



medical

Foot problems are a common complication in people with diabetes, due to the high risk of nerve damage, and to problems with the blood supply to the feet.

Injuries may go unnoticed because the nerve damage makes it difficult to feel pain, while a poor blood supply can interfere with the healing process for wounds. This may result in the formation of foot ulcers, which, if they become infected, may ultimately lead to amputation. Diabetes-related foot disease also significantly impacts on quality of life, causing pain and reduced mobility.¹

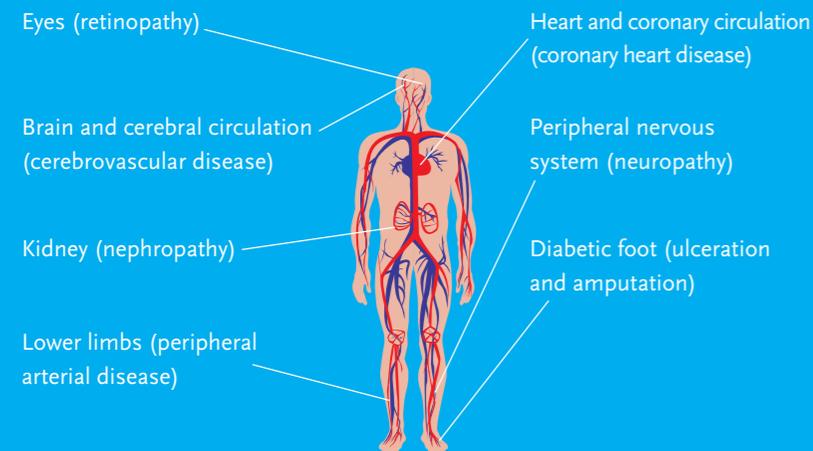
Maintaining intact skin is the best method of avoiding the negative consequences of diabetes-related foot disease. High-quality hosiery plays an essential role in this preventative strategy aiming to keep intact skin free from injury.²

The foot and diabetes

Emerging from the development of compression hosiery for flight travel, the market has now evolved and developed to encompass other products designed to address lower limb and foot problems which may result from medical conditions such as diabetes, arthritis and other circulatory and neurological disorders.

The complications of diabetes are strongly related to high blood sugar levels and are mostly correlated with the duration of diabetes. Long term complications may occur in type 1 and type 2 diabetes mellitus and can impact on the status and health of blood vessels to the heart and peripheries, the kidneys, eyes, feet and the nerves. Collectively, high sugar levels result in a slow progressive deterioration in individuals that cannot sustain high levels of sugar in the blood.

The major diabetic complications



Diabetes – related foot problems

Neuropathy (nerve damage) symptoms include:

- Loss of sensation in feet (numbness)
- Tingling or burning sensations
- Pins and needles sensation in feet
- Stabbing or sharp shooting pains in feet
- Inability to detect differences between hot and cold temperatures
- Inability to detect differences in surface textures when walking barefoot
- Inability to detect minor injuries to feet such as blisters or burns to skin
- Dry, cracked skin with loss of sweat gland function³

Peripheral arterial disease (circulation problems) signs & symptoms include:

- Poor blood flow, weak or absent pulses
- Skin appears pale, cold, dry, hairless
- Wounds sometimes painful and slow to heal
- Cramping calf pain, gradual and consistent, relieved by standing still and ceasing exercise
- Cramping calf pain usually affecting one leg only, triggered by exercise⁴



The statistics are alarming

About 15% of people with diabetes will have foot ulcers at some time in their life.⁵ People with diabetes are 25 times more likely to have a leg amputated than those without the disease.⁶ Somewhere in the world, a lower limb is lost to diabetes every 30 seconds.⁷

In 2000 there were approximately 171 million people worldwide with diabetes. This number is predicted to double over the next 25 years, to 366 million by 2030.⁷

Worldwide, up to 70% of all leg amputations happen to people with diabetes.⁷

85% of diabetes-related amputations are preceded by a foot ulcer.⁸

It takes on average 11 – 14 weeks for a diabetic foot ulcer to heal.⁹

Diabetes-related foot complications impose a large economic burden on society and on the individual.¹⁰



Why is it necessary for people with diabetes to have good quality socks and shoes?

New Zealand diabetes specialist podiatrists have worked closely with Paladin in the development of the Therapeutic Socks.

They understand the emphasis that needs to be placed on preventative strategies, such as offering optimal protection and prescribing high quality natural materials to improve the quality of life of their patients.

The good news is that a high percentage of all diabetes related amputations can be prevented once high-risk and at-risk people with diabetes receive appropriate preventative care.²

Attention to foot care, including the wearing of appropriate, protective footwear, is recognised as one of the most important preventative factors.

