



Workplace Safety and Insurance
Appeals Tribunal

Tribunal d'appel de la sécurité professionnelle
et de l'assurance contre les accidents du travail

Symptoms in the Opposite or Uninjured Arm

Discussion paper prepared for

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Dr. William Robert Harris graduated from the Faculty of Medicine of the University of Toronto in 1945. After a year in the Canadian Navy, he trained in general and orthopedic surgery in Toronto's Gallie Course and in Boston at the Massachusetts General Hospital. Following a McLaughlin Traveling Fellowship in the United Kingdom and Europe, he joined the University of Toronto faculty. He contributed in many areas of orthopedic surgery including trauma, limb prostheses and rehabilitation. During a long and productive career, he served consecutive terms as Chief of Orthopedic Surgery at both Sunnybrook and the Toronto General Hospital. He lectured widely and received numerous honours and awards for his work. He joined the faculty at the University of Toronto and then held the rank of Professor Emeritus from 1988 in the Department of Surgery. His clinical and research interests were in orthopaedic surgery. He held a number of appointments including Chief of Orthopaedic Surgery at Sunnybrook Hospital and Toronto General Hospital. Dr. Harris was involved with the Tribunal as a medical counsellor until 1997. He died in 2005.

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This medical discussion paper will be useful to those seeking general information about the medical issue involved. It is intended to provide a broad and general overview of a medical topic that is frequently considered in Tribunal appeals.

Each medical discussion paper is written by a recognized expert in the field, who has been recommended by the Tribunal's medical counsellors. Each author is asked to present a balanced view of the current medical knowledge on the topic. Discussion papers are not peer reviewed. They are written to be understood by lay individuals.

Discussion papers do not necessarily represent the views of the Tribunal. A vice-chair or panel may consider and rely on the medical information provided in the discussion paper, but the Tribunal is not bound by an opinion expressed in a discussion paper in any particular case. Every Tribunal decision must be based on the facts of the particular appeal. Tribunal adjudicators recognize that it is always open to the parties to an appeal to rely on or to distinguish a medical discussion paper, and to challenge it with alternative evidence: see *Kamara v. Ontario (Workplace Safety and Insurance Appeals Tribunal)* [2009] O.J. No. 2080 (Ont Div Court).

SYMPTOMS IN THE OPPOSITE OR UNINJURED ARM

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In recent years the Tribunal has heard an increasing number of appeals in which it is claimed that a painful injury to one upper extremity causes the patient to “favour” it. The patient concludes that this produces “overuse” of and hence pain in the opposite normal one. Usually, but not always, the symptoms in the “normal” limb resemble those of the original side.

There are three conditions that occasion most of such appeals:

1. Injury to the rotator cuff of the shoulder.
2. Injury to the origin of the muscles that move the wrist: lateral epicondylitis (tennis elbow) and medial epicondylitis (golfer’s elbow); and
3. Carpal Tunnel Syndrome (CTS).

These will be briefly described, and their possible effect on the opposite limb discussed.

1. Rotator Cuff Injuries

a) Anatomy

The Rotator Cuff consists of the tendons of the subscapularis, supra and infra spinatus muscles, blended together to form a hood or cuff over the head of the humerus (upper end of the arm bone). It is inserted to the greater tuberosity of the humerus.

The greater tuberosity can be felt with some difficulty through the thick deltoid (i.e. like a triangle) muscle that lies over the outer side of the shoulder. The rotator cuff’s function is to stabilize the arm when it is abducted (lifted up to the side and over head). This is achieved because the rotator cuff presses the head of the humerus (the ball of the shoulder joint) against the shallow glenoid (socket) of the shoulder. As the rotator cuff

muscles are relatively weak, power for abduction is provided by the much stronger deltoid muscle.

