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ANATOMICAL ANALYSIS OF THE COSTOCLAVICULAR LIGAMENT'S ATTACHMENT TO THE DRY HUMAN CLAVICLE

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ABSTRACT

Background: The sternoclavicular region's costoclavicular ligament is important for pectoral girdle movements and strength delivery. The sternoclavicular joint is stabilized by the costoclavicular ligament. This ligament extends from the lower surface of the medial portion of the clavicle shaft to the first costal cartilage and the adjoining portion of the first rib.

Aim: The present study was undertaken for morphological evaluation of rhomboid impression or costoclavicular ligament were observed for the following features: a) Impression: Rhomboid impression present or absent. b) Pattern of impression: Flat and smooth (FS), flat and rough (FR), elevated and rough (ER), depressed and rough (DR) and no impression.

Methodology: The rhomboid impression morphology and the location of the costoclavicular ligament's attachment to the clavicle were studied using bones from our anatomy department. A total of 80 clavicle bones were studied, out of which 40 were of right side and 40 were of left side. The various patterns of the impression were observed.

Results: In the present study a total of 80 dry clavicle bones were studied, out of which 40 were right sided clavicle and 40 were left sided. Table 1 represents the status of rhomboid impression on the clavicle bones. A total of 66 clavicle bones had rhomboid impression, 33 were right sided and 31 were left sided. Rhomboid impression was absent in 14 clavicle bones. Table 2 presents various type of impressions on clavicle bones, Impression was seen in 66 clavicle bones, out of which 17.5% had flat and rough impression, 18.75% had flat and smooth impression, 28.75% had elevated and rough impression, 15% had depressed and rough impression. The most common type of impression found to be elevated and rough.

Conclusion: The rhomboid impressions, most prevalent morphological pattern is raised and rough. A rhomboid fossa is a highly helpful tool for figuring out someone's age who is unknown. This fossa is essential to the decision of what sex to have. Understanding the costoclavicular impression region is useful from a clinical perspective for orthopedic, radiological, forensic, and anthropological perspectives.

Key-words: rhomboid impression, clavicle, costoclavicular ligament, elevated and rough.

INTRODUCTION

The sternoclavicular region's costoclavicular ligament is important for pectoral girdle movements and strength delivery [1,2]. The sternoclavicular joint is stabilized by the costoclavicular ligament [3,4]. This ligament extends from the lower surface of the medial portion of the clavicle shaft to the first costal cartilage and the adjoining

portion of the first rib [5]. This ligament might appear anteroposteriorly as a flattened, inverted, truncated, or cone-shaped structure. Also known as a rhomboid fossa, the remarkable portion of the costoclavicular ligament on the clavicle has an imprint in the shape of a rough impression, tubercle rough oval, or depressed area [6-8]. Craftspeople, painters, and seamen are prone to ligament damage [9-11]. Hyperostotic changes on the medial end of the clavicle may be seen in this ligament [11]. The physical feature that is most useful for estimating age and sex is the rhomboid fossa [12]. Age and sex can be inferred from the remnants of several bones, including the patella, sternum, pelvis, cranium, and bones of an upper and lower limb. However, because clavicle is more dependable for determining sex and is generally resistant to environmental deterioration, it has also been employed for the identification of unknown individuals [13]. An inexperienced viewer may incorrectly identify the common morphological variations of the costoclavicular ligament attachment site on the clavicle as abnormal circumstances [14]. The rhomboid impression serves as a reference point for assessing the degree of clavicle bone excision on the medial side [15]. The present study was undertaken for morphological evaluation of rhomboid impression or costoclavicular ligament were observed for the following features: a) Impression: Rhomboid impression present or absent. b) Pattern of impression: Flat and smooth (FS), flat and rough (FR), elevated and rough (ER), depressed and rough (DR) and no impression.

MATERIALS AND METHODS

The rhomboid impression morphology and the location of the costoclavicular ligament's attachment to the clavicle were studied using bones from our anatomy department. A total of 80 clavicle bones were studied, out of which 40 were of right side and 40 were of left side. The various patterns of the impression were observed. Morphology of rhomboid impression or costoclavicular ligament were observed for the following features: a) Impression: Rhomboid impression present or absent. b) Pattern of impression: Flat and smooth (FS), flat and rough (FR), elevated and rough (ER), depressed and rough (DR) and no impression.

RESULTS

In the present study a total of 80 dry clavicle bones were studied, out of which 40 were right sided clavicle and 40 were left sided.

Table 1: Represents rhomboid impression status on clavicle bones

Rhomboid impression	Total (100)	Right (40)	Left (40)
Present	66	33	31
Absent	14	7	9

Table 2: Represents the type of rhomboid impression on clavicle bones

Type of Impression	Total	Right	Left
Flat and rough	14 (17.5%)	7 (17.5%)	7 (17.5%)
Flat and smooth	15 (18.75%)	8 (20%)	7 (17.5%)
Elevated and rough	23 (28.75%)	12 (30%)	11
Depressed and rough	12 (15%)	6 (15%)	6
No impression	14 (17.5%)	7 (17.5%)	9



Figure 1: Shows various patterns of costoclavicular ligamentous impression (encircled) on clavicle. Elevated & rough (a); Depressed & rough (b); Flat & rough (c); Depressed & smooth (d); Flat & smooth (e); No impression (f).

DISCUSSION

In the present study a total of 80 dry clavicle bones were studied, out of which 40 were right sided clavicle and 40 were left sided. Table 1 represents the status of rhomboid impression on the clavicle bones. A total of 66 clavicle bones had rhomboid impression, 33 were right sided and 31 were left sided. Rhomboid impression was absent in 14 clavicle bones. Table 2 presents various type of impressions on clavicle bones, Impression was seen in 66 clavicle bones, out of which 17.5% had flat and rough impression, 18.75% had flat and smooth impression, 28.75% had elevated and rough impression, 15% had depressed and rough impression. The most common type of impression found to be elevated and rough. A rhomboid impression, or rough oval impression, is typically seen where the costoclavicular ligament attaches. In rare cases, this region may be smooth or even elevated and form a synovial joint with the first rib, according to Williams et al. [8]. The costoclavicular ligament's attachment area can have one of four patterns: elevated and rough, flat and rough, flat and smooth, or depressed and rough. Diagnostic mistakes may result from a lack of understanding of the variations in the costoclavicular ligament's attachment site. A rough and depressed area on the rhomboid fossa may cause chronic osteomyelitis to be mistakenly diagnosed [1]. Cave examined four different costoclavicular ligament impressions: elevated and rough, depressed and rough, flat and smooth, and 31.29, 8.5, and 18%, in that order [1]. Conversely, Paraskevas and colleagues noted in their radiological analysis that the aforementioned morphological patterns are, in order, 58.12, 26.88, and 15% [16]. Flournoy et al. reported different features, including rough impressions, tubercles, and grooves resembling the rhomboid fossa, were seen on the costoclavicular ligament of the clavicle in the North American population. Occasionally, no imprint was found. The most frequent result in Indian-origin clavicles was rhomboid fossa, according to a study done in Lucknow by Anita Rani and her colleagues [17,18].

CONCLUSION

The rhomboid fossa's most prevalent morphological pattern is raised and rough. A rhomboid fossa is a highly helpful tool for figuring out someone's age who is unknown. This fossa is essential to the decision of what sex to have. Understanding the costoclavicular impression region is useful from a clinical perspective for orthopedic, radiological, forensic, and anthropological perspectives.

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