

## Supplementary Material

Supplemental Table 1. LSVT LOUD treatment schedule and repetition dose.

<b>Target</b>	<b>Treatment Sessions</b>	<b>Homework on treatment days (4 days/week)</b>	<b>Treatment on non-treated days (3 days/week)</b>	<b>Total Minimum Repetitions in one month</b>	<b>12 Week Maintenance Schedule</b>
Long Ah	15 reps/day 16 days= 240	6 reps/day 16 days= 96	12 reps/day 14 days = 168	504	6 reps/day 84 days = 504
High Ah	15 reps/day 16 days = 240	6 reps/day 16 days = 96	12 reps/day 14 days = 168	504	6 reps/day 84 days = 504
Low Ah	15 reps/day 16 days = 240	6 reps/day 16 days = 96	12 reps/day 14 days = 168	504	6 reps/day 84 days = 504
Functional Phrases	10 phrases 5x/day 16 days = 800	10 phrases 2x/day 16 days = 320	10 phrases 4x/day 14 days = 560	1680	10 phrases 2x/day 84 days = 1680
Structured Reading	Week 1: 20 min 4 days = 80 min Week 2: 20 min 4 days = 80 min Week 3: 15 min 4 days = 40 min Week 4: 5 min 4 days = 20 min Total= 220 min	5 min/day 16 days = 80 min	10 min/day 14 days = 140 min	440 minutes structured reading/verbal practice with target voice	5 min/day 84 days = 420 min
Conversational Speech	Week 1: 5 min 4 days = 20 min Week 2: 5 min 4 days = 20 min Week 3: 10 min 4 days = 60 min	5 min/day 16 days = 80 min	10 min/day 14 days = 140 min	440 minutes structured conversation with focus on target voice	N/A

	Week 4: 20 min 4 days = 80 min Total= 180 min				
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Supplemental Table 2. ROI selections for different fibre tracts

<b>Tract</b>	<b>Operations</b>
Genu and Splenium of the Corpus Callosum	<ul style="list-style-type: none"> <li>• Under the image tab, move the sagittal slice until the image looks similar to 'gcc' or 'scc' on p.253</li> <li>• Place the axial plane line in sagittal view so that it lines up at the inferior edge of the 'gcc' or 'scc', move the axial plane line up five slices.</li> <li>• Under Fiber tab, use POLY shape with OR operation on the sagittal slice to select the area from the inferior edge of the 'gcc' or 'scc', up to the axial plane line measured in the previous step.</li> <li>• Under Fiber tab, use POLY shape with NOT operation to remove any fibers not belonging to the genu or splenium of the Corpus Callosum</li> </ul>
Cingulum	<ul style="list-style-type: none"> <li>• Under the image tab, move the axial slice until the image looks similar to 'cgh' on p.51</li> <li>• In Axial view, under Fiber tab, use POLY shape with CUT operation to select the teal fibers lateral to the brain stem.</li> <li>• Move up five axial slices and use the CUT operation again and select the bundle of fibers lateral to the brain stem.</li> </ul>
Corticospinal Tract	<ul style="list-style-type: none"> <li>• Under the image tab, move the axial slice until the image looks similar to 'pic' on p.79</li> <li>• Under Fiber tab, use POLY shape with OR operation to select the purple 'pic' fibers</li> <li>• Under the image tab, move the axial slice until the image looks similar to 'cst' on p.39</li> <li>• Under Fiber tab, use POLY shape with OR operation to select the teal fibers in the brain stem</li> <li>• Move up five axial slices and use the AND operation and select the purple fibers in the brain stem</li> <li>• Under the Fiber tab, use POLY shape with NOT operation to remove any fibers not belonging to the Corticospinal Tract.</li> </ul>
Inferior Longitudinal Fasciculus	<ul style="list-style-type: none"> <li>• Under the image tab, move the sagittal slice until the image looks similar to 'ss' on p.211</li> <li>• Under Fiber tab, use POLY shape with OR operation to select the bundle of green fibers projecting into the temporal lobe.</li> </ul>

