Rehabilitation Considerations Following Surgical Arthroscopy of the Hip

Joy Anderson PT, ATC, CSCS
1 Best Rehab Program?
“paucity of evidence surrounding post-operative rehabilitation after hip arthroscopy...thus the superiority of a particular approach cannot be determined”

Post-Operative Rehabilitation after Hip Arthroscopy: A Search for the Evidence.
J Sport Rehabil, 2014, Cheatham et al

“The current literature of hip arthroscopy rehabilitation lacks high-quality evidence to support a specific protocol”

Rehabilitation Following Hip Arthroscopy - A Systematic Review.
Front Surg, 2015 May, Grzybowski et al,
Theory, Evidence, Experience
Three Main Phases

Phase 1: Healing and Protection
   Set up for Success

Phase 2: Functional Restoration
   Progressive restoration of ROM, Strength, MM control

Phase 3: Return to Sport/Activity
   Progressive sport specific endurance, skill training,
Phase 1: 0 to 4-6 weeks
Optimize Healing/Protect Repair

Goals:
Reduce inflammation
Maintain muscle activation
Prevent adhesions and scarring

Time Based Progression
Phase 1: Healing and Protection

Post-op ROM Restrictions

- **Limit ER and Extension to 0 deg** for 4-6 weeks to allow capsule repair to heal
- **Limit Flexion to 90 deg** for 4-6 weeks following a labrum repair to avoid irritating the repair
- CPM? Hip Brace? Anti-ER Boots?
Motion and Mobility

Immediate goal is to prevent postoperative joint stiffness and avoid potential postoperative intra-articular adhesions

- **Bike:** Start 5-10 min progressing to 30 min
  - easy spin no resistance
  - stay upright,
  - spin with minimal resistance.
  - upright posture
  - avoid recumbent

- **Assisted PROM:**
  - Circumduction,
  - ABD to 45 deg,
  - IR Log Roll
  - Painfree Flexion to 90 deg

- **Self Pendulums**

- **Quadriped Rocking**
Weight Bearing

• TTWB x 2 weeks for FAI/repair
• NWB x 4-6 weeks for microfracture or hip dysplasia
• Foot flat gait with crutches
Muscle Activation/Strength

- **Isometrics** for first 2-3 weeks: quads, glutes, Hams, abds
- **Calf pumps**
- **Avoid active hip flexion/SLR** to avoid iliopsoas and capsular irritation
- **Progress to isotonics as tolerated:**
  - ER to neutral in supine
  - bridge to neutral
  - prone hip ext off table to neutral
  - Crunches, pelvic tilts, bird dogs
Considerations/Complications During Phase 1

- Dysplasia
- Microfracture
- Capsular Repair
- Postoperative adhesions

Follow protocol, and surgery specific MD instructions!!
Phase 2: Functional Restoration

Goals of this Phase:

• Regain functional ROM
• Normalize muscle activation, strength, and endurance
• Normalize gait
• Address soft tissue restrictions

Criteria Based Progressions
Challenges Encountered

• Muscle Inhibition
• Compensatory movements
• Muscle spasm/trigger point pain
• Difficulty restoring full ROM
• Decreased tolerance to prolonged standing & walking
Progressive Not Aggressive

COMMON SENSE
Just because you can, doesn't mean you should.
Muscle and Soft Tissue

I don’t know how to put this... but... I’m kind of a big deal.
Interdependent

**Muscles That Cross the Hip**
- Rectus femoris
- Sartorius
- Gracillis
- TFL
- Adductor Longus
- Adductor Magnus
- Adductor Brevis
- Pectineus
- Iliacus
- Psoas
- Gluteus Medius
- Gluteus Minimus
- Gluteus Maximus
- Piriformis
- Obterator Int/Ext
- Gemellis Inf/Sup
- Semi-membranosis
- Semi-tentinosis
- Bicep Femoris

**Muscles That Connect the Trunk to the Pelvis**
- Rectus Abdominus
- Internal Oblique
- External Oblique
- Quadratus Lumborum
- Erector Spinae
- Latissimus Dorsi

**Muscles of the Pelvic Floor**
- A lot of them

**Muscles That Cross the Knee**
- Gracillis
- Sartorius
- Quadratus x4
- Hamstring x3
- Popliteus
- Gastrocnemius
- Plantaris

