PRESS RELEASE

NEW PROSTHESIS FOR CYCLISTS

Professional Bike Fitter Aaron Dunford Designs Custom And Innovative Prosthesis for Competitive Cyclist

Sydney 05, July 2012: For competitive cyclist, and amputee Gerard Cushan, the only cycling prosthesis available on the market that allowed him to ride and compete was flawed. A better solution was required and bike fit expert Aaron Dunford of Fusion Peak Professional Cycle Fitting designed and built a custom prosthesis that is ergonomic and individually tailored to allow Gerard to cycle more naturally improving his comfort and performance.

Gerard's right leg was amputated just below the knee as a child. Aaron's skills, including a strong understanding of biomechanics and cycling position and the ability to develop and build a working prototype would soon lead to a completely new and totally custom prosthesis for Gerard.

Gerard’s cycling prosthesis at the time was a simple carbon fibre post with a Shimano SPD-SL cleat attached to the bottom. This caused stress on his body while riding due to the fore and aft cleat positions being approximately 100 mm different from foot to prosthesis causing a rotation in his pelvis. Gerard’s left leg worked well but the right leg and the prosthesis equated to instability in his position and an inability to stand and sprint fluently.

The totally new cycling prosthetic began as a drawing. A Turner Flux mountain bike frame was to provide the curtail components that would eventually become the new prosthesis. The cleat placement was a key mechanical factor in setting up symmetry in Gerard’s pedal stroke. From the cleat up the body was to be re-aligned.

The prosthetic’s ankle was established early on and once working effectively, it became important to control its’ range of motion; Gerard at 82 kg would need something to push against. A Fox RP3 mountain bike shock was chosen to control the ankles’ movement. The next step was to attach the prosthesis to Gerard’s coupler (which is attached to his leg).

A shaft was milled to fit into Gerard’s coupler and a cleat plate was welded to the bottom of the foot. The final modification was the installation of two bicycle seat post clamps to clamp the prosthesis to the milled shaft.

Aaron returned to Dubbo to see Gerard and fit his new prosthesis. “I really had no idea if it was going to work,” Aaron recalls, “I was very optimistic, but ready to go back to the drawing board. The connection between Gerard’s coupler and the top shaft of the prosthetic had to be perfect or else there was a chance that the prosthetic would slip or twist.”

The shaft fit perfectly.

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When fitting the cleat to the bottom of the prosthetic the human foot was mimicked and the cleat was placed in symmetry. Another unique advantage of the new prosthetic design is it can be adjusted in 5 dimensions. It can be rotated 360 degrees, it can be raised and lower to adjust for the length of the opposite leg, the angle of the foot can be opened and closed to match the plantar flexion of the human foot, and the shock can be adjusted pneumatically for compression and hydraulically for rebound. These adjustments mean the prosthetic could be fitted to any transtibial amputee.

Gerard recently wrote, “The main improvements that I perceive are:
• More comfortable due to better foot and cleat position
• Improved power conversion
• Less gear shifting required for the same effort
• Less fatigue and soreness on long rides
• Increased average speed (based on two races)
• Other cyclists have observed and mentioned a much smoother cycling technique”

About Fusion Peak
Fusion Peak is a Sydney based bicycle fitting company with a focus on rider satisfaction, comfort and performance. With formal training from Serotta and Trek Bicycles and methodology from some of the world’s greatest fitters, Aaron has the ability to fit existing bikes (road, time trial, triathlon and mountain) or fit and design custom bikes and frames from scratch using his Next Generation Serotta Size Cycle. Fusion Peak now also offers custom cycling prosthetic design and construction.

Images
Hi-res images are available.

Contact
Aaron Dunford
Mobile: 0449665151
Email: aaron@fusionpeak.com.au
Website: www.fusionpeak.com.au