



Reducing Work-Related Injuries and Illnesses in
the Workplace through Ergonomics

Office syndrome experience in workplace

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Mahidol University
Wisdom of the Land

**Work-Related
Musculoskeletal Disorders
(WMSD)**

WMSD

Single overexertion or Sudden Overload
“Sudden Onset”

Frequent and sustained load
“Insidious onset”
Cumulative Trauma Disorders

Cumulative Trauma Disorder (CTD)

**Tendons, Joints, Muscles and
Nerves (Nerve tension)**

Carpal tunnel syndrome

DeQuervain's Syndrome

Low back strain

Upper Cross Syndrome

Epicondylitis

Tendinitis

Myofascial Pain Syndrome

Trigger Finger

CTD (n= 1500)

51% of office workers

Back (47%),

Neck and arm (31%),

Knee and ankle (14%)

Muscle pain(8%)

Causes of WMSD (CTD)

Awkward Postures

Localized Contact Pressure

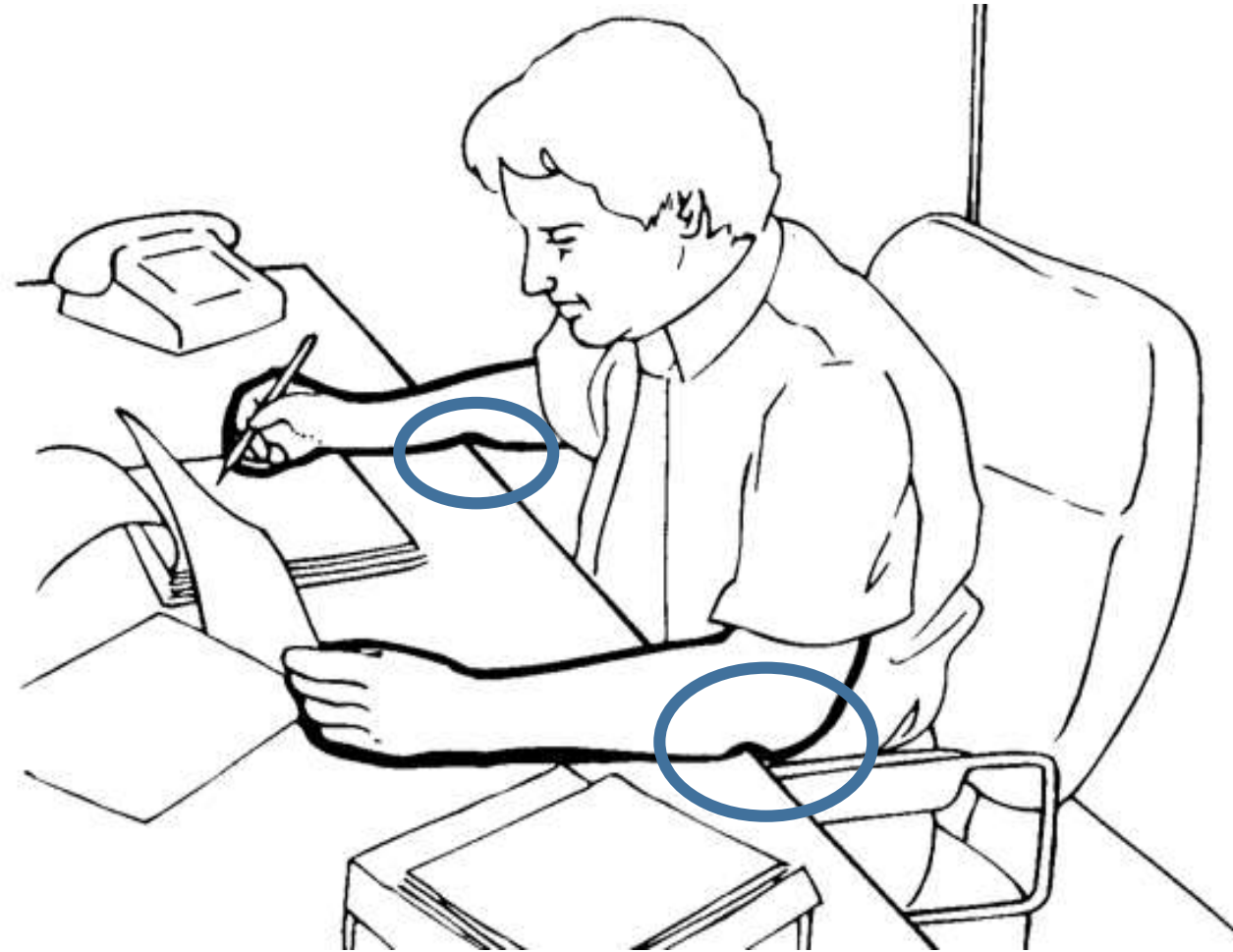
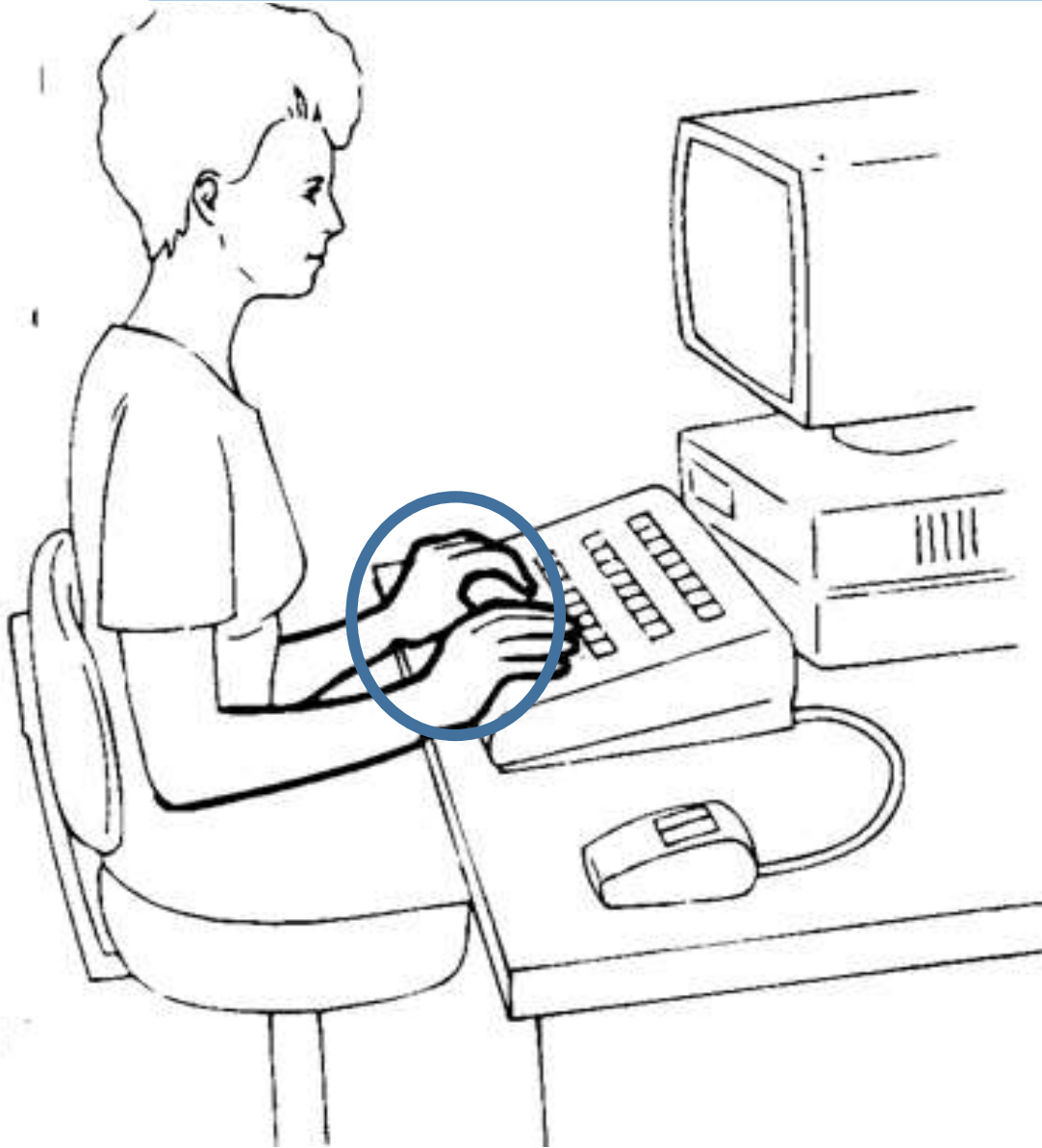
Sustained Postures

