Improving Yaoki’s Body Symmetry with the Leckey Sleepform System

Yaoki is from Nagoya in Japan. We first met him in May 2009, at the Kajita Children’s Rehabilitation Clinic, where we assessed him using Sleepform. His rehabilitation team was impressed with the positioning achieved and decided to undertake a case history to monitor Yaoki’s progress. The case history was led by Mr Akihiro Suzuki at the Rehabilitation Clinic, along with partners at Seijyo University, and of course, Yaoki and his parents. It took a while to get Yaoki’s Sleepform in place, but this is their story one year on.

Clinical Background

At the time of initial assessment, Yaoki was 6 years old. As a result of acute encephalopathy Yaoki’s development is delayed and he has high tone in his trunk and low tone in his limbs. He scores level V (the most severely affected) on the Gross Motor Function Classification Scale (GMFCS). He is dependent for all his daily needs and is unable to communicate verbally.

Physical Assessment

Yaoki has joint contractures with limited hip extension and abduction, knee extension, and also has a kyphotic spine. As a result he finds it unstable and uncomfortable to lie on his back for any length of time. He prefers to turn onto his left side, and this is also his preferred sleeping posture. Yaoki’s parents describe him as being tense all the time – they feel this is to try to keep his body stable – but he finds it hard to relax, and therefore difficult to stay asleep – he wakens up many times crying. His sleeping posture has to be changed 4 or 5 times every night.
Approach

After Yaoki’s posture evaluation, the Sleepform was set up for him. The Xsensor pressure mapping system was also used to help with the moulding process. This map taken in supine (on his back) before using Sleepform shows the majority of pressure asymmetrically between Yaoki’s right shoulder and his sacrum.

This map taken in supine using the Sleepform mattress shows a much more even distribution of pressure.

Yaoki’s parents and clinical team also recorded how many times he wakened during the night and how often he had to be re-positioned. Every two months his range of movement was measured, photographs taken, and x-rays monitored the development of his spine.

Outcomes

Range of movement and measurements of chest and distance between acromion and anterior superior iliac spine

<table>
<thead>
<tr>
<th></th>
<th>Start</th>
<th>2 months</th>
<th>4 months</th>
<th>6 months</th>
<th>10 months</th>
<th>12 months</th>
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<tbody>
<tr>
<td><strong>Hip Ext</strong></td>
<td>R / L</td>
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<td>10° -15°</td>
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<td><strong>Hip Abd</strong></td>
<td>5° 0°</td>
<td>10° 10°</td>
<td>15° 10°</td>
<td>15° 10°</td>
<td>20° 15°</td>
<td>15° 10°</td>
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<tr>
<td><strong>Xiphoid process to side of trunk (cm)</strong></td>
<td>8 9.5</td>
<td>8.5 9</td>
<td>9 10</td>
<td>10 10</td>
<td>10 10</td>
<td>10.5 10.5</td>
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<tr>
<td><strong>R acromion – R ASIS</strong></td>
<td>30cm</td>
<td>30cm</td>
<td>30cm</td>
<td>30cm</td>
<td>32cm</td>
<td>32.5cm</td>
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<tr>
<td><strong>L acromion – L ASIS</strong></td>
<td>28cm</td>
<td>28.5cm</td>
<td>29cm</td>
<td>30cm</td>
<td>32cm</td>
<td>32.5cm</td>
</tr>
<tr>
<td><strong>R acromion – L ASIS</strong></td>
<td>36cm</td>
<td>36cm</td>
<td>36cm</td>
<td>36cm</td>
<td>39cm</td>
<td>40cm</td>
</tr>
<tr>
<td><strong>L acromion – R ASIS</strong></td>
<td>35cm</td>
<td>35.5cm</td>
<td>35.5cm</td>
<td>36cm</td>
<td>39cm</td>
<td>40cm</td>
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</table>
X-Rays

At 2 months post-intervention, the excessive curves of the thoracic and lumbar regions can be seen.

Ten months later this is less marked, particularly in the lumbar region.

At 12 months post-intervention, the change in spinal shape is sustained.

Frequency of position changes during night from 10pm to 8am

The graph shows a downward trend in the number of occasions that Yaoki needs repositioned. There have been many nights where, he has not needed to be readjusted at all, especially between the hours of 1am and 7am, indicating better duration and therefore quality of sleep.
Frequency of wakening at night between 10pm and 8am

Again, the graph shows a downward trend in the frequency of wakening, with many nights having no wakening or only one wakening episode.

Conclusions from the Japanese team

- Sleepform can adapt with changing postures and changing body shape to continuously manage overall posture
- Yaoki is able to hold a supine position for longer than before, even without Sleepform
- Sleepform improved Yaoki’s posture
- His tone is reduced, enabling him to sleep for longer
- His parents slept more too

At the start                      2 months           4 months   6 months    8 months   10 months   12 months