

LONG-TERM FUNCTIONAL OUTCOMES IN PATIENTS WITH CEREBRAL PALSY POST SELECTIVE DORSAL RHIZOTOMY: A SYSTEMATIC REVIEW

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ABSTRACT

Background and Significance: Selective dorsal rhizotomy (SDR) is a surgical procedure that involves the selective cutting of the dorsal lumbosacral spinal nerve rootlets to reduce spasticity. SDR is widely used to treat spasticity in children with cerebral palsy (CP). The purpose of this systematic review was to evaluate the long-term effects of SDR on functional outcomes in children with CP.

Methods: PubMed and Embase databases were searched on November 12, 2018, using terms associated with rhizotomy, cerebral palsy, and activities of daily living. Inclusion criteria consisted of all study designs containing participants diagnosed with CP who underwent SDR at the lumbar or sacral levels on or before the age of 16 and the use of the Pediatric Evaluation of Disability Inventory (PEDI) as a functional outcome measure at least 12 months postoperatively. Risk of bias was assessed with the Joanna Briggs Institute checklist. After performing the electronic search, six articles remained for review.

Results: Whole group scores after SDR in the self-care and mobility domains of the PEDI showed statistically significant improvement ($p < 0.05$) through 5 years postoperatively, compared to baseline values. PEDI scores were maintained in the less severe forms of CP through 10 years.

Conclusion: If SDR is performed on well-selected children before severe orthopedic deformities have developed, it has the potential to increase functional independence particularly in the less severe cases through 10 years postoperatively and protect against the functional decline in adolescence typically seen in the more severe cases.

Keywords: Rhizotomy, Cerebral Palsy, Activities of Daily Living

INTRODUCTION

"Cerebral palsy (CP) describes a group of permanent disorders of the development of movement and posture, causing activity limitation that is attributed to non-progressive disturbances that occurred in the developing fetal or infant brain. The motor disorders of cerebral palsy are often accompanied by disturbances of sensation, perception, cognition, communication, and behavior, by epilepsy, and by secondary musculoskeletal problems." [1]. There are several types of tonal abnormalities associated with CP based on whether the damage is pyramidal or extrapyramidal. In this intervention investigation, we are concerned with the tonal presentation from a pyramidal tract injury known as spasticity. Spasticity is defined as a velocity-dependent resistance of a muscle to stretch [2].

Baseline functional levels were established using the Gross Motor Function Classification System (GMFCS), an internationally accepted functional classification system used for individuals with cerebral palsy to classify self-initiated movement based on usual performance at home or in the community. There are five levels in the GMFCS. Abbreviated descriptions of the GMFCS Levels are as follows: Level I-walks without limitations; Level II-walks with limitations, Level III-walks using a hand-held mobility device; Level IV-self-mobility with limitations, may use powered mobility; Level V-transported in a manual wheelchair [3].

Functional status of the participants was assessed using the Pediatric Evaluation of Disability Inventory (PEDI), a comprehensive standardized clinical assessment that assesses functional activities in children with disabilities [4]. The Gross Motor Function Measure (GMFM) was also used. It is a validated criterion-referenced assessment tool designed specifically for children with cerebral palsy to show change over time in gross motor function. It is available in two versions, the GMFM-88, and the GMFM-66. The GMFM-88 is typically used for very young or more severely involved children (GMFCS Level V). It should be used if the child needs assistive devices or orthotics to walk. The GMFM-66 has fewer items, does not allow