

Appendix

Robotic Assisted Training

1. Klobucká S, et al. Effect of Robot-Assisted Treadmill Training on Motor Functions Depending on Severity of Impairment in Patients with Bilateral Spastic Cerebral Palsy. *Journal of Rehabilitation Robotics* 1 (2013): 71-81.
"Patients demonstrated statistically significant improvements in all GMFM-88 dimensions. Improvements in GMFM A, B and C were significantly larger in the more severely affected cohort (GMFCS III, IV). 6 Min WT of 154 (103.21) to 191.21 (114.55) m; as well as the mean (SD) FAC of 1.44 (1.22) to 1.89 (1.33) showed a statistically significant level of improvement (p= .000)."
2. Pons JL, et al. Robotic-Assisted Gait Training in Children with Cerebral Palsy in Clinical Practice. *Converging Clinical & Engi. Research on NR. BIOSYSROB 1*, pp. 29–33.
"Significant differences were observed pre-training vs. post-training for both walking speed (1.29±0.51 vs. 1.43±0.48 m/s, p<0.01) and walking endurance (238±120 vs. 273±122 meters, p<0.01). RGT in children with CP results in improvements in walking speed and walking endurance."
3. Sucuoglu H. Effects of robot-assisted gait training alongside conventional therapy on the development of walking in children with cerebral palsy. *J Pediatr Rehabil Med.* 2020;13(2):127-135.
"In our study, RAGT in combination with conventional treatment program was significantly associated with improvements in the standing and walking abilities of children with CP."

Mortality

1. Gunman PI, et al. Risk Factor of Mortality in Indonesian Children with Cerebral Palsy in Indonesian children with Cerebral Palsy. *J. Med. Invest.* 65:18-20
"12 patients (21.8%) died. Pneumonia was the most common underlying disease cause of death (OR=5.185 ; 95% CI 1.249 to 21.520 ; P_0.007). Other risk factors of mortality were Gross Motor Functioning Classification System (GMFCS) more than level IV (OR=1.480 ; 95% CI 1.184 to 1.850 ; P_0.006), acute kidney injury (AKI) (OR=3.333 ; 95% CI 1.317 to 8.436 ; P_0.03).
2. Baird G, et al. Mortality from 1- 18 Years in Bilateral Cerebral Palsy. *Arch Dis Child.* 2011 Nov;96(11):1077-81.
"Poorer survival was also significantly associated with greater severity of motor disorder, as classified by the GMFCS or characterized by delayed acquisition of motor milestones, feeding and swallowing problems (as measured by the presence of a gastrostomy), and severe communication problems. All but 2 deaths were in the combined level IV and V group.."
3. Hutton JL, et al. Life expectancy in children with cerebral palsy. *BMJ* 309:431-5
"subjects severely disabled in all three functional groups had 20 year survival of 50% (42% to 58%)."

Quality of Life

1. Houlihan CM, O'Donnell M, Conaway M, Stevenson RD. Bodily pain and health-related quality of life in children with cerebral palsy. *Developmental Medicine and Child Neurology.* 2004 May;46(5):305-10.

“The Parental Impact – Emotional subscale of the CHQ was correlated with reported pain ($r=0.38$, $p<0.001$). Pain was frequent in children with moderate or severe CP. Pain was more prevalent with more severe impairment and was associated with educational and social consequences.”

