

MSI prevention guidance

Contact stress

Contact stress is a common but often unnoticed risk factor for musculoskeletal injury (MSI). This resource provides information to help employers identify, assess, and control the risks to workers of contact stress.

Risk identification

Contact stress happens when some part of a worker's body (e.g., the knees, elbows, wrists, fingers) touches or rubs up against a hard, sharp, or inflexible surface or object repetitively or for an extended period. The surface or object could be a workstation, the floor, a ladder, a tool, or a bucket handle.

Pressure from the surface or object can affect blood flow, nerve function, and the movement and range of motion of tendons and muscles. It can also cause inflammation, bruised muscles, tingling, numbness, reduced grip strength, stiffness, loss of circulation, and aching.

Contact stress can slow down workers and lead to other injuries, especially when combined with other MSI risk factors such as repetition, awkward posture, or excessive force. Contact stress can occur in nearly any type of job.

Risk assessment

The greater the pressure exerted on the body, the greater the risk of MSI. When assessing the risk, talk to workers who may be exposed to a risk of MSI. Ask them if they experience any pressure marks on their skin or any discoloration.

The severity of risk depends on three factors: magnitude, frequency, and duration of exposure. The greater the total time that there is contact stress on a specific part of the body, the greater the risk of MSI. Sustained exposures generally pose a greater risk than several intermittent exposures that total the same amount of time.

Consider the following when assessing the risk of MSI from contact stress:

- Does contact stress leave marks or depressions on the skin?
- Are workers exposed to contact stress for long periods (more than two hours spread over a workday)?
- Are workers experiencing numbness or tingling sensations?
- Are workers exposed to contact stress along with other MSI risk factors, such as frequent or prolonged exposure to grip force, awkward wrist postures, hand-arm vibration, or cold?

Answering yes to one or more of these questions indicates that the contact stress may lead to an MSI, either on its own or along with other risk factors.

Risk controls

As an employer, you're required to control the risk of MSI to workers. Always follow the **hierarchy of controls**. Whenever possible, eliminate the hazard or substitute a less-hazardous material or process. If elimination and substitution are not practicable, use engineering or administrative controls. Finally, consider using personal protective equipment (PPE) such as gloves to protect workers, or use PPE in addition to other controls.

The following table describes some common tasks and activities that can cause contact stress, and potential risk controls for preventing or reducing the severity of that stress. The most effective way to reduce the MSI risk is to design or arrange the work and the worksite to eliminate or limit exposure to contact stress.

Task or activity	Risk controls
Kneeling on a hard surface or against a sharp edge	<ul style="list-style-type: none">• Redesign the task or use alternative tools to eliminate the need to kneel.• Provide workers with knee pads or kneeling pads.• Provide workers with opportunities for frequent breaks from the kneeling position.
Resting wrists, forearms, or elbows on hard surfaces when working with tools or precision instruments	<ul style="list-style-type: none">• Round edges or change workstations to eliminate contact with hard or sharp surfaces.• Redesign workstations to reduce wrist or arm contact with inflexible surfaces.• Supply a jig or fixture to hold objects.• Provide padding or wrist rests and armrests, where appropriate.• Provide chairs with wide, padded armrests.
Using the hand, palm, or knee as a hammer Holding down palm-type control buttons, using trigger tools, or pressing buttons frequently	<ul style="list-style-type: none">• Redesign the task to eliminate the need to use hands for impact tasks.• Provide the correct tools for the job (e.g., hammers, wrenches).• Provide power tools or tools with comfort-grip handles.• Provide spring-assisted pliers or scissors.
Carrying or handling objects with grooved, sharp, or hard surfaces that dig into palms or fingers (e.g., a heavy pail with a plain wire handle)	<ul style="list-style-type: none">• Provide carts, dollies, pallet jacks, or other mechanical material-handling tools.• Provide bins with handles, or add carrying handles to existing bins.• Pad objects that will be handled.• Provide gloves with padded palms and fingers for lifting or holding objects.• Promote the use of team lifts to distribute the weight of heavier loads.• Provide smaller packaging, or have workers break loads down into smaller sizes that are more easily managed.

Task or activity	Risk controls
Holding or repetitively using tools with non-cushioned handles that end within the hand	<ul style="list-style-type: none"> • Modify the task to reduce or eliminate the use of tools that press into the palm. • Provide tools with long handles and comfort-grip handles, or make customized grips by using heat-mouldable material that the worker grips while it is still warm. • Add padding to tools, or have workers wear padded gloves. • Make sure tools fit workers' hands. Replace or modify grips if they don't fit well.
Leaning against a hard work surface or edge	<ul style="list-style-type: none"> • Design the task to eliminate leaning. • Provide sit-stand options to reduce leaning on hard surfaces. • Provide a footrest for standing activities.
Sitting in chairs that are too high (i.e., the worker's legs are angled downward) without adequate foot support	<ul style="list-style-type: none"> • Provide height-adjustable chairs with an adjustable seat pan. • Provide footrests.

Before making changes to tools, tasks, or workstations, talk to workers about their concerns and possible solutions. Also, consult with the joint health and safety committee or worker health and safety representative, as applicable.

Encourage workers to report concerns right away, and follow up on those concerns. Orient and train new workers on work processes and tools to reduce MSI risks. It can also help to add micro breaks to work routines to keep minor stresses from becoming more serious.

For more information

Sections 4.46 to 4.53 of the Occupational Health and Safety Regulation outline the requirements for MSI prevention. The corresponding **OHS guidelines** offer additional support.

For more information and resources on reducing MSI risks, visit the **Ergonomics** page on worksafebc.com.