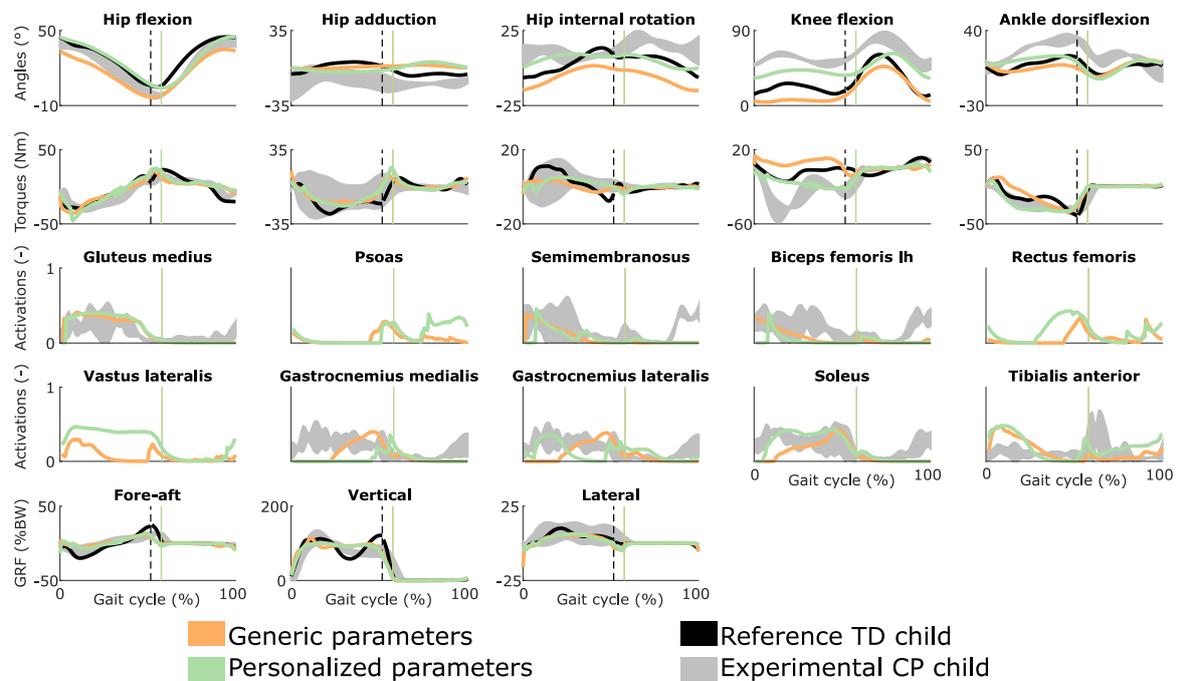
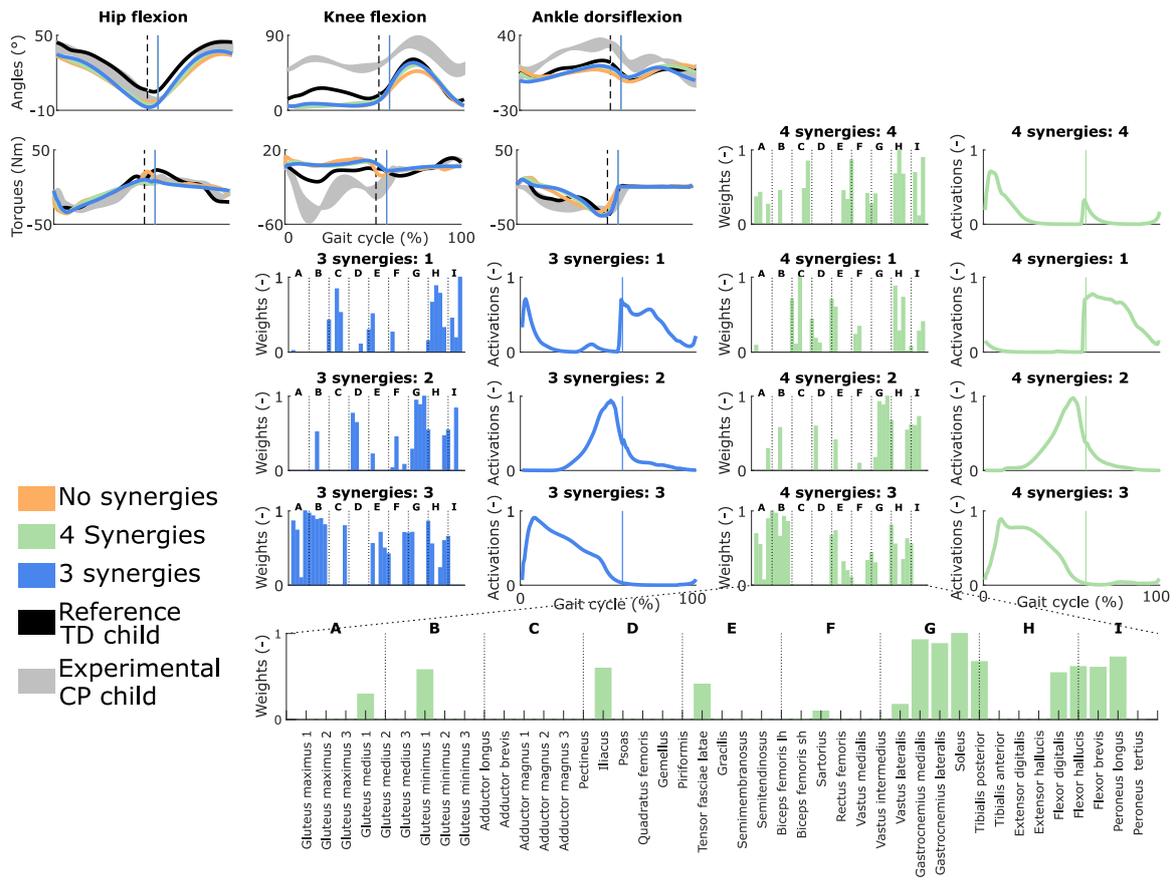


