



WORKPLACE ERGONOMICS

Cumulative Trauma Disorder (CTD)

Definition: strain injury resulting from **repetitive** motions, excessive **force**, poor **posture** and **no rest breaks**.

Contributing Factors to Injury: automation -> repetition, age <25 or >55 years high risk due to young are inexperienced, old have cumulative muscle weakness, weight, fitness level, family history.

65% of the work force has pain, 55% has pain lasting > 3 months, 49% > 6 months.

Ergonomics

Definition: analysis of **worksite** and **job tasks** as well as **work habits** and **body mechanics** of worker.

General Principles

Worksite

- be aware of common injuries specific for worksite and tasks
- reduce risk factors to CTD
- reduce noise; optimal air quality and temperature
- reduce STRESS
- work station needs to promote good posture, e.g., centre of gravity, midline
- equipment in good working condition

Job Tasks

- match tasks to abilities, e.g., **fit work to the worker**, does worker have ability to meet job demands?
- perform task analysis: list job tasks, rank in order of increasing physical severity, assign % of time spent doing each task, focus on high duration/high severity tasks

Work Habits

- organization of job, e.g., **how** is job performed?
- PACE: reduce static postures, e.g., 5 minutes in stand/stretch for every 1 hour in sit, rotate jobs often, take rest breaks every 2 hours
- PLAN: structure day in AM to include rotation and breaks
- PRIORITIZE: do tasks that have to be done first
- POSITIONING: frequent work at midline, less frequent at extremes of reach, use large joints not small ones, e.g., don't rest elbows on desk or arm rests, avoid static positions, e.g., **move!**

Body Mechanics

- attain 90-90-90-90 degree rule for ankles, knees, hips, elbows through chair height, foot rests, desk and keyboard height
- imagine plumb line through centre of gravity and stay there, prolonged positions off this line create muscle strain and lead to CTD
- use large joints (shoulders and elbows) not wrists and fingers to move hands around keyboard
- chair: adjustable height, contour seat with depth 2 inches short of knee crease, seat 90 degrees to back, no arm rests, back lumbar support should promote straight back and shoulders, laterals on back should not prohibit elbow movement, height adjustable back with optimal height just below shoulder blades (allows maximal shoulder movement)
- monitor: eyes look into top 1/3 of screen while neck and back straight, centred on body midline, document holder attached to side of monitor
- keyboard: height adjustable, distance from user adjustable, swivel tray, lateral space for mouse, mouse on wedge, same angle as keyboard, arms hanging at sides with wrists in neutral by adjusting chair height
- desk: optimal heights vary with different tasks (higher desks reduce neck strain when writing but then get restrictive of shoulder movement and wrist problems), create space by putting hard drive on floor and mount monitor on wall, floor or desk

Treatment of CTD

Identification: listen to your body, do a “body check” at rest breaks and treat accordingly. Rule: if pain continues after you discontinue a task, you are straining muscles and should stop!

Treatment: ice during rest break, e.g., every 2 hours, gentle stretching in direction opposite to work position, switch tasks, change positions. If CTD doesn't improve, you may need an ergonomic analysis with equipment prescription, change or modify job demands, fitness program (NIA, yoga, Tai Chi), improved diet, therapy (physiotherapy, chiropractic, massage, body work, alternate techniques), reduce and manage stress (controlled breathing, relaxation).