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# Accessory nerve injury

A series of 13 patients with an injury of the accessory nerve in the posterior cervical triangle is reported. In 11 patients the nerve was damaged during a lymph node biopsy and in two cases there was a sharp glass injury. Paralysis of the trapezius muscle occurred with resulting deformity and loss of function of the shoulder. Nine patients were operated on. In five cases neurolysis, in two cases neurorrhaphy and in two cases reconstruction with a sural nerve graft were performed 3–17 months after the injury. The result was good or fair in six operative cases. Five of these were neurolyses.

In one instance good and in three cases fair recovery was achieved without operation. All but one of the patients were able to return to their former employment. The mean follow-up time was 20 months.

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The superficial course of the accessory nerve in the posterior cervical triangle makes it particularly susceptible to injury during a lymph node biopsy, removal of tumor masses and other operative procedures in this region.

## Patients and methods

Our series consisted of 13 patients with accessory nerve injury seen during the years 1977–1982 (Table 1). The mean follow-up was 20 months.

## Case reports

**Case 3.** A lymph node biopsy in the neck of a 35-year-old woman with toxoplasmosis was followed by paralysis of the trapezius muscle and shoulder pain. Ten months later the severed accessory nerve was reconstructed with one 4 cm sural nerve graft. The pain ceased. After 5 years the range of motion and strength in the upper extremity were normal. There was still considerable atrophy in the trapezius muscle.

**Case 8.** A lymph node biopsy in the neck of a 35-year-old woman with tuberculosis was followed by paralysis of the trapezius muscle and shoulder pain. The patient was on sick-leave and avoided

extensive use of the upper extremity. Supportive dressings were not employed. After 4 months the pain began to diminish and there was an improvement in the range of motion. Five months after the injury, electro-physiologic examination showed signs of regeneration in the nerve. After a year the motion of the upper extremity and that of the shoulder were normal. Slight pain was present only in conjunction with vigorous exertion.

**Case 12.** The head of a 41-year-old woman went through the windshield in a traffic accident. She incurred a laceration in the neck, which was sutured under local anesthesia. At the time of the suturing the patient experienced a tearing pain which radiated from the region of the injury to the acromion. The shoulder remained painful and paralysis of the trapezius muscle developed. Six months later neurolysis of the accessory nerve was performed. Two months after the neurolysis the motion of the upper extremity had been restored almost to normal and the pain had ceased. After 2.5 years, the motion of the shoulder and that of the upper extremity were normal and there was no pain or atrophy of the trapezius.

## Results

Neurolysis of the accessory nerve was performed on five patients. All patients were free

Table 1. Accessory nerve lesions

| Case no | Sex | Age | Operation      | Oper. delay<br>in months | Recovery <sup>1</sup> | Follow-up time<br>in months |
|---------|-----|-----|----------------|--------------------------|-----------------------|-----------------------------|
| 1       | F   | 59  | neurolysis     | 10                       | fair                  | 15                          |
| 2       | F   | 39  | neurorrhaphy   | 6                        | poor                  | 37                          |
| 3       | F   | 35  | reconstruction | 10                       | fair                  | 65                          |
| 4       | F   | 46  | neurolysis     | 17                       | poor                  | 9                           |
| 5       | F   | 40  | none           |                          | fair                  | 15                          |
| 6       | M   | 22  | none           |                          | fair                  | 17                          |
| 7       | F   | 29  | none           |                          | fair                  | 36                          |
| 8       | F   | 35  | none           |                          | good                  | 13                          |
| 9       | F   | 40  | reconstruction | 9                        | poor                  | 12                          |
| 10      | M   | 41  | neurolysis     | 3                        | good                  | 7                           |
| 11      | M   | 12  | neurolysis     | 10                       | fair                  | 5                           |
| 12      | F   | 41  | neurolysis     | 6                        | good                  | 29                          |
| 13      | M   | 24  | neurorrhaphy   | 5                        | fair                  | 7                           |

1. Good = normal strength and range of motion of the shoulder, no atrophy, no pain. Fair = normal range of motion, normal or almost normal strength of the shoulder, atrophy of the trapezius muscle, no or slight pain.

of nocturnal pain, but slight pain on exertion was still present in one patient who had also developed a frozen shoulder on the same side. Apparently the operation was too late, i.e. 17 months after the injury. In one patient the trapezius muscle functioned perfectly 7 months after the neurolysis; the accessory nerve had been compromised by the scar over a distance of 2 cm.

Neurorrhaphy was performed on two patients approximately half a year after the injury. The distal end of the accessory nerve was in poor condition in one case and recovery of the trapezius muscle was not achieved (Case 2).

Reconstruction with a 4 cm sural nerve graft was performed on two patients (Cases 3 and 9). In Case 3, pain disappeared on surgery and the motion of the upper extremity became normal, but muscle atrophy was still present in the trapezius muscle. In Case 9 dysaesthesia was still present in the neck and submandibular region a year after surgery. There were no other complications of surgery.

There were clear signs of recovery of the accessory nerve injury at the time when four patients came for the initial consultation, and surgery was not performed on them. One recovered completely within a year and three became almost symptom-free. There was some degree of pain on exertion in two of these (Cases 5 and 6). Neurolysis perhaps would have been the appropriate measure in these patients.

