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TREATMENT OF PARALYSIS OF THE TRAPEZIUS MUSCLE BY THE EDEN-LANGE OPERATION

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Injury to the accessory nerve, formerly relatively common as the result of a stab injury or as a complication of operative procedures for tuberculosis of the lymphatic glands, is now seen more seldom and usually as a closed injury caused, for instance, by traffic accidents. It is followed by a paralysis of the trapezius and the sternocleidomastoideus muscles.

The upper portion of the trapezius muscle elevates the scapula, the lower portion draws it downwards. One of the functions of all the three portions is to draw the scapula towards the midline. The upper and lower trapezius together with the levator scapulae, the rhomboids and the serratus anterior muscles control the rotatory movement of the scapula, without which the abduction of the arm is limited to 80° (Benninghoff 1949, Dewar & Harris 1950). As a result of the paralysis of the trapezius muscle a drop shoulder with rotation of the angle of the scapula towards the midline and restricted abduction of the arm is caused. The muscular imbalance results in anterior and rotatory displacement of the scapula. The shoulder drop often causes traction on the brachial plexus with paraesthesia and radiating pain in the upper extremity. The overstrain of the remaining muscles may result in pain. These symptoms often indicate an operative correction of the condition.

The fixation of the scapula by fascial slings to the spinous processes has been used by some authors (Szubinski 1920, Henry 1927, Dickson 1937). Because of the complicated function of the trapezius these procedures could not give very satisfying results. Therefore myoplastic operations have been strived for (Dewar & Harris 1950).

Because only very few reports on the results of the myoplastic operations have been published in the literature we feel it justified to

present the follow-up results in three patients treated by an operation originally designed by Eden (1924) and later developed by Lange (1951, 1959).

OPERATIVE METHOD

The technique described in detail by Lange (1951, 1959) was used with only slight modifications. A slightly curved incision extending from the dorsal aspect of the acromion to the medial inferior border of the scapula was used. The levator scapulae muscle was detached from the scapula with a piece of bone, prepared free by blunt dissection in the proximal direction and fixed with some sutures of unresorbable material to the lateral part of the scapula close to the acromioclavicular joint. The scapula was held in an elevated and adducted position during the fixation. The infraspinatus muscle was detached subperiosteally from the scapula. The rhomboids were detached with a piece of bone from the medial margin of the scapula and drawn laterally, holding the scapula in an adducted position and fixed with moderate tension to the bone by sutures of unresorbable material through bore holes in the scapula. The infraspinatus muscle was sutured again on the rhomboids. The arm was immobilised in a thoracobrachial plaster cast for four weeks, after which active exercises were begun.

RESULTS

The subjective result in all three cases was good. All patients experienced increased stability of the shoulder, marked diminution or total disappearance of the pain in the shoulder, relief of paraesthesia, and improved abduction of the arm. The drop shoulder position was corrected totally in all cases. The rotatory malposition of the scapula was markedly improved or totally corrected. The rotatory movement of the scapula was not fully corrected and this caused slight difficulty and residual pain. All three patients were able to do their previous work after the operation.

CASE REPORTS

Case 1. A.K., housewife, 38 years of age at operation, had been in a train accident in 1944, thirteen years before the admission. She had received a closed injury to the right shoulder region with paralysis of the trapezius muscle as the result. The situation became worse with time, making housework more and more difficult because of pain in the shoulder and paraesthesia in the upper extremity. At ad-