When the arm is abducted, the rotator cuff glides under the acromion. This is the bony bump that can be easily felt at the top and outer side of the shoulder. Part of the deltoid muscle is attached to it. The space between the rotator cuff and the under side of the acromion is small, so that the rotator cuff may rub against it. Thus there is a bursa (i.e. a purse) between the rotator cuff and the acromion. It is filled with synovial (joint) fluid and acts to reduce friction. It is called the subacromial or subdeltoid bursa.

b) Pathology

The Rotator Cuff may be torn when it is contracted against resistance. Almost always this occurs in older patients. When the cuff ruptures in an older person, there is always aging change (degeneration). In turn this sets up a repair response in the tendon. As this is an inflammatory process, tears either complete or partial are painful. They may irritate the sub acromial bursa which becomes painful as well. When an attempt is made to abduct the arm, the tender area of the rupture rubs against the under surface of the acromion, causing pain. In the majority, this condition occurs spontaneously. Less commonly, it is related to repetitive over shoulder movement (a waitress hoisting a tray onto her shoulder). Rarely, it results from a sudden downward force to the arm as it is being abducted. The part of the rotator cuff that ruptures has a very poor blood supply. While it is sufficient to cause an inflammatory response, it is insufficient to bring about repair. Thus these tears do not heal spontaneously.

Rotator cuff injuries are very rare indeed in younger patients in whom the cuff is free of aging change. When they do occur, the tendon does not rupture, but its attachment to the greater tuberosity is avulsed along with a flake of bone from the tuberosity. If this flake of bone is correctly reduced (usually by surgery), it will reattach to the place from which it was avulsed, and normal rotator cuff function is restored.

c) Signs (what the examiner notices) and symptoms (what the patient notices)

In a complete rupture, the patient is unable to elevate their arm from their side. Instead they shrug their shoulder and ineffectually abduct their arm only a few degrees. In an incomplete rupture, the patient can elevate their arm above their head, but as they do so, there is a "painful arc" as the tender spot in the rotator cuff passes under the acromion. This is sometimes called an "impingement syndrome". There is tenderness when pressure is

applied to the shoulder at the greater tuberosity. The patient complains of shoulder pain, worse when they try to abduct their arm. If it is an incomplete rupture, the patient recognizes that when they first start to abduct, there is little or no pain, then pain as the rupture passes under the acromion, then no or less pain as full abduction is reached.

d) Imaging Studies

In a complete rotator cuff tear, when abduction is attempted the stabilizing effect of the rotator cuff is lost. Thus, when abduction is attempted, the deltoid pulls the humeral head upwards until it rests against the undersurface of the acromion. This creates a new fulcrum for the humeral head and leads to excessive wear of it (arthritis). The elevation of the head and wearing changes can often be seen in plain x-rays.

The gold standard is an arthrogram, in which a radio opaque dye is injected into the shoulder joint. If a complete tear is present, the dye leaks through the tear into the sub acromial space and can be seen in the x-ray. With incomplete tears, there is no leakage so the arthrogram is of little value. More recently, MRI scans have been employed. These have the advantage of being able to detect incomplete as well as complete tears. Ultra sound is sometimes used. It requires a high degree of interpretive skill, and has significant degrees of false positive and false negative results.

e) Treatment

Incomplete Ruptures. Initial treatment is conservative, consisting of rest and physiotherapy, and sometimes by injection of cortisone into the shoulder. Cortisone has a strong anti-inflammatory effect, and often reduces or eliminates the pain. But it does not promote healing of the tear. In general, most incomplete ruptures do well with conservative treatment. If that fails, then some surgeons advocate removal of part of the acromion (acromionectomy) and sometimes the outer end of the clavicle (collarbone) to eliminate the impingement syndrome.

Complete Ruptures. Surgical repair is the treatment of choice. But the technical problem is that the tear has occurred in an area of degenerative change, so that trying to sew it together is rather like trying to stitch the bristles of two paint brushes together: the stitches have little grip and pull out. Many methods have been devised to overcome this, but none are completely successful. No matter what the treatment, in time the pain usually, but not always disappears, and while the patient has weakness of abduction often there is good shoulder function. For this reason, surgical

repair of the cuff is not an urgent matter. It is the patients with chronic pain that may benefit from surgical decompression (acromionectomy) of the shoulder (either via arthroscopy or an open operative approach).