Stress

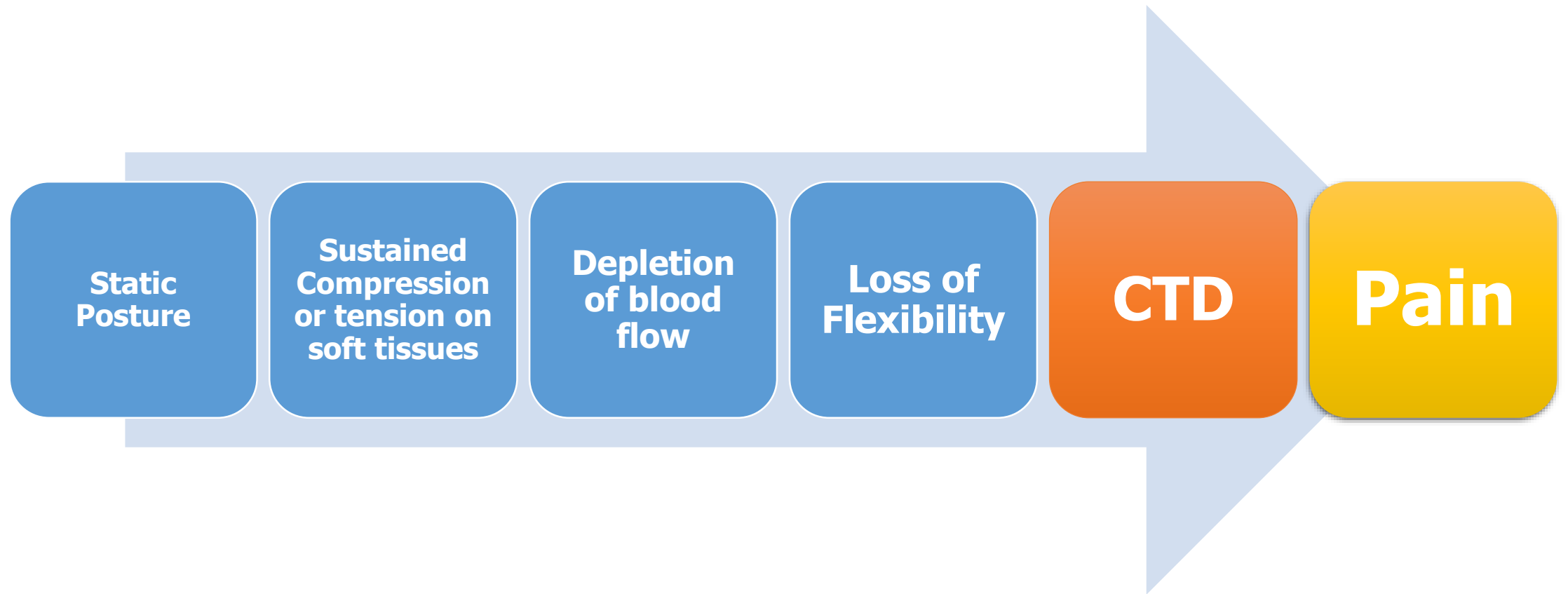
Awkward Postures



Localized Contact Pressure



Sustained Postures



Sustained Postures

Prolonged sitting

Muscle, tendon,
ligament, nerves
injuries

Inactivity

CTD

NCD
(Non
Communicable
Disease)



Office workers(n=1133)

