



SET-UP AND POSITIONING FOR DRIVERS USING HAND CONTROLS

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Any person with limited body function requires correct positioning and set-up in order to optimise their driving performance in order to keep them safe on the roads.

Positioning:

- Each individual should be correctly positioned in the car according to their body height, proportions and strength.
- Every adjustment comes with a compromise – the art is in finding the right balance.
- They must have an unobstructed view of the road ahead.

Leg Positions:

- Legs must be positioned away from the pedals.
- Avoid feet sliding under pedals particularly if they have no sensation or awareness of foot position.
- Place feet in a position to prevent spasms.
- Long legs must not get in the way of the hand controls.

Caution:

Be aware of poor limb position when driving long distances.

E.g. externally rotated hip and internally rotated ankle can result in increased risk of pressure sores and contractures of the ankle joint.

Regular changing of position must be taught when spending long periods in the vehicle.



Pedal Covers:

The use of a pedal cover over the accelerator creates a safe position for the right foot and reduces the risk of a spasm accidentally applying the accelerator.

Automatic cars normally have a built-in positioner for left foot.

This allows for safe and ergonomically correct positioning of legs.

Be aware of pressure areas on your heels when driving long distances.



Seat height and position:

MPV seating position is higher from the floor compared with sedan seats.

The higher seat height puts the legs into a more natural position with more even pressure distribution.



PRINCIPLES OF POSITIONING IN THE VEHICLE

1. Strongest arm on the steering.

- Steering is the primary function – more important than brake and acceleration.
- Greater design options for brake and accelerator to accommodate reduced muscle function.
- Limited and expensive steering adaptations.

Rehab Focus:

- In rehabilitation, work on functional strength required for steering.
- Shoulders at 90° flexion
- Horizontal abduction and adduction

2. The driver should sit slightly higher in relation to the steering wheel than an able body driver.

This limits the stress on the shoulders by working against gravity and reduces the active range of shoulder flexion required.

3. When driving with hand controls the driver should be positioned slightly closer to the steering wheel than drivers using their feet.

This is particularly important if there is any weakness in the shoulder girdle.

The flexed elbow reduces the active range of movement required at the shoulder.

It places the scapular in a stable position.

Important when only using one hand for steering and it is restricted to the spinner position on the steering wheel.

NB. Minimum 25cm between breastbone and airbag to prevent injury in the event of the airbag deploying.

If the driver is positioned too far from the steering, then when turning the shoulder is pulled away from the support of the seat which adds to the instability of an unstable trunk.



General guideline: –

Top of the shoulders should be level with the top of the steering wheel.

Elbows flexion: 30° - 45°- normal strength shoulders

Weak shoulders - > 45°

4. **Where there is a lack of trunk control, the pelvis and trunk need to be stabilised in order to provide proximal stability**

- Proximal stability = distal control
- Stabilise the pelvis as this gives improved balance and allows greater transfer of strength through the shoulders to the steering wheel.
- Use the same ergonomic seating principles that are used in wheelchair seating.
- Bucket seats – at the cost of the transfers, bucket seats can provide a lot of stability when driving, but they are difficult to transfer onto.
- An 8 way electrically adjustable seat provides ease of transfers and pelvic stability when driving.



- Where electronic seating is not available, a wedge cushion can be used to get the same effect.
- The CG Lock can be used to secure the pelvis using the standard seat belt. (Available from Shoprider 012 6531817)
- Providing lateral trunk supports for stabilizing the trunk.



- Use of chest straps or H harness.



5. Position of the hand controls.

- The hand control should be positioned close to steering to allow a thumb grip on the steering.
- They should be low to keep shoulder in neutral position to limit fatigue.



- An armrest to support the elbow helps to limit fatigue. This is beneficial where a hand is kept on the hand controls, spinner or with the weight of a prosthesis.



6. Steering grip and the use of spinners

An Auto-mobility survey shows that only 35% of drivers using hand controls make use of a spinner, even though the Licensing Department would like to see everyone using them when driving with hand controls.

Advantages

- Manoeuvring much easier
- Better grip and control of steering – no palming
- No release of steering.
- Provides grip for quadriplegic hands.
- Licensing Department want everyone to use them.

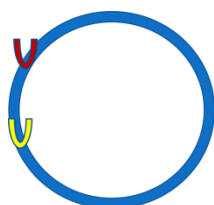
Disadvantages

- Limited to one place on steering wheel.
- Gets in the way of loading wheelchair.
- Safety in event of accident.
- Results in strong and weak zones of steering.

Spinner Positions:

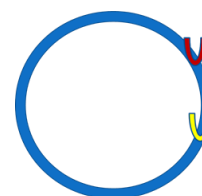
Left hand

10 o'clock
8 o'clock



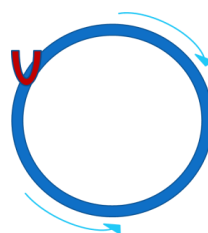
Right hand

2 o'clock
4 o'clock



Steering zones for left hand driver

12 → 2 weakest zone going clockwise
8 → 6 weakest zone anti-clockwise



Opposite for right hand

Alternative grips on steering wheel

Due to weak and strong zones in the steering action, some people with shoulder weakness prefer to use different grips on the steering wheel which enables them to move their hands to different areas of the steering and always work in the strongest zones. A broader steering wheel with a non-slip surface allows the use of a tenodesis grip for steering.



Summary – Principles of positioning:

- Position feet safely away from pedals.
- Look at height and distance in relation to steering wheel.
- Stabilise the pelvis and trunk
- Position of hand control
- Grip and position of hands on the steering wheel.