

Quiz Policies

Eligibility

The NCSF online quizzes are open to any currently certified fitness professional, 18 years or older.

Deadlines

Course completion deadlines correspond with the NCSF Certified Professionals certification expiration date. Students can obtain their expiration dates by reviewing either their certification diploma or certification ID card.

Cancellation/Refund

All NCSF continued education course studies are non-refundable.

General Quiz Rules

- You may not have your quiz back after sending it in.
- Individuals can only take a specific quiz once for continued education units.
- Impersonation of another candidate will result in disqualification from the program without refund.

Disqualification

If disqualified for any of the above-mentioned reasons you may appeal the decision in writing within two weeks of the disqualification date.

Reporting Policy

You will receive your scores within 4 weeks following the quiz. If you do not receive the results after 4 weeks please contact the NCSF Certifying Agency.

Re-testing Procedure

Students who do not successfully pass an online quiz have the option of re-taking. The fees associated with this procedure total \$15 (U.S) per request. There are no limits as to the number of times a student may re-test.

Special Needs

If special needs are required to take the quiz please contact the NCSF so that appropriate measures can be taken for your consideration.

Quiz Rules

What Do I Mail Back to the NCSF?

Students are required to submit the quiz answer form.

What do I Need to Score on the Quiz?

In order to gain the .5 NCSF continued education units students need to score 80% (8 out of 10) or greater on the CEU quiz.

Where Do I Mail My Quiz Answer Form?

You will mail your completed answer form to:

NCSF

Attn: Dept. of Continuing Education

5915 Ponce de Leon Blvd., Suite 60

Coral Gables, FL 33146

How Many CEUs Will I Gain?

Professionals who successfully complete the any continuing education quiz will gain .5 NCSF CEUs per quiz.

How Much does each quiz cost?

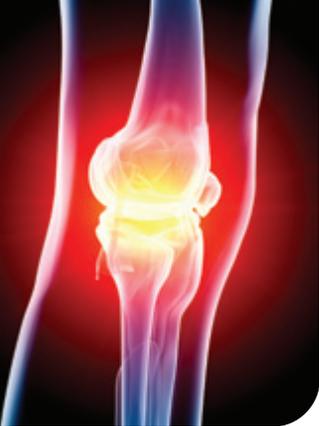
Each quiz costs the student \$15.00.

What Will I Receive When The Course Is Completed?

Students who successfully pass any of the NCSF online quizzes will receive their exam scores, and a confirmation letter.

How Many Times Can I Take The Quizzes For CEUs?

Individuals can take each NCSF quiz once for continuing education credits.



Patellofemoral Pain

Patellofemoral pain syndrome (PFPS) is one of the most prevalent musculoskeletal conditions of the lower limb and is a common problem among many exercisers. The issues are often associated with musculoskeletal deficiencies and repeated use injury response. One of the side effects of PFPS is quadriceps inhibition as a result of swelling in the knee joint. Since knee swelling can directly weaken the quadriceps, it can spawn a vicious cycle – if someone has a muscle imbalance that causes faulty knee function/stabilization he or she will develop a knee injury that is accompanied by swelling, which will inhibit the quadriceps and further exacerbate the muscle imbalances, which then worsens patellar tracking and joint function. Swelling becomes greater, and the cycle continues. In many cases the issues are related to imbalances in the hip and knee musculature. While the vastus medialis (VMO) and vastus lateralis (VL) are often cited as the culprits, inhibitory effects of tight hip flexors on hip extensors and disparities between medial lateral hip muscle range and recruitment can also exacerbate problems at the knee. The proper function of the VMO is extremely important as it is a primary contributor to appropriate patella tracking.

Many fail to realize that repeated action and overuse of a joint can lead to inhibitory signaling and promote greater imbalances when exercise is performed on swollen joints. The quadriceps muscle group is responsible for knee extension and these muscles are activated by alpha motor neurons (within the femoral nerve) coming from the spinal cord. The alpha motor neurons are tightly regulated by inhibitory interneurons in the spinal cord, which govern the motor neuron outflow to the quadriceps. Activation of these governing cells will inhibit the femoral motor units and weaken knee extension during movement. When continuing to perform exercises involving the knee joint with weakened quads, synergists will be forced to accommodate inhibition, resulting in faulty movement patterns and the issues worsen.