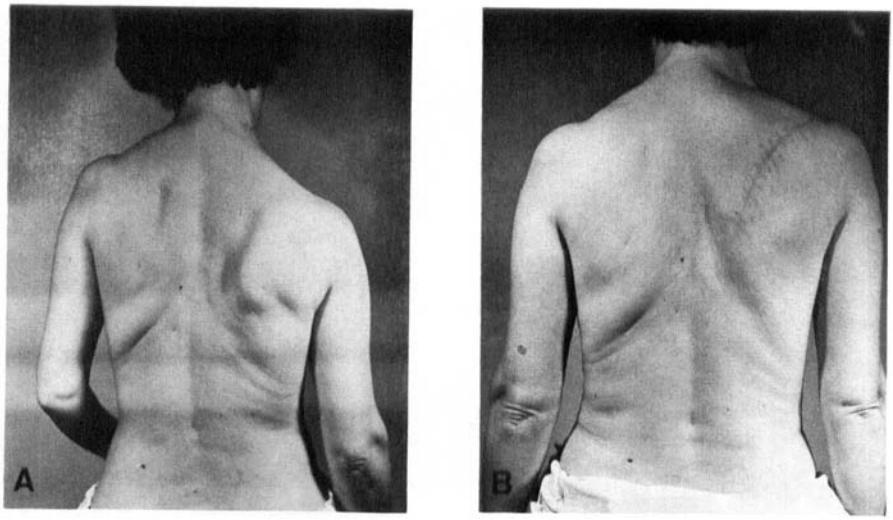

Figure 1. Case 1. The paralysis of the right trapezius resulted in a shoulder drop and rotatory malposition of the scapula. The state before (A) and one year after operative correction by the technique of Eden and Lange (B).

mission she had a typical drop shoulder (Figure 1 A) with forward dislocation and rotation of the scapula. The active abduction of the arm was 70°. When the scapula was passivily fixed in normal position the active abduction of the arm was normal. *Operation* on 13 April, *1957*. After the operation (Figure 1 B) the position of the scapula in the resting state was normal and the active abduction of the arm was full with slight difficulty between 70 and 100° of abduction. The pain had disappeared and the patient was able to do all her daily housework. The situation was unchanged during the follow-up time of fifteen years.

Case 2. F.K., aged 44 years at operation, a male sales agent. In a car accident he had received a rupture of the acromioclavicular joint, a fracture of the scapula at the base of the acromion, a cerebral contusion and fractures of several ribs with haemothorax. In the carotid angiography an avascular area in the parietal region and a little intracerebral haematoma were seen. Unconsciousness of several days cleared up gradually and the patient was back to work four weeks later. At the follow-up examination the patient complained of difficulties in his work arising from poor memory and slowness of thinking, as well as pain and weakness of the shoulder. The latter was thought to be caused by the untreated acromioclavicular injury until a typical shoulder drop (Figure 2 A) with weakness of the trapezius was diagnosed. The active abduction of the arm was hampered but the range of movement was normal. In the electromyography the upper portion of the trapezius showed diminution of the motor units and polyfaciccity of the individual motor potentials. *Operation* on 8 March, *1971*. The patient assumed his previous work three months after the operation. The configuration of the shoulders at rest was almost symmetrical (Figure 2 B). The elevation power of the shoulder had clearly

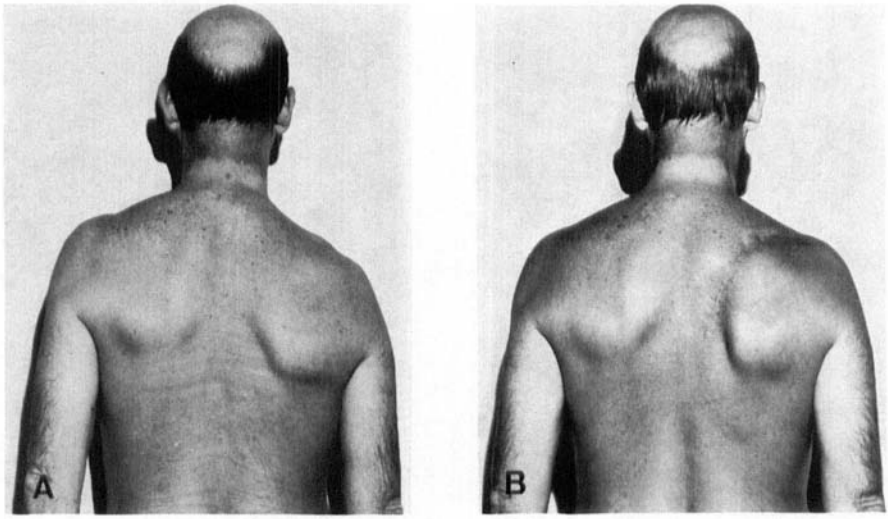

Figure 2. Case 2. Partial paralysis of the right trapezius: Before (A) and after (B) operative correction.

increased and the active abduction of the arm was free. The result was subjectively good. There was slight pain in the acromioclavicular region in lifting of moderately heavy objects and some sensation of weakness. The residual symptoms were interpreted mainly as the result of the subluxation of the acromioclavicular joint. During the time of follow-up of two years the situation has been unchanged.

