



Avalon^{K2}

Confidence, independence
and safety every day.

Blatchford 



Biomechanics of Limited Community Ambulators

Falls

A significant proportion of limited community ambulators are elderly amputees. There are many characteristics of advanced age that have been linked to increased likelihood of falling:

- Shorter stride length
- Lower limb muscle weakness
- Deteriorating vision
- Reduced reaction time
- Certain medications can impede balance
- Weakened vestibular system
- Poor circulation
- Variabilities in gait pattern

Falls can lead to physical injuries affecting a person's independence, confidence and therefore their quality of life. 60% of amputees who fall say it affects their daily life and 36% report a loss of confidence¹.

Vascular Health

The majority of elderly amputees have an amputation aetiology relating to vascular disease or diabetes². The resulting poor circulation and impaired sensation mean the skin and soft tissue has reduced resilience and is vulnerable to damage. Any resulting wounds heal more slowly, are vulnerable to infection and an infected wound may require extensive health care.

Musculoskeletal Health

Amputees tend to walk with more reliance on the unaffected leg. Asymmetry of gait and standing has been linked to the increased likelihood of developing osteoarthritis³⁻⁴ and an increased chance of developing back pain⁵. In fact, 60% of amputees report moderate to extreme back pain within two years of amputation⁶.

There are a number of physiological and biomechanical changes that develop as a result of aging that can contribute to the risk of trips and falls. Hydraulic ankle technology can help reduce the risk and improve the mobility of limited community ambulators.



Why Hydraulics?

Extensive studies into biomimetic hydraulic technology have been shown to provide numerous benefits and improve the user's quality of life.



34% reduction in stance time asymmetry⁷

Balanced limb loading



Increased self-selected walking speed⁸

Improved mobility



22% increase in gait satisfaction⁹

User satisfaction



Reduced socket pressure by up to 81%¹⁰

Greater comfort

Patients' requirements vary, depending on their needs.

*For references please see the back cover.

“I can go
and do my
voluntary
work and I
can give it
my all.”

Jean





Avalon^{K2}

The main driving force behind advancing lower limb prosthetic technology in the 21st century is biomimetic design; reproducing the biomechanical performance of natural limbs. Inherent in this is recognising that different demographics of the amputee population have different biomechanical requirements, and that the engineering principles behind different devices must accommodate for this. With over 128 years of innovation and expertise in lower limb prosthetic technology our award-winning prosthetic products are designed with the patient in mind.



Avalon^{K2} Unique Design

AvalonK2 is a hydraulic ankle that has been designed specifically for the complex needs of limited community ambulators. Through a combination of award-winning hydraulic ankle technology and a unique optimised keel, Blatchford has created a prosthesis that works with the user to enhance confidence, independence and safety.

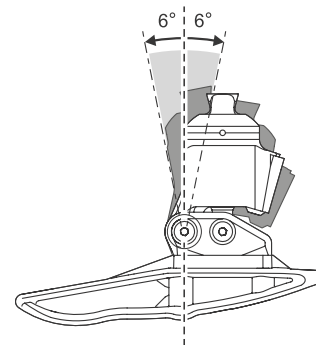
Enhancing walking confidence by hydraulically adjusting to inclines and self-aligning to secure the knee joint, AvalonK2 encourages good posture and joint position. This improves stability, helping to prevent falls and increases balanced limb loading to provide the best performance for limited community ambulators.

Hydraulic Ankle Technology

Hydraulic ankles help align the body interface with the ground interface, allowing for more natural movement and posture. By continuously adjusting to absorb energy, our hydraulic ankles allow for an efficient roll-over, remaining in a dorsiflexed position, increasing clearance to help reduce the risk of falls. This technology has been proven to provide a number of benefits to limited community ambulators optimising posture and comfort.

Range of Motion

An important design consideration of Avalon^{K2} was to enable the user to stand from a seated position in a safe and comfortable way. In addition to the keel and shape, the 6° of dorsiflexion allows the base of support to be moved closer to the body's centre-of-mass making it easier to sit-stand.



Purpose-designed Keel

Limited community ambulators tend to walk more slowly, with a shorter step and stride length. Providing a foot keel that is designed to accommodate natural changes in gait can provide a smoother rollover for such users. The optimised keel shape of Avalon^{K2} considers such requirements and encourages a consistent, stable, and comfortable rollover so the user can walk more easily and move around confidently.



