

Professional cleaning

Ergonomics for cleaners

Serviceerhvervene
UddannelsesSekretariat

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Table of Contents

Ergonomics	4
Where does it hurt?	4
The body	5
The skeleton	5
Joints	6
The back	7
The muscles.....	8
The circulatory system	9
Feet and footwear.....	11
Repetitive movements.....	12
How to wring a cloth.....	12
How to lift properly.....	13



Ergonomics

The term “ergonomics” is derived from two Greek words: “ergon” meaning work, and “nomoi” or “nomos” meaning natural laws. Ergonomists study human capabilities in relationship to work demands.

Cleaning work involves heavy lifting, working in constrained positions, bending and twisting, monotonous work, and a rapid pace of work. This causes musculoskeletal disorders if the worker does not know how to use the correct working techniques and methods and the correct body postures.

If you don’t use the right techniques or postures, you are likely to get pain several places in the body.

Where does it hurt?

Most cleaning workers complain about pain in the neck, shoulders, elbow, hip, back, loin, knees, and feet.

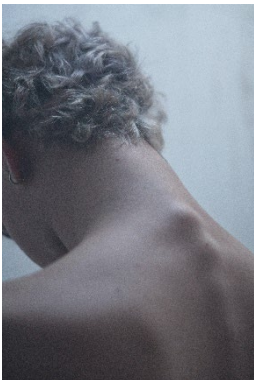


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The body

The skeleton

The skeleton consists of about 200 bones and the skeletal system has four basic functions:

1. Support for tissue and muscles
2. Protection of vital organs. The skull protects the brain, the vertebrae protect the spinal cord, and the thoracic cage protects heart and lungs
3. Movement through bones and attached muscles
4. Storage of minerals (especially calcium and phosphorous) and immature blood cells.



Photo by: Parker West on Pixabay



Joints

Joints are formed where two or more bones meet.

Some joints have no movement, some only slight movement, and some are freely movable. Joints may also be classified as fibrous, cartilaginous and synovial:

1. Fibrous or fixed joints. In this type of joint there is no movement between the bones concerned. As the name suggests, there is fibrous tissue between the ends of the bones. (E.g. the joints between the bones of the skull, called sutures)
2. Cartilaginous or slightly movable joints. In this case there is a pad of white fibrocartilage between the ends of the bones taking part in the joint which allows for very slight movements. Movement is only possible because of compression of the pad of cartilage. (E.g. the joints between the bodies of the vertebrae)
3. Synovial or freely movable joints. Synovial joints are characterised by the presence of synovial membrane. A considerable amount of movement is possible at all synovial joints and the types are subdivided according to the movement possible. Limitation of movement is mainly due to the shape of the bony surfaces which form the joint. (E.g. the shoulder and the hip joints).



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Disease – Osteoarthritis:

Is also known as degenerative arthritis or “wear-and-tear” arthritis. It primarily affects the cartilage (the slippery tissue which cushions the end of bones within a joint). Healthy cartilage allows bones to glide over one another. It also absorbs energy from the shock of physical movement.

In osteoarthritis the surface layer of cartilage breaks down and wears away. This allows bones under the cartilage to rub together, causing pain, swelling and loss of flexibility of the joint. Over time the joint may lose its normal shape. Also, bone spurs (small growths called osteophytes) may grow on the edges of the joint. Bits of bone or cartilage can break off and float inside the joint space. This causes more pain and damage.



The disease usually affects older people but can occur at any age. Symptoms include morning stiffness and joint pain, which typically worsens later in the day after repetitive use of the joint. To avoid this, there are several options: Weight control (being overweight impacts the bearing joints and can increase the pain), exercise (yoga or zumba provides good work out for arthritis patients), and to be mindful of your body postures during the workday.

The back

The back is made of four major parts:

1. The spine
2. The spinal cord
3. The spinal nerves
4. Supporting muscles

The spine has interlocking bones called vertebrae. These vertebrae are separated by discs which act as cushions protecting the vertebrae from each other.



Photo by: Alfred Derks on Pixabay

The muscles of the back and abdomen hold together the vertebrae and shape of the spine. The shape the spine takes on is very important, as the spine should look much like the shape of the letter “S”.

The disc consists of a fibrous ring with a jelly-like core. When the spine is straight, when standing or lying down, internal pressure is equalized on all parts of the discs. While sitting or bending to lift with straight legs and a rounded back, the pressure on the disc may shift and cause a tear in the outer, fibrous ring of the disc allowing the soft core to bulge. It is what we call a spinal disc herniation or more commonly known as a “slipped disc”.



The muscles

The body has three types of muscle tissue:

- Smooth muscle tissue
- Cardiac muscle tissue
- Skeletal muscle tissue

The three types of muscle tissue forms the muscles, which allow movement.

