Practice Directive #C4-2

Replaced by PD#C4-2 November 21, 2017

Activity-Related Soft Tissue Disorder ("ASTD") Claims

General Principles

Activity-related soft tissue disorders ("ASTDs") are defined in policy as a diverse group of soft tissue disorders of the extremities which may or may not have been caused or aggravated by employment activities.

Some conditions that fall under the ASTD group of conditions may be adjudicated as a personal injury under section 5 of the *Workers Compensation Act* (the "*Act*") or as an occupational disease under section 6 of the *Act*, depending on the diagnosis and circumstances.

Determining whether an ASTD is due to the nature of a worker's employment under section 6 requires an analysis of risk factors relevant to the causation of ASTDs.

Determining whether a Condition is a Personal Injury or an Occupational Disease

When a claim is received and the condition may possibly be an ASTD, the first step is to determine whether the condition is a personal injury (adjudicated under section 5 of the *Act*) or an occupational disease (adjudicated under section 6 of the *Act*).

ASTD Conditions

The following conditions have been recognized as ASTD Disorders. As a result, when a worker is diagnosed with one of these conditions, the claim is (barring the occurrence of a traumatic incident) adjudicated as an occupational disease under section 6:

- Tendinopathies (which includes Epicondylopathy and Stenosing Tenosynovitis)
- Bursitis
- Hypothenar Hammer Syndrome
- Cubital Tunnel Syndrome
- Carpal Tunnel Syndrome
- Plantar Fasciitis
- Radial Tunnel Syndrome

- Thoracic Outlet Syndrome
- Disablement from Vibration.

Occupational Diseases (Section 6)

If the diagnosed condition is either recognized through regulation or listed in Schedule B as an occupational disease, it is normally adjudicated under section 6.

An exception is made, and the condition is first considered as a personal injury under section 5, if:

- the condition is attributed to a specific event or trauma, to a series of specific events or traumas, or from short term exposure to awkward posture(s) or movement(s); and where
- the onset of the condition occurred during a single shift (Note: the Board Officer should keep in mind however whether the activities (within a single shift or not) were of causative significance to the worker's condition).

If the claim is not acceptable under section 5 for a personal injury, the Board Officer then considers whether the requirements of section 6 have been met. When adjudicating an ASTD claim where there is a "provisional diagnosis" only, both sections 5 and 6 may need to be considered as part of the adjudication process.

Section 6(3) of the *Act* provides for the presumption of work causation if the worker, at or immediately before the date of the disablement, was employed in a process or industry mentioned in the second column of Schedule B (of the *Act*), and that the disease contracted is the disease found in the first column of the Schedule that corresponds to the description of the process.[1]

Section 6(1) of the *Act* provides for acceptance of claims where a worker suffers from a disease listed in Schedule B but where the 'presumption' has not been met; or where the disease is recognized by regulation (as noted above); or where the disease has not previously been designated or recognized by the Board as an occupational disease but has met the section 6(4.2) test (see below).

Section 6(4.2) provides that if the claim is not acceptable as a personal injury and is not recognized as an occupational disease through Schedule B or by regulation, but the evidence indicates the condition may be due to the nature of the worker's particular employment, section 6(4.2) of the *Act* should be considered. Under section 6(4.2), the Board can designate or recognize an occupational disease as being one that is peculiar to or characteristic of a particular process, trade, or occupation in situations "… where the expert medical and scientific information is insufficient to cause the Board to include it in Schedule B (with the benefit of the rebuttable presumption that the *Act* provides)."[2]

---

[1] See *Rehabilitation Services and Claims Manual*, Volume II ("RSCM II"), policy item #26.21, *Schedule B Presumption*.

[2] See RSCM II, policy item #26.02, *Recognition under Section 6(4.2)*.

