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Does the Functional Status of the Upper Limb Influence Limb Length Discrepancy in a Child with Birth Brachial Plexus Palsy?

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Background: Limb length discrepancy (LLD) is a frequent observation in children with birth brachial plexus palsy (BBPP) and a common concern among parents. A common assumption is that the LLD decreases if the child is using the involved limb more. However, there is no literature evidence for this assumption. The present study was conducted to assess the correlation between the functional status of the involved limb and the LLD in children with BBPP.

Methods: One hundred consecutive patients (age > 5 years) with unilateral BBPP seen at our institute underwent measurements of limb lengths to assess the LLD. The arm, forearm and hand segments were measured separately. The functional status of the involved limb was assessed using modified House's Scoring system (Scores 0–10). The correlation between limb length and functional status was assessed using the one-way Analysis of Variance (ANOVA) test. Post-hoc analyses were performed as required.

Results: A length difference was observed in 98% of the limbs with brachial plexus lesions. The average absolute LLD was 4.6 cm with a standard deviation of 2.5 cm. We found a statistically significant difference in LLD among the patients with a House score of <7 ('Poor function') and 7 and above ('Good function'; $p < 0.001$) with later indicative of independent use of the involved limb. We found no correlation between age and LLD. More extensive plexus involvement resulted in higher LLD. The maximal relative discrepancy was found in the hand segment of the upper extremity.

Conclusions: LLD was seen in most of the patients with BBPP. The functional status of the involved upper limb in BBPP was found to be significantly associated with LLD. Though causation cannot be assumed. We found that children using the involved limb independently tend to have the least LLD.

Level of Evidence: Level IV (Therapeutic)

Keywords: *Limb length, Birth brachial plexus palsy, Shortening, Length discrepancy, Deformity in birth palsy*

INTRODUCTION

Limb length discrepancy (LLD) in children with birth brachial plexus palsy (BBPP) is a common concern among their parents.[1,2] Bae et al noted that most of the parents considered this as 'somewhat important' to 'extremely important'.[2] Parents commonly show their concern for the limb shortening and ask for ways to correct it or at least prevent it from worsening. However, this is one of the least researched aspects of BBPP and many questions are still unanswered or controversial.

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