**DO FOOT ORTHOTICS IMPROVE SELF-REPORTED PAIN AND FUNCTION IN PATIENTS WITH PLANTAR FASCIITIS? A META-ANALYSIS**

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**Context:** While biomechanical analyses of foot orthotics have shown sound theoretical rationale for this intervention, evidence for the clinical efficacy of foot orthotics to reduce pain and enhance function in patients with plantar fasciitis is not well established. **Objectives:** To perform a meta-analysis examining the effects of foot orthotics on self-reported pain and function in patients with plantar fasciitis. **Data Sources:** MEDLINE, SPORT Discus, and CINAHL were searched from their inception until November 2007 using the terms “foot”, “plantar fascia”, “arch”, “orthotic”, “orthoses” and “plantar fasciitis”. The search was limited to English language studies that utilized human subjects. **Study Selection:** Original research articles which met these criteria were included: 1) randomized controlled trials or prospective cohort designs, 2) evaluated the efficacy of foot orthotics with self-reported pain and/or function as dependent measures, 3) means, standard deviations, and sample size of each group had to be reported. **Data Extraction:** Six articles were included and two independent reviewers scored these articles using the PEDro scale (mean=6.2±2.4). Since pain and function measurement instruments were different across studies, the extracted mean and standard deviation values were converted into percentages of the total possible score for each instrument. We divided pain and function outcomes into three follow-up periods: less than 6 weeks (immediate), 7 to 12 weeks (intermediate), and more than 12 weeks (long term). **Data Synthesis:** Because the purpose of most of the included studies was to compare the effects of different types of foot orthotics, there were no true control groups. In an effort to have a control group, we utilized Roos et al’s night splint condition (at 12 week follow-up) to compare our pooled orthotics results. The meta-analysis results showed significant reductions in pain after orthotic intervention at all three follow-up periods: Immediate (Z= 24.1%, 95% CI: 19.7-28.5), intermediate (Z=15.2%, 95% CI: 11.8-18.7), and long term (Z=37.0%, 95% CI: 32.3-41.9). The Roos et al study showed significant reduction in pain after night splint treatment at long term follow-up (Mean Difference = 17%, 95% CI: 8.9-25.15). The meta-analysis results also showed significant increases in function after orthotic use at all three follow-up periods: Immediate (Z=21.9%, 95% CI: 16.0-27.9), Intermediate (Z=15.9%, 95% CI: 11.2-20.7), and long term (Z=23.8%, 95% CI: 18.9-28.7). In contrast, the Roos et al study did not show a significant increase in function after night splinting for 12 weeks (Mean Difference = 10%, 95% CI: -3.6-23.6). **Conclusion:** The use of foot orthotics in patients with plantar fasciitis reduces pain and increases function at immediate, intermediate, and long term follow-up periods. There is, however, limited data from true control groups with which to compare the effects of orthotics in this population. **Importance to Athletic Training:** The current study provides valuable information and evidence about the role and effectiveness of short, intermediate, and long term effects of foot orthotic which may alleviate foot pain and increase foot function.

USEFULNESS OF A CRITICALLY APPRAISED TOPIC WITHIN YOUR CLINICAL PRACTICE

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**Objective**

The objective of this review is to define and illustrate the benefit of implementing critically appraised topics into athletic training clinical practice.

**Background/Review of Literature**

Over the past several decades, evidence-based medicine has become an increasingly popular phenomenon in health and medicine. This process involves not only the best current research evidence, but also incorporates the clinician's individual expertise and most importantly the patient's own personal values and goals. Because current technology allows the modern patient to effortlessly access health care and medical information, it is critical for health care professionals to remain up-to-date with the most scientific research. The demand for clinicians to be conscious of the most efficient way to access this research is becoming a necessity. Most research evidence can be found by searching databases and journals. Unfortunately however, publication does not necessarily ensure the quality of a study. Therefore, critical appraisal is a crucial and necessary skill for evidence-based medicine clinicians. The purpose of critically appraising research evidence is to determine whether or not the results can be translated and applied during clinical practice. Essentially, the clinician should be able to answer three general questions for each study that is analyzed. First, what are the results of the study and are they reliable; can they be reproduced if the same study was conducted again? Second, are the results of the study valid? More specifically, did the results produce answers to what the researcher was initially looking for? And finally, are the findings of the study clinically relevant to the particular clinical question? It is also important for a clinician to not only be able to identify the positive aspects of a study, but the negative ones as well. As is human nature, no single research study is perfect, and therefore being able to identify flaws, limitations, and threats to validity will not necessarily eliminate the study from consideration but will aid the clinician in making a thorough clinical decision.

