KANGAROO MEDTEK

Biomechanical Experiments Undertaken in ISO13485: Medical Devices Accredited Bioengineering Laboratory.
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Digital pressure mapping under three methods of skin traction

Background – To our knowledge no previous study has measured and documented skin pressure when digital skin traction is applied. Determining skin pressure relative to degree of skin traction force may provide guidance for therapeutic capacity and safety.
Aims – This study aimed to compare digital contact pressure when subject to a variety of attachment methods of digital traction which is a component of the EAVAST method (Early Active Vector Adjustable Skin Traction)
Method – This study was undertaken by independent IDE Engineering group, using a Digital Manometer, Brass Weights, a Water Bag and a Digital Scale. Skin traction was provided to a finger with three methods: (1) hypoallergic tape with a closed construct of Butterfly Skin Traction (2) zinc-oxide sports tape (3) Nylon fingertraps. Manometer measurements of pressure (in mmHg) were undertaken at incremental increases in traction force and charted.
Results – The contact pressure mapping charting illustrated that at the therapeutic range at 500 grams Butterfly Hypoallergenic finger traction exerted 0.8 mmHg on the skin, compared to sports tape that exerted 1.7mmHg; and Nylon that exerted 3.4mmHg. At 1000grams the force on the skin was 2.3mmHg for the Butterfly Skin Traction; 2.6mmHg for sports tape and 6.2mmHg for a Nylon fingertrap. Differences may be considered clinically significant.
Conclusion –Hypoallergenic methods demonstrated the lowest contact force on skin and may be a lower risk option with skin contract of 0.8mmHg measured at 500 grams of longitudinal traction.

- **Butterfly Traction Device (BTD) – Without Slit**

Figure 6 – Sample Setup

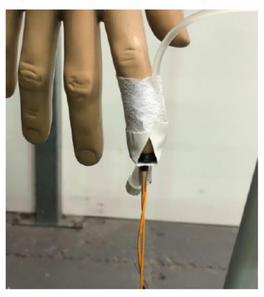
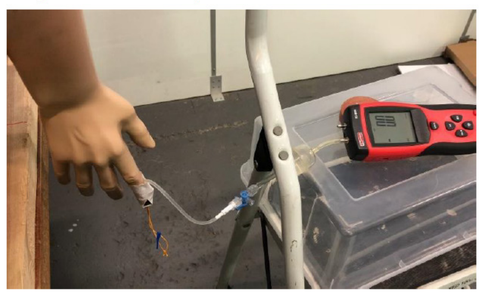


Figure 7 – Test Set Up

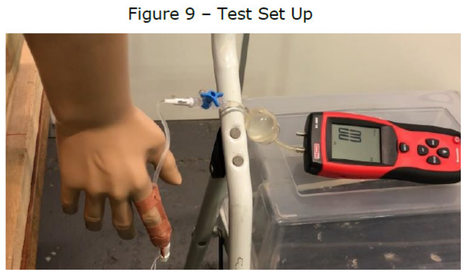


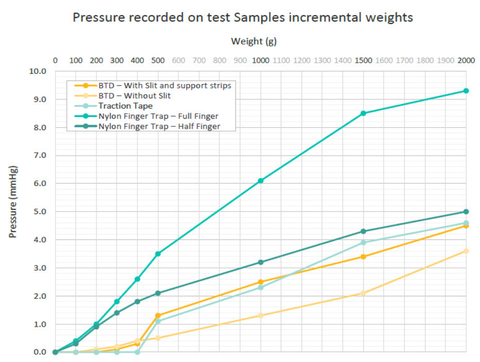
- **Traction Tape**

Note: The Traction tape was applied to the Finger as Per YouTube Tutorial *"Broken Fir*
The EAVAST Skin Traction Kit Might Help."- Jason Fairclough (29 Nov 2018).

Figure 8 – Sample Setup

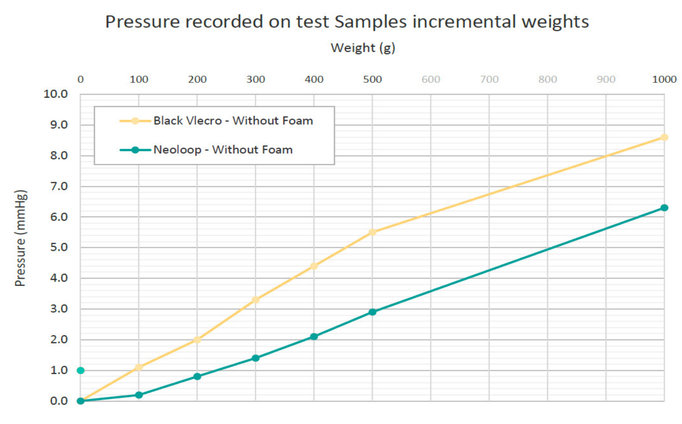
Figure 9 – Test Set Up





Digital pressure mapping under two methods of vector translation

Background – To our knowledge no previous study has measured and documented skin pressure when vector translation is applied. Determining skin pressure relative to degree of translation force may provide guidance for therapeutic capacity and safety particularly in the management of dorsally subluxed middle phalanx fractures.
Aims – This study aimed to compare digital contact pressure when subject to a variety of methods of posterior to anterior translation which is a component of the EAVAST method (Early Active Vector Adjustable Skin Traction).
Method – This study was undertaken with digital manometer, a plastic finger, Brass weights and a measurement scale. A rig was set up with a 1.5mm Aluminium Splint and two spaced closed cell foam blocks. Two types of strap were compared when applying Anterior Translation – a rigid strap (Velcro) and a flexible rubber strap (Neoloop). Comparison was also made between applying a foam block between the strap and the plastic finger and without the foam block.
Results – At 500 grams of translations force pressure pattern was 2.9mmHg for Neoloop without foam block; 5.7mmHg for Neoloop strap with foam; 5.5mmHg for rigid strap only; and 5.8mmHg for rigid strap with foam block.
Conclusion –The lowest pressure pattern on the skin at 500 grams of force was found to be with a flexible Neoloop rubber strap without foam padding at 2.9mmHg. Range of pressure was 2.9mmHg to 5.8mmHg depending on materials used. Further scientific research and clinical studies are indicated for sensitive assessment and clinical efficacy.



Digital pressure mapping under three tensions of lateral compression

Background – To our knowledge no previous study has measured and documented skin pressure when lateral compression. Determining skin pressure relative to degree of compression force may provide guidance for therapeutic capacity and safety particularly in the management of laterally displaced fractures.
Aims – This study aimed to compare digital contact pressure when subject to a variety of tensions of lateral compression which is a component of the EAVAST method (Early Active Vector Adjustable Skin Traction).
Method – This study was undertaken by independent IDE Engineering group, using a Digital Mamometer, Coban tape. Coban was tensioned and marked at full tension, ¾ tension and ½ tension and folded into loops. Two pads of closed cell foam were applied to either side of the middle phalanx of a digit with the manometer tube applied over this. The variously tensioned Coban loops when then applied and digital compression force measured.
Results – The half tensioned Coban recorded 1.4mmHg, the ¾ tensioned Coban recorded 2.25mmHg, and the fully tensioned Coban recorded 4.05mmHg contact pressure. Differences could be considered clinically significant.
Conclusion – Coban loops applied over closed cell recorded a range of compression of 1.4mmHg to 4.05mmHg when applied over a digit. This provides guidance for safety and clinical efficacy of the closed cell foam and Coban loop method for fracture compression.

Figure 9 – ½ Tension

Figure 10 – ¾ Tension

Figure 11 – Full Tension