

# Getting Back To Exercise Without Pain: The Ankle

## part II.



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**Abstract:** Physical activity is becoming an increasingly popular lifestyle choice as people are encouraged to make healthier choices. For most people, this means balancing exercise with a working day that typically requires them to be sitting for 10 to 12 hours which lessens the ability of the body to effectively take part in recreational and sporting activities, and leads to repetitive strain injuries, postural deviations and musculoskeletal problems (8,16,27). Therefore, the desire of the modern client to combine extended periods of inactivity with increasingly demanding exercise routines, such as marathon running, are becoming a growing challenge for personal trainers and sports coaches.

Such issues occur because muscles have the tendency to become underactive or overactive when engaged by certain repetitive postures and activities (20,27). For example, sitting, driving or wearing high heels can encourage the ankle dorsiflexors to weaken, the plantarflexors to become overactive, while it is also suggested that there will be inter-related, global impairments and consequences of this at the more proximal joints such as the knees and hips (11,12,14,19,23,24,30). Achilles tendinopathy (1,31), plantar fasciitis (18) and shin splints (30,33) are some of the most common sports injuries of the ankle among runners and those participating in sports that involve jumping.

As coaches, we shouldn't be diagnosing injuries, but helping to prevent the occurrence of them, by looking for common lower extremity alignments, muscle weaknesses and movement deviations. This article focuses on the evaluation of movement, the scanning of misalignments and the introduction of corrective exercises using the NASM Corrective Exercise Continuum (Cex) (7), which is based on deactivation and activation techniques of the neuromyofascial tissue (7). Using CEX with my clients – in conjunction with body and postural awareness techniques – has enabled them to eliminate some musculoskeletal problems.



[Figure1]



Figure 11. Overhead squat test: out-toeing and excessive medial knee displacement

Further testing:

- Add a wedge under the heel if knee collapses in, if the knee tracks forward and toeing out disappears the calves could be too tight. Prescribe deactivation of the calves and stretch the tight parts of the calves.
- Manual Muscle Test glutesusmaximus, gluteus medius strength (see article about the knee (7, 27))
- Manual Muscle Test posterior tibialis and/or anterior tibialis (7, 20)
- Length test adductor muscles (27)

### NASM CEx for injury prevention at the ankle - Corrective exercise strategy

Achieving relaxation and lengthening of the gastrocnemius and soleus and hip adductor muscles to facilitate increased ankle dorsiflexion and hip abduction strength improvements are the most common goals of our intervention.

As the gluteus maximus and gluteus medius are both involved in frontal plane knee alignment and ankle stability, both hips and ankles have been shown to be connected to ACL injuries, patellar tendinopathy and PFPS. Strengthening of these muscles and the ankle muscles is therefore a primary goal in both the prevention and rehabilitation of these injuries. The results of many studies indicate that the single leg squat may be the most effective exercise both for activating the hip abductors and extensors (6,8,22,25,26,32,34) and the ankle muscles.

# STUDY-ALL GAIN, NO PAIN

Exercise Interventions for foot pronation and excessive medial knee displacement		
Exercise Sequence	Focus	Exercise Protocol
1) Inhibit tight/overactive muscle	Gastrocnemius/soleus, <u>peroneals</u> , hip adductors	Foam roll each for 2 minutes
2) Lengthen tight/overactive muscles	Gastrocnemius/soleus, <u>peroneals</u> , hip adductors	Static Stretch for 2 sets of 30 seconds
3) Strengthen weak/underactive muscles	Medial gastrocnemius/soleus, anterior <u>tibialis</u> or/and posterior <u>tibialis</u>	Each repetition lasts for ~7 seconds at a slow tempo: concentric phase (1 count), isometric (2 counts), eccentric (4 counts)
4) Integration exercises	Complex, Movement quality	Single leg squat Progress to: Single leg balance to reach, hops to balance in multiple directions, single leg hops

Table 1

Warm up with 10 minutes of very light jogging, cycling, elliptical-trainer work, or stair-stepper action.

### Step 1: Self-Myofascial Release (SMR)

Look for tender knots using a foam roller or ball and roll over the muscle. Hold as close to the tension area as possible for 30 to 45 seconds or if the pain is too intense, hold for 90 seconds with lower intensity. Repeat for increased effectiveness. If an area really hurts, transfer more body weight to your arms as you support yourself on them. More bodyweight can be moved to the area as the muscle begins to relax.



Figure 12. SMR a) calf b) peroneals, c) adductors

### Step 2: Static and Dynamic Stretches

I advise clients to do static stretches after their workouts. However, if a muscle is tight – in particular to the calf muscles, they should stretch these before their workout to enable greater range of movement. While stretching, the client should breath deeply and hold each stretch for 15-30 seconds, repeating if possible and only to the edge of discomfort – on a scale of 1-10, aim for 7-8.



Figure 13. a) dynamic calf stretch, b) peroneal stretch c) adductor stretch

### Step 3: Isolation Exercises

Once the release and lengthening of tight muscles has been achieved, activation can be done through isolation exercises. These involve only one joint and a limited number of muscle groups, so that more attention can be paid to ensuring the muscle's sufficient contraction – thereby avoiding using the overactive, 'cheating' muscles. Isolation exercises are slow and controlled motions.

2-3 sets of 12-15 repetitions with a 2-second hold



Figure 14. a) single leg bridge gluteal activation, anterior tibialis strengthening with band start b) and finish c)

### Step 4: Integration

The single leg squat is designed to promote hip and ankle stability. This type of exercise requires the hips to stabilize against the hip adduction/internal rotation forces. Clueing the client with the right alignment is very important otherwise he or she will not have a positive experience.

2-3 sets of 10-15 repetitions on each leg.



Figure 15. Single leg squat start a) and finish b)

### Conclusion

There are some obvious signs that can be spotted while performing single leg squats, overhead squats and landing tasks, which will point the trainer, where to look for limitations. The turn out feet, heel raises or knee valgus would prompt an experienced practitioner to check for calf tightness, which greatly limits ankle dorsiflexion.

It is apparent however, that multiple factors can influence foot pronation and frontal plane knee biomechanics and, ultimately, ankle and knee injury risk. The evidence shows that regaining normal ankle dorsiflexion range and increased hip abductor activation are two components that

can help to prevent or rehabilitate ankle and knee injuries. Given the associations between overpronation of the foot with increased hip adductor activation, this then also should be addressed in programs designed to improve excessive pronation.

A global view that takes into consideration the joints below and above the ankle is therefore required. Subsequently, the integration of specific exercises to address all of these components (Figure...) may be needed to optimize the programs. Trainers should perform visual and manual muscle tests to decide which of these exercises are absolutely needed for that individual.

### Footnote

While exercising, is generally helpful to reduce excessive pronation, some individuals may have structural skeletal pathologies that warrant the use of corrective devices like orthotics. Work with a licensed health care practitioner to determine the best option to ensure your safety and help you achieve the best results. Please consult a doctor if you have any unusual symptoms doing any of these exercises. Foam rolling should be avoided if you have unhealed wounds, bone fractures, skin cancer, osteoporosis, high blood pressure or any others strains or sprains. It is not advised to roll on an area that is affected by varicose veins and broken capillaries. While performing these exercises, please be aware of good body positioning and control of movement.

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