Case 3. A.J., aged 39 years at the second operation, a female assistant in a secretarial office. The patient fell while skiing at the age of nine (in 1941) and a stick penetrated her neck from the supraclavicular region to the region of the mastoid process causing a paresis of the accessory nerve. The nerve lesion had been left untreated. The patient had pain and weakness in the shoulder region and later also paraesthesia in the upper extremity, because of which a scalenomyotomy had been made six years later. This did not resolve the situation and two years later the scapula was operatively fixed to the spinous processes by fascial slings. The symptoms were markedly relieved by this procedure and the patient was able to continue her work during the next ten years until she crashed with her car. After this accident the shoulder drop and other symptoms returned. The situation gradually became so much worse that the patient was no longer able to continue her work. Repeated elevation of the right arm, which was necessary at work, caused intractable pain and paraesthesia. There was a typical shoulder drop (Figure 3 A) with a rotation of the scapula. The active abduction of the arm was only 60°. Passively there was no restriction of the movements. No neurological signs in the upper extremity were demonstrable. *Operation* on 28 September, *1971*. The patient was able to assume her previous work 5 months after the operation. The shoulder was at the same level as the left one at rest (Figure 3 B). Some residual rotatory malposition of the scapula was left. The active abduction of the arm was full with

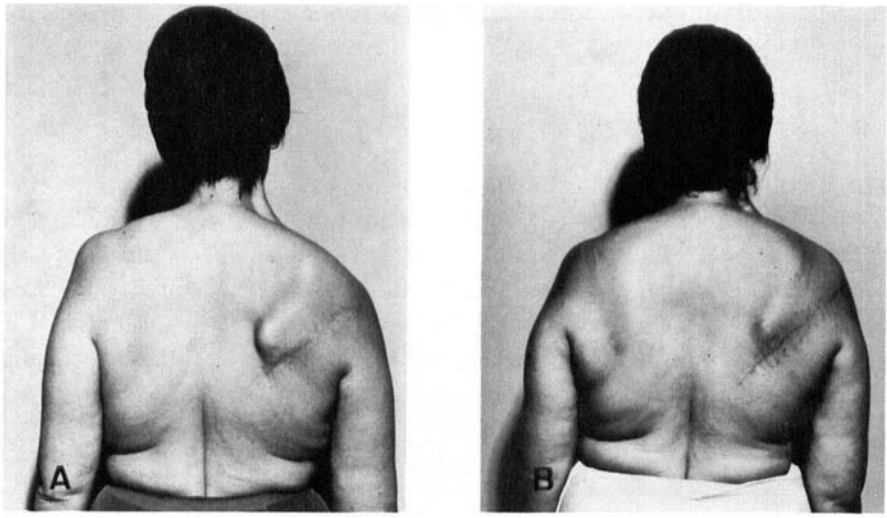

Figure 3. Case 3. Paralysis of the right trapezius treated several years previously by fixing the scapula by fascial slings. Recurrence after a car accident. The state before (A) and after (B) operative correction by the technique of Eden and Lange.

some difficulty in between eighty and hundred degrees. Active elevation of the shoulder was normal. The paraesthesia had disappeared. After more strenous days the patient had pain in the shoulder region. During the time of follow-up of one and a half years the situation had been unchanged.

DISCUSSION

Many patients with paralysis of the trapezius muscle are able to do their work with only slight difficulty and are free of pain. In these cases an operative correction is not indicated. If the function of other muscles is good the loss of function of the trapezius may be sufficiently compensated. It seems, however, that the symptoms have a tendency to become worse with time, perhaps due to weakening of the muscular function and development of degenerative changes in the shoulder region. This means that the operative correction in many cases may be indicated later.

The upper portion of the trapezius also derives some innervation from the upper cervical nerve roots (Benninghoff 1949, Lanz & Wachsmuth 1959). Therefore, the loss of function of this part of the muscle is usually not total. In blunt injury, which is becoming more common as a cause of paralysis of the trapezius, the clinical picture may be

atypical as in in our second case. In these cases the operative procedure has to be planned individually and modified after actual needs.

SUMMARY

The results of operative correction in three cases with paralysis of the trapezius muscle are presented. The technique described by Eden and Lange was used. The time of follow-up examination was one year and a half, two years and fifteen years. The result was good in all cases both subjectively and clinically. This procedure is recommended for patients, in whom disabling symptoms develop as a result of paralysis of the trapezius muscle.

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