

Quantitative measurement of humero-acromial, humero-coracoid, and coraco-clavicular intervals for the diagnosis of subacromial and subcoracoid impingement of shoulder joint^{☆,☆☆}

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Abstract

Objective and purpose: The aim of this study was to determine the acromio-humeral, coraco-humeral, and coraco-clavicular distances with magnetic resonance imaging (MRI) in the diagnosis of shoulder impingement syndrome. **Subjects and methods:** All the acromio-humeral, coraco-humeral, and coraco-clavicular intervals of all patients were reviewed retrospectively. A total of 132 shoulders (76 right and 56 left shoulders) with impingement syndrome (40 males and 92 females, with 79 cases surgically confirmed and the remaining 53 cases clinically and radiologically suspected) and 40 control group patients were included. Statistical correlation of this research was assessed by Fisher's Exact *t* test and Pearson chi-square test-correlation coefficients. **Results:** In the correlation of average acromio-humeral, coraco-humeral, and coraco-clavicular intervals (AHI, CHI, and CCI, respectively), there were significant statistical differences between patient and control groups; all the intervals were found to be higher in the control group. A moderate positive relation between average AHI and CHI, between AHI and CCI, and between CCI and CHI has been found. All intervals in the patient group increase or decrease dependently on each other. No proper cut-off values were determined using a receiver operating characteristic curve for all intervals between patient and control groups. **Conclusion:** Acromio-humeral, coraco-humeral, and coraco-clavicular intervals were extremely lower in the shoulder impingement syndrome and had significant importance in the diagnosis of subacromial and subcoracoid impingements.

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1. Introduction

Impingement syndrome is a frequent and well-known cause of chronic anterior shoulder pain and disability in the shoulder; also, it has been considered that reduction of subacromial space and narrowing of subcoracoid recess play an important role in the etiopathogenesis of this syndrome [1–4]. Subacromial impingement, named as internal impingement and also known as posterosuperior impingement, is a condition that is mostly seen at overhead movements of the shoulder joint at external rotation and abduction [1,5]. Subcoracoid impingement, impingement of the lesser tubercle of the humerus against the coracoid process, which is defined as the decreased width of the coracohumeral interval (CHI) and narrowing of the space

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Table 1A
List of patients with measurements humero-acromial, humero-coracoid, and coraco-clavicular

No.	Age	Gender	Right (R)/ left (L)	Humero-acromial				Humero-coracoid	Coraco-clavicular	Surgical correlation
				Lateral	Middle	Medial	Average			
1	59	F	R	7.3	9.5	14.5	10.43	11	9.5	Negative
2	61	M	L	7.5	8.5	9.5	8.5	7	10	Negative
3	65	F	R	7.7	9.1	14.6	10.46	10.7	5.9	Negative
4	60	M	R	7.2	8.5	10	8.56	12.5	12	Negative
5	57	M	R	5.4	4.6	6.4	5.46	14.2	10.2	Negative
6	78	F	R	3.2	2.6	4.1	3.3	8.7	11.7	Negative
7	68	F	R	5.9	4.6	5.5	5.33	14.4	5.8	Negative
8	68	M	L	10.1	10.8	13.6	11.5	13.3	9.8	Negative
9	69	M	R	7.9	9.4	10.4	9.23	14.9	6.6	Negative
10	68	F	L	3.8	4	4.2	4	9	11.7	Negative
11	70	M	R	3.4	2.6	7	4.33	7.1	6	Negative
12	29	M	L	4.2	6	6.6	5.6	11	8.9	Negative
13	77	M	L	5.3	5.5	7.5	6.1	8.9	5.9	Negative
14	71	F	R	5	5.5	8.5	6.33	10.8	5.2	Negative
15	68	F	R	7.6	6.9	8.3	7.6	12.8	8.2	Negative
16	74	F	R	6.3	6.2	8	6.83	12.8	6.7	Negative
17	60	F	R	4.9	7.5	8.8	7.06	6.6	12.6	Negative
18	72	F	R	2.2	2.8	4.2	3.06	15.4	4.2	Negative
19	75	F	R	2.4	4.6	5.8	4.26	13	12.3	Negative
20	56	F	L	2.7	3.7	4.6	3.66	5.4	8.5	Negative
21	57	M	L	6.5	7	8	7.16	10	8.5	Negative
22	71	F	R	5.6	6.8	10.8	7.73	9	9	Negative
23	59	F	R	3.3	4.4	4.7	4.13	8.2	12	Negative
24	57	F	L	5.4	6.8	11.3	7.83	5.5	9.3	Negative
25	74	F	R	2.5	2.9	3.4	2.93	9.3	7.7	Negative
26	77	F	R	7.3	8.6	9.9	8.6	6.3	8.8	Negative
27	67	M	R	4.8	4.9	4.5	4.73	6.4	7.3	Negative
28	78	F	R	3.7	3.7	4.7	4.03	11	8.2	Negative
29	53	F	R	3.6	3.3	3.5	3.46	14.9	12.6	Negative
30	51	M	R	2.5	2	4	2.83	10	3.5	Negative
31	68	M	L	10	6	4	6.66	16	6	Negative
32	45	M	R	7.3	7.8	12.2	9.1	9.2	8.3	Negative
33	58	F	L	6	7	12	8.33	13.5	11	Negative
34	73	F	R	6	8	12	8.66	12	10	Negative
35	82	F	L	2.9	4.3	5.5	4.23	14.2	9	Negative
36	76	F	R	4	4	3	3.66	16	12	Negative
37	79	F	R	1.5	2	2	1.83	12	10	Negative
38	80	F	R	5	7	8	6.66	13	3.5	Negative
39	84	F	R	4	5	8	5.66	20	11	Negative
40	57	F	R	8	9	12	9.66	13	8	Negative
41	63	F	R	3.5	4	5.7	4.4	15	8	Negative
42	58	F	L	7	8	11	8.66	20	6	Negative
43	71	F	R	6.7	6	11.5	8.06	15	9.5	Negative
44	63	F	L	5	5	6	5.33	12	11	Negative
45	63	F	R	3	4	4.5	3.83	12	5.5	Negative
46	68	F	L	0.25	6	12	6.08	1	5.5	Negative
47	59	F	L	8	9	16	11	15	11	Negative
48	76	M	R	4.8	4.4	9.2	6.13	14.5	7.7	Negative
49	55	F	L	9.1	8.3	9.1	8.83	7.8	6.7	Negative
50	60	M	L	5	5	15	8.33	16	17	Negative
51	61	F	L	5	8	12	8.33	9	10	Negative
52	48	M	R	10	11	12	11	18	12	Negative
53	84	F	R	2	4	6	4	20	9	Positive
54	81	F	R	3.6	5.9	6.8	5.43	13.5	8	Positive
55	50	M	R	6	6	10	7.33	14	11	Positive
56	53	F	L	6.3	6.6	7.8	6.9	12	11	Positive
57	61	M	L	4.3	4.7	7.8	5.6	9	7.6	Positive
58	68	M	R	3.2	3.6	5.6	4.13	11	6.6	Positive
59	74	M	L	2.3	2.5	5.5	3.43	12	8.8	Positive
60	58	F	L	8.8	9.2	11.2	9.73	15	13	Positive

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