

The Pocket Ergonomist

KEYBOARD/CLERICAL VERSION

A quick guide to the causes and reduction of muscle fatigue at work



**Reproduced by kind permission of
David A. Brown and Dr Robin Mitchell**

Copyright © 1988



OCCUPATIONAL SAFETY
& HEALTH SERVICE

DEPARTMENT OF
L|A|B|O|U|R|
TE TARI MAHI

WHAT CAUSES FATIGUE?

If a muscle is kept contracted, or if it contracts repeatedly at high strength, it can become tired or sore. To minimise fatigue, reduce or interrupt this tension and perform workplace exercises to relax and warm up muscles.

This guide describes simple, practical methods that have been used to reduce fatigue in keyboard/clerical operators worldwide.

David Brown and Robin Mitchell

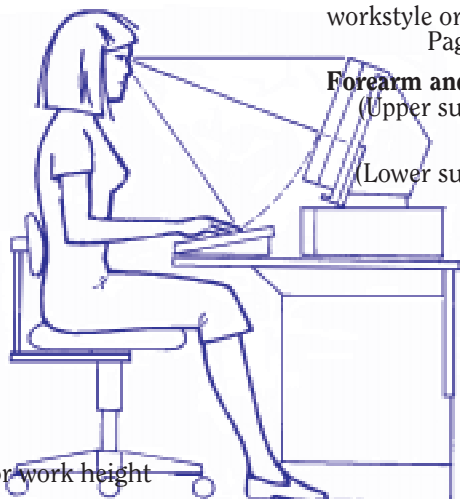
To investigate a report of an ache, soreness or weakness, use this index

Neck: Head posture or stress Pages 4-5

Shoulders: Workstation, workstyle or stress Pages 3-4

Forearm and hand (Upper surface): Page 6

(Lower surface): Page 7



Back: Chair or work height Page 5

Legs: Loss of circulation Page 5

THE STRATEGY

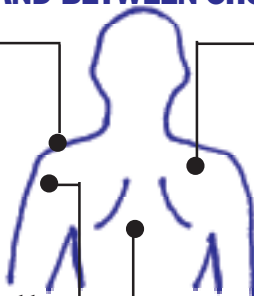
1. **Educate employees** about the role of tension and posture in discomfort.
2. Ask each employee to **report any discomfort**. The OSH publication *Occupational Overuse Syndrome: Checklists for the Evaluation of Work* will simplify this enquiry.
3. Use this *Pocket Ergonomist* to **find possible causes and remedies**. Keep trying until the operator reports feeling better. A Muscle Biofeedback Monitor electromyograph helps to prioritise the causes of each person's discomfort. If one is not available, work through the list and correct all errors found.
4. Introduce **natural relaxation pauses** to interrupt tension. For example, relax one hand, even for a moment, if only the other is needed.
5. **Rotate employees among tasks** where possible, if this varies the muscle load. Take care! Rotation can have social side effects, e.g. it can be seen as punishment ("he took me off my favourite job"), or can separate friends.
6. If stress is a problem, **ask employees** what causes it. Where possible, change job design (for problems of work rate, perceived lack of control, or stock build-up) or train supervisors (for problems of social stress) to eliminate tension at source. Then establish what the person can do themselves to stop tension getting out of control, and **practice the solution with them**.
7. **Demonstrate exercises and supervise their practice**.
8. Now ask **the employee** to summarise the key points of their new relaxed work methods, and **write these down**. These key points should be succinct, for example "drop shoulders; relax hands in lap when waiting".
9. Check again within two weeks. If the employee does not report a substantial improvement, call your occupational health and safety co-ordinator.

Very important: you (the investigator) should relax too.

SHOULDERS AND BETWEEN SHOULDER BLADES

1. Sore on top:
shoulders kept raised

2. Sore behind top:
shoulders kept pulled back



3. Sore outer shoulder:
elbows kept stuck out

4. Sore between shoulder blades:
arms kept forwards; stress

PROBABLE CAUSE OF TENSION

ACTION

1. Top of shoulder: shoulders kept raised

(a) Work too high

Lower keyboard or desk/
raise chair and support feet

(b) Elbows hit armrests

Remove or lower arm rests

(c) Chair backrest is too wide

300 mm optimum. Modify/
replace chair or backrest

(d) Untrained worker is tense

Train shoulder-elbow
technique

"Drop shoulders, hang elbows"

(e) Stress

Reduce stress at source
(specialist advice needed?)

Alternate less stressful
duties

Reduce stress reactions
(relaxation/communications
training)

2. Behind shoulder: shoulders pulled back

(a) Same as "Top of shoulder"

See 1(a) to (e)

(b) Keyboard too far away

Bring keyboard closer so
elbow(s) hang vertically

(c) Incorrect posture e.g.
holding shoulders back

Re-educate postures
(specialist advice needed?)

