Dynamic Constraint-Induced Movement Therapy for children with hemiplegic cerebral palsy: case- report of a new type of restraint

L. Vuilleumier[a], A. Vuilleumier[a], C. Holenweg-Gross[b], C.J. Newman[b]

[a]Occupational Therapy Centre, Lausanne, Switzerland

[b]Paediatric Neurorehabilitation Unit, Lausanne University Hospital, Switzerland

Conclusion:

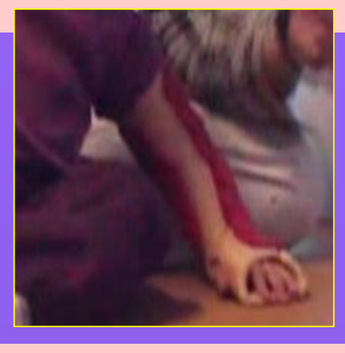
The use of a dynamic constraint is less restricting for the hemiplegic child. He experiments better motor patterns that generate accurate proprioceptive and tactile feedbacks, therefore avoiding compensatory movements and facilitating the use of the plegic hand.

Background:

Recently, several groups have developed child-friendly versions of Constraint-Induced Movement Therapy (CIMT). Considerations about the type of restraint were limited to the need of an equipment sufficiently restrictive to prevent it's use as an assist but still acceptable for the child. Adverse effect of the constraint itself on the dynamic posture of the trunk and hence on the use of the plegic hand has not been discussed yet.

Objective:

This is a case report of a new type of constraint, based on the Bobath approach, using a dynamic orthosis. It's goal is to facilitate pelvic movements and optimal trunk position, which leads to a stable posture of the healthy side and thus enhances the functionality of the plegic upper limb.



Result:

This splint was used in three children who participate in a CIMT program. It was well tolerated. Activities performed without constraint, with two standard constraints and with the dynamic orthosis were filmed. The child had to insert a ring over a stick placed 40 cm away from him on both sides.

Analysis of the video recordings show that our dynamic orthosis provides a more stable posture and improved tonic regulation of the trunk and upper limbs. Compensatory movement were lesser. The children could develop a good support and good stability and improved capture.

Materials and method: Through observation of children working with their plegic arm, we defined the optimal position of the healthy arm that leads to a good anteversion-retroversion pelvic position and decreases excessive weight-bearing and incorrect tonic regulation.

The stability and the compensatory movements of the elbow and the wrist on the normal arm has to be tested to choose how to stabilise this segment (hand-wrist or hand-wrist and elbow).

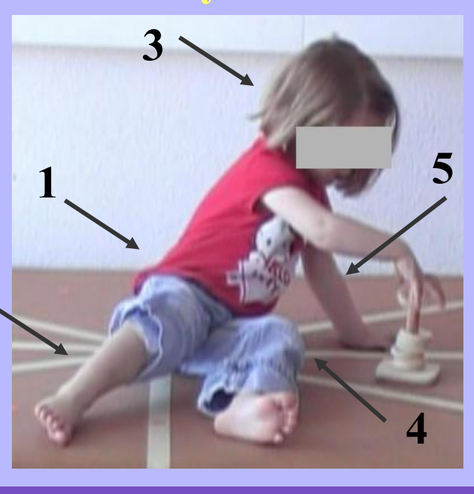
A soft static Plastazote© orthosis was moulded on the child to maintain this position.

The orthosis limits extension but allows flexion of the elbow. A palm support was added. It is closed by Velcro© strips, which allow donning and doffing.

