

How to Prevent

Occupational Musculoskeletal Disorders



職業安全健康局
OCCUPATIONAL SAFETY & HEALTH COUNCIL



工作 安全健康
safety at work



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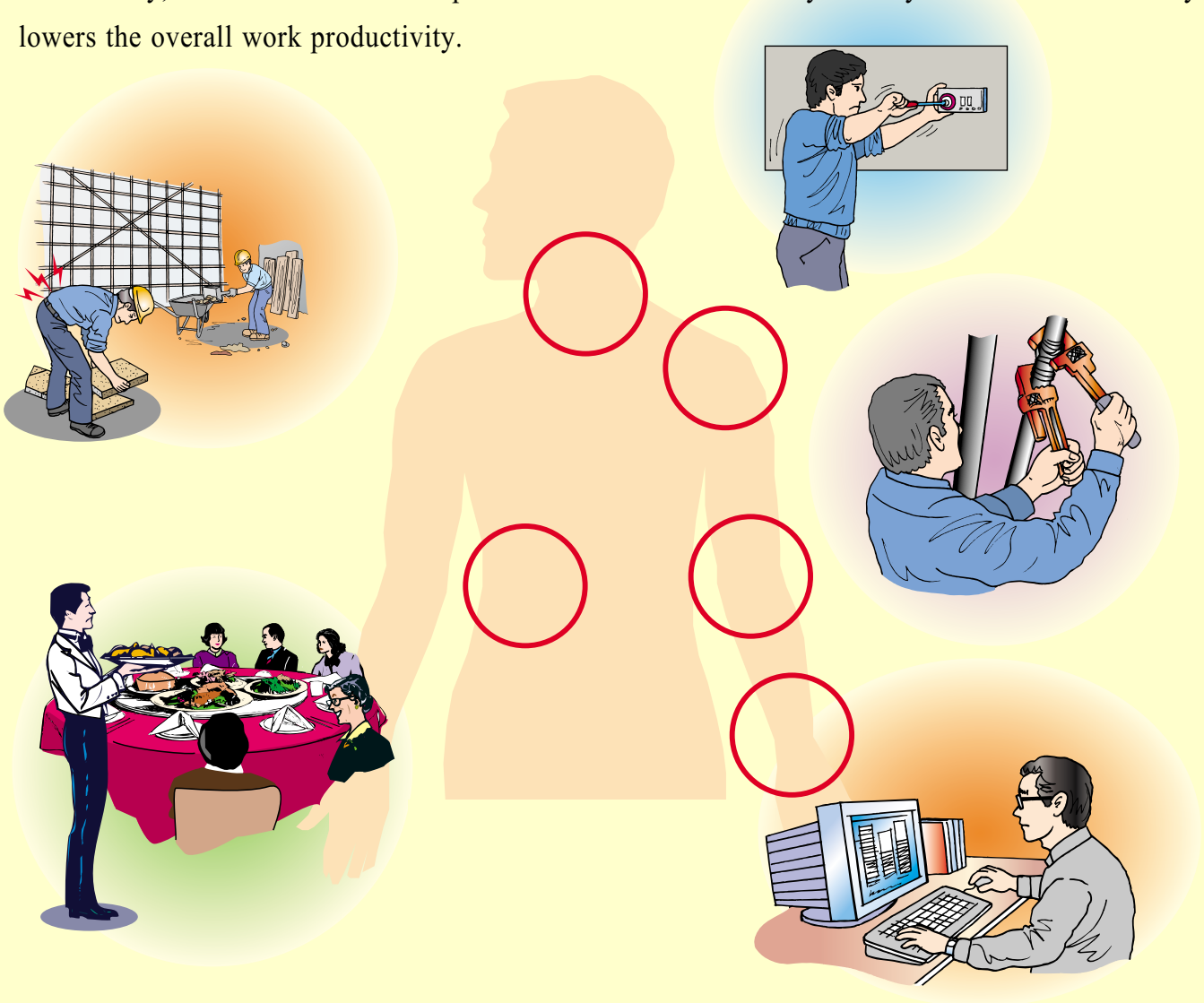
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1. What are Musculoskeletal Disorders ?

Musculoskeletal system is the prime mover of our bodily movement. Muscle, skeleton, tendon and nerve are the key structures in mediating the maneuvers of various body positions adopted in our daily lives.

Occupational musculoskeletal disorders are commonly referred to the wear and tear of musculoskeletal structures resulted from repetitive movement, forceful exertion on body parts and improper postures adopted at work. A single shot of impact may lead to tissue sprain or further develop local inflammation. Nevertheless, occupational musculoskeletal disorders are solely due to the cumulative effect, but not a single event of tissue injuries, induced from the physical work requirement itself. The influence of suffering musculoskeletal disorders not only affects individual's work ability, but the subsided tissue pain also hinders the flexibility of body movement and directly lowers the overall work productivity.



