

**PHYSICAL THERAPY MANAGEMENT OF ARTICULAR CARTILAGE LESION: A  
CASE REPORT**

**By**

**MEGAN BUSKER, SPT**

**In partial fulfillment of the  
requirements for the course:  
PT 7243 Evidence-Based Practice Seminar II  
Department of Physical Therapy  
Angelo State University  
Member, Texas Tech University System  
September, 2020**

## **Abstract**

**Background and Purpose:** Articular cartilage covers bony surfaces of joints to decrease friction. Lesions can be of varying severity and be symptomatic or asymptomatic. Current research has focused on surgical interventions with limited research on conservative management of these lesions. The purpose of this case study is to present conservative treatment and the outcomes of a patient experiencing symptoms related to an articular cartilage lesion.

**Case Description:** Patient is a 41-year-old female referred to Physical Therapy for pain in the right knee. Main complaint was pain during and after running that prevented self-selected running duration and frequency. Findings from evaluation were decreased hip musculature endurance on right compared to left, testing of right gluteus medius resulted in tensor fascia latae compensation, tenderness to palpation at distal medial patella, decreased patellar mobility in all directions and decreased functional dorsiflexion range of motion on the right compared to the left. Interventions included a running program, therapeutic exercise (TE) and correction of body mechanics with functional movement.

**Outcomes:** Patient's overall pain level and symptoms decreased in intensity and frequency. Patient's mental health improved on the Short Form-12 Health Survey. The Lysholm Knee Scoring Scale and International Knee Documentation Committee Subjective Knee Form demonstrated improved scores.

**Discussion:** Physical Therapy proved to be an effective strategy to decrease symptoms and improve this patient's overall function. Primary goal of returning to self-selected running duration and frequency was achieved. Continued research is needed to demonstrate the effect on Physical Therapy on various grades of articular cartilage lesions.

**Key Words:** Physical Therapy, Articular Cartilage Lesion, Running Knee Pain

## **Introduction**

An articular cartilage lesion is defined as a defect in the cartilage that surrounds the bony surface of joints as a form of protection and decreased friction. A study completed by Hjelle et al. found through 1,000 arthroscopies of knees 61% exhibited osteochondral or focal chondral lesions with 55% of those being grade II lesions or higher.<sup>1</sup> Another study completed by Bezuglov et al. found at least one lesion in all 47 asymptomatic male soccer players who underwent bilateral MRI scans (n = 94).<sup>2</sup>

Defects can be graded on multiple systems. A study completed by Jones et al. took 113 articles published from January 2011 to August 2016 and they found 62.8% of articles used the International Cartilage Regeneration and Joint Preservation Society (ICRS) grading scale.<sup>3</sup> The ICRS grading scale and characteristics are shown in Figure 1.0. The signs and symptoms of articular cartilage lesions are pain that can increase with activity or be elicited through specific positioning of the joint. Edema can be intermittent, form in correlation with specific activities, and/or lead to effusion of the joint. There can be a loss of function or ability to participate in sporting activities.<sup>4</sup>

Current research is focused on surgical management with various procedures from microfracturing and drilling to stimulate new growth to Autologous Chondrocyte Implantation and Osteochondral Autograft or Allograft Transplantation to repair the defect.<sup>5</sup> There is very limited research being done on conservative management of articular cartilage lesions. The purpose of this case study is to assess response of an individual with a possible articular cartilage lesion to Physical Therapy.

## **Case Description**

Patient is a 41-year-old female that was referred to Physical Therapy (PT) for right knee pain. Personal past medical history includes obesity and hypertension. Both are currently controlled through diet, exercise, and medication. Only reported past family medical history was osteoarthritis. Activity history for the patient was competing in duathlons, competitive rowing, and CrossFit inspired lifting. Main functional limitation and complaint is the inability to consistently run. Patient has been limited in this activity for approximately one year. Patient was complaining of right medial knee pain and stiffness elicited by descending stairs, during and after running and kneeling on the affected knee. Swelling of the right knee reported in correlation to running. Systematic review revealed no reports of acute trauma to the right knee, no reports of pain waking her at night, no excessive weight loss or gain, no history of low back pain, no numbness into the lower extremities, no loss of sensation at the feet, and no circulation issues in the lower extremities. Intervention prior to initial PT evaluation was aspiration on the right knee by referring physician. Fifteen cubic centimeters (cc's) of fluid was removed one week prior to evaluation. Following this procedure patient reported decreased overall stiffness and pain; Patient then attempted to run with a return of pain and swelling symptoms at an intensity and severity that prevented her from attempting the run again prior to evaluation.

