We welcome a new regular contributor the Professional Soccer Athletic Trainers Society (PSATS) to Performance Conditioning Soccer. Each submission will provide coaches, parents and athletes with the latest strategies in prevention injury and maintaining a healthy soccer lifestyle. The mission of the Professional Soccer Athletic Trainers Society (PSATS) is to serve as an educational resource for the Major League Soccer athletic trainers. PSATS serves its members by providing for the continuing education of the athletic trainer as it relates to the profession thereby improving the athletic trainers understanding of sports medicine as it relates to soccer. PSATS strives to improve the education of its members so that they may better serve Major League Soccer, their organizations, and the professional soccer players under their care. PSATS also serves as an educational resource for those outside of the professional soccer community to better educate them on the role of the athletic trainer within the sports medicine team. Thank you PSATS!-ed

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Alan is in his third season as the Assistant Athletic Trainer with FC Dallas. Alan previously worked as an athletic trainer at the minor league level. He spent three seasons with the Texas Brahmas of the Central Hockey League, and two seasons with the Fort Worth Cats Baseball Club of the American Association. Reid received his Masters of Science in Athletic Training in 2004 from California University of Pennsylvania and his BS in Health and Fitness Promotion with an emphasis in Athletic Training from Texas Christian University in 2003.
Incorporating research techniques into daily training can be a useful task when addressing Chronic Ankle Instability (CAI), a common issue with soccer players. When studying CAI one must ask themselves a few questions: A) how does glute weakness or fatigue play a role into injury mechanism and B) how does decreased ankle joint ROM affect CAI. Hip abductor and extensor weakness and its correlation to ankle injuries has long been a popular subject of research. Through this article the author will attempt to review current research and make some suggestions on how to incorporate these findings into every day training sessions and rehab.

The Research

When researchers want to set a standard for functional balance relating to ankle stability they use the Star Excursion Balance Test (SEBT) as a baseline and post test measurement\(^1\). The test requires a subject to balance on a single leg (stance leg) and reach out into 6 different directions with the opposite limb, while attempting to balance and keep the test foot in contact with the ground. Measurements are taken at the furthest reach point while maintaining upright posture. SEBT is a closed chain activity testing dynamic balance, requiring gluteus medius and maximus functional strength along with adequate ankle dorsiflexion on the stance limb. All of these properties play a major role in ankle stability and should be improved to decrease the re-injury rate of an athlete with CAI. See Fig 1 for reference, SEBT directional movements are in reference to the stance leg.

Hubbard et al in 2007\(^1\) determined that subjects with weak hip abductors and extensors had the lowest reaching ability in the posterior-lateral and posterior-medial direction, as this movement requires considerable glute strength to balance and maintain postural stability. This is an important finding for the world of soccer, as our players are often found in a similar single leg stance reaching posterior medially with the opposite limb when striking a ball. The Hubbard et al study wanted to look at functional vs. mechanical instability, in persons with CAI. Their results found no significant change in the anatomy of the ankle. However, they did find a correlation between the mobility of the talus and its influences on plantar flexion and dorsiflexion. Increased anterior laxity correlated moderately with increased dorsiflexion, and increased posterior laxity correlated with increased posterior-lateral reach during SEBT\(^1\). The decreased ability for dorsiflexion and a decreased posterior-lateral reach may also be correlated to tight gastroc and soleus, as other research has reported\(^1\). In a study comparing ipsilateral hip abductor weakness in subjects with CAI, researchers found significant gluteus medius weakness on the involved side resulting in poor dynamic balance\(^1\). The authors later discuss the importance of gluteus medius in frontal-plane stability during heel strike, and how decreased muscle strength or lack of muscle recruitment can lead to increased ankle injuries. Our body is built in segments and when small corrections of foot placement can not be made at the hip; larger corrections must now be made at the distal segments, resulting in an increase risk of injury at the foot and ankle.

One study by Chaiwanischsiri et al in 2005\(^5\) specifically looked at the effects on proprioception and dynamic balance when incorporating the SEBT into the rehab process. The study found an improvement in functional ankle stability when comparing a conventional ankle rehab program (ROM, stretching, strengthening exercises) to one that incorporates the Star Excursion Balance Training (SEBT) into the rehab process. Subjects using the SEBT 3x a week over four weeks of therapy found moderate statistical improvements in the Single Leg Stance Test times, compared to those in the control group\(^7\).

The Field

Research is wonderful for labs and journals, but how can I incorporate this into my daily activities? Why not incorporate the research testing tools into functional training? Improvements in glute strength, dynamic balance and ankle ROM can be made during all aspects of training. We have begun to incorporate many of the same movements required in the SEBT into our warm-up and gym activities. By incorporating similar movement patterns we can key specifically on gluteus strength and ankle range of motion, two primary factors leading to ankle sprains. Authors talk about the demands on the stance leg in the posterior-lateral and
posterior medial reach positions, which is why we have chosen to use these two specific movement patterns in improving ankle strength.

During our dynamic warm-up phase of training athletes go through a series of movements some of which require specific gluteus medius firing and increased ankle ROM.

**Exp: Cross Over Scorpion Walk** - Athlete steps laterally swings one leg behind the stance leg and squats. This is a good way to incorporate a posterior-lateral reach into an active glute, TFL, and soleus stretch.

**Exp: Single Leg Balance-Squat-Lateral Lunge** - Athlete balances on one leg, half squats, lateral lunges into deep groin stretch, while maintaining complete stance foot contact to improve ankle ROM, the pushes off original stance leg up to opposite balance.

During our gym session we try to incorporate as many multi-planar strength movements as possible always keeping in mind improved ankle mobility.

**Exp: Y-Balance-Curl** - Athlete starts standing with towel under right foot, squats on left leg, curling right leg behind stance leg into posterior-lateral reach position. While in half-squat "Y" position athlete performs a bicep curl with right arm, movement is finished when athlete returns to normal stance position. This movement incorporates a posterior-lateral reach while maintaining dynamic balance through an upper body strength movement.

**Exp: Skater-Press** - Athlete begins in same position as above this time pushes right leg into posterior medial position, completing an overhead press movement with right arm.

**Exp: 3-Way Towel Slides** - Athlete is standing with one foot on ground and one foot on a towel. Athlete performs a half squat on the stance leg while sliding the towel leg out in a lateral direction then returning to start position. This motion is repeated in an anterior and posterior direction. Athlete can use a medicine ball in hands, or elastic band around ankle for increased resistance. This movement incorporates dynamic balance, glute and ADD strength, and forces the athlete into dorsiflexion getting an active stretch on the soleus.

**Conclusion**

Preventative glute strength and improvements in ankle range of motion has been discussed in the literature to decrease future ankle injuries\textsuperscript{1,2,4,5}. If one can improve glute medius strength then there should be a substantial improvement in foot placement and stability during heel strike\textsuperscript{2}. Improvements in soleus and gastroc flexibility have been shown to improve the overall biomechanics of the ankle, therefore reducing the risk of ankle injury\textsuperscript{6}. While there is not a cure all, prevent all strengthening or warm-up activity; we are hoping to improve overall ankle function by incorporating SEBT movements into our daily activities with an overall goal of decreasing lost playing time.

**Net Link:** For an agility/mobility on-field program using the wheel (star) principle click [HERE](#).
Reference:
2) Freil K et al, Ipsilateral Hip Abductor Weakness After Inversion Ankle Sprain. J Athletic Training, 2006; 41(1)74-78