



Postural balance in Adolescent Idiopathic Scoliosis does not improve after corrective posterior spinal fusion

Janneke Schimmel¹, Vivian Weerdesteyn¹, Marinus de Kleuver^{1,2}

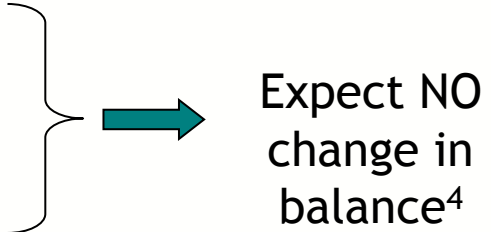
¹Sint Maartenskliniek, Nijmegen, the Netherlands

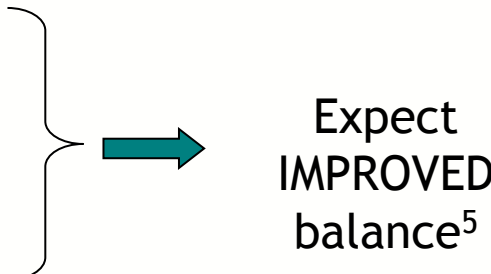
²VU University Medical Center, Amsterdam, the Netherlands



Disturbed postural balance in AIS, but why?

Spinal fusion

- Primary common underlying mechanism:
 - Impaired somatosensory intergration¹

Expect NO change in balance⁴
- Secondary biomechanical disturbance:
 - Asymmetric trunk → changed centre of mass²

Expect IMPROVED balance⁵
- Combination of both aspects³

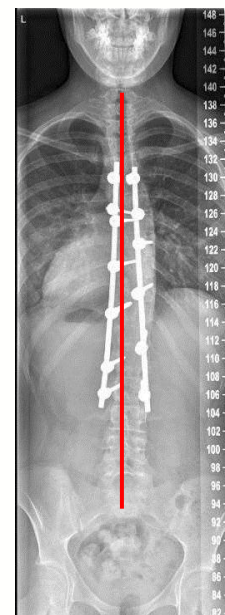
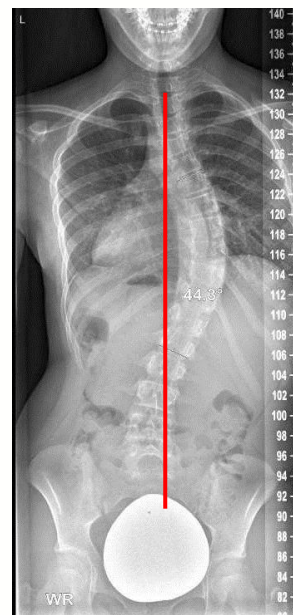
1. Haumont et al. 2011 Spine
2. Kuo et al. 2010 Spine
3. Simoneau et al. 2006 Exp Brain Res
4. Abreu et al. 2012 Gait & Posture
5. Bustamante Valles. 2010 Stud Health Technol Inform





Aim

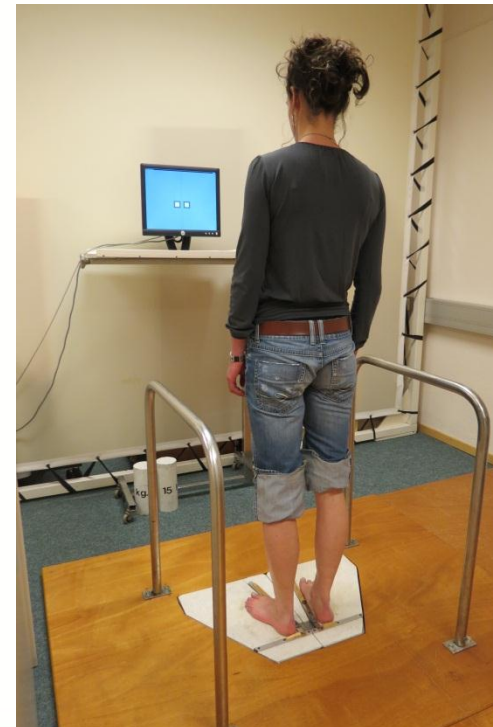
Investigate the effect of a corrective posterior spinal fusion on postural balance in patients with AIS?





