

Assessing the effectiveness of the **Matrix MAC** with complex rehab cases.

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CASE

Identifying solutions of a seating system to provide necessary and appropriate skin protection, postural support, and stability for function (seat, back and foot support)



ASSESSMENT IN CURRENT SEATING SYSTEM

Pelvic Position:

- rotation: left (left forward) +
- obliquity: right (low) +
- tilt: posterior +++

Seating Footprint (contact and loading areas):

- sacrum +++
- thoracic spine +++
- postero-lateral ribs +
- ischial tuberosities ++
- proximal femur +
- feet ++



ASSESSING IN SUPINE

Pelvic Position:

- limited mobility
- rotation: left (left forward)
- obliquity: right (right low)
- tilt: posterior

Spine mobility:

- limited thoracic mobility
- limited lumbar mobility (kyphosis)
- hip mobility: flexion dx 0-80° non-reducible, sn 0-70° non-reducible, abd-add limited mobility knee-feet: full mobility
- spasticity pattern in extension



METHODOLOGY

Data Collection:

age + SCI + ASIA + LDP

Case criteria in current seating system:

- high potential for friction and shear
- not possible to detach the trunk from the backrest
- able to sit with no upper extremity loading/support

We identified a highly adjustable wheelchair with correct user measurements and a comfortable and preventive cushion. We chose to try the Matrix MAC back, given the complex posture and constrains.

Once the backrest's inclination was adjusted to accommodate the limited hip's and pelvis range of motion, the laterals were adjusted to match the curves of the trunk. A further adjustment to the position of the lateral was useful to allow greater freedom of movement to the upper limbs. Even if the load on the PSIS is low, the column is

comfortably supported and welcomed in the foam. Although the asymmetry of the trunk seems not severe, it is little reducible.

Given the high load of the thoracic spine on the backrest, we placed the HUG backrest with medium lateral in the same positions: although the user perceives more comfort, he prefers the Matrix MAC back for the more intense support to the column by the Matrix MAC back foam.

OBSERVED RESULTS

The first sensation reported by the user was the improvement of chest mobility and the reduction of respiratory fatigue. **(pic. 1)** the kyphotic curve appears reduced with consequent opening of the thoracic cage, in particular at the xiphoid process level. Further observations include:

- Improvement of breathing (reduced fatigue)
- Significant increase in comfort and trunk support **(pic. 2)**
- More balance **(pic. 3)**
- Reduction of pain (cervical spine)
- Effortless self-propulsion indoor **(pic. 4)**
- Better load distribution



PIC. 1



PIC. 2



PIC. 3



PIC. 4

CONCLUSIONS

The user has different and complex clinical and postural constraints, so the identification of a single back on a theoretical basis was not predictable.

- 1 By using a single back, it was possible to test the customization and positioning of the lateral until effective support was achieved.
- 2 The Matrx MAC back has simplified the process of identifying good posture.
- 3 The Matrx MAC back will be able to adjust to further changes in the clinical evolution of the user.