Non-Specific Symptoms or Unspecified Non-Traumatic Diagnoses of the Limbs[3]

Further investigation is required in the case of non-specific symptoms where the diagnosis is unclear or the condition is described as a non-traumatic condition such as a 'repetitive strain injury', 'overuse syndrome' or 'occupational cerviobrachial syndrome', etc.[4] Board Officers should commence risk factor analysis while simultaneously obtaining diagnostic clarification from the worker's physician or, if unavailable, a "provisional diagnosis" from the worker's physician or a Board Medical Advisor.

If no work-related risk factors are established, the claim is denied under section 6. If a diagnosis is confirmed and it is a condition recognized through regulation or listed in Schedule B, the Board Officer considers the claim under section 6. If the claim is acceptable based on the risk factors and the final diagnosis is still a general or non-specific label, adjudication is completed under section 6(4.2).

Adjudicative Test – Causation

A worker's occupational disease is compensable where it is due to the nature of his or her employment. For a claim to be accepted as a personal injury, it must have arisen out of and in the course of employment.

In considering causation, Board Officers need to determine whether or not the worker's employment was of "causative significance" in the occurrence of the injury or disease. Policy defines causative significance as meaning the work activities were more than a trivial or insignificant aspect of the injury or disease.[5] While the causative significance test is directly referenced in RSCM Item C3-14.00 as the test for causation for personal injuries, there is no equivalent statement for occupational diseases in Chapter 4. However, based on an overall reading of the policies in Chapter 4, the causation test is the same under section 6 as it is for section 5 (i.e., the "causative significance" test).

To distinguish between adjudicating ASTD claims as personal injuries and those that are treated as diseases, the following provides guidance:

- when an ASTD is attributed to a sudden trauma or an infection due to a penetrating wound, it will be treated as an injury and adjudicated in accordance with the policies in Chapter 3.[6]
- a claim made by a worker diagnosed with an ASTD when no specific trauma or penetrating wound has occurred, will be treated as a disease and adjudicated in accordance with the policies in Chapter 4.

ASTDs are complex and often involve multiple contributing factors. As a result, a thorough analysis is required to determine whether the ASTD was caused by the work activity. For the ASTD to be compensable, the work activity must have contributed in a meaningful way. That is not to say that the work injury must be the only cause or the predominant cause of the worker's ASTD. Rather, the work activity must have been a significant contributing factor in order for the ASTD to be compensable. As

---

[3] See RSCM II, policy item #27.34, *Non-Specific Symptoms or Unspecified Non-Traumatic Diagnoses of the Limbs.*

[4] See RSCM II, policy item #27.00, *ACTIVITY-RELATED SOFT TISSUE DISORDERS ("ASTDS") OF THE LIMBS.*

[5] See RSCM II, item C3-14.00, *Arising Out of and In the Course of Employment*.

[6] See RSCM II, item C3-12.00, *Personal Injury*.

intended by the policy definition of causative significance, it is not enough for the work injury to have contributed in a minor fashion; it has to have contributed to a material degree and employment-related risk factors.

When assessing whether a worker's employment was of causative significance in the development of an ASTD, the Board Officer generally considers how the worker interacts with the work environment. When assessing whether employment-related risk factors caused or contributed to the development of a worker's ASTD, Board Officers need to consider:

- the location of the anatomical structure affected (e.g. the elbow);
- the risk factors involved in the worker's employment activities;
- the muscle groups, tendons and joints involved in performing the worker's employment activities; and
- whether there is a biologically plausible connection between the employment activities and the development of the ASTD.

The presence or absence of certain risk factors may suggest work causation, while the presence or absence of others may suggest non work-related causation. Where the risk factors are determined to be insufficient in contributing in a material way to the development of the condition, the causation test has not been met. Understandably, a worker may feel strongly that the work activity is directly responsible for development of the ASTD. However, it is important that the adjudication reflects a neutral perspective and the Board Officer should apply a common sense point of view to determine whether or not it is reasonable to draw a connection, and whether the connection is significant.

Evidence

There has to be reliable evidence to establish a significant causal relationship between the work activity and the development of an ASTD. A speculative connection is not enough.