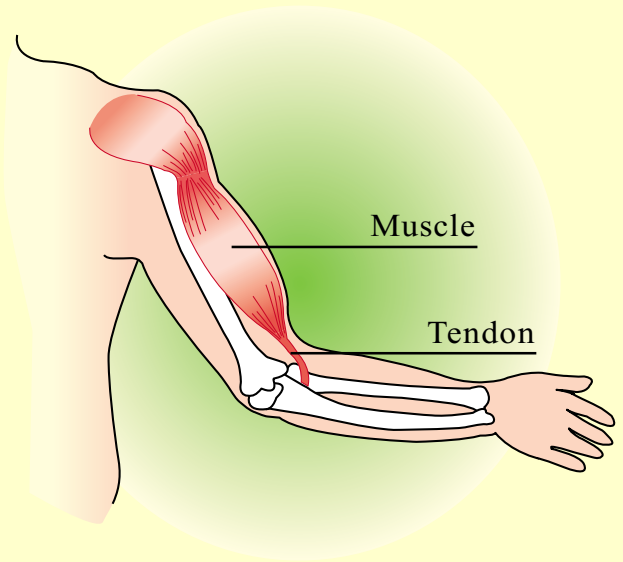


2. Musculoskeletal Injuries

Musculoskeletal injuries include three major types of soft tissue injuries :

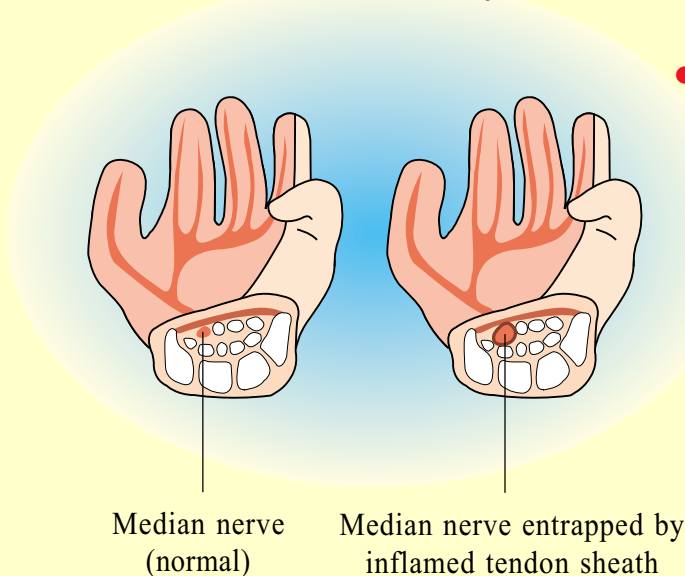
- **Muscle Injuries**

Work activities involving repetitive movement and forceful exertion require vigorous muscle contraction. Active pumping of muscular work promotes accumulation of metabolites which further initiates muscle fatigue and results in muscle soreness. Prolonged muscular work without adequate rest not only delays the recovery process in eliminating the metabolites, but cumulative effect of overusing muscles also assumes the cause of injuries.



- **Tendon Injuries**

Tendons are the connecting tissues which attach muscles to bones. Tendons in hands and wrists are surrounded by tendon sheath but not in shoulder, elbow and forearm. Repetitive hand movement would aggravate sliding of tendon with tendon sheath or the bony part and cause inflammation or even shear injuries.