## **Examination**

Upon assessment of patient's right medial knee pain there was tenderness to palpation at the medial side of the patellar apex. Strength testing of the right hip, knee, and ankle were grossly normal and symmetrical right to left except for right glute medius testing. While testing strength of this muscle TFL compensation was noted with no true muscle grade assessed. Grossly the right hip musculature endurance was diminished compared to the left. Prone quadriceps flexibility was diminished on the right compared to the left. Additional physical findings were increased edema and decreased functional dorsiflexion on the right side; measurements listed in Table 1.0.

Functional assessment included bilateral squatting, eccentric heel tap, and pistol squat for mechanics, depth and reproduction of symptoms. During bilateral squatting patient demonstrated external rotation and abduction at the hips with an anterior translation of the tibia over the toes. The patient reported she experienced her symptoms past 90 degrees of knee flexion. Eccentric heel tap on an 8 inch step was attempted on the right knee with patient experiencing pain from the start of the movement and instability of the right lower extremity. Patient was unable to eccentrically control a pistol squat to 90 degrees of knee flexion on the right and reported pain throughout the movement. Plyometric assessment of single leg landing and bilateral deceleration was not attempted at evaluation due to recent aspiration.

Diagnoses that were considered for this patient were patellofemoral syndrome (PFS), osteoarthritis (OA), and articular cartilage lesion. PFS was ruled out due to patient not being able to report specific positions during running that caused pain. She reported the pain during running would start gradually in intensity and then increasing throughout the run. Although radiographic evidence demonstrates some degenerative changes, knee OA was dismissed as a pain generator

due to lack of morning stiffness, lack of stiffness with static positioning, and lack of increased pain at the end of a day that doesn't include running. Potential articular cartilage lesion was determined to be the pain generator based on the signs and symptoms that were assessed. These signs and symptoms were pain being correlated with an activity, edema correlating to an activity, and effusion resulting from edema.

According to the Articular Cartilage Society when assessing articular cartilage lesions it is recommended to use one knee specific scale and a quality of life (QOL) outcome measure.<sup>6</sup> For this reason the patient filled out International Knee Documentation Committee (IKDC) Subjective Knee Form, Lysholm Knee Scoring Scale, and Short Form-12 (SF-12) Health Survey. The ICRS also uses the IKDC Subjective Knee Form in their "ICRS Cartilage Injury Evaluation Package".<sup>7</sup> Due to pain being the limiting factor in running the Numerical Pain Rating Scale (NPRS) was assessed. Also a personal outcome measure of running duration and frequency was used for this patient due to running being her primary limitation and frustration. Arnetz et al. supported individuals being involved in creating and ranking goal importance resulted in improved treatment outcomes, quality of physical therapy, achievement status, and overall goal clarity compared to controls.<sup>8</sup> All outcome measures taken at initial evaluation are listed in Table 2.0.

General prognosis for this patient was good based on motivation factors and severity of symptoms. The plan of care at initial evaluation was to improve quadriceps flexibility, improve hip musculature endurance, and correct body mechanics that require concentric and eccentric knee flexion activity. Frequency and duration of PT was set at one to two visits per week for six to eight week duration. This was determined on patient availability, pain irritability level and duration needed for musculature and soft tissue changes.

## **Intervention**

The first intervention applied was a running program found in Table 3.0. Following initial evaluation, a hold on running was performed for one week to allow focus on the home exercise program (HEP). Initial HEP focused on hip musculature endurance and decreased flexibility and can be found in Appendix A. The second week of formal PT patient was allowed to return to running with time and distance restrictions. A study focusing on high-impact and aerobic training found that these exercises did not result in increased pain and did not negatively impact the cartilage within the knee. In fact, those individuals participating in the exercise group demonstrated increased bone mineral content, isometric leg extension force, dynamic balance, and cardiorespiratory fitness compared to the control group.<sup>9</sup>

Interventions in a PT session focused on therapeutic exercise (TE) and neuromuscular re-education (NMRE) to begin progressive and biomechanically sound loading of the right knee. Progressive loading was performed throughout the eight-week PT episode. External loading was based on patient's pain response to activity and ability to maintain body mechanics. NMRE was used to correct body mechanics when squatting, lunging, deadlifting, and with single leg stance activity. Corrections through NMRE were provided through the use of external assistance, verbal cues, visual feedback, and manual cues. The ultimate goal of the exercises and NMRE was to increase right knee mobility with external load demands, decrease compensation techniques with functional movements, and increase hip endurance with single leg activity for improved stability. Minimal manual therapy was provided throughout the eight-week duration. When employed manual therapy focused on patellar mobility and edema massage.

