, upper and lower limb bones, sternum, patella, foot bones, and clavicles. For clavicle, various parameters including length, mid-shaft circumference, sternal end, acromial end, and rhomboid foss have been used to identify sex dimorphism in anthropology and forensic sciences. In the literatures, the rhomboid fossa of clavicle, an area of the inferior surface of the sterna end, could be present as the impressions, tuberosities, depressions, or fossa. Since the rhomboid fossa is attached by costoclavicular or rhomboid ligament, it is generally called "impression for costoclavicular ligament. In Thai population, the incidence and anthropological study of the clavicular rhomboid fossa have never been reported. Therefore, this study aimed to classify the types and provide the incidence of the rhomboid fossa's types investigated in Northeastern Thai dried clavicles.

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MATERIALS AND METHODS

The 476 identified clavicles from Northeastern Thai skeletons from KKU Osteological Collection Unit, Department of Anatomy, Faculty of Medicine, Khon Kaen University, were used in the study. The ages were ranged from 19 to 100 years. In sample selection, the incomplete clavicles such as fractured and plate-fixation clavicles were excluded. In observations, the inferior surface of the sterna end of individual clavicle was carefully investigated and the presence of types of the rhomboid fossa of clavicular bones was recorded. All results were calculated for the percentage of each type that was observed and further compared between males and females. In the comparison of all data, the significant differences between left and right clavicles were determined by Wilcoxon and Student's *t*-test using SPSS statistics. $P < 0.05$ was set as the level of statistical significance. As for the necessary human ethical clearance, this study was approved from the Office of The Khon Kaen University Ethics Committee for Human Research. Type 1 was smooth type showing no oval line or nodule or tubercle on inferior surface of the clavicular sterna end. Type 2 was flat type showing only oval line and no fossa with small nodules. Type 3 was elevated type showing many rough tubercles. Type 4 was depressed type showing oval fossa under inferior surface of the sterna end of clavicle.

DISCUSSION

The present study has demonstrated the types and incidence of rhomboid fossa of dried clavicles in Thais for the first time. Previous studies have reported only two types of clavicular rhomboid fossa in many populations such as Greeks, Americans, Brazilians, North Karnataka, North Indians, and Greeks. In our observations, the types of rhomboid fossa were similar to that investigated in Indian clavicles which were classified into 4 types. It is possible that the lifestyles of these two populations are similar such as agricultural occupations in rural areas that might affect the rhomboid fossa development. In a radiological study, the high incidence of excavated type rhomboid fossa on the dominant hand has been observed in Greece. This was assumed to support the mechanical force of fossa formation. Similar to the Indians, this high incidence of Type 4 was found approximately in 67%. In contrast to Greece and Indians, Type 4 fossa in Northeastern Thais was approximately 3.78%. It seemed that Type 4 of rhomboid fossa in Greece and Indians is dominant on the right clavicle of males. In contrast to the Greece and Indians, Type 3 of rhomboid fossa was found to be of high incidence in both sexes but not different between right and left sides. Therefore the clavicular fossa formation of Type 3 of Northeastern Thais could still not be explained as mechanism theory like other races. Interestingly, Type 2 and Type 4 observed in this study can be used to identify males or females. Type 2 of males was lesser than that of females by around 1.25-fold. In contrast, Type 4 of males was greater than that of females by around 6.1-fold. However, the percentages of these two types were still limited in validation. Compared to a previous study, we found that Type 3 in Thai race was higher than that of Indian, whereas Type 1 in Indians was greater than Northeastern Thais. It is possible that the different lifestyles of these populations might cause the varying formations of individual rhomboid fossa. Since these clavicles observed in recent study were mostly old and had very wide age distribution, the analysis of age variation was limited. In conclusion, the rhomboid fossa of Northeastern Thais can be classified as 4 types. The high incidence of rhomboid fossa in both sexes is Type 3.

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COMPETING INTERESTS

The authors declare that they have no competing interests.

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