The Egyptian Journal of Anatomy, July 2018; 41(2): 252-257

Original Article	**Incidence of Coracoclavicular Joint in Egyptian Population and its Clinical Significance**

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ABSTRACT

Background: A synovial coracoclavicular joint (CCJ) is a rare finding in human. When present, this anomalous joint is variably reported as a cause of shoulder pain. Up to date, there are no reports on the incidence of the coracoclavicular joint among Egyptians.

Aim: The aim of the present study was to report on the incidence of this joint among adult Egyptian population, and to report on the differences, if any, of the morphometry of the clavicles and scapulae and to clarify whether the occurrence of this CCJ was associated with a shoulder pain or not.

Materials and Methods: This study was conducted on a sample of 100 adult human clavicles and scapulae, chest radiographs of 200 different patients and chest computed tomography (CT) of 80 patients. Variable morphometric measurements were taken from all assessed bones, chest radiographs and CT. Regarding of the positive cases in the chest radiographs and CT, the clinical history was obtained to assess the incidence of symptomatic cases. Statistical analysis was also performed using a level of significance of $p < 0.05$.

Results: CCJ was found in 28 out of the 380 studied samples with an incidence of (7.5 %). No significant sex distribution was found while there was a significant association as regards aging and presence or absence of shoulder pain.

Conclusion: The Egyptian population showed a CCJ incidence of 7.5%, which was comparable to other ethnic groups in world population. The CCJ should be put in mind as a differential diagnosis for unexplained shoulder pain, especially in older patients.

Received: 06 July 2017, **Accepted:** 30 July 2017

Key Words: CCJ, osteological, radiological, shoulder pain.

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The Egyptian Journal of Anatomy, ISSN: 0013-2446, Vol. 41 No. 2

INTRODUCTION

A synovial coracoclavicular joint is a rare finding. It is a diarthrotic synovial joint between the conoid tubercle of the clavicle and the superior surface of the horizontal part of the coracoid process of the scapula ***(Singh et al., 2011)***. When present, this anomalous joint is variably reported as a cause of shoulder pain. Sometimes the diagnosis is missed because of lack of knowledge of the possibility of such finding ***(Kraiem et al., 2016)***.

Coracoclavicular joint (CCJ) was first described at the end of nineteenth century ***(Gruber, 1861)***. From then various studies investigated its prevelence in different populations, some authors raise the possibility that degenerative changes result in the development of such joint ***(Cho & Kang , 1998)***, while others thought that this joint is genetically determined ***Cockshott (1979)***.

There have been no reports up to date on the incidence of the coracoclavicular joint among Egyptians. The aim of the present study was to report on the incidence of this joint in adult Egyptian population, and to report on the differences, if any, of the morphometry of the clavicles and scapulae and to clarify whether the occurrence of such CCJ is associated with a shoulder pain or not.

MATERIALS AND METHODS

This study was conducted on a sample of 100 adult human clavicles and scapulae (52 clavicles and 48 scapulae) collected from the department of anatomy, Faculty of Medecine, Benha University.