As the eight weeks progressed patient brought in reports of workouts and running duration/frequency to be assessed. The programs she would bring also included the response of

symptoms to the right knee. Exercises resulting in adverse symptoms would be completed in clinic to assess for proper body mechanics and loading of the activity. Modifications of exercises in clinic were followed by patient when completing home workouts. Modifications focused on adjustment of range of motion, changing type of contraction, or adjustment of body mechanics.

Extensive education was provided regarding patient's pain and swelling responses with exercise activity and running. Patient was informed that pain she experienced while performing an activity should not be sharp in nature. We also discussed pain level staying at a five on a NPRS or lower while completing activity. Pain that was sharp in nature and/or exceeded a 5/10 intensity indicated the activity should be stopped. Residual running pain and swelling should be addressed through rest, ice and elevation. If the residual pain and swelling returned to a pre-run baseline within 24 hours then the duration was deemed tolerable and appropriate. If the pain and swelling did not return to baseline within the 24 hours then continued rest from running was required and duration needed to be reduced.

Specific progressions that were monitored throughout the course of PT were eccentric step-down height, running frequency and running duration. Eccentric step-down height progression can be found in Table 4.0 with running progressions in Table 3.0. Patient frequency inside the clinic was adjusted throughout the eight weeks and can be found in Table 5.0.



## **Outcomes**

When this patient returned for first treatment session following initial evaluation she appeared skeptical and reserved. Despite suspected reservations she was more than willing to complete TE and receptive of education. As the eight weeks progressed the patient's overall demeanor appeared to improve with patient reporting confidence in home workouts and returning to running.

There was only one treatment session that resulted in immediate swelling medial and distal to joint line. This was addressed through manual therapy and post-treatment cryotherapy. The swelling was decreased prior to patient leaving the clinic for that day.

Outcome measures were completed at the six weeks mark due to the patient returning to work as an Engineering professor and being unsure if she would return to the clinic. At this time patient reported she continued to always experience some discomfort within the right knee. The six week subjective outcome scores can be found in Table 2.0. Minimal clinically important difference (MCID) or minimal detectable change (MDC) was met for the Lysholm, mental portion of SF-12 and NPRS. MCID for IKDC was not met at this time, however a 6-month allowance is reported in research.<sup>10</sup> The significant factors demonstrated by the subjective outcome measures were reports of decreased overall pain intensity and frequency on the IKDC. On the SF-12 the patient improved her overall health score to "good" rating from "fair" and rated interference of pain with normal work as "a little bit" compared to initial rating of "moderately". Overall running duration and frequency dramatically improved from initial evaluation with specific measures in Table 3.0.

At the eight week visit the patient and PT team determined that significant progress had been made and it was time for patient to maintain outside of formal PT. At this session patient

was assessed performing single leg landing and bilateral deceleration plyometric activity. Symmetrical stability, landing, and eccentric deceleration was observed between right and left lower extremities. Patient was able to perform full-depth squat without right knee pain and able to demonstrate eccentric control with no pain during a pistol squat on the right lower extremity. Finally, patient was reporting being able to complete three to three and a half miles of running six to seven times per week with no pain during the run. She continued to report residual post-run discomfort and swelling that was managed through icing at the end of the day.

## **Discussion**

This case study was prepared to allow for insight of conservative management of a possible articular cartilage lesion. There continues to be very limited research on conservative management with this patient population. The patient in this case study responded very well to PT through the use of a running program, TE, NMRE and manual therapy. She demonstrated the ability to return to running, performing personal workouts at a chosen frequency, and improved overall daily function. Additionally, a significant change was able to be documented in regards to the patient's mental health and perceived health status.