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Superior Longitudinal Fasciculus	<ul style="list-style-type: none"> <li>• Under the Fiber tab, use POLY shape with NOT operation to remove any fibers projecting towards the other hemisphere, and any other fibers not belonging to the inferior longitudinal fasciculus.</li> <li>• Move the coronal slice to the middle of the tract. Under the Fiber tab, use POLY shape with AND operation to select the middle of the fiber tract.</li> </ul>
Posterior Limb of the Internal Capsule	<ul style="list-style-type: none"> <li>• Under the image tab, find the axial slice where the SLF is at its widest (for example, the 'slf' on pg.99).</li> <li>• Place the coronal plane line in axial view at the widest part of the SLF.</li> <li>• In coronal view, under the Fiber tab, use the CUT operation to select the green fibers lateral to the superior corona radiata.</li> <li>• Move the coronal slice ten slices anteriorly.</li> <li>• In coronal view, use the CUT operation again to select the central cluster of fibers</li> <li>• Under the Fiber tab, use POLY shape with NOT operation to remove any fibers not belonging to the Corticospinal Tract.</li> </ul>
Uncinate	<ul style="list-style-type: none"> <li>• Under the image tab, move the axial slice until the image looks similar to 'pic' on p.79</li> <li>• Place the coronal plane line in axial view so that it lines up at the posterior edge of the pic. In axial view, move the coronal plane line anteriorly twenty slices.</li> <li>• Under Fiber tab, use POLY shape with OR operation on the axial slice to select the area from the posterior end of the pic, up to the coronal plane line measured in the previous step.</li> <li>• Move up five axial slices</li> <li>• In axial view, use the coronal plane line again to measure twenty slices.</li> <li>• Under the Fiber tab, use the CUT operation again to select the fibers measured in the previous step.</li> <li>• Under the Fiber tab, use POLY shape with NOT operation to remove any fibers not belonging to the posterior limb of the internal capsule.</li> </ul> <ul style="list-style-type: none"> <li>• Under the image tab, find the most posterior coronal slice where the temporal lobe separates from the parietal lobe (similar to p.139).</li> <li>• In coronal view, under the Fiber tab, use POLY shape with the OR operation to select the entire temporal lobe</li> <li>• In the same slice, under the Fiber tab, use POLY shape with the AND operation to select the bundle of fibers that project into the frontal lobe.</li> </ul>

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Supplemental Table 3. Changes in Mean Diffusivity (MD) observed in children with Cerebral Palsy (CP) group between pre-treatment (PRE), post-treatment (POST) and follow-up (FUP) in the corpus callosum (CC), cingulum (CG), corticospinal tract (CST) and posterior limb of the internal capsule (PLIC). <sup>+</sup> $p < 0.1$ , <sup>\*\*</sup> $p < 0.05$  (one-tailed).

Regions	MD (Mean $\pm$ SD) $\times 10^{-3}$			Test Statistic (df)		
	Pre-Treatment	Post-Treatment	Follow-up	PRE vs POST	POST vs FUP	PRE vs FUP
	Pos CC	0.93 $\pm$ 0.16	0.91 $\pm$ 0.14	0.88 $\pm$ 0.13	-1.92 <sup>+</sup> (5)	-1.788 <sup>+</sup> (5)
Left CG	0.88 $\pm$ 0.11	0.94 $\pm$ 0.16	0.84 $\pm$ 0.04	-	-4.613*(6)	-
Right CG	0.89 $\pm$ 0.09	0.93 $\pm$ 0.19	0.84 $\pm$ 0.08	-	-3.485*(6)	-
Left CST	0.83 $\pm$ 0.09	0.84 $\pm$ 0.07	0.82 $\pm$ 0.08	-	-	-
Right PLIC	0.84 $\pm$ 0.17	0.76 $\pm$ 0.06	0.75 $\pm$ 0.05	-10.17*(7)	-1.547 <sup>+</sup> (6)	-9.217*(6)

Supplemental Table 4. Comparison of Fractional Anisotropy (FA) values between typically developing (TD) children and children with cerebral palsy (CP). A \* indicates significance and a + represents a statistical trend.

	<i>t</i> -test for Equality of Means		
	<i>t</i>	df	Sig. (1-tailed)
Anterior CC	1.46	12	0.08
Posterior CC	1.92	6	0.04 <sup>a*</sup>
Left CG	1.63	8	0.06 <sup>a+</sup>
Right CG	0.77	10	0.22 <sup>a</sup>
Left CST	1.94	8	0.04 <sup>a*</sup>
Right CST	1.87	8	0.04 <sup>a*</sup>
Left ILF	1.06	13	0.15
Right ILF	1.65	10	0.06 <sup>a+</sup>
Left PLIC	1.32	13	0.10
Right PLIC	1.81	9	0.05 <sup>a+</sup>
Left SLF	-	-	-
Right SLF	-	-	-
Left UNC	-	-	-
Right UNC	0.695	12	0.25

<sup>a</sup>Reported Greenhouse-Geisser value