Does a Rotator Injury Cause Symptoms in the Opposite Side?

If the symptoms in the opposite side are similar to those of the injured one, then it must be proven that a) there is a rotator cuff injury and b) that favouring the injured side obliges the patient to strain the “normal” cuff by repetitive overhead use of the shoulder.

If the symptoms in the opposite limb are different than those of the injured one, then it must be clearly shown how “favouring” the injured side could have caused them. Furthermore, other causes of arm pain, such as aging change in the neck with referred pain in the arm, must be ruled out.

2) Lateral and Medial Epicondylitis (Tennis and Golfer’s Elbow)

a) Anatomy

The muscles that dorsiflex (elevate) the hand when it is palm down are called the wrist dorsiflexors. They originate from the bony prominence (the lateral epicondyle) easily felt on the outer side of the elbow. The muscles that bend the hand upwards when it is palm up are called the wrist palmar flexors. They originate from the bony prominence (medial epicondyle) on the inner side of the elbow.

b) Pathology

As a result of normal aging change, degenerative changes may be present in the origin of the wrist dorsiflexors and palmar flexors. These may produce microscopic ruptures. As in the case of the rotator cuff, these setup an inflammatory response which is painful. The pain is worse when the wrist muscles are stressed. Most commonly, the condition occurs spontaneously. Less commonly, it results from repetitive movement of the wrist against resistance such as backhand strokes in tennis, hammering or swinging a golf club. Less commonly, it can result from a direct blow to the epicondyles.

c) Signs and Symptoms

Tenderness is present over the appropriate epicondyle. Sometimes the capsule of the elbow joint is bulging if there is excess fluid in it. Tests designed to stress the muscles against resistance reproduce the pain. The patient knows that when they lift objects (teacup, water jug) with their palm down (tennis elbow), they have pain in the outer aspect of the elbow. Or if they lift objects with their palm up (golfer's elbow) they have pain in the inner side of their elbow.

d) Imaging Studies

Plain x-rays are usually negative, although rarely a patch of calcification is seen in the area of the muscle origin. While MRI scans theoretically might reveal a partial rupture, they have not proven to be of much value.

e) Treatment

The vast majority responds to conservative treatment consisting of rest and local heat. If this does not work, injecting the tender part of the epicondyle as well as the joint with cortisone is usually effective. Surgery is a last resort. Most operations are designed to lessen the tension on the muscle origin, either by lengthening its tendon or detaching its origin from the lateral epicondyle. The fact that many operations have been devised suggests that none are completely effective. But with the majority, relief of symptoms occurs over time.

Does Epicondylitis Cause Symptoms in the Opposite Limb?

If the symptoms are similar to those on the injured side, then it must be proven that "favouring" that side obliged the patient to undertake activity that involved excessive wrist movement against resistance. In this respect, activities of daily living such as dressing, washing, writing or eating cannot be classified as involving excess wrist movement against resistance.

3. Carpal Tunnel Syndrome (CTS)

If the symptoms do not resemble those of the injured side, then the examiner must identify their cause, and try to show how this was the result of “favouring” the injured side. Again, other causes of pain, such as aging changes in the neck with pain referred down the arm, must be ruled out.

a) Anatomy

The carpal tunnel consists of the small (carpal) bones of the wrist behind and the unyielding transverse carpal ligament in front thus its confines are rigid, and it is incapable of either enlarging or becoming smaller. Passing through it are the median nerve and the flexor tendons that bend the fingers. The median nerve provides sensation to the thumb, index, long and thumb side of the ring fingers. In addition, it supplies some of the intrinsic muscles of the thumb, index and middle fingers. The tunnel has just enough room, no more and no less, for the tendons and nerve.

