

Meet David

Matrx® MX2 Case Study

David is 37 and lives with his girlfriend in Den Haag in the Netherlands. At the age of 33 he was diagnosed with Ehlers-Danlos Syndrome. His condition has meant that over the years he's become increasingly dependent upon a wheelchair for mobility, although currently he's still able to walk short distances.

David takes a keen interest in the different products (seat cushions and back supports) available on the market. He makes short equipment review videos, in which he lists, from his perspective, equipment pros and cons, in a bid to increase both his own and other wheelchair users' product awareness, to help when making equipment choices. In his spare time, he enjoys travelling around Europe and handbiking.

David contacted Invacare, seeking to trial the Invacare Matrx Libra cushion. He met with Rhona Moot, Invacare's Clinical Specialist, to discuss his needs.

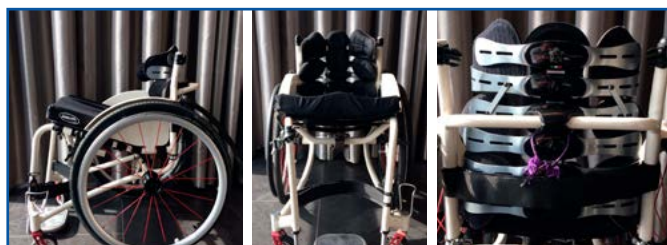


Figure 1 - Current products used by David

David owns a privately purchased Oracing manual, custom made wheelchair, which has an ergoseat. He currently uses an Invacare Flotech Image cushion, combined with a Tarta back support, both of which he was given to trial.

He states that he likes the cushion, however, he indicates it's the wrong size for his wheelchair as it's a loan cushion and that it feels hard, lacks shock absorbency and has started to sag, not giving him the postural stability he needs. He also advises that

the fluid has a tendency to flow over the rear edge of the cushion, leaving him with nothing under his buttock where he's prone to skin breakdown.

Finding a suitable, adjustable cushion with proper protection for a wheelchair with an ergoseat is not easy.

Although he currently has no skin issues, David reports that he has had marking and redness under his ischial tuberosities (IT's) in the past.

David feels that the Tarta Backrest gives him good support, especially laterally around his lower rib cage, but he finds the foam pads too firm and that the back lacks flexibility. Skin integrity is a real issue for David, his skin marks quickly, and the pads on the Tarta have caused bruising and skin sensitivity in the short time that he's had the backrest on trial. David has noticed this worsens when he uses his handbike and thinks this is because of the postural position he adopts, limiting his activity tolerance. Previously, David was a keen cyclist, covering on average 100km a day. He would really love to be able to increase the distance he can cover with his handbike.

David has trialled a number of other back supports and cushions. His first wheelchair came fitted with a tension adjustable back support and a standard 5 cm (2") foam cushion, but neither proved appropriate. The cushion caused him pain and the back support scraped and bruised his skin. Next, he tried another foam cushion, which combined two types of foam, however, this didn't make a difference either. He then trialled a low profile Roho cushion which he bought second hand. This he remarked was better than the first cushion, but didn't provide enough shock absorbency outdoors, leading to lower back pain. He then trialled

a Roho Quattro high profile cushion. This was an improvement to the low profile Roho, but it still didn't provide him with enough shock absorbency, further aggravating his back problems. David describes how his overall sitting position deteriorated on the Roho Quattro, making him feel really unstable. "I felt as though I was sitting on a giant, mostly deflated balloon". After this, David bought a second hand Tempur pedic memory foam wheelchair seat cushion. This he initially used on top of the standard foam cushion, which give slight improvement, and he then used it on top of the low profile Roho, which in his words gave "quite an improvement", however he found the foam too heat sensitive, especially in the winter and the overall height of the cushion, when combined with the Roho, left him feeling like he was "balancing on top of the chair instead of being held in it". This long history shows that an assessment with a wheelchair therapist would have saved David a lot of time and discomfort in his bid to find the right equipment solution.

David's symptoms include chronic fatigue and chronic pain, meaning that he is only active for around two hours a day. Any longer and he suffers a 'backlash', which can put him out of action for anywhere between three days and a week. Increased activity directly affects his joint pain although medication does help. David reports that climate also affects his joints. Warmer weather means less pain, so he and his girlfriend describe how they've adapted their wheelchair van into a 'rolling hotel room', enabling them to combine their love of travelling with taking advantage of warmer weather in other countries to relieve David's joint pain.



