NRA

National Rivers Authority
North West Region

GUARDIANS OF THE WATER ENVIRONMENT

KINETIC HANDLING

TRAINING COURSE

NRA - NORTH WEST REGION SAFETY POLICY PART III

SECTION 4

MANUAL HANDLING

Although mechanical equipment should be used whenever practicable, much of the work throughout the function of the Authority will continue to be done manually.

The risk of injury can be greatly reduced by a knowledge and application of correct lifting and handling techniques and by taking a few elementary precautions.

Hazards:

Lifting a load beyond your physical capacity.
Sudden and awkward movements.
"Stoop" lifting.
Falling objects.
Back injuries.
Crushing of limbs.
Cuts and abrasions.
Pulled muscles, tendons, etc.

Precautions to be taken:

Kinetic handling techniques must be taught to all employees. (This must be achieved using skilled instructors. The techniques involved cannot just be "picked up").

The weight that can be lifted varies according to personal factors including age, but where regular and frequent handling occurs the maximum limit for men should be 35kg (77lb) and the limit for women 15kg (33lb).

Lifting and Carrying:

1. Always wear protective equipment, i.e. steel-toe capped footwear, overalls and suitable gloves. All protective clothing must be Authority issue.

2. Check the approximate weight before lifting and get help if you consider the load too heavy.

3. Make sure that the path is clear for you to move the load to, ie. move any obstacles.

4. Check that the load has no sharp nails, grease marks, loose particles, etc. which may cause a hazard when lifting.

5. Stand close to the load, feet apart with the lead foot facing the way you intend to move, one in front of the

other so that the weight of the load is between them. You should be balanced and stable yet be able to use your body weight to get the load moving easily.
If you feet are too close together your effective base is narrowed and the risk of overbalancing is greater.
If you keep your knees together the stress on your spine is increased dramatically.

6. Everything you lift should always be close to your body.
If the load is on the floor, squat down straddling the load and pull the load into the body.
If the load is too wide, and you cannot get it up on its side, then get some help.

7. If the load is on a bench, place one foot under the bench for balance, pull the load towards you until it rests against your body before you lift it.
Alternatively, if you cannot place your foot under the bench try to position yourself at the corner of the bench. The closer you can get the load to your body the less the stress.

8. Always keep a straight back when lifting, pulling and pushing a load. A straight back means one that is not twisted, rotated nor bent sideways.
The shoulders should be level and facing the same direction as the pelvis and the head should be held slightly up and facing straight forwards.
To keep a straight back all the time, good footwork is essential. The feet have to be in the right position to begin with, ready to move. If you have to turn, pivot on your feet to avoid twisting the spine.

9. Beware of bending down sideways for a one-handed lift. Use the other hand to keep your shoulders and back straight. Use it for counter-support against a wall, bench or table, or even against your thigh. This way you can by-pass some of the load from the spine while keeping a straight back.
When lifting and carrying always try to load the spine evenly on both sides; it is easier and safer to take one gallon of water in each hand than two gallons in one.

10. Carrying involves some static muscular work which can be tiring for the muscles, the back, shoulders, arms and hands depending on how the load is supported. A weight held in front of the body induces more spinal stress than one carried on the back, and likewise a given weight held in one hand is more likely to cause fatigue than if it were divided into equal amounts for each hand.
As with pushing, which loads the shoulders, carrying goods in front of the body or on the shoulders may restrict the rib cage, thus the way in which a load is actually carried makes a great difference to the fatiguing effects which may stem from a high rate of

energy expenditure, from a mechanical restriction to breathing, or which may lead to symptoms of muscular fatigue in the hands, forearms, shoulders or back.

11. Heavy, bulky or unusually long loads require more than one person to lift them.
Persons involved in a two-man or a three-man lift should be matched for height where possible. One person should be chosen as leader before lifting commences. The leader shall call all the stages of the lift because timing and co-ordination are essential for team lifting.

12. If a load is too large for a team lift then a mechanical lifting device should be used. This can range from a rope to a fork-lift truck or crane.

Pushing and Pulling:

1. The strength of a push or pull depends mainly on foot stability and on body weight.
Theoretically, the nearer the body can be to the horizontal without the feet slipping the stronger the pull - hence the posture of a Tug-of-War team. The strength of the leg and shoulder muscles is a secondary factor because they are of no value without firm footage.

2. Stresses on the spine are generally higher for pushing than pulling.
Because the abdominal muscles are active as well as the back muscles, the reactive compressive force on the spine can be even higher than when lifting.
Pushing also loads the shoulders and the rib cage is thus stiffened, making breathing more difficult.
Pulling is therefore a preferable method of applying horizontal forces as the pulling force can be applied fairly close to the long axis of the spine.
Even better for minimising spinal stress is to lean the back on the object to be moved and simply use the thigh and leg muscles.

Some Awkward Loads

Sheet Materials

Single handed lifting and carrying of sheet material is not easy because it is difficult to avoid twisting the spine when taking hold of it, and in a strong wind it can act like a sail.
Even when the sheet is fairly light, it is often safer and quicker for two people to handle it. For one person the sheet should not be longer than the arm span and not wider than the distance between the chest and the palm of the hand, unless slings are used.

To lift a sheet of material from the floor, stand close at one side to steady it and bend the hips and knees to a good lifting position. Tip the sheet up on to one corner, grasp it safely and, keeping the head and back as straight as possible, lift it kinetically. Often it is necessary to rest the load on a convenient support to get a better grip before moving off.

Many sheet materials have dangerous or fragile corners and these should always be protected. Glass is especially dangerous: the correct gloves and carrying tools should always be used.

Cylinders

Long gas cylinders must be handled with great care. Not only are they heavy to lift, but they often contain dangerous gases. Damage to the top mechanism therefore creates an additional hazard.
Where possible, cylinders should be transported on a trolley but if one is not available then the cylinder can be lifted and then carefully rolled using the bottom rim. Once stored make sure that the cylinders are secured by chains.

Sacks and Sandbags

The techniques used will depend on the size and weight of the sack and how far it is to be carried.
Sacks seldom have corners to hold, often they are slippery when wet, rough handling is apt to split them open and the load inside is deemed "live" because it can move once lifted.

Stand at whichever end of the sack is easiest to hold.
Get a good foot position, squat the kinetic way with knees bent and back straight.
Take a firm hold of the sack and using your legs and body weight, move forward to set the sack upright.
Then, move into the kinetic stance once again ready for the 1st stage of the lift.