Methods

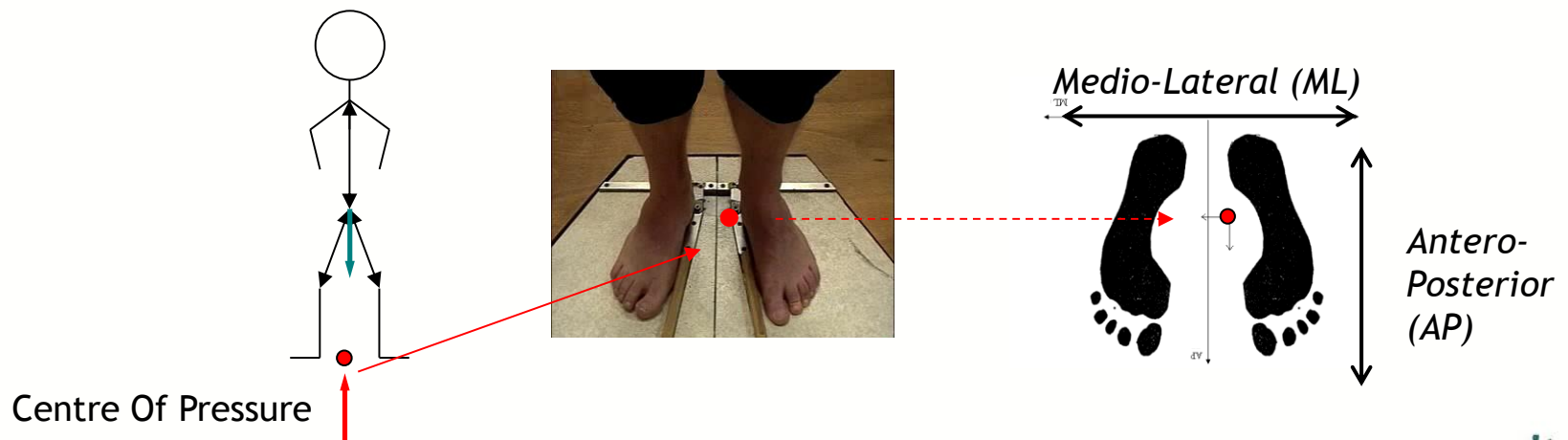
- 24 girls with AIS (12-18 yrs, Cobb angle 42-71°)
- Postural stability tests on force plate
 - Quiet standing
 - Visual: eyes open / eyes closed
 - Surface under feet: solid / foam
 - Preoperative, 3 months and 1 year postoperative





Outcome measures

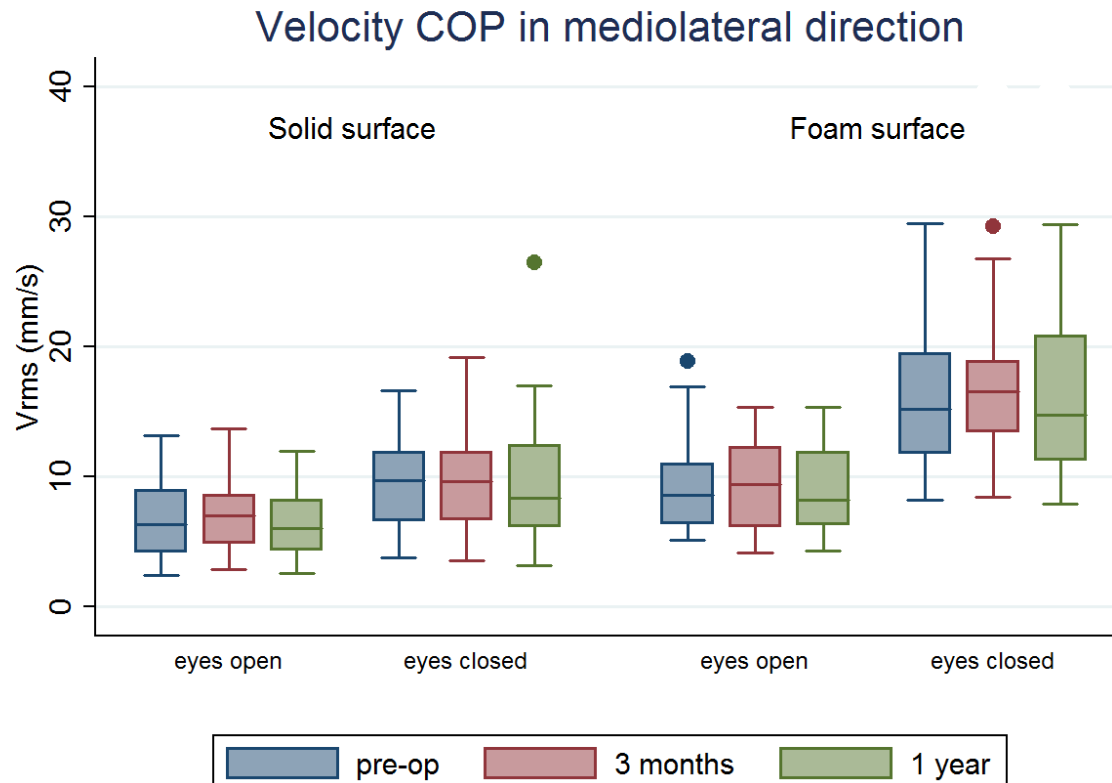
- Centre of Pressure (COP)
 - Position COP → weight distribution
 - Velocity of COP excursions
 - Amplitude of COP excursions } balance control





