



## EVIDENCE BASED MANAGEMENT AND PREVENTION OF MUSCULOSKELETAL DISORDERS

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- Evidence based manual handling training
- Work based exercise interventions

[www.work-safe.co.uk](http://www.work-safe.co.uk)



- Ergonomics consultancy
- Workplace assessments
- Participatory ergonomics
- Implementing ergonomic strategies
- DSE assessments

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## Manual handling training?

- Traditional manual handling training with a focus on postures and techniques does not work.

(Warming et al 2016; Hogan et al 2014; Demoulin et al 2012; Clemes et al 2009; Cochrane 2011; British medical journal 2008; Postal workers study 1997; Van Dieen et al 2000.)

- It will not solve your workplace back pain problem.
- But the HSE still say manual handling training is very important.

## One of our big problems

Who has a back injury?

- “Sorry; had to take the graph out. Link to graph is below.”

What does the previous  
slide tell us?

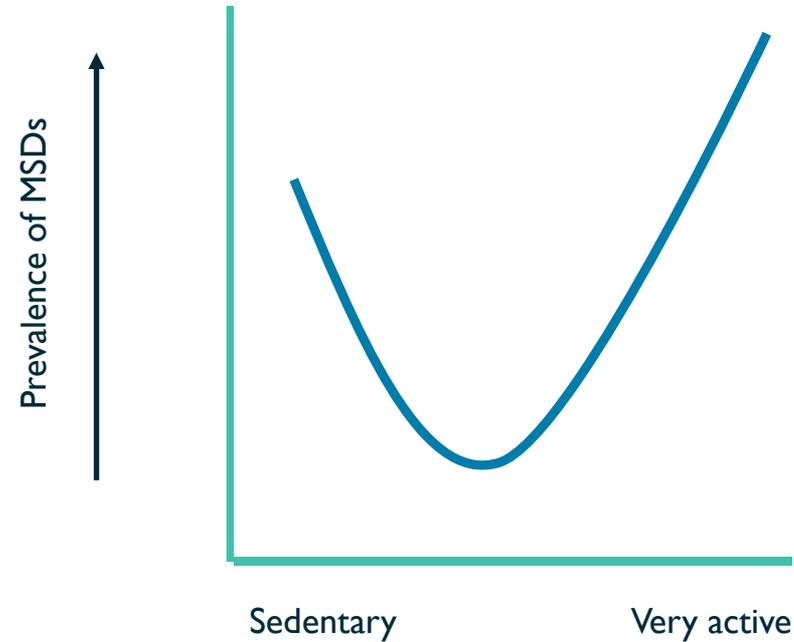
- The presence of specific pathology doesn't mean we will have pain.
- Most of us have some form of spinal pathology.
- Very difficult to identify if work causes an injury or if work aggravates an underlying injury.
- We must accept that most of us (60-90%) will have back pain at some stage in our lives and most of us will have an underlying condition that isn't causing pain.

## Activity and MSDs

Fit the task to the person

Not

Fit the person to the task



(Haneweer et al 2009)

Design jobs to stay comfortable, active and healthy.

Overall objective in  
managing and preventing  
MSDs at work

## Prevention

- Reduce risks that may cause MSDs.
- Reduce risks that may aggravate underlying problems.
- Make work comfortable for asymptomatic.

## Management

- Accommodate symptomatic.

# Risk factors

Low back pain

- Strongest risk factor for future back pain is a previous history of back pain.

## Independent

- Lifting weights of 25kg + more than 15 times per day.
- Medical / genetic e.g. scoliosis.
- Decreased level of physical activity as a child increases risk of LBP in adolescence.
- Decreased level of physical activity as a young person increases risk of LBP when an adult.
- Unfit

## Multifactorial

- Heavy loads
- Severe repetitive loading (particularly in bending and compression)
- Long reach distances
- Wrong work height
- Static or awkward postures
- Cramped work space
- Unstable load
- Unsuitable hand holds
- Poor environmental conditions

## Risk factors

Upper limb disorders

Limited evidence risk factors work in isolation (Grayling 2019)

- Likely that force, frequency and posture are inter-related.
- Vibration.
- Cold.

## Psychosocial Risk factors

Work related musculoskeletal disorders

- Don't cause WRMSD's.
- They are contributory factors.

Particular risk factors:

- High job demands / efforts
- Low control / decision latitude
- Monotonous work tasks

The risk of onset of MSDs in all body regions was elevated by 15-59% among employees exposed to adverse psychosocial work conditions. (Hauke et al 2011).

## Conclusion of risk factors

- Back pain and upper limb disorders are a multifactorial problem.
- They need a multifactorial solution.

