JAVELIN THROWER'S ELBOW

J. E. MILLER, MONTREAL, CANADA

From The London Hospital, London, England

In February 1959 a woman of eighteen sought advice in the Orthopaedic and Accident Department of The London Hospital because of pain in the right elbow. She was one of Great Britain's leading javelin throwers and a promising contender for a position in the Olympic team.

She first experienced this pain in 1956, a year after she had become interested in javelin throwing. The symptoms, initially slight, were situated on the medial and extensor aspect of the elbow, occurring at the moment of throwing and then resolving within a few moments; or alternatively, appearing as a dull, diffuse ache and stiffness on the day after throwing. The pain progressively increased and in 1957 it was a constant accompaniment of her efforts. She attended another hospital and received a course of five injections of hydrocortisone into the tender medial side of the elbow, with considerable relief.

FIG. 1

Right elbow showing irregularity at the tip of the olecranon.

In the autumn of 1958 the pain recurred and was so severe that it prevented her from throwing. With a few isolated throws, at the instant of full extension of the elbow she experienced, in addition to elbow pain, a transient paraesthesia in the ulnar distribution of the hand.

The elbow was normal on clinical examination but radiographs (Fig. 1) showed irregularity at the tip of the olecranon.

In April 1959 the ulnar nerve was explored at the elbow. It was found to be slightly constricted at the point where it passed between the heads of flexor carpi ulnaris, and it was

therefore transposed anteriorly. The olecranon was then exposed and was found to be fractured about 0.8 centimetre from the tip (Fig. 2). The small fragment was removed and the triceps reconstituted.

Recovery was rapid. Two months after operation she began to train and six months later had surpassed her previous best throw.

FIG. 2

Photograph at operation showing a transverse fracture of the tip of the olecranon.

DISCUSSION

It was the impression of the writer that elbow pain in javelin throwers is an unusual complaint. Extensive inquiry, particularly from trainers, coaches and athletes, soon established that it is, in fact, common. It is experienced at some time by almost every competitor, varying from slight discomfort to symptoms severe enough to prevent throwing. In spite of its frequent occurrence and its disabling and discouraging effect, the condition appears to have stimulated little interest. The literature is practically devoid of reports.

No mention of the syndrome has been found in the dissertations of the ancients, even though it might well have been endemic at a time when wars were fought with hurled missiles. The English medical literature of the past forty years does not contain a single report of pain in the elbow in javelin throwers. Most text-books on athletic injuries fail to mention the condition and not one discusses it in detail. In the German and Scandinavian literature Heiss (1934) and Waris (1946) published radiological surveys of the changes in a number of elbows which were symptomless at the time of the study.

A similar condition commonly occurs in the elbows of professional baseball pitchers (Bennett 1941, 1947) and may be severe enough to terminate their careers.

Clinical features—"Javelin elbow" or "javelin thrower's elbow" is a condition characterised by pain in the elbow during or after throwing. It is most commonly seen in the unskilled and untrained enthusiast, but can develop in any calibre of javelin thrower. The cause is not completely understood but it appears to be related to an imperfect throwing technique. The onset is usually insidious, in the form of slight discomfort on the inner aspect of the elbow during the throw, or a generalised ache and stiffness after a strenuous session. The pain tends to increase in proportion to the amount and intensity of throwing until eventually it may interfere with the performance of the athlete. Conversely, it tends to resolve with rest.

Examination of the elbow reveals tenderness in the course of the medial ligament, usually over the medial epicondyle and, less commonly, over the ulnar attachment of the ligament. There is a full range of painless movement and resisted effort of the elbow and wrist does not reproduce the symptoms. The signs disappear with a period away from throwing.

Radiographs of the elbow are usually normal. Uncommonly, spur formation or calcification is noted on the medial side of the elbow and rarely, irregularities of the tip of the olecranon are seen.

FIG. 3

FIG. 4

FIG. 5

FIG. 6

The "round arm" method of arm action. Note that the elbow comes around at the level of the shoulder (Figs. 4 and 5) and that medial rotation of the shoulder (Figs. 5 and 6) transmits the force to the javelin.

DISCUSSION

Elbow pain is such a common affliction of javelin throwers that the serious athlete regards it as an unpleasant and often unavoidable accompaniment of the sport and seldom seeks medical advice. Most coaches who guide the enthusiasts and deal with their complaints believe that the condition is the result of an incorrect throwing technique (Lockwood 1960).

The successful running throw requires the highest degree of coordination of limbs and trunk to effect a transfer of momentum to the javelin. In the absence of a smooth train of movements the javelin is delivered by a short quick jerk of the arm which may strain or injure the elbow. In addition to general lack of coordination in the throw, the action of the propelling arm is of the greatest significance in the development of pain.

There are two types of arm motion in general use and these result in two definite types of "javelin elbow." The limited information available in the literature and from personal communications suggests that each type is characterised by distinctive clinical and radiological findings.

The common type usually develops in the novice and uncoached thrower who employs a method known as "round arm" or "side arm" (Figs. 3 to 6). As the action of the arm begins, the elbow swings around in an arc at about the level of the shoulder. With the arm in the abducted position parallel to the ground, and with the elbow flexed to a right angle, medial rotation of the shoulder transmits the required force to the javelin but at the same time exposes the medial ligament of the elbow to a considerable strain. Damage appears to be cumulative rather than the result of a single incident (Baetzner 1936, Heiss 1934). Recurrent minor strains of the ligament result in the common type of "javelin elbow" which is characterised by pain and tenderness at the medial aspect of the joint. The pain is felt before extension of the elbow begins (Lockwood 1960), at the moment when the medial ligament is transmitting the greatest force. It interferes to a variable degree with the performance of the thrower and quickly resolves with rest, to recur with the next session of throwing. The exact nature of the injury is not certain, but appears to be related to the medial ligament of the elbow.

