Appendix D The intervention method to improve pelvic rotation

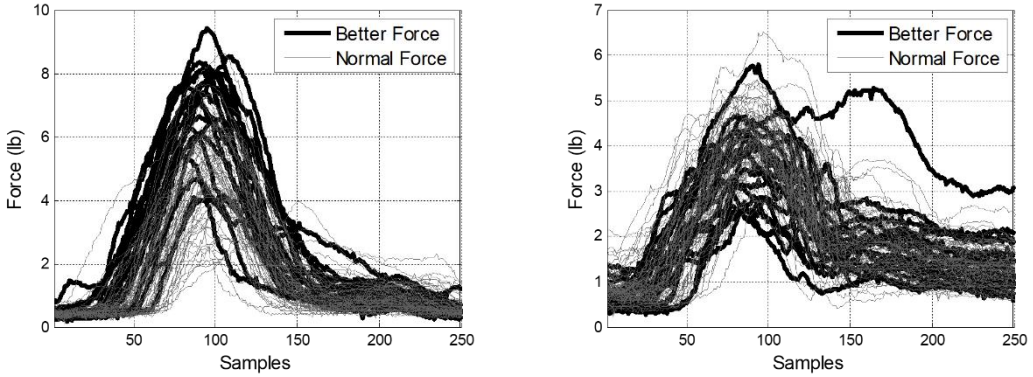
We analyzed the therapist intervention during the clinical NDT rehabilitation conducted by therapists. Table 1 illustrates the subjects' pelvic rotations, generally improved in traditional NDT rehabilitation by therapists. Therefore, we analyzed the relationship between the therapists' intervention and the pelvic rotation in the following three scenarios:

(1) The applied forces when the pelvic rotation is better.
(2) The pelvic rotation when the applied forces are more considerable.
(3) The influences of larger forces on the asymmetry of swing phases.

Table 1. Pelvic rotation from the clinical NDT rehabilitation by therapists.

Subject	A	B (imp%)		$\bar{A}$ (imp%)	
P1	8.9	16.7	(87)	10.0	(12)
P2	18.0	23.1	(28)	18.7	(4)
P3	11.3	16.3	(45)	11.4	(2)
P4	12.1	16.9	(39)	15.8	(31)
P5	19.9	26.5	(34)	22.6	(14)
P6	17.3	21.6	(25)	15.1	(-12)
P7	21.9	35.9	(65)	24.4	(12)
P8	15.6	31.6	(103)	17.9	(15)
P9	9.4	25.9	(175)	17.7	(87)
P10	9.2	18.2	(98)	12.8	(39)

(1) Figure 1 illustrates the intervention forces when the pelvic rotation is the best 20%. We concluded that the therapists' intervention forces were more significant when the pelvic rotation Amp_{PR} was better. For example, the average pelvic rotation is $22.98°$ with an average applied force of $F_{\max} = 2.79$ lb . When Amp_{PR} is the best 20%, the average pelvic rotation $28.24°$ is with an average applied force of $F_{\max} = 3.07$ lb . The applied forces were more considerable when the pelvic rotation was better.



(a) on the sound side (b) on the paretic side

Figure S4. The intervention force analyses for pelvic rotation.

(2) The impacts of force magnitudes on pelvic rotation: the average applied force is $F_{\max} = 2.79$ lb with an average pelvic rotation of $22.98°$. Considering the largest 20% applied forces, the average applied force is $F_{\max} = 3.8$ lb with an average pelvic rotation of $Amp = 23.81°$. The pelvic rotation was larger when the applied forces were bigger.

(3) The influences of force magnitudes on the longitudinal symmetry: the results are shown in Table 2, where the magnitude of the applied forces had no significant influence on the asymmetry of swing phases $Asym_{SP}$.

Table S4-2. $Asym_{SP}$: all steps v.s. steps with the largest 20% applied forces.

Subject	all steps	steps with the largest 20% forces
P1	17.15	19.94
P2	36.78	36.50
P3	38.67	35.07
P4	34.87	37.49
P5	38.02	55.09
P6	33.79	32.68
P7	17.30	13.34
P8	33.39	38.10
P9	4.36	-8.00
P10	13.35	-13.34

From the above analyses, adjusting the magnitudes of applied forces can improve the pelvic rotation Amp_{PR} without influencing the asymmetry of swing phases $Asym_{SP}$. Therefore, we modified the NDT intervention to improve pelvic rotation: *increasing the applied forces* $\bar{F}_{\max}$ *by 50% when the pelvic rotation* Amp_{PR} *is less than a threshold of* 12^{o}.