



Cumulative Trauma & Ergonomics

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Key Point

- Things can be done in the workplace to help reduce fatigue, reduce stress and reduce the chance of injury for the employee

- Analysis of jobs from an ergonomic and/or psycho-social demand perspective can be used in a proactive manner to identify potential areas of risk, and to modify jobs as a means of injury prevention (Keyserling et al. 1991, Domanski, Gowan and Leyshon, 2008).

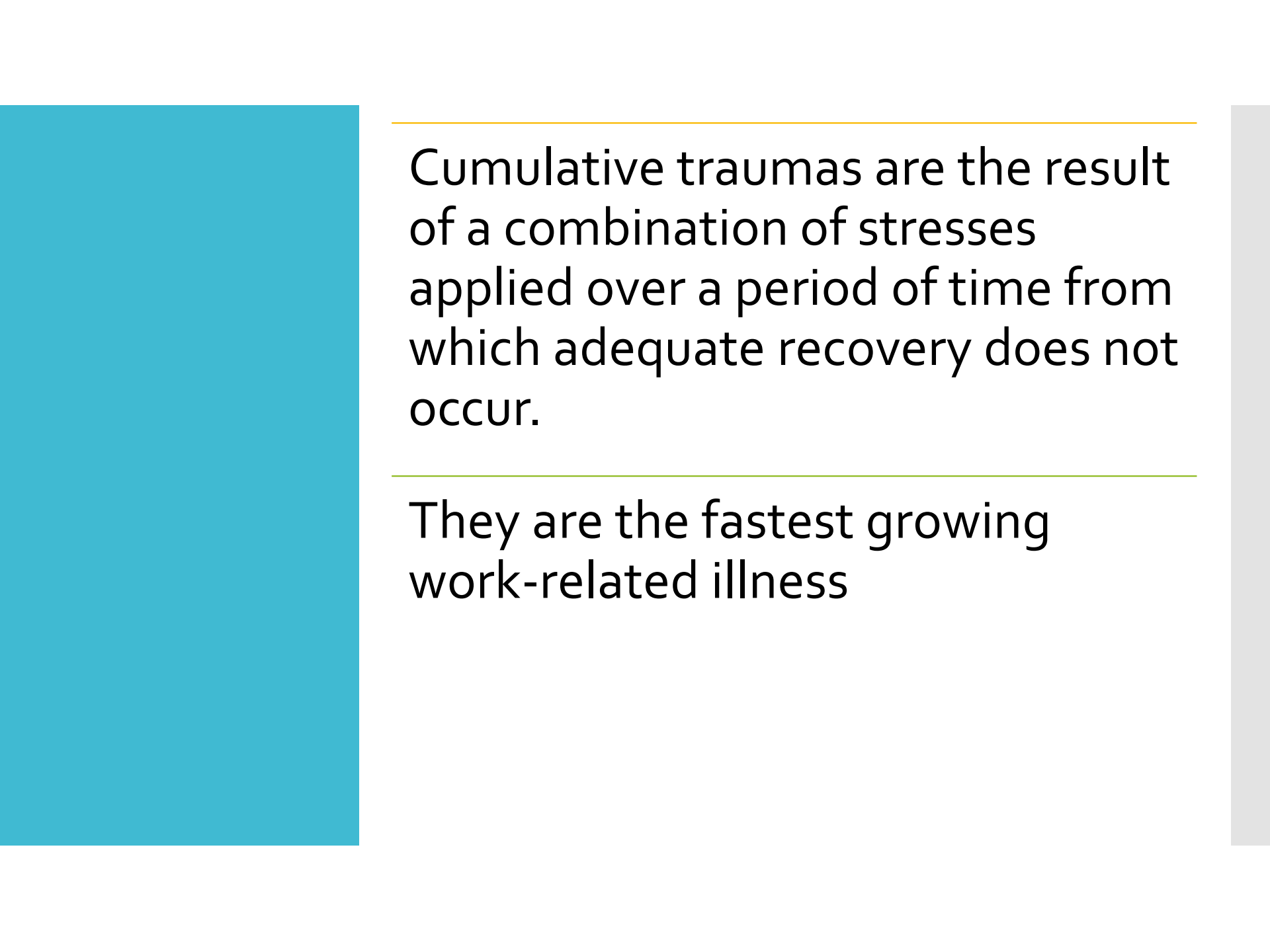
HISTORY:

Since the early 1980's, a rapid increase in the incidence of Musculoskeletal Disorders has been reported.

