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### Prevalence of Spasticity-Related Pain in Children/Adolescents With Cerebral Palsy

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**Conclusion:** In addition to muscle tone regulation, incobotulinumtoxinA provides sustained pain relief across multiple ICs for children with CP and LL SRP, even when they were engaged in demanding tasks.

### P-249 | Improvements in upper limb spasticity-related pain in children/adolescents with cerebral palsy after incobotulinumtoxinA injections

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**Introduction:** The effects of incobotulinumtoxinA on upper limb (UL) spasticity-related pain (SRP) over multiple treatment cycles (ICs) in children/adolescents (C/As) with cerebral palsy (CP) were analyzed using pooled data from two prospective phase 3 trials.

**Patients and methods:** C/As aged 2–17 years with CP-associated UL spasticity received incobotulinumtoxinA for 4 ICs. SRP was assessed with the Questionnaire on Pain caused by Spasticity (QPS) using C/A- (direct or via interviewer) and parent/caregiver (P/C)-completed UL modules. The pain population included all C/As with a key QPS item score >0 at baseline; post-baseline scores of 0 indicated complete pain relief.

**Results:** Data from 155 C/As and 444 P/Cs with data for at least one key QPS item were included. UL general SRP was reported by 69 C/As at baseline; 39.7%/41.8% of patients treated with incobotulinumtoxinA were pain-free by week 4 of IC1/IC4 ( $p < 0.001$  vs baseline for all ICs), at which times C/A-reported mean UL QPS general item intensity scores had improved by 1.7/2.2 points ( $p < 0.001$  vs baseline for all ICs). P/Cs observed UL general SRP in 294 C/As at baseline; 28.3%/38.2% of patients treated with incobotulinumtoxinA were pain-free by week 4 of IC1/IC4 ( $p < 0.001$  vs baseline for all ICs). C/A-reported and P/C-observed improvements were generally greater with demanding tasks than at rest and more pronounced with increasing incobotulinumtoxinA ICs.

**Conclusion:** In addition to muscle tone regulation, incobotulinumtoxinA provided sustained pain relief across multiple ICs for children with CP and UL SRP, even when they were engaged in demanding tasks.

### P-250 | Muscle stem cell characteristics across contracted muscles and functional levels in children with cerebral palsy

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**Introduction:** Satellite cells (SC) are muscle-specific stem cells that facilitate postnatal development and repair. Children with CP have impaired muscle growth and develop contractures. We investigated if SC characteristics differs between contracted and non-contracted muscles and across GMFCS functional levels in children with CP.

**Patients and methods:** Thirty-six children participated in this study (CP: mean age  $11.32 \pm 0.57$ , sex: 22 male, 12 female, GMFCS: I-V, TD: mean age  $13.50 \pm 0.76$ , sex: 3 male, 3 female). Muscle biopsies ( $n = 40$ ) were obtained from vastus lateralis (TD and CP), adductors and gastrocnemius (CP) during surgery for contractures (CP) or for ACL repair (TD). Muscle cross-sections were immunohistochemically labeled for Pax7, Dystrophin, MHC-1, DAPI, Ki67, MyoD in 2–3 serial sections.

**Results:** Non-contracted muscles (VL) in children with CP have overall lower SC abundance and a higher percentage of activated SCs compared to TD children ( $10.1 \pm 2.0$  vs.  $19.7 \pm 8.5$  SC/100 fibers,  $p < 0.05$ ) ( $3.9 \pm 2.5$  vs.  $1.3 \pm 2.01\%$  activated SCs,  $p < 0.05$ ). Contractured muscles exhibited higher SC abundance with lower percentage of activated SCs compared to non-contracted muscles ( $16 \pm 4.4$  vs.  $10.1 \pm 2$  SC/100 fibers,  $p < 0.05$ ) ( $0.6 \pm 0.8$  vs.  $3.9 \pm 2.5\%$  activated SCs  $p < 0.05$ ). SC abundance was similar across GMFCS levels.

**Conclusion:** SCs of CP contracted muscle appear to be abundant but have lower myogenic potential compared to non-contracted muscles. These SCs may contain an exasperated intrinsic cell deficiency disallowing them from progressing into proliferative/differentiative stages in attempts to facilitate growth.

