Dynamic Chiropractic

SOFT TISSUE / TRIGGER POINTS

Chronic Peripheral Nerve Compression

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Since surgeons do not usually analyze tissue samples after operating on nerve compression sites, most information on the changes occurring in chronic nerve compression has been taken from animal studies.[1] With compression, there is initial subperineurial edema followed by thickening of the perineurium and then thickening of the internal and external epineurium (intraneural fibrosis). There is thinning of the myelin; if the compression is prolonged, axonal degeneration occurs. These changes may occur at several locations along the nerve, and the amount of protective connective tissue surrounding the nerve will allow a slower neuronal change. The changes within the nerve are affected by the amount of force and duration of compression, with changes in the nerve taking place over months and years.[2]

Common physical stressors to nerves are excessive repetitive movements, high forces or loads, awkward postures and vibration. For example, positions of wrist flexion and extension and finger flexion increase the pressure within the carpal tunnel while elbow flexion increases pressure in the cubital tunnel. This knowledge is behind the tests (such as the Phelan test and elbow flexion test) to determine if there is nerve compression. With elbow flexion, the ulnar nerve is placed more superficial and put under increased tension, thereby increasing the possibility of compression when a patient spends prolonged periods sitting with the elbow flexed on a hard surface. The elbow flexion test is simply placing the elbow in full flexion with the wrist in neutral while the examiner applies pressure to the ulnar nerve proximal to the cubital tunnel.[3]

Chronic shortened muscles can be blamed for compressing nerves that pass around or through them. When muscles are placed in a shortened position for prolonged periods, the muscles reset to these shortened lengths. As soon as these muscles are stretched, they may create a burning sensation or affect the accompanying nerve. Patients who have a job requiring resisted pronation or spend hours in a position of pronation may eventually may end up with a shortened pronator teres, which will compress the median nerve in the forearm.

The median nerve can become compressed when the individual places the arm in supination. Based on this fact, the following test can be used to determine if the pronator is adversely affecting the median nerve. The patient's forearm is placed in full supination with the elbow in extension and the wrist in neutral. Pressure is then applied over the pronator teres where the median nerve is present.[3] If there is compression at this level, there will be distal paresthesias along the median nerve. A Tinel's sign at this location may also be positive.

Another example of chronic shortened muscles affecting nerves is with the forward-head and forward-shoulder patient. These patients characteristically show tight, shortened pectorals (especially the pectoralis minor) and scalenes which may compress the brachial plexus. In these cases, the upper trapezia and levator scapulae are also tightened. The scapulae are more lateral than usual in the

abducted position due to weakness of the lower scapular stabilizers resulting in overuse of the scapular elevators.

Patients should be viewed from behind and asked to abduct and forward flex the shoulders. The examiner should evaluate scapular motion for possible dyskinesia. If the middle and lower trapezius and serratus anterior are weak, the scapula will shift laterally instead of rotating anterior-superiorly around the chest cavity. The brachial plexus may be tested for muscular compression by having the patient raise the arms overhead while the examiner applies pressure on the plexus supraclavicularly between the scalene muscles.[3] A Tinel's sign at this site may also be positive.

With arm elevation, the brachial plexus may also be stressed by the coracoid process. These patients often present with upper extremity paresthesia and numbness. Cervical origination using foraminal compression tests must always be used to determine the source of the problem. If after a period of treating the peripheral and spinal areas without results, neurological testing (EMG) may be necessary to pinpoint the location.

Novak and Mackinnon[1] describe how the clinical signs and symptoms of nerve compression are related to the degree of the nerve compression. In the early stages of compression, the patient is asymptomatic at rest. The tests described above will be positive due to the temporary ischemia created, such as Phelan's test of holding the wrist in flexion; elbow flexion test; forearm supination; and brachial plexus arm elevation test. These provocative positions should be held for at least one minute to duplicate the particular nerve paresthesia.

In the moderate stages of nerve compression, there are increased complaints of paresthesia and numbness; in the more advanced stages there will be muscle atrophy and abnormal two-point discrimination. It is necessary to go back to old-fashioned nerve tracing to find out where the compression is located, and often there is more than one location.

References

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