Supplemental Material S2. Benefits of principles of motor learning in motor speech interventions for children with CAS and upper limb motor interventions for children with CP.

PML	Motor speech interventions for children with CAS		Upper limb interventions for children with CP	
Intervention dose	**High-frequency** Includes100–150 trials per session (Edeal & Gildersleeve-Neumann, 2011) Includes 12 sessions x 1 hr, 4 days a week for 3 weeks (Maas et al., 2014)	**Moderate-frequency** Includes 30–40 trials per session (Edeal & Gildersleeve-Neumann, 2011) **Low intensity** Includes 20 sessions, 1 hr a week (Maas et al., 2014)	**High-frequency** Intervention dosage 30–40 hours More effective (Jackman et al., 2020)	**Low intensity** Intervention dosage: less than 14 hours Less effective (Jackman et al., 2020)
Practice distribution: Massed vs Distributed	**Massed Practice,** More effective in DTTC[2]; 2 sessions a day, 5 sessions a week for 8 weeks (Maas & Farinella, 2012) Facilitates: Accuracy of sounds (Wambaugh et al., 2013) Acquisition of skills (Knock et al. 2000; Maas et al., 2019) Retention of skills (Knock et al. 2000)	**Distributed Practice** Less effective in DTTC: 3 sessions a week for 8 weeks (Maas & Farinella, 2012)	**Massed Practice** More effective Consists of: 3 hours a day for 2 weeks (Klingels et al., 2013)	**Distributed Practice** Less effective Consists of: 5 x1 hour sessions a week for 10 weeks (Klingels et al., 2013)

Practice variability: Varied vs Constant targets	**Variable practice** Facilitates: Production of sounds (Ballard et al., 2007)	**Constant practice** Facilitates: Acquisition of skills (Park &Shea, 2005)	**Variable practice** More effective (Demers et at., 2021)	**Constant practice** Less effective Demers et at., 2021)
Practice schedule: Random vs Blocked	**Random practice** Facilitates: Retention and transfer of skills (Knock et al., 2000; Scheiner et al., 2014) Faster acquisition of new skills (Maas & Farinella, 2012)	**Blocked practice** Facilitates: Acquisition of new speech skills. (Knock et al., 2000; Scheiner et al., 2014) Improvements in speech (Maas & Farinella, 2012)	**Random practice** More effective (Prado et al., 2017)	**Constant practice** Less effective (Prado et al., 2017)
Attentional focus: Internal vs External	**External focus** Facilitates: Automatic control of speech movements, consistent speech productions (Freedman et al., 2007; Lisman & Sadagopan, 2013)	**Internal focus** No data	**External focus** More effective (Pourazar et al., 2017)	**Internal focus** Less effective (Pourazar et al., 2017)
Target complexity: Complex vs Simple	**Complex target** Facilitates: Moderate contribution to improvement (Maas et al., 2019)	**Simple target** No data	**Complex target** No data	**Simple Target** No data

Feedback type: Knowledge of performance vs Knowledge of results	**Knowledge of performance** Facilitates: Self-evaluation skills and retention (Knock et al., 2000)	**Knowledge of results** No data	**Knowledge of performance** More effective once skill is learnt (Muratori et al., 2013) Inconclusive findings (Robert et al., 2017)	**Knowledge of results** More effective in skill acquisition (Muratori et al., 2013) Inconclusive findings (Robert et al., 2017)
Feedback frequency: Frequent vs Infrequent	**High frequency** Feedback given: 100% of all trials Less effective (Katz et al., 2010; Maas et al., 2012; Kim et al., 2012)	**Low frequency** Feedback given: 20%, 50% or 60% of all trials More effective (Katz et al., 2010; Kim et al., 2012) Inconsistent findings (Maas et al. 2012)	**High frequency** Feedback given: 100% of all trials More errors No difference in skill acquisition (Burtner et al., 2014)	**Low frequency** 62% feedback more errors Less errors No difference in skill acquisition (Burtner et al., 2014)
Feedback timing: Delayed vs Immediate	**Delayed feedback** Facilitates: acquisition, retention, and transfer of skills (Hula et al., 2008).	**Immediate feedback** Facilitates: Faster rate of acquisition (Hula et al., 2008; Bislick et al., 2012).	**Delayed feedback** More effective (Muratori et al., 2013)	**Immediate feedback** Less effective (Muratori et al., 2013)

[1]Principles of motor learning (PML); [2] Dynamic Temporal Tactile Cuing (DTTC; Strand et al., 2020)

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