Grand Total:
Hip Pelvis= 25 x2=50 (+PF)
Knee= 12
**Core:**

Controls the acetabulum by controlling pelvis position

Transfers force from the lower extremities

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**Inhibited:**

Gluteus Medius

Gluteus Maximus

**Facilitated:**

TFL

Adductors

Quads

**Restricted:**

Soft Tissue: TFL, Ant/Lat Quads, Adductors
Improving Glute Med & Max Function

- Cue standing straight!
- Decrease anterior pelvic tilt
- Restore ROM: Hip Extension
- Good exercises to work glute med and max with minimal TFL contribution
Gluteal Muscle Activation During Common Therapeutic Exercises

Lindsay J. DiStefano, J. Troy Blackburn, Stephen W. Marshall, Darin A. Padua
<table>
<thead>
<tr>
<th>Exercise</th>
<th>Mean ± SD (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-limb squat</td>
<td>59 ± 27 (47, 72)</td>
</tr>
<tr>
<td>Single-limb deadlift</td>
<td>59 ± 28 (46, 71)</td>
</tr>
<tr>
<td>Transverse lunge</td>
<td>49 ± 20 (39, 58)</td>
</tr>
<tr>
<td>Forward lunge</td>
<td>44 ± 23 (33, 54)</td>
</tr>
<tr>
<td>Sideways lunge</td>
<td>41 ± 20 (32, 50)</td>
</tr>
<tr>
<td>Side-lying hip abduction</td>
<td>39 ± 18 (31, 47)</td>
</tr>
<tr>
<td>Sideways hop</td>
<td>30 ± 19 (31, 48)</td>
</tr>
<tr>
<td>Clam with 60° hip flexion</td>
<td>39 ± 34 (24, 54)</td>
</tr>
<tr>
<td>Transverse hop*†</td>
<td>35 ± 16 (28, 43)</td>
</tr>
<tr>
<td>Forward hop*†</td>
<td>35 ± 22 (25, 45)</td>
</tr>
<tr>
<td>Clam with 30° hip flexion*†</td>
<td>34 ± 27 (21, 46)</td>
</tr>
<tr>
<td>Lateral band walk*†</td>
<td>27 ± 16 (20, 35)</td>
</tr>
</tbody>
</table>

Abbreviations: CI, confidence interval; MVIC, maximum voluntary isometric contraction.

* Exercises are significantly different than the single-limb squat (P < .05).
† Exercises are significantly different from the single-limb deadlift (P < .05).
‡ Exercises are significantly different from the transverse lunge (P < .05).
# TABLE 2

## Normalized Gluteus Medius Mean Signal Amplitude (% MVIC)

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Mean ± SD (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Side-lying hip abduction</td>
<td>81 ± 42 (62, 101)</td>
</tr>
<tr>
<td>Single-limb squat</td>
<td>64 ± 24 (53, 75)</td>
</tr>
<tr>
<td>Lateral band walk</td>
<td>61 ± 34 (46, 76)</td>
</tr>
<tr>
<td>Single-limb deadlift</td>
<td>58 ± 25 (47, 70)</td>
</tr>
<tr>
<td>Sideways hop</td>
<td>57 ± 35 (41, 73)</td>
</tr>
<tr>
<td>Transverse hop*</td>
<td>48 ± 25 (37, 59)</td>
</tr>
<tr>
<td>Transverse lunge*</td>
<td>48 ± 21 (38, 57)</td>
</tr>
<tr>
<td>Forward hop*</td>
<td>45 ± 21 (38, 57)</td>
</tr>
<tr>
<td>Forward lunge*†</td>
<td>42 ± 21 (33, 52)</td>
</tr>
<tr>
<td>Clam with 30° hip flexion*</td>
<td>40 ± 38 (23, 57)</td>
</tr>
<tr>
<td>Sideways lunge*†</td>
<td>39 ± 19 (30, 47)</td>
</tr>
<tr>
<td>Clam with 60° hip flexion†</td>
<td>38 ± 29 (25, 51)</td>
</tr>
</tbody>
</table>

* Abbreviations: CI, confidence interval; MVIC, maximum voluntary isometric contraction.
* Exercises are significantly different than the hip abduction exercise (P < .05).
† Exercises are significantly different from the single-limb squat (P < .05).
FIGURE 1. Start and end position for hip clam exercise with 60° hip flexion (FIGURE 1A); middle position for hip clam exercise with 60° hip flexion (FIGURE 1B).