Skeletal muscle is made up of bundles of muscle fibres which contract together in one direction. During movement, when a muscle contracts, the muscle fibres are reduced in length so the amount of movement that the muscle can produce depends on the original length of these fibres. The strength of the muscle will depend on the number of fibres the muscle contains, and the cross-sectional area of the muscle.

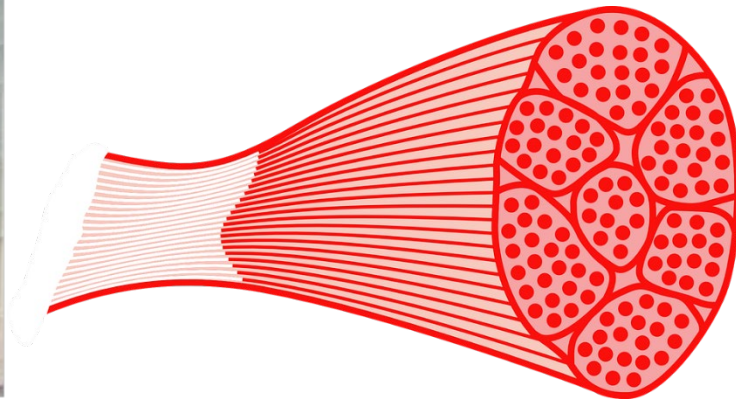


Photo by: Maria Veha, TEC

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Types of physical work:

Physical work is carried out by the muscles and is therefore often called muscular work.

There are two types:

- **Static:** This is where a muscle remains contracted for a period but there is no movement, as in holding a picture against the wall or carrying a bag of shopping. Holding a static or fixed posture can be very tiring as your muscles do not get time to relax. A muscle which is heavily contracted squeezes against the blood vessels next to it, thus restricting blood flow. Restricted blood flow slows down or interrupts delivery of oxygen to the muscle as well as removal of lactic acid, a waste product from the muscle. This causes in muscle aches or pain. Any fixed posture will cause these symptoms.
- **Dynamic:** Rhythmical contraction and relaxation of a muscle which results in movement, as in pulling open a drawer or walking up stairs. Dynamic work is less tiring and more efficient than static work. This is because during dynamic work a muscle contracts and relaxes rhythmically which it acts like a pump for the flow of blood in the blood vessels, allowing the blood to supply more oxygen and take away more lactic acid than during static work.

The circulatory system

The heart, blood, and blood vessels make up the circulatory system, which services all cells in the body. Blood flows from the heart through arteries to the rest of the body, where it goes into smaller and smaller vessels until it reaches the capillaries. In these tiny vessels, the blood exchanges oxygen for CO₂, sugar for waste, etc.

The “used blood” then flows into the veins. Blood either flows under gravity or gets pushed upwards by body movements. The small vessels meet and flow into the biggest veins, which lead the blood into the atria of the heart.

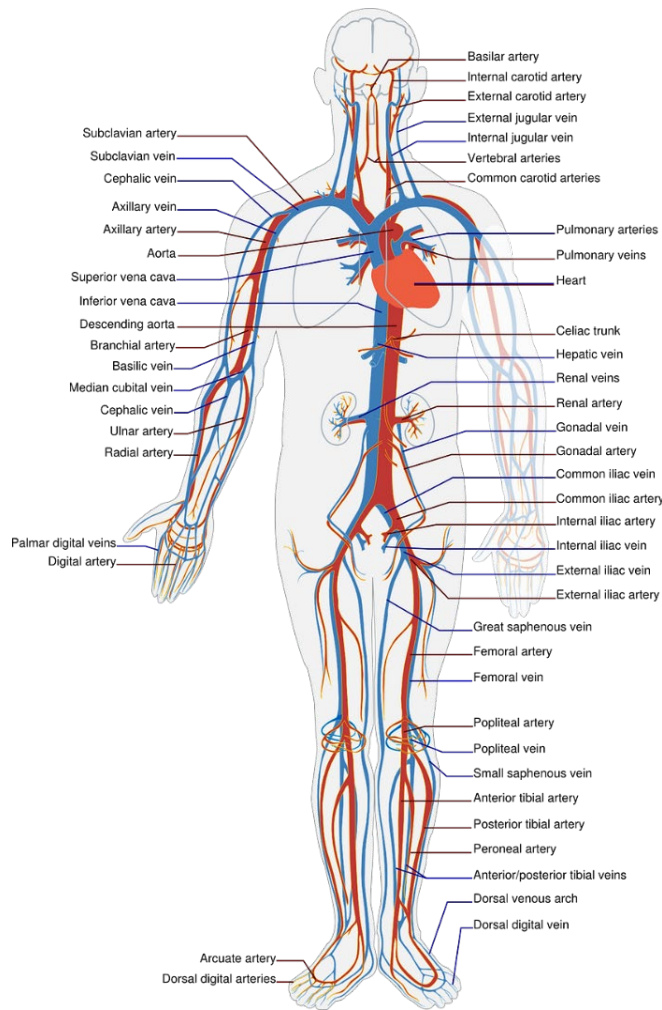


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The venous pump:

To push blood back to the heart, the veins rely mainly on surrounding muscles and a network of one-way valves. As blood flows through a vein, the cup-like valves alternately open to allow blood through, then close to prevent backflow. When you move the muscles, e.g. in the legs, the pressure on the veins will make the valves open and close. This is called the venous pump.

