

Improving posture, reducing pain and enhancing stability through customized seating adjustments with the Vicair Active O2 9cm

Background

This clinical case report describes the seating assessment and intervention of Noa, a wheelchair user with a partial spinal cord injury at the T3 level. In addition, she underwent spinal fixation from T2 to T7, resulting in reduced thoracic mobility and influencing her seated posture. For her daily mobility, Noa uses an RGK custom-made manual wheelchair with an ergonomic seat and a Vicair Active O2 wheelchair cushion. She transfers independently using a transfer board and leads an active and independent lifestyle.

As an expert by experience, Noa is closely involved in the spinal cord injury community. She serves as Board Member Communications for the Dutch Spinal Cord Injury Organization (Dwarslaesie Organisatie Nederland, DON) and actively promotes sports participation for people with disabilities. Handcycling plays an important role in her life, and maintaining an optimal sitting position is essential to support both her daily activities and sporting ambitions.

Over time, Noa started experiencing increasing discomfort while seated in her wheelchair. She reported recurring neck, shoulder and lower back pain, particularly towards the end of the day when fatigue increased. She also noticed that maintaining an upright sitting position required frequent repositioning throughout the day.

To better understand the cause of these complaints and optimize her seating position, a comprehensive seating assessment was performed.

The problem

The seating assessment revealed several postural asymmetries that affected both comfort and function. While seated in her wheelchair, Noa presented with a left-sided pelvic obliquity, pelvic rotation and a mild scoliosis with a right-sided concavity. Her right shoulder was positioned forward and increased pressure loading was observed around the left greater trochanter and left ischial tuberosity.

The ISAS–lower rib correlation showed that the thorax was not positioned centrally over the pelvis, indicating that trunk alignment was compensating for asymmetries at pelvic level (See box C in, figure 1).

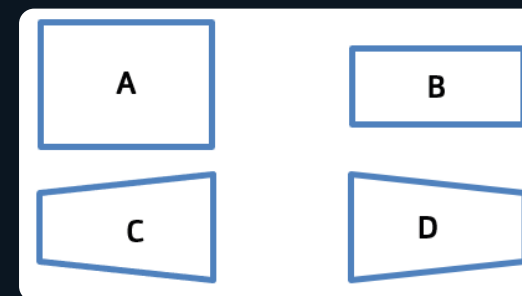


Figure 1. ISAS - lower rib correlation

These asymmetries appeared to be influenced by a combination of muscle tone imbalance, spasticity and differences in lower extremity contour. During the physical assessment in a supine position, the pelvic obliquity and scoliosis proved to be fully correctable, indicating that the asymmetries were flexible rather than fixed deformities.

The asymmetrical posture reduced sitting stability and contributed to discomfort throughout the day. Noa frequently crossed her left leg over her right leg and needed to reposition herself regularly in order to maintain comfort. As fatigue increased, she tended to collapse into a less optimal sitting posture, resulting in increased loading of the shoulders, neck and lower back.

The primary goals of the intervention were therefore to improve postural alignment, increase stability, reduce pressure around the left greater trochanter and decrease the need for frequent repositioning.



Figure 2. Old seating situation Noa

Optimizing the seating system

Following the assessment, it was concluded that improvements could be achieved by optimizing both the wheelchair cushion and the back support.

To compensate for the difference in lower extremity contour without increasing pressure underneath the left greater trochanter, the Vicair Active O2 cushion was modified according to the findings of the seating assessment (Figure 3).

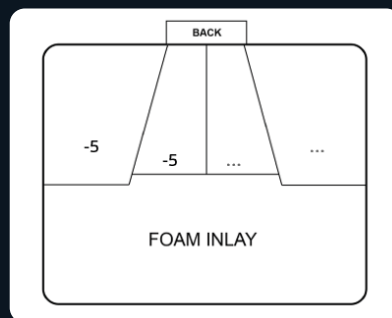


Figure 3. Changes in the filling grade of the Vicair Active O2 cushion

SmartCell distribution was adjusted to provide improved support underneath the pelvis and lower extremities while maintaining immersion and pressure redistribution. In addition, the wheelchair back support was fully adjusted to optimize pelvic support at PSIS level, as pelvic alignment forms the foundation for stable trunk positioning. By improving pelvic support, the treatment team aimed to reduce compensatory trunk movements and minimize the pressure concentration observed around the left trochanteric region.

Immediately after the adjustments, improvements in posture were visible. The ISAS – lower rib correlation improved considerably (see box A, in figure 4). Noa demonstrated a more symmetrical sitting position with improved trunk alignment and shoulder position. The modifications also resulted in better weight distribution throughout the seating system.

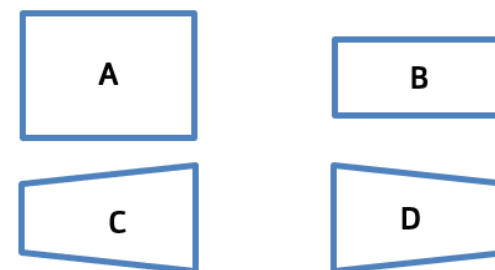


Figure 4. ISAS - lower rib correlation



Conclusion

The combination of the customized Vicair Active O2 adjustments and the optimization of the wheelchair back support resulted in a noticeable improvement in Noa’s sitting posture, comfort, pressure distribution and stability (see figure 5).



Figure 5. New seating situation Noa.

By accommodating the asymmetries in her lower extremities and providing improved pelvic support, a more neutral pelvic position was achieved. This reduced the compensatory postural deviations that had previously contributed to discomfort and fatigue.

The improved support reduced pressure underneath the left greater trochanter and created a more symmetrical sitting posture. As a result, Noa experienced less

neck, shoulder and lower back pain, even during longer days and periods of fatigue. She also reported less need to reposition herself throughout the day, resulting in reduced overloading of the upper extremities.

In addition to these clinical improvements, Noa experienced increased freedom of movement and no longer felt as though she was falling forward while seated. After a short adaptation period of two to three days, the new seating position felt natural and comfortable. Most importantly, Noa reported feeling less fatigued and was highly satisfied with the outcome. She indicated that she would not want to return to her previous seating configuration.

This case demonstrates how a comprehensive seating assessment, combined with targeted wheelchair cushion and back support adjustments, can significantly improve posture, pressure distribution, comfort and function in an active wheelchair user.

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