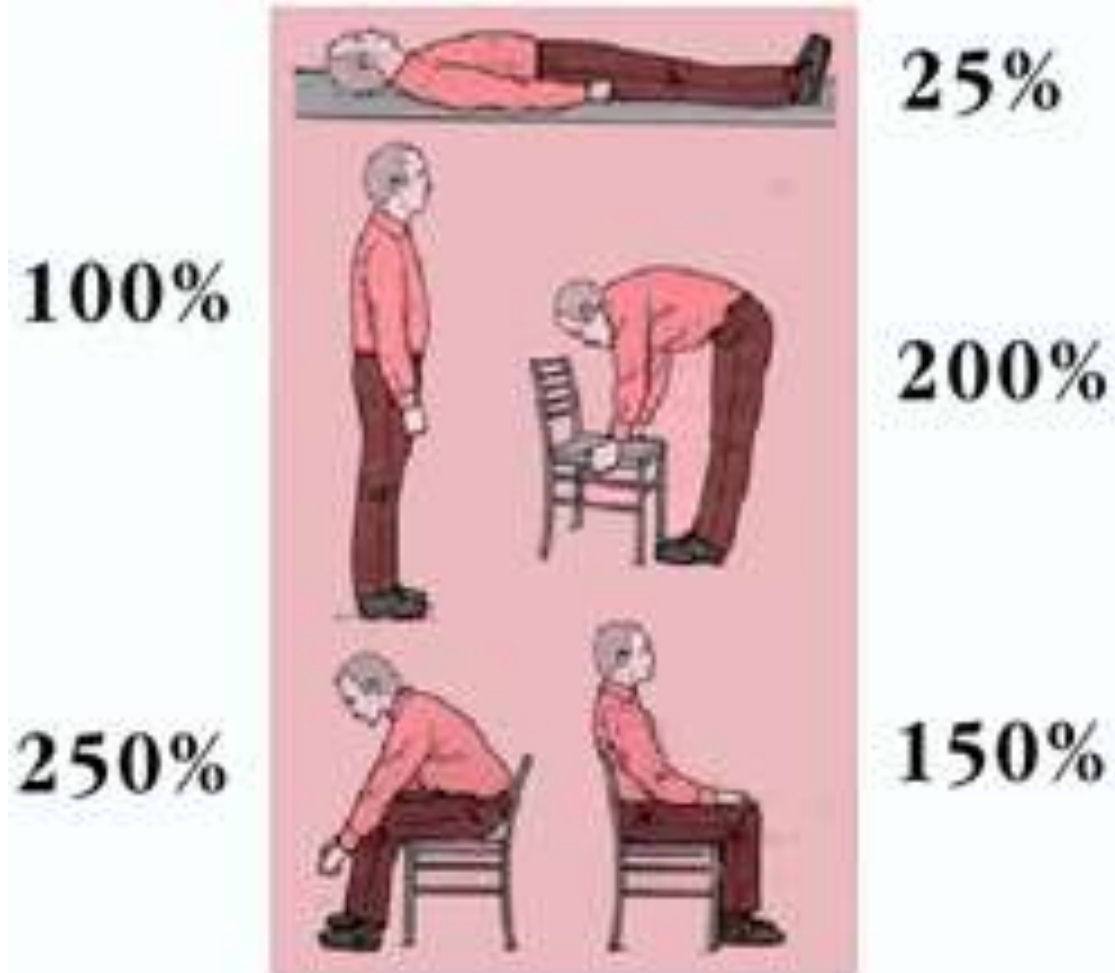
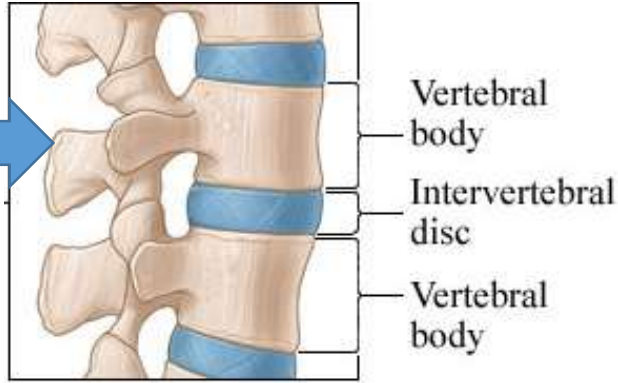
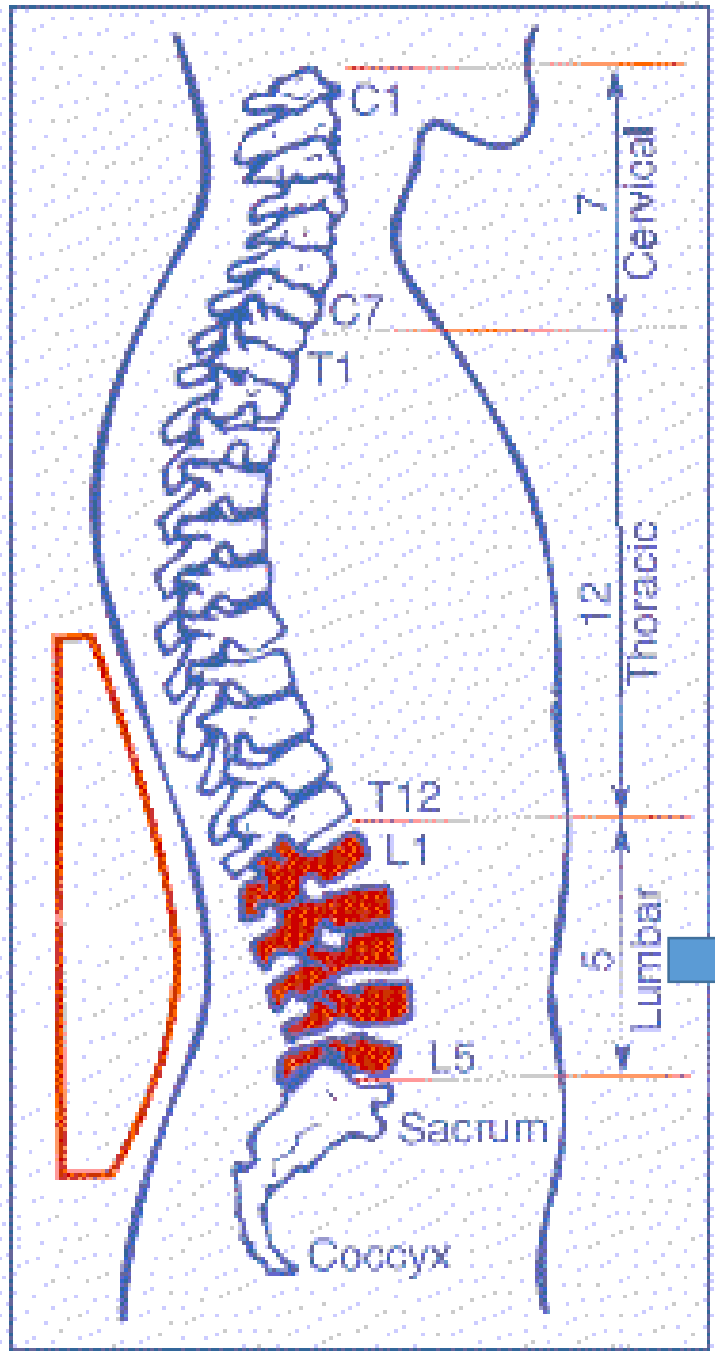
Sitting = 8.5 hrs (5-14 hrs)

