

# Reliability of Early Clinical Assessment of Balance Scale in Assessment of Children with Cerebral Palsy

Dr. Poonam Shah<sup>1</sup>, Dr. Crisi Chauhan<sup>2</sup>

<sup>1</sup>Consulting Physiotherapist, B-303, Sukan residency, Pal, Surat, India (Corresponding Author)

<sup>2</sup>Government Physiotherapy College, New Civil Hospital, Surat, India

**Abstract:** ***Introduction:** A study to check the reliability of Early Clinical Assessment of Balance Scale in the assessment of children with Cerebral Palsy. The study is check to establish interrater and intrarater reliability of the Early Clinical Assessment of Balance Scale in children with Cerebral Palsy. **Material and Method:** 30 subjects were selected who fulfilled the inclusion criteria. To check interrater reliability, rater A and B have rate the Early Clinical Assessment of Balance Scale which consists of 13 items. To check intrarater reliability, rater A has to rate the scale again after 1 week of interval. **Result:** According to the study, statistical analysis of interrater reliability Rater A =  $45.26 \pm 3.65$  and Rater B =  $45.40 \pm 4.04$ . In intrarater reliability, statistical analysis Rater A =  $45.26 \pm 3.65$  and Rater A (after 1 week of interval) =  $44.28 \pm 3.25$ . **Conclusion:** The study concluded that there is a significance between interrater reliability and intrarater reliability.*

**Keywords:** EACB, Reliability, Cerebral palsy

## 1. Introduction

Cerebral palsy is a group of disorders that affect the development of posture and movement and is caused by an irreversible insult to the developing central nervous system<sup>[1]</sup>

Motor disorder results in loss of functional balance. As functional balance has been defined as the elements of gross motor abilities, poor balance causes difficulties with functional tasks involved in activities of daily living<sup>[2]</sup>

Preschoolers and school aged children with cerebral palsy classified as level 1 of the Gross Motor Function Classification Measure (GMFCS) are able to ambulate independently without assistive devices within their homes, schools and communities with a limited movement repertoire, but it is difficult for them to work on uneven surfaces & walk in crowds or confined spaces. Physical therapy often includes balance training in their therapy sessions to improve their gross motor ability<sup>[3,4]</sup>. Therefore, a reliable & functional balance measure is needed to evaluate the effects of physical therapy intervention<sup>[5]</sup>

Balance measures for children with Cerebral palsy have been examined through the observations of the underlying elements of the balance responses, standardized developmental measures of gross motor function and foreplates<sup>[6,7]</sup>. The standardized assessment tools for children with cerebral palsy include the Pediatric Evaluation of Disability Inventory<sup>[8]</sup>, The Gross Motor Functional Measure<sup>[9]</sup> And Pediatric Reach Test<sup>[10]</sup>. These test however do not detect small changes in functional balance<sup>[11]</sup>. A review of balance in the literature suggested that the Early Clinical Assessment of Balance Scale might be useful for assessing the functional balance of preschoolers and school aged children with Cerebral palsy. The validity of the EACB scale was supported and responsiveness need study<sup>[12]</sup>

Reliability refers to the dependability, consistency and stability of an assessment tool. Several types of reliability exist such as inter-rater, intrarater and test-retest reliability. Inter-rater reliability estimates how consistent the test is when used by different raters, whereas interrater reliability is the consistency with which one rater assigns scores to a single set of responses on two or more occasions. The test-retest reliability demonstrates the consistency of an assessment tool between one test occasion and another.

Thus study is aimed to establish intrarater and interrater reliability of the Early Clinical Assessment of Balance scale in children with Cerebral Palsy

## 2. Aims and Objective

The study is aimed to check interrater and intrarater reliability of the Early Clinical Assessment of Balance Scale in children with Cerebral Palsy.

## 3. Methodology

**Study design:** Observational study.

**Study Setting:** New Civil Hospital, Surat.

**Study Sample Size:** 30 children with Cerebral Palsy

**Study Duration:** 1 week

### Inclusion Criteria

- Both male and female
- Children of age between 11 months upto 7 years
- Subjects who follow verbal commands
- Absence of nerve block injection or orthopedic surgery within the previous 6 months such as Botox injection or muscle-lengthening surgery
- Subjects who are medically stable

**Exclusion Criteria**

- Neurological disorders other than cerebral palsy or any children with delayed development
- Visual impairment
- Hearing impairment

**Material Used**

- Bench mat
- Timer
- Step tool about 6” high

**Outcome Measure**

Early Clinical Assessment of Balance scale to assess the Balance in children with Cerebral Palsy

**Method**

The ECAB includes 13 items. It measures head, trunk, sitting and standing postural control for children from 11 months upto 7 years. The balance tasks are divided into two parts. They are head righting, rolling from supine to prone, sitting with weight shift, protective extension, sit to stand transfer, standing with feet together, turning 360 degrees, standing & placing alternate foot on a footstool.

