One-Legged Activities: Necessary Intervention

One-legged stance activities are often ignored in subacute and long-term care settings due to the fact that they are seen as higher level actions that may not be appropriate for this population. In truth, one-legged activities are a part of many standard functional movements and incorporating single-limb testing and training can be an essential part of a PT’s or PTA’s treatment regimen.

Research
There are a number of research articles that highlight the use of the one-legged stance test (OLST) or one-legged activities and exercise with the older population. The OLST is also known as the Single Limb Stance test (SLS) or Unipedal Stance Test (UPST). A unipedal standing balance exercise (standing on one leg for one minute three times a day with or without support) was found to be effective to prevent falls in an elderly group (mean age 81.6) compared to a control group.1 Gehlsen and Whaley found that a one-legged stance test distinguished elderly fallers from non-fallers.2 Ledlie and Renfro found that impaired OLST is a marker of frailty in the elderly population.3 Vellas et al found a 2.1-times greater risk of sustaining injury during a fall if OLST was less than five seconds.4 Springer et al studied 549 subjects of all ages to develop normative data for the OLST.5 These researchers asked subjects to stand barefoot on a limb of choice with eyes both open and closed. Normative values for the elderly are exhibited in Table 1. A typical testing position requires a patient to stand on one foot, usually barefoot, with arms crossed.

A number of exercises can be performed to strengthen these muscle groups including:

- Resisted theraband exercises in sitting (early intervention) and standing (later intervention) in all planes;
- Simple side-stepping (early intervention) progressing to cross-over stepping and braiding and ultimately adding theraband resistance (later intervention);
- Hip abduction strengthening progression starting in supine (most frail) to standing with resistance (later intervention);
- Sitting theraband exercises for evertors and invertors;
- Terminal knee extension (TKE) and short arc quads (SAQ) with theraband resistance or weights;
- Plantarflexion strengthening beginning with manual resistance or theraband in supine or sitting progressing to double-heel raises then single-heel raises both with and without support;
- Having a patient stand on two flat bathroom scales (one foot on each) can provide some visual feedback and objective data for the unweighting of one limb as the patient attempts to move into one-legged stance;
- Using a tennis ball under one foot can be used as an intermediary phase between double-limb stance and progression to single-limb stance.

Physical support can be provided to your patients to progress them to single-limb stance. Begin with the patient using parallel bars, a counter or other stable surface. You can progress the patient holding both of your hands and then remove support by allowing your patient to hold only one hand and then one finger for support. Progress to short periods of nonsupport (i.e., briefly remove your hand or finger from the patient’s) and slowly increase time of nonsupport. The amount and time of support should be documented.

Table. Normative Values (in seconds) for One-Legged Stance in the Elderly Population

<table>
<thead>
<tr>
<th></th>
<th>EYES OPEN</th>
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<th>EYES CLOSED</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Mean (3 Trials)</td>
<td>Mean (Best Trial)</td>
<td>Mean (3 Trials)</td>
<td>Mean (Best Trial)</td>
</tr>
<tr>
<td>60-69</td>
<td>Male 28.7</td>
<td>33.8</td>
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<tr>
<td></td>
<td>Female 25.1</td>
<td>30.4</td>
<td>2.5</td>
<td>3.6</td>
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<td>70-79</td>
<td>Male 18.3</td>
<td>25.9</td>
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<tr>
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<td>Female 11.3</td>
<td>16.7</td>
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<td>80-89</td>
<td>Male 7.4</td>
<td>10.6</td>
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<tr>
<td></td>
<td>Female 5.6</td>
<td>8.7</td>
<td>1.3</td>
<td>1.8</td>
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</tbody>
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References

Bob Thomas is a geriatric physical therapist who currently serves as the president of Infinity Rehab and Therapy Solutions and Healthcare, a provider of rehab in subacute, long-term care, hospitals, schools and outpatient settings in seven states. He lectures nationally on rehab for the frail older population for Great Seminars and Books Inc. and is an adjunct professor in the physical therapy program at Pacific University in Hillsboro, OR.