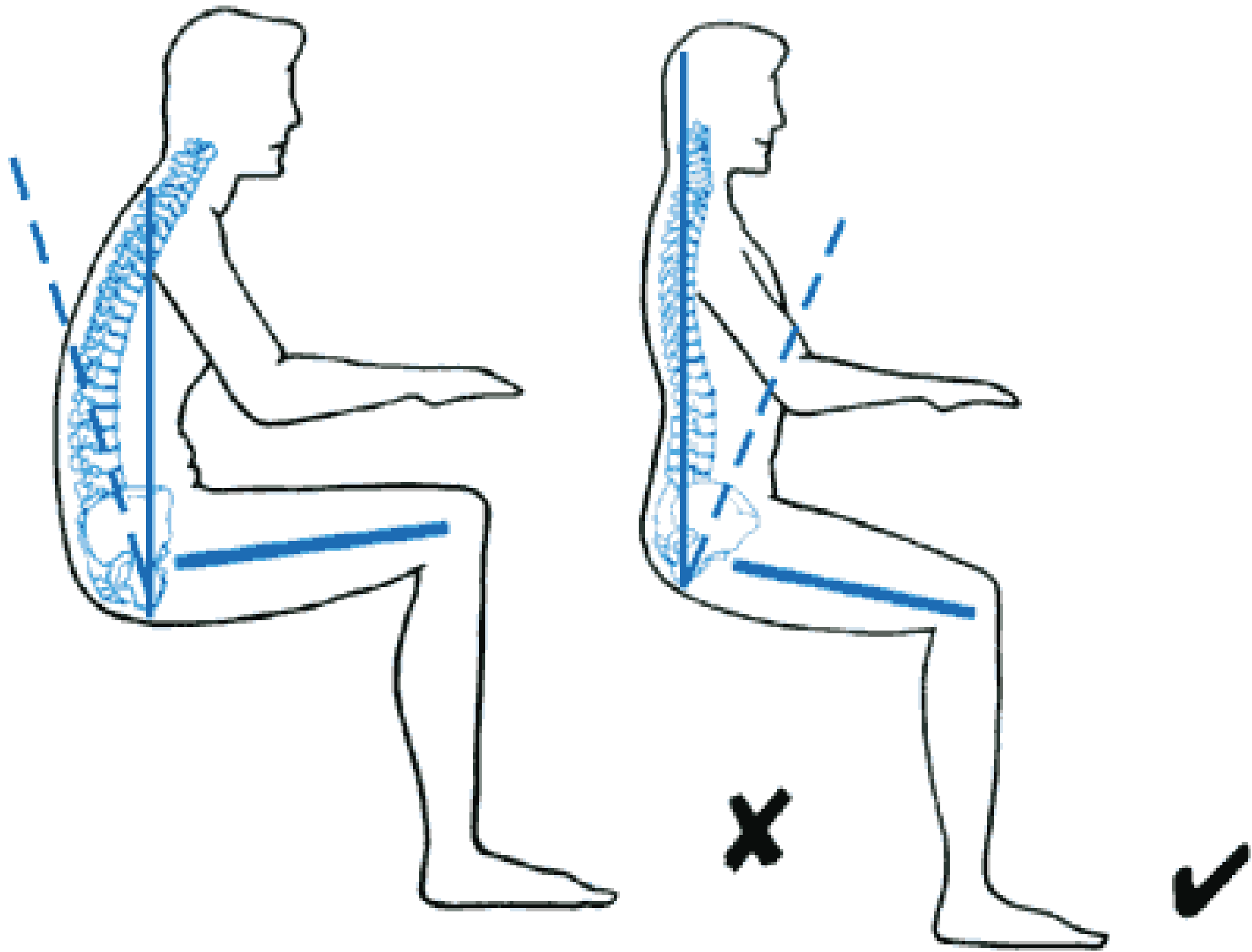
Leisure time (Exercise, Play games and cell phone) = 2.8 hrs