Similar to muscle and tendon proprioceptors (spindles, GTOs) used during muscle stretch and tension reflexes, joint receptors located within the fibrous joint capsule play a role in limb position and in the regulation of reflexive muscle tone

through neuronal communication with the inhibitory interneurons. Capsular strain in the knee joint produced by swelling will activate neural impulses to these interneurons and lead to the withdrawal of signals being transmitted to the quadriceps muscles. Again, the body will attempt to replicate the desired movement through joint angle adjustments which affect alignment. Weakened quadriceps (especially in the VMO) can cause misalignment of the patella, tibial translation, or lead to overall artherokinetic knee dysfunction. Common signs of this phenomenon include failure of the quads to properly decelerate upon landing from a jump or during the downward phase of a squat or deadlift; or when the knee is being flexed rapidly by the hamstrings.

Researchers have directly infused fluid into the knee joint to measure the inhibitory effects on knee extension and found that approximately 25mL of fluid led to a 35% reduction in isokinetic quadricep force production. However, it is generally accepted that fluid volumes as low as 20mL elicit quadricep inhibition. The level of inhibition may be altered during varying angles of knee flexion due to increases in the capsular pressure throughout the range of motion. Nonetheless, swelling associated with patellofemoral pain syndrome will trigger a negative response.

Interestingly, in the 90's this evidence was equivocal, since not all studies were able to replicate the results. Some studies on arthritic patients, and studies using the infusion of fluid in healthy subjects, failed to find changes in quadriceps peak torque or work. It seems that the differences among studies helped reveal a critical component of training someone with knee swelling; the amount of non-weight bearing knee flexion and extension that occurred during the research protocol. Specifically, the studies that involved prolonged warm-up periods and greater volumes of sub-maximal knee extension and flexion were unable to show inhibition, while those studies involving less warm-up activity did show significant dampening of quadriceps force production. This evidence demonstrates the relevance of knee specific warm-ups prior to exercise participation.

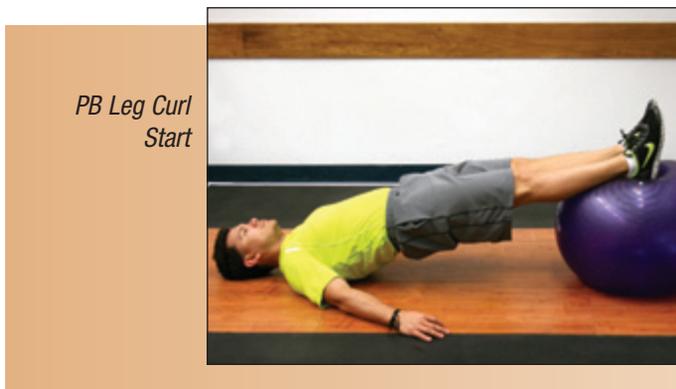
Generalized warm-ups and specific movements act to

reduce the level of quadriceps inhibition by reducing the intracapsular pressure (by up to 50%). The reduction in knee pressure during continuous and intermittent submaximal exercise is presumed to occur due to an increase in the compliance of the joint capsule or due to the distribution of fluid within the knee to alternative compartments. Therefore, a proper warm-up before exercise is essential for clients with knee pain, particularly with swelling. Specific warm-up activities should include a series of open chain extension and flexion movements as well as weight bearing actions (assisted/unassisted closed chain) to reduce inhibitory effects of knee swelling and prevent tibial translation and other mechanical problems that can aggravate an existing knee problem or arthritis.