FIGURE 2. Middle position for side-lying hip abduction exercise.


FIGURE 4. Lateral band walks.

FIGURE 5. Forward lunge.

FIGURE 6. Sideways lunge.
Electromyographic Analysis of Core Trunk, Hip, and Thigh Muscles During 9 Rehabilitation Exercises

**TABLE 1**

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Gluteus Medius</th>
<th>Gluteus Maximus</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Side-bridge</td>
<td>74 ± 30†</td>
<td>21 ± 16</td>
</tr>
<tr>
<td>2. Unilateral-bridge</td>
<td>47 ± 24‡</td>
<td>40 ± 20†</td>
</tr>
<tr>
<td>3. Lateral step-up</td>
<td>43 ± 18‡</td>
<td>29 ± 13</td>
</tr>
<tr>
<td>4. Quadruped arm/lower extremity lift</td>
<td>42 ± 17‡</td>
<td>56 ± 22†</td>
</tr>
<tr>
<td>5. Active hip abduction</td>
<td>39 ± 17‡</td>
<td>21 ± 16</td>
</tr>
<tr>
<td>6. Dynamic Edge</td>
<td>33 ± 16</td>
<td>19 ± 14</td>
</tr>
<tr>
<td>7. Lunge</td>
<td>29 ± 12</td>
<td>36 ± 17‡</td>
</tr>
<tr>
<td>8. Bridge</td>
<td>28 ± 17</td>
<td>25 ± 14</td>
</tr>
<tr>
<td>9. Prone-bridge</td>
<td>27 ± 11</td>
<td>9 ± 7</td>
</tr>
</tbody>
</table>
Which Exercises Target the Gluteal Muscles While Minimizing Activation of the Tensor Fascia Lata? Electromyographic Assessment Using Fine-Wire Electrodes

Selkowitz et al, JOSPT Feb, 2013

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Tensor Fascia Lata</th>
<th>Gluteus Medius</th>
<th>Superior Gluteus Maximus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sidelying hip abduction</td>
<td>32.3 ± 13.1</td>
<td>43.5 ± 14.7 (P = .012)</td>
<td>23.7 ± 15.3 (P = .033)</td>
</tr>
<tr>
<td>Bilateral bridge</td>
<td>8.2 ± 7.4</td>
<td>15.0 ± 10.5 (P = .011)</td>
<td>17.4 ± 11.9 (P = .008)</td>
</tr>
<tr>
<td>Clam</td>
<td>11.4 ± 11.4</td>
<td>26.7 ± 18.0 (P = .006)</td>
<td>43.6 ± 26.1 (P &lt; .001)</td>
</tr>
<tr>
<td>Hip hike</td>
<td>31.4 ± 14.4</td>
<td>37.7 ± 15.1 (P = .196)</td>
<td>17.7 ± 15.2 (P = .001)</td>
</tr>
<tr>
<td>Lunge</td>
<td>21.6 ± 14.5</td>
<td>19.3 ± 12.9 (P = .623)</td>
<td>20.1 ± 11.1 (P = .728)</td>
</tr>
<tr>
<td>Quadruped hip extension, knee extending</td>
<td>15.6 ± 9.3</td>
<td>27.3 ± 14.9 (P &lt; .002)</td>
<td>28.5 ± 16.6 (P &lt; .007)</td>
</tr>
<tr>
<td>Quadruped hip extension, knee flexed</td>
<td><strong>18.7 ± 10.6</strong></td>
<td><strong>30.9 ± 15.2 (P = .001)</strong></td>
<td><strong>30.1 ± 12.5 (P = .012)</strong></td>
</tr>
<tr>
<td>Sidestep</td>
<td>13.1 ± 7.1</td>
<td>30.2 ± 15.7 (P = .002)</td>
<td>27.4 ± 16.7 (P = .002)</td>
</tr>
<tr>
<td>Squat</td>
<td>4.6 ± 3.8</td>
<td>9.7 ± 7.3 (P = .017)</td>
<td>12.9 ± 7.9 (P &lt; .001)</td>
</tr>
<tr>
<td>Step-up</td>
<td>21.4 ± 11.4</td>
<td>29.5 ± 14.9 (P = .065)</td>
<td>22.8 ± 15.6 (P = .754)</td>
</tr>
<tr>
<td>Unilateral bridge</td>
<td><strong>18.1 ± 12.9</strong></td>
<td><strong>30.9 ± 20.7 (P = .007)</strong></td>
<td><strong>34.6 ± 16.8 (P = .001)</strong></td>
</tr>
</tbody>
</table>

