
Tutorial on the Treatment of the Upper Extremity Dysfunction in Hemiplegia

Tutorial on the Treatment of the Upper Extremity in Hemiplegic Cerebral Palsy: Preoperative Evaluation

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Case Study

LA is a 14-year-old female with right hemiplegic CP secondary to presumed in utero frontoparietal stroke. She is left-hand dominant and uses her right hand as a post for holding things whilst predominantly using her left hand. She can use her right hand to open doors but wishes to be able to perform grasping activities, including holding a cup and holding a comb to brush her hair. She has previously had Botox into the right upper extremity (pronator teres, FCU, brachialis, adductor pollicis), most recently in January 2020, with moderate improvement. She has actively participated in OT and stretching. She is interested in surgical rebalancing. She is eager to participate in her postoperative rehabilitation.

In-office examination shows the patient has slow but present selective motor control. She is able to open and close her hand without mirroring however uses mirroring at times to achieve tasks. Her thumb postures between her index and middle fingers and primarily has adductor spasticity. She has a decreased first webspace with thumb metacarpophalangeal joint hyperextension of 90 degrees (Figure 1).

She does not have evidence of finger or thumb flexor tendon contracture. With her fingers held in full extension her wrist 30 degrees above neutral indicating she has an Eaton angle of +30 degrees and 40 degrees of passive wrist extension with finger flexion. She has good passive radial deviation of the wrist. She extends her wrist just past neutral when asked to perform wrist extension as an isolated activity; however, this is not with use. She ulnarly deviates her wrist, especially with activities typically utilizing active wrist extension (Figure 2). It is difficult to assess if her FCU is phasic or tonically active however seems active in both flexion and extension.

Her elbow actively extends within 15 degrees of full extension, and she has full active elbow flexion. She can actively supinate to neutral but not beyond and passively lacks the terminal 15 degrees of supination (Figure 3). She has full pronation.

Preoperative Occupational Therapy Assessment

In consideration of potential single-event multilevel surgery (SEMLS) intervention, she has undergone an



Figure 1. Patient grasping objects with thumb metacarpal adduction contracture and MCP joint hyperextension.

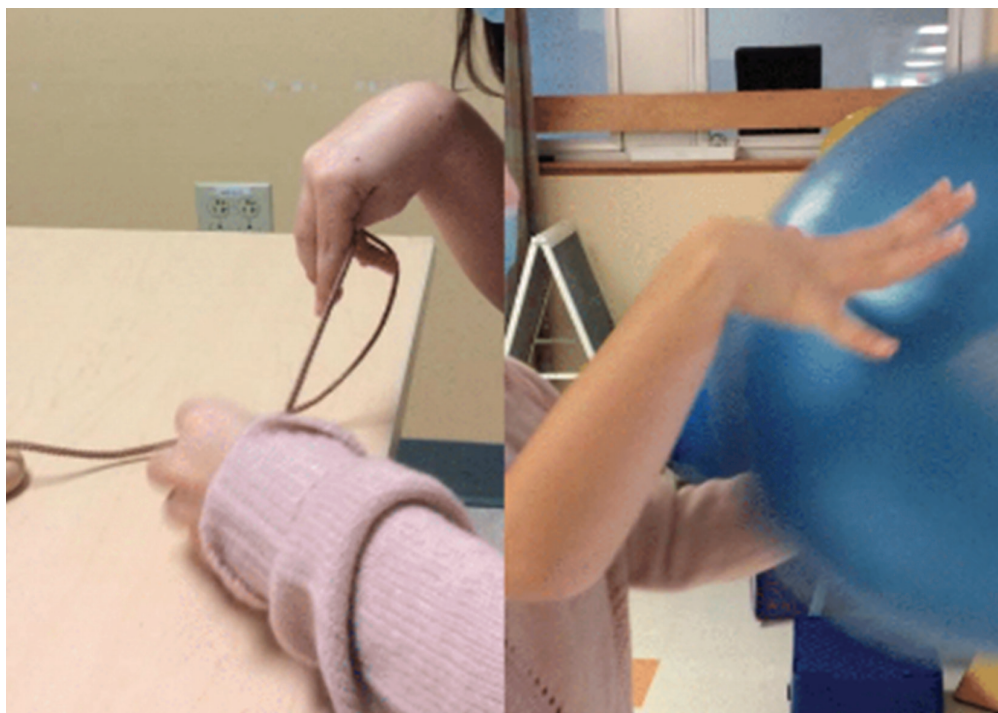


Figure 2. Wrist in marked flexion and ulnar deviation.



Figure 3. Forearm in neutral during activities requiring supination and unable to supinate to touch contralateral ear.

occupational therapy evaluation, including Shriners Hospital Upper Extremity Evaluation (SHUEE). The SHUEE is a validated video-based evaluation developed to be a standardized assessment of the hemiplegic upper extremity and help direct intervention.

She uses her right hand as an active assist for bimanual tasks.

Below, you will find the patient's SHUEE assessment. This includes the assessment scoring summary sheet (Figure 4), composite representative snapshots of each video-assessed task (Figure 5), and representative video assessments ([Preoperative Video 1](#) and [Preoperative Video 2](#)). During the assessment, she worked with her wrist in flexion and ulnar deviation, with active

finger flexion and extension with MP hyperextension and swan neck deformities. Grasping was performed with the thumb metacarpal in adduction with MP joint hyperextension, which caused difficulty with grasping large objects. The forearm operates in pronation, with a neutral forearm position for activities requiring forearm supination. The patient can grasp and release the large bead in each of the positions; however, this is only just so in the extended position and therefore either needs more length in the finger flexors if the wrist is repositioned or to use the relaxing of the tenodesis effect with wrist flexion for improved release ([Preoperative Video 3](#)).

Disclaimer

The authors have no conflicts of interest to report.

Shriners Hospital Upper Extremity Evaluation

Place X in appropriate observation

Dynamic Positional Analysis

[illegible]

Figure 4. Comprehensive SHUEE examination score sheet.



Figure 5. Static snapshots taken from SHUEE video assessment.