LOCKING OF THE METACARPO-PHALANGEAL JOINTS

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Locking of the metacarlo-phalangeal joints has been reported infrequently in the literature. Honner in 1969 reviewed twenty-two cases. In this paper two further cases occurring in young women are described. Most cases of metacarlo-phalangeal locking appear to fall into two main groups, and a simple classification will be presented.

CASE REPORTS

Case 1—In January 1972 a nurse aged twenty years presented with locking of the left index finger. Earlier the same day she had been removing sutures, holding a forceps in the left hand, when the second metacarlo-phalangeal joint “locked” in the flexed position and she could not straighten it. She gave no history of any injury but said that during the preceding month she had noticed “cramps” in the same finger. These would occur once or twice a week and the finger would assume the flexed position momentarily and could not be straightened.

On examination four days after the episode, it was found that the metacarlo-phalangeal joint could not be extended through the last 30 degrees. Flexion of the finger was full and extension of the interphalangeal joints was also full. The metacarlo-phalangeal joints of the other fingers could be hyperextended through 40 degrees. Radiographs of the hand were normal.

The patient was observed for six weeks, but there was no return of extension in the index finger. The hand was therefore examined under a general anaesthetic, and passive extension of the joint was found to be as limited as active extension before anaesthesia (Fig. 1).

At operation the front of the metacarlo-phalangeal joint was exposed through a transverse incision in the distal palmar crease. The capsule of the metacarlo-phalangeal joint when opened showed a prominent fold running proximally from the volar plate to the lateral side of the metacarloal head. This fold was caught over the proximal side of the bony prominence on the antero-lateral aspect of the metacarloal condyle (Fig. 2). As soon as the capsule was divided longitudinally the tension was released from the fold, which then slipped off the bony
prominence of the condyle, restoring full extension. The bony prominence was removed with bone nibblers. The course after operation was uneventful.

**Case 2**—A woman aged twenty-six years was lifting a heavy teapot when the right index finger "popped". The metacarpo-phalangeal joint could not be extended through the last 30 degrees. Radiographs did not show any abnormality. Nine days later the finger spontaneously became free and the patient returned to work, but a week later it "caught" again. Pain was mostly over the back of the joint, and at operation a posterior exposure was therefore used. It was not possible, however, to release the joint until the anterior aspect had been exposed and a longitudinal incision made through the joint capsule as in the first patient.

**DISCUSSION**

These two cases, with the twenty-two cases of locking in the metacarpo-phalangeal joints described by Honner, make a total of twenty-four. Goodfellow and Weaver (1961) described the anatomy of the ligamentous structures about the metacarpo-phalangeal joint, and explained the mechanism by which the volar plate can catch on osteophytes on the metacarpal heads. All their five patients, however, were elderly and showed radiological evidence of degenerative change. In the twenty-four cases mentioned above there are two main groups of patients. There is an additional third smaller group in which one could place the more unusual causes of joint locking. A suggested classification is set out in Table I.

**MECHANISM OF LOCKING**

The volar plate is attached distally to the front of the base of the proximal phalanx, and proximally it is supported by an accessory collateral ligament which is continuous inferiorly with the collateral ligament. This fan-shaped accessory collateral ligament arises from the metacarpal head adjacent to the collateral ligament and passes around the front of the metacarpal head to become incorporated in the volar plate with similar fibres from the opposite side. These fibres form a semicircular cuff which slides backwards and forwards over the front of the metacarpal head on flexion and extension of the metacarpo-phalangeal joint (Fig. 3). More superficially, fibres of the volar plate pass to the volar plate in the adjacent finger to form the deep transverse ligament of the palm. More superficially again the volar plate is continuous with the fibrous flexor tendon sheath. It is the cuff formed by the accessory collateral ligaments mentioned above which catches the osteophytes in the "degenerative" group of patients. In the "spontaneous" group the catching is on the bony prominence on the antero-lateral aspect of the index metacarpal head. Usually it is the accessory collateral ligament just lateral to the volar plate which is caught on the bony prominence.
CLINICAL FEATURES

Degenerative group—Of the twenty-four cases under review, eleven appear to fall into this group. The youngest patient was forty-seven and the oldest eighty-three. In all but three cases degenerative changes were noted in the radiographs. In no instance was the index finger involved. The middle finger was involved in eight of the eleven cases, the ring finger was affected twice and the little finger only once.

Spontaneous group—In this group the patients were younger, between twenty and forty-seven years of age. In every instance the index finger was involved. Despite different pathological descriptions the etiology appears to be basically identical. In two cases it had been noted that a sesamoid caught behind the ridge on the radial side of the index metacarpal head (Flatt 1958, Bloom and Bryan 1965). A sesamoid bone is present in the volar plate in this position in 64 per cent of hands (Bizzaro 1921), and this does not alter the basic picture. A crescentic membrane has been described within the joint (Bruner 1961), but this probably represents a fold caused by the deep layers of the accessory collateral ligament described above. Tears have also been described (Aldred 1954, Yancey and Howard 1962). It is probable that these tears were produced in the accessory collateral ligament by attempts to release the locking.

It seems that there are three reasons why the index fingers should be affected so often in the spontaneous group of patients. Firstly, in the case of the ring and middle fingers the volar plate cannot catch on the antero-medial or antero-lateral aspect of the metacarpal head because it is held off the margins by the deep transverse ligament on either side, which itself is continuous with the volar plate (Fig. 4). Secondly, the second metacarpal head is the largest, and the large cornu on the antero-lateral aspect of the metacarpal head is a recognised anatomical feature (Frazer 1958). Thirdly, the normal concavity of the palm at the level of the metacarpal heads throws the antero-lateral aspect of the index metacarpal head into prominence (Fig. 4).
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TREATMENT

It is apparent that most cases of locking of the metacarpo-phalangeal joint are caused by the catching of the volar plate either on osteophytes or the bony prominence on the anterolateral aspect of the second metacarpal head. It is suggested, therefore, that the following routine be adopted. First, the patient be observed for at least a month, because spontaneous recovery does occur in some cases (Aston 1960). Manipulation of the joint is not indicated because at best it gives only temporary relief, and fracture of the metacarpal head due to forceful manipulation has been described (Langenskiöld 1949). Operation is indicated if spontaneous recovery has not occurred after a month. The front of the metacarpo-phalangeal joint should be exposed and a longitudinal incision made along the lateral margin of the volar plate beside the tendon sheath. Division of the accessory collateral ligament from the volar plate will allow it to move forward and then to move freely across the front of the metacarpal head. Usually no other intervention is necessary, but osteophytes or undue bony prominences may be shaved off. It is probably wiser to avoid much dissection within the joint because it is usually unnecessary and may lead to a slower return of function because of adhesions.

SUMMARY

1. Two cases of locking of the metacarpo-phalangeal joint of the index finger are presented.
2. A simple classification of metacarpo-phalangeal joint locking is suggested, and the clinical features of the two main groups—degenerative and spontaneous—are described.
3. A routine approach to the treatment of the condition is suggested.

REFERENCES

Yamauchi, Y., and Kurimura, H. (1966): [Case of Locked Finger due to a Metacarpophalangeal Joint Disorder of Both Index Fingers.] Orthopaedic Surgery, Tokyo, 17, 749. (Japanese.)