Pain Reducing Device For PC Patients

BYU CAPSTONE

Background: Pachyonychia Congenital (PC) is a rare genetic disorder that leads to excessive callusing and blistering on the sole of the foot. These calluses and blisters cause intense pain when standing and walking.

Figure 1: Plantar view of a typical patient's callus formation

Objective: Create a device for PC patients that relieves some of the pain experienced during standing and walking.

Solution: An orthotic brace combined with a foam support transfers weight from the sole of the foot to the lower leg. This reduces pain by lowering pressure peaks on the foot.

Figure 2: Toad Medical Corporation's Antigravity Brace used in combination with foam wedge supports of our design.

Results: The brace alone reduces pressure peaks by 33% compared to a normal shoe. The brace combined with foam cushions reduces pressure peaks by 77 %.

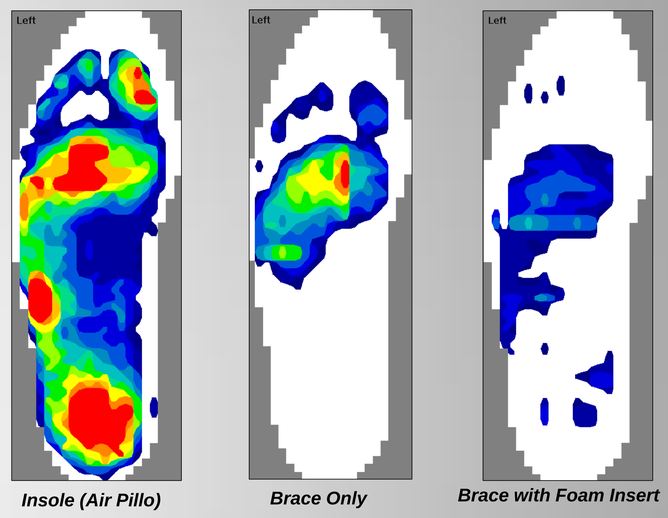

Figure 3: The brace alone removes pressure from the majority of the foot, but leaves substantial pressure on the forefoot. The foam insert succeeds in redistributing this pressure over the entire plantar surface.

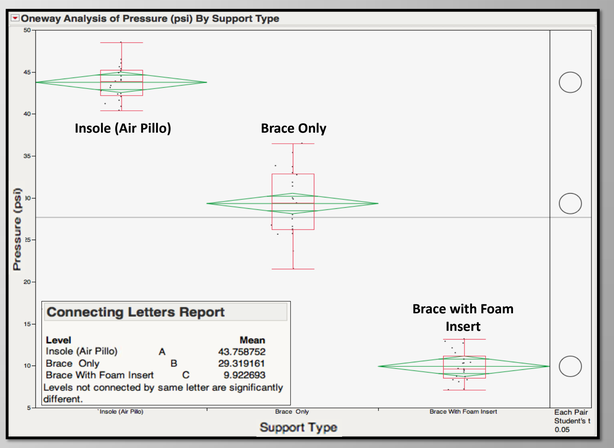

Figure 4: There is a statistically significant difference between the brace and foam combination vs. the other two methods..

(From left) Dr. Steven Charles, Wyatt Felt, Braeden Brown, Ryan Butler, Kevin Farr, Boris Martinez, Brandon Hanna

PC SHOE

Pachyonychia Congenita Project
OUR MISSION - FIND A CURE FOR PACHYONYCHIA CONGENITA

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