Research published in *Physical Therapy and Sport* (2010) suggests that the effects of a warm-up on knee joint position using merely an open kinetic chain technique, would underestimate the valuable role of the warm-up. It was found that warm-up programs enhance knee joint position most

effectively when closed kinetic chain exercises are employed. Squats with isometric hip adduction and lunges were also cited as relevant inclusions to preparation programs. Specifically, in closed kinetic chain exercises, more selective VMO activation can be obtained at 60 degrees knee flexion. Maximal VMO/VL ratio was observed at this knee flexion angle, and muscle contraction intensity was also found to be greatest. A common error in closed kinetic chain activities aimed at PFPS is use of excessive ROM, particularly excessive levels of flexion.

A review of 10 randomized trials that included 14 different interventions was performed by the International Centre for Allied Health Evidence (2011). According to the review, the current body of evidence demonstrates positive results with exercise interventions for individuals with patellofemoral pain syndrome. The literature suggests that a progressive regime of daily exercises of two to four sets of ten or more repetitions, over an intervention period of 6 weeks or more, combined with exercises to address flexibility of the



lower limb musculature was common and successfully employed. In addition, longer warm-ups and post-exercise icing will help manage the swelling and consequent inhibition.

Athletes and fitness enthusiasts will encounter problems with their knees; it's virtually inevitable. A critical aspect of being a successful coach or personal trainer is to guide athletes toward optimum injury prevention strategies and to aid the injury recovery process. Muscle strength and flexibility imbalances at the ankle, knee, or hip can increase the risk of knee problems due to improper patella alignment and tracking. A common example is seen when gluteus maximus weakness leads to greater reliance on the medial hamstrings during hip extension (synergist dominance), which will rotate the hip internally and alter the tracking of the patella causing irritation or injury to the cartilage, tendons, ligaments, and bursa. Several other, even more common conditions can lead to knee joint dysfunction, such as weak inner quadriceps, tight hamstrings, a tight IT band,

overzealous training volume, and improper or worn out footwear. Overuse of the knee joint, especially with flawed mechanics, will most often lead to knee problems accompanied by knee swelling.

NCSF certified trainers should constantly evaluate client biomechanics, such as during the performance of a lunge or squat, and look for signs of musculoskeletal impairments that can lead to knee pain or injury. Moreover, trainers should implement a training program with an appropriate progression and recovery to minimize overtraining ensuring an effective warm-up plan is implemented. It is also important to recognize that a swollen knee will directly weaken the quadriceps and trainers must emphasize a thorough warm-up to remove the inhibitory effects and preserve functional knee extension strength during exercise to avert injury. The exercises displayed can be viable options for prevention and management of PFPS and can be easily implemented in a comprehensive program. ●