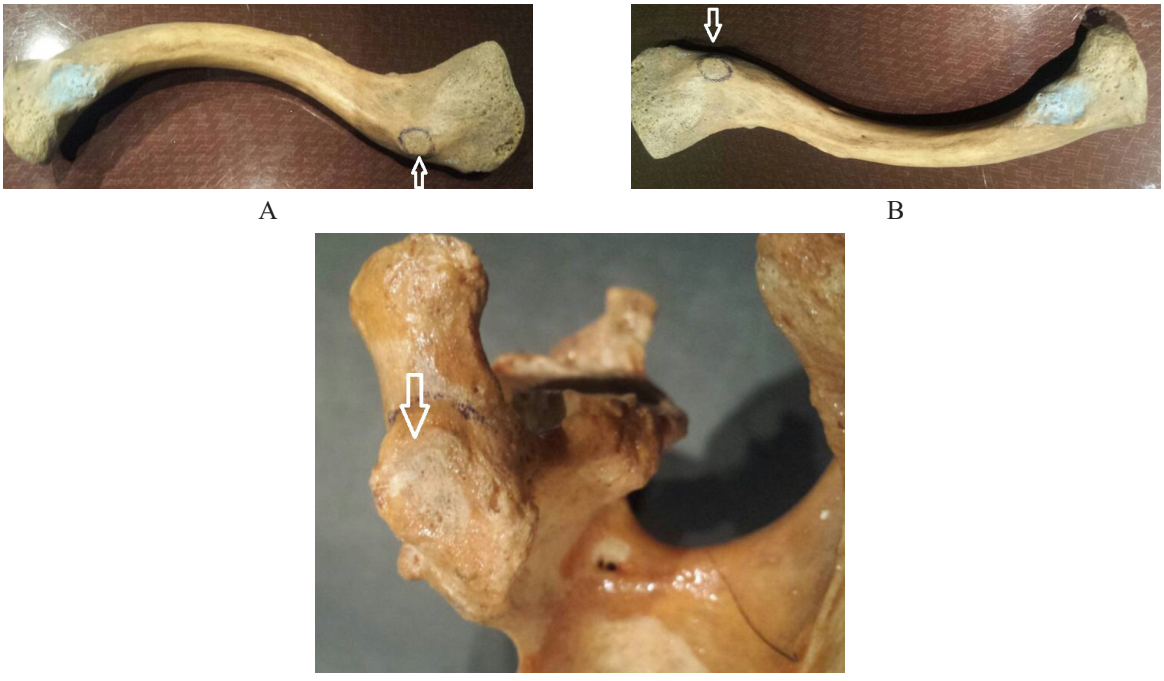
 DOI: 10.21608/EJANA.2021.171455

We assessed also chest radiographs of 200 different patients (136 males & 64 females) and chest computed tomography (CT) of 80 patients (51 males & 29 females) which were obtained sequentially from Al-Fouad radiology scan centre for variable medical indications, with an age ranged from 28 to 74 years. The following measurements were taken on all studied cases: (1) the length of the clavicles; (2) the lengths of the medial, lateral and superior borders of the scapulae. Regarding to CCJ positive cases in the chest radiographs and CT, the clinical history was obtained to assess the incidence of symptomatic cases. Statistical Analysis: The Chi Square test for nominal categorical data and Student's t-test for numerical variables were used to assess the relationship between the examined variables. Statistical analysis was performed using a level of significance of $p < 0.05$.

RESULTS

A coracoclavicular joint articulating facet was noted in 9 cases out of the 100 examined clavicles and scapulae (Figure 1), 16 of chest radiographs (Figure 2) and 3 of chest CT examined in this study (Figure 3), with a total prevalence of (7.4 %). Of the 28 individuals who possessed the joint, 60.7 % (17/28) were males and 39.3 % (11/28) were females. Most of the positive cases (19 out of 28) belonged to the group of age ranging from 48 to 74 years ($p< 0.05$) (Table 1).

Individuals possessing a coracoclavicular joint showed statistically significant longer scapula border lengths (medial, lateral and superior), ($p < 0.05$). No statistically significant differences were found for the clavicle length. However, these were larger in individuals possessing the joint, although this was not statistically significant (Table 2). 7 out of the positive 19 cases were found in the screened chest radiographs and chest CT exhibited unexplained shoulder pain and this variable was found to be statistically significant in the screened patients (Table 1).



A B C

Fig. 1 (A,B &C): views of the clavicles showing articular facets (an arrow) at the conoid tubercle (A&B) as well as scapula showing articular facet (an arrow) at the superior surface of the coracoid process (C).

