Ready-made Compression Stockings. Do they fit?

Finn Gottrup
Professor of Surgery

Copenhagen Wound Healing Center
Department of Dermatology
Bispebjerg University Hospital
Copenhagen, Denmark
This Presentation is based on the following Article:

Ready-made Stockings

Content

• Background
• Aim
• Materials and Methods
• Results
• Conclusion
Ready-made Stockings

Background

Use of Stockings in Venous Leg Ulcer Patients

Stockings are normally used:

• **Treat Oedema and Wounds** to improve the Quality of Life and physical Activity of the Patient. In DK the Municipal administrates the distribution of Stockings.

• **Prophylactic** to prevent new Formation of Oedema and Wounds.
Background

Compression Stockings are produced in standard Sizes, so called ‘Ready-made’ Compression Stockings

It has been suggested that 80% of all Patients should, in Theory, fit into a ready-made below-knee Compression Stocking. (Arpaia, G. et al. Int Angiol 2008; 27: 6,507–511)

However, a range of different Problems have been experienced (Slippages, Pressure Marks, Wounds, Oedema etc.).
Background

The Evidence to support Compression Stockings as prophylaxis, is not robust, and the Extent of the prophylactic Effect is still uncertain.

This may be based on Problems in choosing the optimal Type of Compression Stockings.

Background

Several Problems for choosing the optimal Type of Stockings in DK (other places?)

- The Municipal pay and administrates the Selection, Distribution, Size, Type and Brand
- No National Guidelines or Danish Standard for Measurement System
- When a Stocking is delivered it is not know how chosen or which Measurement Systems have been used.
- No specific Healthcare related Education for measuring or delivering
- Municipal: As cheap as possible and following the 80/20 Rule (80% of delivered Stockings should be Ready-Made and 20% Costume made)
- Probably very few Patients get the correct Stockings
Background

• The used **Measurement System** is vital for choosing the correct Type of “Ready-Made” Stockings

• The most used and present available Systems are the **3/7 Points Measuring Systems**

• **What is the these Systems based on and how usable are they as Evaluation Tool in daily clinical Life?**
Ready-made Stockings

Background

Ready –Made Stockings Measurements (3/7 Points) (Germany)
Measurements are based on an evaluation from healthy Volunteers with Normal Anatomy Legs, not Legs found in the Clinical daily Life

Aim

• The Study is designed to investigate how Two measuring Methods are suited to make a Choice in selected Ready-Made Compression Stockings below knee in Venous Leg Ulcers Patients, treated at the Copenhagen Wound Healing Center.

• Investigate if 80% of the Patients fit into a Ready-Made compression Stocking in a limited Selection of Brands.
Material and Methods

A prospective, consecutive, comparative Study of Two standardized measuring Methods (3/7 Points) to select the right Size of a Ready-Made Compression Stockings below Knee.

The three Brands selected in this study were the most commonly used Compression Stockings in the Municipals in the Copenhagen area.
Material and Methods

Inclusion Criteria
- Patients with Venous Insufficiency
- Patients treated with Compression Bandages in the Center
- Patients assessed to be treated with Compression Stockings
- Patients with Ankle Brachial Pressure Index (ABPI) > 0.8 and <1.3 mmHg
- Patients Age >18 years
- Patients who can understand Danish
- Patients who gave oral informed Consent

Exclusion Criteria
- Patients not diagnosed with Venous Insufficiency
- Patients with ABPI <0.8 and >1.3 mmHg
- Patients who do not understand Danish
- Patients with Dementia
- Patients clinical evaluated to have Oedema
Material and Methods

Measuring Method 1:
A **tree Point** Measurement: Circumference Measurements at point **B** and **D** of the Leg and the Length of the Leg from Heel to hollow of the Knee **AD**

Measuring Method 2:
A **seven Point** Measurement: Circumference Measurements at Point **A, Y, B, B1, C, D** of the Leg and the Length of the Leg from Heel to hollow of the Knee **AD**
Material and Methods
Material and Methods

Example of the Brands Size Charts

<table>
<thead>
<tr>
<th></th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
</tr>
</thead>
<tbody>
<tr>
<td>cD</td>
<td>32-36</td>
<td>34-38</td>
<td>36-40</td>
<td>37-41</td>
<td>39-43</td>
</tr>
<tr>
<td>cC</td>
<td>33-37</td>
<td>35-39</td>
<td>37-41</td>
<td>38-42</td>
<td>40-45</td>
</tr>
<tr>
<td>cB</td>
<td>26-29</td>
<td>28-31</td>
<td>30-34</td>
<td>32-36</td>
<td>34-38</td>
</tr>
<tr>
<td>cB₁</td>
<td>20-23</td>
<td>22-25</td>
<td>24-27</td>
<td>26-29</td>
<td>28-31</td>
</tr>
<tr>
<td>cY</td>
<td>29-32</td>
<td>31-35</td>
<td>33-37</td>
<td>35-39</td>
<td>36-40</td>
</tr>
<tr>
<td>cA</td>
<td>20-23</td>
<td>22-25</td>
<td>24-27</td>
<td>26-29</td>
<td>28-31</td>
</tr>
</tbody>
</table>

C = Circumference in cm
l = Length in cm
Figures = Company Sizes of Stockings

To be the correct Stocking Size all figures should fit into this table for this Company Product.

ℓ A-D short 34-37 cm and ℓ A-D normal 37-40 cm and ℓ A-D long 40-43 cm
## Results

<table>
<thead>
<tr>
<th>Patients characteristics</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male / Female</td>
<td>25 / 18 (Total 43 Pts.)</td>
</tr>
<tr>
<td>Age</td>
<td>Between 38 and 93 years, median 63,5 years (mean 63,26)</td>
</tr>
<tr>
<td>BMI</td>
<td>Between 18 and 59, median 28 (mean 29,95)</td>
</tr>
<tr>
<td>Hight</td>
<td>Mean 175,29 (stand dev. 11.37)</td>
</tr>
<tr>
<td>Diabetes</td>
<td>5 of 43 patients had Type 2 diabetes</td>
</tr>
<tr>
<td>ABPI</td>
<td>Mean 1,08 (stand dev. 0,144)</td>
</tr>
<tr>
<td>Wound</td>
<td>30 of 43 patients had wounds</td>
</tr>
<tr>
<td>Legs – position</td>
<td>Right leg 22, left leg 21</td>
</tr>
<tr>
<td>Ulcer duration (n=28)</td>
<td>Mean 6,7 years (stand dev. 10,49)</td>
</tr>
<tr>
<td>Duplex scan performed</td>
<td>29 out of the 43 patients</td>
</tr>
</tbody>
</table>
Results

Compared with the Size Charts from the three Brands the Number of Patients who could fit into one of the Standard Sizes using:

Measuring Method 1 (3 Points) was respectively:
Brand A  53,5%.  Brand B  34,9%.  Brand C  0%

Measuring Method 2 (7 Points) was respectively:
Brand A  4,7%.  Brand B  7.0%.  Brand C  0%
Conclusion

The different Measuring Methods have a great influence on the Choice of a Ready-Made Compression Stocking below Knee, in Patients with Venous Leg Ulcers.

Measuring Methods/standard Sizes are based on Legs with a Normal Anatomy and not specifically developed to the Anatomy of Legs with chronic Wounds. This should be adjusted in the Future.

For this reason further Data and Studies are needed also to establish if the 80/20 Rule are to be changed.
Thank You for Your Attention

Copenhagen Wound Healing Center
Bispebjerg University Hospital
Copenhagen, Denmark
Email. fgottrup@post4.tele.dk
Tel: +45 40303390