

# Tech Update

## Prosthetic Feet Offer Options for Varying Lifestyles

Muilenburg Prosthetics has built its reputation on providing prosthetics for patients at all activity levels and varying lifestyles. Of course, an essential component of lower limb prosthetics is the foot - actually a combination of foot, ankle and pylon.

Choices in prosthetic feet have expanded over the years from the basic SACH (solid ankle cushion heel) foot for walking to energy-storing feet for higher activity levels to multiaxial designs, which bend side-to-side and rotate for stability on uneven surfaces.

Materials such as thermal plastics, carbon fiber, and composites result in prosthetic feet that are lighter and stronger. New features also offer more control as well as comfort, reduce fatigue, and help amputees function at a higher level. The patient has the option of leaving the componentry exposed or having a cosmetic covering.

Advancing technology provides today's prosthetic foot much of the same functionality as the biological foot. Prosthetic feet can be selected to closely fit a person's activity level, occupational requirements, and sports and recreational pursuits.

While there is a prosthetic foot for seemingly every amputee, budgetary considerations sometimes come into play. Costs and insurance coverage can vary depending on the type of prosthesis and its function level.

### SELECTING THE APPROPRIATE FOOT

Although the choices for prosthetic feet are many, factors such as general health, height and weight, level of amputation, and the length and shape of the residual limb are considerations. A comfortable, good-fitting socket will complement the prosthesis, providing good suspension and stability in stance phase under varying forms of terrain. Prosthetic feet options are best discussed with a certified prosthetist, who is qualified to determine the best device for each patient's situation.

There are many manufacturers offering a variety of feet, so a prosthetist and patient will have little trouble finding one to fit an individual's specific needs.

### A SAMPLING OF OPTIONS

**College Park Industries TruStep®** is designed to accommodate uneven terrain with the incorporation of multiple joints and elastomeric bumpers with the body of the foot system. It combines virtually the same vertical motion, rotation and stability found in the anatomical foot. Its split-toe design provides up to a half-inch of independent toe flex during normal use. The TruStep responds to ground reaction forces

much like a natural foot does, providing the user freedom of motion in all three anatomical planes. This results in a more symmetrical gait and a reduction in energy expenditure for the user.

**Fillauer's Ibx Foot System™** is a leap forward in multiaxial foot design. The innovative micro-slices in the Ibx pylon and the split heel plate provide controlled inversion/eversion for terrain performance. The multiaxis design is energy optimized with a long carbon pylon and full-length heel plate that allows the Ibx to reach foot flat sooner and store more energy.

The unique components of the Ibx work together from heel strike to toe off to provide stability without sacrificing energy return. The Ibx foot's balanced performance gives amputees the confidence they need to meet life's challenges head on.

**Freedom Innovations Renegade®** utilizes patented Z-shape technology for high shock absorption along with greater energy return

and forward stride motion, providing a smooth gait regardless of the wearer's speed. Because of the foot's angular design, energy is returned to all key areas of the leg, providing optimum cushioning of the residual limb, and also the highest possible level of tibial progression. The foot can be used for amputees at any speed or activity level and is suitable for everyday use. The Renegade LP offers the same features and benefits as the standard profile Renegade, but in a lower profile foot for those with decreased clearance due to a long residual limb.

**Freedom Innovations Silhouette™ VS** offers shock absorption and multiaxial ground compliance to soften otherwise unforgiving surfaces. The unique VS carbon fiber foot and sole plate design absorbs impact at heel strike, reducing forces that would otherwise be directed to the socket and residual limb. Its multiaxial function and +/- 15 degrees of inversion/eversion provide excellent ground compliance and stability. The choice between 3/8-in. and 3/4-in. heel height provides the ability to wear higher heel dress shoes or work boots while maintaining proper prosthetic alignment. Lightweight, slim profile, and 365-lb. weight rating.

**Freedom Innovations Thrive™** features a load-activated carbon fiber prosthetic foot designed to accommodate added weight when lifting or carrying heavy objects. Users will no longer experience the feeling of a flat or soft foot when additional loads are encountered, nor will they need to be subjected to a product that is too stiff for everyday walking. Thrive utilizes a synergistic, dual-keel design incorporating a full-length primary keel and a secondary load-activated keel. When an additional load up to



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30 percent of the user's body weight is sensed, Thrive's primary keel progressively comes into contact with the upper keel, providing incremental support. This ensures consistent performance and ultimately greater confidence among users.

**Ossur's Re-Flex Rotate™ with EVO™** (Energy Vector Optimization) technology is a robust, high performance foot allowing users to enjoy daily living, work, and leisure with the comfort and confidence to reach their full potential. Re-Flex Rotate meets the active user's challenging requirements by combining optimal shock absorption, dynamic energy return, and comfort. The rotational shock absorption is particularly beneficial for users whose daily routines involve frequent side-to-side and turning movements. Incorporation of the EVO technology promotes a more fluid and energetic forward progression by mimicking the natural movement of the human foot from heel strike to toe off. A more natural gait reduces fatigue and puts less strain on the lower back and sound side.



**Ossur's Proprio Foot® with EVO™** technology closely mimics the movement of the human foot for a fluid, energetic, forward progression. Using real-time sensor technology, actuators, and software, the foot enables amputees to perform activities in a normal and functional pattern. On level ground, the Proprio Foot detects toe-off, the final contact between the shoe and the floor, triggering dorsiflexion during swing phase to safely clear the ground, curbs, and other irregularities. On inclines and



declines, the ankle is automatically adjusted, making slopes safer and easier to navigate. During stair ascent and descent, the foot adapts its ankle angulation so the user can place their foot completely flat on each step and perform a more natural stair pattern. When in relaxed mode, the wearer can sit more naturally with the two lowered toward the floor. When rising from a chair, by tapping the heel in relax mode, the wearer flexes the ankle forward so the foot can be pulled back. Its height can be adjusted up to two inches via a keypad to accommodate different shoe styles.

**Ossur Talux®** - The Talux has been designed to provide fluid, natural walking motion on a variety of terrain. The foot's design reproduces many of the anatomical features of the human foot, which is why walking on it feels so natural. It even has an Achilles strap, which simulates the movement of the Achilles tendon and helps to propel the user forward. The Talux's tarsal core contributes to stability and shock absorption



by optimizing the movement that flexes the foot and toe downward toward the sole. Designed to provide multi-axial function, it improves ground contact on uneven surfaces. Combined with the J-shaped pylon and active heel, Talux ensures a balanced energy load and response, allowing the user to walk more comfortably, longer.

**Otto Bock Trias+®** offers the high functionality of carbon fiber feet specifically designed for moderate walkers. With a design concept modeled from the natural human foot, the Trias+ not only looks great, but provides exceptional walking function - easy rollover to reduce effort and conserve energy, improved gait symmetry, and a reduction of excessive forces on the contralateral limb. The foot offers a secure, controlled action while improving confidence and the ability to vary cadence. The superior gait characteristics of the Trias+ are a direct result of the unique dual spring elements incorporated into its design.



For more information on the proper selection of prosthetic feet or the services Muilenburg Prosthetics offer, call (713) 524-3949 or visit [www.mpihouston.com](http://www.mpihouston.com).



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