In this scale Part-I consists of 7 items and Part-II consists of 6 items. A total score of 100 could be obtained from the

thirteen items measured in this study. Start testing the child with item 1 if the child is classified as GMFCS level III, IV or V. If the child is classified as GMFCS Level I or II, start with Part II, item 8, and give full points for Part I. If the child has hemiplegia, start with Item 4 and give full points for Items 1-3. Continue testing until it is apparent that the child is not able to do the items. To check interrater reliability, rater A and rater B measures the scale of all 30 subjects differently. To check intrarater reliability, rater A measures the scale of 30 subjects within an interval of 1 week.

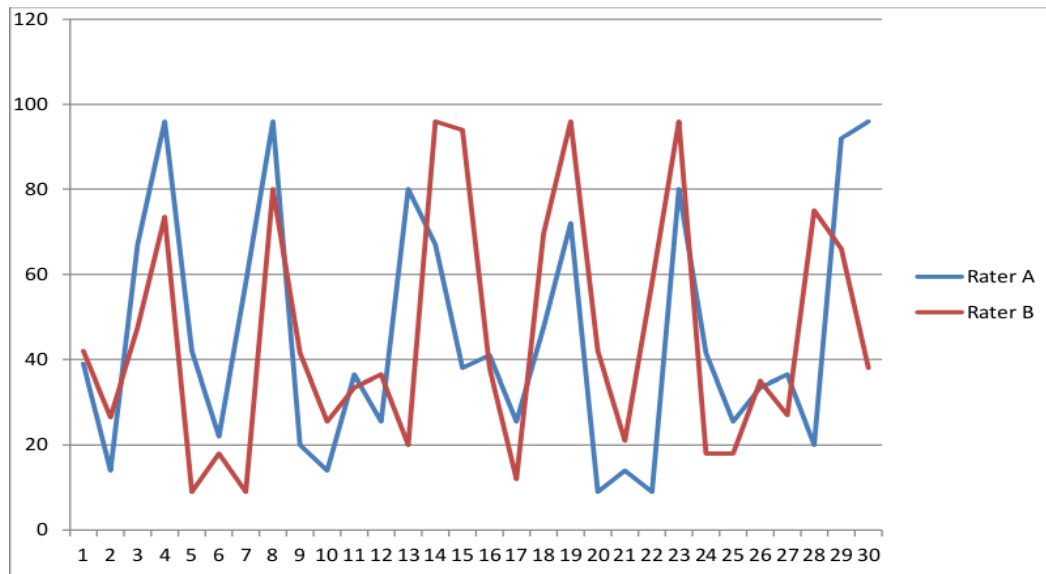
**4. Results**

In this study, 30 children with Cerebral Palsy are assessed for Balance.

**Statistical Analysis**

**1) Interrater Reliability**

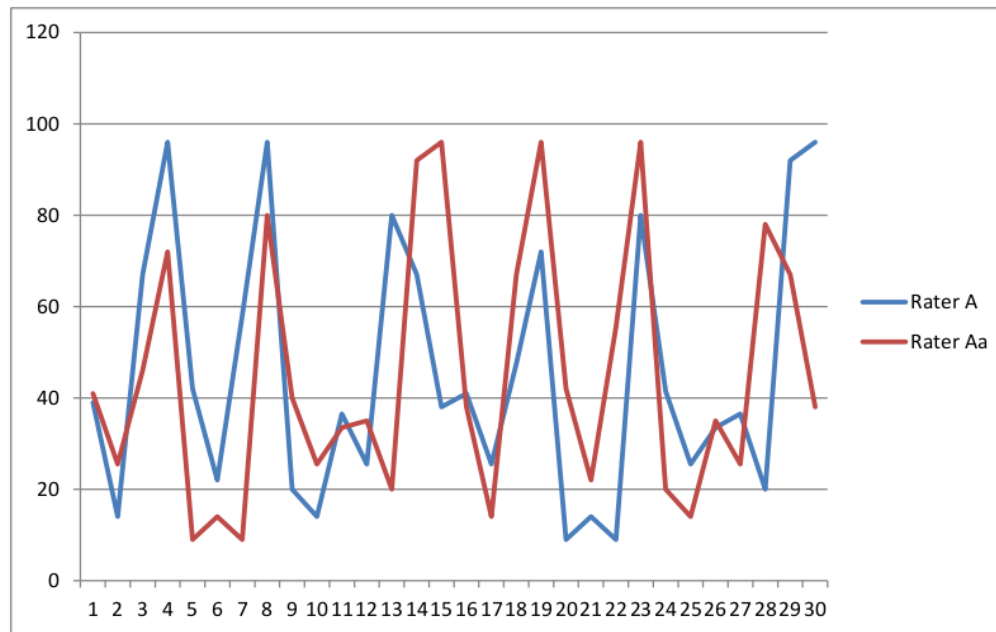
	Rater A	Rater B
Mean	45.26	45.40
SD	3.65	4.04



**Inter rater Reliability between Rater A and Rater B**

**2) Intrarater Reliability:**

	Rater A	Rater A (1 week interval)
Mean	45.26	44.28
SD	3.65	3.25



**Intrarater Reliability between Rater A and Rater Aa after 1 week of interval**

## 5. Ethical Consideration

Procedure followed were in accordance with the ethical standards of Helsinki declaration of 1975, as revised in 2000.<sup>[13]</sup>