## Discussion

The removal of tuberculous lymph nodes in the early 1930's was often complicated by accessory nerve lesion, e.g. in 3 per cent of Wulff's (1940) 105 cases and in 6 per cent of Hanford's (1933) 131 cases. Nordén (1946), Mead (1952), Woodhall (1952), Dunn (1974) and Wright (1975) reported altogether 33 cases of accessory nerve injury after minor surgical procedures in the posterior cervical triangle. Carenfelt & Eliasson (1980) reported 23 cases of involuntary accessory nerve injury in connection with radical neck dissection. Paljärvi & Partanen (1980) reported one case of biting palsy of the accessory nerve.

The accessory nerve leaves the skull through the jugular foramen. The nerve lies close to the internal jugular vein, and just below the lateral mass of the atlas it reaches the interior surface of the sternocleidomastoid muscle. It emits motor fibres to the muscle, passes underneath it or penetrates its deep head, reappearing under its posterior edge between the upper and middle third (Figure 1). In the posterior cervical triangle the nerve lies very superficially before it enters the trapezius muscle. It is rather a thin nerve, 1–3 mm in diameter. A small branch from the transverse cervical artery may accompany the nerve or closely approximate its course.

When the nerve is damaged during a surgical operation, the patient may immediately notice pain in the shoulder, in the axilla or in

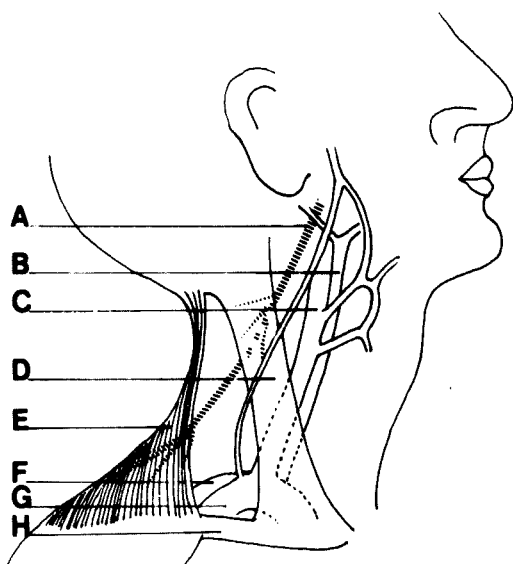


Figure 1. Schematic topography of the accessory nerve. A = N. accessorius. B = A. carotis communis. C = V. jugularis externa. D = M. sternocleidomastoideus. E = M. trapezius. F = A. subclavia. G = V. subclavia. H = Clavicula.

the occipital scalp. Occasionally, pain does not appear until the patient has begun to move about and to resume work (Nordén 1946). Pain and paraesthesias have a tendency to increase when the arm has been subjected to exertion. It has been assumed that tension of the plexus brachialis due to the paresis of the supporting trapezius muscle is the eliciting factor.

Paresis of the superior portion of the trapezius muscle is a dominant diagnostic sign. Paresis involves lowering of the shoulder and causes the scapula to slip away from the median line. The loss of the bulk of the trapezius muscle leaves a hollow in the supraclavicular region. The arm feels heavy and the patient is unable to abduct it above 80–90 degrees. Often, some degree of paresis is noted in the sternocleidomastoid muscle.

A positive abduction test with flaring of the entire vertebral border of the scapula and a virtual dislocation of the scapula is a typical finding (Figure 2). When performing the test, the examiner holds the patient's wrist firmly at the side. The patient then attempts abduction against this resistance.

When the diagnosis of the lesion has been ascertained, surgical intervention should be considered. Woodhall (1957) did not observe

spontaneous regeneration in any of his 14 cases of accessory nerve injury. Harris & Dickey (1965) accomplished grafting of the preserved section of the accessory nerve with the greater auricular nerve. Nordén (1946) concluded that functional prognosis is poor when repair is accomplished more than 6 months after injury.

The proximal segment of the nerve is best found by using the posterior border of the sternocleidomastoid muscle as a landmark and by keeping the dissection very superficial. In cases of complete severance the gap is usually small, but it may be difficult to find the distal end of the nerve. Sensory nerves in the operative region may resemble the accessory nerve. The nerve lesion is treated like other injuries to peripheral nerves. If the nerve is not severed, liberation from the operative scar is adequate treatment. If the nerve has been severed, neurorrhaphy is performed if it does not cause tension. If necessary, the nerve is reconstructed with a graft. Usually one graft



Figure 2. Positive abduction test on the left in accessory nerve injury. Note flaring of the vertebral border of the scapula.

from the sural nerve is adequate. After revision and suturing or reconstruction of the nerve, the arm is supported by a sling for the following 2 or 3 weeks.

If conservative treatment is considered adequate, the paralyzed muscle is protected and kept unstretched for a period of 2-3 months with an arm-supporting bandage or a sling. If there are no signs of recovery, surgery has to be seriously considered.

Late treatment includes attempts at correction of the erroneous position of the scapula by means of muscle and fascial plastics (Dewar & Harris 1950, Campbell 1980), if deemed necessary.

On the basis of the literature and our own experience, damage to the accessory nerve is most often a result of iatrogenic constriction of the nerve, and, at times, severing of the nerve. Operative treatment of the nerve is often performed too late. The shortest interval between injury and repair, in our material, was 3 months. Although conservative treatment in some cases of neurapraxia gives satisfactory results, exploration of the accessory nerve should not be delayed if paralysis of the trapezius muscle has occurred after surgery in the neck region, because neurolysis often gives good results. Moreover, neuroorrhaphy or reconstruction is easier in the early stage before the formation of large amounts of scar tissue.

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