

Letter to Editor

Do toning pants help to give you a better workout?

Dear Editor-in-Chief,

Athletes have been wearing compression clothing (e.g., shorts, tights, or stockings) for many years in attempts to prevent injury, aid performance, and help recover after exercise. More recently, a number of manufacturers have developed compression garments which they market as “toning apparel.” Most of these garments incorporate elasticized “toning panels” which are designed to provide resistance as the user moves through a given range of motion. This added resistance purportedly increases muscle activation, which would result in greater energy expenditure and muscle toning benefits compared to exercising in regular exercise clothing. We believe that the validity of these claims has never been verified. The purpose of our study was to determine whether wearing toning capris had an appreciable effect on the physiological, perceptual, or muscular responses during exercise.

Sixteen moderately active, female volunteers (21.4 ± 1.86 yrs, 1.67 ± 5.37 m, 61.3 ± 6.53 kg) were fitted with toning capris (Fila USA™; www.fila.com). After providing written informed consent, each subject completed one testing session. Subjects walked for 5 minutes at each of three speeds: 4, 4.8 and 5.6 km·hr⁻¹ (2.5, 3.0, and 3.5 mph, respectively). This sequence was repeated twice; once while wearing the toning capris and once while wearing regular athletic shorts. The order was randomized for each subject and 5 minutes of rest was given between trials. During each trial VO₂ was measured continuously using open circuit spirometry (AEI Inc., Pittsburgh, PA), heart rate (HR) was measured each minute using radiotelemetry (Polar, Woodbury, NY), and Ratings of Perceived Exertion (RPE) were determined every 5 minutes (after each stage) using the 6-20 Borg scale. Additionally, EMG was recorded from the gluteus maximus, vastus lateralis, and biceps femoris during the last 15 seconds of each 5-minute stage. The average EMG for each muscle, at each speed, was “normalized” to the maximal EMG obtained during a previously recorded maximal isometric contraction (MVIC). The average EMG from each exercise trial was presented as a percentage of MVIC for each muscle.

Physiological responses to walking at each speed in regular athletic shorts and toning capris are presented in Table 1. There were significant increases in HR, VO₂, energy expenditure and RPE with increasing speed when wearing both athletic shorts and toning capris. However, there were no significant differences in HR when wearing toning capris as opposed to athletic shorts at any speed. Overall, there was a significantly higher VO₂ when wearing toning capris versus athletic shorts (15.3 vs. 14.9 ml·kg·min⁻¹). Further analysis revealed that this difference was only significant at 4 km·hr⁻¹. Similarly, test results showed a significantly higher energy expenditure when wearing the toning capris versus athletic shorts (4.66 vs. 4.57 kcal·min⁻¹). Again, pairwise comparisons revealed

that this difference was only significant at 4 km·hr⁻¹. Finally, there was also a significantly higher overall RPE when subjects wore toning capris compared with athletic shorts (9.2 vs 8.8). Here, however, pairwise comparisons revealed that this increase in RPE was only significant at 4.8 km·hr⁻¹.

Table 1. Physiological responses to wearing athletic shorts and toning capris (N=16). Data are means (±SD).

	Athletic Shorts	Toning Capris
Heart Rate (bpm)		
4 km·hr ⁻¹	99(10.0)	99(10.9)
4.8 km·hr ⁻¹	105(10.9)	106(11.1)
5.6 km·hr ⁻¹	115(11.9)	115(11.9)
VO₂ (ml·kg·min⁻¹)		
4 km·hr ⁻¹	12.7(0.83)	13.2(0.96)*
4.8 km·hr ⁻¹	14.7(0.93)	15.0(0.89)
5.6 km·hr ⁻¹	17.5(1.10)	17.6(1.10)
Kcal·min⁻¹		
4 km·hr ⁻¹	3.88(0.437)	4.02(0.399)*
4.8 km·hr ⁻¹	4.48(0.483)	4.58(0.410)
5.6 km·hr ⁻¹	5.34(0.486)	5.37(0.480)
RPE		
4 km·hr ⁻¹	7.4(0.62)	7.7(0.79)
4.8 km·hr ⁻¹	8.6(1.02)	9.1(1.15)*
5.6 km·hr ⁻¹	10.4(1.31)	10.7(1.40)

Table 2. Muscle activation (% MVIC) of the gluteus maximus, bicep femoris, and vastus lateralis while wearing athletic shorts and toning capris. Data are means (±SD).

