



COMMON INJURIES IN INSTRUMENTAL MUSICIANS

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Focal Dystonia (Focal Task-Specific Dystonia, Musician's Dystonia, Hand Dystonia, Embouchure Dystonia):

Focal Dystonia is a neurologic condition that manifests as involuntary movements or slowed voluntary movements that impede smooth performance of a specific activity. For example, a musician who plays a wind instrument with this condition may experience difficulty with or inability to correctly form an embouchure, affecting their ability to form a tight seal against their mouthpiece. Whereas, a pianist with this condition may have a loss of independent finger movement affecting their ability to play chords or runs. Etiology is yet unknown but is thought to involve genetic and environmental factors. Focal dystonia includes deficits in surround inhibition and abnormal selectivity in the central nervous system, maladaptive plasticity in the sensorimotor cortex, and abnormal co-contraction and overflow to muscles. Contributing factors include a history of anxiety, perfectionism and overuse within repetitive activities. There is no cure for dystonia, but physical therapy can address strengthening, neuromuscular re-education, adaptations, and provide patient education in sensory tricks to work around abnormal plasticity. Focal dystonia can be a potentially career-ending condition for musicians.

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Carpal Tunnel Syndrome

The carpal bones and the flexor retinaculum of the wrist form the carpal tunnel. Within this tunnel lie the tendons of the deep and superficial finger flexors and short thumb flexor along with the median nerve. Compression of the median nerve produces numbness, tingling in the thumb, index, and a portion of the ring fingers, as well as pain in the wrist and forearm. Over time, muscle function of the thumb may be impacted. Night pain and diminished sharp/dull sensation are also common. The carpal tunnel can become compressed in musicians due to repetitive wrist

activity such as forceful grasping and excessive flexion. It can be exacerbated by obesity, fluid retention, inflammation, or Rheumatoid Arthritis. Emerging literature has found that musicians may present with thicker cross-sectional area of the median nerve compared to non-musicians. It has been proposed that patients with Carpal Tunnel Syndrome may also experience some nociplastic changes leading to allodynia and hyperalgesia. Conservative management of Carpal Tunnel Syndrome with physical therapy is often successful in mild to moderate cases. Interventions include ergonomic modifications, neurodynamics, manual therapy, therapeutic exercises dry needling and pain neuroscience education. Carpal Tunnel Release surgical consult is recommended if conservative treatment fails.

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Cubital Tunnel Syndrome (Ulnar Neuropathy at the Elbow)

Cubital Tunnel Syndrome is the compression of the ulnar nerve in the cubital tunnel (under the medial epicondyle in the elbow). Possible sites of entrapment include Osborne's ligament, between the two heads of flexor carpi ulnaris, the medial epicondyle of the humerus, the flexor-pronator aponeurosis or the anconeus muscle. The ulnar nerve can also become displaced from beneath the medial epicondyle with elbow flexion. Symptoms include pain in the elbow and numbness and tingling in the ulnar nerve distribution down to the 4th and 5th fingers. Weakness, loss of grip or dexterity may also occur. Physical therapy can be used to manage Cubital Tunnel Syndrome with activity modification and ergonomics, neural mobilization and manual therapy.

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Temporomandibular Joint Disorders (TMD)

Temporomandibular Joint Disorders refer to a wide spectrum of presentations of pain and/or dysfunction at the temporomandibular joint (TMJ), where the mandible meets the skull, just in front of the ear. TMD can originate from the muscles of mastication, displacement of the supracondylar disc of the mandibular condyle or arthritis of the bony structures within the joint. Persistent low-level contraction caused by anxiety, teeth grinding, head or embouchure placement can lead to trigger points or adaptive shortening of muscles, including those that attach to the supracondylar disc. Jaw clicking is caused by reduction of a displaced supracondylar disc whereas locking can occur when a disc is anteriorly or medially displaced without reduction. TMD can impact woodwind and brass players or violinists and violists due in part to the ergonomics of playing. Physical therapy can help TMD with manual therapy to muscular and joint structures, dry needling to address trigger points, and ergonomic modifications and exercises to improve pain and function.

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Thoracic Outlet Syndrome

Thoracic Outlet Syndrome (TOS) is a symptom complex that presents with pain, numbness and tingling, weakness, swelling and heaviness of the arm. The neurovascular bundle that contains nerves from the brachial plexus, the subclavian and axillary arteries and veins passes through the thoracic outlet between the neck and shoulder. These structures can be compressed in one of three areas: the interscalene triangle (anterior/middle scalenes and first rib), the costoclavicular space between the clavicle and first rib, or the subcoracoid space (below the coracoid process behind pec minor). Prolonged forward head or shoulder postures and repetitive arm activities can lead to TOS. Physical therapy can address this condition with activity modification and ergonomics, manual therapy, soft tissue mobilization and neural mobilization.