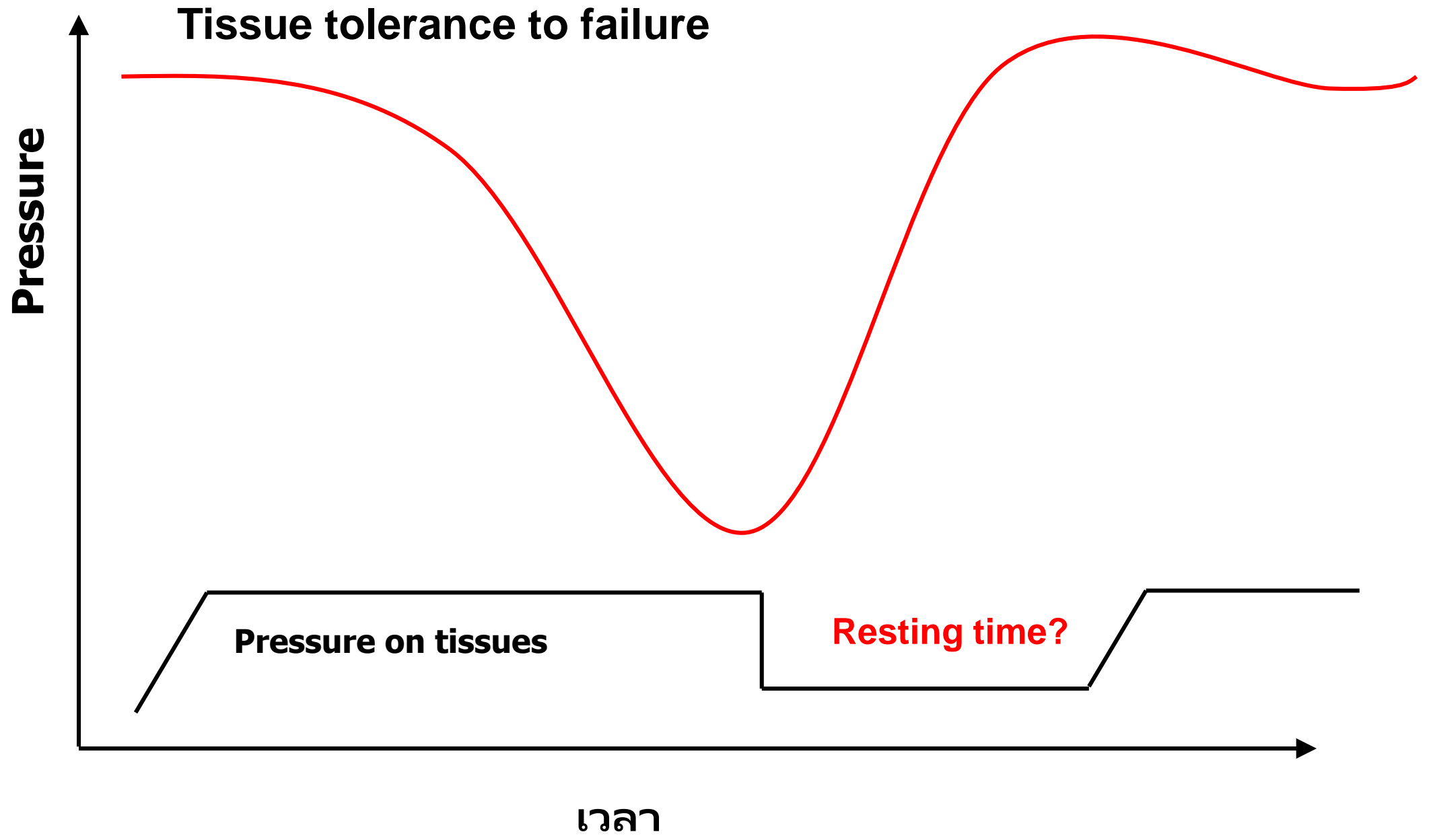
Break from sitting at work = 12 min

Commute = 1.78 hrs

Disc Pressure









Time to recovery (Disc)



**Full trunk flexion
in sitting**



Standing

- 7 hr. => Full recovery
- 30 min => Slight Laxity
- 2 min => 50 % recovery

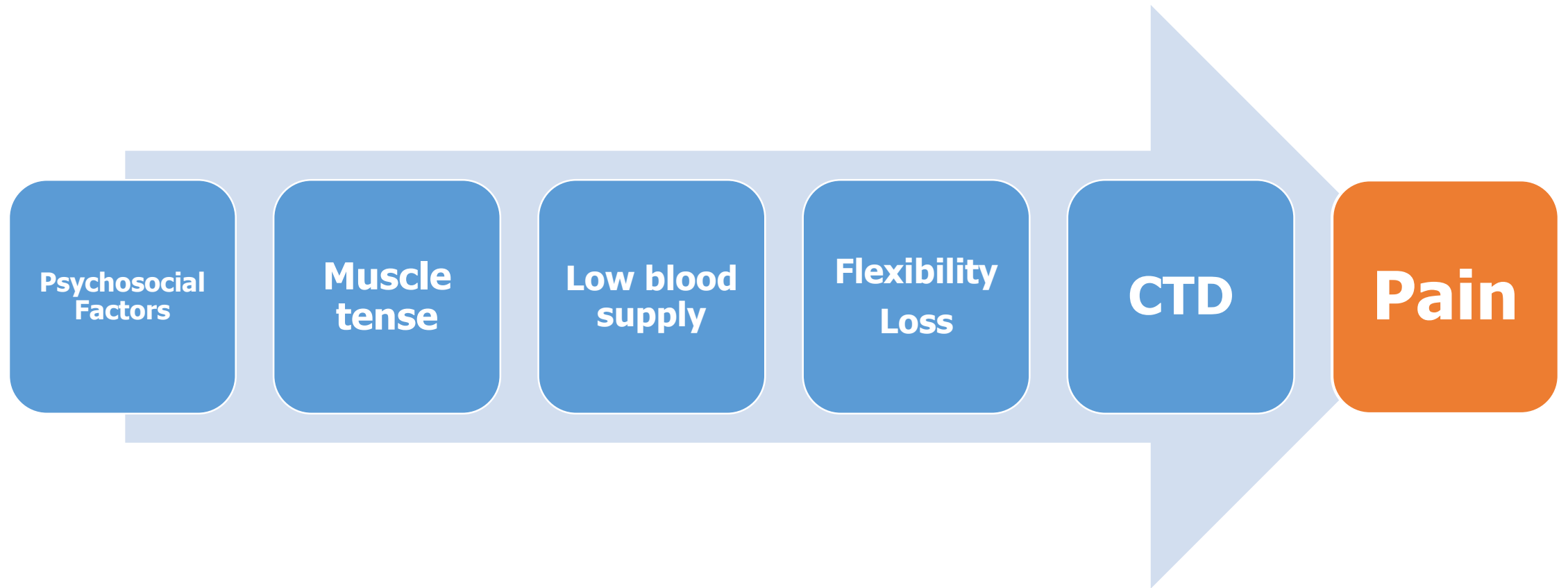
Sitting < 2 hr?





<http://ux.stackexchange.com/questions/48296/why-are-normal-water-coolers-so-low>

Psychosocial Factors



Stress and WMSD (n=835)

Table 36. Causes of stress and WMSDs

Cause of stress	WMSDs		OR	95%CI	p-value
	Have (n=297)	Not have (n=539)			
from workplace	205	321	1.51	1.12-2.04	0.007*
- work system	158	242	1.39	1.05-1.85	0.021*
- bosses, colleagues, subordinates	115	173	1.34	0.99-1.79	0.05*
from atmosphere in workplace	131	216	1.18	0.88-1.57	0.25
from personal problems	100	199	0.86	0.64-1.16	0.34
from commuting and traffic	87	165	0.94	0.68-1.28	0.69
Does the stress affect to your job?	205	303	1.73	1.28-2.34	<0.001*
Thought about pursuing new job?	183	306	1.22	0.91-1.63	0.174

Prevention of CTD

- Ergonomics intervention
- Management (Break)
- Exercise
- Stress management

Ergonomics Intervention

- **Computer
Workstation
Adjustment**

Head

Head back,
chin tucked,
Ears, shoulder,
hips aligned.