Figure 2 - Matrx Libra special design features

After discussing David's needs and explaining the design features of the Matrx Libra, both parties agreed that the Libra would likely be a good solution, given its positioning and skin protection qualities. The shape and contour of the Libra would keep the fluid in place, especially due to the rear cushion radius.



Figure 3 - Matrx Libra review and Matrx MX2 backrest fit

David was also keen to try the MX2 back support that Rhona had brought along. This would offer David more flexibility owing to the carbon fibre layers, as well as more suspension and shock absorbency, all of which he seems to be missing from his current back support.

Although David has no current postural problems, he exhibits postural collapse at his trunk when sitting in his current seating system.



Figure 4 - David's posture comparison between seating systems (lateral view); right picture shows a combination of Matrix Libra cushion with Matrix MX2 backrest.

In Figure 4 it is possible to see a major improvement on David's posture, by using the combination of the Matrix Libra cushion and Matrix MX2 back (picture on the right). David sits more upright - no more wrinkles on the shirt - and shows better head positioning - head over shoulders, over pelvis. This was accomplished because we were able to reduce the abnormal thoracic kyphosis.

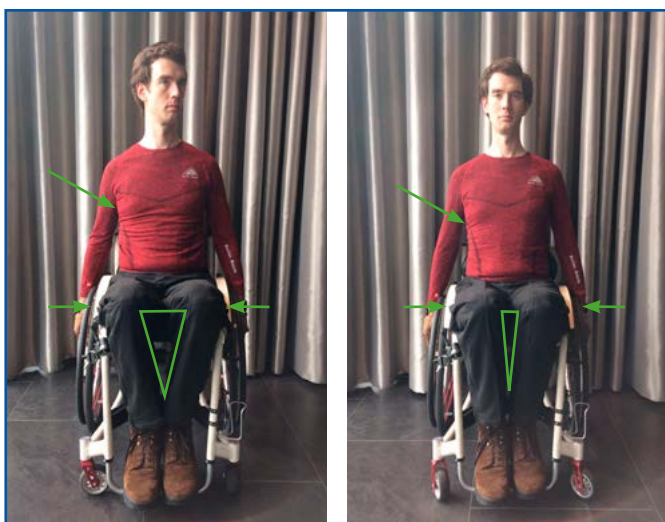


Figure 5 - David's posture comparison between seating systems (front view); right picture shows a combination of Matrix Libra cushion with Matrix MX2 backrest.

Using the same reference points, Figure 5, right picture, shows an interesting improvement in trunk extension - no evidence of postural collapse. This means a positive impact in the physiological functions, as well as reducing the intervertebral disc pressure. Despite the improvement, it is still noticeable that his right shoulder appears lower than his left.

In a bid to correct David's shoulder alignment a fluid sac was placed onto the left trochanteric shelf of the Libra, however, David didn't tolerate this well, so it was removed. Also in Figure 4, left side, we observe that David's hips abduct slightly, likely as a result of his height causing his lower leg position to be just off midline. David agrees he has the feeling he wants to bring his legs closer together. A few tests were undertaken in order to make David feel more comfortable.

Firstly, lateral wedges were placed under the base of the Matrix Libra cushion as seen in Figure 6. However, this proved too aggressive for David's needs.

Secondly, smaller tapered wedges were placed at the rear of the cushion (Figure 7), but again, David felt this input was also too aggressive.



Figure 6 - Matrix Libra cushion with side wedges



Figure 7 - Matrix Libra with tapered wedges

Finally, the decision was to cut the tapered wedges to approximately half their existing size. Being smaller, the positioning input was smoother and when sitting back on the cushion, David immediately reported an improvement in both his comfort and position. His leg position is visibly improved, as the wedges have created just the right amount of adduction needed to encourage his lower limbs back into midline. Customising the tapered wedges appeared to have worked effectively to correct David's lower leg position, as seen in Figure 8, and also improved his shoulder alignment.



Figure 8 - Differences between shoulder alignment and legs position (front view); right picture shows combination of Matrix Libra cushion with Matrix MX2 backrest.

After this meeting, David and his girlfriend left for a holiday. A few weeks ago, we made contact to see how he'd been getting on and this is what he wrote.

“The back support and the cushion are fantastic, better than expected! With the earlier combination, I had back pain after longer or more continuous use of my wheelchair, however, with the MX2 and Libra cushion, this is gone. I can definitely say that without this configuration on my chair this trip would not have been possible”.