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Neck Pain

Neck pain is an umbrella term for multiple presentations that include but are not limited to: cervicalgia, mobility deficits, uni or bi-lateral headaches, or cervical radiculopathy with radiating pain to the upper extremities. In the instrumental musician, neck pain is common to instruments requiring asymmetrical postures such as violin, viola, flute and horn. Pain can arise as a result of faulty ergonomics, repetitive activities or the acceleration of normal degenerative changes in vertebrae and discs. Tight, weak or asymmetrical muscles about the neck and shoulders can result in pain and/or headaches. Osteophytes and foraminal stenosis on cervical vertebrae or cervical disc herniations can lead to radiculopathy. Physical therapy treatments are successful for neck pain in most cases and include ergonomic modification, soft tissue mobilization, stretching, strengthening of upper back, arm and neck muscles, thrust and non-thrust mobilization of the cervical and thoracic spine, dry needling and traction. Patients with neck pain may also benefit from interventions to address cognitive and affective factors.

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Rotator Cuff Injury (Muscle performance deficits of the Rotator Cuff, Subacromial Impingement Syndrome)

Pathology of the Rotator Cuff is a non-specific diagnosis that encompasses any muscle performance deficits of the rotator cuff. The tendons of the rotator cuff lie superior to the humeral head and inferior to the acromion process of the scapula and can become impinged within the subacromial space due a variety of factors including the shape of the acromion, shortening of the inferior/posterior joint capsule and posterior shoulder structures, weakness of the rotator cuff muscles as compared to the deltoid during elevation, or an abnormal scapular force couple limiting upward rotation and posterior tilt. Rotator cuff pathology is common to overhead athletes as well as bowed string musicians. It progresses from acute tendinitis and inflammation to tendinosis with fibrosis and degenerative changes, including partial thickness tears. Conservative management of Rotator Cuff pathology with physical therapy can provide functional recovery and reduction in pain. Interventions include muscle strengthening, stabilizing, stretching and motor control, manual therapy to posterior glenohumeral structures and thrust and non-thrust mobilization to the thoracic spine. Frequent rest breaks during aggravating activities and alterations to technique may also be incorporated into physical therapy care. Surgery followed by rehabilitation is a first line-treatment for full-thickness tears, and is recommended for young active individuals with small to medium tears. There is little difference between surgery and conservative management at 2-5 years, but the outcomes at 10 years are more favorable with surgery than conservative management alone. PT should commence within 3-6 months of the discovery of a degenerative tear for optimal results.

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Osteoarthritis of the hand and shoulder

Primary Osteoarthritis (OA) is a normal consequence of aging in which articular cartilage on bony joint surfaces develops lesions over time marring the smooth joint surface. As OA progresses, the joint space becomes compressed and osteophytes form on joint surfaces. These intrinsic changes to the joint can cause pain, and are only diagnosed on radiography.

Radiographic changes, however, do not always indicate the presence of pain. Secondary OA is an acceleration of the natural process due to previous injury, or increased stress on the joint. Instrumental musicians are impacted by OA-related pain in the joints of the hand, wrist and shoulder. Physical therapy is successful in conservative management of early OA using manual therapy, strengthening exercises, lifestyle and postural modifications. Corticosteroid injections are another possible addition to multimodal management approach that can reduce pain and allow normal function in the short term. Surgical options for relief from OA include arthroscopic debridement, Osteoarticular transfer system (OATS) and total arthroplasty.

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Tendinitis/Tendinopathy

Tendinitis is the inflammation of tendons due to overuse, weakness and fatigue. Over time tendinitis develops into tendinopathy, a degenerative pathology of the tendon in which additional fibroblasts, hypervascularization, and immature disorganized collagen fibers cause a thickening, lack of mobility and pain at the tendon. A prolonged local inflammatory response is also thought to play a role in the development of tendinopathy. The incidence of this condition is high among individuals who engage in activities involving repetitive activities of mechanical stress, such as instrumental musicians. Common sites of tendinopathy for the instrumental musician are the rotator cuff muscles of the shoulder (see above entry), lateral epicondyle and the tendon insertions of the wrist, hand and fingers. Physical therapy can reduce pain and improve function with ergonomic and activity modifications, soft tissue mobilization, dry needling, manual therapy, kinesiotaping, and strengthening exercises.

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Low Back Pain

Low Back pain is an umbrella term for nociceptive drivers from muscular, vertebral, capsular or neural structures. The origins of back pain include traumatic injury, congenital abnormalities such as scoliosis or spondylolysis, degenerative changes, systemic conditions and prolonged postures or repetitive activities. Long-standing low-back pain may also lead to nociplastic changes, and patients presenting with low back pain should be screened for yellow flags and signs of pain catastrophizing. Physical therapy is effective in treatment of pain and loss of function due to low back pain. Interventions include manual therapy, soft tissue mobilization, neural mobilization, strengthening, general exercise, motor control and pain neuroscience education.

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