

CORRIGENDUM TO: “WASHING CHARACTERIZATION OF COMPRESSION SOCKS”

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In the published article “Siddique, Hafiz Faisal, Mazari, Adnan Ahmed, Havelka, Antonin, Kus, Zdenek and Akcagun, Engin. “Washing Characterization of Compression Socks” *AUTEX Research Journal* 23, no. 3 (2023): 323–339. <https://doi.org/10.2478/aut-2022-0009>,” due to miscommunication between the authors, correct Figure 3(a) and correct text in Section 1.4 were not included.

Figure 3. (a) is replaced by the following figure:

Text in Section 1.4 of the original article is replaced by the following text:



1.4 Washing of compression socks

According to the literature there are many studies about the performance of the socks. Performance includes pressure changes and dimensional deterioration of compression stockings composed of different combinations of main and inlaid yarns. It is usually recommended that commercial elastic compression stockings are routinely washed to eliminate hysteresis and refresh their mechanical performance. On the contrary, only a limited number of studies have investigated the performance of compression socks after multiple wearing, machine washes and the effect on the compression pressure (Ps) of socks [9,22–29].

There are many local and global brands of different countries in the compression socks market worldwide. These brands

suggest hand washing sock samples at 40°C instead of machine washing at different temperatures. They also recommend drying compression socks between two layers of towels in case of any decrease in pressure [15–21].

For compression socks RAL-GZ 387/1 suggests that before testing, the socks should undergo a single wash according to DIN EN 26 330/6 A. Then, the test samples should be dried in the machine for 2 min and then dried by laying flat in accordance with DIN EN 26 330, Method C. Finally, the socks should be laid in accordance with DIN EN 20139 guidelines and

conditioned by drying in a standard atmosphere for at least 12 h [9].

Proper care of compression socks is essential as per the guidelines for the utilization and prescription of compression hosiery endorsed by the National Health Services of UK. This manual recommends hand washing of socks at 40°C. However, the guide also states that some garments can be machine washed with appropriate mild detergent. It is important to avoid wringing out or twisting compression socks, and they should not be tumble-dried. Instead, they should be dried flat away from direct heat, and once dry, ironing is not recommended [22].

Liu et al. in their research produced new heterogeneous compression products (compression sleeves) with a hybrid knitted structured material using three-dimensional seamless knitting



technology and a unique built-in structural design instead of traditional homogeneous compression materials. Thermoplastic polymer threads were used for the stability of the developed material structure. Their findings indicate that these heterogeneous fabrics can withstand up to 50 wash cycles with a low tension loss, while the material has demonstrated success in its elasticity and shape retention performance when exposed to high tensile strain cycles [23].

Maleki et al. also analyzed the impact of multiple washing and usage on pressure changes in various knitted fabrics with a tubular form. For this purpose, two kinds of knitted fabric were tested for pressure measurements after repeated washing and repeated usage. After this, a comparison was made with the experimental compression pressure results and the theoretical compression pressure results obtained from Laplace's law. Their statistical findings show that repeated washing and usage have a significant impact on fabric compression pressure [24].

Harpa et al. also investigated with a new method by repeated wear and washing cycles of medical compression socks performance in their study. For this purpose, two pairs of socks were sampled for 15 and 30 days wearing and washing cycles. They tested the socks compression pressure before washing and then they tested after 15 and 30 days cycles of wearing and washing. The results showed that repeated washing caused a decrease in compression pressure [25].

Recently, Siddique et al. analyzed the compression socks washing performance. They washed the same sock sample first at 30°C, then 50°C and lastly 75°C as a small part of his scientific research work. They conclude during the research work that as the temperature level of washing increases there is a significant increase in compression pressure due to gradual increase in shrinkage percentage of compression stockings composed of Nylon/lycra compositions [26].

Macintyre et al. noted that washing the samples led to a significant improvement in pressure over the method of allowing the samples to relax through simple drying. Additionally, machine washing the socks samples at 60°C resulted in slightly higher compression pressures than regeneration. Therefore, in the study, it was recommended to wash anti-embolism socks daily. Washing the socks samples at 60°C allowed one brand to show "like new" pressure in initial condition and the other brand to apply higher pressure after being worn and washed than when they were new. The decrease in pressure caused by wearing socks all day long can be compensated by this increase in pressure. Therefore, in the study, it was recommended to wash anti-embolism socks daily [27].

Macintyre et al. stated in their studies that compression socks are recommended to be washed at temperatures between 40 and 75°C by various manufacturers.

They investigated the effects of wear and washing cycles on anti-embolism socks at 40 and 60°C, concluding that compression socks retain their compression pressure when washed at 40°C.

However, when the same sock samples are machine washed at 60°C, their compression pressure is significantly enhanced compared to new compression socks [28].

Ghosh et al. investigated the effect of washing factor on the compression pressure of warp-knitted compression bandages. Research results showed a reduction in compression pressure after use of the bandages in all three critical positions: ankle, calf and thigh. This finding contradicts the common belief that washing improves the performance of compression garments. In fact, any improvement from washing of compression product is only observed after the second or third use of the garment before it is washed. However, this pressure range may not be at the same level as the pressure range defined for effective disease treatment [29].

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The original references numbered [9]–[29] correspond to references [1]–[21] listed below.

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