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COMPLETE LESION OF THE MEDIAN NERVE ASSOCIATED WITH DISLOCATION OF THE ELBOW JOINT

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Complete lesions of the median nerve after dislocations of the elbow joint are uncommon injuries usually associated with severe compound fracture dislocations (Linscheid & Wheeler 1965, Roberts 1969, Watson-Jones 1930, Wilson 1938). There is only one case previously recorded in which there was a complete median nerve lesion associated with a closed dislocation of the elbow without fracture (Gurdjian & Smathers 1945). In this instance and in one other report of a partial median nerve lesion (Mannerfelt 1968), the nerve was found at operation to be entrapped within the elbow joint.

The purpose of this paper is to describe the case of a child who developed a complete median nerve lesion after closed postero-lateral dislocation of the elbow joint and to discuss some of the difficulties of diagnosis and treatment.

CASE REPORT

On 18.6.1968 an 8-year-old boy fell from a tree and sustained an apparently uncomplicated postero-lateral dislocation of the left elbow joint without fracture. Pre-reduction neurological examination was recorded as normal. Reduction was performed under general anaesthetic without any undue use of force. Neurological examination made 12 hours after reduction was also recorded as normal. The patient was discharged from hospital in a plaster of Paris posterior splint after 24 hours. Hospital follow-up appointments were poorly attended and the patient presented again 8 weeks after injury, the mother complaining that the boy had not been using his thumb or index finger for 3 weeks. Examination demonstrated loss of sensation in the median nerve distribution and loss of the power of flexor pollicis longus, flexor digitorum profundus of the index finger, flexor digitorum sublimis and abductor pollicis brevis. Needle electrode electromyograms from the abductor pollicis brevis showed profuse fibrillation and no response of motor units on voluntary effort. Electrical stimulation of the digital nerves in the median nerve distribution failed to evoke any sensory potential and there was no motor

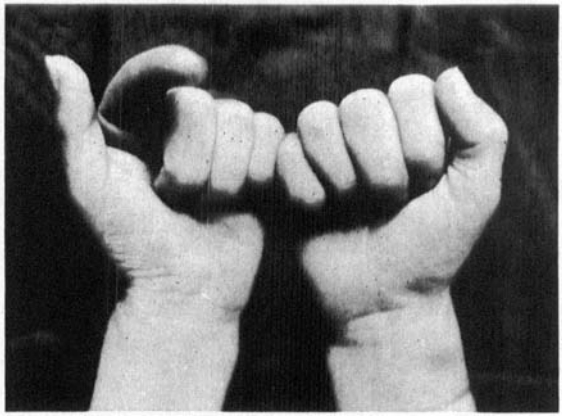

Figure 1. The median nerve lesion in the left hand just before exploratory operation; patient attempting active flexion of digits of both hands.

response to high intensity stimulation of the median nerve at the wrist, in the cubital fossa and in the axilla. A diagnosis of complete median nerve lesion was made but due to failed attendances the next examination was one year after injury. At this time the boy claimed he had sensation in the median nerve distribution, but there were trophic changes and motor loss as at the previous examination (Figure 1). A repetition of the electro-physiological examination again produced evidence of a complete median nerve lesion at the level of the elbow. Surgical exploration was therefore performed.

Operative Findings

The bicipital aponeurosis was divided but the median nerve could not be seen anterior to the elbow joint. The nerve was exposed and traced from more proxim-

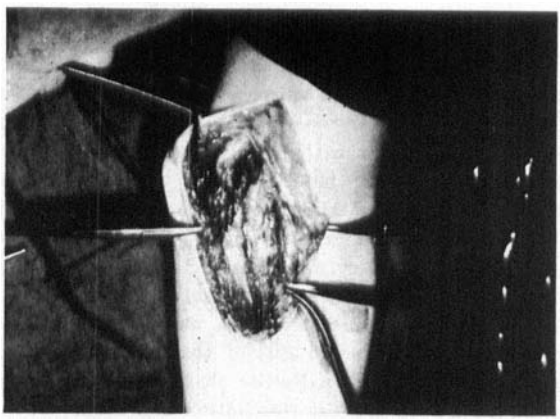

Figure 2. Median nerve dipping into the elbow joint at operation, and the disparity between the size of two ends of the median nerve.

