

Bio-Mechanics in the Workplace

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Biomechanics is the study and analysis of movement and position activities. Biomechanics differentiate between the geometry of movement and position (kinematics) and the forces associated with motion and position holding (kinetics).

Biomechanics helps analyse the body's movements, exploring how internal forces - such as muscles, ligaments, and joints - help create external movement and positions. Biomechanics help people obtain optimal muscle recruitment and performance. This helps the proper work of brain, nervous system and metabolism. Biomechanics also uses the knowledge of applying proper **load bearing** (body weight) and **load transmission** techniques to preserve and regulate the internal performance of the body and the external performance of work in the workplace. Everybody has her/his own legs and arms the own biomechanics and can try to understand, regulate and stabilise in workplace activities. This brings a multifaceted inner and outer **regulation** and **stabilization** of the body (allostasis).

Load Transmission and Extensor Chain

The desirable load transmission is via the bones. They are the stable and hard structures holding the body. The desirable anti-gravity-activity is via the extensor-muscle-chain (see figure 1). The two main important muscles here are the front muscles in the upper legs (quadriceps) and the back muscles in the upper arms (triceps). The upper legs support all the way to the feet, and in the opposite direction the upper chest. The upper arms supports the hands and in the other direction the upper chest.

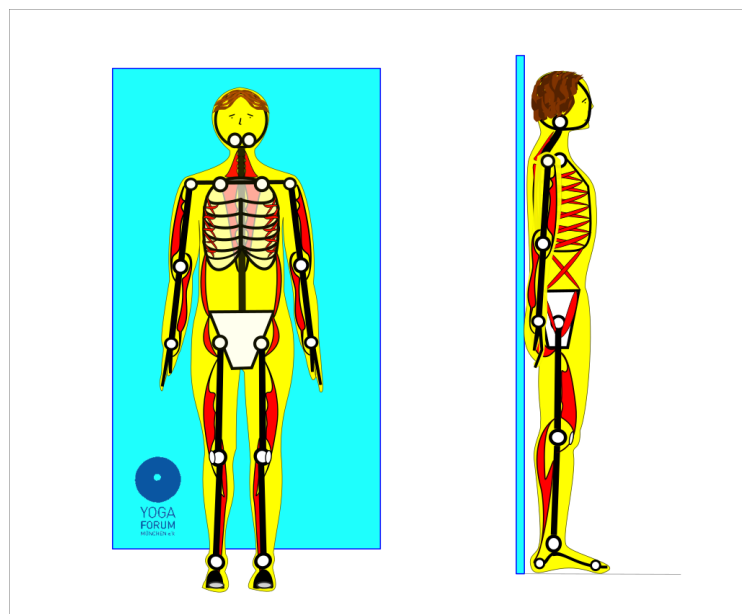


Figure 1: Standing (Tad-Asana) showing the extensor-muscle-chain.

In every single position, the main idea is to bring the load onto the bones and to use the extensor-muscle-chain. In the modern workplace, we perform a lot of activities sitting, mostly on a desk in front of a computer. The main difference between standing and sitting is that in standing the whole weight and support-points are the two heels, while in sitting the main two stabilizing points are the two sitting bones.

Healthy Positions in the Workplace

Figure 2 shows the most important points in obtaining a healthy and useful position while working on a desk. The idea is that this is not a permanent position, free changes are allowed. But as a general orientation, it is good to come back to this position from time to time while working.

