Combining IPC with static compression, to improve patient’s compliance using smart materials

Omer Zelka
ICC annual meeting
SS Rotterdam
June 7th, 2018
INTRO

• Compression stockings with medium to high level of compression suffer from limited compliance
• Doffing & donning difficulties & patient discomfort are the main factors
INTRO

• IPC is proven as highly effective, but limits patient mobility, suffers from noisy activation and a high cost

• New development in the field of smart materials, enables combining the benefits of both compression stocking and IPC without their disadvantages
TECHNOLOGY

• The smart material is built as a rubber band that expands and contracts according to an electric pulse
TECHNOLOGY

• Wrapping the band around the leg, creates the initial pressure
• Activating the band, causes the initial pressure to be reduced
• The material is activated using a battery & doesn’t generate any heat or noise
• The band is highly flexible:
  o 30mmHg sitting/lying position
  o 34mmHg standing position
TREATMENT

- 3 bands are wrapped along the leg in parallel
- Even when activated, the band isn’t completely loose, there is always a base line pressure applied
- The band applies 30mmHg when contracted, and 20mmHg when loose
- The 3 bands contract sequentially
- Contraction speed and frequency are highly controllable
1 CONTRACTION PER MIN (PICOPRESS)
PRESSURE SEQUENCE

• 1 contraction per minute:
  o 20mmHg - 46.5 sec
  o 20mmHg -> 30mmHg – 0.5 sec
  o 30mmHg - 3 sec
  o 30mmHg -> 20 mmHg – 10 sec

• 2 sec delay between straps (sequential)
STUDY – *(ONGOING)*

- 10-15 healthy subjects – 3 subjects were tested so far
- Measurement of peak blood flow velocity on the Popliteal & Femoral veins while sitting down – after 30 mins rest and again after using device for 30 mins
- Results were calculated by average of 3 measurements
- Measurements were made using a Duplex Ultrasound
- Additional measurements were made on the SSV and GSV diameter on the 2\textsuperscript{nd} and 3\textsuperscript{rd} subjects
# RESULTS

<table>
<thead>
<tr>
<th>Subject</th>
<th>Time</th>
<th>Pop. avg. peak flow (cm/s)</th>
<th>Fem. avg. peak flow (cm/s)</th>
<th>SSV diameter (cm)</th>
<th>GSV diameter (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-01</td>
<td>T-0</td>
<td>7</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>T-30</td>
<td>12.3</td>
<td>9.46</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Improvement</strong></td>
<td></td>
<td><strong>175%</strong></td>
<td><strong>118%</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-02</td>
<td>T-0</td>
<td>3.18</td>
<td>4.87</td>
<td>0.33</td>
<td>0.32</td>
</tr>
<tr>
<td></td>
<td>T-30</td>
<td>4.8</td>
<td>5.37</td>
<td>0.24</td>
<td>0.23</td>
</tr>
<tr>
<td><strong>Improvement</strong></td>
<td></td>
<td><strong>151%</strong></td>
<td><strong>110%</strong></td>
<td><strong>73%</strong></td>
<td><strong>72%</strong></td>
</tr>
<tr>
<td>P-03</td>
<td>T-0</td>
<td>2.48</td>
<td>4.37</td>
<td>0.29</td>
<td>0.27</td>
</tr>
<tr>
<td></td>
<td>T-30</td>
<td>5.43</td>
<td>5</td>
<td>0.25</td>
<td>0.26</td>
</tr>
<tr>
<td><strong>Improvement</strong></td>
<td></td>
<td><strong>219%</strong></td>
<td><strong>114%</strong></td>
<td><strong>86%</strong></td>
<td><strong>96%</strong></td>
</tr>
<tr>
<td><strong>Avg.</strong></td>
<td></td>
<td><strong>182%</strong></td>
<td><strong>114%</strong></td>
<td><strong>79%</strong></td>
<td><strong>84%</strong></td>
</tr>
</tbody>
</table>
RESULTS – P-01 - POPLITEAL
RESULTS – P-02 - POPLITEAL

T0

T0 POPL

T1 POPL

T30

24/05/2018 12:28:24
AP 52% MI 0.8 TIS 0.1 L 1.466 MHz

M7
B1
F 12.0
G 3.7
IPS
DR90

FW1
F5.7
PS23.3k
WF 270
SV022.4
SV 1.0
RESULTS – P-02 - SSV
CONCLUSION

• Combining static pressure with IPC by using new technology allow for a highly effective device, that is easy to don/doff and comfortable to use
• Can significantly increase patient compliance
NEXT VERSION OF DEVICE

• Fully portable
• 4 bands
• Mechanism for validating initial pressure
• 3 pressure peaks per minute
• Higher pressure change – 10mmHg to 30mmHg or 20mmHg to 40mmHg
THANK YOU

Contact: Omer Zelka, Founder & CEO
omer@elastimed.com