Figure 3. End to end repair of median nerve with the elbow flexed.

ally and more distally towards the elbow where it was found to be dipping into the region of the elbow joint (Figure 2). Further dissection through dense fibrous tissue anterior to the joint showed that a complete division of the median nerve had occurred within this region, leaving a gap of two centimetres between the proximal and distal ends. The diameter of the proximal end was markedly broader than the distal end. End to end repair was performed and the elbow immobilised in flexion (Figure 3).

Progress

Recovery of median nerve function was progressive. Follow-up examination performed 20 months after nerve repair showed good clinical function (Figure 4). Motor power was then as shown in Table 1. The patient could feel a von Frey hair of 4.08 g on the tip of the thumb and 4.17 g on the tips of the other fingers supplied

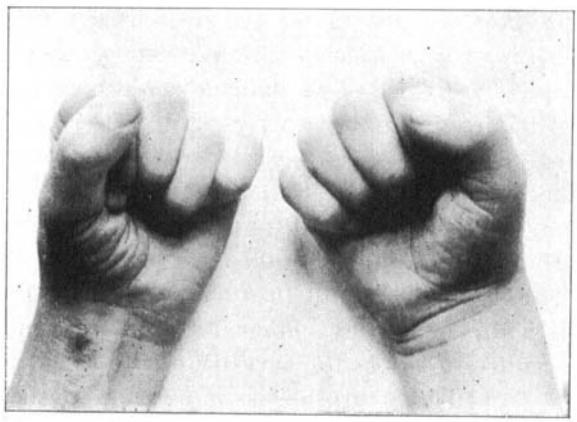

Figure 4. Active flexion of thumb and index finger of left hand, 20 months after the operation.

Table 1. Post-operative muscle function

	Power (Medical Research Council Scale)				
	Thumb	Index	Middle	Ring	Little
Flexor digitorum profundus		4–5	4–5	5	5
Flexor digitorum sublimis		4	4	4	4
Flexor pollicis longus	5				
Opponens pollicis	5				
Abductor pollicis brevis	5				

by the median nerve. (A normal control perceived hairs of 2.36–2.44 g). There was a full range of motion in the left elbow joint. An electrophysiological examination confirmed that reinnervation was progressing. Recordings from the left abductor pollicis brevis showed no spontaneous activity at rest. Maximum voluntary effort evoked five to six single motor units reaching 500 microvolts in amplitude, of long duration and polyphasic. The maximum conduction velocity of the motor nerve fibres innervating these units was 60 meters per second proximal to the elbow, 34 meters per second distal to the elbow, and the peripheral delay was 5 milliseconds, which was a little prolonged. Electrical stimulation of the digital nerves of the left thumb evoked a small sensory potential (one microvolt) in the median nerve proximal to the left wrist, and the velocity of the propagation through the hand to the wrist was only 16 meters per second. No potential could be evoked from the index finger.

DISCUSSION

The case of a child who developed a complete median nerve lesion after postero-lateral dislocation of the elbow joint has been described. Clinical examination did not reveal the median nerve lesion until 8 weeks after injury. Surgical exploration demonstrated the nerve to have been completely divided. This damage could have occurred at the time of the initial trauma or by entrapment of the nerve within the elbow joint during reduction as has been described previously (Gurdjian & Smathers 1945, Mannerfelt 1968).

Diagnosis may be difficult in children. In adults sensory findings are more reliable than motor signs as indicators of median nerve function (Boswick & Stromberg 1967), but in a child the assessment of sensation may be difficult. Electrophysiological examination may be a useful diagnostic procedure to assess the severity of the lesion in such cases. Seddon (1947) described neurotmesis and axonotmesis as being indistinguishable at initial clinical examination and one of the problems in diagnosis is the assessment of which type of nerve lesion is particu-

larly associated with a particular skeletal injury. Closed injuries around the elbow joint are almost always associated with a neuropraxia or very rarely an axonotmesis and usually recover without operation. The case described here demonstrates that this may not always be so even after an apparently simple posterior dislocation of the elbow joint in a child. If a lesion is diagnosed, careful follow-up is required as it cannot be assumed that spontaneous recovery will follow.

SUMMARY

A complete lesion of the median nerve associated with a closed dislocation of the elbow joint in a child is described and some of the diagnostic difficulties which were encountered are discussed.

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