The most significant result for this patient was her ability to return to running at her chosen duration and frequency with minimal interference from pain and swelling during and post-run. At the end of the therapeutic episode patient was demonstrating appropriate management of discomfort and swelling from running. We personally believe that the ability to run at a chosen intensity directly resulted in patient's improved mental health and health status that was seen in the scoring of the SF-12. A study completed by Roeh et al. found marathon runners' scores were decreased when comparing "helplessness/hopelessness and stress/worry compared to non-active controls".<sup>11</sup>

A concern with any degenerative articular cartilage lesion is what makes the lesion progress? Without directly identified trauma the concern was that physical activity could be contributing to breakdown of the articular cartilage. Several articles were previously cited that contradicts this thought process. Wang et al. found at the end of the two-year duration the primary factors in progression of cartilage defects were being male and the grade of the lesion. Physical activity was assessed in this study and had no significant effect on progression of the lesions.<sup>12</sup> A systematic review completed by Urquhart et al. reported strong evidence that

physical activity did lead to osteophyte formation but not joint space narrowing. They went on to say there is strong evidence to justify an inverse relationship between performance of physical activity and formation of articular defects.<sup>13</sup>

Limitations of this study consisted of lack of MRI to confirm diagnosis of articular cartilage lesion and inability to assess patient's running mechanics. It is unclear why an MRI had not been performed on the patient at this time. A confirmed diagnosis would have been beneficial from an educational perspective. The study completed by Wang et al. found the lower grade of a lesion (1 and 2) was likely to not progress over a two year period. However, a higher grade (3 and 4) would be more likely to regress over a two-year period.<sup>12</sup> Running mechanics were not assessed due to patient aversion to treadmill and there being no other clinical resource. It would have been helpful to see what mechanics were being employed for correctional purposes.

In conclusion, this patient demonstrated a positive response to Physical Therapy. Patient was able to accomplish her primary goal of returning to running at a chosen intensity. Significant decrease in pain and swelling was achieved through selected interventions. Management strategies of symptoms were formed and demonstrated by patient during the eight-week duration of the therapeutic episode. For this patient conservative management was a great option to address the symptoms and decreased participation in activity from a potential articular lesion.

## **Acknowledgments**

I would like to thank Dan Curnutt, PT, DPT from Central Texas Orthopedics and Sports Medicine in Bryan, Texas. He contributed to the success of this patient through direct intervention application and guidance to myself throughout the episode of care. Without Dan's support and critique of methods the success of this case study would have been questionable.

## References

1. Hjelle K, Solheim E, Strang T, Muri R, Brittberg M. Articular cartilage effects in 1,000 knee arthroscopies. *Arthroscopy*. 2002;18(7):730-734. doi: 10.1053/jars.2002.32839
2. Bezuglov EN, Lyubushkina AV, Khaitin VY, et al. Prevalence of asymptomatic intra-articular changes of the knee in adult professional soccer players. *Orthop J Sports Med*. 2019;7(11). doi: 10.1177/2325967119885370.
3. Jones KJ, Sheppard WL, Arshi A, Hinckel BB, Sherman SL. Articular cartilage lesion characteristic reporting is highly variable in clinical outcomes studies of the knee. *Cartilage*. 2019;10(3):299-304. doi:10.1177/1947603518756464.
4. Articular Cartilage Lesions of the Knee. Physiopedia. [https://www.physio-pedia.com/Articular\\_Cartilag\\_Lesions\\_of\\_the\\_Knee](https://www.physio-pedia.com/Articular_Cartilag_Lesions_of_the_Knee). Published August 28, 2019. Accessed August 4, 2020.
5. Articular Cartilage Restoration. OrthoInfo. <https://orthoinfo.aaos.org/en/treatment/articular-cartilage-restoration>. Published February 2009. Accessed August 4, 2020.
6. Clinical Outcomes Assessment for Articular Cartilage Restoration. Musculoskeletal Key website. Updates June 26, 2020. Accessed July 5, 2020. <https://musculoskeletalkey.com/clinical-outcomes-assessment-for-articular-cartilage-restoration/>.
7. International Cartilage Regeneration and Joint Preservation Society. ICRS Score/Grade. ICRS website. Accessed August 25, 2020. <https://cartilage.org/society/publications/icrs-score/>.
8. Arnetz JE, Almin I, Vergstrom K, Franzen Y, Nilsson H. Active patient involvement in the establishment of physical therapy goals: effects on treatment outcome and quality of care. *Advances in Physiotherapy*. 2009;6(2):50-69. doi: 10.1080/14038190310017147

