

# Appendix A

## Intervention Details

Detailed resources on the interventions will be available at  
[www.movement4everyone.com](http://www.movement4everyone.com)

## Summary of Clinic-Based Group-Specific Interventions (13 visits over 10 weeks)

Activity	*MOVE Group Exercise	MOVE Group Feedback	CONTROL Group Exercise	CONTROL Group Feedback
<b>Standing</b>	Bilateral Stance Practice	Auditory, Visual, Tactile <b>*Including biofeedback insoles</b>	Bilateral Stance	<b>None</b>
<b>Rising from a Chair</b>	Mini-Squats Sit to Stand Practice	Auditory, Visual, Tactile <b>*Including biofeedback insoles</b>	Mini-Squats Sit to Stands	<b>None</b>
<b>Rising from the Floor</b>	Lunges Rising from the Floor Practice	Auditory, Visual, Tactile <b>*Including biofeedback insoles</b>	Lunges Rising from the Floor	<b>None</b>
<b>Walking</b>	Walking Practice Treadmill Walking	Auditory, Visual, Tactile <b>*Including biofeedback insoles</b>	Walking Treadmill Walking	<b>None</b>
<b>Stair Climbing</b>	Step Ups and Step Downs Stair Climbing Practice	Auditory, Visual, Tactile <b>*Including biofeedback insoles</b>	Step Ups and Step Downs Stair Climbing	<b>None</b>

## Summary of Home Exercise Group- Specific Interventions (performed 1-2x daily)

Activity or Exercise	*MOVE Group Exercise	MOVE Group Feedback	CONTROL Group Exercise	CONTROL Group Feedback
<b>Clinic Activities</b>	All activities performed in clinic	Auditory & Visual <b>*Utilizing biofeedback insoles</b>	All activities performed in clinic	<b>None</b>
<b>Walking and Standing Endurance</b>	Build up to 30 min daily	Auditory, Visual, Tactile <b>*Including biofeedback insoles</b>	Build up to 30 min daily	<b>None</b>

**\*The MOVE group will also receive education on the importance of symmetrical movement patterns and encouragement to incorporate these patterns in to normal daily life including involvement of significant others for reminders.**

## Summary of Additional Clinic-Based Interventions Utilized in Both MOVE and CONTROL Groups

Intervention Type	MOVE Group Intervention	CONTROL Group Intervention
<b>Neuromotor Re-education*</b>	<ul style="list-style-type: none"> <li>• Quadriceps activation re-education</li> </ul>	Same as MOVE Group
<b>Balance Training*</b>	<ul style="list-style-type: none"> <li>• Single limb balance progression with increasingly challenging conditions (e.g. foam surface or closing eyes)</li> </ul>	Same as MOVE Group
<b>Range of Motion and Flexibility*</b>	<ul style="list-style-type: none"> <li>• Manual therapy techniques and stretching targeting knee range of motion and flexibility in key lower extremity muscle groups</li> </ul>	Same as MOVE Group
<b>Education</b>	<ul style="list-style-type: none"> <li>• Education on healing time frames, swelling management, pain management, wound care, and return to activity progression</li> </ul>	Same as MOVE Group

## Summary of Additional Home Exercise Interventions Utilized in Both MOVE and CONTROL Groups

Intervention Type	MOVE Group Intervention	CONTROL Group Intervention
<b>Neuromotor Re-education*</b>	<ul style="list-style-type: none"> <li>• quadriceps activation exercises during the acute phase</li> </ul>	Same as MOVE Group
<b>Balance Training*</b>	<ul style="list-style-type: none"> <li>• Single limb balance progression with increasingly challenging conditions (e.g. foam surface or closing eyes)</li> </ul>	Same as MOVE Group
<b>Range of Motion and Flexibility*</b>	<ul style="list-style-type: none"> <li>• Low-load long duration stretching, ROM, flexibility in key lower extremity muscle groups</li> </ul>	Same as MOVE Group
<b>Manual Therapy</b>	<ul style="list-style-type: none"> <li>• Scar tissue self-mobilization, soft-tissue massage, and patellofemoral self-mobilization as needed</li> </ul>	Same as MOVE Group
<b>Modalities</b>	<ul style="list-style-type: none"> <li>• Ice 3x/day during acute phase, option for heat or ice during late phase</li> </ul>	Same as MOVE Group

# Motor Learning Overview – MOVE Group

1. **Retention** – Have the patient perform a set/bout of the activity while recording with insoles and observing the patient
  2. **Knowledge of Performance** - Tell them how they did
  3. **Correct Movement Pattern or Progress Activity**
  4. **Feedback** - Have them use feedback for a set/bout
  5. **Consolidation/Faded Feedback** – Have them try to do it without feedback
  6. **Knowledge of Performance** – Tell them how they did
  7. **Emphasize** – Emphasize cues for home as well as how to implement into daily life
- Random order of activity practice at home and from session to session
  - Patients are instructed to use the same procedure at home (retention, feedback, faded feedback) at home during performance of prescribed activities as well as self-selected feedback during the day during performance of activities

# Activity Initiation

- All patients begin with standing, walking, and sit to stand progression
- Lunges – Initiate when a patient can perform a  $\frac{1}{4}$  squat for 2x10 reps without the use of upper extremities
- Step Ups/Downs – Initiate when a patient can perform a  $\frac{1}{2}$  lunge 2x10 reps
- Stairs – Initiate at the same time as step ups/downs

# Activity Progression

1. No movement pattern substitutions (MOVE Group only)
2. No asymmetry (MOVE Group only)
3. Non-pain increasing and safe
4. No muscular fatigue that causes prolonged soreness (tolerance criteria)

Activity	Clinic Dose (Recommended)	Progression
Standing	1 min	AD Weening then Time (HEP)
Walking	5 min	AD Weening then Time (HEP)
Sit to Stand	2x10	Depth
Lunges (Rising from the Floor)	2x10	Depth
Step Ups Downs	2x10	Depth
Stairs	4 flights	Decrease Handrail Use then Speed

Abbreviation: AD, assistive device

# Tolerance Criteria

1. Increased joint pain or muscle soreness greater than 2 hours after last treatment
2. Decrease in ROM by 5°
3. Increase in resting verbal pain score (joint or muscle) by 2 points
4. Subjective decrease in ability to rise from a chair, walk, or climb stairs

**Only 1 finding (e.g. soreness):** maintain current level of provocative exercise/s and advance all others as tolerated

**2 or more findings:** Focus on ROM/low-intensity/low-load for that session and decrease treatment intensity to prior tolerated level. Also consider if total daily activity load is a factor and educate appropriately