Abstract— The BiOM®, T2 System is a bionic ankle unique to the prosthetic world. This bionic ankle addresses the issue of natural propulsion by improving the gait of an amputee. By using bionic propulsion and personal bionics tuning, the T2 system is ideal for any lower limb amputee with an active lifestyle.

I. INTRODUCTION

According to the Amputee Coalition of America estimates that there are about 28,000 new amputees each year. This leaves for a large need for ankle including prosthetics. Most below knee prosthetics are unpowered and do not have a bionic propulsion system allowing for a natural gait. This technology introduces a system that mimics the muscles of the calf and tendons in the ankle. Many problems have been encountered without the T2 system such as musculoskeletal problems associated with non-powered ankle joints. The system also allows for less energy loss and metabolic resources allowing an amputee to move in a more comfortable manner without tiring as easily. The BiOM® T2 is a system that has changed many lives for the better.

II. METHODS

The T2 introduces bionic propulsion. The idea behind this is that it uses power to restore natural ankle stiffness and power during the stance phase of walking. Upon heal strike the device adjusts to reduce impact by absorption using springs and propels the tibia forward. Secondly, the device uses programmable controls to adjust torque and power to mimic normal plantar flexion allowing for more efficient propulsion.

Another technology built into the bionic ankle is Personal Bionics Tuning. This insures that each system is unique to an individual providing the best experience. The T2 can be connected to a Bluetooth to adjust the systems inside to so that each amputee’s new gait falls within physiological norms. Via a tablet, computer, or phone, the Bluetooth collects data and will further adjust the system for best results.

III. RESULTS

As of August 2014, 1000 devices have been sold thus far in the process, around half of which being sold to wounded soldiers and in all of these sold, only one has been returned to the company. The system mimics normal calf and tendon muscles to emulate normal flexion and extension responses as one walks. As the system communicates between motor and transmission, the system does make some noise which researchers are trying to reduce. Another area BiOM is working on is making the device available to a larger population outside of the 150-250lb restriction it currently has.

IV. DISCUSSION

In conclusion, the BiOM T2 system is the most technologically advanced on the market. The advantages of this device includes walking with a more natural gait, reducing musculoskeletal stress, using less energy to walk, walking on uneven surfaces, and walking at a normal speed. Disadvantages include cost and sound emitted by the system. The system unfortunately does not work in all weather conditions, it can only succeed in light rain and small puddles but could fail when submerged in water. The system last roughly 3 to 5 years depending on personal usage, wear, and tear. Over all, this device helps hundreds of amputees.

REFERENCES