9. Multanen J, Nieminen MT, Hakkinen A, et al. Effects of high-impact training on bone and articular cartilage: 12-month randomized controlled quantitative MRI study. *J Bone Miner Res.* 2014;29(1):192-201. doi: 10.1002/jbmr.2015
10. Collins NJ, Misra D, Fleson DT, Crossley KM, Roos EM. Measures of knee function: International Knee Documentation Committee (IKDC), Subjective Knee Evaluation Form, Knee Injury and Osteoarthritis Outcome Score (KOOS), Knee Injury and osteoarthritis of Daily Living Scale (KOS\_ADL), Lysholm Knee Scoring Scale, Oxford Knee Score (OKS), Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), Activity Rating Scale (ARS), and Tegner Activity Score (TAS). *Arthritis Care Res (Hoboken).* 2011;63(11):S208-S228. doi: 10/1002/acr.2031
11. Roeh A, Engel RR, Lembek M, et al. Personality traits in marathon runners and sedentary controls with MMPI-2-RF. *Front Psychol.* 2020;11. doi: 10.3389/fpsyg.2020.00886
12. Wang Y, Ding C, Wluka AE, et al. Factors affecting progression of knee cartilage defects in normal subjects over 2 years. *Rheumatology (Oxford).* 2006;45(1):79-84. doi: 10.1093/rheumatology/kei108
13. Urquhart DM, Tobing JFL, Hanna FS, et al. What is the effect of physical activity on the knee joint? A systematic review. *Med Sci Sports Exerc.* 2011;43(3):432-442. doi: 10.1249/MSS.0b013e3181ef5bf8
14. Ogura T, Ackermann J, Barbieri Mestriner A, Merkely G, Gomoll AH. Minimal clinically important differences and substantial clinical benefit in patient-reported outcome measures after autologous chondrocyte implantation. *Cartilage.* 2018;1947603518799839. doi: 10.1177/1947603518799839

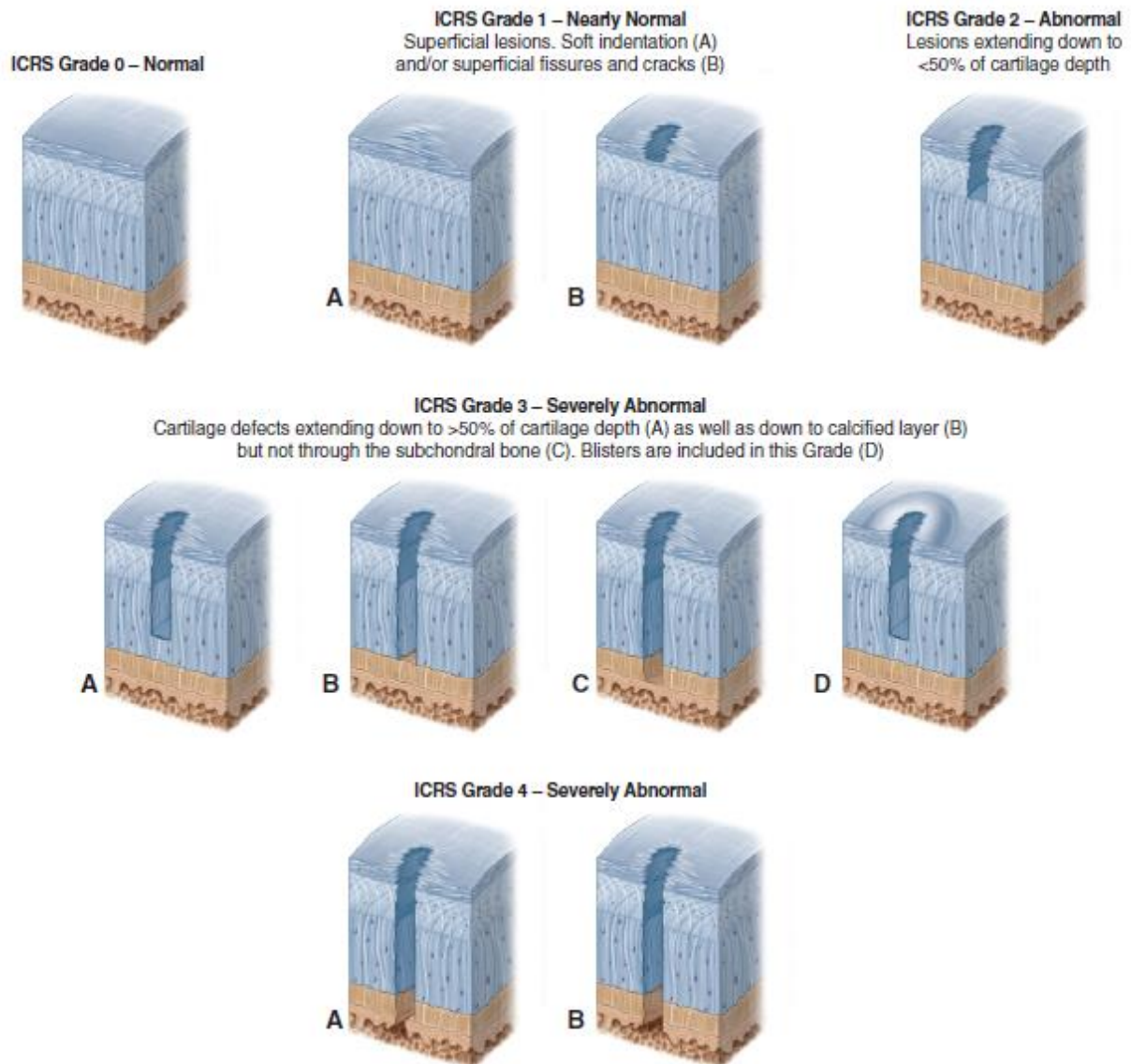
15. Farrar JT, Young JP Jr, LaMoreaux L, Werth JL, Poole RM. Clinical importance of changes in chronic pain intensity measured on a 11-point numerical pain rating scale.

