

$P = 20$ hPa and radius $R = 13.68$ cm, which corresponds to the length of a circle with a circumference $G_1 = 85.96$ cm. In this case, the unit pressure is between $P = 2 - 47.2$ hPa. The condition of the minimum value of unit pressure (eg 20 hPa) necessary for effective after-burn therapy is not fulfilled for a part of the circumference of the body.

The designing of compression garments on the assumption that the body circumferences are circular can lead to failure in medical requirements relating to the values of unit pressure recommended. In particular, it refers to the circumference of the human body. In such cases very useful is the 3D scanning technique, which should be updated with software in order to determine the curvature radius for the circumferences of the body analyzed.

Conclusions

- Compression garments supporting the process of external treatment, for example in after-burn therapy and lymphedema do not provide a constant unit pressure along the circumference of individual body parts with different curvature radii.
- In order to meet the requirements related to providing a certain value of unit pressure in the place of hypertrophic scars (keloids) for parts of the body with different curvature radii of the circumference, it is necessary to consider the curvature radius in a place subjected to pressotherapy in the procedure of designing the product. Then the value of circumference of knitted fabric in a free state G_0 is defined by **Equation 10**.
- Sample calculations of unit pressure made for the circumference of a body in the form of an ellipse with the following geometrical parameters: $G_1 = 104$ cm, semi-axes $a = 20$ cm and $b = 13$ cm for areas with a minimum and maximum curvature radius and intended value of unit pressure $P = 20$ hPa for these locations, were within the following ranges: from 5.0 to 20 and from 20 to 70 hPa. In contrast, assuming the mentioned ellipse as a circle of radius R arising from the circumference of an ellipse, and the intended value of unit pressure $P = 20$ hPa results in the following range of pressure $11 \div 39$ hPa along its circumference.

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Technical University of Lodz Faculty of Material Technologies and Textile Design

Department of Clothing Technology and Textronics

The Department was established in 2009, combining the departments of: Clothing Technology and Automation of Textile Processes.

The Department offers research and cooperation within the following fields:

- physical and biophysical properties of clothing (modelling the microclimate under clothing packages)
- creating a basis for engineering fashion design (e.g. actions to improve design processes)
- unconventional structures of clothing with regard to use and manufacturing
- analysis of the operating conditions of machines for clothing production (e.g. optimisation of the gluing parameters process working conditions of sewing threads)
- creating analysis and design processes for the industrial production of garments
- basic problems of general and technical metrology
- instrumentation of measurements, the construction of unique measurement device and system
- measurement and control computer systems, including virtual instruments of the fourth generation
- textronics as synergetic connecting textile technologies with advanced electronic systems and computer science applied in metrology and automatics
- identification of textile and clothing objects with the use of advanced microprocessor measurement techniques
- modelling of objects and their computer simulation, methods of experimental research, especially experiment design of experiments and computer analysis of results

The Department is active in the following educational and scientific fields: textile engineering, pattern design, education of technology and information engineering, materials engineering, health and safety at work, and logistics.

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