RUPTURE OF THE COLLATERAL LIGAMENT OF THE METACARPO-PHALANGEAL JOINT OF THE THUMB

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The metacarpo-phalangeal joint of the thumb permits flexion and extension only and the range varies widely in different individuals. This is due to differences in the shape of the metacarpal head and the tension of the capsule. Joseph (1951) has shown that the metacarpal head may be flat or round and that the range of movement varies between 5 and 88 degrees. Thumbs with the smaller range tend to have flat metacarpal heads and those with the greater

FIG. 1

FIG. 2

Figure 1—The swelling can be seen in the web at the base of the thumb.

Figure 2—Photograph showing the deviation of the thumb from the index finger when the collateral ligament is ruptured.

range to have round heads. The joint is a hinge, but when the metacarpal head is rounded some gliding of the base of the phalanx will increase the range of movement. Whatever the range of flexion, movement in other planes is negligible as it is effectively prevented by the collateral ligaments. These consist of short strong bands of fibres which radiate from depressions on either side of the head of the metacarpal to the base of the first phalanx and sesamoid bones. They extend distally and a little forward so that the greater number are inserted anterior to the axis of movement. With the thumb in the extended position they give to the metacarpo-phalangeal joint the stability so important in gripping. This is particularly so in the pincers action of the thumb when the pulp is compressed against the pulp of one of the fingers, usually the index or middle finger. When the stability of the joint is weakened, as when a collateral ligament is ruptured, this action is greatly weakened. As Watson-Jones (1943) pointed out, when the ligament on the side nearest the index is deficient, pressure merely pushes the thumb away and opens the joint on the same side. The ligaments are comparable with the collateral ligaments of the knee. With the knee extended, rupture of the medial ligament produces a similar weakness and instability.

Mechanism of injury—The ligament is damaged by a blow on the thumb in the extended position. Partial rupture may occur and cause pain and swelling, but no instability, and provided the joint is protected by a plaster healing will occur with no permanent instability. If

FIG. 3

Marked shift of the phalanx on the metacarpal head when radiographed with abduction stress.

the rupture is complete the stability is destroyed and subluxation of the phalanx on the metacarpal head occurs. This is towards the radial side, as already explained, but some forward shift may also occur. If a chip of bone is avulsed the lesion will be obvious in the radiograph, but not otherwise, and the slight shift of the phalanx on the metacarpal head is easily overlooked.

Clinical features—The patient complains of a swelling in the web at the base of the thumb (Fig. 1), with pain and weakness of grip. If he is asked to press the tip of the index finger against the thumb, comparison of the two hands will show a deviation of the thumb away from the index (Fig. 2). A radiograph will show the shift of the base of the phalanx on the metacarpal head, which can occur only if the ligament is ruptured. The opening of the joint when radiographed under strain is similar to that seen in the knee forced into valgus after rupture of the medial ligament (Fig. 3). In such cases stability can be restored by operative reconstruction of the ligament.

Operative repair—The joint is exposed and the periosteum of the metacarpal and phalanx is elevated. Holes are bored, taking care to preserve the small bony ridges between them. The extensor tendon of the fourth toe is removed from the base of the toe to the lower edge of the

FIG. 4

The method of reconstruction, using the extensor of the fourth toe.

extensor retinaculum. The tendon is threaded through the holes and pulled tight to reduce the subluxation and sutured to itself (Fig. 4). Plaster fixation is maintained for four weeks to allow consolidation. Mobilisation of the thumb is quick as the increased stability returns the strength to the long muscles.

CASE REPORTS

Case 1—A medical student ruptured the collateral ligament at the base of the thumb in a motor cycle accident. The thumb was fixed in plaster for six weeks and he was allowed free for two months. The thumb was weak and he was unable to grip. Radiographs revealed marked displacement when strain was applied (Fig. 3). The ligament was reconstructed and the thumb fixed in plaster for four weeks. Two months later he had full function and stability.

Case 2—An apprentice coppersmith was struck on the thumb by a baseball bat. He had the characteristic swelling in the web at the base of the thumb, and radiographs revealed that there was outward shift of the base of the phalanx on the metacarpal head. A plaster was applied for

four weeks. Three weeks after the removal of the plaster the joint was unstable and he was unable to grip with the index and thumb. At operation the ligament was found completely divided and was reconstructed. Plaster fixation was maintained for four weeks. One month later he returned to work with the joint stable.

Case 3—A labourer strained his thumb severely while wrestling. He showed swelling at the base of the thumb, and the pincers action was weak. Radiographs confirmed the rupture of the ligament. The ligament was reconstructed. The thumb was stable and strong, with a full range of movement.

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