*Pain.* 2011;94(2):129-158. doi: 10/1016/s0304-3959(01)00349-9



## Tables and Figures

**Figure 1.0:** ICRS Articular Cartilage Lesion Grading System



**Table 1.0:** Edema and Function Dorsiflexion Measurements

	<b>Left Lower Extremity</b>	<b>Right Lower Extremity</b>
<b>Edema</b>	40 cm joint line girth	42 cm joint line girth
<b>Functional Dorsiflexion ROM*</b>	3.0 inches from wall	4.0 inches from wall

\*Functional Dorsiflexion was measured with great toe a standardized distance from wall and measurements taken from wall to knee

**Table 2.0:** Subjective Outcome Measure Scores

	<b>Initial Evaluation</b>	<b>6-weeks</b>	<b>MCID/MDC</b>
<b>IKDC</b>	50/87 = 57.5%	55/85 = 63.2%	6.3 at six months following repair <sup>10</sup>
<b>Lysholm</b>	47/100	82/100	0.9 at one month <sup>10</sup>
<b>SF-12</b>	Physical Score: 48.61009 Mental Score: 44.40465	Physical Score: 52.98214 Mental Score: 49.87414	Physical: 6.2-8.2 Mental: 1.9-4.6 <sup>14</sup>
<b>NPRS</b>	6/10	3/10	2 points <sup>15</sup>

**Table 3.0:** Running Program and Symptom Response

	<b>Programming</b>	<b>Duration</b>	<b>Frequency</b>	<b>Symptoms</b>
<b>Initial Evaluation</b>	Hold on Running	0 miles	N/A	If attempting to run would have pain during and after with residual swelling
<b>Week 2</b>	Run for 1 minute and alternate with walk/speed walk for 1 minute	1-1.5 miles	Every Other Day	Pain coming on at end of run and stay after with minimal swelling. Ice after running and symptoms resolve within 24 hours.
<b>Week 3</b>	Run for 2 minute and alternate with walk/speed walk for 1 minute	1-2 miles	Patient Selected	Pain coming on at end of run and stay after with minimal swelling. Ice after running and symptoms resolve within 24 hours.
<b>Week 6</b>	Patient selected training	1.7 and 3.5 miles	Patient Selected	No exacerbation of symptoms at 1.7 miles. Increased pain during and after with swelling at 3.5 miles that did not resolve within 24 hours with icing.
<b>Week 8 Discharge</b>	Patient selected training	3-3.5 miles	Daily	Minimal to no pain during running. Some pain after with minor swelling that is managed through icing at end of day. Symptoms resolve within 24 hours.