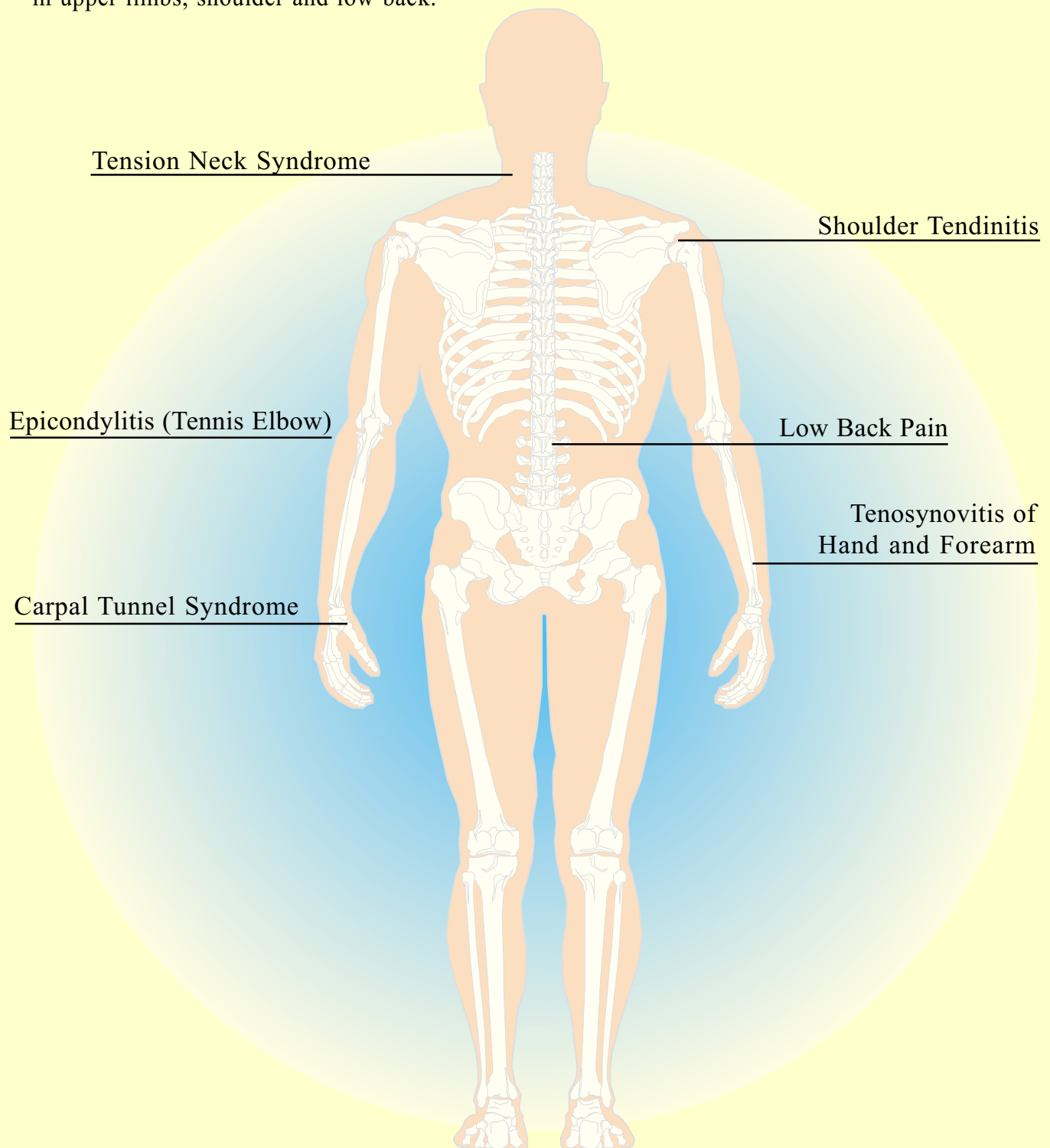
- **Nerve Compression**

Nervous system is responsible for carrying messages within our body. It innervates muscle and kicks off movement, so that we can move our hands or feet. Nerve transmission can be restricted by increased pressure on nerve. It can be caused by the swelling of inflamed muscles or tendons around the nerve endings. Desensitization is one of the symptom of nerve compression. For severe nerve compression, it can result in muscle degeneration.



3. Common Types of Musculoskeletal Disorders

There are various kind of musculoskeletal disorders. The most common sites of disorders are found in upper limbs, shoulder and low back.



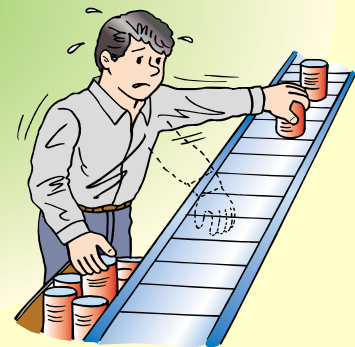


4. Contributing Factors of Musculoskeletal Disorders

Highly repetitive work with fast, forceful movements for long periods of time is stressful to our musculoskeletal system. Overusing this delicate system without giving it a chance to rest increases the odds of developing musculoskeletal disorders. The contributing factors of developing musculoskeletal disorders are commonly found as follows :

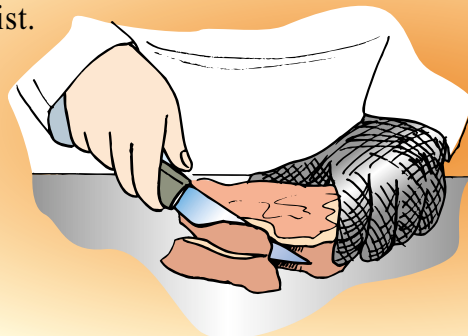
- **Prolonged and Sustained Working Position**

Examples of putting one in awkward position include :
Operation with display screen equipment, assembly work at production line and cash registering work for cashier.



- **Fast and Repetitive Movement**

Examples include : Meat cutting work as frequently performed by butcher, fast and repetitive finger tapping movements performed by pianist.