b) Pathology

When something happens that crowds the contents of the tunnel, the median nerve is compressed. This causes tingling and numbness which is sometimes of a painful burning quality, in the thumb, index, long and outer side of the ring finger. Characteristically the tingling is worse at night and awakens the patient. In severe cases, there may be weakness of the intrinsic muscles of the thumb, with decrease in the strength of the muscle that lifts the thumb away from the palm, and weakness when opposing the thumb to the fingers to provide a strong pinch. This characterized by wasting of the muscle that forms the web of the thumb, and inability to lift the thumb away from the palm and weakness of pinch. The causes of crowding are conditions that narrow the tunnel, conditions that swell its contents and idiopathic (no known cause). Narrowing of the tunnel is caused by fractures or dislocations of the lower end of the forearm and dislocations of the carpal bones, hypothyroidism and acromegaly. Conditions that may swell the contents are pregnancy, and rheumatoid arthritis, both of which may produce swelling of the sheaths of the finger flexor tendons. In idiopathic cases, there is no clear explanation of the cause and no convincing evidence that repetitive wrist movement such as typing or using a computer keyboard crowds the contents of the carpal tunnel. It is important to how that many patients' complaints of numbness are entirely subjective: i.e. there is no evidence on careful examination of sensory impairment and no muscle abnormality on electrical testing. In this case, the symptoms are probably not the result of a true Carpal Tunnel Syndrome (CTS).

c) Signs and Symptoms

There may or may not be numbness to pin prick and light touch in the thumb, index, long and thumb side of the ring fingers. There may be wasting of the web of the thumb and inability to pinch the thumb against the index. The patient is aware of tingling and numbness in the distribution of the median nerve and sometimes of weakness and inability to pinch. The symptoms are usually worse at night.

d) Investigation

The only useful test is electromyography (EMG). This is a measure of the electrical activity in muscle. This is reduced when the nerve supply to a muscle is compromised. When positive, it confirms the physical findings of altered sensation and muscle weakness.

e) Treatment

The use of a splint to immobilize the wrist at night is often sufficient to relieve symptoms. If it does not work, then surgical release of the carpal tunnel is done. This is achieved by dividing the strong transverse carpal ligament and is effective in most cases.

Does Favouring One Wrist Because of Carpal Tunnel Syndrome Cause Symptoms On the Opposite Side?

Nearly always when this is claimed, the symptoms on the “normal” side are similar to those on the injured one. The examiner must be certain that the diagnosis is proven. One must be satisfied that the “favouring” obliged the patient to over use the finger flexor muscles on the “normal” side. In this respect, it is important to differentiate between wrist movement (which does not require use of the finger flexor muscles) and finger movement. And, most important, it should be borne in mind that idiopathic CTS is commonly bilateral.

Summary

Claims of serious or persisting painful syndromes in the arm or hand opposite to the injured one are seldom supported by adequate clinical scientific evidence. If it were true, one would expect that nearly everyone with pain in one upper extremity would develop pain in the opposite one, and that simply does not occur.

Shoulder and elbow symptoms are in most cases the result of aging change which can occur simultaneously, in both sides, so that symptoms are commonly bilateral. Symptoms usually begin in the dominant side. There must be strong evidence that the compensable injury did cause similar over use of the "normal" side.

Idiopathic CTS is commonly bilateral, and it is difficult to prove that symptoms that began on one side caused similar ones in the other. And it should be remembered that diabetics with diabetic neuropathy may have symptoms that mimic CTS.

Reference

Carpal Tunnel Syndrome. National Organization for Rare Diseases. 1998

WSIAT DECISIONS (as of November 1999)

Area of Injury	Decision Nos.
Elbow	933/97 (allowed), 663/96 (allowed), 500/89 (denied)
Arm	277/98 (denied)
Shoulder	169/95 (allowed), 533/96 (allowed), 840/89 (denied), 1648/97 (denied), 91/95 (denied)
Hand/Wrist	1260/98 (allowed), 1128/98 (allowed), 477/89 (allowed), 250/95 (denied), 258/94 (denied)