Neck

Use headphones.
Do not cradle
phone between
head and
shoulder!

Elbows

At sides - slightly
more than 90
degree bend.

Chair

Fully adjustable with
lumbar support in
small of the back.

Eyes

Level with top
1/3 of screen.
18-24"



Document Holder

Adjacent to and at
same height as
monitor.

Keyboard

Same height as elbow
with wrists slightly bent.
Keystroke gently!

Mouse

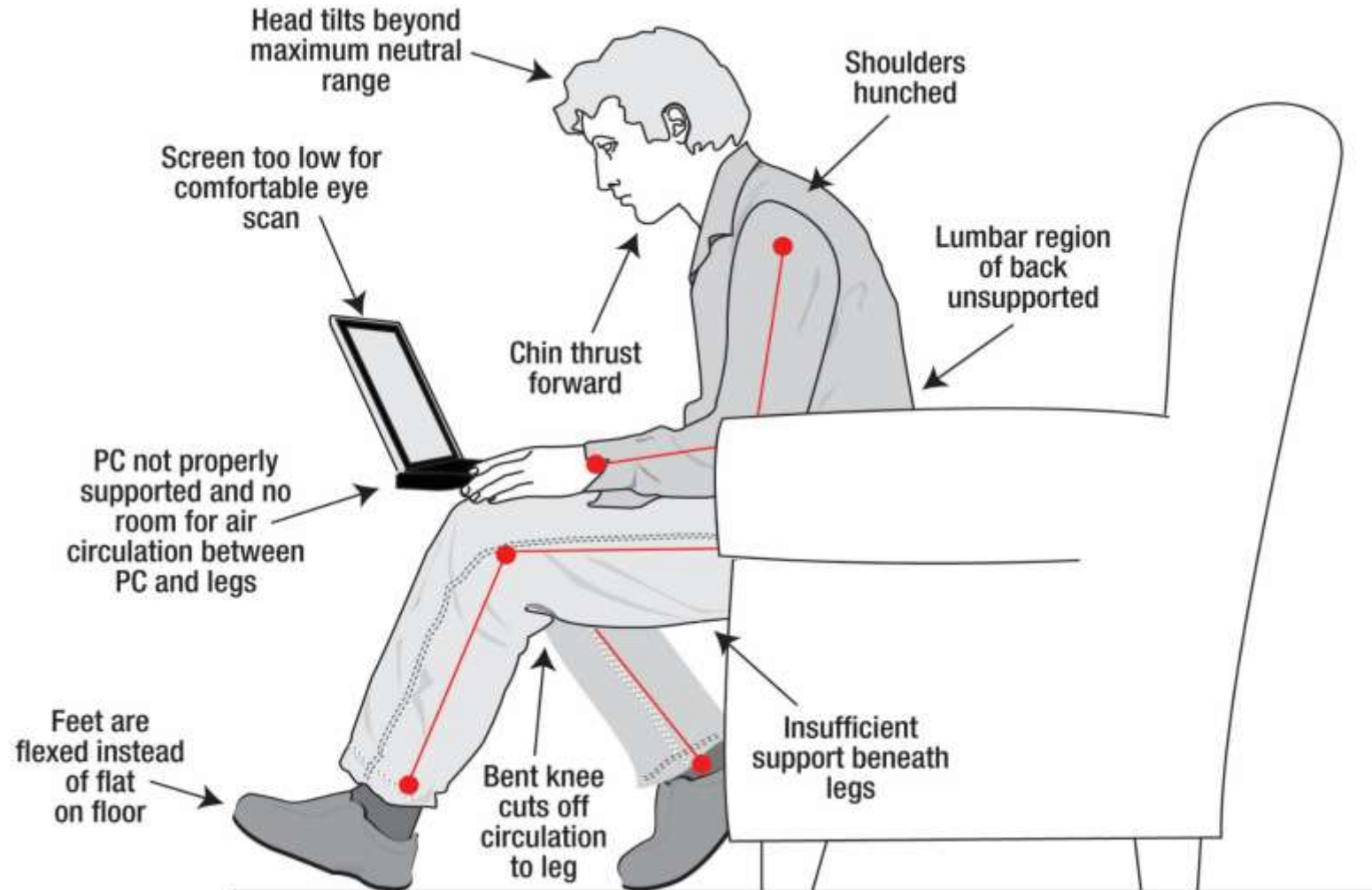
Adjacent to and
at same height
as keyboard.

