



# Review of Best Practice Techniques: Gait Training

Katie Fabian, SPT

## FAST FACTS:

- After 3 months, 85% of stroke survivors had impaired gait velocity, and after 1 year, walking endurance was limited to 40% of predicted ability.<sup>2</sup>
- Daily step count approximately 47% lower than **sedentary** healthy adults<sup>1</sup>

## Background Information:

- **Stroke is the leading cause of long-term disability**, approximately 75-85% eventually discharge home, 90% have some functional disability with mobility issues.<sup>1</sup>
- **Walking endurance** is most commonly affected after a stroke<sup>1,2</sup>
- Ability to walk and engage in an active lifestyle has health implications for every person, not just stroke survivors

## Common Impairments

- **Walking Endurance:** 1-year post-stroke, endurance was affected in most survivors. Of those who could complete 6MWT, most could only complete 40% of predicted ability.<sup>2</sup>
  - Contributing Factors: LE strength, Standing Balance, Cardiovascular Health
  - **NOT** Contributing: Spasticity, ROM, Poor Sensation or Proprioception.
- **Gait Speed:** by 3 months, 85% had impaired gait speed<sup>2</sup>
- **Balance:** balance on its own does not explain differences in gait, matters for quality and safety of gait (wt shifting, postural control, reactions)<sup>1</sup>

## Effect on Participation

- Limited Community Ambulation
  - Daily step count ~47% lower in stroke survivors than healthy **sedentary** adults.<sup>1</sup>
- Falls
- Affected By: Readiness to Change (motivation), and Self-Efficacy<sup>1</sup>

## FUNCTIONAL OUTCOME MEASURES

<b>6MWT</b>	<b>SEM</b> = 61 ft or 4.8% change; <b>MCID</b> = 112.9 ft; <b>Healthy Adult</b> = 1312 ft; <b>Stroke</b> = 650-990 ft
<b>Gait Speed</b>	<b>SEM</b> = 0.07 sec; <b>MCID</b> = 0.14 m/s; <b>Cut-Off</b> = household: <0.4, limited community: 0.4-0.8, community: >0.8. m/s
<b>TUG</b>	<b>SEM</b> = 1.14 sec; <b>MCD</b> = 2.9 sec; <b>Cut-Off Elderly Stroke</b> = >14 sec; <b>Healthy Adult</b> = 9.1 sec; <b>Stroke</b> = 22.6 sec
<b>Berg</b>	<b>SEM</b> = 2.5; <b>MCID</b> = 7; <b>Cut-Off:</b> 45/56 <b>Healthy Adult</b> = 55/56 (↓ with age)

## WALKING ENDURANCE

### NDT

- Insufficient Evidence<sup>3</sup>, no harm

### PNF

- “improves gait parameters”<sup>4</sup>

### Strength Training

- No significant direct impact<sup>1,5</sup>

### Treadmill Training (TT)

- **Significantly Improved Endurance** (2017 review of 28 trials, n = 1680) mean difference of 48.9 ft\*\* (mod quality)<sup>6</sup>
- **Significantly Improved Endurance** (2003 RCT, n= 29 subacute 4 wks, 3x/wk) group with combined tx of TT and conventional tx walked 28% further than control at 6 weeks and 95% farther after 18 weeks.<sup>7</sup>

### Bodyweight Supported TT (BWSTT)

- **Significantly Improved Endurance** (early 2000s, meta-analysis) endurance improved by 30% found by 3 RCTs<sup>8</sup>
- **Significantly Improved Endurance** (2004 RCT, n = 50 subacute 6 wks, 5x/wk) group with combined tx of BWSTT and conventional tx walked 62% further than control at 6 weeks and 95% farther after 18 weeks.<sup>9</sup>

### Circuit Training (CCT)

- **Significantly Improved Endurance** (2004 RCT, n = 30 subacute 4 wks, 5x/wk, 50 min) CCT group had 120% improvement in 6MWT while control only had 60%; (2017 Cochrane Review 17 RCT, n = 1297) sig 200 ft difference in 6MWT; (2012 RCT, 12 weeks, 2x/wk) sig 66 ft difference in 6MWT; (2017 Cochrane Review) sig 136 ft difference in 6MWT<sup>1,10-12</sup>
- **Significantly Improved Endurance** in chronic stroke<sup>1</sup>



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## GAIT SPEED

### NDT

- Weak Evidence ( RCT, n = 60) significant improvement in 65% of participants<sup>16</sup>

### PNF

- Weak Evidence (2015 RCT, n = 30) significant improvement in TUG with PNF incline and stair training<sup>13,14</sup>

### Strength Training

- No significant direct impact <sup>1,5</sup>

### Treadmill Training (TT)

- Weak Evidence of improvement in chronic stroke
- **Significantly Improved Speed** (2017 review of 47 trials, n = 2323) mean difference of 0.06 m/s (mod quality)<sup>6</sup>

### Bodyweight Supported TT (BWSTT)

- **Significantly Improved Speed** (2004 RCT, n = 50 subacute 6 wks, 5x/wk) group with combined tx of BWSTT and conventional tx walked 0.15m/s faster (93% faster) than control at 6 weeks and 0.21 m/s faster (140% faster) after 18 weeks.<sup>9</sup>

### Circuit Training (CCT)

- **Significantly Improved Speed** (2017 Cochrane Review 17 RCT, n = 1297) sig 0.15 m/s increase in velocity; (2012 RCT, 12 weeks, 2x/wk) sig 0.09 m/s increase in velocity; (2017 Cochrane Review) sig 0.08 m/s increase in velocity <sup>1,10-12</sup>
- **Significantly Improved Speed** in chronic stroke (meta-analysis of 4 RCTs) <sup>1</sup>

## BALANCE & GAIT

### PNF

- Weak Evidence (2015 RCT, n = 30 ) significant improvement in Berg and FTR with PNF incline and stair training<sup>13,14</sup>

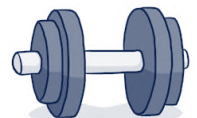
### Modified STS with Mental Practice

- Weak Evidence (n = 28) sig improvements in Berg and DGI with 2 wk, 5x/wk 45 min sessions<sup>15</sup>

### Clinical Takeaways:

- Task Specific Strengthening
- Combination of treatments and variation (just like we experience in normal walking)
- Circuit Training is clinically useful and safe in our setting

### Circuit Training Quick Tips:



- **graded strengthening using functional tasks:** repetitive rise from a chair, stepping up and down a stepper
- **aerobic component:** graded walking activity, stationary bicycle or goal of continuous period of functional tasks at least at a moderate intensity
- **variety of challenging walking activities with substantial postural control:** walking backwards, on foam or stepping over obstacles
- **Intensity and challenge continually incremented for maximal challenge**



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