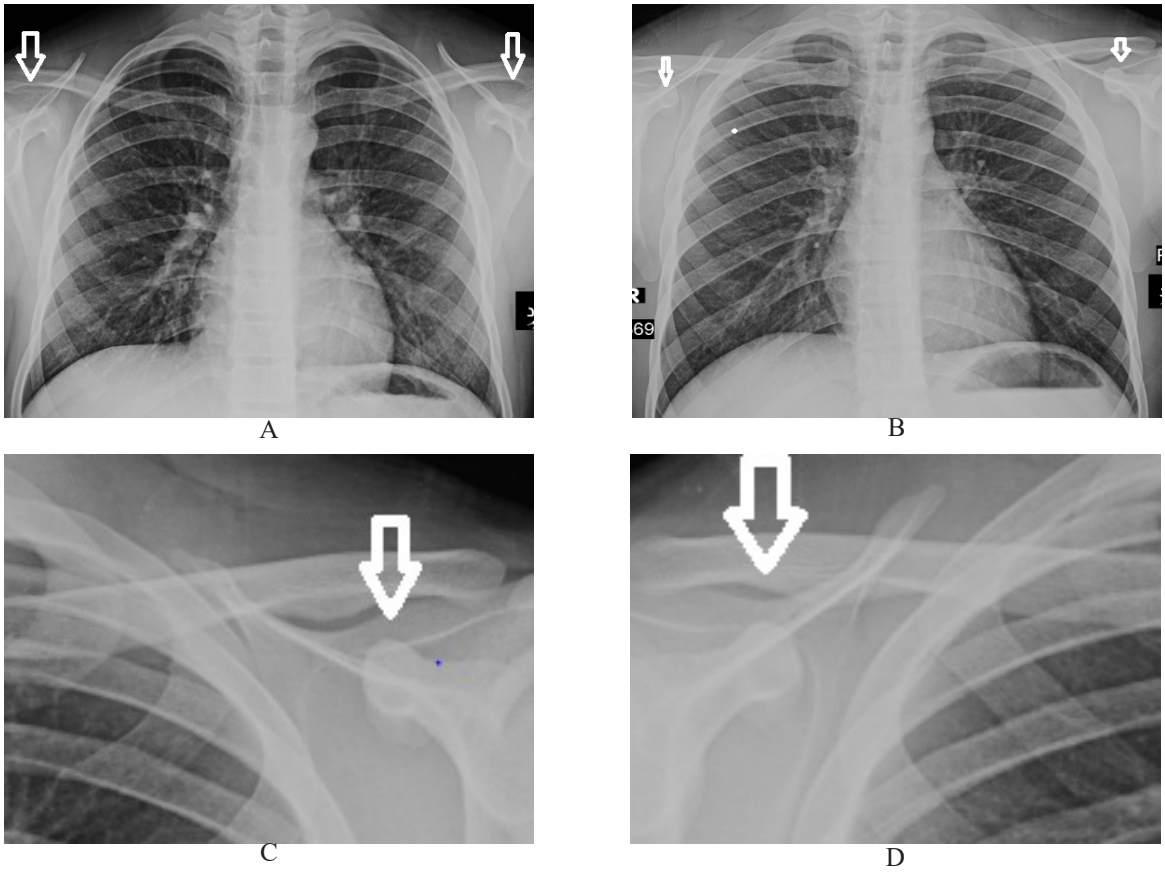


Fig. 2: (A): Normal chest X-ray in one patient did not show the CCJ, **(B)**: chest X-ray showing the CCJ bilaterally, **(C)**: coned view on left CCJ & **(D)**: coned view on right CCJ.

Fig. 3: Chest CT with sagittal reformatting showing coracoclavicular joint.

Table 1: Incidence of CCJ in Egyptian population on basis of sex, age and presence or absence of unexplained shoulder pain and their significance

Individuals possessing the joint		Total study population	incidence
Sex:			
Males	17	243	6.99%
Females	11	137	8%
Total	28	380	7.4%
Significance	$p > 0.05$		
Age range:			
22-48	9	207	4.34%
48-74	19	173	10.9%
Total	28	380	7.4%
Significance	$p > 0.05$		
Presence of unexplained shoulder pain in radiographed patients:			
Yes	7	42	16.7%
No	12	238	5.04%
Total	19	280	7.4%
Significance	$p > 0.05$		

Table 2: Measurements in the studied samples of clavicles and scapulae (represented by mean and standard deviation in cm)

Individuals possessing the joint			Individuals not possessing the joint		
	Mean	SD	Mean	SD	P
Clavicular length	13.65	1.09	13.12	0.98	>0.05
Scapula length					
Medial	14.11	1.23	13.25	0.87	<0.05
Lateral	12.14	0.99	11.08	0.79	<0.05
Superior	7.81	0.87	6.99	0.65	<0.05

DISCUSSION

The coracoclavicular joint (CCJ) is an anomalous joint; it is represented by an articular facet on the conoid tubercle of the clavicle and the superior surface of the coracoid process of the scapula ***(Nalla & Asvat, 1995)***.

