



10th International Conference Interdisciplinarity in Engineering, INTER-ENG 2016

## Comparative Anthropometric Study Regarding the Foot of Elderly Female Population

Bogdan Sarghie<sup>a</sup>, Aura Mihai<sup>a,\*</sup>, Mariana Costea<sup>a</sup>, Elena Rezuș<sup>b</sup>

<sup>a</sup>“Gheorghe Asachi” Technical University of Iasi-Romania, Faculty of Textiles, Leather and Industrial Management, Blvd. Dimitrie Mangeron, no. 29, 700050, Iasi, Romania

<sup>b</sup>“Grigore T. Popa” University of Medicine and Pharmacy, Iasi, Romania, Universitatii str., no. 16, 700115 Iasi, Romania

---

### Abstract

To design and manufacture proper footwear that satisfies the needs of the elderly female population the anthropometrical characteristics, and particularities of the foot are necessary to be evaluated, which represents the main topic of the research presented in this paper. The footwear inner dimensions are determined by the dimension of the last on which the footwear is manufactured, and they influence the comfort of the consumers. The shoe last represents the correspondent shape of the human foot [1], therefore in the case of the elderly female population, it is very important to manufacture suitable lasts based on the feet anthropometric dimensions. Previous studies [2, 3] revealed that the elderly female population from Romania have difficulties in finding and buying proper footwear that meets their needs regarding fit, size, comfort, and price. Thereby, the need for customized made footwear for the elderly female population is obvious. For this study, the main feet anthropometric parameters for a group of 92 female subjects were measured and analyzed. Based on the observation made, we may conclude that the feet of the elderly females from Romania differ from those of the general female population, which justifies the need to develop and manufacture footwear that specially addresses to the needs of the elderly females.

© 2017 Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Peer-review under responsibility of the organizing committee of INTER-ENG 2016

*Keywords:* Anthropometry; 3D scanning; footwear; elderly; foot; comfort.

---

---

\* Corresponding author. Tel.: +40-232-278683 ext.1267.  
E-mail address: [amihai@tex.tuiasi.ro](mailto:amihai@tex.tuiasi.ro)

## 1. Introduction

The first step to manufacturing footwear that satisfies the needs of the elder population is to identify the feet anthropometrical particularities. Because the footwear inner dimensions are defined by the last, which represents a shape similar whit that of the human foot [1], the next step is to develop and manufacture suitable shoe lasts. The study of the anthropometric parameters and the development of suitable shoe lasts, supplemented by biomechanical studies, represent the foundation for designing proper footwear addressing to the elderly female population. Previous studies [2, 3] revealed that the elderly female population from Romania has difficulties in finding and buying proper footwear that meets their needs regarding fit, size, comfort, and price. Thereby, the need for customized footwear made for the elderly female population is obvious. Liking the inner footwear dimensions with the anthropometrical dimensions of the foot is particularly important to meet the conditions of comfort [4, 5, 6], namely: Foot Length, Ball Girth, Foot Breadth and Instep Circumference [7]. By analyzing and comparing anthropometric parameters of the feet of elderly females, with the representative average values of the general female population [8], the subject can be divided into categories [9], and any feet anomalies can be identified.

## 2. Method

The 3D shape acquisition of the feet was made using the INFOOT-USB scanning system (Fig. 1) which consists of a 3D scanner and a dedicated software program, Measure 2.8. The 3D scanner has eight cameras that acquire different images of the foot which are processed by the software resulting in a virtual 3D shape [10]. The software is optimized for recognizing foot shapes. After the scanning process, up to 20 anatomical points are manually placed on the 3D shape of the foot to measure the scanned feet anthropometric dimensions (Fig. 2a). Based on the position of the anatomical points, the software will automatically generate an anthropometric data sheet (Fig. 2b). This scanning system is dedicated to being used for conducting scientific research, for educational purposes or in medical institutions. The collected anthropometric data are used for establishing the morphological and structural characteristics of subjects' feet [11, 12]. The characteristics of the INFOOT USB 3D scanning system are the following: low cost, rapid scanning, high accuracy, automatic measurement of foot dimensions, compact size for easy transportation [11]. The anthropometric measurements were statistically analyzed using the SPSS software program, which is dedicated to the statistical processing of data, providing fast results [13].

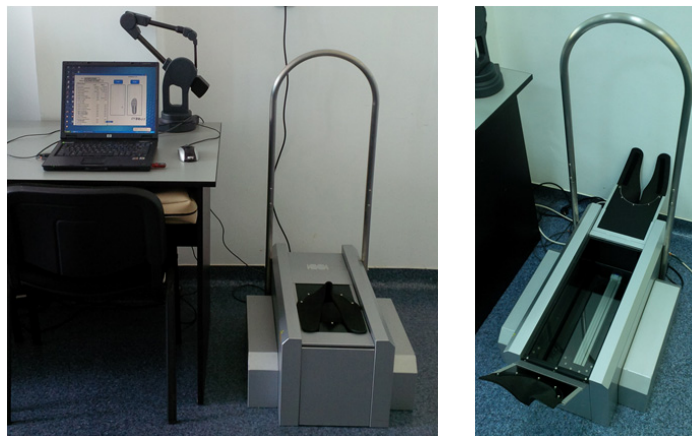


Fig. 1. INFOOT USB 3D Scanning system

Download English Version:

<https://daneshyari.com/en/article/5028827>

Download Persian Version:

<https://daneshyari.com/article/5028827>

[Daneshyari.com](https://daneshyari.com)