A temporal connection is a factor supporting causation but is not sufficient evidence on its own to meet the causative significance test.

An association provided by the treating physician on a medical report is an important piece of evidence; however, it is not determinative in the acceptance of the claim. When Board Officers are analyzing the workplace data against the medical evidence, input from a Board Medical Advisor may be helpful. However, the Board Officer decides whether the work activity was of causative significance to the development of the ASTD.

The Board Officer should gather the appropriate evidence in order to understand whether the worker has risk of ASTD in the work environment and to the nature of that condition. In most cases, this information will be gathered through a detailed history, medical information and worksite assessment.

The evidence may demonstrate that several factors, including ones not related to the work activity, have contributed to the worker's ASTD. The presence of other factors unrelated to the work activity does not, in and of itself, preclude the work activity from being of causative significance to the development of the worker's condition.

Examples of factors not related to the work activities:

- A worker's pre-existing or underlying medical conditions (e.g., diabetes; osteoarthritis)
- A worker's non-occupational activities (e.g., sports; gaming)
- Other activities of daily living.

When multiple factors are identified, the Board Officer weighs the available evidence to determine the significance of the factors related to the work activity and those not related to the work activity. In some cases, the impact of the factors unrelated to the work activity may be so great that the risk factors identified in the work environment cannot be considered to be of sufficient significance to meet the causation threshold.

Medical Advisors' Opinions

The Board Medical Advisors play an important role in the adjudication of complex ASTD claims by providing an expert medical opinion on whether or not the work activities have contributed to the worker's medical condition and if so, to what extent.

When asking for a medical opinion, the Board Officer identifies the risk factor(s) associated with the worker's job and asks the Board Medical Advisor if those risk factors are considered medically significant in the development of the diagnosed condition. For example, the Board Officer may ask the Medical Advisor if the identified risk factors stress the tendons associated with the condition with which the worker has been diagnosed.

The Board Officer considers the Medical Advisor's opinion, together with any other relevant evidence, to decide whether the work activities were of causative significance in producing the injury, occupational disease, or aggravation of pre-existing condition. The work activities need only be a significant cause, they need not be the most significant cause or the only cause of the worker's condition.

In order to reach a decision on whether work was of causative significance in producing the injury or disease, the Board Officer, taking into consideration the activities and risk factors that have been identified and accepted, may wish to ask the Board Medical Advisor to explain what role (if any) the work activities have had in the development of the worker's condition.

The decision as to whether or not the work activities were of causative significance in producing the worker's condition is made by the Board Officer not the Board Medical Advisor. The Medical Advisor's role is to provide a medical opinion on the impact of the work activities on the worker's condition and on the biological plausibility of the tissues being damaged by the work activity. If it is not biologically plausible, then the answer should be no. However, if it is biologically plausible, the Board Officer will have to still determine whether the activities were of causative significance.

Aggravation of a Pre-Existing Disease

Adjudicative Test

In considering an aggravation of a pre-existing disease, the Board Officer should consider policy item #26.50 which discusses situations where disability results from the natural degeneration of the body. As it often happens, disability results from the natural aging process, and as explained in the policy, "… [i]if a worker is suffering from a kind of bodily deterioration that affects the population at large, it is not compensable simply because of a possibility that work may be one of the range of variables influencing

the pace of that degeneration". There must be evidence that the employment activity brought about a disability which would not otherwise have occurred or occurred much later.[7]

Policy item #26.55 explains what is meant by an aggravation, which is to significantly accelerate, activate or advance more quickly than would have occurred in the absence of the work activity, the underlying / pre-existing condition. This is to distinguish from work activities that simply produce symptoms. It is important to be aware that what policy intends by "aggravation" is often not what physicians mean. A physician's reference to 'aggravating a pre-existing degenerative condition' may include a description of symptom onset. Policy requires more. Evidence is required to show in what way the pre-existing condition has been accelerated, activated, or advanced more quickly. The principles in policy item #26.55 can be applied to adjudication under section 5 or section 6.

