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Hand Surgery Unit, Kaplan Hospital, Rehovot, Israel

OSTEOARTHRITIS OF THE THIRD METACARPO-PHALANGEAL JOINT

ISIDOR KESSLER

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Osteoarthritis of the hand usually involves several joints, unless it develops as a consequence of isolated trauma to one single joint. The proximal and distal interphalangeal joints are the most commonly affected. Metacarpo-phalangeal joints seldom participate in a generalised degenerative osteoarthritis and almost never in its initial stages. The carpal joints do participate occasionally in the process; among them the most common and characteristic location is the carpometacarpal joint of the thumb.

The present report describes a small series of seven patients, in whom clinical and radiological signs have shown an involvement of the metacarpo-phalangeal joints. The most prominent feature brought out by this series was the initial and progressive involvement of the third metacarpo-phalangeal joint. In all cases clinical signs have been related predominantly to the third metacarpo-phalangeal joint, whereas the adjacent joints, even if radiologically affected, have remained clinically silent (Case 1).

The present report will deal particularly with common diagnostic problems; treatment will not be discussed in detail.

CASE REPORTS

Case 1: M. B., a 57-year-old housewife was first seen in our clinic in February, 1968, with a history of pain and swelling on her right hand. Pain and discomfort were more pronounced when she performed prolonged or heavy manual work. There was no history of trauma and no other arthritic pain. The patient was right-handed. She was treated symptomatically, but the pain increased. Two months before admission she had a course of X-ray therapy without improvement. When examined for the first time, she had a pronounced fusiform swelling over the third knuckle, with local tenderness and limitation of motion of the third metacarpo-phalangeal joint. The roentgenogram showed narrowing of the joint space and changes of the metacarpal head with irregular contour and osteophytes projecting into the soft

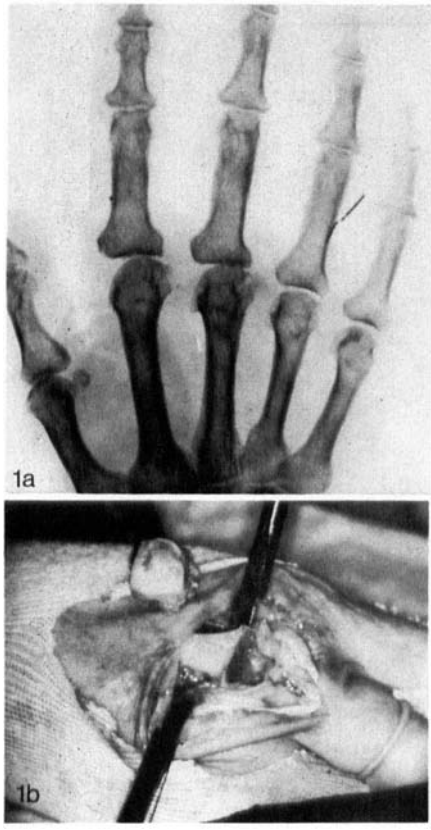
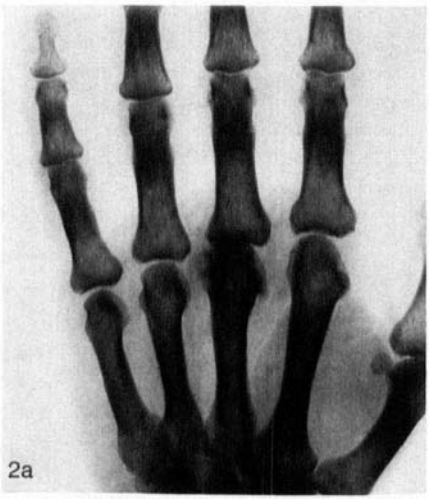
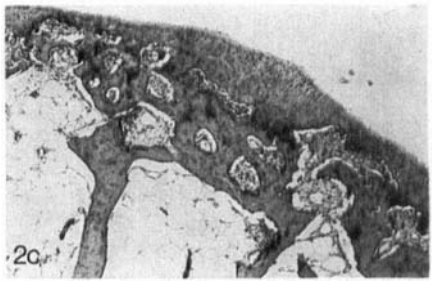


Figure 1. A. The third metacarpo-phalangeal joint is narrow and irregular. Note the particular destruction of the ulnar side. B. The metacarpal head has been excised. Note that most of its articular cartilage has been destroyed.

tissues (Figure 1 A). There was no osteoporosis of the bones of the affected hand, the sedimentation rate was normal and the latex fixation test was negative. Because of progressive symptoms she was admitted to the hospital in March, 1970. On admission the third metacarbo-phalangeal joint was found to be moderately swollen and painful. There was a flxeion contracture of about 20° and range of motion was limited to 50° of active flexion. Repeated roentgenographic examination showed increased sclerosis of the subchondral bone and more deformity of the head of the third metacarpal than on previous films. It is to be noted that although slight irregularity of the articular surface of the second metacarpo-phalangeal joint could be interpreted as a beginning osteoarthritis, there were no clinical signs related to that joint. The patient underwent a silicone type arthroplastry of the third metacarpo-phalangeal joint. The excised metacarpal head showed a large area of loss of articular cartilage (Figure 1 B), underlying sclerosis and multiple osteophyte formation. She returned to her household activities about six weeks after surgery and gradually regained her working capacity. The last examination about two years after operation revealed an improved range of motion, between zero and 60° and a strong, painless grip. The radiograms showed no further progression of osteoarthritis among the other joints of the hand.