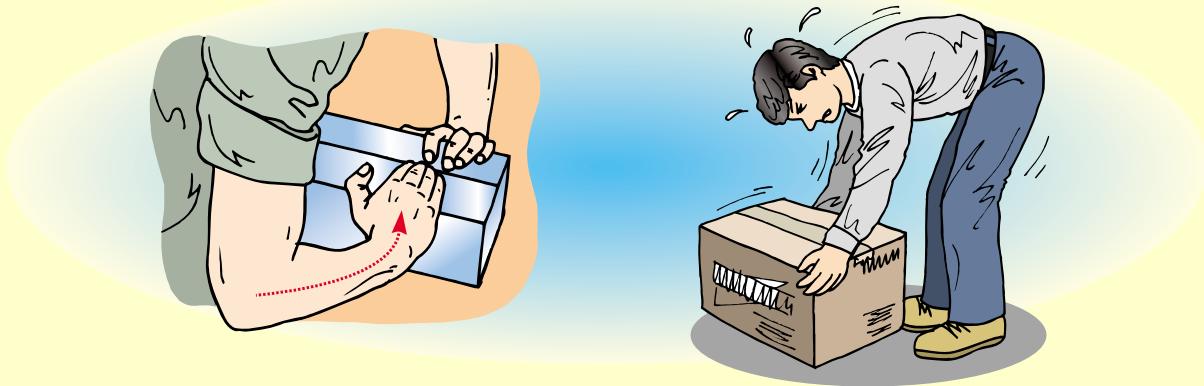




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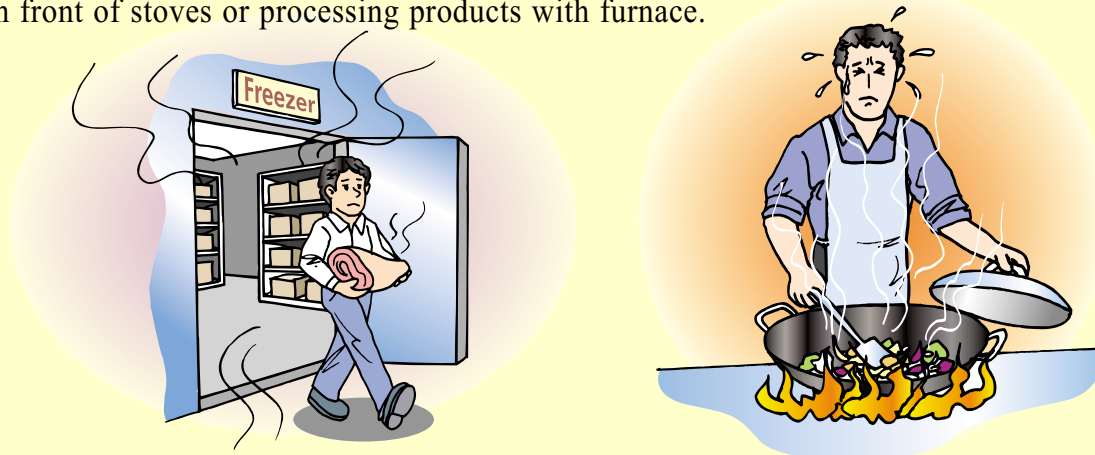
- **Forceful Exertion**

Examples of using too much force in particular body parts include: Forcefully bring parts together along the assembly line, bending back to lift heavy goods.



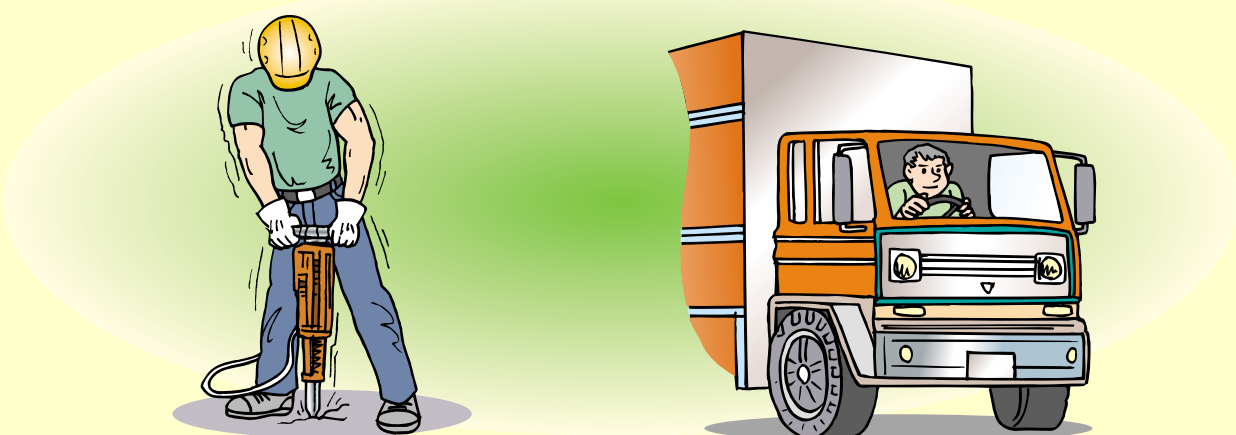
- **Extreme Temperature**

Examples of work environment with extreme temperature include: Direct contact with frozen food in handling and delivery of frozen package, performing hot work procedures such as working in front of stoves or processing products with furnace.



- **Vibration**

Vibrating force can be induced by operating concrete breaker and experienced via truck driving.