Policy item #26.55 provides that where work activates or accelerates a pre-existing disease to the point of disability, and the disease would not have been disabling if not for the employment, the worker's claim may be accepted for an aggravation of the pre-existing disease. The disease in question does not need to be an occupational disease in order for an aggravation to be accepted under policy item #26.55.

In cases where the worker feels increased symptoms from a pre-existing condition while working, but work has not significantly affected the course of the disease, an aggravation of the pre-existing condition is not accepted and the symptoms are not compensable. For example, the policy notes that a worker who experiences pain and numbness in a hand/wrist due to pre-existing carpel tunnel syndrome is not entitled to compensation just because they experience those same symptoms while performing their work activities. In order for an aggravation of the pre-existing condition to be accepted, there must be reliable evidence that the worker's underlying condition has been significantly accelerated, activated, or advanced more quickly as a result of the work duties in question**.**

For example, a worker has pain in both hands and files a claim. The worker's symptoms persist even after being off work for some time. After medical investigations, the worker is diagnosed with rheumatoid arthritis. The Medical Advisor is asked for an opinion as to whether the work duties contributed to the worker's arthritic condition. The Medical Advisor explains that rheumatoid arthritis is a systemic condition and is not caused by physical activity. The worker's employment duties involved intensive use of her hands and the worker experienced pain associated with her arthritic condition while performing these duties. However, the medical evidence did not support a finding that the worker's arthritis was accelerated, activated, or advanced by the work duties. Based on the medical evidence and Medical Advisor's opinion, the Board Officer decides that the work activities were not the cause of the worker's rheumatoid arthritis, and the test for a compensable aggravation of the worker's arthritis as set out in policy item #26.55 was also not met. As a result, the claim was not accepted for either rheumatoid arthritis or an aggravation of the worker's arthritis.

A distinction must be made between a situation where an underlying condition has been significantly accelerated, activated, or advanced more quickly by the employment activity and one where the work activity merely brought the symptoms to light.

[7] See *Workers' Compensation Appeal Tribunal* decision WCAT-2012-02764 at paragraph 39.

A distinction must also be made where the worker has developed an ASTD (i.e. repetitive strain injury/tendonitis) in conjunction with an underlying condition (i.e. arthritis). Unless it can be shown that the natural course of the underlying condition has been altered through the work activity only the new condition would be acceptable and not the aggravation of the underlying condition.

In summary, a compensable aggravation of a worker's pre-existing disease requires the following:

- work activities have accelerated, activated, or advanced the worker's pre-existing disease to the point of disability,
- the pre-existing disease would not have been disabling if not for the work activities,
- the work activities have changed the underlying pre-existing disease; it is not enough for the work activities to simply have caused increased symptoms, and
- the aggravation of an underlying condition needs to be adjudicated on its own merits when it appears in conjunction with a newly diagnosed ASTD.

Evidence

To determine if work has accelerated or activated the worker's pre-existing disease to the point of disability, the Board Officer should seek the following information:

- evidence that establishes the extent of the disease prior to the impact of the work activities,
- details of the work activities that caused an acceleration or activation of the worker's condition, and
- medical evidence that supports a finding that the work activities have impacted the worker's pre-existing disease and contributed to the resulting disability.

The evidence has to provide a clear picture of the worker's disease prior to the impact of the work activities, in order for the Board Officer to determine there has been a change/acceleration in that disease as a result of work. It is not enough for the evidence to simply show that the worker is currently disabled as a result of his or her pre-existing disease. It must also establish that work activities caused the worker's disease to accelerate to the point of disability.

In some cases, it will be difficult to obtain a clear picture of the worker's disease prior to the impact of the work activities because the worker may not have sought medical attention for the condition recently, if at all. In those circumstances, the Board Officer should refer the file to a Medical Advisor for comment on the etiology and usual progression for that type of condition, as well as what impact (if any) the work activities would have on the condition.