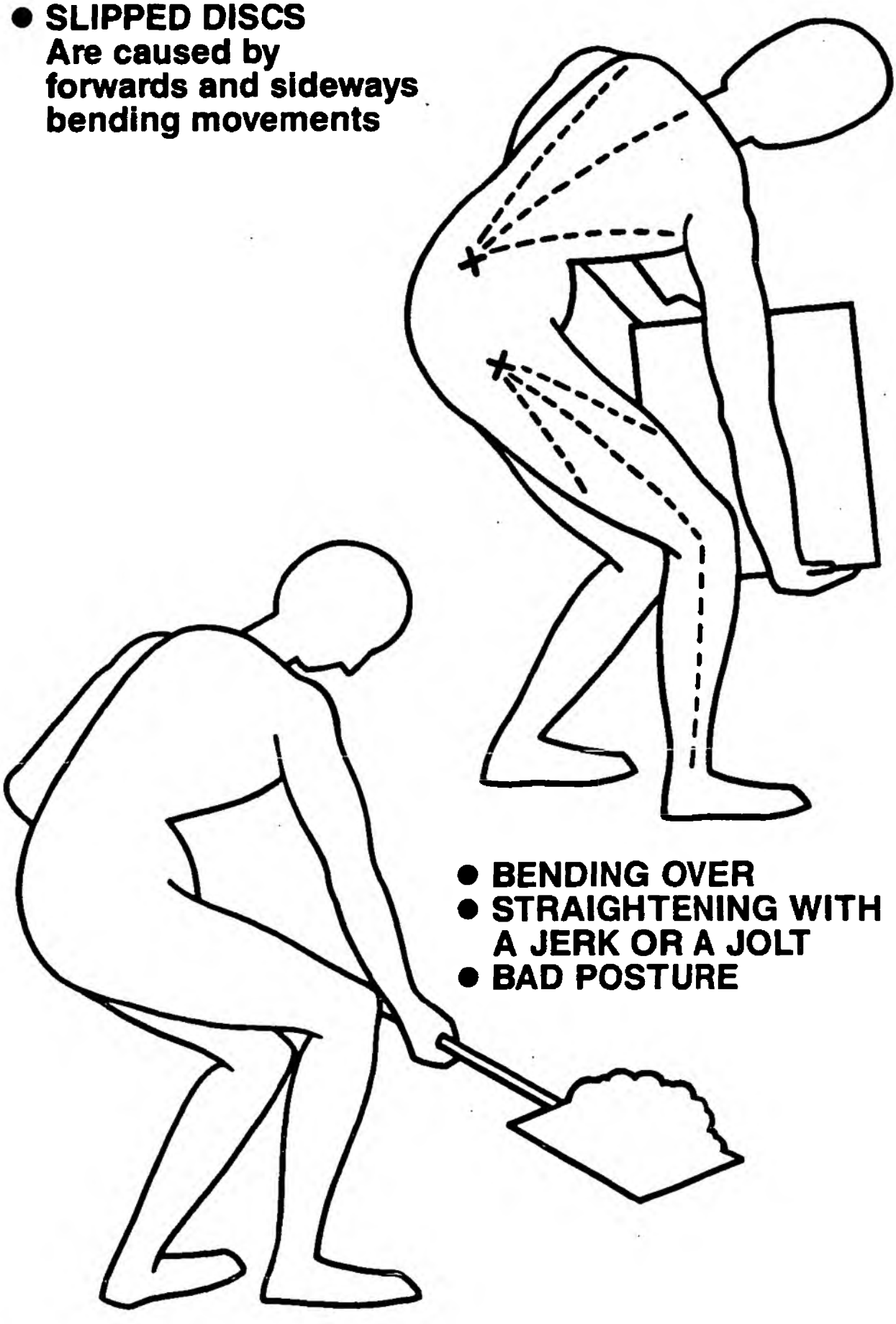
With the load firmly held close to the body, head up and back straight, lift the sack kinetically using your legs. Once in the upright position you are ready for the 2nd stage of the lift.
With your feet in the correct position, squat and lower the load onto the top of your leg, once comfortable you can move your hands and firmly clutch the sack to your body.
Stand upright and the sack will be held against the chest.

With relatively light sandbags, two can be lifted simultaneously one in each hand as if you were carrying two suitcases. If the sandbags prove to be too heavy then the above procedure using the two stage lift should be adopted.

When lifting or placing from the back of a lorry always keep the gap between your body and the lorry to a minimum.

