GYMNAST WRIST

L. DE SMET[1], A. CLAESSENS[2], G. FABRY[1]

Excessive or repetitive loading of an immature joint can lead to premature closure of the growth plate. In gymnastics this event is known as the gymnast wrist, or the Madelung-like deformity. Six new cases are presented. All had an ulnar-plus variance and an increased sagittal angle of the distal radial epiphysis. Five of them preferred to stop their sports career one was successfully treated with an arthroscopic debridement of the TFCC.

Keywords : wrist ; gymnastics ; growth plate.
Mots-clés : poignet ; gymnastique ; cartilage de croissance.

INTRODUCTION

The wrist is one of the most frequently injured joints. In gymnasts this joint is particularly vulnerable since it is excessively and repetitively loaded. Most participants in gymnastics are young with still active growth plates. The repetitive loading of a non-weight-bearing joint can lead to premature growth arrest of this joint.

Mandelbaum *et al.* (8) found wrist pain in 87.5% of the gymnastic population studied. In the epidemiologic investigation of injuries by Caine *et al.* (4) wrist injuries were responsible for 9.5% of all injuries, and most of them had a gradual onset. The injury rate in gymnasts is rather high : 0.95 injuries per participant per year (15). In the last decade there has been increasing interest in wrist pathology in general and gymnastic wrist problems in particular. The stress reaction in the growth plate of the distal radial epiphysis has been recognized since 1981 by several authors (1, 5, 11, 12, 17). The resulting deformity is very similar to the congenital Madelung's deformity (17, 18).

CASE REPORTS

From January 1991 until March 1992, six cases were seen at the University Hospital of the K.U. Leuven, Pellenberg. All patients were examined by one surgeon (L.D.S.). All were young females, active participants in gymnastics, with training sessions of more than 10 hours per week. All complained of ulnar wrist pain ; none of them had had an accident. The pain was related to the exercises, and forced them to stop their sports activity. With rest, the symptoms decreased, but reappeared as soon as the training was started again. The mobility was unrestricted, but forced prosupination caused pain. The ulnar head was prominent in all cases (fig. 1). Radiographs in the "zero"-position (9) were taken of all patients. The ulnar variance was determined according to the following criteria : (1) : a minus variant indicates an ulna shorter than the radius, a plus variant a longer ulna, ulnar zero variance is an ulna level with the distal radial epiphysis. In the normal population the mean ulnar variance is – 0.9 mm (14). The sagittal angle or radial inclination is represented by the angle between the distal articulation surface of the radius and a line perpendicular to the shaft of the radius : normally it averages 22° (14). The findings of the cases presented are summarized in table I.

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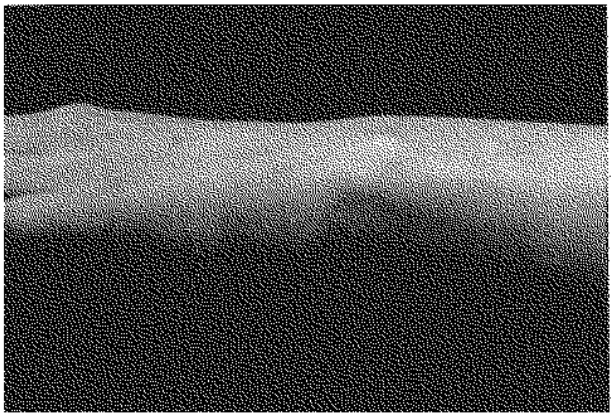

Fig. 1. — Prominence of the ulnar head.

Table I. — Radiographic findings of the reported cases

Case	Age	Involved side	Ulnar variance	Radial inclination
IVDB	19	L	+ 5 mm	38°
VVE	16	L	+ 2 mm	35°
JN	22	L + R	+ 2 mm	30°
MD	23	L + R	+ 2 mm	32°
LP	18	L	+ 4 mm	30°
KD	17	R	+ 4 mm	38°

One patient (case 2) underwent an arthroscopic investigation with debridement of a torn triangulate fibrocartilage complex (TFCC) and could continue her training after 2 months. One gymnast (case 4) had a shortening osteotomy of both radii elsewhere without success ; the four others preferred to stop their gymnastic activity.