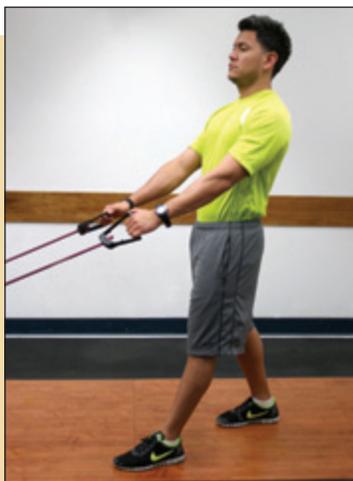
PB Supine Leg Marches Start



PB Supine Leg Marches End

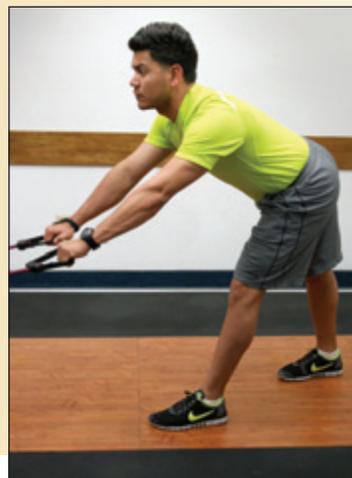


PB Supine Leg Marches Alt. End

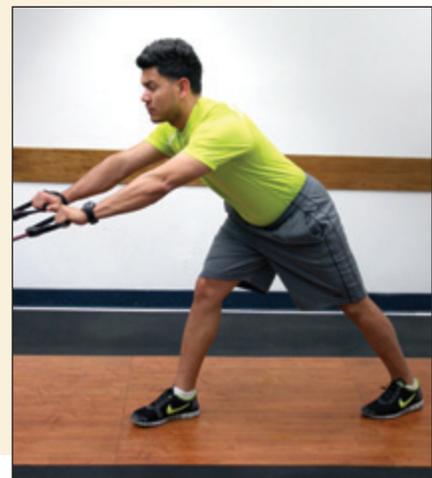


Split Stance Band Reaches Start

Split Stance Band Reaches End



Split Stance Band Reaches Alt. End



CEU Quiz

Patellofemoral Pain

- One of the common side effects of patellofemoral pain syndrome is _____.
 - stress fractures
 - ankle instability
 - hamstring tightness
 - quadriceps inhibition due to swelling
- Which of the following can contribute to patellofemoral pain syndrome?
 - imbalances in the hip and knee musculature
 - inhibitory effects of tight hip flexors
 - disparities between medial lateral hip muscle range
 - all of the above can contribute
- The _____ of the quadriceps muscle plays a primary role in proper patella tracking.
 - vastus medialis (VMO)
 - vastus lateralis (VL)
 - vastus intermedius
 - rectus femoris
- Activation of the inhibitory interneurons, which govern motor neuron outflow to the quadriceps, can lead to _____.
 - improved knee extension power
 - weakened knee extension during movement
 - greater flexibility of the hamstring
 - improved patella tracking
- Weakened quads can cause which of the following?
 - tibial translation
 - misalignment of the patella
 - arthrokinetic knee dysfunction
 - all of the above
- Research indicates that fluid levels in the knee joint as low as ____ will elicit quadriceps inhibition.
 - 5 mL
 - 10 mL
 - 20 mL
 - 40 mL
- Previous research studies showed mixed results when quadriceps force production was examined relative to knee swelling. The evidence showed that _____ was a key component to eliminating the swelling-induced inhibition of the quadriceps.
 - a general warm-up
 - a prolonged knee specific warm-up
 - stretching
 - VO₂max
- Specific warm-up activities for individuals with swelling of the knee joint should include which of the following _____.
 - closed chain activities
 - flexion movements
 - open chain activities
 - all of the above should be used
- During closed kinetic chain exercises, the optimal knee flexion angle is _____, which allows more selective VMO activation and muscle contraction intensity.
 - 30 degrees
 - 45 degrees
 - 60 degrees
 - 75 degrees
- A review of the literature results in a recommendation of _____ for individuals with patellofemoral pain syndrome.
 - 2-4 sets of 10 or more reps over a 6 week period
 - 1 set of 12 reps over a 4 week period
 - 4-6 sets of 6-8 reps over a 12 week period
 - 2-4 sets of less than 6 reps over a 8 week period

Quiz Answer Form

FIRST NAME _____ LAST NAME _____ M.I. _____

TITLE _____

ADDRESS _____ APT. _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

COUNTRY _____ POSTAL CODE _____

CERTIFICATION NO. _____ CERTIFICATION EXP. ____/____/____

MEMBERSHIP NO. _____ MEMBERSHIP EXP. ____/____/____

Quiz Name	Member Price	Total
	\$15	



Discover



Visa



Mastercard



Amex



Check/Money Order

Account No. _____

Exp. Date _____

Security Code _____

Signature _____

Date _____

Quiz Answers

- | | |
|----------|-----------|
| 1. _____ | 6. _____ |
| 2. _____ | 7. _____ |
| 3. _____ | 8. _____ |
| 4. _____ | 9. _____ |
| 5. _____ | 10. _____ |

Fill in each blank with the correct choice on the answer sheet. To receive 0.5 CEUs, you must answer 8 of the 10 questions correctly.

Please mail this Quiz answer form along with the proper enclosed payment to:

NCSF
5915 Ponce de Leon Blvd., Suite 60
Coral Gables, FL 33146

Questions? 800-772-NCSF