Vehicle ergonomics: driving comfortably

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Driver health research

- Review of business drivers (Gyi et al. 2003)
  - 65% reported low-back pain
  - 43% neck discomfort
  - 40% shoulder pain
- 1/3 of all drivers reported that they experienced moderate or severe low-back discomfort in a typical week (Gyi et al. 2003)
- Low-back related sickness absence is 6 times greater for those who drive >4 hours a day (Loughborough University 2001)
- Drivers who spend >50% of their day driving are 3 times more likely to experience a slipped disc.
Causes?

- **Postures:**
  - Static, constrained postures
  - Increased pressure on discs
  - External pressure on body

- **Duration of driving / sitting in vehicle:**
  - Commuting
  - Traffic volumes / delays
  - Use as ‘office’
An ergonomics approach

- User
- Vehicle
- Task

WorksOut
User’s characteristics

- Size and shape
- Existing discomfort
- Strength
- Specific needs e.g. air conditioning, clothing
- Driving style / tension when driving
Seat

Supportive
Comfortable
Adjustable

WorksOut
Seat

- Long enough to support without restricting
- Height and tilt adjustment
- Shape
Backrest

- Height (up to shoulders, but should not restrict rear view)
- Width and lateral support
- Shape
- Angle (typically 20-30° reclined)
- Lumbar support – in-out, up-down adjustment
Lumbar supports

Can help, but not ideal:

- Shorten seat length/prevent contact with whole backrest
- Don’t stay in place

Best to offer integral lumbar support:

- Up / down
- In / out
Head restraints

Avoid forcing awkward postures
Middle of headrest should be level with middle of ear
Headroom

- Be aware of internal structures / bulkhead
- Ensure adequate clearance above head
Legroom

Be aware of handbrake or facia which may press onto legs
Steering wheel

- Ideally, should be adjustable in:
  - Angle
  - Height
  - Depth
- Ease of holding
- Ease of turning (e.g. power steering)
- Centrally positioned
Steering wheel position

• Should be centrally positioned. Test by putting your hands together in ‘prayer position’, and point at steering wheel.
• At a comfortable height and distance; preferably should be adjustable in depth and angle.
Pedals

Should be:
• Centrally positioned
• Sufficiently large (re: shoes worn)
• Suitable distance apart (to avoid accidental activation)
• Reached comfortably

Also consider:
• Height above floor
• Travel on depression
• Left foot rest
• Floor surface
Offset pedal position
Pedals close together
Foot rest too narrow
Gear stick

- Should be easy to reach.
- Be aware of vibration if hand is rested on gear stick.
Hand brake

If closer to passenger seat – may be OK for broad drivers but a stretch for smaller drivers
Vision

- To displays within vehicle – be aware of impact of steering wheel position.
- External – view may be blocked by:
  - Car frame
  - Overhead storage
  - Rain channelled onto side windows
Driving task

- Duration of driving
- Complexity of task (types of roads, unpredictability of road environment)
- Route navigation
- Time of day of journey
- Time pressure
- Allowing time for the journey
- Driving style / purpose
Getting into / out of vehicle

- Seat shaping
- Height of vehicle (higher usually better)
- Where it is parked (e.g. beside kerb)
- Door clearances
Storage and manual handling

- What?
- What into?
- A sill may hinder easy access
- Beware of head clearance, and catches on boot lids that stick out
Other tasks in the vehicle

- Paper work
- Laptop / tablet
- Think about:
  - Posture
  - Duration of use
  - Safe storage
  - Security
- Consider providing:
  - Guidance and information on working comfortably (e.g. sitting in passenger rather than driver’s seat)
  - Ancillary equipment to facilitate better posture
Improving comfort / reducing risk

- Use the adjustments, and change them regularly when driving / vary posture
- Cushions etc in car
- Alternative seat (e.g. Recaro)
- Alternative cars
- Regular active breaks
- Reducing driving (e.g. relocate; phone calls; alternative transport)
- Reducing stress (e.g. sat nav, plan routes, advice on not gripping steering wheel)
Vehicle selection for organisations

- Assess vehicles for design problems:
  - Does not force awkward postures
  - Is adequately adjustable / supportive for a range of users
- Offer a range of cars
- Allow test drives / consultation
- Don’t assume that the seat will be the same from the same manufacturer, one model to another
- Features available at top of one range are often better than those at bottom end of next model up.
Vehicle selection: pool vehicles

- Consider:
  - Fit to drivers (and adjustability)
  - Driving patterns
  - Tasks undertaken / equipment required
Further info

Guidance:

• [www.aohnp.co.uk/media/Vehicleergonomicsbestpracticeguide$28Highwaysagency$29.pdf](https://www.aohnp.co.uk/media/Vehicleergonomicsbestpracticeguide$28Highwaysagency$29.pdf) (or google: ‘Highways agency vehicle ergonomics’)

• [http://safety.dept.shef.ac.uk/guidance/DRIVING%20POSTURE.pdf](http://safety.dept.shef.ac.uk/guidance/DRIVING%20POSTURE.pdf)

• [www.drivingergonomics.com](http://www.drivingergonomics.com) – includes a car selection checklist

Car review sites e.g.:

• [www.thecarconnection.com](http://www.thecarconnection.com)
Thank you!

Any questions?

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