*Values are mean ± SD percent maximum voluntary isometric contraction.

*Significantly greater than tensor fascia lata (P < .05).

†Significantly less than tensor fascia lata (P < .05).
Band Walks

Muscle Activation Depends on Positioning

- Lateral hips extended
- Lateral in squat position
- Backwards hips straight
- Backward/Forward Skates
What About the Hip Flexors?
Hip Flexors

- Iliopsoas
- Rectus Femoris
- TFL
Core and Hip Flexor

Optimize Strengthening

- Work hip flexors from a very stable pelvis platform
- Start short lever before long lever.
- Start in a mid-range position before full hip extension
- Seated quad extensions

**Examples:**

- Roller pelvic tilts
- Roller Pelvic tilts with knee raises
- Ball Hold Heel taps
- Ball hold knee extensions
- Front planks
- Front plank taps
- Dolly Pikes
- Modified Side Planks
- Side plank knee drives
Adductors

- Tend to be very tight/facilitated
- Start with side lying leg raises
- Progress to focus on eccentric control and mm coordination through full ROM
Mobility Considerations

- Myofascial restrictions of the TFL, Quad, Adductor
- Limited ROM: Hip Extension, Abduction, ER
- Compensations with movement and gait increase SI/lumbar load.
- Trigger point pain
Anterior/Lateral Tissue Scarring/Tightness
Trigger Point Referred Pain

Dry Needling Guidelines
6 weeks post op in non-operative sites
12 weeks post-op in operative sites
Criteria For Return to Sport Progression

• Normal pain free gait
• Symmetrical ROM
• Manual muscle test of 5/5 or 90% with dynamometer
• Forward step down
• Y balance test 90%
Phase 3

Return to Sport/Activity

• Progression back to functional strength & endurance
• Sports Specific
• Criteria Based Progressions
• Ongoing treatment to limit sxs as stress and loads increase.
• Return to Sport Testing?
Return to Sport Testing
Need to have the potential to succeed!

• Sport Specific: ROM, strength, endurance, reaction time
• Timed squat test
• Single leg squat to 90 +
• Sport cord tests
• Hop tests
• Timed core tests

Criteria Based Progressions are the most important factor
Return to Run
Running Progression Program & Guidelines

Monitor Discomfort Level:

<table>
<thead>
<tr>
<th>Acceptable: Continue to Progress Training</th>
<th>Unacceptable: Back off Training</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General muscle soreness</td>
<td>1. Pain that lasts for 2-3 days after a workout</td>
</tr>
<tr>
<td>2. Slight joint discomfort after workout or next day that is gone in 24 hours</td>
<td>2. Pain that is evident at the beginning of a run/walk then becomes worse as run/walk continues</td>
</tr>
<tr>
<td>3. Slight stiffness at beginning of run or walk that dissipates after first 10 minutes</td>
<td>3. Pain that is keeping you awake at night</td>
</tr>
<tr>
<td></td>
<td>4. Pain that changes your stride</td>
</tr>
</tbody>
</table>

Phase 1: Walking Program
You should be able to walk 30 minutes pain free at a fairly aggressive pace (3.5 miles per hour or higher). Start on a treadmill before progressing to outdoor surfaces.

Phase 2: Quick Response and Plyometric Routine
Quick muscle response and plyometrics will be initiated in this phase, progressing to about 500-600 foot contacts between 1 and 2 legs. Successful completion of this phase is a good indicator that an athlete is ready to initiate the running program.

