

Wheelchair seating principles used to optimise driver performance in SCI.

Action Research demonstrated through Case Studies.



By Caroline Rule (BSc Occ Ther)

Rolling Rehab

May 2018

WFOT Congress



New drivers

- Lose balance on right turns
- Unable to transfer strength to steering wheel ↓ trunk stability

Experienced drivers

- Develop compensation techniques
- Are these adequate in emergency situations?

??

Seating principles



Impact



Convince

??

Goals and principles of wheelchair seating 1.

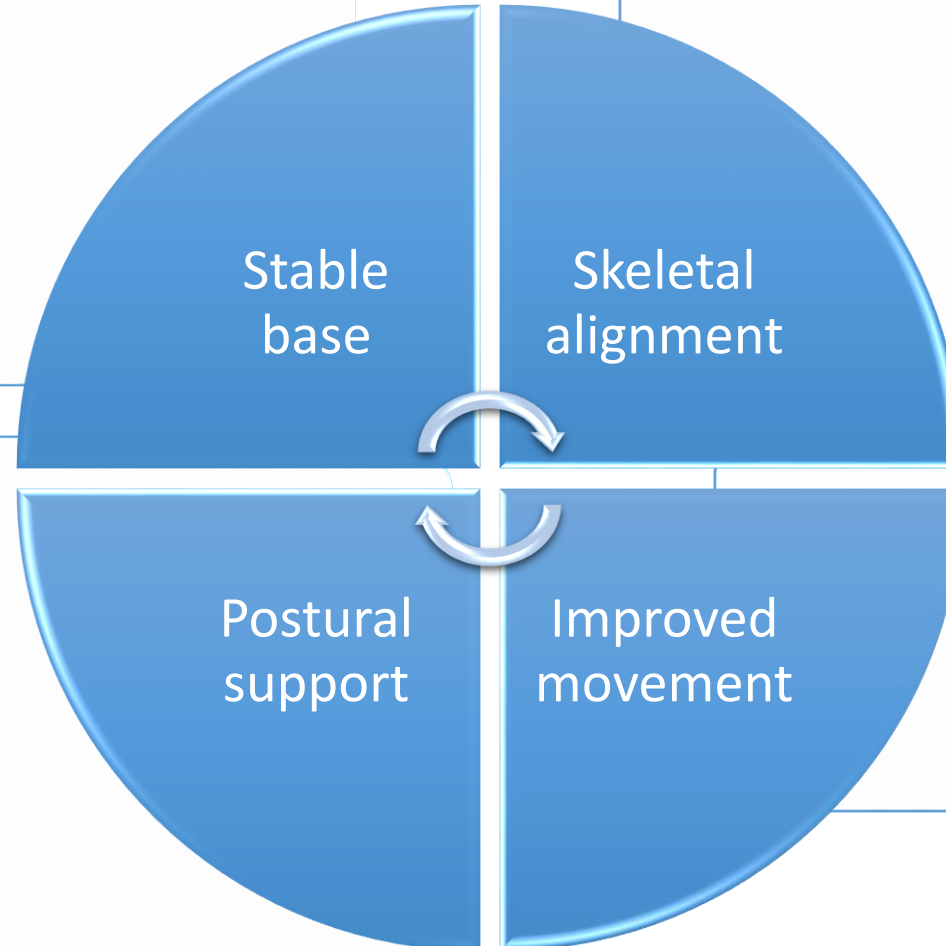
- similar to seating goals for driving

• Stabilise Pelvis

- Stop sideways movement
- Prevent sliding forwards

• Tilt in space

- Improve stability
- Counteract gravity
- Align head in space



• Stabilise spine

- Stop sideways collapse
- Stop slumping

• Steering wheel

- Transfer of strength
- Improved balance

Stabilising Interventions used in vehicle

Stabilise pelvis

CG Lock,
Wedge cushion



Stabilise spine

Bodypoint Chest strap



Tilt in Space

Wedge cushion
Reclined backrest



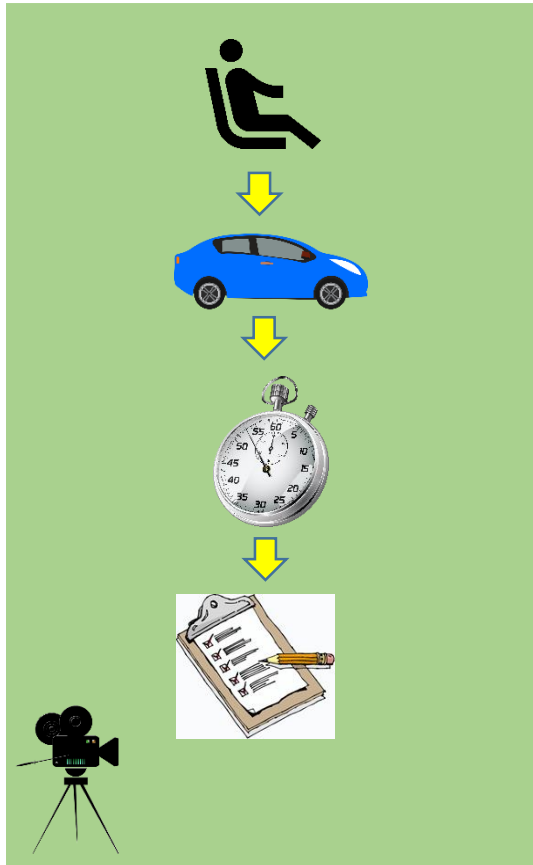
Signed Consent obtained for use of photos and videos from all participants

Testing Procedure

4 experienced drivers
Different levels SCI
Driving school vehicle
Tested on skid pan