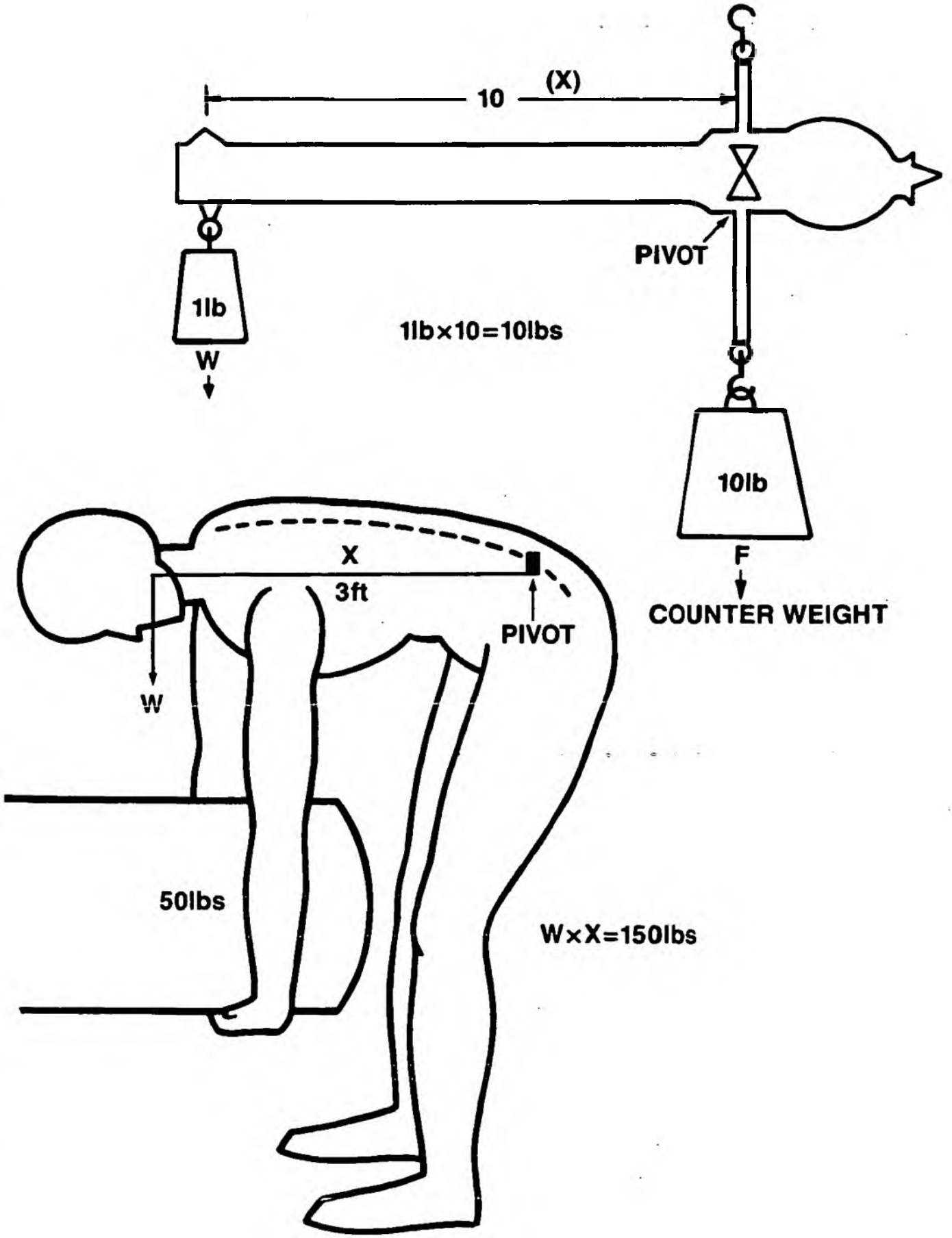
1 MAIN CAUSES OF BACK FAILURE

- **SLIPPED DISCS**
  Are caused by forwards and sideways bending movements

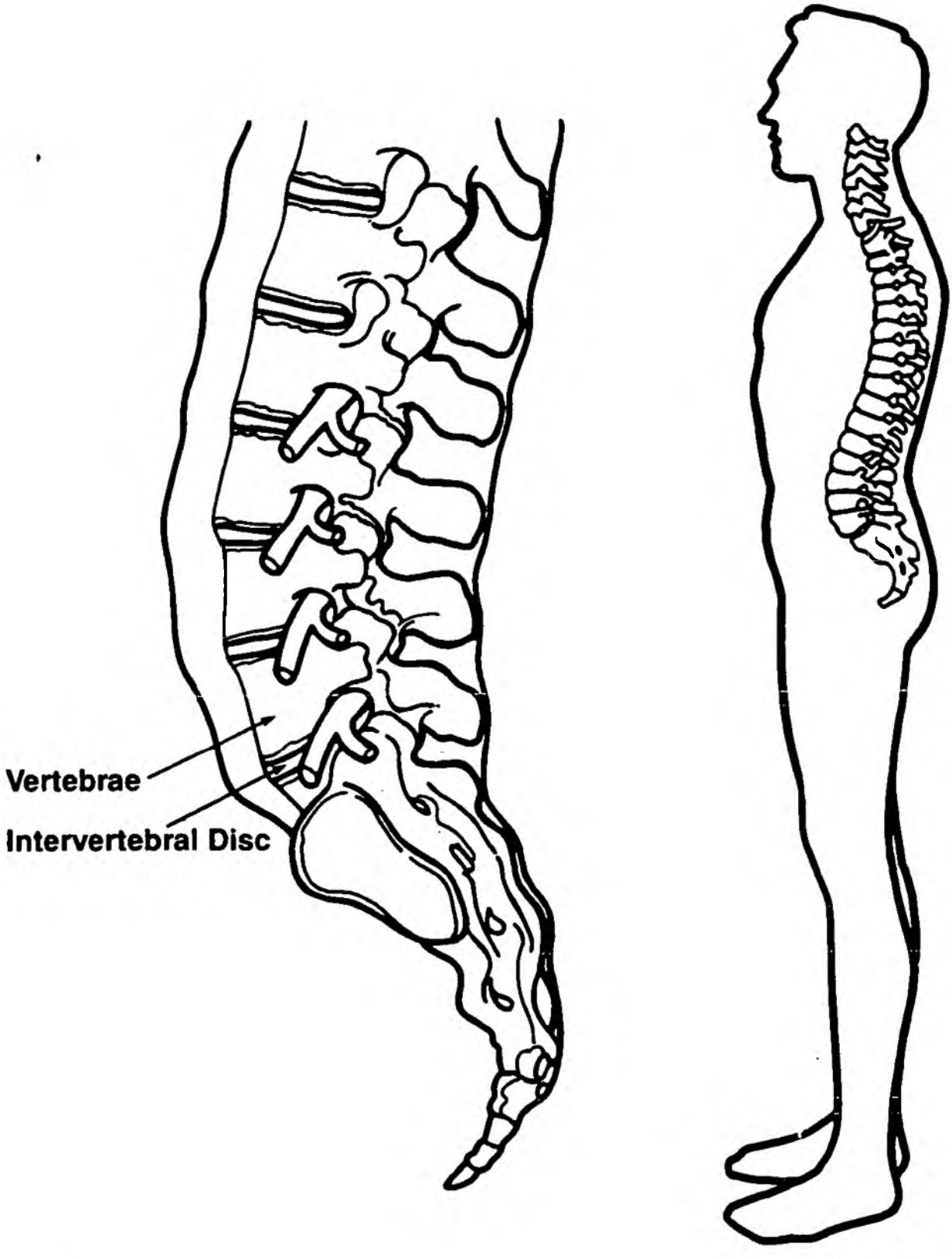


- **BENDING OVER**
- **STRAIGHTENING WITH A JERK OR A JOLT**
- **BAD POSTURE**

2 BALANCED LOAD



3 SPINAL COLUMN



4 WHAT THE LAW SAYS

FACTORIES ACT 1961

SECTION 72 (1) – PROVIDES THAT A PERSON SHALL NOT BE EMPLOYED TO LIFT, CARRY OR MOVE ANY LOAD SO HEAVY AS TO BE LIKELY TO CAUSE INJURY

HEALTH AND SAFETY AT WORK etc. ACT 1974

EMPLOYER'S DUTIES TO HIS EMPLOYEES:–

SECTION 2 (2)a PROVISION OF SAFE SYSTEMS OF WORK

SECTION 2 (2)c PROVISION OF

INFORMATION

INSTRUCTION

TRAINING

SUPERVISION

SECTION 9 WHEN REQUIRED, EMPLOYERS HAVE TO SUPPLY FREE ISSUE OF NECESSARY SAFETY CLOTHING AND EQUIPMENT

HEALTH AND SAFETY AT WORK etc. ACT

EMPLOYEE'S DUTIES:–

SECTION 7 a ALL EMPLOYEES MUST TAKE CARE OF THEMSELVES AND OTHERS WHO MAY BE AFFECTED BY HIS ACTS OR OMISSIONS

b CO-OPERATE WITH HIS EMPLOYER TO COMPLY WITH THE ACT

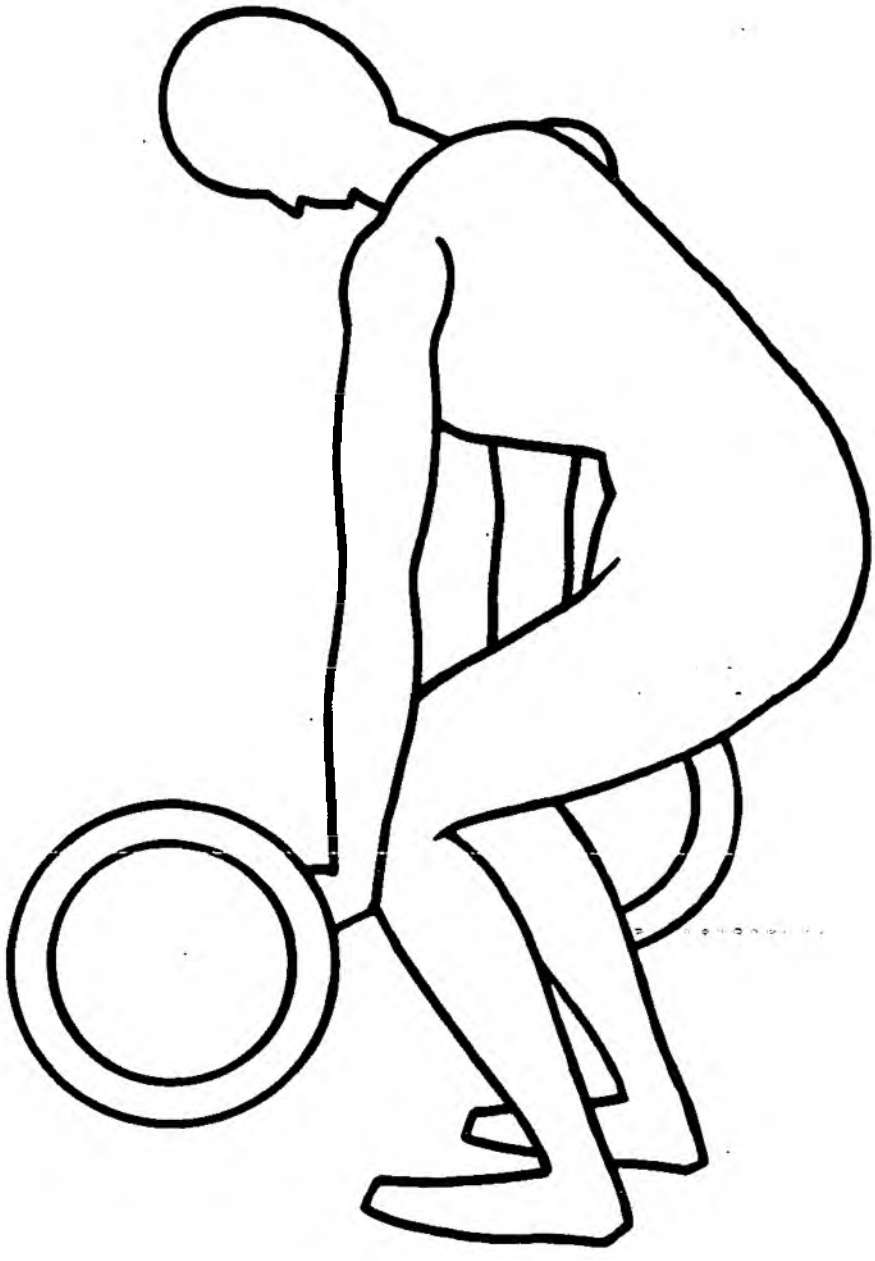
SECTION 8 NOT TO INTERFERE WITH OR MISUSE ANYTHING PROVIDED FOR EMPLOYEES' HEALTH, SAFETY OR WELFARE

