



EFFECT OF POSTOPERATIVE PHYSIOTHERAPY ON CHILDREN WITH SPASTIC DIPLEGIA- QUANTITATIVE ASSESSMENT

Orthopaedics

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ABSTRACT

Objectives: This study assessed the effect of physiotherapy on functional outcome following soft tissue release in children with spastic diplegia.

Material And Methods: This prospective study was conducted in Christian Medical College and Hospital, Ludhiana. A population-based sample of 50 children with spastic diplegia aged 5-15 years (mean 9.96) was taken. The children had soft tissue releases for deformity correction and gait deviations. Functional outcome was assessed using functional independence measure and functional mobility scale. Muscle spasticity was graded using modified Ashworth Scale. Outcome was assessed at 1 month, 3 months, 6 months and 12 months post operatively.

Results: Spasticity in adductor muscles of hip was less in patients who underwent regular physiotherapy postoperatively ($p = 0.049$). In other muscle groups the results were not statistically significant. Functional outcome though was better in children who underwent physiotherapy was not found to be statistically significant ($p = 0.054$).

Conclusion: There was a significant increase in muscle spasticity in children with spastic diplegia who did not undergo postoperative physiotherapy after soft tissue release. Functional outcome though affected was not significantly changed by the end of one year

KEYWORDS

Spastic diplegia, soft tissue release, functional outcome assessment, physiotherapy.

INTRODUCTION

Cerebral palsy is not a single disease entity and it is likely that different etiological factors acting at different times in fetal development are responsible for the complexity of the abnormalities that comprise the syndrome.¹ The most common movement disorder in CP is a spastic paresis, defined as a posture and movement-dependent tone regulation disorder. In a spastic diplegia patient goals of treatment are to make them ambulatory and treat associated defects².

Spasticity management requires different treatment methods throughout the childhood. For the walking child physiotherapy, walking and orthotic use can be supplemented by oral medications and botulinum toxin. Children with more severe deformity require surgery³.

In a study done by **Adrienne Harvey et al (2009)** it was seen that functional outcome had improved significantly by the end of 1 year⁴. **Dimitrios Patikas et al** in a study done on postoperative CP children showed that MAS decreased significantly at the end of six months after surgery and this change was maintained even at the end of one year⁵.

There is a notion that postoperative physiotherapy might increase spasticity⁶ which has been proven wrong in studies done by **Mac Phai et al**⁷. **Dhiren Ganjawala** in his study has proven the advantage of strengthening exercises on postoperative patients of cerebral palsy⁸. Despite proven advantage of surgery in improvement in functional outcome and muscle spasticity, the evidence to support role of postoperative physiotherapy is inadequate in developing countries where access to regular physiotherapy is not there. This study aimed at assessing effect of physiotherapy on functional outcome and muscle spasticity following soft tissue release surgeries in children with spastic diplegia.

METHODS

Our study was conducted in department of orthopaedics Christian Medical College and hospital, Ludhiana over a period of one year. We assessed the effect of physiotherapy on functional outcome and muscle spasticity following soft tissue release surgeries This study was approved by our institutional review board.

Included were children from age group 5 years to 15 years with spastic diplegia who required surgery and were operated. Excluded were children with other associated diseases causing contractures like

meningomyelocele and hereditary sensory motor neuropathy. Patients with severe mental retardation were also excluded from this study.

The intervention included in this study was soft tissue releases (adductor tenotomy, hamstring lengthening, tendoachilles lengthening).

After a patient with spastic diplegia was admitted to hospital all the necessary clinical details were recorded as per the protocol. It included a pre operative functional assessment using functional mobility scale⁴. Spasticity of the muscles was assessed using tests specific for muscle groups and was graded using modified Ashworth's Scale⁹. Children with modified Ashworth's grade 3 and 4 were taken up for soft tissue releases.

The patients were operated on elective basis after overcoming the avoidable anaesthetic risks. Post operatively patients were given cast in corrective position for four weeks. They were started on physiotherapy for one month post cast removal at hospital itself and parents were educated about the same and given orthoses as per the requirement postoperatively. After the completion of hospital treatment, patients were followed up at outpatient level at 1 month, 3 months, 6 months and 1 year for assessing functional outcome and muscle spasticity.

The variables were coded and entered in a Microsoft Excel computer programme. Data was analyzed using EPI info 3.32.

RESULTS

The study included 50 patients with spastic Diplegia treated with soft tissue release procedure. The patients age ranged from 5 years to 15 years with the mean age of 9.66 years. 68% of the patients in this study were males and 32% females. Table 1 summarizes participant characteristics.

Table : 1 Distribution According To Age (in Years)

Characteristics		Value
Age(mean)		9.66 years
Gender	Male	68%
	Female	32%
Popliteal angle(average)	Right	64.34
	Left	61.9

Table: 2 Post Operative Comparison Of Patients Based On Physiotherapy

	Physiotherapy	N	Mean±SD	P value
HIP 12 MONTHS(MAS)	Y	37	.11±.315	.049
	N	13	.38±.650	
Ankle POST OP	Y	37	.43±.765	.266
	N	13	.77±1.301	
Knee 12 MONTHS(MAS)	Y	37	.38±.681	.129
	N	13	.85±1.463	
FMS 12 MONTHS 5M	Y	37	4.41±1.878	.683
	N	13	4.15±1.951	
FMS 12 MONTHS POST OP 50M	Y	37	4.59±1.777	.054
	N	13	3.33±2.188	
FMS 12 MONTHS 500M	Y	37	3.51±2.142	.972
	N	13	3.54±2.332	

There was a significant increase in spasticity in hip adductors in children not undergoing regular physiotherapy ($P=0.049$). There was no significant affect on other muscles groups. Functional outcomes for 5 meters and 500 were not affected much as distance was either too less or too much. Patients with functional mobility for 50 meters were affected but not significantly (0.054). A significant affect can be expected in future follow ups. Table 2 summarizes comparisons of patients based on physiotherapy.

DISCUSSION

The aim of this study was to assess the effect of physiotherapy on functional outcome and muscle spasticity in children who had spastic diplegia and had undergone various soft tissue release surgeries. The notion that physiotherapy might increase spasticity⁶ is not supported by present study. In our study physiotherapy was found to have significantly affected the muscle spasticity in hip adductors at the end of one year. Patients not undergoing physiotherapy had significant increase in spasticity. The effect on other muscles and functional outcome though present was not significant.

There are some limitations in our study. Our study was too heterogenous to provide meaningful subgroups. There was lack of randomization between surgical procedures which reduces the generalizability of results due to differences between surgical procedures. There could be significant differences in all muscle groups and functional outcome if analysis was done after two years.

CONCLUSION

There was a significant increase in hip muscle spasticity in children not undergoing physiotherapy postoperatively. A longer follow up would have shown significant change in other muscle groups and functional outcomes. We would like to recommend a larger sample size and longer follow up for similar studies in future. To make the study more meaningful we would like to evaluate specific surgery for a specific deformity.

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