The late sequel of these recurrent strains is new bone formation in the form of spurs or ossicles on the medial side of the joint (Heiss 1934, Bennett 1947). Nothing is known about the degree and duration of re-injury required to produce these changes.

There are no recognised principles in the treatment of this type of "javelin elbow" other than reduction in the intensity of throwing with increased emphasis on the employment of

correct coordination and technique. Severe symptoms may demand complete cessation of throwing for a variable period, during which time general training should continue and can include putting the shot and discus throwing. Established symptoms often resolve when the thrower abandons "round arm" in favour of the correct method (Lockwood 1960). Acute symptoms respond temporarily to injected local anaesthetic, allowing unimpaired throwing for several hours before the disability reappears unchanged (Nicholson 1960). Considerable

FIG. 7

FIG. 8

FIG. 9

FIG. 10

The correct method of arm action. Note that the elbow, remaining flexed, takes up a position well above and in front of the shoulder and close to the head (Figs. 8 and 9). Extension of the elbow (Fig. 10) launches the javelin.

improvement often follows the injection of hydrocortisone into the tender area (Newman 1960). Spur formation and ossicles are the source of symptoms only rarely and removal in these cases affords relief (Bennett 1941).

The second method of throwing, the correct method (Figs. 7 to 10), is somewhat more difficult to learn than the "round arm" technique and may result in "javelin elbow" distinctly different from the common type. The elbow is brought well forward early in the throw so that it reaches a position directly in front of and above the shoulder. Powerful extension of the elbow then transmits the necessary force to the javelin without endangering the medial ligament. This is the method which is taught by most coaches. It is seldom mastered completely by throwers, but the employment of its principles, even incompletely, tends to prevent the development of "javelin elbow" of the medial ligament type.

Rarely, the accomplished javelin thrower using this method may hyperextend the elbow at the end of the throw, impinging and injuring the tip of the olecranon process against the floor of the olecranon fossa. Waris (1946), who examined seventeen outstanding Finnish throwers radiologically, found changes at the tip of the olecranon in ten. These varied in degree from roughness and irregularity to complete detachment. In one there was a fracture of the entire olecranon with malunion. All had suffered pain in the elbow after one particular throw or "mal-throw" which had disabled them for periods from a few weeks to as long as a year and which had recurred periodically.

When surgical excision of the loose tip has been practised it has produced a complete cure (Welply 1960).

There is little doubt that prevention is of great importance. Employing the correct throwing technique removes or minimises the threat of "javelin elbow." It is essential that the novice receive careful and conscientious guidance in his earliest efforts from a competent coach. To withhold instruction until the individual's interest has deepened or until he shows promise is a prelude to the development of "javelin elbow." Bad technique, once established, is difficult to correct and tends to reappear when the athlete is "off his form."

The management of the condition is a matter for close cooperation between the surgeon, the patient and the coach.

The patient described in this report first suffered from the common type of "javelin elbow" due to medial ligament strain, and this responded to injections of hydrocortisone.

The recurrence of severe pain in 1958 came at a time when the patient was making her best throws and probably marked the injury to the tip of the olecranon.

The symptoms related to the ulnar neuritis are unusual and no other similar history has been encountered.

SUMMARY

1. Pain in the elbow in javelin throwers is a common complaint.
2. The commonest type is caused by recurrent strain of the medial ligament. It develops in individuals who employ an incorrect throwing technique. The symptoms are cumulative, increasing with throwing and decreasing and resolving with rest. Treatment consists in improving the throwing technique. Local anaesthetic injected into the tender area produces complete but temporary relief. Hydrocortisone may produce partial or complete relief.
3. A second type of "javelin elbow" occurs in expert throwers and is the result of hyperextension of the elbow at the end of the throw, causing an injury to the tip of the olecranon. The symptoms are the result of a single throw or "mal-throw" and are completely disabling. They resolve with rest but tend to recur. If the tip of the olecranon is fractured excision of the fragment completely relieves the symptoms.

This patient was treated by Mr H. Osmond-Clarke. I am indebted to him for his permission to publish the report and for his help in the preparation of this paper. I should also like to thank Miss P. Burgess, A.R.P.S., of The London Hospital Photographic Department. It is a pleasure to acknowledge the help of Mr H. H. Lockwood, President of the Ilford Athletic Club, for his valuable guidance and illustrations.

REFERENCES

- BAETZNER, W. (1936): As quoted by Waris.
- BENNETT, G. E. (1941): Shoulder and Elbow Lesions of the Professional Baseball Pitcher. *Journal of the American Medical Association*, **117**, 510.
- BENNETT, G. E. (1947): Shoulder and Elbow Lesions Distinctive of Baseball Players. *Annals of Surgery*, **126**, 107.
- HEISS, F. (1934): Entstehung von Knochenbildungen am Ellbogengelenk als Folge starker körperlicher Betätigung. *Deutsche Zeitschrift für Chirurgie*, **242**, 342.
- LOCKWOOD, H. H. (1960): *Personal communication*.
- NEWMAN, P. H. (1960): *Personal communication*.
- NICHOLSON, C. B. (1960): *Personal communication*.
- WARIS, W. (1946): Elbow Injuries of Javelin-Throwers. *Acta Chirurgica Scandinavica*, **93**, 563.
- WELPLY, W. R. (1960): *Personal communication*.