(d) Leaning forward

Raise visual task to
straighten upper back (also
see 5,6)

PROBABLE CAUSE OF TENSION**ACTION****3. Outer shoulder: elbows held out to side**

(a) Same as "Top of shoulder"
(some raise shoulders, others hold elbows out)

See 1(a) to (e) to correct working height, chair, workstyle, stress

(b) Numeric keys/calculator too far to one side

Reorganise desk to bring keyboard closer to midline so arms hang vertically

4. Between shoulder blades: arms kept forwards

(a) Keyboard or work too far away

Bring work closer so elbow(s) hang vertically

(b) Stress

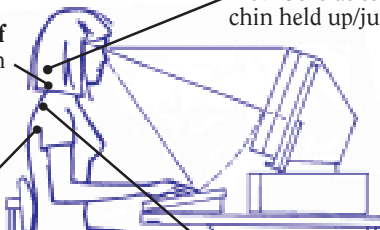
See 1(e)

THE NECK

5. Sore at base of neck: forward lean

7. Sore at top of neck: chin held up/juts forward

6. Soreness continues down back: hunched over work



8. Sore one side of neck: head constantly turned

PROBABLE CAUSE OF TENSION**ACTION****5. Base of neck: forward lean**

(a) Documents too low, causing forward lean of head

Raise documents
For documents which need writing/ turning/ stamping use slanted work surface

(b) Screen too low

Raise screen. Use mechanical lift/ platform/ arm or improvise, e.g. use phone books

6. Upper back: hunched over work

(a) Same as for (5)

Raise visual task as above

(b) Chair too low or high (especially for writing)

Adjust chair and educate, or write with arms supported

7. Top of neck: chin held up/ juts forward

- | | |
|-----------------------------|---|
| (a) Visual task too high | Lower visual task or recline operator slightly in full-backrest chair, or replace equipment or rotate staff |
| (b) Operator wears bifocals | Advise purchase of task-specific glasses or lower visual task for that operator |
| (c) Stress and tension | Reduce stress, see 1(e) |

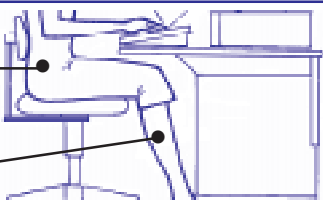
8. One side of neck: head constantly turned

- | | |
|----------------------------------|--|
| (a) Main visual task to one side | Bring documents closer to centre, alternate from left to right |
|----------------------------------|--|

BACK AND LEGS

9. Lower back: —————
 Inadequate support from backrest, leading to constant back muscle tension

10. Lower legs: —————
 Circulation cut off by chair cushion or lack of foot movement

**9. Lower back: inadequate back support**

- | | |
|-----------------------------------|--|
| (a) Backrest too high or low | Readjust so backrest firmly supports the small of the back |
| (b) Backrest not used | Move backrest forwards. If not possible, modify/ replace chair |
| (c) Forward slump | See 5 and 6 (upper back) |
| (d) Buttocks not to rear of chair | Move backrest forward or ask person to sit back |

10. Lower leg: circulation cut off

- | | |
|-------------------------------|---|
| (a) Feet not supported | Provide footrest or lower chair and lower work surface |
| (b) Chair cushion too deep | Replace chair |
| (c) Cushion front not rounded | Replace chair |

FOREARM AND HAND (UPPER SURFACE)

11. Sore upper surface:

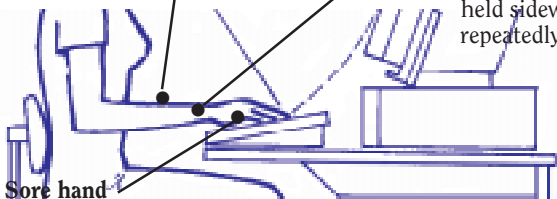
hand/ finger held back

12. Sore outer surface:

hand/little finger held sideways, or repeatedly jerked

13. Sore hand

(little finger end):
over stretched/ hammering



PROBABLE CAUSE OF TENSION

ACTION

11. Forearm upper surface: hand/fingers held up

(a) Wrist on table when keying, so hand is held up
Check for sore shoulders

First reduce shoulder load, see 1(a) to (e). Then train operator to use neutral wrist angle.

(b) Keyboard angle too steep

Adjust keyboard angle

(c) Operator is bracing wrist (also in writing, stapling)

Train relaxed work style (and improve pens, staplers, etc.)

(d) Lack of micropauses or poor job variety

Build in relaxation and variety; drop hands when VDU is processing request, etc.

(e) Stress

See 1(e) for stress reduction

12. Forearm outer surface: hand held/ jerked sideways

(a) Elbows held out

See 1(a) to (e)

(b) Calculator at wrong angle

Turn calculator to straighten wrist

(c) Wrist bends to reach function or cursor keys

Train: "Move hands don't bend wrist". Or use different keys, e.g. Backspace not cursor left

13. Hand near little finger: overstretch/ hammering

(a) Overstretching fingers

See 12(c)

(b) "Hammering" action

Use larger finger/ softer action; modify software to avoid repeating keystrokes

FOREARM AND HAND (PALM SURFACE)

14. Sore flexor muscles:
"banging" keys

15. Sore flexor, outer side:
wrist/ little finger
held sideways

16. Sore little finger:
overstretch or "banging"

17. Sore thumb muscle:
sustained pressure

PROBABLE CAUSE OF TENSION

ACTION

14. Forearm flexor muscles: banging keys

- | | |
|---------------------------|---|
| (a) Dead feeling keyboard | Service or replace keyboard;
or turn up "click" sound |
| (b) Untrained operator | Train operator to use softer
touch, e.g. use biofeedback |

15. Flexors (outer/ ulnar side): hand held sideways

- | | |
|-----------------------|--------|
| Same as for extensors | See 12 |
|-----------------------|--------|

16. Little finger: overstretch or "banging"

- | | |
|---------------------------|-----------|
| (a) Overstretched fingers | See 12(c) |
| (b) "Hammering" action | See 13(b) |

17. Thumb muscle: sustained pressure

- | | |
|---|--|
| (a) Repeatedly hitting space bar | Check and adjust space bar
feel; programme space bar
repeat when key held down |
| (b) Folding paper using thumb | Use folding machine, or back
or side of hand; or use folding
block or blade |
| (c) Writing with awkward
thumb angle | Replace pen, or add rubber
grip; train person to relax
while writing |