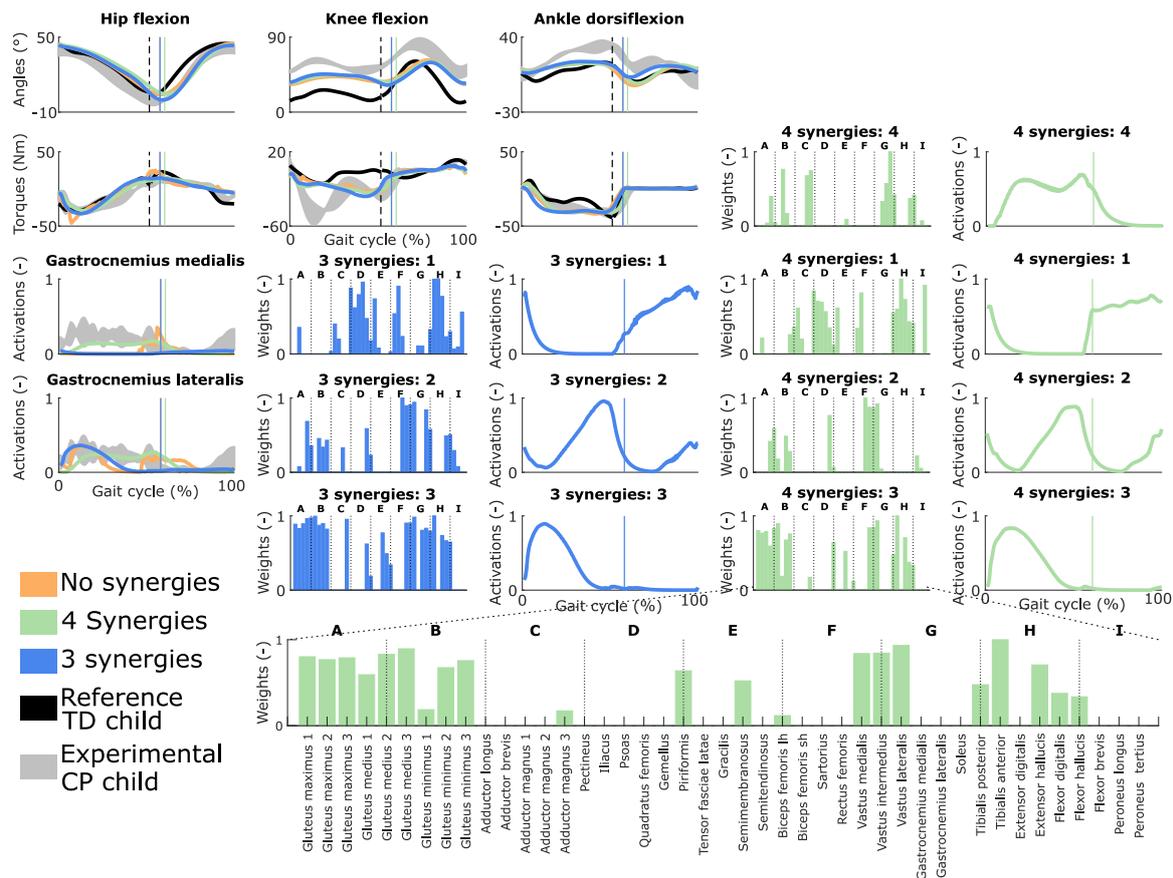
## Supplementary Figures



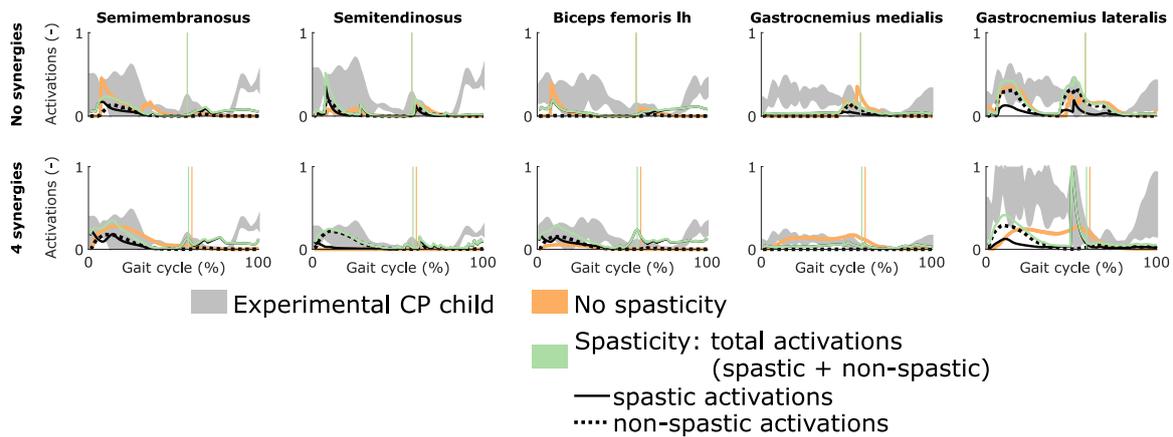
**Figure S1. Influence of the muscle-tendon parameters on the predicted walking gaits.** Variables from the left leg are shown over a complete gait cycle; right leg variables are shown in Figure 2 (Manuscript). Solid vertical lines indicate the transition from stance to swing. Experimental data is shown as mean  $\pm$  two standard deviations. Experimental EMG data was normalized to peak activations. Reference TD child data was available for a single gait cycle starting at right heel strike; left leg data was thus reconstructed from that gait cycle but is discontinuous as indicated by the dashed vertical lines. GRF is for ground reaction forces; BW is for body weight; COT is for metabolic cost of transport; lh is for long head.



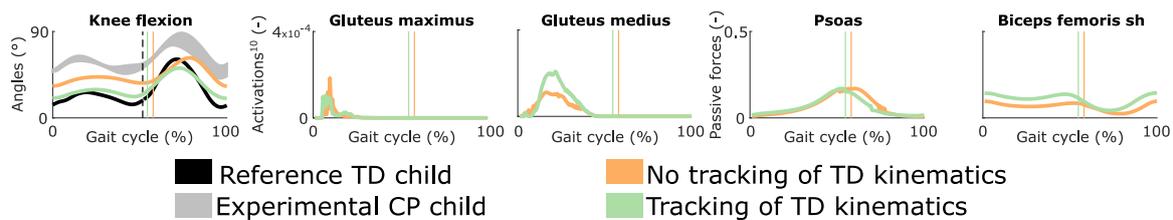
**Figure S2. Influence of the synergies on walking gaits predicted with the generic muscle-tendon parameters.** Variables from the left leg are shown over a complete gait cycle; right leg variables are shown in Figure 3 (Manuscript). Vertical lines (solid) indicate the transition from stance to swing. Panels of synergy weights are divided into sections (A-I) to relate bars to muscle names provided in the bottom bar plot, which is an expanded version of the plot of weights with title 4 synergies: 3. Lh and sh are for long and short head, respectively. Weights were normalized to one. Experimental data is shown as mean  $\pm$  two standard deviations. Reference TD child data was available for a single gait cycle starting at right heel strike; left leg data was thus reconstructed from that gait cycle but is discontinuous as indicated by the dashed vertical lines.



