

Pneumatic Leg Brace after Tibial Stress Fracture for Faster Return to Play

Swenson EJ, DeHaven KE, Sebastianelli WJ, et al. The effect of a pneumatic leg brace on return to play in athletes with tibial stress fractures. *Am J Sports Med* 1997;25:322-8.

Objective

To assess the effect of pneumatic leg braces in comparison with traditional treatment on the time to return to sporting activity after a tibial stress fracture in athletes.

Design

Randomized, controlled 12-wk trial.

Setting

3 orthopedic clinics in the U.S.A.

Participants

Patients with symptoms for < 6 mo, clinical evidence of a stress fracture affecting the distal two thirds of the tibial shaft, and positive bone scans at the area of localized tenderness were eligible. Exclusion criteria were anterior cortex tibial stress fractures, asymptomatic sites of uptake on bone scan, and linear uptake on bone scan consistent with medial tibial stress syndrome. After randomization 3 patients left the control group (2 dropped out, and 1 was excluded). Characteristics of the traditional treatment group (8 patients after exclusions) and brace group (10 patients) were mean age, 22 (range, 15 to 44) y and 18 (16 to 21) y; competitive athletes, 63% and 90%; mean time from pain on walking to diagnosis, 35 d and 26 d; and 25% and 60% were men, respectively.

Intervention

The pneumatic leg-brace group was fitted with the long Air-Stirrup leg brace. The control group had optional use of crutches and were nonweightbearing. No casts were applied. Patients began a progressive return to impact activities when they had been walking with no pain for 3 d. Both groups maintained fitness by nonimpact activities.

Main outcome measures

Main measures were the periods from initiation of treatment until return to light impact activity and to full sporting activity, and the disappearance of pain while hopping. Patients returned to full activity when they completed a 5-stage functional progression of impact activities. Patients were evaluated weekly.

Main results

Median time to begin light impact activity and to complete the functional progression was shorter for the brace group (7 d and 21 d, respectively) than for the traditional group (21 d and 77 d, respectively; $p = 0.017$ and $p = 0.0005$ for the differences between groups). All the athletes assigned to braces returned to full activity in their sports. Median time to pain-free hopping on the affected leg was 14 d for the brace group and 45 d for the control group.

Conclusion

A pneumatic leg brace eliminated pain during impact activity earlier and allowed patients to return to sporting activities faster than traditional treatment for tibial stress fracture.

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Commentary

The study by Swenson and colleagues was designed to "settle any controversy regarding whether the pneumatic leg brace can facilitate a significantly earlier return to play in athletes with tibial stress fractures." The results are dramatic: those treated with the brace were back to sport activity within 21 days while the control group took 77 days. The magnitude of the difference prompts a closer look for weaknesses that might affect the validity of the conclusions; this is one of those rare studies where the results seem too good to be true. The criteria for diagnosis were clearly described, and most of the cases eventually developed plain radiographic changes consistent with stress fractures. Patients were assigned to treatment randomly. Follow-up was weekly for 12 weeks, and return to running and agility drills was closely monitored.

We must consider several factors that might moderate enthusiasm. 18 subjects is a small sample size for generalizing to the population, and it is of concern that men and women were studied together and that there was a predominance of women in the control group and men in the brace group. The biology of bone injury and healing is probably gender dependent. The period from the onset of disabling pain to diagnosis was longer for the control group than the brace group. Clinical experience and the literature both tell us that time to recovery is a function of duration of symptoms. Finally, the groups did not differ on the regular clinical assessments of swelling, palpable bony mass, local tenderness, and pain with percussion. This may indicate that the two groups were healing at the same rate but the pneumatic brace served as a method of pain relief. Thus, the authors' speculation that the brace, through compression of the soft tissues, resulted in faster healing is not based on data presented in the article.

The Aircast brace was effective in reducing the time to return to sport activity. Whether this was related to pain relief or the rate of healing is not yet known.

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