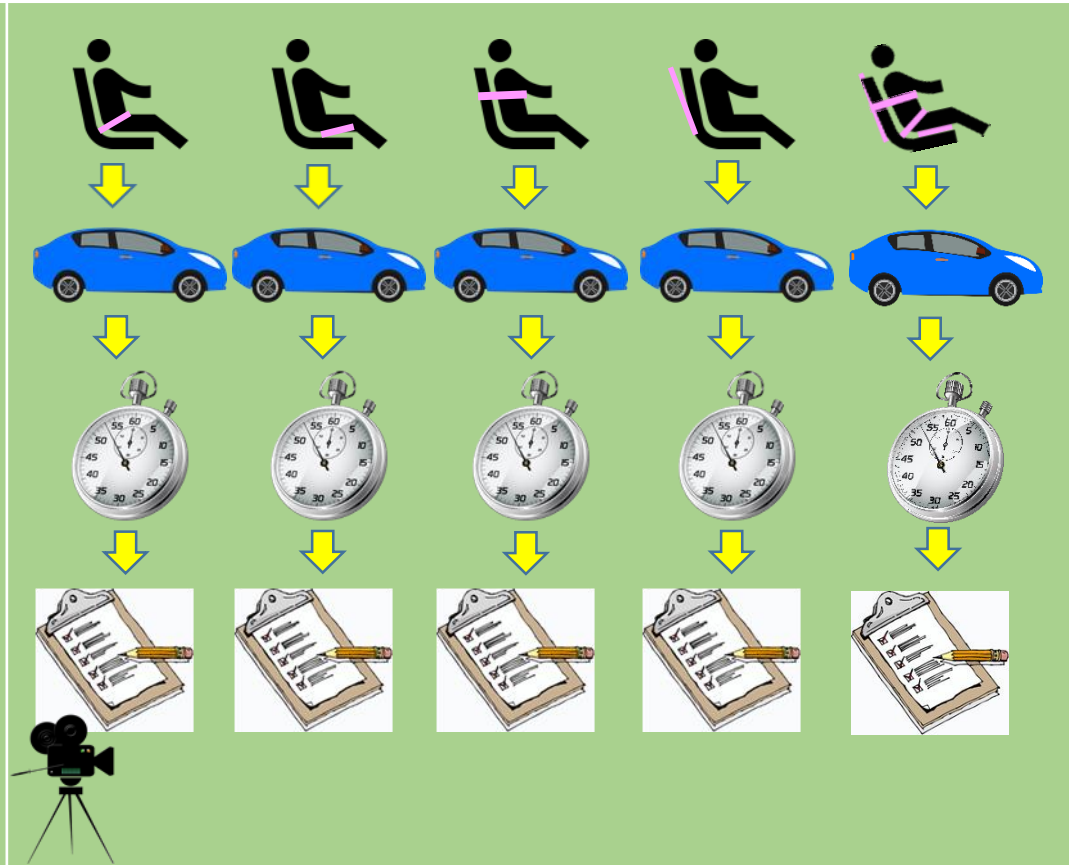
Round 1

Own set up



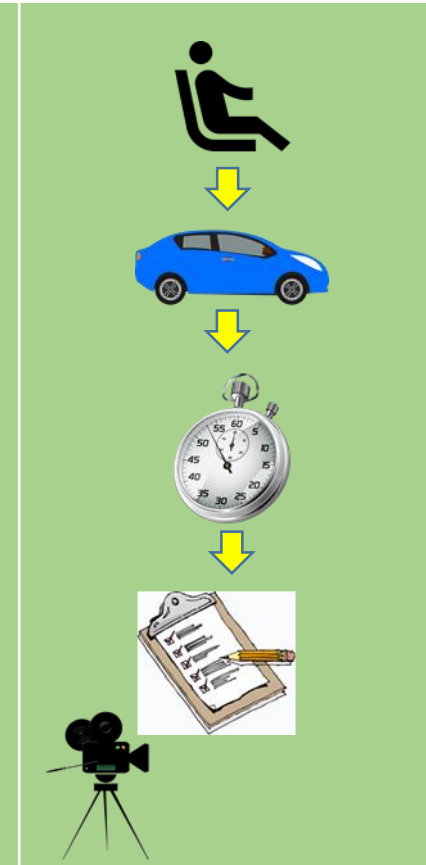
Round 2