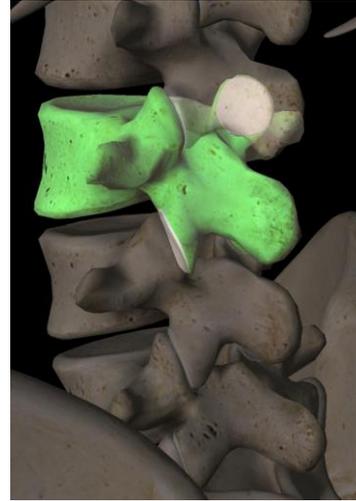
## What doesn't cause MSDs

- EXERCISE
- Exercise is good for us.
- Exercise is especially good for the management and prevention of musculoskeletal aches and pains.

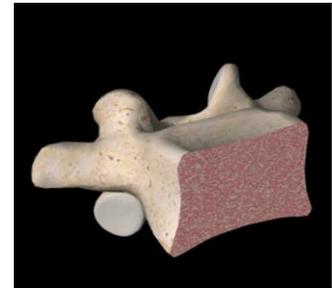
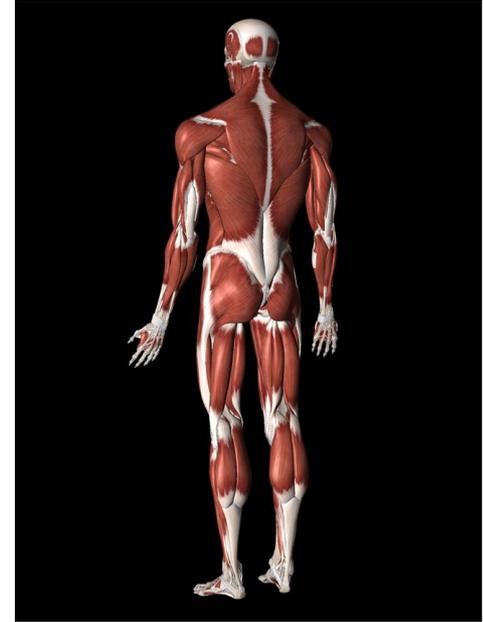
# How exercise helps

Adaptation with and without loading

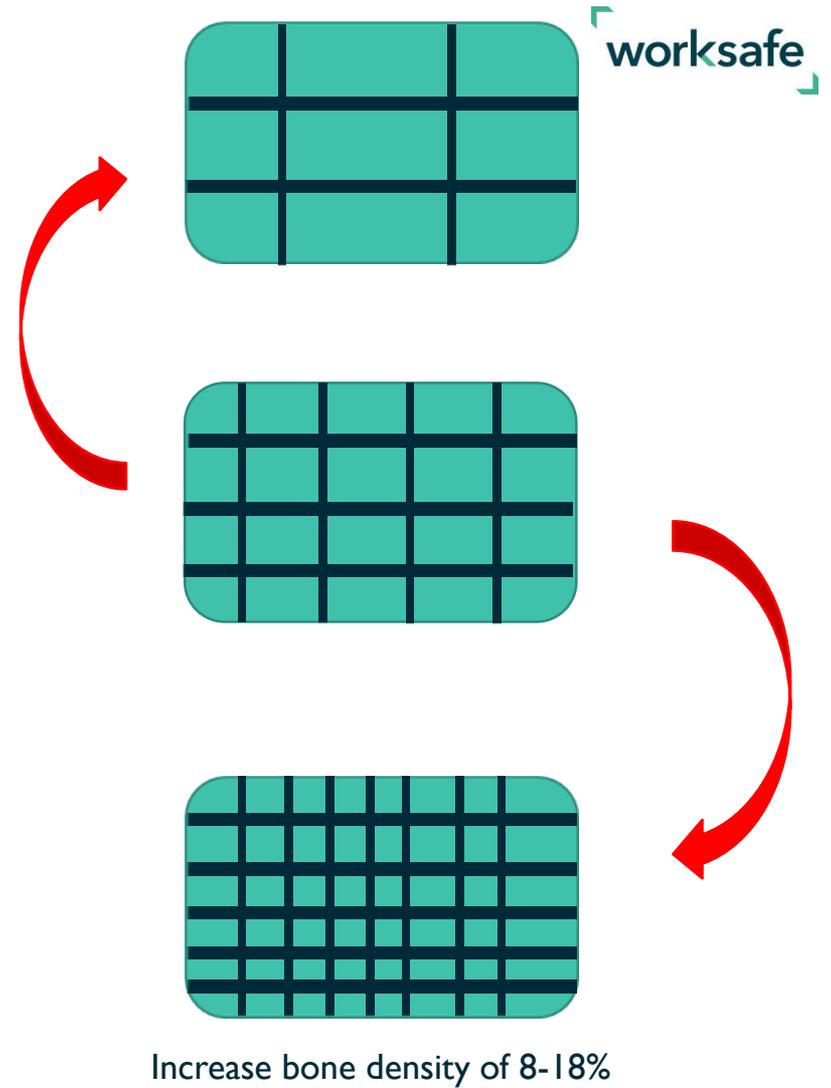
- Muscles
- Tendons
- Ligaments
- Bones
- Joint surfaces
- Discs



worksafe



# How adaptation works



Clemes 2009 & HSE 2007

Strong evidence for:

- Risk assessment (TILE)
- Use equipment
- Exercise interventions showed promise

Kuijer et al 2014

- Optimizing work height (improved working postures)
- Reducing load mass
- Keeping the load close (reduce lever arm).