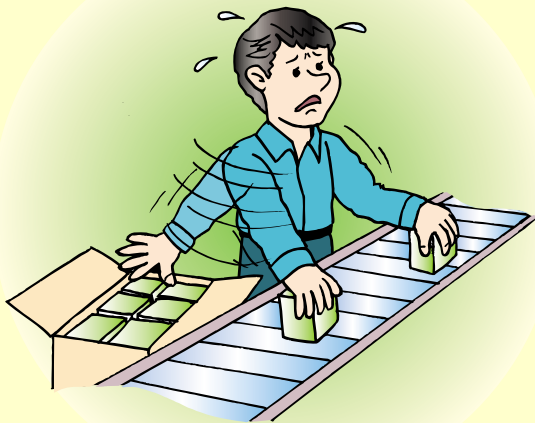




5. Occupational Factors in Relation to Development of Musculoskeletal Disorders

Job nature and its physical demand is the key to explain the development of musculoskeletal disorders. Certain jobs among different industries actually share the same characteristics which more or less require workers to perform repetitive tasks, apply substantial force, or even tuck in an awkward or sustained position. All these put unnecessary pressure on muscles, tendons and nerves and further cause trouble to us. Among different occupational groups, the work performed by data entry clerks, cashiers, maintenance workers, storekeepers and warehouse workers, chefs, construction workers, musicians, health care workers, etc. are considered to share similar contributing factors of musculoskeletal disorders.

- **Packing Workers along the production line :**
Remain in repetitive back and forth packing movement.



- **Storekeepers :**
Exert forceful grip in holding goods.



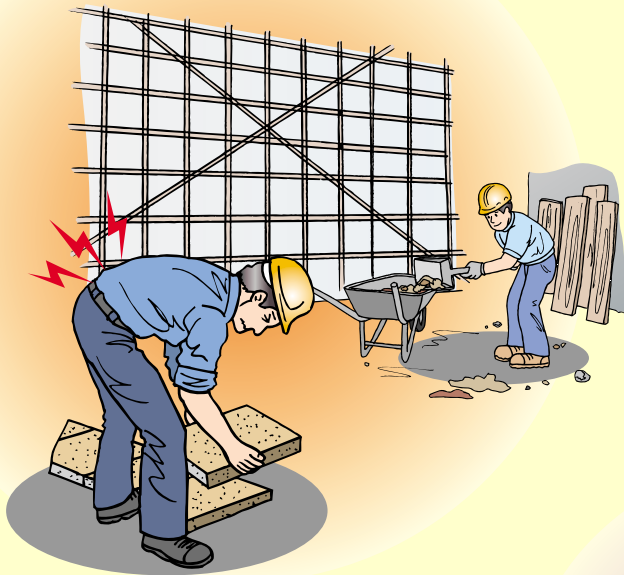
- **Data Entry Clerk :**
Hold upper limbs in sustained position and repeated finger tapping movement.



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- **Construction Workers :**

Lift and carry heavy construction materials which puts pressure on muscles.



- **Chefs :**

Keep bending the wrist in repetitive meat cutting work.



- **Violinists :**

Holding arms and hands in elevated position to play the musical instrument.



- **Health Care Workers :**

Stoop to lift and transfer patients from bed to bed.





6. Symptoms

The on-set of musculoskeletal problem usually comes along with symptoms of pain and tingling. Because of local inflammation, swelling on the injured body parts as well as the burning sensation are identified. Other symptoms also include tenderness, muscle weakness and numbness. For the symptom of pain subsided persistently, our movement is limited to the pain free range of motion. Limited movement further put us to habituate a decreased range of motion and it can be easily turned into joint stiffness. The symptoms of musculoskeletal problems due to overuse are developed progressively from the on-set to acute phase and finally the chronic phase:



On-Set

An aching sensation and pain in affected body part are common at the onset of the problem. The symptoms will be gone after taking rest and the situation is not likely to affect the activities at work.

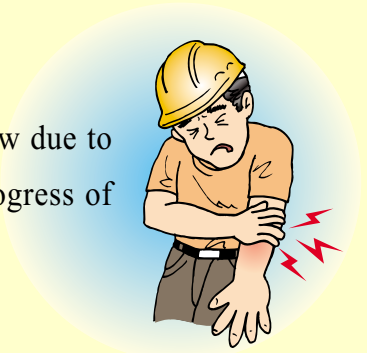
Acute Phase

Tingling increases and symptoms of swelling and a burning sensation follow due to local inflammation. It starts to take longer time or even slow down the progress of work in order to recover from the symptoms.



Chronic Phase

The pain increases and signifies even at rest. The persistent symptoms weaken muscle strength. For this reason, the symptoms are worse enough to prevent us from moving around as freely and comfortably as before. In chronic phase of musculoskeletal disorders, ability to perform daily activities is greatly affected which also decreases our work productivity.





7. Prevention

Prevention of musculoskeletal disorders at workplace can be achieved by making effort in improving the workplace design and organization of work tasks. The best design can help to minimize the risk of setting us in awkward postures.

