Lifting and carrying Loads

Lifting and carrying loads and workplace injury

Lifting and carrying loads is the major cause of work-related lower back problems.

The muscular effort in lifting and carrying depends mostly on the -

⇒ weight of the load, and

⇒ distance of the centre of gravity[1] of the load from the body.

Therefore, the heavier the load, and the further away the load is from the body, the greater the muscular effort needed to handle it is.

For example, a 4 kg weight held at a distance of 50 cm requires the same effort as a 20 kg weight held close to the body.

The effect of posture

The back muscles have to work harder when lifting with the back bent forward, because they also need to support the upper body.

Injuries are more likely to happen when the back is fully bent forwards, and/or when combined with twisting.

Figure 1 shows a person holding a 20 kg load in both the standing and bent positions. There is an almost three fold increase in the forces on the spine in the bent position when compared with the straight position.

Effect of posture on the discs

Increased disc pressures over a certain level can lead to injury.

Disc pressures are lowest when the back is straight. Pressures increase when the back the back is bent or twisted and the back muscles are active.

When picking up a load with the back bent, the front part of the disc is squeezed and this can cause damage, particularly if done repeatedly.

Combining bending forwards with bending sideways or twisting further increases disc pressures. This has implications for handling loads, particularly with the back bent.

Other factors that increase the effort in lifting and carrying

In addition to the weight and distance of the load from the body, other factors that increase the effort include –

- ***the distance the load has to be lifted*** - this is the difference (vertically) between the start and the end of the lift
- ***twisting*** - having to twist the trunk and shoulders to handle the load
- ***frequency of lifting*** - the number of lifts to be performed over a shift
- ***lifting duration*** - the total time in a workshift spent lifting
- ***load placement clearance*** - careful manoeuvring to place loads at their final location increases the holding time
- ***load shape and composition*** - loads which are bulky, unwieldy or unstable with the contents likely to shift
- ***off-centre or loads*** - loads that are unevenly balanced *eg. one side heavier than the other*
- ***how easy the load is to grip*** – if the handles are not suitable, or the packaging is slippery, a worker will need to use to use additional gripping force

[1] The centre of gravity of a regular object is situated at its centre. In an object of uneven weight distribution, it is towards the heavier side.

- ***workplace conditions***, such as whether slopes or stairs have to be negotiated when carrying loads
- ***the weather*** - whether it is hot and humid, or very cold
- the ***physical capacity*** of individual workers.

How Should Loads Be Lifted

You should -

- keep the load as close to the body as possible during all lifting and carrying procedures.
- avoid lifting –
  - with the back fully bent
  - from a position where it is necessary to twist or bend sideways to place the load
  - after prolonged periods with the back bent
  - after a prolonged period of exposure to whole body vibration *eg. driving a vehicle*.

How much weight to lift

Weight limits cannot be set because of the many factors other than weight involved.

The level of loading on the worker's spine is the vital factor, but it is difficult to measure.

Workplace Responsibilities

You should use a risk management process to meet your legal obligations[2] with regard to controlling your workers' exposure to lifting and carrying loads.

Employers must also –

- design work processes and equipment so as to eliminate or minimise risk
- specify carefully when you purchase new tools or equipment
- consult workers and their representatives
- train workers to perform their jobs without risk to health and safety.

Controlling risks from lifting and carrying loads

You should consider manual lifting or carrying of heavy loads only as a last resort.

As part of the risk control process, consider the following -

- **Provide mechanical handling aids.** These should be -
  - designed to suit the load and the work being done
  - as light as their function will allow
  - easy to use and not cause an obstruction
  - located close to the work area so as to be readily available
  - in good working order, so set up a maintenance schedule
  - brought to staff attention when new, so additional risks are not introduced *eg. a forklift appearing without warning in a work area*.
- **Modify the handling task.** When mechanical aids cannot be used -
  - make loads lighter, less bulky and easier to grasp by providing handles
  - make sure packaging is not causing problems by being slippery or an uncomfortable temperature
  - take precautions if contents are likely to move
  - reduce the amount of loading/unloading by using mobile racks for pallets, containers or trays
  - convert from carrying to pushing, pulling, sliding or rolling suitable loads
  - move loads using skids, skates, wheels and slides.

[2] The Workplace Health and Safety Act (1995) requires employers to ensure the health and safety of every person (workers and others) at a workplace is not affected by their business.

- **Improve storage of loads**. The best level of muscular effort can be exerted at about knuckle height (70 - 80 cm). Where possible –
  - store loads at this level
  - avoid storage above shoulder level or close to the floor except for light or infrequently used items
  - if the object must be lifted from a low to a high position, have an intermediate surface so the worker can rest the load for a moment before shifting grip.
- **Change location of loads**. Improve work area layout to reduce carry distances -
  - stipulate to suppliers where products are to be delivered. Plan the location to minimise the distance where loads are stored, and where they will be used.
- **Avoid double handling**. Consider "just in time" arrangements to reduce the amount of materials in storage or requiring handling
- **Use team handling**[3]. Make sure there is a procedure for workers to access help with handling, particularly if they are working alone.

  Team handling may be needed when mechanical aids are not practical.
- **Train and supervise workers**. You must train workers to do their jobs safety. Make sure you include the following -
  - how and when to use any mechanical handling aids
  - when to call for help when handling
  - how to handle loads safely.

Hints to the worker on how to lift

The following are general lifting principles -

- Do not do a job with repetitive lifting before you have warmed up. Spend some time doing other jobs first.
- Stand as close to the load as you can.
- Get a good grip on the load.
- Keep the load as close to the body as possible. This is very important in reducing the strain on your back.
- Turn with the whole body rather than just the trunk to avoid twisting the back.

Try to avoid lifting -

- from a position where it is necessary to twist or bend sideways to place the load
- after long periods with the back bent
- immediately after driving a vehicle.

Do not lift if you are not convinced that you can handle the load safely - call for help.

Lifting from a low position

The more you have to bend forward to pick up the load, the greater the stress on your back.

When you are bending forward to pick up or put down a load, do not fully bend your back. This can be damaging if you are handling a heavy load.

Note – heavy loads you are physically able to handle can still be damaging, particularly If you are doing it repeatedly.

Further Information

Contact Workplace Health and Safety Queensland:

Phone: 1300 369 915

Internet: www.whs.qld.gov.au

[3] For further information, look at the safety link on "team handling".