Reduces
chance of trips
and falls¹¹



Safeguards
musculoskeletal
wellbeing⁷



Reduces
pain and
discomfort¹⁰



Improves quality
of life and
independence⁹





Features

- Hydraulic ankle technology designed to replicate natural motion
- Optimised keel shape enhances walking stability
- Plantarflexion compliance when descending slopes
- Increased range of motion to enable greater sit-stand transfer safety
- Increased shock absorption, reduction in interface pressures
- Remains dorsiflexed for increased toe clearance in swing phase
- Waterproof
- Sandal toe footshell



A Study of Avalon^{K2}

Avalon^{K2}

Specifications

Max. User Weight:	150kg
Activity Level:	2
Size Range:	22-30cm
Component Weight:	520g [†]
Build Height:	115mm
Heel Height:	10mm
Range of Ankle Motion:	6° plantar to 6° dorsiflexion



Suitable for submersion

Order Example

Product Code	Size	Side
AV	25	L

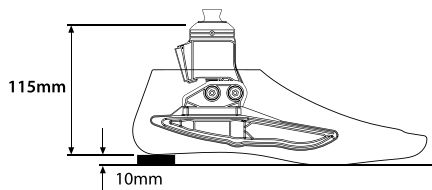
For dark tone add suffix D. Foot example: Avalon^{K2} size 25 left.

Accessories

Alignment Wedge 940093



Build Height



[†]Component weight shown is for a size 26cm without foot shell.

To take a more in-depth look into Avalon^{K2}, discover our White Paper 'A Study of Avalon^{K2}' where the biomechanics of the limited community ambulators gait are considered along with the latest clinical evidence for biomimetic hydraulic technology. Then uncover how the biomechanical performance of Avalon^{K2} can improve mobility and independence. To download visit the Blatchford website.

References:

1. Kulkarni J, Wright S, Toole C, Morris J, Hirons R. Falls in patients with lower limb amputations: prevalence and contributing factors. *Physiotherapy*. 1996;82(2):130–136.
2. Scottish Physiotherapy Amputee Research Group (SPARG). A Survey of the Lower Limb Amputee Population in Scotland. 2010.
3. Burke MJ, Roman V, Wright V. Bone and joint changes in lower limb amputees. *Ann Rheum Dis*. 1978;37(3):252–254.
4. Kulkarni J, Adams J, Thomas E, Silman A. Association between amputation, arthritis and osteopenia in British male war veterans with major lower limb amputations. *Clin Rehabil*. 1998;12(4):348–353.
5. Ehde DM, Czerniecki JM, Smith DG, Campbell KM, Edwards WT, Jensen MP, et al. Chronic phantom sensations, phantom pain, residual limb pain, and other regional pain after lower limb amputation. *Arch Phys Med Rehabil*. 2000;81(8):1039–1044.
6. Kulkarni J, Gaine WJ, Buckley JG, Rankine JJ, Adams J. Chronic low back pain in traumatic lower limb amputees. *Clin Rehabil*. 2005;19(1):81–86.
7. Moore R. Effect on Stance Phase Timing Asymmetry in Individuals with Amputation Using Hydraulic Ankle Units. *JPO: Journal of Prosthetics and Orthotics*. 2016; 28(1):44–8.
8. Barnett CT, Brown OH, Bisele M, Brown MJ, De Asha AR, Strutzenberger G. Individuals with Unilateral Transtibial Amputation and Lower Activity Levels Walk More Quickly when Using a Hydraulically Articulating Versus Rigidly Attached Prosthetic Ankle-Foot Device. *JPO: Journal of Prosthetics and Orthotics*. 2018;30(3):158–64.
9. Moore R. Patient Evaluation of a Novel Prosthetic Foot with Hydraulic Ankle Aimed at Persons with Amputation with Lower Activity Levels. *JPO: Journal of Prosthetics and Orthotics*. 2017; 29(1):44–47
10. Portnoy S, Kristal A, Gefen A, Siev-Ner I. Outdoor dynamic subject-specific evaluation of internal stresses in the residual limb: hydraulic energy-stored prosthetic foot compared to conventional energy-stored prosthetic feet. *Gait Posture*. 2012;35(1):121–125.
11. Johnson L, De Asha AR, Munjal R, Kulkarni J, Buckley JG. Toe clearance when walking in people with unilateral transtibial amputation: Effects of passive hydraulic ankle. *Journal of Rehabilitation Research and Development*. 2014;51(3):429–38.

Patents: US: 8574312, 8740991. EU/RoW: 5336386



An annual visual inspection is recommended. Check for visual defects that may affect proper function. Maintenance must be carried out by competent personnel. Before carrying out any new activities of daily living, please check with your clinician whether specific training is required.

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