

# Comparison of handling, pressure and wearing comfort of different compression devices for decongestion therapy

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## Introduction

Compression therapy is an effective therapeutic measure for prevention and therapy of venous leg ulcers (VLU) as well as their recurrence. If properly performed, it causes an increase in venous return, reduces pressure and volume overload in the vein system of the leg. Also it reduces edema, improves pathological changes in micro and macro circulation, and reduces pain.<sup>1,2</sup> In the decongestion phase a florid VLU needs to be treated with strong compression.<sup>3,4</sup> For this purpose, short-stretch bandages, multi-component systems or adaptive compression bandages can be used. The success of compression bandaging depends on the experience, knowledge and practical skills of the supplier.<sup>5,6</sup> Studies indicate that knowledge and skills of users are insufficient.<sup>7-9</sup> Badly performed compression bandagings are often rejected by patients.<sup>10,11</sup> The quality of application has a huge influence on the success of therapy.

## Materials and Methods

This study investigates the quality of application and the required time to create a phlebological compression bandaging with various materials: short-stretch bandages including padding, eight different multi-component systems and one adaptive compression bandage. Additionally, user-friendliness was determined, the pressure of the compression bandaging was measured, and the wearing comfort was assessed. This provided valid data for the estimation of efficiency, user-friendliness and security of application of the examined materials. Also it enabled the comparison of the examined

options of treatment with each other.

The mentioned study was published in 2017 with the title *Compression devices for decongestion therapy: A cross-sectional observational survey of handling, pressure, and comfort* in *Hautarzt*.<sup>12</sup>

## Results

A total of 302 compression bandagings were performed by 137 participants. More than 80% of these were nurses, about 10% were medical assistants, and others were physicians, podiatrists and physiotherapists. During this survey, 134 bandagings with short-stretch bandages including padding, 128 bandagings with multi-component systems and 40 bandagings with an adaptive compression bandage were performed.

## Pressure

The pressure of a phlebological compression bandaging with short-stretch bandages and padding decreases already a few minutes after completion of the bandaging.<sup>13</sup> Therefore, the participants were asked to apply these bandagings with an initial pressure value of 50-60 mmHg. This task was met by 15 participants, while the majority of 82 produced a much lower pressure. Multi-component systems keep the initial pressure significantly better than short-stretch bandages.<sup>14</sup> They are designed to provide a pressure value of 40 mmHg.<sup>6,13</sup> Some products even have optical markers for assessing the pressure.<sup>6</sup> Therefore, the participants were asked to achieve a pressure value range between 40 and 50 mmHg with multi-component systems. 45 compression bandagings laid within this pressure range and 52 above it. The tested adaptive compression system (Circaid JuxtaCures, medi company) included a pressure measurement template. So the participants were asked to hit a defined pressure value between 35 and 45 mmHg. This requirement met 34 of these bandagings.

## Time

The most time of 234 seconds in average, was needed for application of short-stretch bandages with padding. The average time, used for applying the adaptive compression bandages, was 175 seconds. 141 seconds were needed in average to apply one of the eight multi-component systems.

## Difficulty of application

The participants who had completed a

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compression treatment judged the difficulty of the applying on a questionnaire with six answer options: very simple, simple, neither simple nor difficult, difficult and very difficult. Of the participants who applied bandagings with short-stretch bandages and padding, 38.8% found it *difficult* and 25.4% *easy*. Performing compression bandagings with multi-component systems was rated by 53.1% as *easy*. The application of an adaptive compression bandage was rated by 50% as *neither easy nor difficult*.

## Comfort

95 of the participants who wore bandagings with short-stretch bandages with padding were not able to get into their own shoes anymore. 6 got in their shoes by moving the bandages. This proportion was with 80 participants similar for the multi-component systems. The best result was shown by the adaptive compression bandage, which only consists of a simple compression stocking in the foot area. All participants who had put it on were able to get into their shoes. The bandagings with short-stretch bandages with padding were rated by 37.7% as *pleasant*. For multi-component systems 65% expressed this view and the adaptive compression bandages were rated by 94.6% as *pleasant*.

## Conclusions

Pressure and comfort of compression treatment influence the efficiency of therapy. The required time for the application and the complexity of the performance are essential for the economic aspects of care. This study considers all four

aspects and compares in this framework the three most common care options used in the initial decongestion phase for people with VLU. Under all aspects today's most commonly used option, short-stretch bandages with padding, showed the worst results.

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