European wide project – evidence based interventions

- Physical exercise works.
- Participatory ergonomics programme that includes physical and psychosocial elements.
- Modified return to work to facilitate earlier return with LBP.

## What works to prevent aches and pains at work

Multifaceted solution for a multifaceted problem

## What works continued

Systems approach is required (Grayling 2019)

An effective ergonomic intervention that includes physical and psychosocial elements must do the following:

- Reduce mechanical exposure
- Actively involve the worker
- Must affect organisational culture

## What works for office workers?

Specific equipment

Training

- Sit / stand desks: reduce MSD discomfort. (Graves et al 2015, Ognibene et al 2016)
- VDU placement and alternative mouse: no difference in MSD symptoms. (Cochrane review 2012)
- Arm supports: do help (Kennedy et al 2010)
- Arm support and alternative mouse: decreased MSD incidence (Cochrane review 2012)
- Adjustable chair: reduced MSD symptoms (Van Niekerk 2012)
- Office ergonomics training and 1 to 1 advice: reduced MSD (Mahmud et al 2011 & Esmailzadeh et al 2014)
- Dynamic sitting: no evidence.
- Psychosocial intervention: reduced incidence of MSDs. (Gilbert-Ouimet et al 2011)

## What to do if we get a MSD

Correct management

### Back pain

- Seek advice
- Pain relief
- Keep moving / light exercise
- Stay at work

### Upper limb disorders

- Keep moving
- Stay at work
- Make temporary workplace adjustments
- Seek physiotherapy treatment if not resolved within 2 weeks

## Biopsychosocial approach to MH training

The law requires us to perform some form of training.

The HSE say it is very important.

Evidence based approach.

### Theory

- Activity is good for us – emphasise the need to exercise
- Educate on the correct management of musculoskeletal disorders
- Emphasise our spines are strong and made to move
- Fear avoidance behaviour and its consequences
- Risk assessment
- Use of equipment

### Practical

- Job specific practical

Don't forget

- Manual handling training is one part of the solution.
- It must be part of an ergonomics system tackling physical and psychosocial issues in the workplace.

## Case study

Manufacturing

- Furniture manufacturer with 450 staff
- 11 and 8 RIDDOR reports (musculoskeletal) in previous 2 years
- Physically demanding work – lifting, carrying, repetition

## Case study

Manufacturing

Participatory ergonomics programme (empowering staff to make changes):

- Programme support at board level.
- Identification of a strong champion for the programme – health and safety manager.
- Measurement of the problem to be able to assess the return on investment.
- Creation of a robust reporting system.
- Development of a tailored training package including:
  - Training of members of the board and senior managers to understand the structure and ensure support and commitment to the programme.
  - Training line managers as ergonomic risk assessors.
  - Empower line managers to make ergonomic changes.
  - Training ergonomic trainers within each department.
  - Training of all staff.

## Case study

Manufacturing

### Outcome

- RIDDOR reportable musculoskeletal injuries decreased to 3 during the year of training and program implementation.
- The following year they had 1 RIDDOR reportable musculoskeletal injury.
- Zero reportable for 8 subsequent years (period of follow up).
- The year after implementation the company had their employee liability insurance decreased by £60,000 per annum as a direct result of implementing the participatory ergonomics program.

- Identified physical ergonomics hazards and made ‘top level’ recommendations.
- Evidence based manual handling training
- Exercise intervention (Tested 10; re-tested 4)

## Case study

Utilities

The results were in line with research:

- Improved physical activity results in a decrease in musculoskeletal aches and pains.
- Reduced or no physical activity results in an increase in musculoskeletal aches and pains.

Delegate	Exercise activity between initial and final testing.	Results of fitness tests.	Self-reported musculoskeletal aches and pains
A	Increased exercise activity.	Improved core strength scores. Improved cardiovascular fitness.	Reduced low back pain.
B	Increased exercise activity.	Improved core strength scores. Improved cardiovascular fitness.	Eliminated low back pain.
C	Continued exercising regularly in gym.	Maintained pre and post-test fitness levels. However scored full scores on initial test.	Slight shoulder discomfort.
D	Did no exercise between testing dates.	No significant overall change in testing results.	Increase in aches and pains (neck and low back).
E	Could not conduct all tests as delegate had an operation between testing dates and was unable to do certain activities. Did not exercise between testing dates.		
F	Did not attend on day 1 so no comparison can be made.		

## Case study

Ergonomics and exercise intervention with  
surgeons

- Implemented ergonomic principles in the operating room and specific physical exercises.
- The intervention group showed a significant improvement in quality of life, low back pain, and analgesic consumption after 6 months.
- This study demonstrated the effectiveness of a global program based on the application of ergonomics in the operating room and specific physical exercises. (Giagio, S. et al 2019)

- [IOSH magazine - Toyota](#)

Further reading

Questions?