Due to the demanding schedule of most health care practitioners, it is difficult to delegate time to explore current research. Therefore, the use of critically appraised topics is a convenient tool for health care professionals to access up-to-date research. A Critically Appraised Topic (CAT) is a 1-page analysis of an article published in a peer-reviewed medical journal. Before a CAT can be written however, a specific clinical question must be developed and a literature search performed. Once a peer-reviewed journal article has been found that relates to the clinical question, it is time for the critical appraisal. The main piece of the CAT is the clinical bottom line, which provides a positive or negative recommendation for clinical application by the reviewer based on the significance of the study's results. However, a complete analysis of the study must occur before the clinical bottom line can be determined. First, a summary of key evidence is written, which closely emulates the article's abstract. This brief overview describes the study design, participants, procedures, outcome measures, and, finally, the results. Once the summary of key evidence is completed, a more thorough examination can be conducted to determine the validity and ultimately the applicability of the study results. Both threats and strengths of internal, external, and statistical validity are identified in order to facilitate a clinician's decision to utilize the study's findings in practice. Next, the clinical bottom line is written, as well as a final statement relating the study being analyzed to the clinical question. This assertion may further identify how limitations of the study influenced the reviewer's clinical bottom line. Finally, a full citation of the article evaluated in the CAT is referenced at the end of the paper.

**Importance to Athletic Training**

The athletic training profession is still considered relatively young and new when compared to similar allied health occupations such as physical and occupational therapies. With the rapid evolvement of evidence-based medicine (EBM) throughout allied healthcare, it is evident that for EBM practice to prosper and strengthen in the future generations of athletic training, effective strategies to implement evidence-based practice must be acknowledged. Critically appraised topics are a great way to facilitate EBM integration into athletic training. By considering a critically appraised topic, a clinician is able to quickly determine whether the results of a specific study are applicable to his or her clinical question. If the CAT is applicable to a specific case, the clinician is able to easily, efficiently, and safely reproduce the intervention described by the research and predict the prognosis of the intervention for the patient in practice. Thus, critically appraised topics provide a means for the everyday busy certified athletic trainer to include current evidence into their clinical practices without the hassle of conducting exhaustive literature searches and reading page after page of numerous journal articles.

# THE EFFECTS OF ANKLE SUPPORT ON STATIC BALANCE OF SUBJECTS WITH AND WITHOUT FAI

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**Objective:** Ankle braces and tape are used to improve ankle stability, restrict range of motion, improve balance, and/or reduce ankle sprain injury in physically active individuals with functional ankle instability (FAI). Applying an ankle brace overtop ankle tape has been used clinically, yet no research exists that indicates the efficacy of this treatment technique to improve ankle stability or balance. The purpose of this study was to determine balance differences between single leg stance tests under 4 treatment conditions: 1) ankle brace, 2) ankle tape, 3) a combination of ankle tape and brace, and 4) no ankle tape or brace. **Design and Setting:** A crossover trial conducted in a research laboratory. **Subjects:** Participants in this study included fifteen subjects with no history of ankle injury (23.1±5.4 yrs, 167.2±9 cm, 66.6±14.6 kg) and fifteen subjects with a history of FAI (22.7±3 yrs, 171.8±10 cm, 74.5±10 kg) who reported "giving-way" sensations at their ankle and recurrent ankle sprains with physical activity. **Measurements:** Subjects stood on a single leg on a force plate with their eyes closed and remained as motionless as possible for 20 seconds. Three trials were performed for each treatment condition. Testing order was counterbalanced. Means and standard deviations were calculated over three trials. A 2 x 2 x 2 mixed-model repeated measures ANOVA with 2 within factors with 2 levels (tape: no brace, brace; brace: no brace, brace) and 1 between factor (ankle: FAI, stable) was used for statistical analysis for each dependent measure ($\alpha$=.05). Resultant center-of-pressure velocity vector (COPV) was calculated from a force plate. The Balance Error Scoring System (BESS) was used to record balance errors each time one of the following movements occurred: 1) lifting hands off hips; 2) excessive hip flexion or abduction (>30°); 3) lifting the forefoot or heel; 4) remaining out of testing position; and 5) opening eyes. Faster velocities and greater errors were indicative of poor balance. **Results:** Main effects for tape (no brace=7.77±2.16 cm/s, brace=7.22±2.01 cm/s; p=0.028), brace (no brace=7.29±2.17 cm/s; brace=7.7±20 cm/s; p=0.014), and group (FAI=8.26±1.9, stable=6.73±1.95; p=0.023) were found for COPV. Main effects for tape (no brace=2.56±1.89; brace=3.94±2.21; p<0.001) and brace (no brace=2.84±2.21; brace=3.66±2.05; p<0.001) were found for the BESS. No group main effect (FAI=3.58±1.94, stable=2.92±2.33; p=0.32) was found for the BESS. **Conclusions:** The application of tape or brace impaired single leg balance in subjects with or without FAI. A brace applied overtop tape did not alter balance in our subjects. We speculate that ankle supports may have restricted ankle motion and caused subjects to sway excessively, resulting in increased COPV and greater balance errors. Future research should examine the association between balance with ankle supports and recurrent ankle sprain injury in individuals with FAI. **Key Words:** functional ankle instability, ankle tape, ankle brace, static balance, BESS, center of pressure velocity.