

Research Article

Torsional Differentiation of Lower Limb in Children with Cerebral Palsy

T.R Ashok*¹ & Lakshmi Priya Baskaran²¹Department of Orthopaedics, Sri Ramachandra University, Porur, Chennai, Tamilnadu, India²Junior resident in Paediatrics, Sathya Sai Medical college and hospital, Kancheepuram, Tamilnadu, India**Article History**

Received: 11.04.2020

Accepted: 26.05.2020

Published: 29.05.2020

Journal homepage:<https://www.easpublisher.com/easjms>**Quick Response Code**

Abstract: 150 children with cerebral palsy of varying age groups were examined clinically for their lower limb torsional variation. All cerebral palsy children were divided into groups depending on involvement of limbs. Femoral and tibial torsion were assessed individually, as they can alter the gait pattern in these children. In our study the femoral and tibial torsions were assessed clinically by assessing the femoral in-torsion and out-torsion, the trans malleolar axis and the thigh foot axis. These lower limb torsions vary within the two groups in this study, between limbs of the same individual and between different age groups. It is important to know the normal variations for better management and observation for prognostic importance.

Keywords: Femoral in-torsion, out-torsion, Trans-malleolar axis, Thigh foot axis.

Copyright @ 2020: This is an open-access article distributed under the terms of the Creative Commons Attribution license which permits unrestricted use, distribution, and reproduction in any medium for non commercial use (NonCommercial, or CC-BY-NC) provided the original author and source are credited.

INTRODUCTION

Cerebral palsy is a cortical insult during birth leading to irreversible brain damage with multimodal presentation and progressive musculoskeletal deformities. It's the most common cause of motor disability in childhood affecting muscle tone, posture and movement and associated with problems of hearing, vision, speech and swallowing difficulties. Torsional problems in children with cerebral palsy can produce abnormal gait patterns. These torsional abnormalities are usually masked in cerebral palsy children as they have other components of spasticity which can produce abnormalities of the lower limb. These torsional abnormalities are mostly benign and may resolve with growth. The treatment of such abnormalities are just observation and reassurance. No surgical intervention is required for such abnormalities as they correct themselves most the time

AIM

To compare the lower limb torsional differentiation between femoral torsion and tibial torsion in children with cerebral palsy, between spastic diplegics and quadriplegics.

MATERIALS AND METHODS:

This is a prospective observational study done at Sri Ramachandra University, Chennai between June 2016 to September 2019. 150 cerebral palsy children were analyzed and included in this study. The children were divided into two groups depending on the type of the disease, either diplegics or quadriplegics. Ambulance status of children with or without aids or orthotic support were not considered in our study. Age of all children's varied from 4 to 15 years. Exclusion criteria were children's who had other congenital abnormalities that would further affect the torsion of lower limbs, fractures limbs, pathologically affected limbs and if undergone any bony surgery to the lower limb, were not included in this study. All the children were positioned prone and the following assessments were done which include:

1. Femoral intorsion
2. Femoral out-torsion
3. Thigh foot axis
4. Transmalleolar axis.

(Clinical methods were adapted from Staheli LT: Torsional deformity, *Pediatr Clin North Am* 24:799,1977).

RESULTS:

All Cerebral palsy children were divided into groups, diplegics and quadriplegics.

Table - 1. Number of children

	Diplegics	Quadriplegics	Total
Number	56	94	150

Table - 2. Mean femoral in-torsion between each limb in both groups

Femoral in-torsion	Diplegics	Quadriplegics
Left	68.97	70.86
Right	63.94	65.12

Table -3. Mean femoral out-torsion between each limb in both groups

Femoral out-torsion	Diplegics	Quadriplegics
Left	69.22	62.22
Right	62.81	64.25

Table- 4. Mean femoral torsion between diplegics and quadriplegics

Mean femoral torsion	Diplegics	Quadriplegics
Femoral in-torsion	68.45	69.99
Femoral out-torsion	65.01	67.23

Table - 5. Mean tibial torsion between diplegics and quadriplegics

Mean tibial torsion	Diplegics	Quadriplegics
Thigh foot angle	14.16	9.65
Trans-malleolar axis	17.22	16.75

DISCUSSION

In our study, 300 lower limbs were examined for femoral and tibial torsions, clinically with simple goniometer only. All the limbs were examined individually with the child in prone position using a simple goniometer. Children of age more than two years were preferred in this study for safe handling during prone for taking measurements.

Age, gender, socioeconomic background of family, obstetric history of mother, marriage consanguinity and ambulatory status of children were the limitations in our study.

In our study, age was found not significant for the presentation and torsional variation as of observed besides changes with growth pattern as expected.

Socioeconomic status, plays a vital role on addressing the needs of cerebral palsy children at each stage of their bone development and psychological maturity starting from weaning to nutritional supplements, which implies better outcomes in future. Obstetric history of mother, was found not significant in our study. Marriage consanguinity, also observed not significant in our study. Mobilisation of child, walker or non walker with aids or orthotic support was observed insignificant.

In our study we observed, both spastic diplegics and quadriplegics have varying femoral and tibial torsion which vary with age and follow a pattern of growth. The femoral torsion decreases with increase in age and tibial torsion increase with increase in age. Proper assessment of torsion is required, as they may be difficult to measure if spasticity is severe and the management varies depending on it. All the children can be left untreated until the growth spurt is over as the torsional variation may get corrected spontaneously with growth. Reassurance stays the main role as the most of the children doesn't require surgical intervention as they may resolve spontaneously.

CONCLUSION

1. Femoral and tibial torsion variations follow a pattern of growth and to be kept observed for appropriate management on regular basis.
2. Femoral and tibial torsion between spastic diplegics and quadriplegic is not statistically significant in our study.
3. Torsional values seem to alter within the lower limbs of the same individual within the normal range or more.
4. Multifactorial limitations like age, nutrition, growth observation and modulation, psychosocial support of family and siblings might influence the outcome for better prognostic rehabilitation measures.

Conflict of Interest – Nil

Funding - Nil.

REFERENCES

1. Staheli, L.T. (1983). In journal of family practice, *may,16(5),1005-11*.
2. The Definition and Classification of Cerebral Palsy. (2007). *Dev Med Child Neurol*. 49:1–44.
3. Carriero, A., & zovatsky, A.S. (2009). *Journal of paediatric orthopaedics Feb, 29(1), 73-79*.
4. Lee, S.H., & Chung, C.Y. (2009). In *clinical orthopaedic relat res*, aug; *467(8),2098-104*.
5. Blackmur, J.P., & Murray, A.W. (2010). *Journal of paediatric orthopaedics B, Sept;19(5), 415-7*
6. Gaumentou, E., Quijano, S., Lharrebore, B., & Presedo, A. (2014). In *Orthopaedic traumatology surgical res*,2014Feb;*100(1),147-51*
7. Mooney, J.F. 3rd, (2014). *Paediatric clinical north America journal*, december;*61(06),1175-81*

8. Simon, A.L.L., Bregrest, F., & Mallet, C. (2015). *Journal of paediatric orthopaedics*, 2015 Sept; 31(6), 576-82.
9. Gulati, S., & Sondhi, V. (2018). Cerebral palsy : an overview, *Indian J Pediatr*. 2018 Nov; 85(11),1006-1016.