- Painful/expensive

Developed strategies for PREVENTION

- **ERGONOMICS PROGRAM**



Cumulative traumas are the result of a combination of stresses applied over a period of time from which adequate recovery does not occur.

They are the fastest growing work-related illness

Major Causes of CT Injuries are:

Posture – positions (held longer than 10 min) or awkward

Repetitive Motion – like moving fingers at computer, etc

Force or Pressure- the exertion to do the activity or job

*all three produce physical stress that result in “fatigue”

Signs of Problems

Pain or Discomfort

Numbness or “Pins and Needles”

Weakness

Limited Range of Motion

Redness or Swelling

Back Injuries

Most backaches result not from a single traumatic event but from the cumulative effect of repeated activities or trauma

Risk Factors for Back Injuries

- Posture (slouching, bending, twisting)
- Repetitive Motion (lifting, lifting/twisting, vibration)
- Force or Pressure (heavy weight)
- Smoking tobacco products – increases incidence and slows recovery from backache



Job Site Factors

Vibration – from equipment or vehicles

Heat/Cold

Distance from task

Size and shape of object



Personal Factors

Physical Fitness Level

Stress – physical and emotional

Body Mechanics

Nutritional Habits



1

Change
positions or
move around
every 15 minutes



2

Keep your work
in the “Strike
Zone”



3

Listen to “Your
Body” and keep
pain free

Solutions

Neck, Head & Upper Back Injuries

Head bent forward places stress of the upper back, neck and jaw. No support for weight of arms (desk jobs)

Solution: frequent stretch breaks, higher screen, higher back on chair, arms on chair

Major Dysfunction of the Head and Neck

Postural

- Dowgar's Hump
- TMJ (Temporomandibular Joint)
- TOS (Thoracic Outlet Syndrome)
- Scoliosis

Degenerative Joint Disease

- Neck and Arm Pains
- Myelopathy

Headaches

CT of the UE and LE

Bursitis

Thoracic Outlet Syndrome

Tennis Elbow (epicondylitis)

Carpel Tunnel Syndrome

Shin Splints

Tendonitis

Fallen Arches

Heel Spurs (Plantar Fascitis)

Bursitis - Shoulder

Repetitive motion and slumped shoulder posture can cause the Rotator Cuff tendons to be strained or torn. Bursa's are sacks of fluid that keep muscles, tendons and bones separated.

Irritation of the bursa = bursitis

Carpal Tunnel Syndrome

Compression of the Median Nerve at the wrist

The tunnel is narrow and is formed by the carpal bones, flexor tendons, and the carpal ligament

When stressed, the tendons swell and compress the median nerve

Sensory distribution over the thumb, index, and middle fingers

Leg and Foot Pain

- Only about 5% of CT injuries involve the leg and foot today but experts predict that this will be on the increase, as our working population ages.
- Two of the major sources of CT stress in this area are our shoes and the floor surfaces.

Incidence of MSDs & Ergonomics

MSDs produce 33% of lost time claims in the US

- Back 41%
- Shoulder 13%
- Legs 10%

Ave direct cost per MSD > \$20,000

Success of Ergonomics

- 61% decrease in injury rate
- 30% decrease in severity

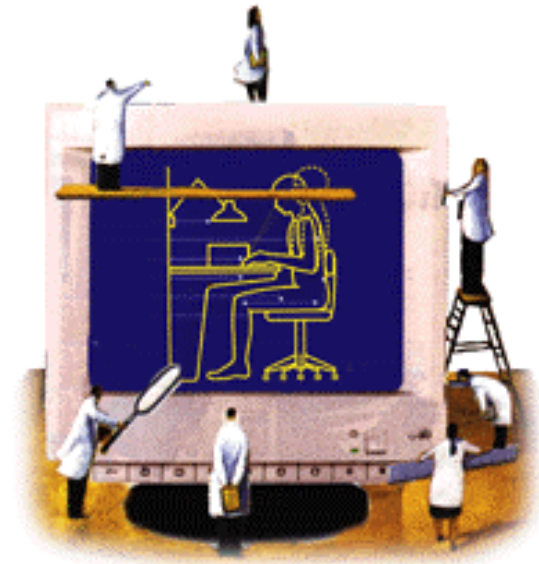
- www.osha.gov/SLTC/ergonomics/success_stories.html
- Accounts published by OSHA where employers have implemented ergonomic programs or utilized best practices & have reported successful results. Grouped by Standard Industrial Classification (SIC) Code.

