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## Musculocutaneous nerve lesion (C5–C6)

The musculocutaneous nerve has a segmental origin – C5–C6. As its name suggests, it has both motor and sensory fibres. The brachial plexus originates from anterior rami of C5, C6, C7, C8 and T1 and it forms the musculocutaneous, median, ulnar, axillary and radial nerves. The lateral cord divides into the musculocutaneous nerve and the lateral branch of the median nerve<sup>[1]</sup>.

The nerve usually passes through the coracobrachialis and between the biceps and the brachialis and at the elbow it becomes the lateral antebrachial cutaneous nerve. Above the elbow it supplies only motor nerves but below the elbow it contains only sensory fibres<sup>[2]</sup>.

There are, however, considerable anatomical variations which can have clinical significance<sup>[3]</sup> <sup>[4]</sup>.

The arrangements of the fibrous sheaths of the coracobrachialis muscle allow for a 'telescoping' effect in relation to the musculocutaneous nerve. Any factor which decreases this sliding effect may expose the nerve to mechanical effects of muscle contraction, with the possibility of a compression syndrome<sup>[2]</sup> <sup>[5]</sup>.

Lesions of the nerve produce weakness of flexion at the elbow and weakness of supination. The biceps is an important supinator. There is sensory loss on the lateral side of the forearm. The brachialis muscle receives innervation from both the musculocutaneous nerve and the radial nerve<sup>[6]</sup>. One study found that the musculocutaneous nerve contributes to 42% of the muscle power that flexes the elbow<sup>[7]</sup>.

### Epidemiology<sup>[8]</sup>

Isolated injury to the musculocutaneous nerve or the lateral antebrachial cutaneous nerve is uncommon. .

## Risk factors

- Damage to the shoulder and brachial plexus can affect the musculocutaneous nerve.
- Compression of the nerve by the biceps aponeurosis and tendon against the fascia of the brachialis muscle causes sensory loss below the elbow on the lateral side of the forearm. Entrapment of the nerve is one cause of pain at the elbow<sup>[2]</sup>.
- Musculocutaneous nerve injury can be a complication of shoulder joint replacement, albeit uncommon (8 out of 44 patients in one study)<sup>[9]</sup>.
- Using an anterolateral approach to the humerus during orthopaedic surgery also carries a risk<sup>[6]</sup>.

## Presentation<sup>[10]</sup>

### History

- There may be complaint of weakness of flexion of the elbow, poor power at supination or numbness over the lower lateral forearm. This may follow trauma to the shoulder or upper limb or excessive use or training.
- It presents with loss in power of biceps and brachialis muscles without a disturbing pain. The injury generally occurs after strenuous exercise and can be demonstrated by electrophysiology .
- Strenuous elbow extension and forearm pronation are the risk exercises for the lesion. Presentation can be pain at the elbow or 'burning' in the forearm<sup>[11]</sup>.

### Examination

The following features are characteristic:

- Weakness of elbow flexion and forearm supination.
- Sensory loss over the lateral and volar aspect of the forearm.
- Weak or absent biceps tendon reflex.

- Being a lower motor neurone lesion, other expected signs include poor muscle tone, marked wasting and possibly fasciculation.

## Investigations<sup>[2]</sup>

Nerve conduction studies, electromyography and MRI scan should confirm a lower motor neurone and sensory nerve lesion and are useful in differentiating musculocutaneous nerve lesions from cervical spine nerve root impingement.

## Management

- Spontaneous recovery is possible but may take several months<sup>[12]</sup>. In lesions that are not directly due to trauma, rehabilitative measures may be appropriate<sup>[2]</sup>.
- If conservative therapy fails, surgical decompression should be considered. Surgical decompression is indicated as first-line treatment if there is paraesthesia, as this suggests that the affected nerve still has some function<sup>[11]</sup>.
- Traumatic lesions of the musculocutaneous nerve may be amenable to end-to-end repair. In cases where this is not possible, nerve grafting was the preferred option. However, difficulties in maintaining viability in a nerve graft have proved a challenge and have led to the development of nerve transfer. Transfer of redundant nerve fascicles from the median and ulnar nerves to the biceps brachii and brachialis branches of the musculocutaneous nerve has been reported<sup>[13]</sup>.

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