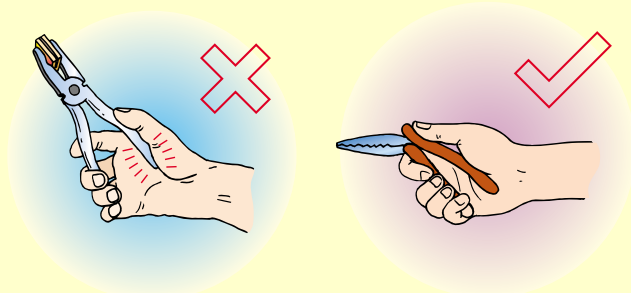
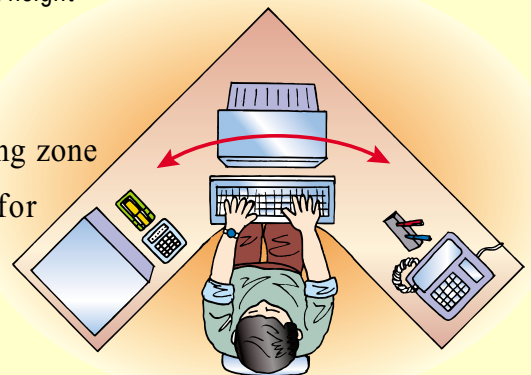
Modification of Workplace Design

- Utilize chairs, desks, working platforms with adjustable height to accommodate workers in different sizes; the best-fit-design for individuals can prevent awkward postures such as overstretching of forearm reach, wrist bending and twisting of trunk.



- A** First line on screen at about or just below eye level
- B** Comfortable viewing distance (e.g. 35-60cm)
- C** Forearm at about right angle to arm
- D** Suitable armrest if required
- E** Backrest adjustable in height and tilt
- F** Adjustable seat height
- G** Adequate leg room
- H** Firm footrest if required
- I** Screen at about right angle to line of sight
- J** Wrist kept straight or slightly inclined
- K** Stable base, with castors if necessary

- Arrange those frequently used materials within the working zone which can be easily reached by workers; organized for convenience can avoid unnecessary twisting or overreaching.

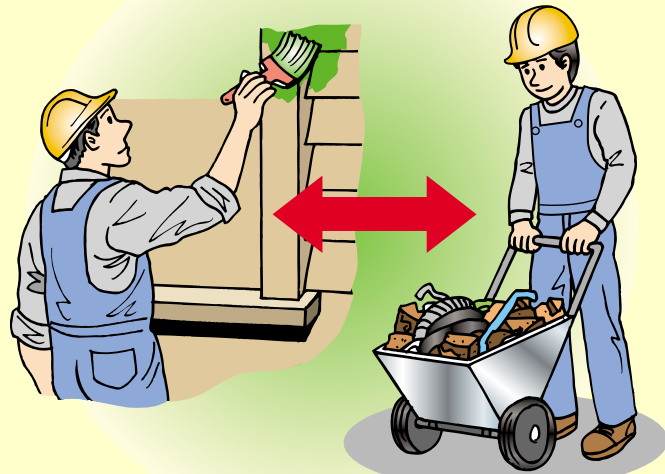


- Pick the hand tools or equipment which design to match our size; use of appropriate tools save us from strenuous exertion in holding or gripping objects in hands.



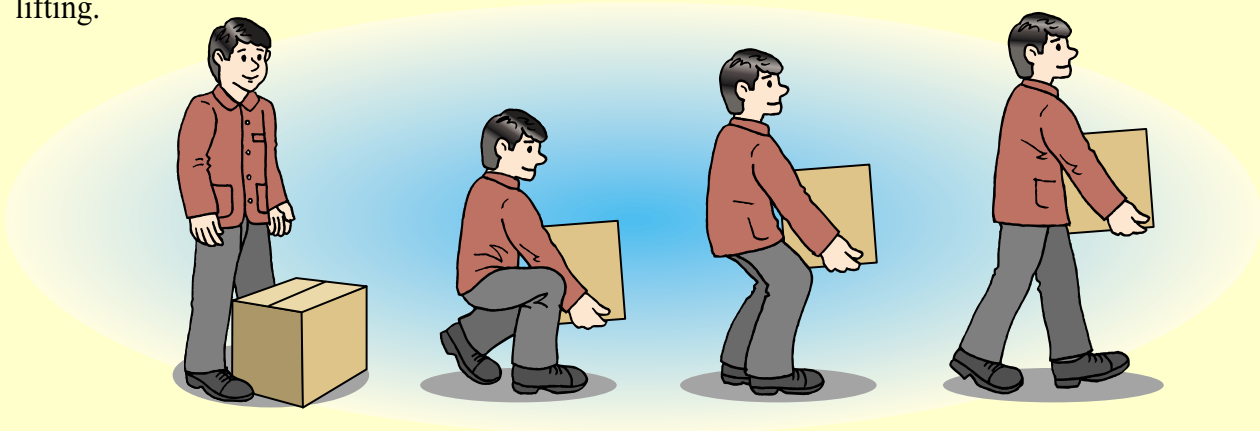
Organization of Work Tasks

- Organize rotation of job tasks to increase job variety; a mixture of job tasks minimizes chance of trapping into sustained posture or repetitive movement in one single task.



- Mechanical aids such as trolleys, conveyors are recommended whenever possible; mechanical aids assist carrying and moving heavy objects and reduce force required to lift.

- Determine the best lifting technique to eliminate the risk of manual handling operation; protect your back and always maintain a good up-right posture and use the strongest thigh muscles in lifting.