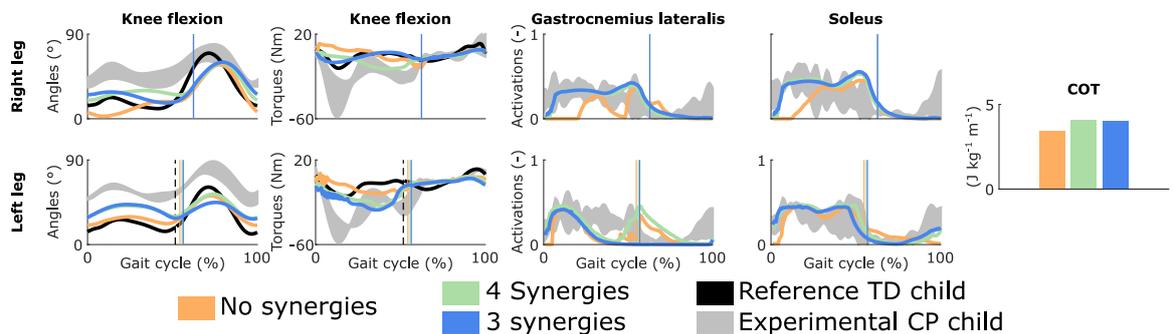
**Figure S3. Influence of the synergies on walking gaits predicted with the personalized muscle-tendon parameters.** Variables from the left leg are shown over a complete gait cycle; right leg variables are shown in Figure 4 (Manuscript). Vertical lines (solid) indicate the transition from stance to swing. Panels of synergy weights are divided into sections (A-I) to relate bars to muscle names provided in the bottom bar plot, which is an expanded version of the plot of weights with title 4 synergies: 3. Lh and sh are for long and short head, respectively. Weights were normalized to one. Experimental data is shown as mean  $\pm$  two standard deviations. Experimental EMG data was normalized to peak activations. Reference TD child data was available for a single gait cycle starting at right heel strike; left leg data was thus reconstructed from that gait cycle but is discontinuous as indicated by the dashed vertical lines.



**Figure S4. Influence of spasticity on the predicted muscle activity.** Activations from left leg muscles only are shown over a complete gait cycle; right leg activations are shown in Figure 5 (Manuscript). When accounting for spasticity, total activations (green) combine spastic (solid black) and non-spastic (dotted black) activations. Vertical lines indicate the transition from stance to swing. Experimental data is shown as mean  $\pm$  two standard deviations. Experimental EMG data was normalized to peak activations. Lh is for long head.



**Figure S5. Influence of tracking the TD kinematics on predicted walking gaits.** Variables from the left leg are shown over a complete gait cycle; right leg variables are shown in Figure 6 (Manuscript). Vertical lines indicate the transition from stance to swing. Experimental data is shown as mean  $\pm$  two standard deviations. Muscle fatigue is modeled by activations at the tenth power. Passive muscle forces are normalized by maximal isometric muscle forces. Sh is for short head.



**Figure S6. Influence of the synergies on walking gaits predicted with the personalized muscle-tendon parameters while tracking the TD kinematics.** Solid vertical lines indicate the transition from stance to swing. Experimental data is shown as mean  $\pm$  two standard deviations. Experimental EMG data was normalized to peak activations. Reference TD child data was available for a single gait cycle starting at right heel strike; left leg data was thus reconstructed from that gait cycle but is discontinuous as indicated by the dashed vertical lines.