NOTE CIVIL LIABILITY FOR EMPLOYEES

EMPLOYEES CAN BE HELD LIABLE AGAINST ANY CIVIL CLAIM MADE FOR COMPENSATION RESULTING FROM ANY ACCIDENT, IF IT IS SEEN THAT THEIR ACTIONS CONTRIBUTED TO THE CAUSE OF THE ACCIDENT

7 THE MECHANICAL WAY

LIMITED TO SPECIALISTS SUCH AS WEIGHT LIFTERS

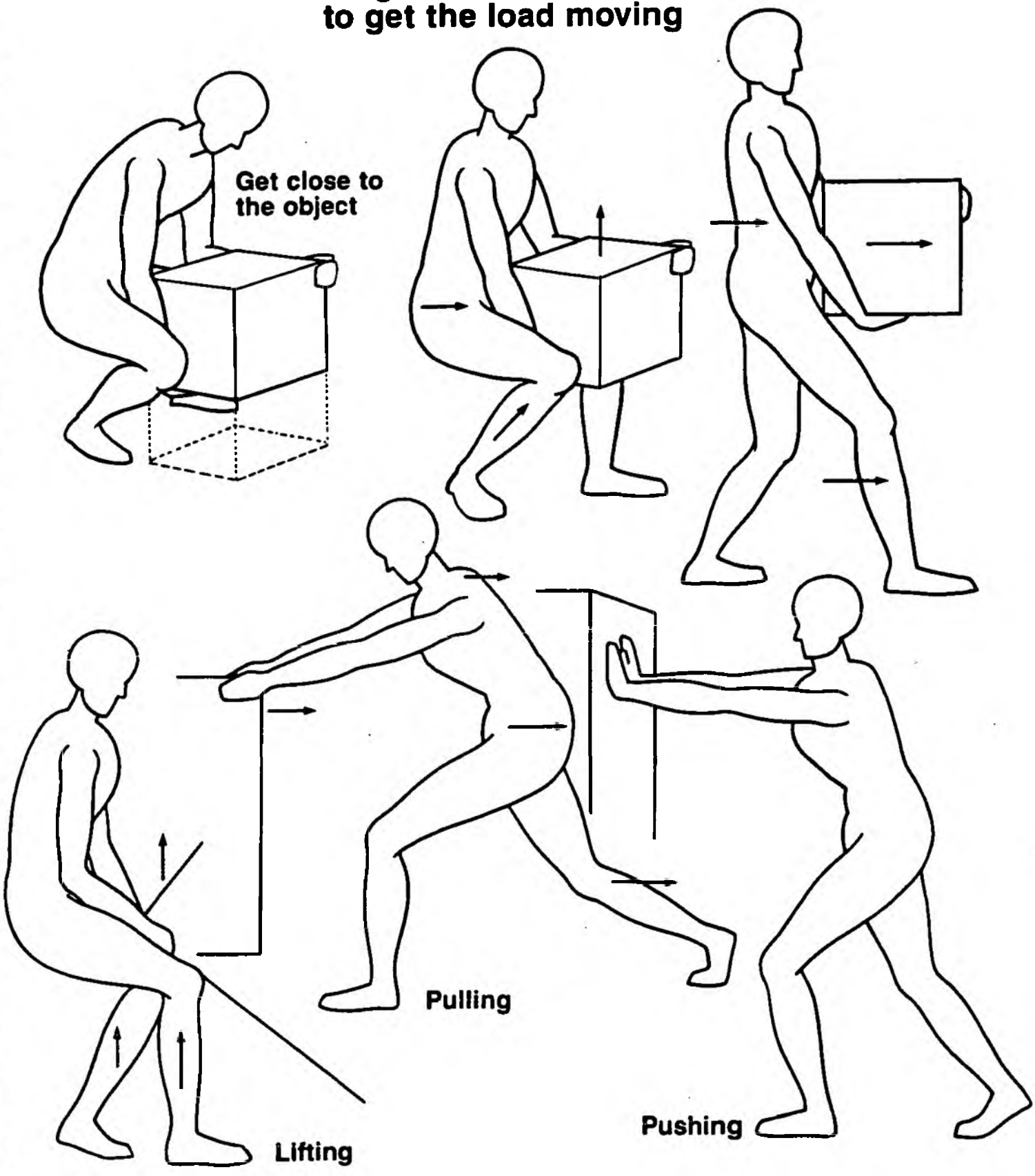


A vertically controlled lift
The weight is lifted and lowered through the centre line of gravity

