

Sultan MJ, Zhing T, et al. Compression stockings in the management of fractures of the ankle: a randomised controlled trial. Bone Joint J. 2014;96-B(8):1062-9.

Design: randomized clinical trial

Purpose of study: to compare compression stocking with a tubular elastic support in the management of ankle fractures

Population/sample size/setting:

- 90 patients (54 women, 36 men, mean age 47) treated for acute ankle fractures at the University of Manchester in the UK
- Eligibility criteria were ages 16 to 90 with a fracture of the ankle within the previous 72 hours and normal arterial pressures in the dorsalis pedis and posterior tibial arteries assessed by handheld Doppler in the emergency room
- Exclusion criteria were previous fracture or ankle surgery, a complex (open or pilon) fracture, peripheral arterial disease, or any systemic disease which the treating orthopedist thought unsuitable for inclusion

Interventions

- The initial management of the fracture depended on whether it was stable (Weber A and some B, n=59) or unstable (Weber C and some B, n=31); the unstable fractures were treated with open reduction with internal fixation and the stable fractures were treated conservatively
- All patients received an Aircast boot as part of their fracture immobilization; this was applied immediately for the conservatively treated patients and after surgery for the operatively treated patients
- All surgical patients were given low molecular weight heparin during hospitalization
- Randomization was to one of two devices used underneath the Aircast boot: either an ankle injury stocking (AIS, n=44) or an elastic bandage (n=46)
 - o For both groups, the uninjured limb was used to select the appropriate size of either the AIS or the bandage
 - o The AIS ended below the knee in order to prevent its rolling down

Outcomes:

- Followup was done at 2, 4, 8, and 12 weeks, and again at six months
- The objective assessments were done by a nurse who was unaware of treatment group, who measured variables such as calf and ankle circumference and range of motion
- The primary outcome was the Olerud–Molander ankle score (OMAS), a patient questionnaire assessing function based on pain, stiffness, swelling, stair climbing,

- running, jumping, squatting, and the use of a walker, with a best score of 100 and a worst score of 0
- The OMAS improved in both groups over time, but the AIS group experienced greater improvements than the bandage group
 - o At 4 weeks, 8 weeks, 12 weeks, and 6 months the mean OMAS scores for the AIS group were 43,74,88, and 98
 - o The corresponding OMAS scores for the bandage group were 24,44,58, and 67
 - Secondary measures, which included foot, ankle, and calf circumference and range of motion, also favored the AIS group during followup
 - In addition, the American Orthopaedic Foot and Ankle Society score (AOFAS) also favored the AIS group
 - o At 4 weeks, 8 weeks, 12 weeks, and 6 months the mean AOFAS scores for the AIS group were 73,89,96, and 99
 - o The corresponding AOFAS scores for the bandage group were 55, 75, 82, and 84
 - Return to work and to normal activity was reported with means of 40 and 52 days for the AIS group, compared to 52 and 70 days for the bandage group
 - Adverse events were rare; one patient in the bandage group had a superficial wound infection, one AIS patient required removal of a screw, and one bandage patient had revision surgery

Authors' conclusions:

- AIS applied as soon as possible after an ankle fracture reduces swelling, and in comparison to a tubular bandage, AIS leads to greater functional gains during the first six months after treatment of the ankle fracture

Comments:

- Both groups were immobilized without a plaster cast using a removable boot, which is apparently an increasingly common practice, which is probably an important component of the fracture management
- There is an illustration of the AIS in Figure 2 which shows that it goes from the end of the metatarsals to just below the knee, but it is not clear how the bandage was applied and whether it also had the same coverage from foot to knee, but it is likely that this was the case, since that is how it is usually applied
- An additional between-group comparison was made using duplex ultrasound to look for a DVT; there were more DVT in the bandage group, but this did not reach statistical significance

- Treatment allocation was done using a minimization procedure rather than a random allocation procedure, and this is considered to be equal to randomization in achieving prognostic balance at baseline
- Although the study does not have quite 50 patients per group, which would be useful to assure a high quality estimate of treatment effect, it otherwise is high quality in avoiding biases which would threaten internal validity

Assessment: High quality study with good evidence that in the setting of ankle fractures immobilized with a removable boot, a below-the-knee ankle injury stocking is more effective than a tubular bandage in controlling swelling and in yielding functional gains six months after the initial injury.