	Athletic Shorts	Toning Capris
Gluteus Maximus (n=16)		
4 km·hr ⁻¹	34(27.3)	28(16.4)
4.8 km·hr ⁻¹	32(19.9)	30(17.3)
5.6 km·hr ⁻¹	34(19.5)	32(17.7)
Bicep Femoris (n=15)		
4 km·hr ⁻¹	19(13.1)	18(10.5)
4.8 km·hr ⁻¹	21(12.7)	21(12.3)
5.6 km·hr ⁻¹	24(13.5)	24(12.5)
Vastus Lateralis (n=13)		
4 km·hr ⁻¹	26(8.7)	27(9.8)
4.8 km·hr ⁻¹	32(9.7)	32(10.4)
5.6 km·hr ⁻¹	39(10.2)	39(12.1)

The EMG data for the toning capri and athletic short conditions are presented in Table 2. Muscle activity in the biceps femoris and vastas lateralis increased significantly with increasing speed when wearing either the athletic shorts or toning capris. There was no significant difference in muscle activation across speeds for the gluteus maximus. When comparing muscle activation while wearing athletic shorts or toning capris, there were no significant differences between the two conditions.

To our knowledge, this is the first study to assess the effects of wearing toning apparel on exercise responses. Several studies have studied the responses to

wearing compression shorts, tights, and stockings (Ali et al., 2010; Bringard et al., 2006; Doan et al., 2003; Sperlich et al., 2009); however, typical compression clothing does not have resistive toning panels included in its design. While there were no significant differences in HR when wearing toning capris or athletic shorts, there were small but significant differences in VO_2 , energy expenditure, and RPE. The difference in VO_2 and kcal was approximately 2% higher ($0.4 \text{ ml}\cdot\text{kg}\cdot\text{min}^{-1}$ or $0.09 \text{ kcal}\cdot\text{min}^{-1}$) when toning capris were worn. These findings are in contrast to the results of previous studies which studied the use of compression tights. Sperlich et al. (2009) found no significant variation in VO_2 while running in no compression and compression tight conditions (41.1 ± 5.6 vs. $40.8 \pm 6.7 \text{ ml}\cdot\text{kg}\cdot\text{min}^{-1}$). Bringard et al. (2006) reported that VO_2 was actually lower when wearing compression tights compared to either elastic tights or athletic shorts (by 26% and 36%, respectively). It was hypothesized that compression and elastic tights might give the muscles extra support, allowing for improved proprioception, muscle coordination, and propulsive force, which would then result in decreased VO_2 while running.

While there was a significant difference in energy expenditure when wearing toning capris versus athletic shorts, the difference was only $0.09 \text{ kcal}\cdot\text{min}^{-1}$. When this difference is extrapolated to 1 hour of exercise, an individual would only expend an additional 5 kcal. Thus, the impact of this small increase in energy cost would be negligible in terms of weight maintenance.

Our study found a significant increase in RPE while walking in the toning capris compared to athletic shorts. In the current study, subjects were asked write down what they felt while wearing the toning capris compared to the athletic shorts. Several subjects stated that they felt “increased compression” and “resistance around the hip joint.” The results of Doan et al. (2003) support our subject’s statements regarding the sensations around the hip joint. Doan et al. looked at the effects of wearing custom fit compression shorts on range of motion, muscle oscillation, jump power, and skin temperature. It was reported that there was a significant reduction in hip range of motion while wearing the compression shorts. This might help to explain why subjects in the current study felt that they were working harder in the toning capris (i.e., the resistance offered by the toning panels probably made it harder to move through the normal range of motion).

Muscle activation of the gluteus maximus, bicep femoris, and vastus lateralis was also examined in the present study. The product tag located on the toning capris at the time of purchase claimed that the capris provide “a 50% increase in muscle workouts.” However, we found no difference in muscle activation when wearing the toning capris compared to athletic shorts.

In conclusion, we found no difference in muscle activation attributable to the use of the toning capris rather than athletic shorts. We believe subjects perceived the toning capris to be harder to walk in due to the increase in compression and resistance around the hip joint. This perceived increase in difficulty was accompanied by small, but significant increases in energy cost. However,

this 2% increase in VO_2 would amount to only 5 extra kcal expended per hour of exercise, which would be of very little practical weight loss benefit compared to wearing regular athletic shorts.

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