8 FEET POSITIONS

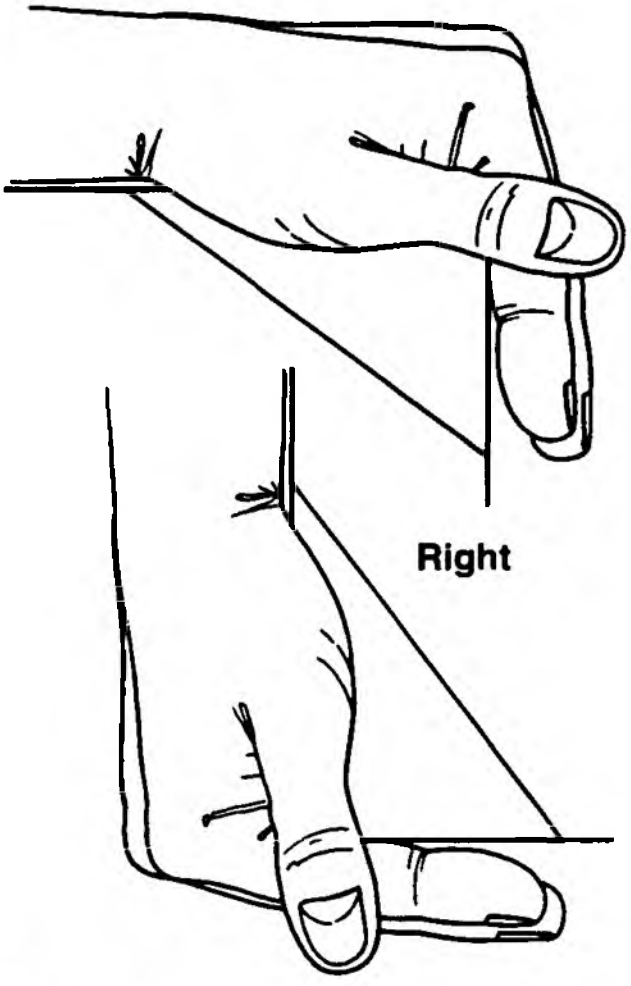
A GOOD BALANCED STANCE

Use the legs to transfer body weight to get the load moving



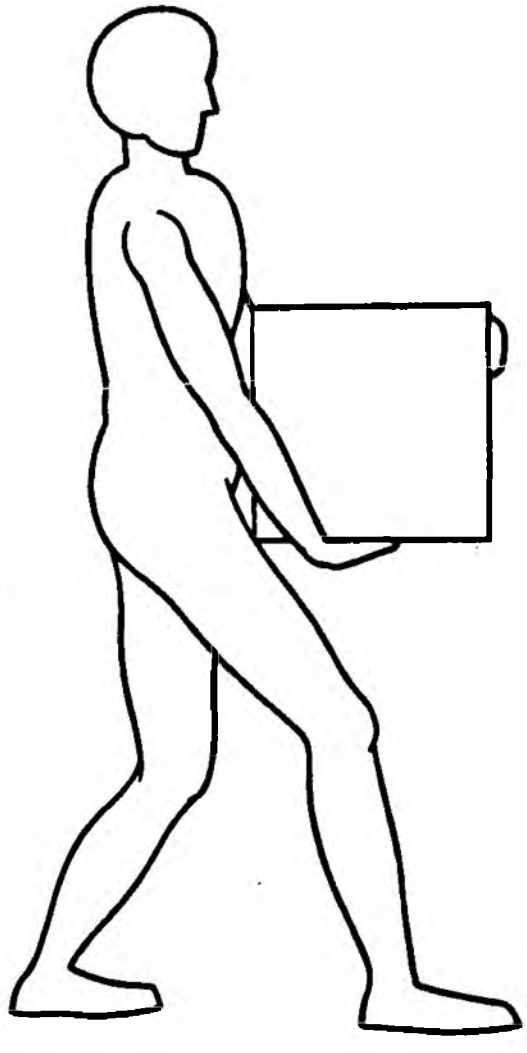
9 HAND POSITIONS

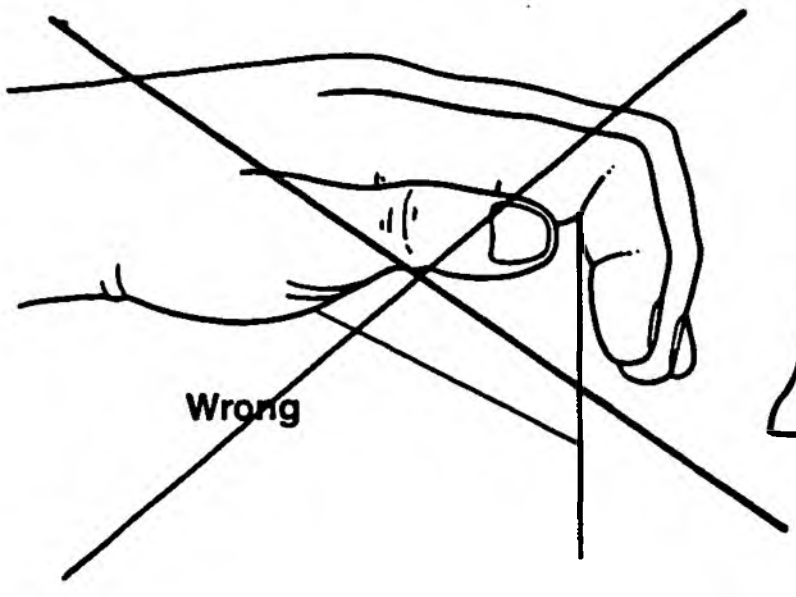
ONE HAND UNDER FOR SUPPORT ONE HOLDING THE OBJECT CLOSE TO THE BODY



Right

Use the roots of the fingers with the thumb coming round plus contact of the weight with the palm of the hand