RSCM II, policy item #16.00, *Pre-Existing Conditions or Diseases*, explains that "… in adjudicating these types of claims, the Board considers:

- the nature and extent of the pre-existing condition or disease,
- the nature and extent of the employment activity, and
- the relationship between the pre-existing condition or disease and the employment activity, including the degree to which the employment activity may have affected the pre-existing condition or disease."

The policy also notes that evidence supporting that the pre-existing condition or disease has been accelerated, activated or advanced more quickly than would have occurred in the absence of the work activity, may confirm the connection between the aggravation and the work activity. As such, the

adjudicative test for aggravations of pre-existing conditions or diseases follows the same principles and considerations whether under section 5 or section 6.

Adjudicative Process for Aggravations

Where the worker's pre-existing disease was compensable, the Board Officer needs to determine whether the aggravation should be treated as a reopening of the previous claim or as a new claim. If it is determined that a previous claim should be reopened, the Board Officer should consult Practice Directive # C14-3, *Reopenings* for guidance.

If however the aggravation is treated as a new claim, the following provides guidance.

An aggravation of a pre-existing disease which is attributed to a specific event or trauma, or series of specific events or traumas, is adjudicated under section 5. For example, a worker who injures his or her back while performing a series of awkward lifts at work may suffer an aggravation to an underlying degenerative disc disease, or a worker with subacromial bursitis may strain the shoulder while completing a particular lift. These aggravation claims would be adjudicated as personal injuries under chapter 3 of the RSCM.

An aggravation of a pre-existing disease which is not attributable to a specific event or trauma, or series of specific events or traumas, is treated as an occupational disease and adjudicated under section 6. For example, a claim for aggravation of carpal tunnel syndrome where the worker has a prior history of carpal tunnel syndrome and the condition has been aggravated to the point of requiring surgery as a result of several weeks of exposure to vibrating equipment, will be adjudicated under section 6.

In some cases the disease that has been aggravated is one that is recognized as an occupational disease, either under Schedule B or by regulation. However, where the claim is for an aggravation of a disease that has not been recognized as an occupational disease, the Board Officer adjudicates the aggravation of the disease under policy item #26.55 and section 6. It is the 'aggravation' of that disease that is being adjudicated and not the disease itself, therefore the procedure set out in policy item #26.04 is not required.

CROSS REFERENCES

Workers Compensation Act:	Sections 1, 5, 6; and Schedule B.
History:	Significant amendments were made to this Practice Directive in May 2012 to provide additional guidance, particularly with respect to the aggravation of pre-existing diseases and the adjudicative test. The Practice Directive was further amended in May 2015 in response to changes to Chapter 4 of the RSCM. Aditionally, the was converted into a new format, and certain sections were combined or updated, while others were reordered or eliminated altogether. The 'Grid' (which was created to assist with the adjudication under section 5 or section 6) was removed. There were also some minor housekeeping changes.
Application:	This Practice Directive was developed to provide guidance on RSCM Chapter 4, and in particular policy items #25.10, #26.01 - #26.60, and #27.00 – #27.35.

Appendix 1 – Assessment Guidelines

Consideration of Force, Magnitude, and Duration

The risk factors listed below are to be **used as guidelines only**. They are **not absolutes**. The numbers listed below are entry level numbers to be considered as a threshold when assessing a single risk factor. The threshold may change where there are two or more risk factors present. Where the worker's job duties do not meet all or some of the applicable risk factor(s) listed below, the claim may still be acceptable. Please note that risk factors for certain conditions are also set out in the RSCM, Chapter 4 policies.

The 'weighing of evidence' requires taking individual characteristics into play. All ranges/postures noted below should be considered on the basis of that which would be beyond the 'available' range for the individual.

Consideration must also be given to the **cumulative effects of multiple risk factors**.