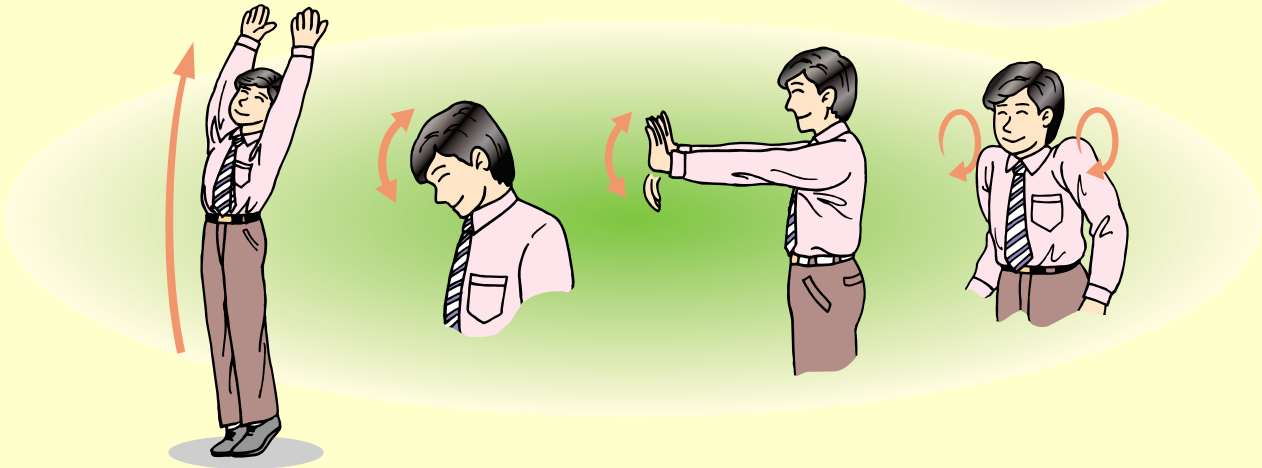




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Rest and Stretch

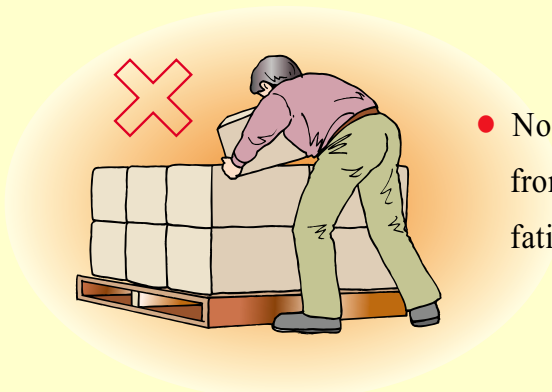
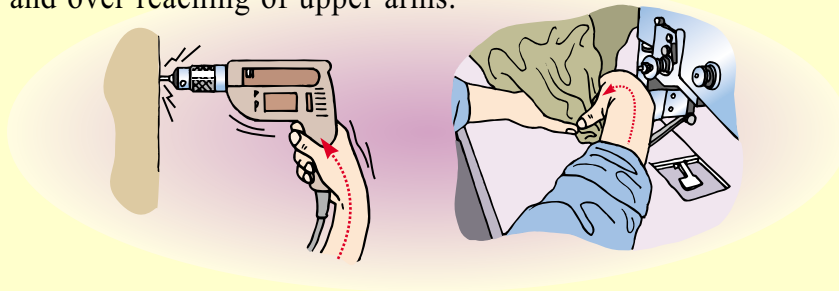
- Take adequate rest to recover from muscle fatigue.
- Take some short breaks in a day to stretch out as to improve blood circulation and promote adequate nutrient supply to those working muscles.



Self-Care Tips

Tips to stay away from injury :

- Avoid frequent activities in twisting or bending wrists, bending back and over reaching of upper arms.



- Not a single posture is a good posture. Try to move around from sitting to standing or vice versa in order to relieve muscle fatigue.



- Avoid repeating same task for prolonged period of time. Try to organize a mixture of work task to increase job diversity.

- Maintain proper lifting posture in manual handling operation and make use of mechanical aids to lift and carry heavy loads. Do seek for team lifting if the lifting task cannot be handled by one person.



- Arrange short breaks in a work shift which provides momentary relief.



8. Treatment

Treatment options for musculoskeletal disorders are listed as follows. If further enquiries on medical treatment of individual case are needed, do always seek for professional advice from medical practitioners and therapists.