**Table 4.0:** Eccentric Step-Down Depth Progression

<b>Initial Evaluation/Week 1</b>	<b>Week 3</b>	<b>Week 6</b>	<b>Week 8</b>
Left Lower Extremity: 8 inches – no pain  Right Lower Extremity: unable due to pain	Right Lower Extremity: 2 inches without pain; 4 inches resulted in sharp pain	Right Lower Extremity: 6 inches without pain	Right and Left Lower Extremities: symmetrical stability and no pain at 8 inch depth

**Table 5.0:** Frequency of Physical Therapy

<b>Initial Evaluation/Week 1</b>	<b>Weeks 2-3</b>	<b>Weeks 4-6</b>	<b>Weeks 7 and 8</b>
1 visit for focus on HEP x 1 week	2 visits per week	1 visit per week	Patient was completely independent at home for week 7 and returned at the end of week 8 to assess ability to manage symptoms and readiness to discharge from therapy services.

## Appendixes



### Prone Quad Stretch

Lie down flat on your stomach. Wrap a strap (belt, towel, dog leash) around the top of one of your feet and pull the strap across your opposite shoulder so that your knee starts to curl up to your body. Pull until a stretch is felt across the front of your thigh.



Repeat 3 Times

Hold 30 Seconds

Complete 1 Set

Perform 2 Times a Day



### STANDING CALF STRETCH - GASTROCNEMIUS

Start by standing in front of a wall or other sturdy object. Step forward with one foot and maintain your toes on both feet to be pointed straight forward. Keep the leg behind you with a straight knee during the stretch.

Lean forward towards the wall and support yourself with your arms as you allow your front knee to bend until a gentle stretch is felt along the back of your leg that is most behind you.

Move closer or further away from the wall to control the stretch of the back leg. Also you can adjust the bend of the front knee to control the stretch as well. Video # VVNCZDYGG

Repeat 3 Times

Hold 30 Seconds

Complete 1 Set

Perform 2 Times a Day



### STANDING CALF STRETCH - SOLEUS

Start by standing in front of a wall or other sturdy object. Step forward with one foot and maintain your toes on both feet to be pointed straight forward. Keep the leg behind you with a bent knee during the stretch.

Lean forward towards the wall and support yourself with your arms as you allow your front knee to bend until a gentle stretch is felt along the back of your leg that is most behind you.

Move closer or further away from the wall to control the stretch of the back leg. Also you can adjust the bend of the front knee to control the stretch as well. Video # VVGUVSTYG

Repeat 3 Times

Hold 30 Seconds

Complete 1 Set

Perform 2 Times a Day



### STRAIGHT LEG RAISE - SLR

While lying on your back, raise up your leg with a straight knee. Keep the opposite knee bent with the foot planted on the ground. Video # VVBVU5P69

Repeat 30 Times  
Complete 1 Set

Hold 3 Seconds  
Perform 2 Times a Day



### HIP ABDUCTION - SIDELYING

While lying on your side, slowly raise up your top leg to the side. Keep your knee straight and maintain your toes pointed forward the entire time. Keep your leg in-line with your body.

The bottom leg can be bent to stabilize your body. Video # VV4R4FB65

Repeat 30 Times  
Complete 1 Set

Hold 3 Seconds  
Perform 2 Times a Day



### PRONE HIP EXTENSION

While lying face down with your knee straight, slowly raise up leg off the ground. Maintain a straight knee the entire time. Video # VVYXQ3QHJ

Repeat 30 Times  
Complete 1 Set

Hold 3 Seconds  
Perform 2 Times a Day



### HIP ADDUCTION - SIDELYING

While lying on your side, slowly raise up your bottom leg towards the ceiling. Keep your knee straight the entire time.

Your top leg should be bent at the knee and your foot planted on the ground supporting your body. Video # VV2ZBYYNW

Repeat 30 Times  
Complete 1 Set

Hold 3 Seconds  
Perform 2 Times a Day



### Clamshell with theraband

Place theraband above the knee and lie on your side. Spread legs and make sure not to roll backwards.

\*\*\*Its all about form...can lie against wall or sofa to prevent rolling\*\*\*

Repeat 30 Times  
Complete 1 Set

Hold 3 Seconds  
Perform 2 Times a Day



### WALL SQUATS

Leaning up against a wall or closed door on your back, slide your body downward and then return back to upright position.

A door was used here because it was smoother and had less friction than the wall.

Knees should bend in line with the 2nd toe and not pass the front of the foot. □

\*\*DO NOT GO LOWER THAN 90 DEGREES KNEE FLEXION  
Video # VVFP6PWHG

Repeat 10 Times  
Complete 1 Set

Hold 10 Seconds  
Perform 1 Times a Day