This means that Board Officers have to weigh the cumulative, or combined, effects of exposure to risk factors when adjudicating ASTD claims (e.g. continuous exposure versus intermittent exposure; or combinations of force and posture).

Risk Factors

Posture

Body Part	Movement	Degrees of Movement
Shoulder	Flexion	Greater than 60
Shoulder	Abduction	Greater than 60
Elbow	Flexion	Greater than 120
Elbow	Extension	Greater than 0
Elbow	Pronation	Greater than 80
Elbow	Supination	Greater than 80
Wrist	Flexion	Greater than 25 from anatomical neutral
Wrist	Extension	Greater than 25 from functional neutral
Wrist	Ulnar deviation	Greater than 10
Wrist	Radial deviation	Greater than 10
Thumb	Flexion	Full Range
Thumb	Abduction	Greater than 45
Finger	Flexion	Full Range
Hip	Flexion	Greater than 120
Hip	Extension	Greater than 10

Knee	Flexion	Greater than 120
Ankle	Planta Flexion	Greater than 30
Ankle	Dorsi Flexion	Greater than 10

Work Posture

Position	Surface	Duration
Squatting		Greater than 2 hours (cumulative)
Kneeling	Hard	Greater than 2 hours (cumulative)
Crawling	Hard	Greater than 2 hours (cumulative)

Contact Stress

Hammering	Repetition	Duration
Any Body Part	10 per hour	Greater than 2 hours

Repetition

Body Part	Movements[8]	Duration
Shoulder	2 per minute	Greater than 2 hours
Elbow	2 /min if elbow is working through full range of motion for the joint;	
	10 /min. (or greater) if elbow is working through < full range of motion	Greater than 2 hours
Wrist	2 /min. if wrist is working through full range of motion for the joint; 10 /min. (or greater) if wrist is working through < full range of motion	Greater than 2 hours
Finger	200 per min./ finger (100 keystrokes/min)	Greater than 4 hours

Force[9]

Lift	Repetition	Duration (cumulative/day)
55 lbs	more than 10 /day	

[8] 'In a range in excess of functional normal'.

[9] Applied to/by affected body part.

25 lbs	more than 25 /day from below knee to above shoulders, or lift at arm's length	
10 lbs	more than 2 /min.	Greater than 2 hours

Any object lifted and carried greater than 9 meters increases risk factors

Push / Pull	**Duration**	**Distance**
20 lbs	Greater than 2 hours	Greater than 60 meters

Risk factors increased on rough or inclined surfaces or unstable loads

Grip	**Weight**	**Duration**
Power	10 lbs or more unsupported	Greater than 4 hours
Pinch	2 lbs or more unsupported	Greater than 4 hours

Risk factors increased with poor fitting / low friction gloves

Appendix 2 – Glossary of Terms

Administrative Controls — The provision, use, and scheduling of resources in the workplace, including planning, organizing, and staffing and coordinating.

Duration — The length of time a worker is exposed to a particular risk factor.

For lifting tasks:

Long duration:	lifting for 2 – 8 hours with standard breaks.
Medium duration:	lifting for 1 – 2 hours with 0.3 recovery time to work time ratio.
Short duration:	lifting for 1 hour or less with 1.2 recovery time to work time ratio.

Dynamic — Means that there is movement of the affected muscle/tendon group during the task. The biomechanical aspects of the human body in motion.

Engineering Controls — The physical arrangement, alteration or design of workstations, equipment, materials, production facilities or other aspects of the physical work environment.

Extension — The lengthening of muscles in order to make a movement across a joint (generally body parts moving away from each other).

Human factors (Ergonomics) — The applied science that seeks to fit the job to the individual through the evaluation and design of the work environment in relation to human characteristics and interactions in the workplace.

Ergonomic Factors — Factors which affect the interaction of an individual with the work environment.

Flexion — The shortening of muscles in order to produce a movement across a joint (generally body parts moving together).