The prevalence of CCJ ranged from 0.7% to 10%, according to data derived from osteological studies or dissection, and from 0.6% to 21% in radiological studies ***(Gumina et al., 2002)***. The incidence of this joint in Egyptian population, by osteological and radiological methods, was found to be (7.4%) in this study. This incidence is comparable with the 9.6% incidence obtained by a south African study ***(Nalla & Asvat, 1995)***, the 9.7% incidence reported in the Northwest Indian population ***(Kaur & Jit, 1991)*** and the 9.8% incidence among Japanese population ***(Ray, 1959)***. The joint was said to be more common in Asians than in Europeans or Africans ***(Cockshott, 1979)***. This is contrary to the results observed in the present study.

In the present study, there were no statistically significant difference between both sexes in the incidence of the (CCJ). This was in consistence with the italian study ***(Gumina et al., 2002)*** and that of ***Kaur & Jit (1991)***, while it was non-consistent with study of ***Lewis (1959)*** who found the incidence of the joint to be significantly higher in males than in females (11:1).

Most of the positive CCJ cases found had an age ranged from 48 to 74 years old; this was similar to other studies such as the studies of ***Cho & Kang (1998), Gumina et al (2002) and Kaur & Jit (1991)*** who had correlated the presence of the CCJ with ageing, eliciting a degenerative etiology to the presence of the joint.

Whether the morphometric characteristics of the clavicle and scapula might condition the CCJ development were still a matter of debate. We had studied the possible relationship among CCJ presence, clavicle length and scapular lengths and our results showed that Individuals possessing a coracoclavicular joint showed statistical significantly longer scapular border lengths. No statistically significant differences were found for clavicle length. This agreed with ***Nalla & Asvat (1995)***, who had done an osteological study on 240 skeletons. They observed that individuals possessing CCJ showed larger scapulae, longer first ribs and longer clavicles. They explained this variation by that the coracoclavicular joint might develop in individuals with longer scapulae so as to facilitate movement. These observations were completely neglected by ***Cho & Kang (1998)*** who, in their study of 102 cadavers, stated that occurrence of CCJ was not related to the size of the scapulae, clavicle length or to the slope and heights of some coracoacromial arch elements.

In this study, we found that the presence of the CCJ was significantly associated with an unexplained shoulder pain. Other studies had also documented this association. However, the actual incidence of symptomatic cases was grossly underestimated scince clinical papers available uptill now are limited to case reports ***(Cheung et al., 2006; Nikolaides et al., 2006 & Ma & Pullen, 2006)***.

CONFLICT OF INTERESTS

There are no conflicts of interest

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نسبة تواجد المفصل الترقوي في المصريين وأهميته الإكلينيكية

أسامة فؤاد أحمد

قسم التشريح بكلية الطب – جامعة بنها

ملخص البحث

المقدمة : المفصل القوقعى الترقوى الزلالي هو نادر في الإنسان. عندما يكون موجود، يتم الإبلاغ عن هذا المفصل الشاذة كسبب ألم في الكتف. وحتى الآن، لا توجد تقارير عن حدوث المفاصل القوقعية الترقوية بين المصريين.

الغرض من البحث: كان الهدف من هذه الدراسة هو الإبلاغ عن حدوث هذا المشترك بين السكان المصريين البالغين، معرفه الاختلافات، إن وجدت، مع مقاييس ومورفومتري عظمتى الترقوة ولوح الكتف وتوضيح ما إذا كان وجود هذا المفصل مرتبط بآلام الكتف أم لا.