35° elbow flexion, 50° wrist extension, 10° lateral flexion (radial), 30° forearm pronation, 10° MP flexion

IP extension

Figure 1: Activity without orthosis



1 Adequate central tonic regulation

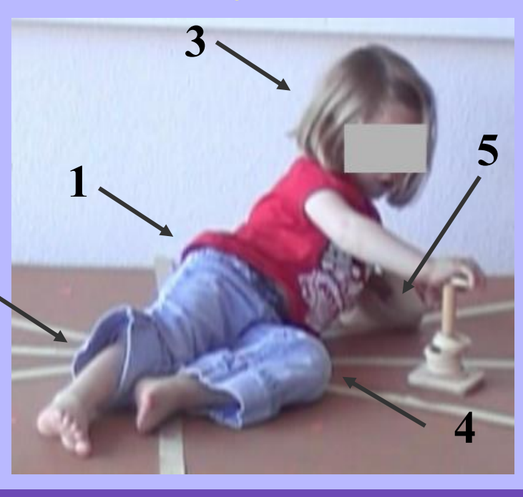
2 Normal balance reaction of the leg

3 Normal balance reaction of the head

4 Stable support of the hip

5 Stable support of the arm

Figure 2: Activity with a scarf



1 Lack of central tonic regulation

2 Anormal balance reaction of the leg

3 Exagerated balance reaction of the head

4 Fixing support of the hip

5 Fixing support of the arm

Figure 3: Activity with a glove

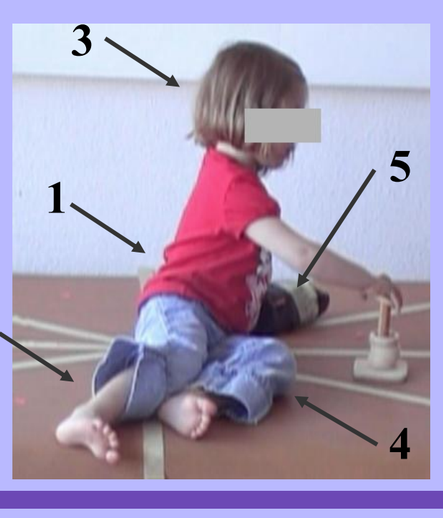


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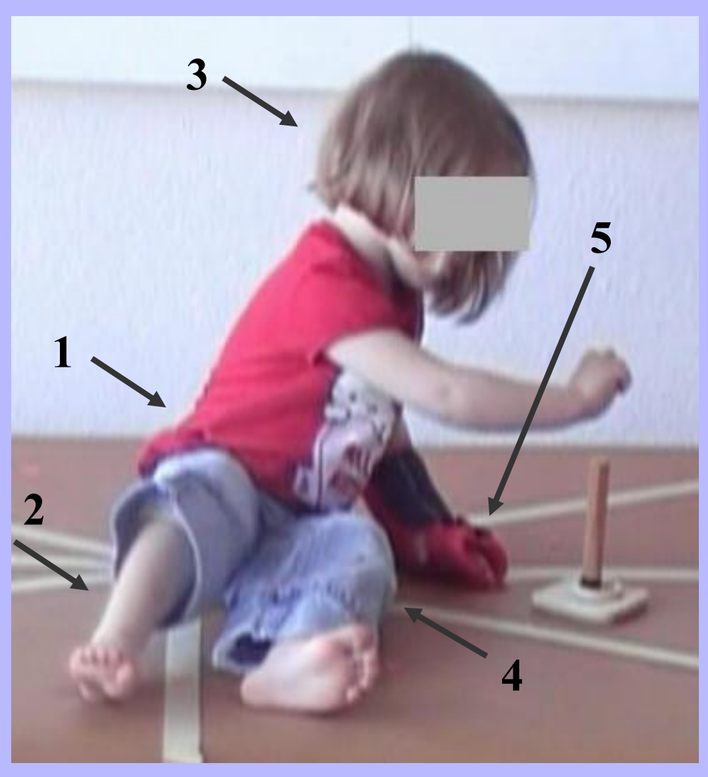
Figure 4: Activity with the dynamic constraint orthosis



1 Adequate central tonic regulation

2 Normal balance reaction of the leg

3 Normal balance reaction of the head

4 Stable support of the hip

5 Stable support of the arm

6 Better use of the plegic hand during the activities

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