Hallux Valgus Surgery in Children with Cerebral Palsy: A Retrospective Comparative Analysis

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INTRODUCTION: Due to the inherent muscle imbalances in children with cerebral palsy (CP), common foot deformities such as hallux valgus can be difficult to manage. Controversy exists regarding the surgical management of hallux valgus in children with CP, with some surgeons favoring joint sparing versus fusion procedures. The purpose of this study was to investigate clinical outcomes and recurrence/reoperation rates of first metatarsal phalangeal (MTP) arthrodesis vs. corrective surgery for hallux valgus in children with CP.

METHODS: A retrospective analysis of prospectively collected data of children with CP treated surgically for hallux valgus was performed at a large academic pediatric institution from 2004 to 2022. Chart review analysis was utilized to identify demographic data, surgical details, complications, revisions, and pre- and post-operative Pediatric Outcomes Data Collection Instrument (PODCI) data. Additionally, pre-operative and post-operative gait lab analysis were utilized to obtain ground foot pressures and hallux alignment during the stance phase of gait.

RESULTS: A total of 66 patients (105 feet) were identified and included in the study. The average age was 15.1 (3-19) years with an average follow up of 4.4 (2.0-13.5) years. Thirty-two feet underwent corrective surgery for symptomatic hallux valgus, compared to 73 feet that underwent first MTP arthrodesis. There were no significant differences found between the correction and arthrodesis groups with regards to post-operative PODCI scores and ground foot pressures. The arthrodesis group demonstrated a more neutral post-operative alignment as well as greater improvement in alignment of the hallux during the stance phase (p=0.02; p=0.04, respectively). Finally, there were a total of 18 instances of recurrence that required additional surgery, all of which occurred in the correction group (56% vs 0%, p<0.001).

DISCUSSION AND CONCLUSION: With significantly lower recurrence rates, improved hallux alignment during gait and comparable functional outcome scores, surgeons should highly consider primary first MTP arthrodesis for the treatment of hallux valgus in patients with CP.

	Correction	Arthrodesis	Total
Total Patients	22	47	66
Feet	32	73	105
Sex (% male)	17 (53%)	46 (63%)	63 (60%)
Avg age at surgery (years, range)	13.7 (3-19)	15.1 (3-19)	15.1 (3-19)
Avg f/u (years, range)	6.3 (2.6-10.5)	3.4 (2.0-13.5)	4.4 (2.0-13.5)
GMFCS			
GMFCS I	3	2	5
GMFCS II	11	14	25
GMFCS III	8	12	20
GMFCS IV	6	28	34
GMFCS V	4	17	21
Associated deformities			
Planovalgus	22	43	65
Cavovarus	1	4	5
Dorsal Bunion	4	20	24

Table 1. Patient Demographics

	Correction (n=24)	Arthrodesis (n=21)	P-value
Post-Op Foot Pressure*	-7.0 (29.4)	-15.3 (47.3)	0.48
Change in Foot Pressure*	23.6 (38.6)	27.6 (64.1)	0.8
Post-Op Hallux Alignment during stance phase*	-10.8 (10.7)	3.0 (8.7)	**0.02**
Change in Hallux Alignment during stance phase*	8.5 (9.5)	16.1 (12.5)	**0.04**
Post-Op UEPF (SD)	86.4 (10.9)	87.2 (15.2)	0.85
Change in UEPF (SD)	7.5 (12.4)	7.2 (11.1)	0.95
Post-Op TBM (SD)	81.8 (16.8)	88.5 (8.6)	0.12
Change in TBM (SD)	1.2 (8.6)	3.0 (6.7)	0.46
Post-Op S&PF (SD)	40.4 (20.0)	51.2 (22.7)	0.1
Change in S&PF (SD)	0.7 (15.8)	2.0 (14.7)	0.79
Post-Op Pain (SD)	69.5 (18.4)	64.1 (25.3)	0.42
Change in Pain (SD)	-4.3 (20.4)	6.2 (32.1)	0.22
Post-Op Happy (SD)	72.7 (22.0)	81.6 (22.5)	0.2
Change in Happy (SD)	2.9 (17.2)	11.0 (24.8)	0.23
Post-Op Global (SD)	70.1 (11.6)	72.6 (11.8)	0.51
Change in Global (SD)	2.0 (9.8)	5.3 (10.2)	0.32

Table 2. Gait Lab Analysis

**Positive value indicates varus, zero indicates neutral, & negative value indicating valgus alignment*

	Correction (n=32)	Arthrodesis (n=73)	P-value
Recurrence Requiring Sx	18	0	**p<0.001**
GMFCS I	3	--	
GMFCS II	6	--	
GMFCS III	4	--	
GMFCS IV	3	--	
GMFCS V	2	--	
Removal of Hardware	0	8	
Complications	0	1*	p=0.70

Table 3. Revisions, Complications, and Reoperations

**B/L fusion patient complicated by SSI (MRSA/Pseudomonas) on left*