Walk/Jog Progression:

<table>
<thead>
<tr>
<th>Run Interval</th>
<th>Walk Interval</th>
<th>Repetitions</th>
<th>Total Run Time</th>
<th>Total Time Spent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 minute</td>
<td>1 minute</td>
<td>X7</td>
<td>7 minutes</td>
<td>14 minutes</td>
</tr>
<tr>
<td>2-3 minutes</td>
<td>1 minute</td>
<td>X5</td>
<td>10-15 minutes</td>
<td>15-20 minutes</td>
</tr>
<tr>
<td>3-5 minutes</td>
<td>1 minute</td>
<td></td>
<td>20 minutes</td>
<td>24+ minutes</td>
</tr>
</tbody>
</table>

Run until fatigue or form failure, then walk 1-2 minutes, repeat for a total run time of 25-30 minutes
Initiate running outdoors

Jog every other day with a goal of reaching 30 consecutive minutes.
# 6 WEEK JUMP TRAINING PROGRAM

Click on Links in Boxes Below for Video

<table>
<thead>
<tr>
<th>WEEK 1</th>
<th>WEEK 2</th>
<th>WEEK 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Technique Training Phase</strong></td>
<td><strong>Sets/Reps</strong></td>
<td><strong>Sets/Reps</strong></td>
</tr>
<tr>
<td>Low Hold Squat Jumps</td>
<td>3x5</td>
<td>2 Leg SLJ</td>
</tr>
<tr>
<td>2 Leg Box Jump Up Front</td>
<td>3x5</td>
<td>Skater Jumps</td>
</tr>
<tr>
<td>2 Leg Lateral Box Jump Ups</td>
<td>2x5 each side</td>
<td>Alternate Hop in Place</td>
</tr>
<tr>
<td>2 Leg Backwards Jumps</td>
<td>3x5</td>
<td>1 Leg Box Jump Up Front</td>
</tr>
<tr>
<td>Box Drop 2 Leg</td>
<td>2x5</td>
<td>1 Leg Lateral Line Jumps</td>
</tr>
<tr>
<td>2 Leg 90 Deg Hops</td>
<td>3x2 rounds</td>
<td>Squat Jumps 90 deg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WEEK 4</th>
<th>WEEK 5</th>
<th>WEEK 6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Single Response: Hold</strong></td>
<td><strong>Multi-Response: No Hold</strong></td>
<td><strong>Multi-Response: No Hold</strong></td>
</tr>
<tr>
<td>1 Leg SLJ</td>
<td>4x3</td>
<td>1 leg SLJ</td>
</tr>
<tr>
<td>180 Jumps 2 leg</td>
<td>3x3</td>
<td>1 leg crossover line jump</td>
</tr>
<tr>
<td>Zig-zag Forward</td>
<td>3x10</td>
<td>180 jumps 2 leg</td>
</tr>
<tr>
<td>Zig-Zag Backward</td>
<td>3x10</td>
<td>split squats</td>
</tr>
<tr>
<td>Split Squats</td>
<td>3x6</td>
<td>lateral box split jumps</td>
</tr>
<tr>
<td>1 Leg Hurdle Hop Hold</td>
<td>3x5</td>
<td>front box split jumps</td>
</tr>
<tr>
<td>1 Leg Hurdle Hop Hold</td>
<td>3x5</td>
<td>box drop to VJ 2 leg</td>
</tr>
<tr>
<td><strong>Multi-Response: No Hold</strong></td>
<td><strong>Multi-Response: No Hold</strong></td>
<td><strong>Multi-Response: No Hold</strong></td>
</tr>
<tr>
<td>1 leg hurdle hops lateral bounce</td>
<td>3x6</td>
<td>tuck jumps</td>
</tr>
<tr>
<td>2 leg lateral hurdle hop bounce</td>
<td>3x6-8</td>
<td>1 leg hurdle hops front bounce</td>
</tr>
<tr>
<td>2 leg front hurdle hop bounce</td>
<td>3x6-8</td>
<td>2 leg front hurdle hops No Hold</td>
</tr>
</tbody>
</table>
Pitfalls to Progression

- Not meeting basic ROM, Strength requirements
- Skipping progression steps
- Not getting timely treatment
- Not allowing enough time for recovery
- Pushing through pain
Have patience.
All things are difficult before they become easy  

SAADI