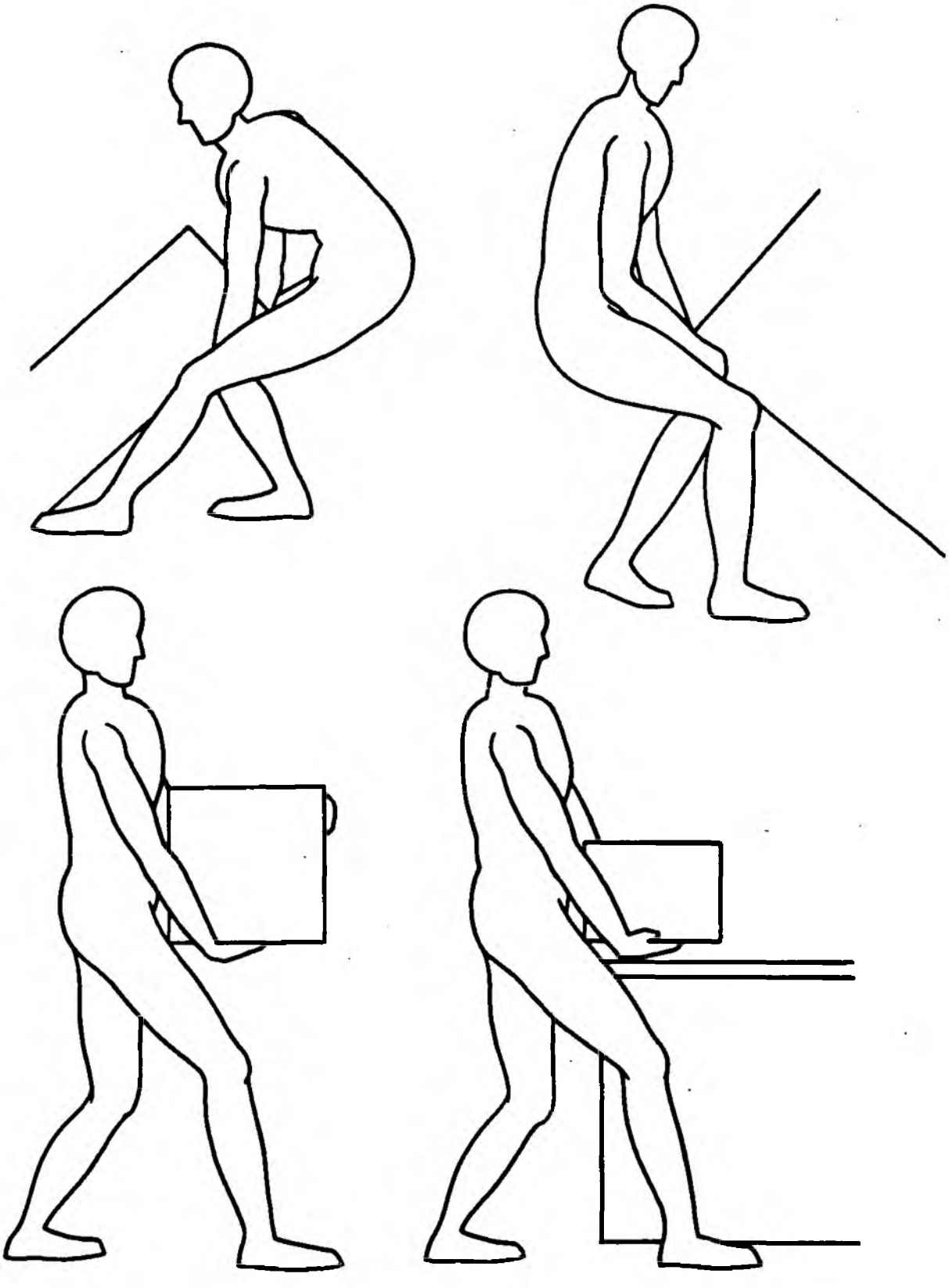


Wrong

10 ARM POSITIONS

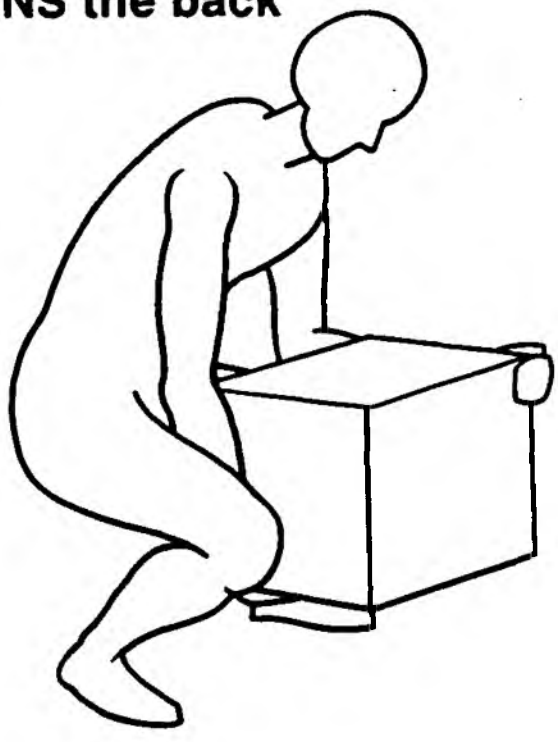
ARMS CLOSE TO THE BODY

The further away the weight is from the body the greater the strain will be



11 HEAD POSITION

CHIN TUCKED IN automatically STRENGTHENS and STRAIGHTENS the back



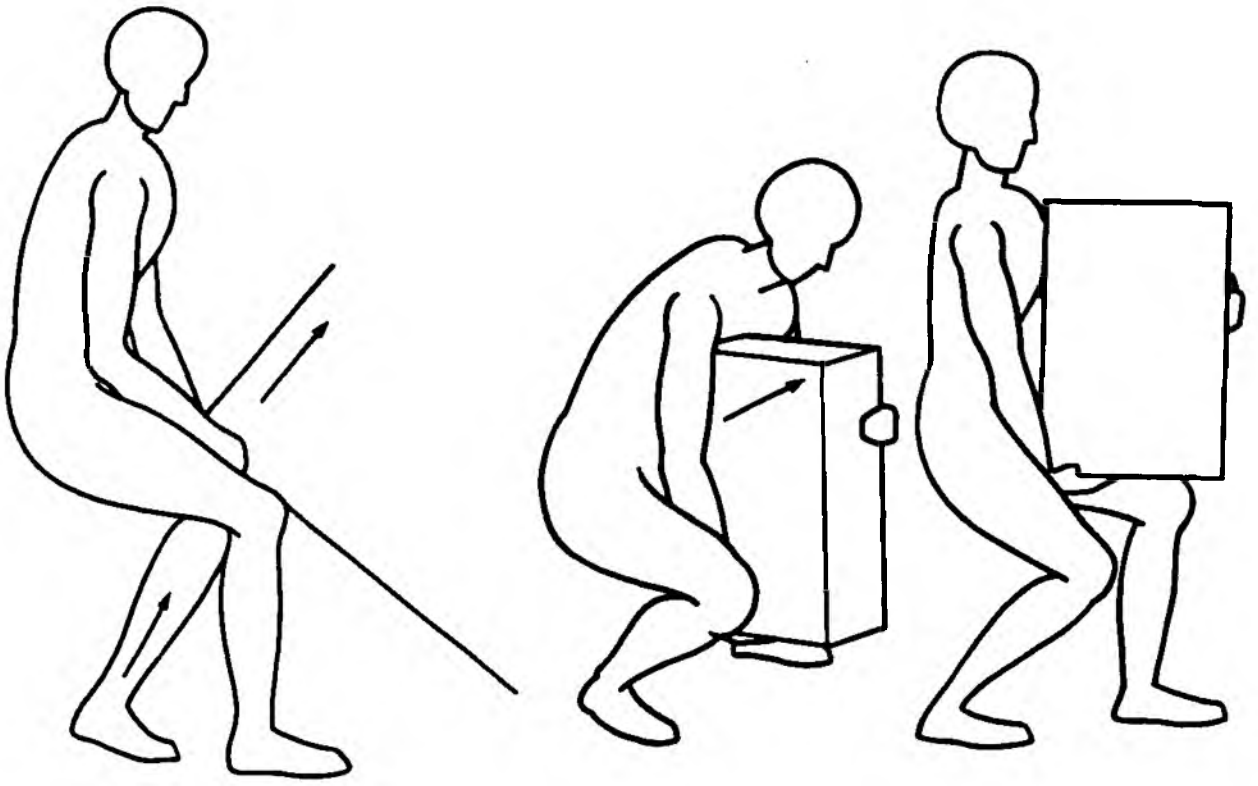
BACK POSITION

A STRAIGHT BACK makes the STRONGER LEG MUSCLES do the work

