

Dynamic Cervical Orthosis

A Case Study

// Introduction

The patient was born full term. She was 6 pounds 12 ounces and 19 ½ inches long. She left the hospital with mom two days after delivery. Prenatal history included nicotine use. An MRI had findings of periventricular leukomalacia. She had a negative genetic workup. Additional diagnoses included dystonia, esotropia, strabismus, dysphasia and reflux. She was placed on baclofen at age 1 year.

She started physical therapy at 14 months. She received aquatic therapy, physical therapy and vision therapy at home. During that time, no major gross motor skill gains were made and other interventions were considered. She was unable to roll or sit and had significant head lag with pull to sit and poor head control in any position. Her eyes were closed in any upright position. In side-lying, with her head supported, she would open her eyes and track objects.

At this time, it was determined that she needed head support in sitting to work on endurance and visual spatial, cognitive and social skills in a seated position. A Surestep Dynamic Cervical Orthosis (DCO) was used to facilitate external head support and control. The DCO was a good fit for her size and for the fact that it did not require an external chair for use.

// Method

She utilized the DCO in her home daily for four weeks. Wear time ranged between 20 and 45 minutes per session. Her caregiver reported that during these sessions, she also worked on focused attention and play. This should be taken into consideration when looking at her fatigue levels.



Figure 1. Surestep Dynamic Cervical Orthosis (DCO) The Surestep DCO was developed for patients with mild to moderate head ptosis (head drop). It is a low profile device that encourages neck extension to promote a more upright posture. It utilizes elastic tension bands to provide dynamic support of the head and neck.



Figure 2. Day one trial of DCO. She is able to pull out of her asymmetrical tonic neck reflex (ATNR) at times. Amount of eye opening is typical for her in this position.



Figure 3. After two weeks of DCO trial. Her hands are together with decreased ATNR. Her eyes were wide open but she would close them with the flash each time.

Results

	PRIOR TO USE	AFTER 2 WEEKS OF USE	AFTER 4 WEEKS OF USE
RANGE OF MOTION	Pectoral muscle protracted bilaterally.		Range increased to neutral, easier passive range of motion into protraction.
SITTING	Would sit with bilateral upper extremity pedi wraps donned and placed in sitting position with tactile cues at upper lip for motivation to lift into midline. She could hold position with constant tactile cues for ten seconds prior to loss of balance or head falling into flexion.	She would sit with bilateral upper extremity pedi wraps donned and placed in sitting position with maximum assistance at mid-trunk. With DCO and pedi wraps, she would bring her head up independently and hold for 10 seconds.	She would prop sit independently when placed for 5 seconds.
EYES/HEAD CONTROL	Would open eyes majority of the time when in side-lying or with head supported. She would hold her head in midline for 2 seconds.		Would keep eyes open in supported sitting with improved tracking. She would hold her head in midline for 5 seconds.
GROSS MOTOR	Would roll side to side but not completely into side-lying.		Would roll from supine to side-lying and almost into prone but is unable to clear arm to complete skill.
ENDURANCE		Would tolerate up to 20 minutes with DCO on in focused play.	Would tolerate 30-45 minutes with DCO on in focused play.



Figure 4. After four weeks of DCO trial. Placed in prop sitting. Her eyes are all the way open. She is tracking objects and pushing through her upper extremities for support.



Figure 5. Week four of DCO trial.



Figure 6. Week four of DCO trial. She will hold her head up in midline for a maximum of five seconds prior to falling back into partial extension.



Figure 7. After four weeks of DCO trial. This is her fall back into extension now. She is able to recover from this position and bring herself back to midline without falling into excessive flexion.