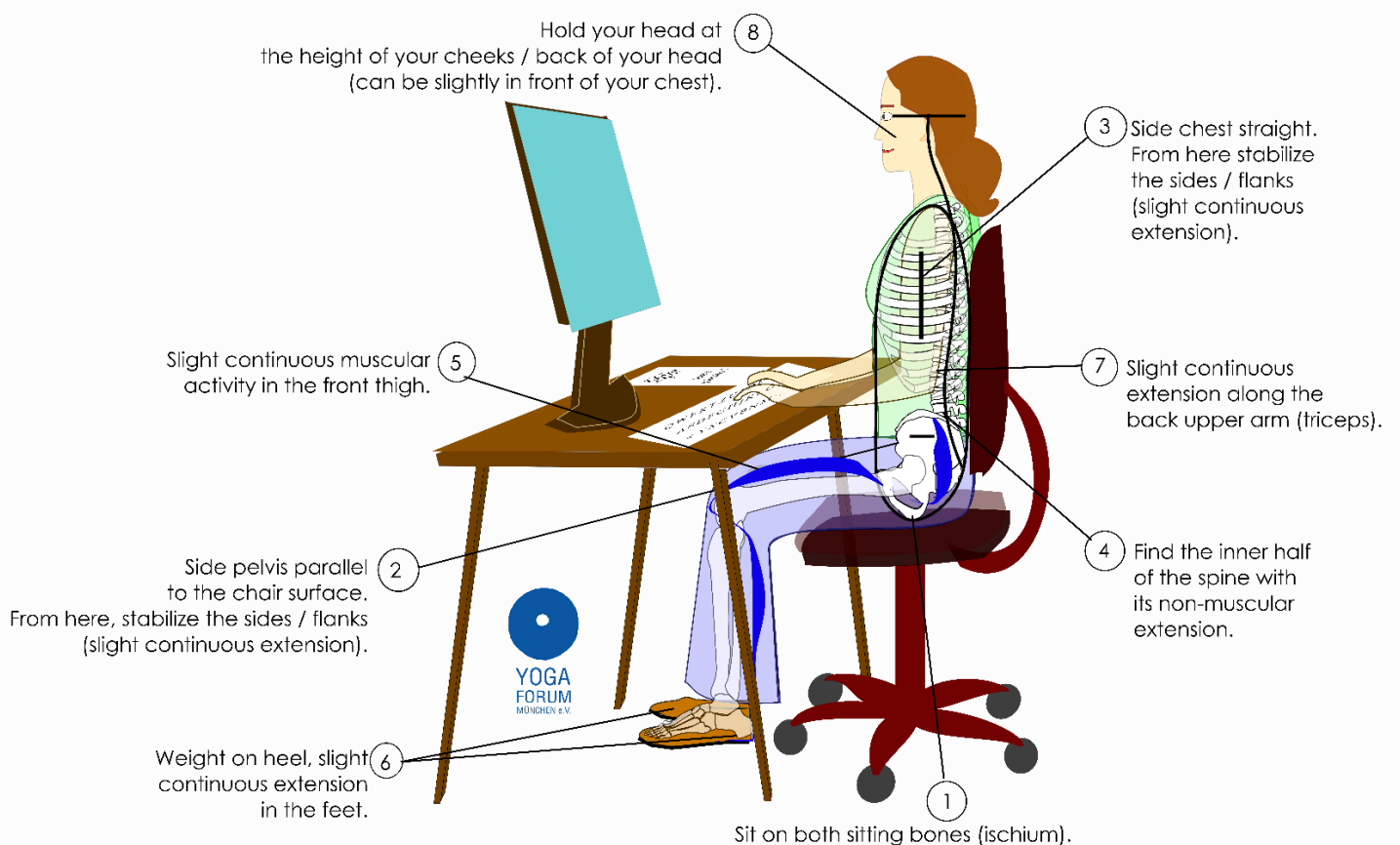


Figure 2: A useful position for working on a desk.

Figure 3 concerns specifically the placement of the computer on your desk and the angles of the feet, lower legs, side trunks and elbow. The top edge of your computer should be level with your eyes if you sit straight. That way, the eyes can look downwards and see the entire computer screen without moving the head.

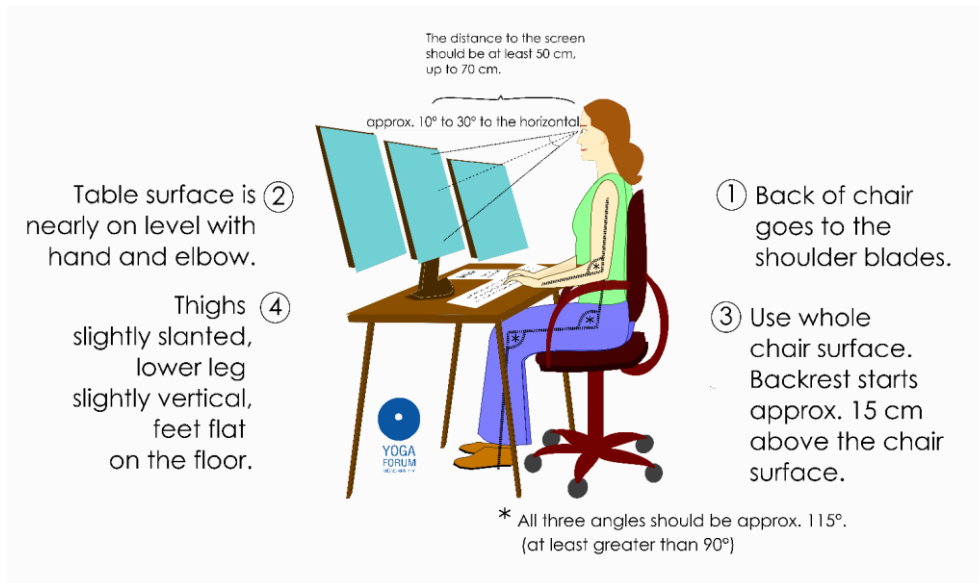


Figure 3: The ideal placement of your screen should be on level with your eyes.

Exercises for the Workplace

If a person wants to have a short break in between working, there are two Yoga positions that are useful. The first one is Tad-Asana: Standing next to a wall or corner for approximately one minute, the skin of the back should touch the wall (see figure 1).

The second position is the half dog position using a desk (see figure 4). Again the position should be held for one to two minutes, with soft knees and a little bit round back. In both positions it is important to maintain free breathing and relaxed awareness.

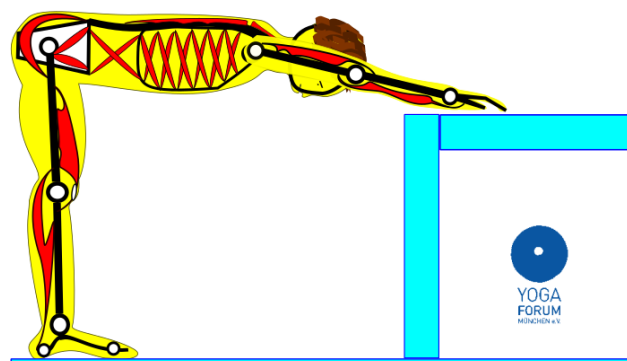


Figure 4: Half-dog pose using a desk.

Summing up, one of the two basic ideas of biomechanics is the adequate force a person should apply. The idea is to use as little force as necessary to maintain the weight of one's own body. The geometry of the position is less important, this is only the second basic idea. This is significant to note, because there are individual variations and the geometry of the positions is not always possible, but the use of the proper anti-gravity-force is the main factor of the bio-mechanics stimulation.

Every other work position can be done according to the same principles.