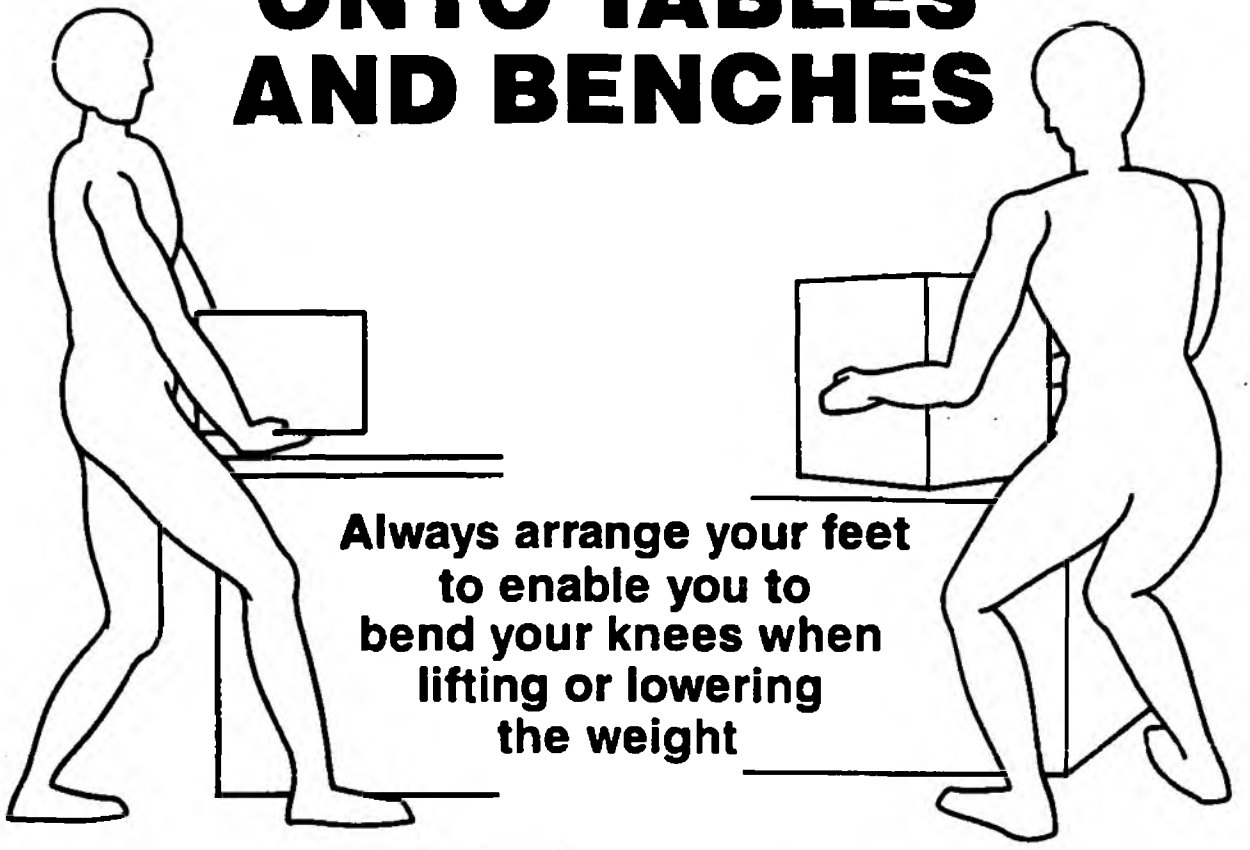
12

THE SHAPE OF THE OBJECT

Arrange the shortest angle of the object so that it is nearest the centre line of gravity



ONTO TABLES AND BENCHES

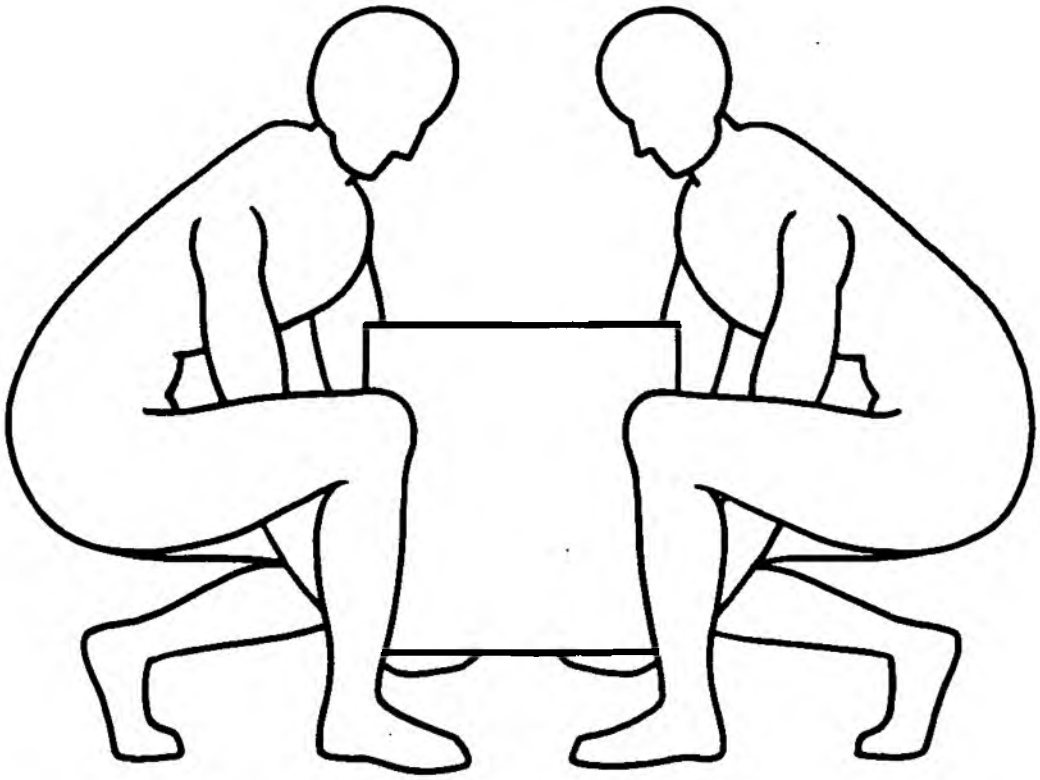


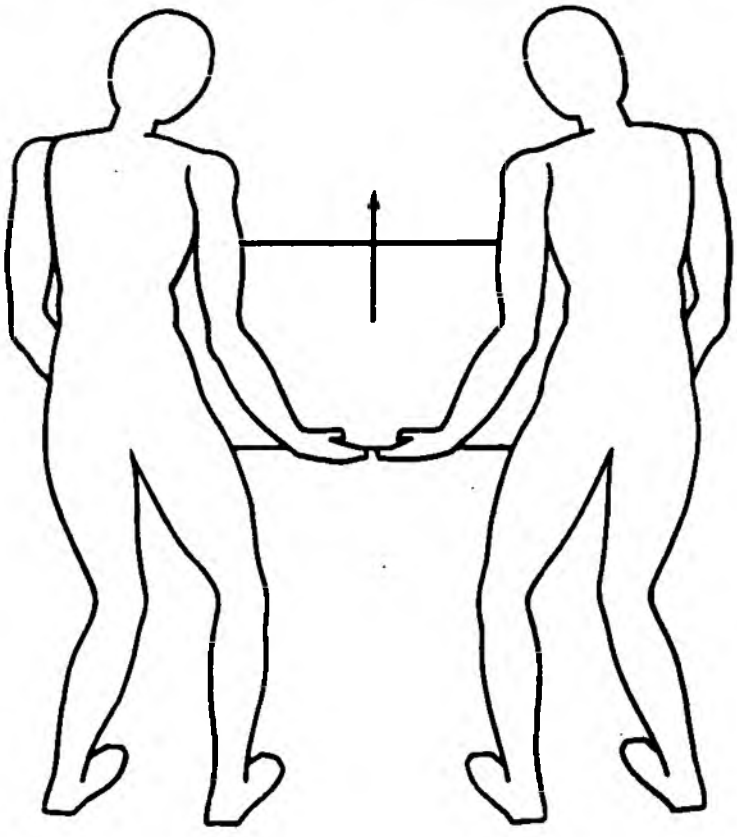
Always arrange your feet to enable you to bend your knees when lifting or lowering the weight