2. Lauruschkus A, et al. Dynamic Standing Exercise in a Novel Assistive Device Compared with Standard Care for Children with Cerebral Palsy Who Are Non-Ambulant, with Regard to Quality of Life and Cost-Effectiveness. *Disabilities* (2022) 2:73–85.
“The quality of life improved after a four-month exercise training period with Dynamic Standing (DyS) for children with non-ambulatory CP-NA. In addition, the secondary outcomes satisfaction, fatigability, ability to focus, number of pain locations, number of doses of medicine, and bowel function improved significantly with DyS. Considering the positive effect on quality of life indicated in the current study and the positive effects noted for other outcomes, it is possible that DyS will result in an even larger improvement in quality of life over time.”
3. Varni JW, et al. Health-related quality of life of children and adolescents with cerebral palsy: hearing the voices of the children. *Developmental medicine and child neurology*. 2005 Sep;47(9):592-7.
“Children with CP self-reported a similar HRQOL to pediatric cancer patients receiving treatment (mean 68.9). Children diagnosed with quadriplegia (mean 49.4) self-reported more impaired HRQOL than children with diplegia (mean 69.1) and hemiplegia (mean 72.4). Parent–child concordance was lowest for emotional functioning. Providers and parents should obtain the children’s HRQOL perceptions whenever possible.”
4. Shelly A, Davis E, Waters E, Mackinnon A, Reddihough D, Boyd R, Reid S, Graham HK. The relationship between quality of life and functioning for children with cerebral palsy. *Developmental Medicine & Child Neurology*. 2008 Mar;50(3):199-203.
“Physical wellbeing domains of QOL are more strongly associated with functioning than psychosocial well-being domains. Hence, a child with poor functioning may report good social and emotional well-being. These results, consistent with previous studies in the area, have implications for defining, measuring, and interpreting children’s QOL.”
5. O Ones K, et al. Assessment of the Quality of Life of Mothers of Children with Cerebral Palsy (Primary Caregivers). *Neurorehabilitation and neural repair*. 2005 Sep;19(3):232-7.
“The quality of life in mothers of children with cerebral palsy (MCCPs) is significantly lower than that of control mothers. Also, although the BAI scores were not significantly different between the groups, the Beck Depression Inventory scores were poorer in MCCPs compared to those the control group.”

Cardiovascular and Respiratory Morbidity and Mortality

1. Hammam N, et al. Early indicators of cardiovascular disease are evident in children and adolescents with cerebral palsy. *Disability and Health Journal*. (2021) 14(4):101112.,
“Cardiovascular disease (CVD) is a leading cause of early mortality among young adults with cerebral palsy. While low physical activity in childhood has been hypothesized as a potential contributor to increased CVD risk in early adulthood. Children and adolescents with cerebral palsy may exhibit impairments in vascular structure and function which represent an increased risk of premature atherosclerosis compared to children without cerebral palsy.”

2. Ryan JM, et al. Mortality due to cardiovascular disease, respiratory disease, and cancer in adults with cerebral palsy. *Developmental Medicine & Child Neurology*. 2019 Aug;61(8):924-8.
"Adults with CP had an increased risk of death due to cardiovascular disease (SMR: 3.19, 95% confidence interval [CI] 2.20–4.62) and respiratory disease (SMR: 13.59, 95% CI 9.89–18.6mary7)."
3. Boel L, et al. Respiratory morbidity in children with cerebral palsy: an overview. *Developmental Medicine & Child Neurology* 61.6 (2019): 646-653.
"Respiratory problems are frequent in the CP population and are an important cause of death. The respiratory status of patients with CP is influenced by recurrent aspiration, impaired airway clearance, deformity of the spine and chest wall, impaired lung function, poor nutritional status, and recurrent respiratory infections. These factors should all be addressed when caring for patients with CP."
4. Meehan E, et al. Hospital admissions in children with cerebral palsy: a data linkage study. *Develop Med Child Neuro*. 2017 59:512–519.
"Overall, 80% of the CP cohort (n=1401) had at least admission. Compared to the general population admissions, CP admissions were more costly. Increased CP severity and complexity were associated with having more admissions and a higher proportion of admissions attributable to respiratory illness."

Gastrointestinal

1. Eisenberg S, et al. Contribution of Stepping While Standing to Function and Secondary Conditions Among Children with Cerebral Palsy. *Pediatric Physical Therapy*. 2009 Apr 1;21(1):79-85.
"Providing a child who is nonambulatory the opportunity to walk may be important both for participation in activities of daily living and social roles and for preventing secondary conditions. Children in the hands-free walker group exhibited a significant reduction in constipation rate. This finding might be related to the stepping activity while standing or might be due to a 2.25 average time increase in the upright position or due to the combination of these two."
2. Awan WA, et al. Lauruschkus A, et al. Role of stretching exercises in management of constipation in spastic cerebral palsy. *J Ayub Med Coll Abbottabad* 2016;28(4)
"Stretching exercises administered for the management of spasticity in CP can significantly improve the symptoms of constipation in such children"