### P-251 | Prevalence of spasticity-related pain in children/adolescents with cerebral palsy

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**Introduction:** This analysis determined the prevalence and intensity of spasticity-related pain (SRP) in children/adolescents (C/As) with cerebral palsy (CP).

**Patients and methods:** Baseline data from the prospective incobotulinumtoxinA trials TIM, TIMO and XARA were pooled. In all three studies, SRP was assessed in C/As aged 2–17 years with lower limb (LL) and/or upper limb (UL) spasticity using the Questionnaire on Pain caused by Spasticity (QPS); both self-reports (direct or via interviewer) and parent/caregiver (P/C) observer reports were included. A C/A was considered to have SRP if any QPS key item score was rated >0 at baseline. Individual QPS modules were descriptively analyzed.

**Results:** At baseline, 331 and 155 C/As and 841 and 444 P/Cs completed at least one item of the relevant LL and UL QPS module, respectively. The presence of LL or UL SRP with at least one activity at baseline was respectively reported by 81.9% and 69.7% of C/As and observed by 85.9% and 77.7% of P/Cs. For both LL and UL SRP, frequency and intensity were higher with more demanding activities, irrespective of who completed the QPS. P/Cs indicated that SRP altered many of their child's behaviors, such as activity level, posture, mood, facial expression, eating, sleeping and interactions with others.

**Conclusion:** This pooled analysis indicates that most C/As with CP and LL and/or UL spasticity experience SRP, which is associated with more demanding activities. This emphasizes the need for effective, early and long-term pain management in C/As with CP.

### P-252 | The effects of power exercises on body structure and function, activity and participation in children with cerebral palsy: An ICF based systematic review

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**Introduction:** Power training can be a promising approach to improve function in daily living activities. This systematic review investigates the effect of power exercises on the International Classification of Functioning (ICF) components body structure and function, activity and participation in children with cerebral palsy (CP) compared to alternative training programs.

**Methods:** MEDLINE (PubMed), Web of Science, and Cochrane Library were searched until August 30, 2021. Methodological quality and evidence synthesis were assessed by two independent reviewers using the Cochrane Risk of Bias Tools and Modified Bakker Scale.

**Results:** Ten studies met the inclusion criteria. The overall risk of bias of four randomized clinical trials was low, one had some concerns and two were rated as high. All three non-randomised studies had moderate risk of bias. Moderate

evidence that power exercises increased walking speed, activities of daily living, muscle strength and enhanced gross motor function more than routine physical therapy program was found and without any adverse events.

**Conclusion:** The lack of stronger evidence for power training interventions to improve body structures, body functions, activity and participation domain of ICF in children with CP might be explained by the differences in training protocols and degree to which these meet the physiological definition of power, different methods of measuring power, limited durations of training, and relative effectiveness of control interventions. Future research should also focus on the effect of power exercises on the ICF participation domain.

### Treatment: Service provision

#### P-267 | Models and principles to guide the organization of physical and mental health services for youth: A scoping review

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**Introduction:** Youth with physical disabilities face multiple challenges, and research indicates that mental health problems in this population are prevalent. However, rehabilitation services are seldom organized in such a way to address mental health needs. This scoping review aimed to map and synthesize current evidence related to the organization and delivery of services for youth with a co-occurring physical disability and emerging mental health problem (e.g., symptoms of depression, anxiety or diagnosed mental disorder).

**Patients and methods:** Four databases (Medline, PsycINFO, CINAHL, Embase) were consulted for peer-reviewed scientific articles in French or English published between 2000 and 2021. Articles were included if they addressed: (1) youth aged 15 to 24 with a childhood-onset physical disability, (2) mental health problems, and (3) healthcare service organization or delivery. Documents were screened and extracted by 2 reviewers.

**Results:** 16 peer-reviewed articles (from 1011 identified) met all inclusion criteria. They were primarily from the USA (9/16), and included quantitative (6), qualitative (5), conceptual (3) and mixed methods (2) papers. Most (12/16) targeted a sample including various physical disabilities, and all papers highlighted unmet mental health needs. Only two novel models of service delivery were presented, though other principles such as inter-professional and intersectoral collaboration and having a case coordinator were also present.

**Conclusion:** This scoping review identifies current gaps including few existing models and key principles to guide health and rehabilitation services for youth with multiple needs. Results can inform how to shape comprehensive networks of care to be more accessible and efficient.