## 6. Discussion

The objective of the study was to investigate the inter-rater and intra-rater reliability of the Early Clinical Assessment Balance Scale in the assessment of children with Cerebral Palsy in order to provide therapists with useful clinical values for detecting real changes before and after interventions. Reliability refers to the dependability, consistency and stability of an assessment tool. Several types of reliability exist such as inter-rater, intra-rater and test-retest reliability. Interrater reliability estimates how consistent the test is when used by different raters, whereas interrater reliability is the consistency with which one rater assigns scores to a single set of responses on two or more occasions. The test-retest reliability demonstrates the consistency of an assessment tool between one test occasion and another. These three kinds of reliability are necessary to establish a reliable assessment tool. Reliability investigates the agreement between a group of raters. Absolute reliability examines variability in scores in repeated measurements.

The study do show that there is a reliability between raters examining the same scale but to confirm both reliability, we need further study and development in the interpretation of the EACB scale.

## 7. Limitation of the Study

- The sample was one of the convenience and we included only children with Cerebral Palsy treated in a CP clinic.
- Further studies are required to examine the reliability of the EACB by comparing it with other assessment tools that are frequently used in paediatric settings.

- In addition, other psychometric properties such as responsiveness and sensitivity to change need to be addressed with larger numbers of subjects including children with CP who attend physiotherapy outside the CP clinic.

## Scope of the Study

- Sample size should be large.
- Study duration should be more
- Long term outcomes can be taken

## 8. Conclusion

There is significance between interrater reliability and and intrarater reliability of Early Clinical Assessment of Balance Scale in Cerebral Palsy children. In conclusion, we have demonstrated satisfactory intrarater and interrater reliabilities and provide a reference framework for future studies to assess the functional balance of children with Cerebral Palsy.

## 9. Acknowledgments

We are thankful to all our subjects who participated with full cooperation and showed voluntary interest. We are also grateful to authors/,editors/, publishers of all those articles, journals and books from where the literature for this article has been reviewed and discussed.

## References

- [1] Bax M, Goldstein M, Rosenbaum P, Et Al.: Proposed Definition And Clas-Sification Of Cerebral Palsy, April 2005. Dev Med Child Neurol, 2005, 47:571–576. [Medline] [Crossref]
- [2] Gan SM, Tung LC, Tang YH, Et Al. : Psychometric Properties Of Functional Balance Assessment In Children With Cerebral Palsy. Neurorehabil Neural Repair, 2008, 22: 745–753.

- [3] Shumway-Cook A, Hutchinson S, Kartin D, Et Al.: Effect Of Balance Train-Ing On Recovery In Children With Cerebral Palsy. *Dev Med Child Neurol*,2003, 45: 591–602. [Medline] [Crossref]
- [4] Liao HF, Hwang AW: Relations Of Balance Function And Gross Motor Ability For Children With Cerebral Palsy. *Percept Mot Skills*, 2003, 96: 1173–1184.[Medline]
- [5] Lexell JE, Downham DY: How To Assess The Reliability Of Measurements In Rehabilitation. *Am J Phys Med Rehabil*, 2005, 84: 719–723. [Medline][Crossref]
- [6] Pountney TE, Mulcahy C, Green E: Early Development Of Postural Control. *Phys Can*, 1990, 76: 799–802.Hsue BJ, Miler F, Su FC: The Dynamic Balance Of The Children With Cere-bral Palsy And Typical Developing During Gait. Part I: Spatial Relationship
- [7] Between COM And COP Trajectories. *Gait Posture*, 2009, 29: 465–470. [Medline] [Crossref] Vargus-Adams JN, Martin LK, Maignan SH, Et Al.: The GMFM,PEDI, And CP-QOL And Perspectives On Functioning From Children With CP,Parents, And Medical Professionals. *J Pediatr Rehabil Med*, 2011, 4: 3–12. [Medline]
- [8] Russell DJ, Rosenbaum PJ, Avery LM, Et Al.: Gross Motor Function Mea-Sure (GMFM-66 & GMFM-88). User’s Manual. London: Mac Keith Press,2002.
- [9] Bartlett D, Birmingham T: Validity of the Early Clinical Assessment of BalanceTest.*Pediatr Phys Ther*, 2003, 15: 84–92. [Medline] [Crossref]Gan SM, Tung LC, Tang YH, Et Al.: Psychometric Properties Of Functional
- [10] Balance Assessment In Children With Cerebral Palsy. *Neurorehabil Neural Repair*, 2008, 22: 745–753. [Medline] [Crossref]
- [11] Franjoine MR, Gunther JS, Taylor MJ: Pediatric Balance Scale: A Modified Version Of The Berg Balance Scale For The School-Age Child With Mild To Mod-Erate Motor Impairment. *Pediatr Phys Ther*, 2003, 15: 114–128. [Medline]
- [12] Development and validity of the early clinical assessment of balance for young children with cerebral palsy,McCoy SW et al.*Dev Neurorehabil*.
- [13] WMA Declared of Helsinki.59<sup>th</sup> General Assembly, seoul, Republic of Korea, October 2008.