

# Broadcast Summary

# Workstation Ergonomics With Lillian Antonio Ergonomist to Herman Miller International First broadcast on 18th February 2015

## Art or Science?

• Long tradition of both at Herman Miller (10 years of research behind the Aeron chair)

- Design also a major aspect of company's heritage (<u>Charles and Ray Eames</u>, Bob Prowst)
- Ergonomics hub: a free facility, with very useful self-help ergonomics training videos (go to ergonomicshub.com)
- Research at Herman Miller in 3 categories:
  - Physical comfort

- Cognitive – how workstation setup affects concentration levels etc

- Social – encouraging people to use their overall workspace better. EG, Herman Miller

will not allow eating at desks - promotes social interaction at the cafeteria (and a bit of exercise!)

• Technology drives sitting posture: everyone is at a computer

• The "living office" is the current focus – looking at how people actually function in the modern workplace (not simply the traditional workstation).

- Anthropometrics<sup>1</sup>Very important in chair design global data used to ensure chairs suitable for widest variety (the 3 sizes of Aeron will accommodate 99% of the population)
- Materials used are very different to "normal" office chair the result of research, not whim

# "Sitting is the new smoking"

• Sitting not only affects the musculosketal system (eg shortened hip flexors) but also has systemic consequences (cancer and diabetes)

• But research shows that <u>seating can help the CVS</u> (Michigan University). The graph to the right shows figures for Herman Miller's *"Embody"* chair, as compared to a conventional chair. The precise source



<sup>&</sup>lt;sup>1</sup> A branch of ergonomics – the science of human dimensions



for these figures is not yet known, nor are the figures for any other brand of chair claiming to be ergonomic.

• There is no universal answer!

#### Chair Design

- The term "ergonomic" is often misused, so do not take ergonomic claims at face value
- Comfort is essential:
  - Pressure distribution: ideally should be evenly spread.
    - Foam tends to "bottom out" leading to high pressure areas.
    - Herman Miller's "suspension material" prevents this (and all chairs guaranteed for 12 years, 24/7 use)
  - Thermal comfort: heat build-up causes discomfort and saps concentration levels
- Pelvic alignment critical, to encourage correct spinal alignment and avoid the "C-curve" effect
- The ability to fine-tune a chair to the individual is important, but the number of controls
- should not be excessive, as this may discourage use. The minimum recommended is:
  - Seat height
  - Back rest lock
  - Forward tilt lock
  - Sacral/lumbar support (sacral variation is minimal between individuals)
  - Seat pan length. One of the biggest problems in poorly set up chairs; a seat pan that is too long will force a user forward in the chair, defeating the purpose of the back support.
    - Angle of hips/knees may be different between individuals
- Static posture is to be avoided a chair which encourages/allows movement is important
- Armrests:
  - Often too high
  - Can prevent users getting close to desk.
  - Shorter armrests or elbow rests may be better
  - High armrests forces user to lift shoulders to type effectively, with consequences for the shoulder and neck musculature.
  - Arms need to be "free-floating" while at the desk. If anchored to desk or wrist-rest, the user forced to make constant small movements with wrist, leading to tendon injuries and RSI.

#### Laptops and tablets

- Tend to promote bad posture, especially when used on the lap.
- A possible reason for increasing incidence of neck problems?
- When used at a desk, the same rules as for a desktop apply laptop stands are essential.





# "Turtle posture"

- Forward head posture
- Possibly due to weakened eyes (but eyes weaken during course of day in a healthy person also)
- Important to ensure patients sight is properly corrected, if necessary
- Monitor arms can help, by allowing the screen to be brought closer

## <u>Swiss balls</u>

- Problem is time a working day of ~8 hours, with the back unsupported is very tiring and will lead to poor posture. Short times may be OK.
- They tend to be used by those with back problems, looking for a solution so the back is already injured
- Ball size not always compatible with desk height
- Short times probably OK

# Affordability of Ergonomic Seating

- A question of priorities? If the bulk of your day is in your chair, why not get best?
- Office seating is a long-term investment, both for employer and employee
- Cheap seating, which may technically meet the HSE requirements, may be a false economy
- Cheaper chairs often have problems with relationship between back rest and seat pan when

adjusted - the seat pan moves further away, defeating the purpose of the back support

- For reference, Herman Miller's chairs retail at<sup>2</sup>:
  - Aeron: £900 £1200
  - Milla: £650
  - Embody: £980

## Ergonomics in cars

- Offset pedals (becoming more common) and can exacerbate or cause back pain
- Cost of car is no indicator of ergonomic excellence
- No option but change car if this is the cause of pain (difficult advice to give!)

## Sit-to-Stand desks are a great way to encourage movement

- Nordic countries use as standard UK not yet as keen
- Cost is clearly a factor
- Standing after lunch is believed to help digestion/blood sugar levels<sup>3</sup>
- As with all kit need to encourage people to actually use it

# Dual/Multiple monitors

- Can affect posture (repetitive, unilateral rotation of neck)
- Despite their good intentions, people tend to favour one monitor, with the other as a "storage area"
  - keep the main one central
  - offset the secondary monitor
  - Keep the main monitor directly behind keyboard



<sup>&</sup>lt;sup>2</sup> We are **not** suggesting that Herman Miller are the only or the best suppliers of ergonomic furniture. These prices are provided purely as an indication of top-end cost (and in response to one questioner, who wanted to know if they were affordable!).

Source of info not known

### HSE recommendation for seating

- DSE (Display Screen Equipment) regulations give HSE rules/guidance on screen use and workstation setup (see download)
- HSE rules also govern seating in the workspace (see download) including:

#### Waiting room chairs

- HSE regulations do not apply
- Used for short periods less important
- Common sense
- Firm seats, with arms, correct height

## MSK/Systemic changes as a result of chair use over time

- Research on long-term sitting (in and out of work) has been conducted
- Lipoproteinlipase drops by 20% after prolonged sitting (responsible for hydrolysing triglycerides and therefore promoting cardiovascular health)

#### School chairs

- A chair has been designed for children
- More work needed to develop good habits early
- Kids using technology earlier, therefore susceptible to poor posture
- Swiss balls all day at school questionable decision but at least children get up and run about regularly (in theory...)

## Treadmills at the desk

- Popular (esp in NY)
- Theory good, but concentration on screen can suffer (eyes refocusing rapid eye fatigue)
- Competing muscle activity to walk and type

#### Saddle chairs

- Similar problems to Swiss ball lack of support can cause fatigue if overused
- Tend to be promote a forward sitting posture

#### Wedge cushions

- External devices such as these defeat inbuilt ergonomic features
- Wedges alter height of lumbar spine with respect to backrest not good
- Can create a very unnatural position
- On car seats, can help, but lumbar support height remains important

## Key Workstation Considerations

- Not just about the chair
- Whole workstation needs to be considered
- Desk height (too high a serious problem)
- Screen height can cause problems, particularly in the neck
- Position of keyboards and mice affect upper body torsion/shoulder position
- Keep moving is probably a really helpful mantra

#### **Opportunities to visit HM**

- Herman Miller happy to set up group visits, preferably in Chippenham or London
- Can run ergonomics workshops posture/workstation/etc
- If interested in setting up a workshop contact us at APM and we'll arrange
- But have a look at Herman Miller's Ergonomics Hub a Herman Miller microsite (ergonomicshub com) it's a useful training facility.

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Some interesting references:

Bogie, KM, Nuseibeh I, Bader DL. "Early progressive changes in tissue viability in the seated spinal cord injured subject." *Paraplegia*. 1995, 33(3):141-147.

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