Force — The physical effort a worker is exposed to a particular risk factor (i.e., particular movement or activity). Force may be either external (a force applied, voluntarily or involuntarily, to the surface of the body) or internal (tension within muscles, tendons, and ligaments). Consideration should be given to:

- *Posture* – in an awkward posture you exert more force because your muscles cannot perform efficiently.
- *The speed of movement* – you need extra force at both the beginning and the end of rapid movements such as throwing or catching a load and when your load moves suddenly or unexpectedly.

- *The duration of the exertion* – the longer or more frequently you exert a force, the greater the demand on the tissue.
- *The weight of the load* – as the weight of a load is increased, you must exert more force when lifting, or if load is farther away from point of rotation (MXD=F) lowering, pushing, pulling, carrying, or gripping.
- *The friction of the load* – both high and low friction can increase the force you must exert. For example, pushing loads on carpets and holding tools with slippery handles requires both extra force.

Frequency	The number of repetitions of a complete sequence of tasks or movements of a process occurring per unit of time during a work cycle.
Frequently repeated	Means the frequency of the work cycle for the tasks being performed (the number of times the same motion or muscle contraction is performed within a specified period).
High effort	A large amount of energy or physical effort required to complete a task through actions such as lifting, continuous arm movement, running, or vigorous walking.
High repetition	Using the same body parts to exert forces again and again without sufficient time to return to a resting state for recovery.
High mental stress	Refers to the perceived level of stress or mental effort by the workers. High mental stress may result in an increase in muscle tension.
Job Enlargement	The addition of tasks to a job to make it more varied and interesting.
Job Rotation	The planned interchange of jobs among a group of workers at regular intervals to vary each worker's tasks. In this way, postures are varied, stressful tasks are shared and interest and versatility are increased.
Inflammation	Localized protective response elicited by injury or destruction of tissues which serves to destroy, dilute or wall off (sequester) both the infectious agent and the injured tissue. Swelling, tenderness and a localized increase in temperature are associated with inflammation.
Magnitude	Means the degree of exposure to a noted risk factor.
Musculoskeletal Injury	A sprain, strain, inflammation or other disorder of soft tissues (i.e., muscles, tendons, ligaments, joints, nerves, or blood vessels) that may be caused or aggravated by work.
Neutral Position	The body position which minimizes stresses on the body. Typically the neutral posture will be near the mid-range of any joint's range of motion.

Open Grip	Posture of the hand required for holding tool or part in which thumb and fingers do not overlap (space exists between them).
Posture	Refers to postures that are awkward when joints are held at or near the end range of motion or muscle tension is required to hold the posture without movement. Consideration should be given to: • As a joint moves farther away from its neutral range, it requires more effort to achieve the same force. • The weight of the body may contribute significantly to the total load. For example, in long arm reaches, the shoulder muscles must bear the weight of the entire arm.
Repetition	The cyclical use of the same body tissues either as a repeated motion or as a repeated muscular effort without movement. Consideration should be given to: • Cycle time • Work period; and • Work-recovery (rest) cycle.
Rest Period	The portion of each work cycle where the muscle/tendon is maintained in a neutral position.
Risk	The likelihood and extent of harm an individual may encounter because of a work condition or activity.
Risk Factor	A general term for a factor which the medical/scientific research indicates may be relevant to the issue of causation. The principle risk factors to consider when looking at work performed are the intensity, duration and frequency of (or combination thereof): • Repetition • Force • Posture • Vibration
Significant component	Means that the worker has been performing work activities, involving the described structure, for sufficiently long enough that it is biologically plausible that the condition affecting the muscle/tendon group has resulted from the work activities.
Sprain	A joint injury in which some fibres of a supporting ligament are ruptured but the continuity of the ligament remains intact.
Strain	Overstretching or overexertion of some part of the musculature.
Static Exertion	A muscular action which involves maintaining some part of the body in a fixed posture.

