JUST PUT ONE FOOT IN FRONT OF THE OTHER?

BEST PRACTICE SUGGESTIONS FOR GAIT TRAINING AFTER STROKE

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OBJECTIVES

- Identify key common impairments, their functional implications, and appropriate outcome measures
- Review research for a variety of common treatment techniques
- Suggest practical and feasible evidence-based applications
Stroke is leading cause of long-term disability
- most return home, almost all have some functional disability and mobility impairment.\(^1\)

Ability to walk and engage in an active lifestyle has health implications for every person, not just patients with strokes

Walking endurance is most commonly affected after a stroke\(^1,2\)
One year after stroke, walking endurance was most striking area of difficulty

- Subjects were able to walk only 40% of predicted ability on 6MWT

- Contributing Factors:
  - LE Strength
  - Standing Postural Sway & Balance
  - Cardiovascular Health

- NOT Correlated:
  - Spasticity, ROM, poor sensation or proprioception
“by 3 months, there was still considerable room for improvement in all measures: 85% of participants still had impaired gait speed”
Balance on its own does not explain differences in gait.

However, walking requires dynamic balance, proper weight shifting, postural control, and reactions.
FUNCTIONAL IMPLICATIONS

IMPACT ON PARTICIPATION:

- Limited Community Ambulation
- Readiness to change (motivation)
- Stages of Change (self-efficacy)
- Falls

- Gait Speed ~0.4 m/s more likely to be community ambulators
  - Increasing by >0.4 m/s resulted in increased participation
- Daily step count approximately 47% lower than sedentary healthy adults
<table>
<thead>
<tr>
<th>Test</th>
<th>SEM (m)</th>
<th>MCID (m)</th>
<th>Cut-Off</th>
</tr>
</thead>
<tbody>
<tr>
<td>6MWT</td>
<td>18.6 m</td>
<td>400 m</td>
<td>200-300 m</td>
</tr>
<tr>
<td></td>
<td>4.8% change</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MCID</td>
<td>34.4 m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Healthy Adult</td>
<td>400 m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stoke</td>
<td>200-300 m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gait Speed</td>
<td>0.07 m/s</td>
<td>0.14 m/s</td>
<td>&lt;0.4: household; 0.4-0.8: limited community; &gt;0.8: community</td>
</tr>
<tr>
<td>TUG</td>
<td>1.14 sec</td>
<td>2.9 sec</td>
<td>&gt;14 sec</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&gt;14 sec: community</td>
</tr>
<tr>
<td>Healthy Adult</td>
<td>9.1 sec</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stroke</td>
<td>22.6 sec</td>
<td></td>
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</tbody>
</table>
**TECHNIQUES: NDT & PNF**

- **NDT vs LE strengthening** found both effective in step length, gait speed, and cadence\(^3\)
  - only NDT improved spasticity of hip adductors
- **NDT vs conventional treatment** found greatest improvements in gait velocity (65%) and stride length (83%)\(^4\)
- Some older evidence less clear\(^1\)

- **Systematic Review:** all studies found improved gait outcome measures with PNF\(^5\)
- **PNF and Incline:** significantly improved Berg, FRT, and TUG compared to control\(^6\)
- **PNF and Stair:** significantly improved Berg, FRT, and TUG compared to control\(^7\)
TECHNIQUES: STRENGTH TRAINING

- 6 weeks of isokinetic strength training of quads and hamstrings → improved speed, no increase in spasticity
- Systematic Review found improvement in force generation, minimal translation to walking
- Older literature says yes, newer research says minimal direct impact on walking

KEEP IN MIND:
Strength training is still valuable to our patients as it decreases risk for osteoporosis, a major concern for this patient population
TECHNIQUES: TREADMILL

- Older research seems to be split\(^1\)
  - 2005 Meta-Analysis of 15 RCTs found no significant change
  - General trend towards improved outcomes, not often significant
- Recent Cochrane Review found significantly improved walking endurance and gait speed\(^9\)
- BWSTT vs conventional treatment found significant improvement in walking endurance (30\%)\(^{10}\)
- BWSTT and TT combined with conventional treatment significantly improved speed and endurance\(^{11,12}\)
Multiple studies have found significant and sustained improvements in walking endurance and walking speed in both sub-acute and chronic stroke.  

Circuit vs conventional treatment: significant improvements in walking endurance (60.8 m on 6MWT) and gait speed (0.15 m/s) along with significant decrease in TUG time.

**KEYS TO CIRCUIT TRAINING**

1. graded strengthening using functional tasks
2. aerobic component
3. variety of challenging walking activities with substantial postural control
4. Intensity and challenge continually incremented for maximal challenge
TECHNIQUES: THERABAND ASSISTED & SIT-STAND

- **TB Assisted vs Conventional Treatment:** found significant increase in gait in 3-6 week window, no significant difference by end\(^{17}\)
  - Challenge point?

- **Modified STS vs Conventional Treatment:** found significant improvements in Berg and DGI\(^{16}\)
CLINICAL TAKEAWAYS

- There is no one-treatment-fits-all
- Task-Specific Strengthening
- Combination and Variation
- Circuit Training
RESOURCES