National and international evidence-based scientific literature and diabetes guidelines clearly comment on the essential requirement of protective footwear hosiery.⁹⁻¹² Appropriate, well-fitting shoes and socks play a significant role in the prevention of diabetes-related foot complications.

The safer the feet are inside protective, well fitting socks and shoes, the less likely they are to be injured. Complications such as slow-healing wounds and foot ulcers are then less likely to develop.²

The importance of wearing high-quality socks cannot be over-emphasised. Socks provide an important protective interface between the abrasive surfaces of the inside of the shoe and the skin. Socks are essential to protect the skin from the traumas of friction and shear stresses inside the shoe while walking, and to protect the skin from fluctuations in temperature that can cause chilling or thermal burns associated with friction.



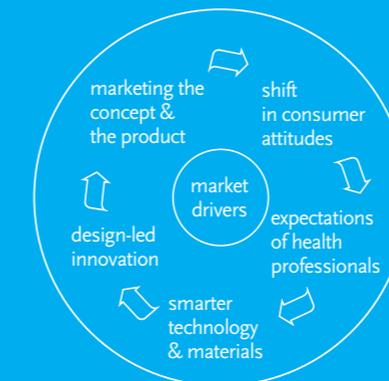


The sock is one of the last items of clothing to undergo a revolutionary change in design.

But today's smarter technology, new materials, a shift in consumer attitudes to their health issues, and the added expectations of health professionals for products that support the treatments, are driving the market opportunity for innovative, design-led solutions.

Sock design – current trends

- sophisticated, niche market products for specialist stores, exclusive retail outlets and web marketing
- natural yarns and innovations, including blended yarns for softness, moisture management and antibacterial assistance
- anatomical left and right foot design
- added comfort, supportive and protective features using strategic placement of cushioning and advanced elastic systems
- activity specific socks eg: trail running, mountain biking
- footwear specific socks eg: gumboots
- women specific socks in outdoor leisure market



The Paladin™ therapeutic sock

Created specifically for the medical market.
 Developed in consultation with expert clinical advisors.
 Produced with advanced, cutting-edge technology, and incorporating a unique combination of natural fibres.

Paladin's premium range of high-quality, high-performance socks deliver outstanding preventative & protective features.

These are designed to:

- reduce friction, shear and pressure
- provide effective temperature & moisture management
- offer resistance against compression
- assist in providing a bacteriostatic environment
- adapt to the individual shape of the foot
- offer safe, warm, non-constrictive hosiery
- provide an important protective interface between the skin and the shoe



CONSUMER PROBLEMS	PALADIN SOLUTION
Build up of odour, particularly with synthetics	Natural merino fibre combined with SeaCell active®, working together to inhibit the growth of bacteria and eliminate the presence of odour
Heat and moisture buildup	Natural merino fibre and SeaCell active® to effectively manage temperature and moisture Mesh panels and rib structures to aid air flow
Inadequate cushioning for protection	Anatomical cushioning strategically placed throughout for protection Dense cushion pad for added protection to bony prominences
Tight top cuff causing leg constriction	Double cuff, high-stretch top to ensure minimal compression
Irritating seams	Seamless toe closure for ridge-free comfort
Hard to pull on	High-stretch top with lateral stretch >320mm for easy slide-on
Poor shaping/poorly fitting	Trademarked Elastic Support System (ESS) for a snug, customised fit Y heel for an improved, wrinkle-free fit and pressure-point reduction Individual shaping for left and right foot
Bunching and ride-down	ESS locks the sock snugly onto the foot
Rubbing/friction	Merino wool and SeaCell active® knitted with ESS reduces friction

The wearer experience

- a softer feel
- superior comfort
- excellent support
- cushioning protection
- ideal warmth
- breathability
- less sweat/less odour
- minimal compression
- a snug, firm fit
- ease to slide on foot
- benefits of natural fibres
- healthier skin

the design

MEDICAL

The material components of the sock provide impact protection, injury avoidance, anti-frictional and anti-static properties, anti-bacterial and anti-mycotic properties. Resistance is provided against compressive and shearing forces to the heel, ankle, metatarsal regions and dorsal toe regions. The lateral and medial aspects of the foot are also protected from compression and frictional forces.

This sock is seamless, avoiding pressure from harsh ridging, skin irritation and abrasion, particularly over vulnerable pressure regions such as the top and tips of the toes. A red target symbol identifies the superficial positioning of the dorsalis pedis artery. Increased elasticity contoured into the plantar metatarsal arch region provides additional stretch capabilities in the arch.

The plantar metatarsal region has loop-pile cushioning anatomically designed to accommodate the metatarso-phalangeal joints, during the propulsive phase of gait. Loop-pile cushioning provides foot protection and comfort as well as leaving mesh spaces to reduce bulk inside footwear, enhancing air circulation and temperature regulation. The sock will stretch to accommodate wider ankles and calves, and will allow for a potential increase in mild ankle oedema.