DISCUSSION

Although a compression type of injury of the growth plate is still under discussion (10) the premature arrest of longitudinal growth under repetitive compression is a well-known phenomenon (3). The forces transmitted to the upper limb during gymnastics are immense, up to 2.37 times body weight (7). Alterations of the growth plate in gymnasts have been demonstrated by different authors (5, 11, 12, 19), in an acute phase, as well as in a chronic situation. The arrest of the radial growth plate results in a mild form of Madelung-like deformity of the wrist (1, 17), with increased radial inclination of the distal articular surface and an overgrowth of the ulna, even with dorsal dislocation of the ulnar head. The complaints of this deformity are not related to the severity of the deformation. The growth arrest seems to occur at the end of the growth spurt. During this period the growth plates are enlarged and vulnerable.

The UCLA investigation (8) found a significant difference between the ulnar variance in high-level gymnasts compared to control populations.

Fig. 2. — Radiograph of case 1.

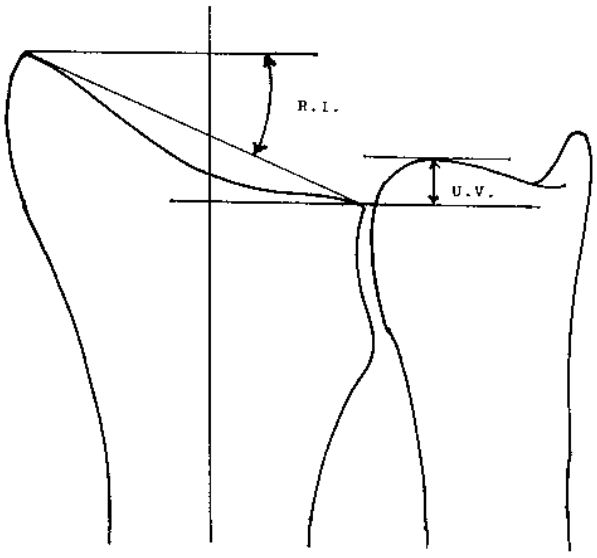

Fig. 3. — Schematic drawing of measurements (see text). UV : ulnar variance ; RI : radial inclination.

Therapeutic modalities are limited, but Mandelbaum *et al.* achieved good results with arthroscopic debridement of TFCC-lesions. Other possibilities such as matched resection of the ulnar head (18), resection-arthroplasty of the distal radioulnar joint (2), shortening of the ulna (6) wafer or complete resections of the distal ulna and a Sauvé-Kapandji procedure (13) can be considered, but we doubt that with the high demands on the wrists in gymnastics these surgical procedures will remain successful. Prevention of the growth deformity by rigorous rest periods is recommended in gymnasts complaining of wrist pain, certainly when radiographic alterations in the growth plate and/or increased scintigraphic uptake become evident. The lack of popularity of this sport in our country, and a critical age of the female competitors made five of the patients' discontinue gymnastics.

CONCLUSION

Gymnast wrist is a special entity to be recognized. The premature arrest of the distal radial growth plate results in a Madelung-like deformity, with ulnar wrist pain. Prevention consists of rest until all symptoms disappear. Until now only arthroscopic treatment of a torn TFCC has given satisfactory results. Mutilating procedures such as Darrach's resection and the Sauvé Kpandji procedure are not indicated for this pathology.

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SAMENVATTING

L. DE SMET, A. CLAESSENS, G. FABRY. Turners pols..

Overmatig en/of herhaalde belasting van een groeischijf kan leiden tot de vervroegde sluiting ervan. Bij turners wordt dit fenomeen erkend als de "gymnast wrist" of de "Madelung-like" afwijking. Zes nieuwe gevallen worden voorgesteld. Ze hadden allen een ulna plus variant en een toename van de sagittale hoek van de radius epiphyse. Bij 5 van hen was dit het einde van hun sportcarrière ; één werd met succes arthroscopisch behandeld.

RÉSUMÉ

L. DE SMET, A. CLAESSENS, G. FABRY. Le poignet du gymnaste.

La mise en compression d'une articulation immature, peut mener à la fermeture précoce du cartilage de conjugaison. Chez le gymnaste, le phénomène est connu sous le nom de "gymnast wrist" ou de "déformation pseudo-Madelung". Nous en présentons 6 nouveaux cas. Cinq d'entre eux ont préféré mettre un terme à leur carrière sportive. Un patient a subi un débridement arthroscopique du ligament triangulaire avec un résultat favorable.