SURGICAL OPTIONS

Neurosurgical options may be considered in situations where first-line treatments have failed and hypertonia continues to affect a child's functional abilities or quality of life. Because children and youth with CP require specialized management by a multidisciplinary team, referral to a tertiary centre is often required.

Selective dorsal rhizotomy (SDR) is a procedure where selected nerve rootlets are severed to modify sensory inputs in the reflex arc, reducing spasticity. Individuals can be considered for SDR if they:

- Were born preterm, with characteristic white matter injuries such as periventricular leukomalacia,
- Do not have a co-occurring dyskinetic movement disorder,
- Do not experience musculoskeletal contracture,
- Possess antigravity muscle strength, or
- Live with positive psychosocial factors (e.g., they can access and participate in a therapy program) (9,10).

Benefits of SDR appear to be greatest in individuals with CP GMFCS levels II and III. While SDR as an option is controversial for children functioning at GMFCS levels IV and V, some children who have had this surgery experienced improvement in gross motor tasks and have exceeded their expected natural history (9).

Intrathecal baclofen (ITB) treatment involves surgically implanting a reservoir pump and catheter to deliver baclofen to the intrathecal space. ITB can treat dystonia and spasticity in individuals with CP who are functioning at GMFCS levels IV and V (11). Indications for ITB include failure of oral medications (e.g., baclofen) to treat hypertonia causing pain or interfering with quality of life or activities of daily living (11). Complication rates are high, and catheter dislodgment or pump malfunction can lead to severe baclofen withdrawal. Individuals treated with ITB must have access to specialized emergency care.

Deep brain stimulation (DBS) is a form of neuromodulation that is reserved for children with severe, refractory dystonia and significant functional impairment despite appropriate medical management and when other treatment options are not possible (12). Studies to date of DBS in children with CP are small but have shown significant reductions in pain-related symptoms and analgesia requirements (13).

BEST PRACTICE POINTS

Children and youth with CP GMFCS levels III to V should have a developmental and rehabilitative "home" that provides regular surveillance and monitoring for common health issues and conditions in this population. Paediatricians are ideally situated to follow up, support wellness, and guide children and families living with CP to be as independent and healthy as possible. They also provide a nexus for communication with health team members, school authorities, hospital-based care providers, and community services.

Paediatricians and other primary care providers should endeavour to:

1. Support early diagnosis by using evidence-based tools such as the Hammersmith Infant Neurological Examination (HINE) and MRI to facilitate referrals for timely intervention and access to supportive services.
2. Explore goal-directed and active rehabilitation with children and families, with focus on fun, fitness, and friendship.
3. Provide ongoing health surveillance and support by maintaining a comprehensive health and wellness record.

ACKNOWLEDGEMENTS

This practice point has been reviewed by the Complex Care Section Executive and by the Community Paediatrics and Mental Health and Developmental Disabilities Committees of the Canadian Paediatric Society.

FUNDING

No funding to report.

POTENTIAL CONFLICT OF INTEREST

All authors: No reported conflicts of interest. All authors have submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Conflicts that the editors consider relevant to the content of the manuscript have been disclosed.

REFERENCES

1. Novak I, Morgan C, Adde L, et al. Early, accurate diagnosis and early intervention in cerebral palsy: Advances in diagnosis and treatment. JAMA Pediatr 2017;171(9):897–907. doi:10.1001/jamapediatrics.2017.1689
2. Morgan C, Fetters L, Adde L, et al. Early intervention for children aged 0 to 2 years with or at high risk of cerebral palsy: International clinical practice guideline based on systematic reviews. JAMA Pediatr 2021;175(8):846–58. doi:10.1001/jamapediatrics.2021.0878
3. Rosenbaum PL, Palisano RJ, Bartlett DJ, Galuppi BE, Russell DJ. Development of the gross motor function classification system for cerebral palsy. Dev Med Child Neurol 2008;50(4):249–53. doi:10.1111/j.1469-8749.2008.02045.x
4. Palisano RJ, Cameron D, Rosenbaum PL, Walter SD, Russell D. Stability of the gross motor function classification system. Dev Med Child Neurol 2006;48(6):424–8. doi:10.1017/S0012162206000934
5. Rosenbaum PL, Walter SD, Hanna SE, et al. Prognosis for gross motor function in cerebral palsy: Creation of motor development curves. JAMA 2002;288(11):1357–63. doi:10.1001/jama.288.11.1357
6. Novak I, Morgan C, Fahey M, et al. State of the evidence traffic lights 2019: Systematic review of interventions for preventing and treating children with cerebral palsy. Curr Neurol Neurosci Rep 2020;20(2):3. doi:10.1007/s11910-020-1022-z
7. Novak I. Evidence-based diagnosis, health care, and rehabilitation for children with cerebral palsy. J Child Neurol 2014;29(8):1141–56. doi:10.1177/0883073814535503
8. American Academy of Cerebral Palsy and Developmental Medicine. Hip Surveillance in Cerebral Palsy. 2017. https://www.aacpdm.org/publications/care-pathways/hip-surveillance-in-cerebral-palsy (Accessed March 31, 2023).
9. Iorio-Morin C, Yap R, Dudley RWR, et al. Selective dorsal root rhizotomy for spastic cerebral palsy: A longitudinal case-control analysis of functional outcome. Neurosurgery 2020;87(2):186–92. doi:10.1093/neuros/nyz422
10. Summers J, Coker B, Eddy S, et al.; Selective Dorsal Rhizotomy Steering Committee. Selective dorsal rhizotomy in ambulant children with