

JOINT SPACE IN NORMAL GLENO-HUMERAL RADIOGRAPHS

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The gleno-humeral joint space in standard antero-posterior images of 175 normal subjects was measured at three different sites. The average of the three measurements, the integral joint space, was calculated and was found to be between 4 and 5 mm. The value does not change with age, except in women, in whom it increases slightly. A narrow joint space in an elderly patient should not be expected simply because the patient is old. The measuring technique described is useful in population studies. In individual cases a simple measurement with a ruler serves the same purpose.

Key words: degenerative joint disease; joint space; shoulder joint

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The literature concerning the aging of the normal gleno-humeral joint is scanty. Heine (1926), De Palma (1950), Olsson (1953) and Neer (1961) reported increasing frequency of degenerative changes of the gleno-humeral joint with age. The purpose of the present investigation was to describe the joint space in standard antero-posterior projections of the normal adult.

MATERIAL AND METHODS

A total of 175 images were reviewed, 88 of men and 87 of women. There were 10–11 patients in each 10-year age-group between 10 and 90. The radiograms were standard antero-posterior projections of the shoulder with the borders of the gleno-humeral joint clearly outlined. All images had been taken with the patient supine and with the same film focus distance. Images with osteophytes, cysts and subchondral sclerosis were not included. Images from patients with a history of chronic shoulder disability such as rheumatoid arthritis,

rotator cuff disease, peritendinitis calcarea or other forms of painful shoulder distress were excluded. The roentgen examinations therefore included mostly trauma cases with negative findings.

The joint space was measured on images with the arm in zero abduction and outward rotation being one of the standard projections in the department. In this position the projection of the joint surface of the caput humeri forms a half-circle the diameter of which is the line joining the two terminal points of the joint surface projection. The midpoint of this line was determined with a ruler. With the ruler aimed at this point and perpendicular to the joint surface of the head of the humerus, the joint space was measured from three measuring sites at the glenoid cavity, a, b and c (Figure 1), points a and c being the superior and inferior edges of the glenoid surface and point b the midpoint. The joint space at the three sites and the average value, the integral space, were determined.

The coefficient of variation of repeated measurements was 7 per cent.

RESULTS

There was no systematic left-right difference in either sex, therefore the measurements of the two

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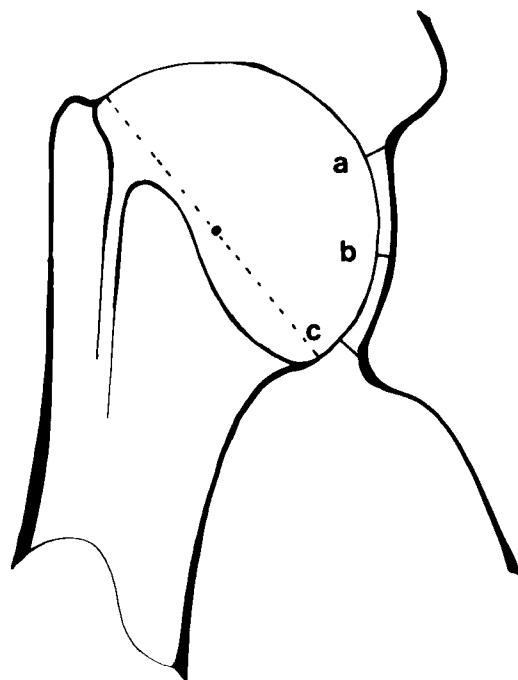


Figure 1. Measuring technique.

sides were pooled. The results of the measurements are presented in Table 1. There was a significantly greater joint space in men in all sites. In men there was no relationship between age and joint space. In women a significant positive correlation was found, the joint space increased somewhat with increasing age.

In Figure 2 the relationship of age, sex and joint space is demonstrated. The scatter of the measurements was fairly uniform in various ages in men. In women there was a slight increase in scatter with increasing age.

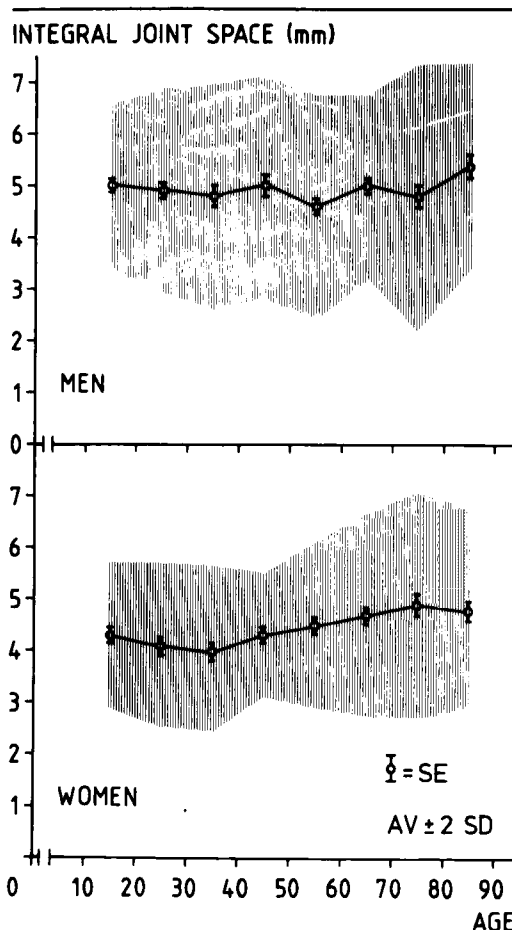


Figure 2. The relationship of age, sex and joint space. There is a significant correlation ($P < 0.001$) between age and joint space in women in sites a, b and integral space, but not in site c, whereas in men there was no such relationship.

DISCUSSION

To our knowledge no other reports have been presented concerning the normal gleno-humeral

Table 1. Gleno-humeral joint space in various measuring sites (average $\pm$ S.D.)

	Position			Integral space
	a	b	c	
Men	5.40 $\pm$ 0.24	4.42 $\pm$ 0.45	5.02 $\pm$ 0.33	4.93 $\pm$ 0.22
Women	4.86 $\pm$ 0.31	3.96 $\pm$ 0.31	4.50 $\pm$ 0.42	4.43 $\pm$ 0.33
Men + Women	5.13 $\pm$ 0.38	4.19 $\pm$ 0.32	4.76 $\pm$ 0.37	4.68 $\pm$ 0.35

joint space at different ages. In view of existing opinion one might have expected a slowly decreasing joint space with age. We found no such tendency. In men there was no relationship between joint space and age and in women there was a significant tendency towards an increasing joint space with age. Also, in women, the scatter of the joint space data increased with age. Our results are in accordance with those of Fredensborg & Nilsson (1978). They studied the joint space in normal hip radiographs and found a tendency of increasing joint space with age in men. Our data suggest that a gleno-humeral joint space of <2 mm is a pathological finding irrespective of the age of the patient. The integral joint space measurement described in this study has the advantage of smoothing irregularities of the joint space and may be valuable in group measurements. For routine daily use a single measurement in one of the described positions

serves just as well. The joint space is narrowest at position b at the centre of the glenoid cavity owing to the diameter of the circle formed by the projection of the humeral head being smaller than that of the circle of the glenoid cavity.

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