CG Wedge Strap Recline All 4



Round 3

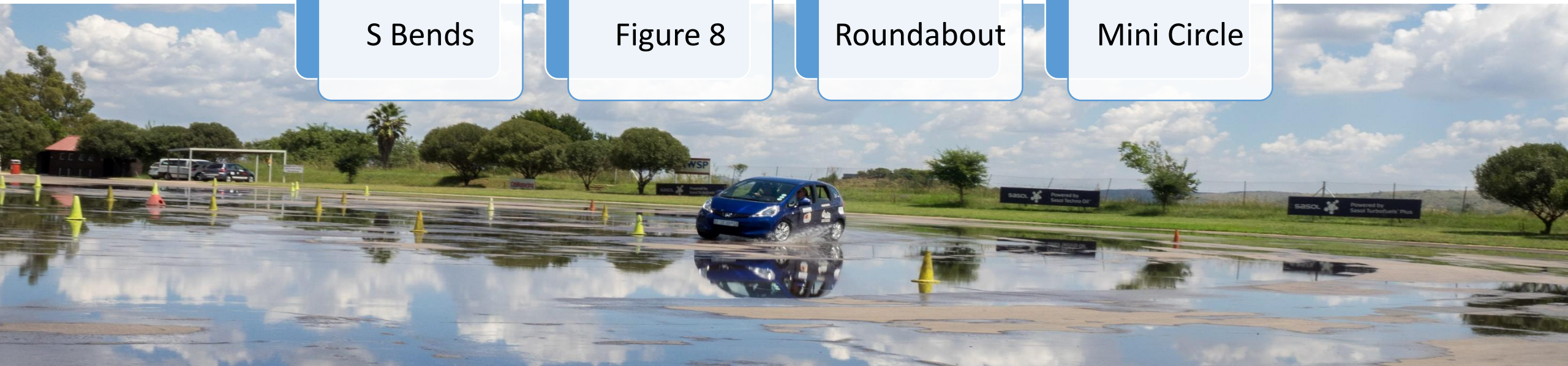
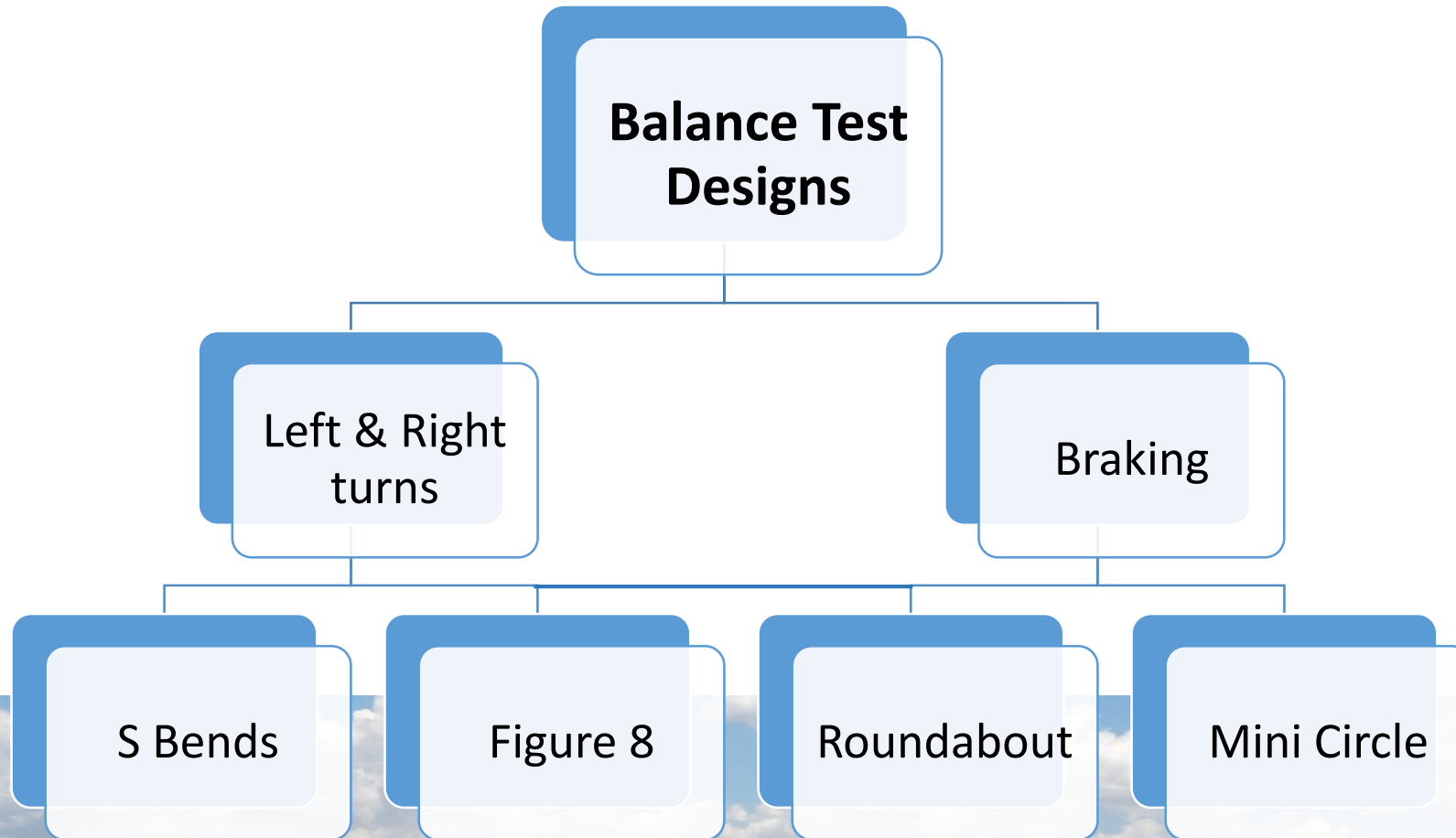
Own choice



