GLENOHUMERAL JOINT INSTABILITY IN NORMAL ADOLESCENTS

INCIDENCE AND SIGNIFICANCE

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One hundred and fifty asymptomatic shoulders in 75 schoolchildren were studied. The shoulders were tested for instability and a hyperextensometer was used to assess joint laxity.

Signs of instability were found in 57% of the shoulders in boys and 48% in girls; the commonest sign was a positive posterior drawer test which was found in 63 shoulders. A positive sulcus sign was found in 17 shoulders and 17 subjects had signs of multidirectional instability. General joint laxity was not a feature of subjects whose shoulders had positive instability signs.

It is well known that multidirectional instability is demonstrable in glenohumeral joints which dislocate or sublux. In adolescents, anterior dislocation often follows trivial injury; it is frequently bilateral, equally common in boys and girls and has a high rate of recurrence (Hovelius, Lind and Thorling 1983). These facts suggest that inherent glenohumeral instability or general joint laxity may be significant factors and Dubs and Gschwend (1988) have suggested that anterior dislocation is more common in lax-jointed individuals. However, the relationship between general joint laxity and clinical signs of multidirectional instability has not been demonstrated and is the subject of this present report.

PATIENTS AND METHODS

Seventy-five schoolchildren (150 shoulders) were studied. There were 49 boys (mean age 14.4 years, range 13 years 1 month to 18 years) and 26 girls (mean age 16.6 years, range 15 years 8 months to 17 years 2 months). All the subjects had asymptomatic shoulders and no previous history of instability. Anterior and posterior drawer tests were performed in the supine position as described by Gerber and Ganz (1984), and these tests were repeated

in the sitting position. The displacement of the humeral head in relation to the glenoid was graded from 1 to 3, in a manner similar to that used for Lachman's test of knee instability. Inferior instability was assessed by the sulcus test (Neer and Foster 1980).

General joint laxity was inferred from measurements on the left index finger with a hyperextensometer (Fig. 1) using a standard torque of 2.5 kg/cm (Jobbins, Bird and Wright 1979). The mean of three readings was plotted on a norm curve for European subjects (Dubs and Gschwend 1988); this allowed assessment of joint laxity independently of age and sex. All measurements were made by one observer (ABM).

RESULTS

In the boys, 56 of 98 shoulders (57%) and in the girls 25 of 52 shoulders (48%) had positive signs when tested in the supine position. The most common positive sign was the posterior drawer test (63 shoulders, 48 in boys and 15 in girls); the anterior drawer test was positive in 49 shoulders (37 in boys and 12 in girls) and the sulcus sign was positive in 17 shoulders (11 in boys and six in girls). In eight shoulders (seven boys and one girl) all three signs were positive (Fig. 2). In the sitting position 11 shoulders (10 in boys and one in a girl) had positive signs. Most subjects (30) with positive signs demonstrated them in both shoulders. However, in 13 boys and seven girls instability signs were confined to one shoulder (11 on the right and nine on the left). No relation to dominance was observed.

Using the norm curves for appropriate age and sex, the measurements of joint laxity obtained with the

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hyperextensometer were placed in a percentile system. This allowed the subjects to be allocated into grades of general joint laxity. The histogram shows the percentage of positive instability signs for the anterior drawer, posterior drawer and sulcus tests with each grade of joint laxity (Fig. 3). Unexpectedly we found little correlation between positive signs and the degree of joint laxity.

Although the majority of shoulders (11 boys and six girls) that could be classified as displaying 'multidirec-

tional instability' (namely inferior instability with either positive anterior or positive posterior drawer tests) were above the 50th percentile for general laxity, surprisingly only three of these shoulders were in subjects with marked laxity (above the 90th percentile) (Table I).

DISCUSSION

This study has shown that signs of instability are frequently seen in adolescents with asymptomatic shoulders. Unlike apprehension signs, which are suggestive of pathology, these signs merely assess movement of the humeral head in relation to the glenoid; they form the basis for identifying multidirectional instability (Neer and Foster 1980; Gerber and Ganz 1984).

Fig. 1

Joint laxity being measured by a hyperextensometer.

a) Boys

b) Girls

Fig. 2

Venn diagram showing positive instability signs in boys and girls.

Table I. Relation between multidirectional instability of the shoulder and percentile group for general joint laxity

Percentile for laxity	Number with instability		
	Boys	Girls	Total
25	—	1	1
25 to 50	—	—	—
50 to 75	6	2	8
75 to 90	5	—	5
90+	—	3	3

Fig. 3

Histogram showing percentage of positive instability signs according to percentiles for general joint laxity.

We agree with Gerber and Ganz (1980) that drawer tests performed in the supine position are far more sensitive than the same tests performed in the sitting position, which only detect marked instability of the humeral head. Of the three signs, the posterior test was most commonly positive. Positive anterior and positive posterior drawer tests in isolation were fairly frequent, but a positive sulcus sign was rarely found on its own. Unlike the anterior drawer test, which has been noted to be positive in slight to moderate joint laxity (Gerber and Ganz 1984), several authors emphasise that inferior instability invariably points to complex multidirectional instability (Neer and Foster 1980; Gerber and Ganz 1984).

Contrary to expectations, general joint laxity did not seem to be a major factor in producing signs of instability. The presence, albeit rarely, of multidirectional instability confined to one shoulder supports the concept that general joint laxity cannot be the sole factor responsible for such signs. It may be that other factors, such as capsular redundancy (Uthoff and Piscopo 1985), the

position of the glenoid (Brewer, Wubben and Carrera 1986) or version of the humeral head (Kronberg, Broström and Söderlund 1988) are significant.

In conclusion, signs of instability can frequently be elicited in normal adolescents and even multidirectional instability is not solely due to general joint laxity.

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