Results

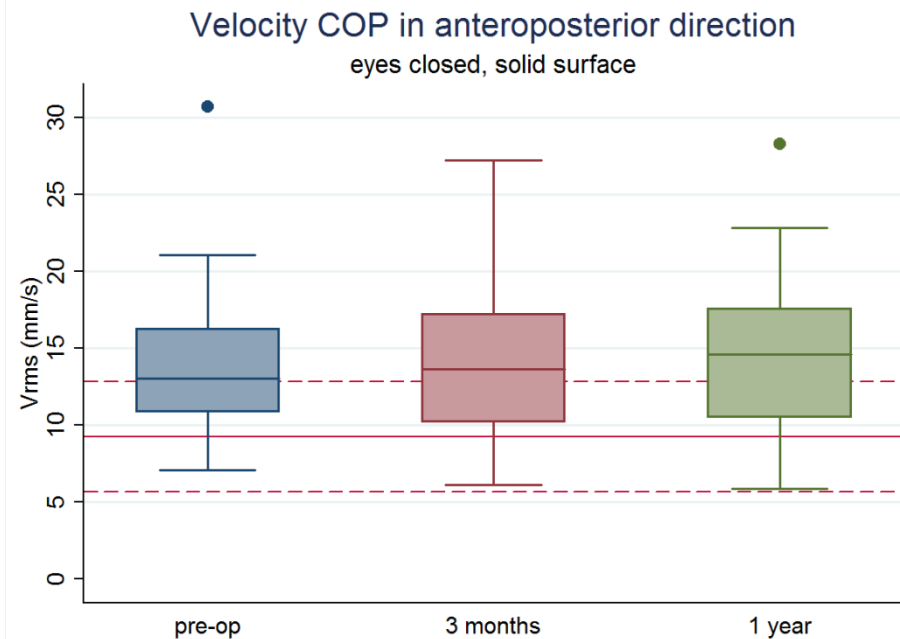
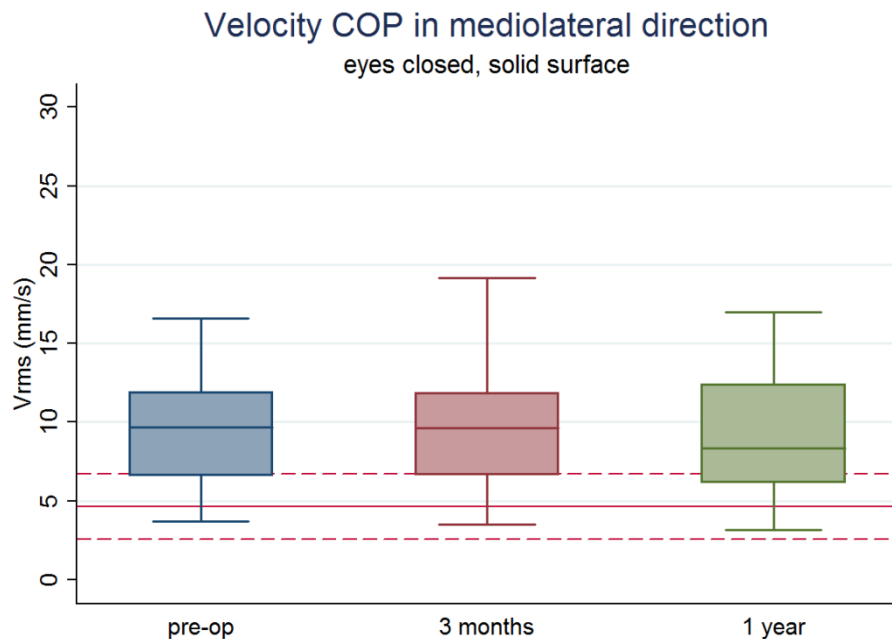
- No change in balance in any condition or outcome measure over time ($p > 0.05$)





Results

- Poorer balance compared to healthy volunteers in ML & AP-direction (red lines*)





Conclusion

- AIS patients have disturbed postural balance
 - Increased velocity of Centre of Pressure (COP) excursion compared to controls
- Surgery does not improve postural balance
 - Despite improved trunk symmetry and increased stiffness of the trunk
- Disturbed postural balance may be inherent to AIS
 - deficient somatosensory integration



Thank you



None of the authors has any potential conflict of interest