*Patent applications pending:
PCT/NZ2006/000280
NZ 544020

The features

<p>Anatomy of foot.</p>	<p>Special alignment points are knitted into the sock; these allow the correct location of the Dorsal protection pad, giving protection from shoe and lace pressure.</p>	<p>The target symbol points to the superficial positioning of the dorsalis pedis artery.</p>

<p>Machine technology allows us to shape and place cushioning just where needed for foot protection and comfort.</p>	<p>Mesh and ribs are knitted into the sole of the sock for moisture management and temperature control.</p>	<p>The double cuff, high-stretch top ensures minimal compression.</p>



The Paladin Elastic Support System (ESS)

Our trademarked Elastic Support System (ESS) locks the sock onto the foot and the lower leg with minimal compression, providing support particularly under the plantar arch region.

By fitting snugly to the skin, this sock works to maintain regular skin temperature, thus avoiding fluctuations that may cause chilling or vasoconstriction.

Elastics: Elasticity is defined as the ability of a stretched fibre to return to its original size. In the Paladin therapeutic sock we employ the highest quality elastics available to provide stretch and recovery.

Elastic Support System ensures:

- a form-fitting system
- minimal compression
- a snug, customised fit
- no bunching or ride-down
- reduce friction & shear forces



The illustrated red areas indicate the strategic knitting of the ESS throughout the sock.



Pure. New Zealand Merino. Nature at its best

- a fine, natural, renewable fibre with outstanding insulating abilities
- designed by nature to protect the Merino sheep from the environmental extremes of New Zealand's Southern Alps
- works in harmony with the human body to buffer it from environmental change

Merino promises

- a natural, healthy alternative to synthetic fibres
- superior softness & comfort
- warmth without weight
- odour resistance
- an ability to breathe
- temperature & moisture management
- strength & durability
- extra resilience for impact protection

The New Zealand Merino difference

Our New Zealand Merino growers do things differently. The unique alpine environment in which New Zealand Merino thrive is renowned for producing exceptionally high quality Merino fibre, superior in its whiteness, softness, strength and durability.

Merino is a complex keratin protein-based fibre that shares a close compatibility with human skin, nails and hair. This makes Merino fibre a natural, harmonious choice when selecting hosiery to wear next to the skin and provide protection for the foot.

The wearer advantages:

The yarn selected for the Paladin sock is 100% pure New Zealand Merino, chosen for its remarkable natural ability to effectively manage both temperature and moisture.

Temperature is regulated by the natural crimp and resilience of Merino fibres which trap pockets of air, providing insulation and ensuring that the socks are comfortable to wear in all seasons. Put simply, your feet will feel warmer in colder climates and cooler in warmer conditions.

Moisture is managed by the way the fine, soft Merino fibres are able to repel liquid moisture and to absorb and transfer moisture vapour between the foot and the sock, preventing the feeling of dampness and discomfort. Your socks won't get smelly because odour-producing bacteria can not flourish easily in this environment. You are also less likely to experience the friction, rubbing and blistering that can occur if excessive fluid accumulates on the skin.

By retaining the moisture and naturally occurring oils that are produced when the skin sweats, the Merino fibres also assist in nourishing the skin, keeping it supple and flexible and helping to prevent cracking or splitting.





Cellulose + Seaweed + Silver = SeaCell active

Entwined within the thread of the New Zealand merino yarn is SeaCell active, an innovative, cellulose and seaweed-based fibre with extensive applications for medical textiles and situations where hygiene and cleanliness are important.

Developed in Germany as a natural alternative to conventional antibacterial fibres, the environmentally friendly SeaCell active is able to combine favourably with other textile fibres and natural substances. Because the foot is a region prone to increased sweating, this high-tech bioactive fibre has been selected by Paladin for inclusion in their medical sock material to address the problem of bacteria growth in an area where heat and humidity are frequently present.



The skin compatible SeaCell active fibres work by slowly releasing silver ions when coming into contact with moist, warm conditions. The non-toxic silver content acts by inhibiting the growth of bacteria and fungi, discouraging skin contamination and reducing the presence of odour.



While the merino fibres are working to insulate the foot, the soft and highly-absorbent SeaCell fibres also act to regulate moisture and hydrate the skin. Together these two complementary fibres provide an optimal local environment and maintain a delicate moisture balance far more effectively than that created by synthetic substitutes.

In the Paladin design, the durable SeaCell active fibres are strategically plaited into the inside of the sock during knitting to create maximum contact with the foot's surface.