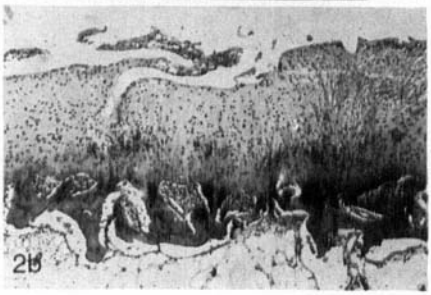


Figure 2. A. Almost missing joint space and advanced structural changes of the metacarpal head. B. Showing degenerative changes of the cartilage with vertical and tangential fibrilation. C. Showing focal sclerosis of the subchondral bone and loss of the superficial layers of the cartilage (hematoxylin–eosin × 40).

Case 2: Sh. J., a 64-year-old farmer was seen at the hand clinic complaining of pain in his right hand for more than one year. There was no known injury. The symptoms were moderate and had increased slowly over the preceding year. The patient was right-handed. He had been treated by paraffin baths, ultrasound, salicylates, indomethacin and exercises, with only transient improvement. At the time of admission his condition had worsened and it was seriously interfering with his usual activities. The examination revealed an oval tumor-like swelling over the third knuckle and a very restricted, painful motion of the metacarpo-phalangeal joint. The range of flexion was from 10 to 40°, in comparison with minus 10 to 90° on the left. Radiological examination showed a narrow, almost missing joint space, irregularity of the metacarpal head and osteophytes projecting into the soft tissue from the joint margins (Figure 2 A). There was no real flattening or fragmentation of the metacarpal head. There were no changes related to the other metacarpo-phalangeal joints. The sedimentation rate was normal and the latex fixation test was negative. The patient was operated on and a silicone type arthroplasty was performed. Histologically the resected metacarpal head showed large patchy areas of destroyed or degenerated articular cartilage and a concomitant sclerosing process in the underlying bone with cystic structural changes (Figure 2 B and C). Three weeks after the operation the patient was sent to physical treatment. He returned to

his usual farm work few weeks later. The last examination, more than two years after surgery, revealed no swelling, improved and painless motion and increased strength.

The remaining five patients, four men and one woman, showed very similar changes concentrated over the third metacarpo-phalangeal joint. In none of them were there any signs, clinical or roentgenographic, related to the other metacarpo-phalangeal joints. All patients were engaged in physical work. One of them was 46 years old, the rest aged over 50. By the time of completing this study two patients were still under conservative treatment. All the others underwent resection arthroplasty of the third metacarpo-phalangeal joint.

DISCUSSION

This small series of seven patients is characterised clinically by a localised swelling and painful limitation of motion of the third metacarpo-phalangeal joint. With one exception, the process had affected patients in their sixth and seventh decades. No systemic symptoms were found and laboratory examinations were all normal. The differential diagnosis includes the so-called Dietrich's disease, which has a similar location.

Dietrich's disease, described as an osseous aseptic necrosis of the head of the metacarpals, is an extremely rare condition. It has been reported mainly in the German literature and is characterised by solitary or multiple affections localised to all but the first metacarpal heads (Dietrich 1932, Friedl 1934, Bopp 1938, Carstam & Danielson 1966). Radiologically it shows fragmentation and flattening of the affected metacarpal head, with shortening in total length. Dietrich's disease has been reported in patients from 15 to 51 years. Although the age at diagnosis may vary, most cases develop during the first two decades. Neither clinically nor radiologically does this condition constitute a clear-cut nosological entity. The radiological characteristics of various cases described as Dietrich's disease had often very few in common, thus provoking the question whether they should be included in the same category (Köhler 1956).

The seven cases in our series were classified as osteoarthritis according to their clinical courses and radiological findings. Painful limitation of motion and progressive narrowing of the joint space were the main findings common to all of them. No real flattening or fragmentation of the metacarpal heads were noted. Histological examination performed in four of the operated patients provided further support for this assumption.

Neither in the histories of the cases reported here, nor in their clinical course, were there any elements which could suggest the possible eitology of the process. Why should an osteoarthritis particularly affect the third metacarpo-phalangeal joint while the adjacent joints would be left undisturbed? Should the affection of the third metacarpo-phalangeal joint be considered an isolated location, or as the beginning of a process which would eventually spread further and involve the other metacarpo-phalangeal joints? No definitive answer could be given to those questions. The problem of the initial involvement of the third metacarpo-phalangeal joint probably has something to do with the fact that the third knuckle is the most prominent one, and in this respect is exposed to injury more than the others. Trauma as a single external act of violence has not been established as a common feature in the reported series. However, repeated micro-injuries possibly connected with the kind of life of a particular patient, or specific occupational requirements, could almost never be denied absolutely. More attention to this condition and further cumulation of details would probably offer the clue to better understanding of its pathomechanics.

SUMMARY

A series of seven cases showing isolated affections of the third metacarpo-phalangeal joint has been reported. The possible nature of these affections as well as problems of differential diagnosis have been briefly discussed.

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Correspondence to:

Isidor Kessler
Hand Surgery Department
Kaplan Hospital
Rehovot, Israel