Chair Height

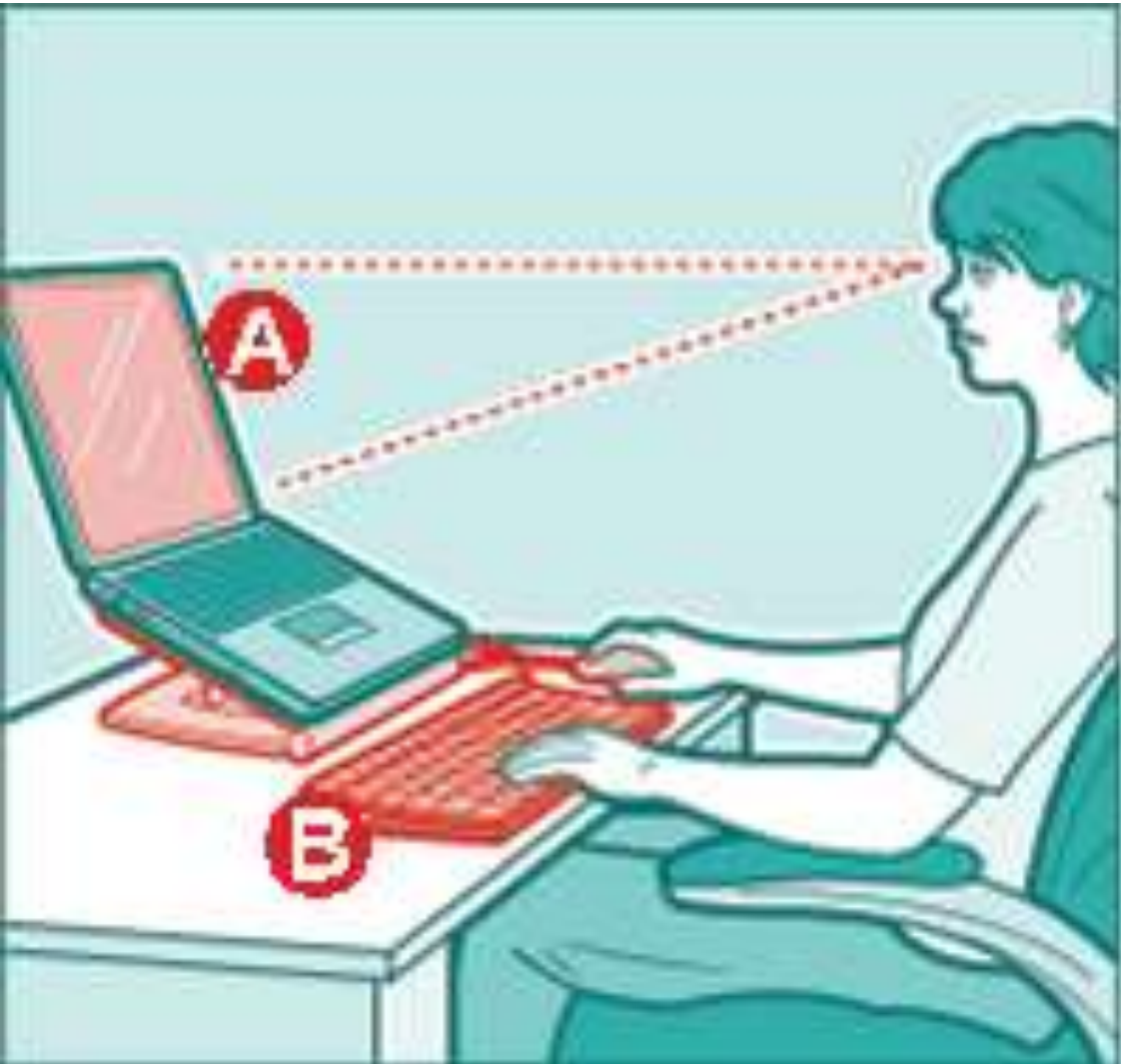
Hips slightly more than 90
degrees, feet flat on the floor

**Take breaks
every
30 minutes!**

Laptop Risk Factors



Ergonomic Intervention for Laptop



Management

- Rest
- Switch between jobs
- Worker knowledge

**Increase
Physical Activity
(PA)**

- Exercise
 - Stretching
 - Posture correction
 - Strengthening exercise
- Increase PA
 - Walk more
 - Park the car further
 - Climbing stairs
 - Gardening, washing car, baby care
 - Aerobic exercise

Article

Break in Sedentary Behavior Reduces the Risk of Noncommunicable Diseases and Cardiometabolic Risk Factors among Workers in a Petroleum Company

Chutima Jalayondeja ^{1,*}, Wattana Jalayondeja ¹, Keerin Mekhora ¹,
Petcharatana Bhuanantanondh ¹, Asadang Dusadi-Isariyavong ² and Rujiret Upiriyasakul ¹

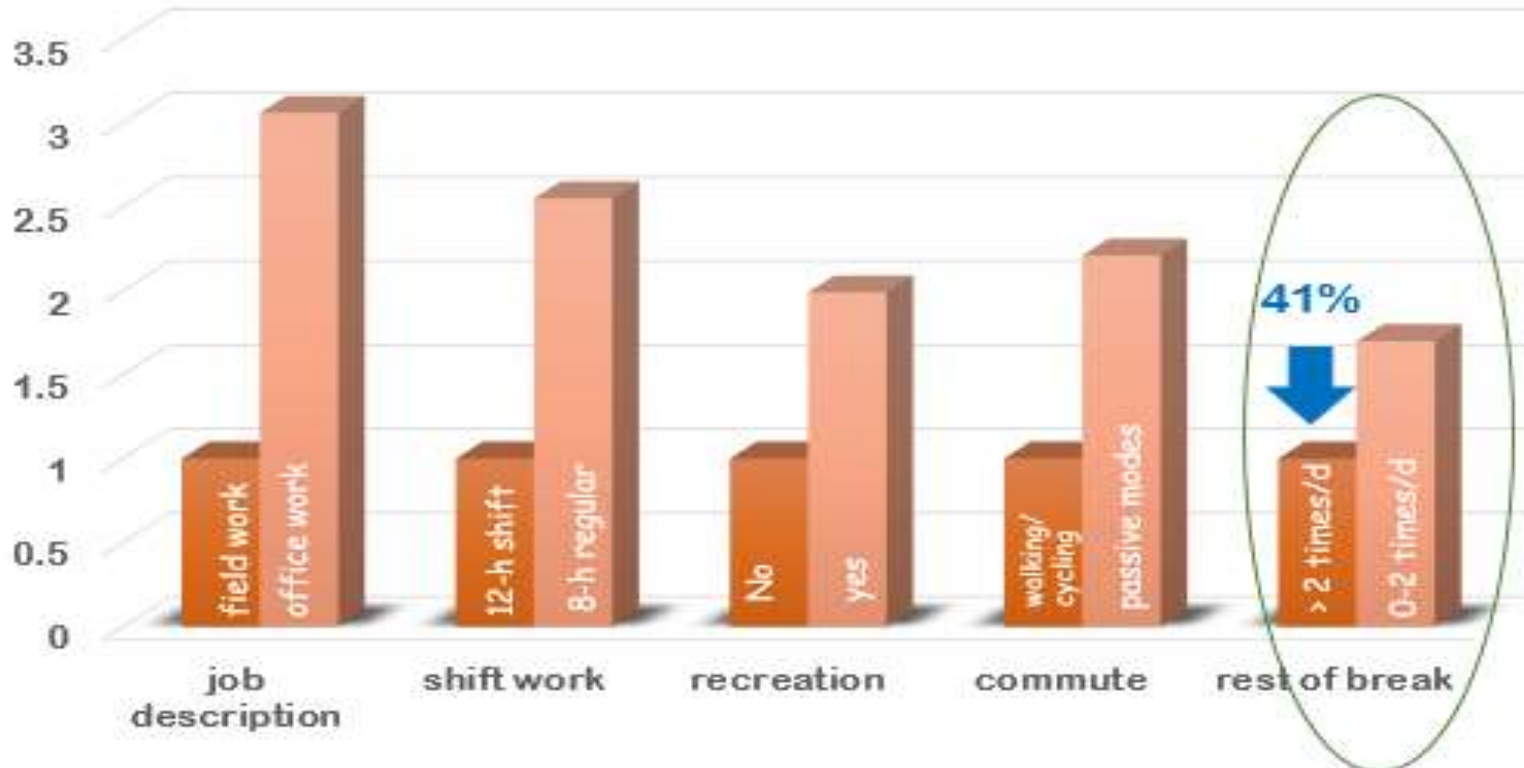


Fig2: Adjusted for age, BMI and exercise, association between sedentary lifestyle and disease prevalence among 1133 workers