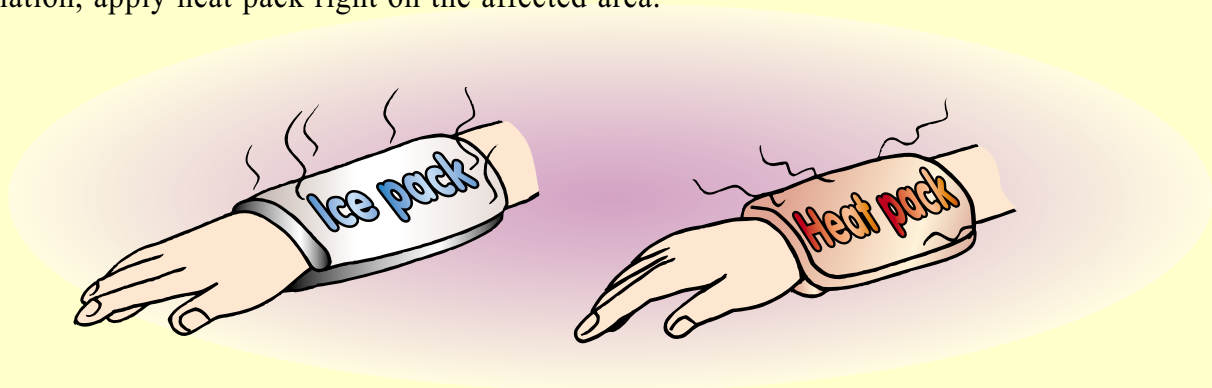
Rest

Rest is the simplest but essential way to relieve symptoms of discomforts. Bed rest gives the muscle a chance to recover from fatigue and restore energy for another day.



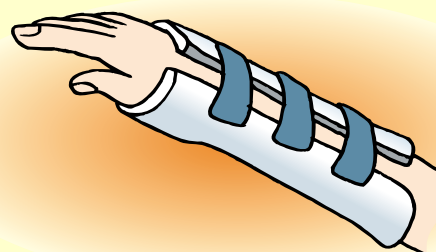
Hot and Cold Packs

To numb pain and decrease swelling, apply ice pack to the affected area; to relax sore muscles and increase circulation, apply heat pack right on the affected area.



Splinting

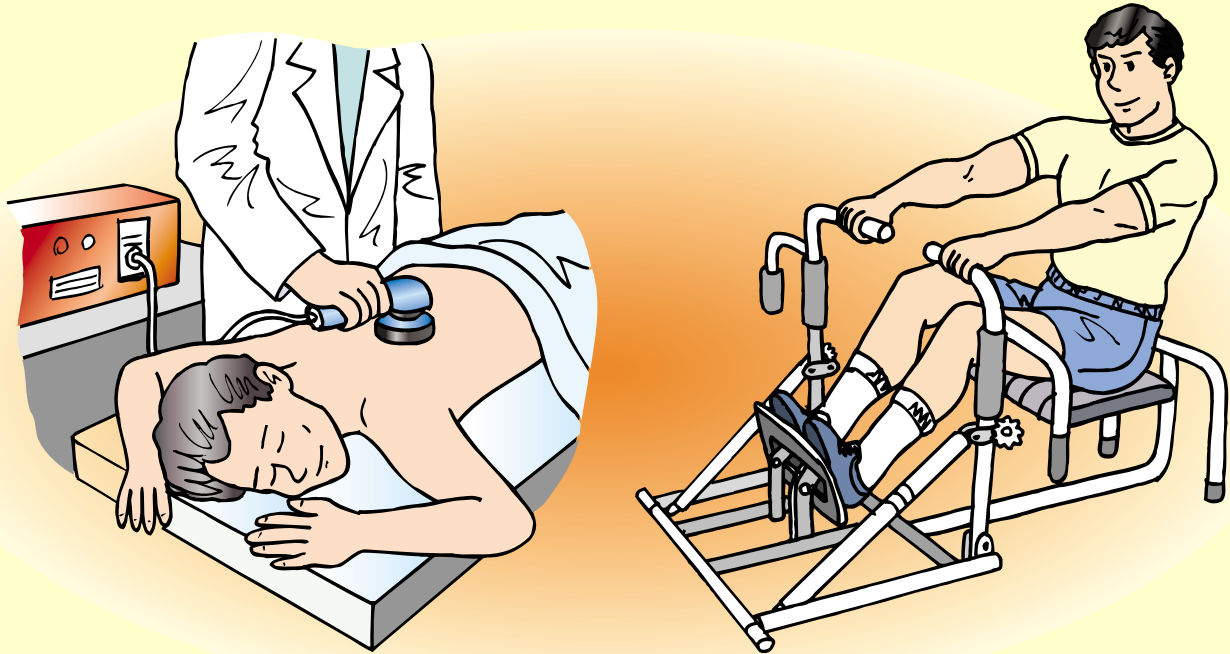
Flexing or extending excessively worsens the symptoms substantially. Splints immobilize joint movement and help to stabilize the affected area in a neutral position.





Physiotherapy

Treatment modalities include using ultrasound, infrared and short wave. Mobilization exercises are prescribed in therapeutic means to speed up the healing process of musculoskeletal injuries.



Medication and Surgery

Medications are taken to reduce swelling, inflammation and also ease compression on nerve. Medications prescribed by doctors include non-steroidal anti-inflammatory and steroid drugs. Surgical option may be recommended if the symptoms cannot be treated solely by medication.





香港北角馬寶道28號華匯中心19樓
19/F, China United Centre, 28 Marble Road,
North Point, Hong Kong
電話 Tel : 2739 9377 傳真 Fax : 2739 9779
電子郵件 E-mail : oshc@oshc.org.hk
職安熱線 Hotline : 2739 9000
職安資訊傳真服務 SafeFax : 2316 2576
網頁 Homepage : www.oshc.org.hk