Static Load	Refers to sustaining a given level of muscle force/exertion for a duration of time, against gravity or against some other external force.
Steps/actions	A specific action which makes up part of a task. This will usually begin with an action such as pull, push, lift, hold, or drive.
Sustained	Means that the affected muscle/tendon group has been held in a static position for a sufficient period of time that it is biologically plausible that the condition affecting the muscle/tendon group has resulted from the work activities.
Task	A distinct work activity to accomplish a specific purpose. One or more elements can comprise a task. Several tasks can comprise a job.
Task Variation	The degree to which a task remains unchanged. Consideration should be given to how varied are the work duties; although a task appears repetitive, are there frequent interruptions such as telephone calls, reloading a machine, moving the next piece of work into place etc.; the number of and duration of rest periods; the amount of job rotation; the less varied the task, the less likely are the affected tissues able to return to a resting state of recovery.
Torque (moment)	A force that produces or tends to produce rotation; the rotational force about a point (e.g., torque is the force required to tighten a bolt).
Work cycle	An exertion period and a recovery (or smaller exertion) period necessary to complete one sequence of a task, before the sequence is repeated. A work cycle can be the time to complete a job with many tasks or the time to produce one unit.
Work Environment	Includes the physical layout, location, equipment, materials, work processes, and conditions such as temperatures and light.
Work Period	The time to complete the entire task before job rotation or a break.
Work Process	Includes the sequence of activities and the interaction of persons, equipment, materials, energy and information. This term is also referred to as the "organization of work".
Work rate	The speed at which the task is carried out. Factors that influence this are incentive pay (piece work) and machine paced work. Workers may adopt non-optimal work techniques exposing them to further risk of injury. Work rate may require more concentration which in turn may increase muscle tension.
Work-recovery (rest) cycle	The availability and distribution of breaks to allow the tissue to return to a resting state of recovery. The more frequent the breaks the greater the opportunity for the tissues to recover. This can be achieved through job rotation and/or use of different body parts to perform a task (for example, alternating use of both right and left hands).

Work rest cycles

The total amount of rest required for a given period of work (work rest ratio) is important, however, the actual duration of the work before a rest period is given may be of greater importance for adequate recovery. Shorter work periods with shorter rest cycles result in better physiological recovery and lower stress levels than longer work and longer rest periods.

The following table identifies the terms of reference for characterizing work as sedentary, light, medium, and heavy.

The simplified definitions are as follows:

Sedentary: Requires the ability to sit up to six hours in an eight hour work day, lift light objects such as files and paperwork frequently during the day, and objects weighing up to 10lbs occasionally during the day.

Light: Requires the ability to stand up to six hours in an eight hour work day, lift up to 10lbs frequently and up to 20lbs occasionally.

Medium: Requires the ability to stand up to six hours in an eight hour work day, lift up to 25 lbs frequently and 50lbs occasionally.

Heavy: Same standing as light and medium, lifting heavier than medium.

Frequency/Duration **weight**	**None** 0%	**Seldom** 1 – 10 %	**Occasional** 11 – 33%	**Frequent** 34 – 66%	**Constant** 67 -100 %
0lbs	Sedentary	Sedentary	Sedentary	Sedentary	Sedentary
5lbs	Sedentary	Sedentary	Sedentary	Sedentary	Sedentary
10lbs	Sedentary	Sedentary	Light	Light	Medium
20lbs	Sedentary	Light	Light	Medium	Heavy
50lbs	Sedentary	Medium	Medium	Heavy	Heavy

The following table identifies the terms of reference for characterizing repetitive motion (repetition) as low; medium; or high:

LOW		MEDIUM		HIGH	
0 Hands idle most of the time: no regular exertions	2 Consistent, conspicuous long pauses; or very slow motions	4 Slow steady motion/ exertion; frequent brief pauses	6 Steady motion/ exertion; infrequent pauses	8 Rapid steady motion/ exertion; infrequent pauses	10 Rapid steady motion or continuous exertion, difficulty keeping up