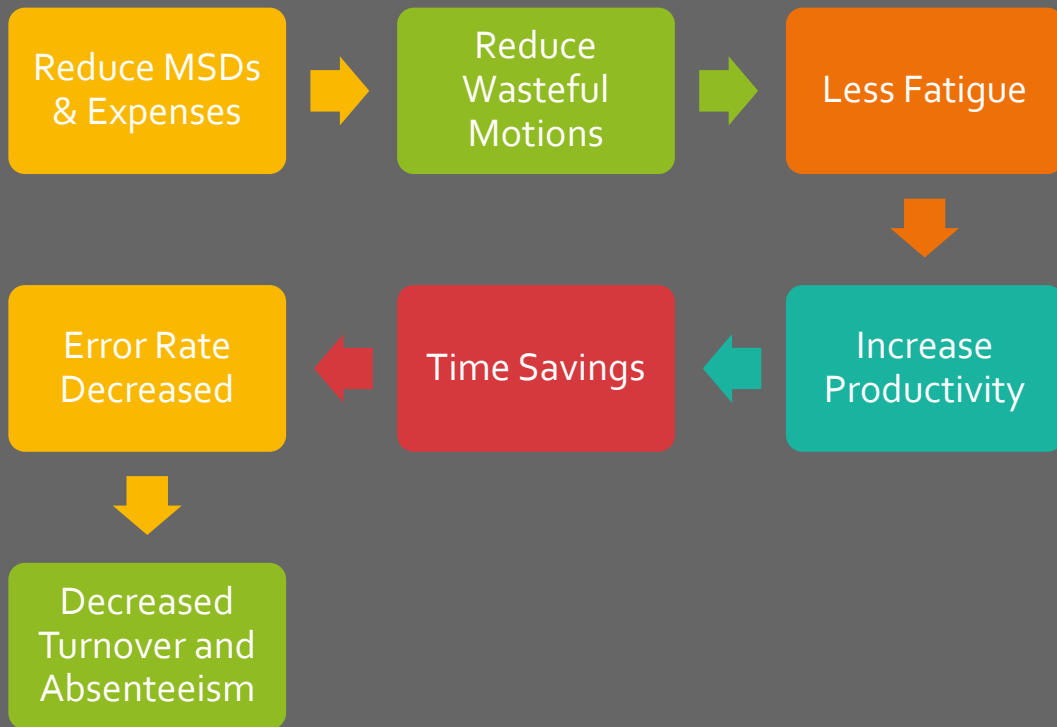
Ergonomics: Possible Solutions & Success Stories

What is “Ergonomics?”

The term “ergonomics” is
derived from two Greek words:
“erg” - meaning a “unit of work”
“nomas” - meaning natural laws