13 TWO PERSON LIFTS

THERE MUST ALWAYS BE A CALLER

GET CLOSE TO THE LOAD

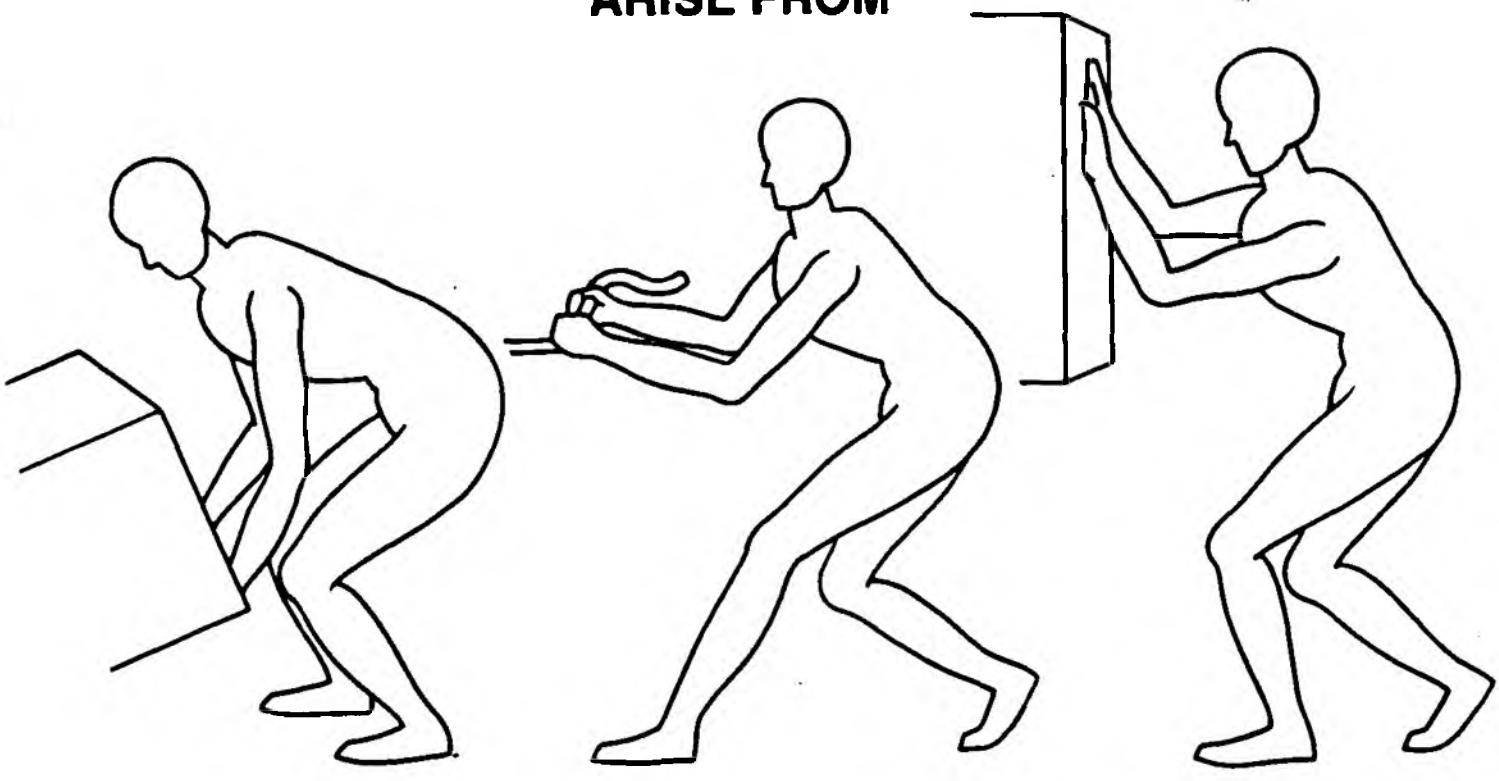




THINK BEFORE YOU LIFT

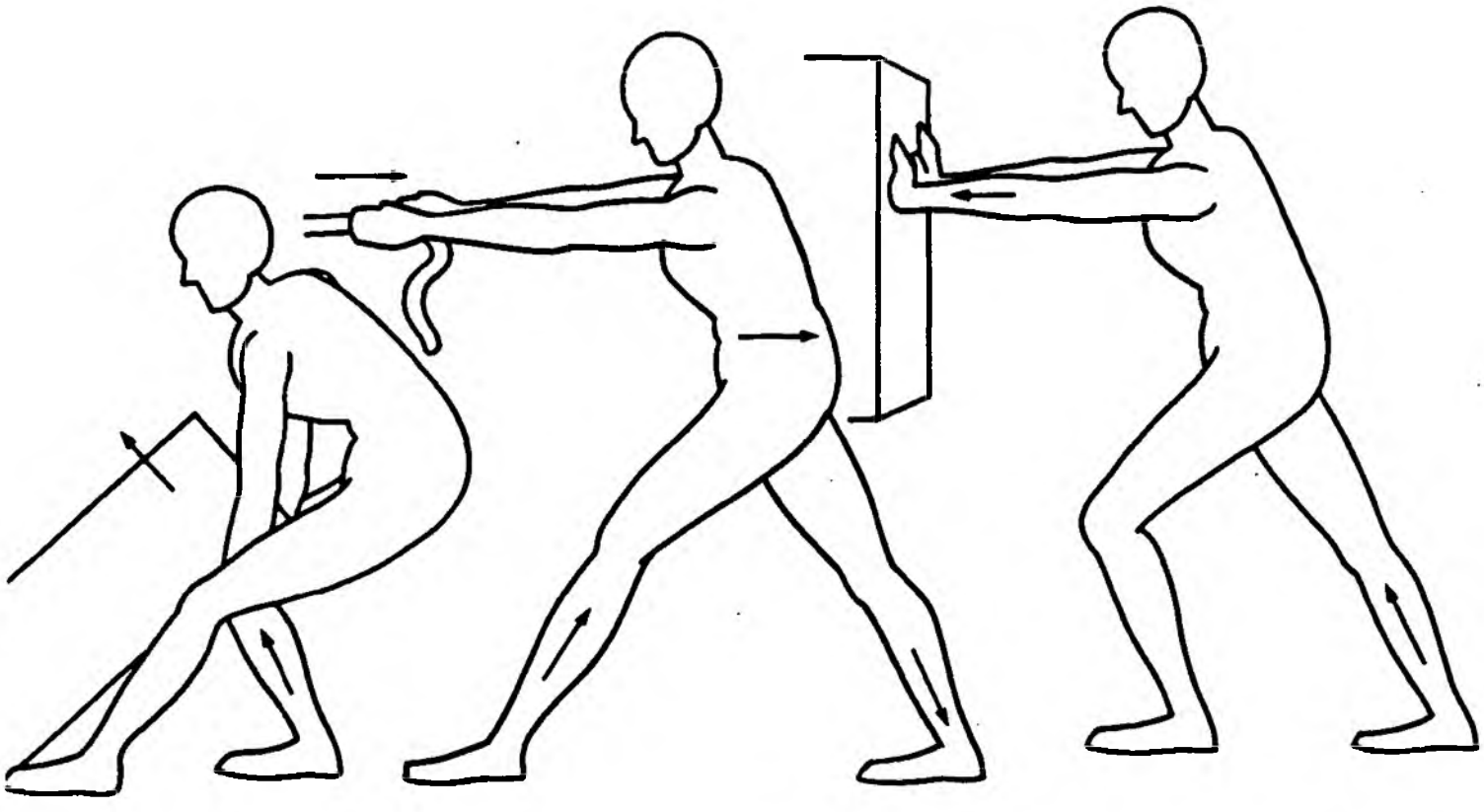
FATIGUE AND INJURY

ARISE FROM



Lifting Like This | Pulling Like This | Pushing Like This

BUT THESE WON'T CAUSE INJURY



NRA

National Rivers Authority
North West Region

Headquarters: P.O. Box 12, Richard Fairclough House, Knutsford Road, Warrington WA4 1HG. Telephone: (0925) 53999 Telex: 628425 Fax: (0925) 415961