SYSTEMATIC REVIEW OF SELECTED OUTCOMES, COMPLICATIONS AND POSTOPERATIVE CONSIDERATIONS AMONG SURGICAL INTERVENTIONS FOR SCOLIOSIS IN CHILDREN WITH CEREBRAL PALSY

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Overview

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- Procedure
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Surgical procedures

- **Unit Rod:** segmental sublaminar fixation

- **Growing rods:** expandable spinal rods which are attached to spine without true fusion

- **Luque-Galveston:** rods attached sublaminarily through each vertebral level and anchored at iliac crest.
Outcome measures

- **Cobb angle**: angle between the most superior vertebra in curve and the most inferior vertebra in curve

- **Pelvic obliquity**: angle created from line across iliac crests and a line drawn down from spinous process of $T_1$ on x-ray.
Introduction \(^2,^3\)

- Spinal deformities are common occurrence in children with Cerebral Palsy (CP).

- Neuromuscular Scoliosis in patients with CP limits function and adds strain to caregivers.

- Bracing is shown to be ineffective in controlling spinal curvature or preventing further changes.

- Surgery is a good option to prevent further progression of spinal curvature.

- Complications are common with surgery in this population.
Incidence

- Scoliosis is prevalent in 29% in children with CP.
  - *Moderate/severe scoliosis has a prevalence of 11%*

- Higher Gross Motor Function Classification Scale (GMFCS) score showed higher incidence of scoliosis and greater severity.
Purpose

To evaluate outcomes, complications and postoperative considerations among surgical interventions for scoliosis in children with cerebral palsy.
Databases

- Google Scholar
- CINAHL
- PubMed
- ProQuest Central
Search Terms

(Children or Pediatric) AND
(cerebral palsy or CP) AND
(scoliosis or spinal curvature) AND
(surgery or surgical interventions)
Inclusion and Exclusion Criteria

- English
- Human subjects
- Children under 18 years
- Scoliosis
- Surgical interventions
- Outcome measures of Cobb and pelvic obliquity angles.
Records identified through database searching (n = 4,280)

Records screened (n = 2,180)

Full-text articles assessed for eligibility (n = 59)

Records after duplicates removed (n = 51)

Studies included in qualitative synthesis (n = 29)

Records excluded due to irrelevance, inclusion and exclusion criteria (n = 22)

Studies included in qualitative synthesis (n = 7)
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Results 1-3,5-8

- The mean age of patients examined was 13.7 years old (7-24 years old).

- Surgical techniques examined included Custom Rods, Growing Rods, Luque Galveston or Contrel Dubousset instrumentation.

- Mean pre-op Cobb angle was 84.6°, post-op the angle was 36.8°, at follow up the angle was 36.2°.
Results\textsuperscript{1-3,5-8}

- Mean pre-op pelvic obliquity was 22.8°, post-op was 8.35° and follow up was 9.6°.

- Immediate post-op results were not recorded in one study.

- In four studies, patients experienced infectious complications.

- In three studies, hardware was exchanged due to malformation.
Results$^{1-3,5-8}$

- In three studies, patients experienced pulmonary complications
- Five fatalities related to pulmonary complications
- There was an overall mean blood loss of 1602 mL and mean hospital stay of 11.5 days
Conclusion\textsuperscript{1-3,5-8}

- There is moderate evidence in support of surgical interventions to improve Cobb and pelvic obliquity angles post-op and at follow-up in pediatric patients with CP and scoliosis.

- The results suggest that parents and clinicians can expect a decrease in Cobb angle of 54.6\% (36-86\%) and pelvic obliquity decrease of 51.59\% (18-89\%) and a 11 day hospital stay.
Limitations

- Lack of comparators for surgical procedures and lack of standardization with CP diagnoses.
- Not all databases were searched
- Quality of life was not directly assessed
Future Research

- Future research is needed with specific CP diagnoses and better inclusion and exclusion criteria to determine effectiveness.
Clinical Relevance

- As medical advances occur, there are more options for treatment of scoliosis in children with CP.

- It is important for clinicians to understand the expected outcomes of scoliosis surgery including possible complications for children with CP and to educate parents and caregivers.

- The long term outcomes may improve physical well being and cosmesis.
Acknowledgements

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References