Ergonomists study human capabilities
in relationship to work demands





Benefits of ERGONOMICS

Elements of an Ergo Program in the Worksite

Establish an Ergo Committee or Team

- Written Plan: Objectives, Goals, Budget, Timeline

Hazard Identification

Job Site Audit

Medical Management Concepts

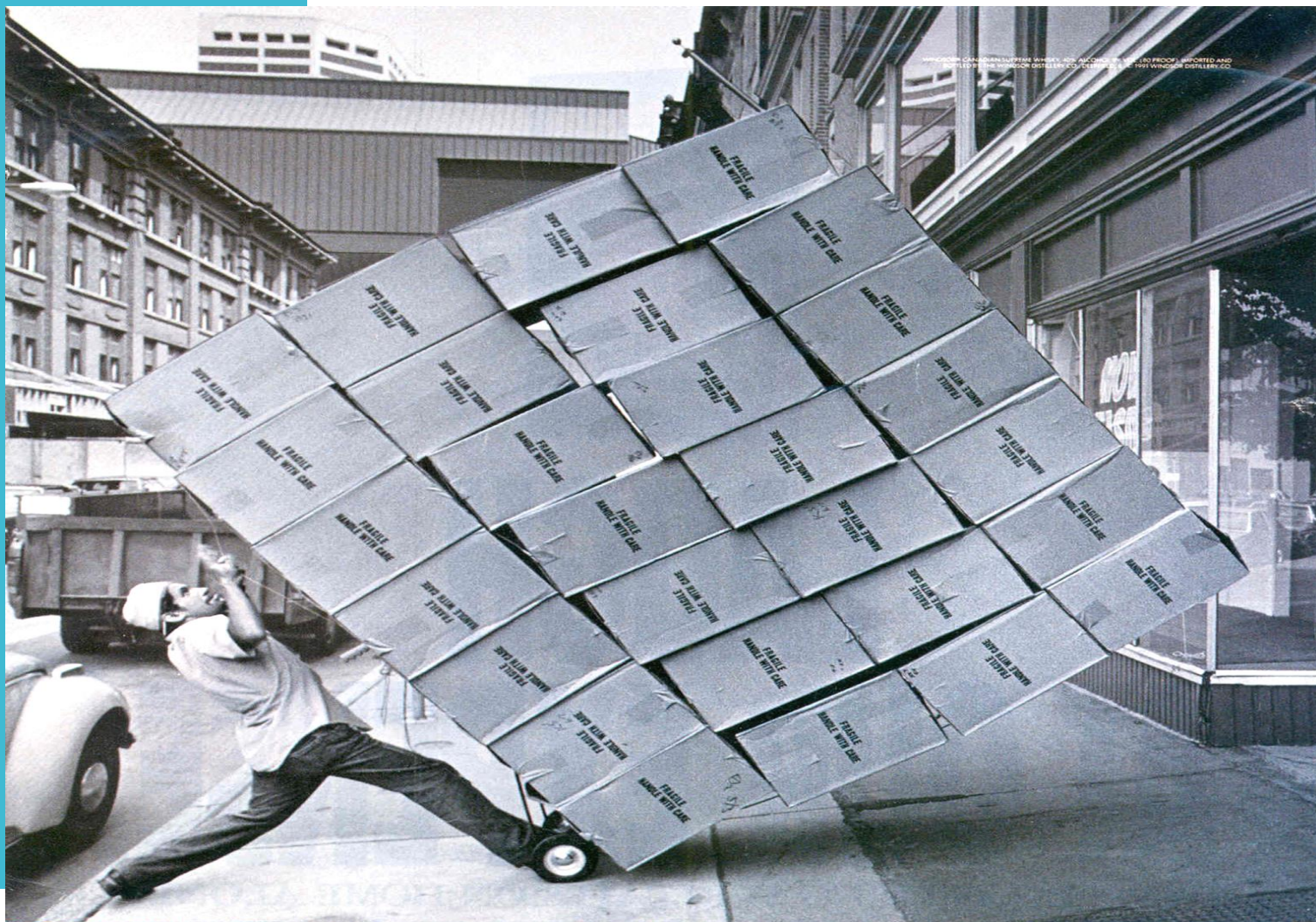
- Identify warning signs
- First Aid Treatment
- Restricted Duty
- Constant supervision of process

Job Hazard Analysis

- Determine if the it qualifies as an MSD Incident
 - Work-related and requires days away from work, restricted work, or medical treatment beyond first aid
 - The MSD signs or symptoms are work related and last for 7 consecutive days after the employee reports them

Job Hazard Analysis

- If there is a MSD Incident...does the job meet the standard's Action Trigger
 - The employees job routinely involves, on one or more days a week, exposure to one or more relevant risk factors at the levels described in the Basic Screening Tool



Risk factors
covered by
OSHA Ergo
Standard

Repetition – Frequency and speed over time

Force – Grip, pinch, push/pull

Awkward Posture – static positions

Contact Stress – focused sustained or suddenly applied with compressive force

Vibration – Segmental or whole body over time, frequency and amplitude

Methods to address MSD Risk Factors

Administrative Controls – job assignment

- “Cheapest way to go”