If the valves do not work properly, the blood will pool in the vein and making it difficult for the vein, and making it difficult for the muscles to push the blood upwards towards the heart. Instead of flowing from one valve to the next - the blood continues to build up in the vein. This increases venous pressure, and the likelihood of congestion while causing the vein to bulge and twist. It shows as knotted, bluish cords just beneath the surface of your skin and is called varicose veins.

Varicose veins are very common. You are likely to get varicose veins when pregnant, overweight, or when standing for long periods. Genetics can also play a part, if other family members have varicose veins, there is a greater probability that you will inherit it also. Varicose veins can be prevented by weight control and by exercising the venous pump.



Feet and footwear

Our feet carry us, the equivalent of five times around the earth in an average lifetime. Wearing shoes that fit properly and support our feet is vital to avoid sore feet and to prevent or alleviate many common foot problems. It's also important to choose footwear that will minimise your risk of falling or slipping.



Illustration from: SUS

The best shoes for working on your feet all day:

1. Shoes with a low heel. Choose a shoe where the heels are elevated by at least $\frac{1}{4}$ inch. This allows the shoe to have a good arch support.
2. Shoes with a large toe box. Choose a shoe that has a wide toe box. Your feet tend to swell during the day, so try to shop for shoes in the late afternoon, when your feet are at their largest. Make sure there is “wobble room” in the toe box of the shoe. If the shoes are tight or pinch in the store, they will become worse following a day on your feet.
3. Shoes with laces. Wearing a shoe with a lace (or a Velcro strap) will help stop your feet from sliding forward when walking. Shoelaces act in much the same way as a seat belt does – it stops your feet from unwanted movement and protects it from injury.
4. Shoes with a good arch support. Choose shoes with a good arch support. Arch support will help distribute weight over a large surface area so that pressure is not focused on the heel and forefoot.
5. Alternate your shoes. Alternating your shoes from one day to the next will help to vary the posture of the foot and distribute the load over a greater range of joints and muscles. It will also allow your shoes to dry out and therefore reduce the growth of bacteria.



Repetitive movements

If you perform the same movement continually during the day, it will strain the body parts involved. Too many uninterrupted repetitions of an activity or movement, unnatural or awkward movements such as twisting the arm or wrist, overexertion, incorrect posture, or muscle fatigue can lead to disorders like carpal tunnel syndrome, trigger finger/thumb, golfer's elbow, tennis elbow, or tendinitis.

Avoid or reduced the risk of these disorders by following these advice:

- Adjust your work area to fit your body. A comfortable work environment benefits both you and your employer
- Stretching every few hours relieves physical tension and body aches. Stretching increases your productivity
- Change the pattern of your work so that you are not repeating the same movements over and over
- If you can, lean or sit rather than stand for long periods of time
- Work with your wrists straight
- Lift by using your legs, arms, and buttocks. Bend your knees and keep your head, back and hips in a straight line. Never bend over to pick anything up without bending your knees first. Never twist while lifting

How to wring a cloth



Photo from: SUS

Remember to lower your shoulders and keep the wrists straight.
It's less strenuous for your shoulders, arms, and wrists.



How to lift properly

Back injuries occur for a number of reasons. Back strain and fatigue are probably the most common reasons. Improper lifting can also cause back injuries. It most often results in tears in the discs between the vertebrae or pressure on spinal nerves. To avoid or reduce risk of back injuries, use proper lifting techniques.

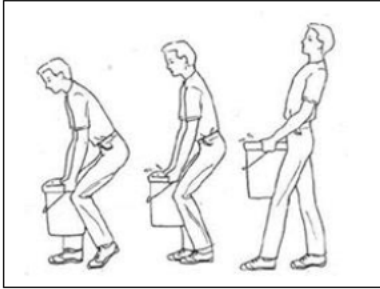


Illustration from: SUS

Always think before you lift:

1. Examine the object.
2. Decide where to grasp it.
3. Determine how to hold it.
4. Have a clear path to your destination.
5. Take your time.

Initial positioning is also important:

1. Stand close to the object.
2. Place your feet comfortably apart.
3. Bend at your knees and hips.
4. Keep your back straight.
5. Get a good grip.