Adapting the physical environment for independent sitting

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Each therapy encounter is an opportunity to provide the infant or child with the very best possible environment to foster learning from experience and thereby promote function and participation, as well as confidence in their own abilities, willingness to persist and to figure things out for themselves.

This means that as therapists we need to keep in mind the complex set of factors that influence the child's ability to participate in any activities or tasks included in the therapy session.

The child-task-environment model of motor behaviour and performance allows therapists to consider, in a systematic manner, all factors that affect a child's ability to perform a task. I am sure that nobody will dispute the value of the model as a basis for understanding the complexities of task performance.

What is not always appreciated is that **small changes in the nature of the task or the physical and social environment can have a large negative or positive impact** of the child's ability to perform a task successfully, learn from experience and be motivated to take on new challenges.

This means that when designing training tasks, every aspect of the task needs to be considered and adapted every aspect of the task needs o be considered and adapted.

Jacob works on trunk stability, balance and ball skills

Jacob (6 years), sits with a very flexed posture. Although he can sit erect when instructed to do so, he has difficulty maintaining trunk extension for more than a few seconds. His lateral balance is also poor when sitting without support, and tends to fall to the side when he lifts one hand to reach forwards or to the side.

There are three issues here:

- The ability to stabilize the head in space. Maintaining the trunk erect requires sustained action in the neck and spine extensors.
- The ability to anticipate and adapt to perturbations that arise as soon as the UEs are moved.
- The ability to adapt head and trunk alignment to maintain balance when the UE are moved.

Changing the environment

For the first activity I let Jacob sit on a bench with a waist high foam behind him and one on either side. The blocks are positioned parallel to, and a 3 cm, away from his pelvis and thighs.

With his hands resting on the raised surfaces on each side, he is able to stay sitting erect and even maintain his balance when lifting one hand.

If he does lose his balance to the side, the foam blocks mean that he does not fall very far and he is able to right himself again without help.

Simon says

Now, **here is the important bit**: finding activities that will motivate the child and encourage sustained trunk extension with a stable head, especially when moving the UEs

I want to give Jacob an opportunity to practice sitting erect using just one hand lightly resting on the raised surface of the block while moving the other hand in different directions.

So we play a game of Simon Says. In order to encourage Jacob to stabilize his head, the game is played with a beanbag on his head. I also sit opposite him and use an animated voice and face to keep him engaged and interested in looking at me as we play the game. This sustained visual attention also helps him to maintain a stable head.

Jacob starts the game, tentatively lifting one hand up a little way, then becomes more adventurous. Reaching his hand up to shoulder level he loses his balance, but his fall is stopped by the block and he is able to sit up straight again without assistance.

We play the game for 10 minutes, starting with slow movements, sometimes lifting both hands, then progress to faster actions but lifting only one hand at a time.

Throwing a ball hard and far

Ball games are usually a great motivator. I want a game that provides a just-right challenge to the postural system and keeps Jacob motivated.

Jacob and I, after some discussion settle on a ball game where he throws a ball as hard and as far as he can. He is a little nervous about losing his ballance, so I move the blocks up against his thighs to provide extra stability.

Throwing a ball provides an extra challenge to Jacob's head and trunk stability.

- Lifting the hand up above his head in preparation for the throwing action requires **anticipatory activation of the neck and trunk flexors.**
- Then the rapid forwards movement of the hand as shoulder and elbow extends in **the throwing action, perturbs the trunk in an anterior direction,** requiring a rapid and adequate increase in the trunk and neck extensor muscles to control neck and trunk flexion.

Jacob selects 5 balls from my basket of balls, and we place them on the block to his right.

I position a length of rope meter away to act as a target. I encourage Jacob to visually fix on the rope, before he initiates the throwing action. This helps him to adapt his actions the the goal.

After a few throws we decide that this is too easy, and I move the rope further away. Now he has to lift his hand higher and throw harder in order to propel the ball further and reach his new and more challenging target.

Jacob practices this activity for 10 minutes, completing 25 throws and managing to throw over the rope moved 3 meters away.

What Jacob has learned

- Jacob has learned to maintain an upright sitting posture while moving his arms slowly.
- He has learned to use light support on one hand to improve his balance.
- He is more confident sitting without support and is willing to challenge his balance.
- When provided with some lateral support around the pelvis, Jacob has learned to keep his head and trunk stable when throwing a ball "hard and far".
- His trunk extensor muscles have also been loaded over an extended period of time.

What next

Progressively adapting the physical environment to provide less support and coupling this with activities that challenge Jacob's stability and balance at each level of support will allow Jacob to improve his sitting stability, balance and stamina.

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