Engineering Controls – Physical change to the job

- Expensive to do later, apply ergo principles to job design

Personal Protective Equipment (PPE)

Work Practice Controls – Worker education

Administrative Controls



EMPLOYEE
ROTATION



JOB TASK
ENLARGEMENT



ALTERNATIVE
TASKS



CHANGES IN
WORK PACE

Engineering
Controls

Physical changes such as:
redesigning tools, tables,
equipment, materials



BEST TO APPLY DURING
THE DESIGN STAGE

PPE – Personal Protective Equipment

- Barrier between worker and a hazard
 - Vibration reduction gloves
 - Carpet Layer's knee pads

Work Practice Controls

Changes in the way a worker performs and approaches their jobs due to education

Strong role for Health and Safety
Professional participation

Safety through education....

- Use neutral postures
- Use 2 person team lifts
- Observance of micro-breaks

Office
Ergonomics:
Worksite
Analysis
Form

Appendix D-2 to
1910.900

VDT Workstation
Checklist

Video Display Terminal (VDT) Workstation Assessments

- If employee exposure meets the levels indicated by the Basic Screening Tool you must continue to VDT Workstation Checklist

DO

Head Balanced over Shoulders

Shoulders Relaxed and Comfortable

Wrists Straight

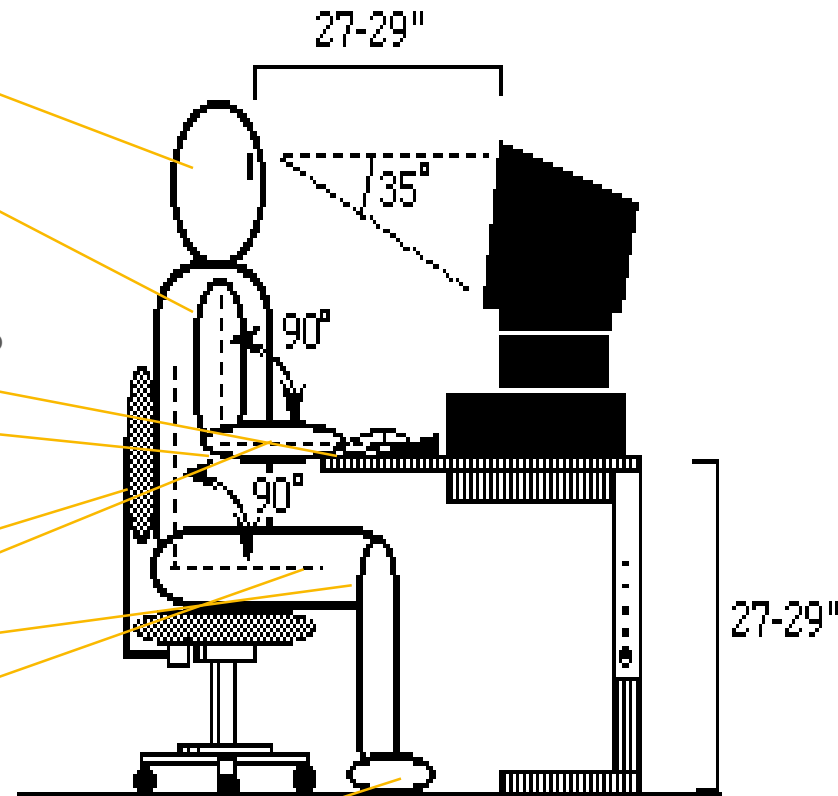
Elbows Close to Body, Bent @ $70-90^{\circ}$

Lower Back Upright and Supported

Knees bent at 90°

Forearms / Thighs parallel to Floor

Feet Settled on Floor or Footrest





Designing a good fit



1

Arrange your office to minimize glare from overhead lights, desk lamps, and windows.



2

Maintain appropriate air circulation.



3

Avoid sitting directly under air conditioning vents that "dump" air right on top of you.

Environment Quick Tips

The Goals of an Ergonomic Program...

- Improved Health and Safety
- Increased Job Satisfaction
- Lower Worker Turnover
- Increased Productivity
- Reduced Lost Time from Work
- Fitting the workstation to the worker...not the worker to the workstation!

