

EVALUATION OF SEATING IN SADDLE SEATS FOR CHILDREN WITH SPECIAL NEEDS

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Seating problems in children with movement disorders requires individual adjustment, careful choice of device, trial and adaptation to the child's needs. When we see children sitting in a position with limited possibility to control the trunk, head and arms it is time to act.

The non-functional position can be:

- The pelvis tilted backward
- Hips adducted
- The feet placed in front of the knee
- Thoracic spine with an increased kyphosis and cervical spine with an increased lordosis
- Head not in midline
- Trunk asymmetrical
- Arms effected by pathological patterns

Research has shown that a functional seating option in activity is a position with:

- Neutral pelvis and open angle of the hip joint
- Slightly abducted hips
- The feet positioned under or just behind the knee
- Trunk in a good posture and free to move in different directions [1]

The background to this project has its beginning in 2005 when two engineers in Norway started to seek a technical solution to make it easier for children to sit in this functional posture. One of the engineers had a son with cerebral palsy and he sought for functional chairs and wheelchairs. He didn't find what he was looking for. Search for literature, research and conversations with experienced therapists led them to saddle sitting but there were no existing product meeting the requirements. The development of the Krabat Jockey saddle seat started.

Over the years of product development and trials, the development team searched for evaluation instruments and concluded that the Posture and Postural Ability Scale (PPAS) was the most relevant. PPAS is a further development of the Postural Ability Scale, developed by physiotherapist Pauline Pope in the 1990s [2]. The scale has its origin from the Chailey Levels of Availability and Physical Ability Scale [3]. The PPAS showed an excellent interrater reliability for experienced raters, a high internal consistency and construct validity [4,5].

PPAS contains a 7-point ordinal scale for postural ability in supine, prone, sitting and standing, and items for assessment of posture. In our evaluations, we used the part designed for assessment of sitting in frontal and sagittal view. The scale is originally designed to assess the child sitting on a bench with support for the feet, however we have used the scale to compare the posture seated in a traditional chair with the posture seated in a saddle chair. In saddle sitting the child gets an open angle of the hip joint and the legs are slightly abducted, while in a traditional chair hips are about 90 degrees, and legs straight in relation to the pelvis. The aim was to evaluate how the position of the

hips effect the body. Our experience was that with the saddle seat we are able to prevent seating problems like thoracic spine with an increased kyphosis and cervical spine with an increased lordosis, head not in midline, trunk asymmetrical, arms effected by pathological patterns which will all lead to increased function, pain and high risk of developing deformities.

Over the years, we have personally observed and evaluated many children for their seating and positioning needs. We firmly believe that in the absence of respecting the hips, many children are presenting in their more traditional type seating with compromised postures leading to respiratory and GI complications. Saddle seating is an excellent alternative type seating that can help us to “take the work out of sitting” for some of these children. However, there is always a need for a tool to show if the saddle seat is beneficial for the individual.

We have found that the Posture and Postural Ability Scale (PPAS) is a great tool for evaluating children using new products. We aim to give children with movement disorders the best opportunity for development and independence. In some cases economics seem to be an obstacle for choosing and prescribing the most useful technical solution. By using this scale, we hope to be able to show the difference and value of finding the best solution for every child.

We have evaluated children with seating abilities varying from level one to seven and documented them with both photos and videos. We will present several cases during our lesson. One of them is eleven-year-old Felix with Down syndrome. He scored a level seven of postural ability in sitting because of his ability to move into and out of position on his own. Felix’ PPAS scores shows he would clearly benefit from sitting on a saddle seat rather than a flat seat.

	POSTURAL ABILITY, SITTING	
Level 1	Unplaceable in an aligned posture	
Level 2	Placeable in an aligned posture but needs support	
Level 3	Able to maintain position when placed but cannot move	
Level 4	Able to initiate flexion/extension of trunk	
Level 5	Able to transfer weight laterally and regain posture	
Level 6	Able to move out of position	
Level 7	Able to move into and out of position	X



Quality of posture, frontal view (Yes = 1 point, No = 0 points)	
NORMAL CHAIR	
Head midline	1
Trunk symmetrical	0
Pelvis neutral	0
Legs separated and straight relative to pelvis	1
Arms resting by side	1
Weight evenly distributed	0
Total score	3



Quality of posture, sagittal view (Yes = 1 point, No = 0 points)	
NORMAL CHAIR	
Head midline	0
Trunk in neutral position	0
Pelvis neutral	0
Hips mid-position (90°)	1
Knees mid position (90°)	1
Feet mid position, flat on floor	1
Total score	3



Quality of posture, frontal view (Yes = 1 point, No = 0 points)	
SADDLE SEAT	
Head midline	1
Trunk symmetrical	1
Pelvis neutral	1
Legs separated and straight relative to pelvis	0
Arms resting by side	1
Weight evenly distributed	1
Total score	5



Quality of posture, sagittal view (Yes = 1 point, No = 0 points)	
SADDLE SEAT	
Head midline	1
Trunk in neutral position	1
Pelvis neutral	0
Hips mid-position (90°)	0
Knees mid position (90°)	1
Feet mid position, flat on floor	1
Total score	4

References

- [1] Myhr, U. and Wendt, L. *Improvement of functional sitting position for children with cerebral palsy*. *Developmental Medicine & Child Neurology*, 1991, 33.3: 246-256.
- [2] Pope, P.M. *Severe and complex neurological disability; management of the physical condition*. Edinburgh: Butterworth-Heinemann/Elsevier, 2007.
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- [4] Rodby-Bousquet, E., Persson-Bunke, M., and Czuba, T. *Psychometric evaluation of the Posture and Postural Ability Scale for children with cerebral palsy*. *Clinical Rehabilitation* 2015, June 30th.
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