Follow up

2 months





T12 Paraplegic – with stable trunk



Mr B C5/6 Quadriplegic

Compensation techniques: sits with left hip higher than right to prevent falling to left

Using compensation techniques



Stabilised



Mr B Results

Choice of interventions:	Comments and Observations:	Carry over into own car:	2 month follow up:
All 4	<p>Chest Strap biggest impact on performance: “I’d get speeding fines all day”</p> <p>Significant improvement in performance when stable.</p>	<p>Uses wedge and recline in own car seat</p> <p>Strap only for racing.</p>	<p>No changes to position.</p> <p>Realised the importance of positioning for new drivers.</p>

Mr V C6/7 Quadriplegic

Compensation techniques: Wedged position, backrest reclined, pushes head against headrest to stabilise self on corners.

Using compensation techniques



Stabilised



Mr V Results

Choice of interventions:	Comments and Observations:	Carry over into own car:	2 month follow up:
Strap Wedge Recline	Very competitive Asked to try with quad spinner Strap “makes him want to race” Significant time improvement	Wedge and recline (already uses it, has bucket seat) Strap “if it was easier to use.”	Recognised benefit of using a quad spinner, recommended it to others. Sits higher than before, less tension in shoulders Increased wedge in seating position.

Mr M – T2 Paraplegic

Driving Position: Far from steering wheel, backrest reclined, seat higher

Difficulties: Loses balance on right turns

Lacks strength when turning steering wheel at high speeds.

Minimal compensation techniques



Stabilised



Mr M Results

Choice of interventions:	Comments and Observations:	Carry over into own car:	2 month follow up:
All 4	Very surprised and pleased with improvement in performance due to stabilising.	Uses tilt in car seat with reclined backrest. Strap – good for performance but not worth the effort CG lock – maybe!	Changed driving position. Sits closer to steering with increased recline and wedge. Has helped a lot with reducing loss of balance in car.

Conclusion



- ✓ Experience limitations
- ✓ Collaborate to find solutions
- ✓ Bucket seats
- ✓ Sponge wedge cushion
- ✓ Must be quick and easy to use
- ✓ Combination of positioning & stabilising
- ✓ Educate drivers with SCI
- ✓ Optimise performance
- ✓ Significant impact

Thank you



Zwartkops Raceway

Driving Ambitions

QuadPara Association

Rolling Rehab

Eugene Searle -

Photographer