# Tight enough?

## The ins and outs of compression garments

by Stuart Miller

***As the only item of 'specialist' equipment claimed to aid efficiency in all sports, compression garments (CG) can supposedly make you cooler, or warmer, or stronger. Available data identify both assets and drawbacks – but it seems highly likely that a good fit is essential.***

Improved performance associated with compression garments is varied and not fully substantiated. Flexibility has been shown to decrease during range-of-motion (ROM) tests [1] and sprinting [2]. However, the latter study also found an increased squat depth during a counter movement jump, suggesting that range of motion is not affected in all conditions. The reduced flexibility is likely to be associated to the increased passive joint torque present when wearing CG [2]. Bringard and colleagues [3] also found a reduced energy cost when running at 12km/hr, but a significant difference was not recorded at 8, 14, or 16 km/hr.

### A mixed message

Explosive performance measures that have been found to increase whilst wearing CG include:

- peak force during a maximal vertical counter movement jump in males – but not females [4];
- mean peak force and power over 10 counter movement jumps (power was not found to be improved over an individual jump) [4];
- counter movement jump height [2], and repeated sprint performance – although not single sprint performance [5].

### Fast and loose?

Compression garments are proposed to work through their, for need of a better word, compression. As such, having the right size for each individual would appear to be an important factor. Studies to date have incorporated two main methods to monitor sizing: (a) following manufacturer's guidelines; (b) testing the compression at specific locations. Option (a) is easy to do, but its validity is compromised by the (implicit) assumption that manufacturers have addressed the issue of optimal size, although there is no evidence of this. However, option (b) requires specialised equipment, which is normally purpose built in house. Both methods suggest that a specific optimal compression is required. However, only a few studies have actually addressed the issue of different compression gradients, as most compare compression with loose clothing.

### Multiple factors

One study in particular [4] assessed the effect of three conditions: normal clothing; compression garment fitted to manufacturer's guidelines; and one size smaller than recommended. They found that the over-tight compression garment condition resulted in a drop-off of performance in power/strength-based tests compared to the properly fitted compression garment (although both were better than the control), thus suggesting there may be an optimal fit. An interesting addition to this is that one theory being proposed for performance increments is increased stiffness at the joint when wearing compression garments. Extension of this theory would suggest that a tighter garment (ie, more stiff) would result in a better performance, which was not the case in the previous study. Therefore, it appears that there is either an optimal stiffness, or an interplay of different factors.

### Performance enhancers

Other theories focus on increased muscle temperature or improved blood dynamics. A warmer muscle is much better at producing force – which would help with maximal contractions. On the other hand, a warmer tendon is more compliant – making it more economical over repetitive movements yet also less effective at transferring maximal force from muscle to joint. As such, warming the muscle and tendon simultaneously may result in the muscle and tendon becoming optimal for different actions. This may explain the inconclusive, and sometimes contradictory, findings within the research.

Improvement in blood dynamics is linked to a better 'flushing' of the muscle. During repetitive exercise, lactate builds up within the muscle, which is detrimental to performance. At submaximal intensities, the body is able to remove this lactate using the blood system. If this removal is enhanced, then continuous activity can be maintained at a higher intensity. Continuous compression and relaxation of the blood vessels from muscular contraction is the main driver of blood removal: if this compression can be improved, then detrimental effects of muscle lactate build-up will be reduced.

### An individual choice

The issue with these theories of how compression garments aid performance is that there are insufficient data to substantiate or refute them. The mixed findings in the literature indicate a need for further research into the mechanisms behind compression garments. Until then, their use will remain a matter of individual preference, as will the choice of garment best suited to desired outcome – given that the warmer and cooler advantages are not both offered from same garment!

What can be said with certainty is that studies have not shown reduced performance, with the main benefit being maintenance of warmth for the athlete in a cold environment, without limiting performance by layers of clothing. The compression garment allows for a streamlined, lightweight, method of maintaining body temperature at a level optimal for performance. Over and above this, the benefits of compression garments are not fully understood. Perhaps the improvements in performance are simply because of the placebo effect – we just like training in tight tops …

### References


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