- Breaking up prolonged sitting periods at work and active commuting benefited the body's ability to regain metabolism and stimulate cardiovascular function
- Workers who took breaks more than twice daily had **41% less risk of NCDs and CMRFs**
- Those who took a break without sitting more than twice a day and commuted by walking or cycling had less risk of NCDs and CMRFs.

Jalayondeja C. et al, IJERPH 2017

ตารางที่ 13 การเปรียบเทียบข้อมูลด้านสุขภาพและสมรรถภาพทางกาย ระหว่างก่อนและหลังได้รับ โปรแกรมส่งเสริมสุขภาพ ระยะเวลา 6 เดือน ในพนักงานสำนักงาน ที่มีพฤติกรรมเนือยนิ่งขณะทำงานมากกว่าหรือเท่ากับ 8 ชั่วโมงต่อวันและน้อยกว่า 8 ชั่วโมงต่อวัน

Parameters	High SB (n=19)				Low SB (n=19)			
	Baseline	month2	month6	p-value	Baseline	month2	month6	p-value
Body Mass Index	24.83±4.27	24.97±4.43	24.96±4.56	0.762	24.58±3.74	24.04±3.61	23.96±3.90	0.002*
Waist to Height Ratio	0.53±0.71	0.53±0.07	0.51±0.06	0.036*	0.53±0.05	0.52±0.05	0.49±0.04	0.007*
Waist to Hip Ratio	0.86±0.07	0.85±0.07	0.84±0.06	0.341	0.85±0.05	0.86±0.05	0.81±0.05	0.017*
% Body Fat	29.87±6.52	29.45±6.17	29.20±6.64	0.414	30.45±4.72	29.23±5.51	30.01±4.62	0.395
Total cholesterol	216.13±42.82	213.06±41.06	206.25±41.19	0.156	204.50±43.10	191.50±34.04	192.28±32.34	0.023
Triglyceride	106.75±47.76	99.43±52.65	98.37±50.85	0.487	93.64±54.72	80.64±42.26	87.28±48.00	0.423
HDL	62.09±14.26	61.95±17.26	65.08±18.28	0.269	73.04±23.31	71.65±23.01	74.32±19.89	0.606
LDL	139.81±40.97	138.25±38.27	128.75±40.09	0.053	120.14±39.55	111.07±31.93	107.85±34.53	0.008*
Fasting blood glucose	98.25±39.54	93.50±32.14	93.31±27.02	0.142	97.43±32.20	89.50±13.58	92.14±14.78	0.220
HbA1C	5.07±0.54	5.16±0.29	5.23±0.49	0.202	5.26±0.55	5.38±0.50	5.44±0.47	0.240
Grip strength ^a								
Nondominant hand	36.46±6.62	38.59±6.74	38.80±6.43	0.164	40.03±7.90	38.73±10.58	37.08±11.56	0.068
Dominant hand	43.74±8.91	46.54±8.43	41.64±7.04	0.019*	43.75±11.57	43.81±11.91	43.78±11.97	0.999
HR _{minl} ^b	127.37±22.04	111.87±22.52	117.75±18.27	0.012*	119.84±16.65	111.84±15.42	110.07±16.70	0.004*

a Grip strength was normalized by body weight and presented in percentage (%), b data of 13 subjects were analyzed. *p-value<0.05

"Development of multicomponent intervention model for reducing sedentary behavior and encouraging physical activity in office workers"

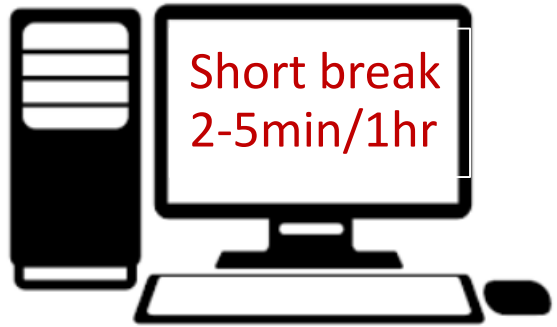
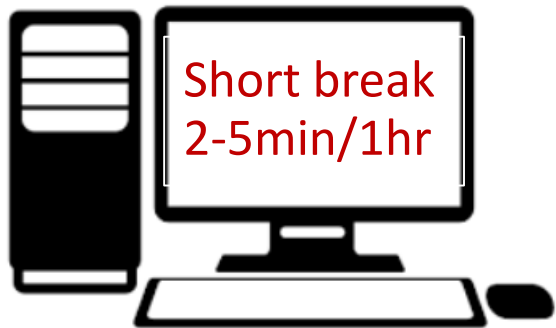
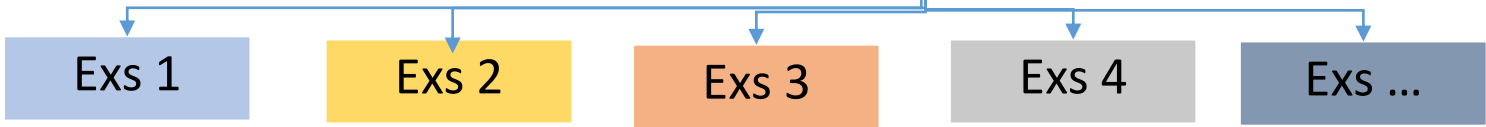
Do you want to rest/break?

Yes

No

Exercise

Self break



Office workers
Computer users

Computer/mobile Application to break sitting

8.00AM

LUNCH 12.00-1.00

5.00PM

Thank you