SeaCell active benefits:

- skin compatible
- antimicrobial
- bacteriostatic
- anti-fungal
- anti-inflammatory
- hypo-allergenic
- odour inhibiting
- environmentally friendly
- safe, stable, and permanent in action, even after frequent washing



Treat your Feet

The Paladin medical range required a distinct packaging design to make the socks readily recognisable in the medical market. Identifying the style and function of the socks was a priority for the packaging face, whilst technical information on the reverse of the pack, allows the customer to understand the features and benefits of this unique brand.



Paladin Medical Range - Packaging

1. LifestyleMed
2. BaseMed.Women
3. BaseMed.Men
4. AirborneMed.Quarter
5. ProtectiveMed



Non-restrictive double cuff for easy slide-on, minimal compression and maximum stretch

Flex panel for ergonomic shaping

Unique* double - density cushion padding to protect dorsal bony prominences from shoe pressure

Anatomical cushioning strategically placed throughout for added protection and comfort

Target system highlights Dorsalis Pedis Pulse

Y heel for an improved, wrinkle-free fit and pressure-point reduction

Positioning points for correct alignment of sock

Ribs and Mesh panels to aid airflow and to regulate moisture & temperature

Seamless toe closure for ridge-free comfort

Mesh panels for increased flexibility

Individual shaping for left and right foot



*Patent applications pending:
PCT/NZ2006/000280
NZ 544020

Fabrication

Fibre Content

- 55% Merino Wool
- 29% Nylon
- 9% Elastic
- 4% SeaCell active
- 3% Lycra



LifestyleMed colourways



BaseMed .Women Business & Casual Lightweight



*Patent applications pending:
PCT/NZ2006/000280
NZ 544020

Fabrication

Fibre Content
60% Merino Wool
21% Nylon
9% Elastic
7% SeaCell active
3% Lycra



BaseMed .Women colourways



Paladin™ Medical RANGE Treat your feet

BaseMed.Men Business & Casual Lightweight



Non-restrictive double cuff for easy slide-on, minimal compression and maximum stretch

Unique*, double - density cushion padding to protect dorsal bony prominences from shoe pressure

Target system highlights Dorsalis Pedis Pulse

Positioning points for correct alignment of sock

Seamless toe closure for ridge-free comfort

Anatomical cushioning strategically placed throughout for added protection and comfort

Y heel for an improved, wrinkle-free fit and pressure-point reduction

Mesh panels to aid airflow and to regulate moisture & temperature

Individual shaping for left and right foot



*Patent applications pending:
PCT/NZ2006/000280
NZ 544020

Fabrication

Fibre Content

- 60% Merino Wool
- 21% Nylon
- 9% Elastic
- 7% SeaCell active
- 3% Lycra



BaseMed.Men colourways



Black

String

Kalamata



Navy



LifestyleMed

BaseMed . Women

BaseMed . Men

Airborne Med . Quarter

ProtectiveMed

Paladin™ Medical RANGE

Treat your feet

AirborneMed.Quarter Sport & Play Midweight



Fabrication

Fibre Content

- 58% Merino Wool
- 25% Nylon
- 9% Elastic
- 5% SeaCell active
- 3% Lycra



AirborneMed.Quarter colourways



*Patent applications pending:
PCT/NZ2006/000280
NZ 544020



Paladin™ Medical RANGE

Treat your feet



*Patent applications pending:
PCT/NZ2006/000280
NZ 544020

Fabrication

Fibre Content
60% Merino Wool
30% Nylon
10% Elastic



ProtectiveMed colourways



Paladin™ Medical RANGE

Treat your feet

					
	LifestyleMed	BaseMed . Women	BaseMed . Men	AirborneMed . Quarter	ProtectiveMed
Style	Poo8	Po11	Po12	Po09	Po10
Weight	midweight	lightweight	lightweight	midweight	heavyweight
Double Cuff	LONG	SHORT	SHORT	SHORT	LONG
Lateral Stretch	270mm	240mm	240mm	245mm	320mm
Y heel	●	●	●	●	
Elastic Support System	●	●	●	●	●
Unisex	●			●	●
Women's Only		●			
Men's Only			●		
Flexible Panel	●			●	
L & R Shaping	●	●	●	●	●
Mesh Pads	●	●	●	●	●
Protection U Pad	●	●	●	●	●
Seamless Toe Closure	●	●	●	●	●
SeaCell active	●	●	●	●	●
Composition	55% Merino 29% Nylon 9% Elastic 4% SeaCell 3% Lycra	60% Merino 21% Nylon 9% Elastic 7% SeaCell 3% Lycra	60% Merino 21% Nylon 9% Elastic 7% SeaCell 3% Lycra	58% Merino 25% Nylon 9% Elastic 5% SeaCell 3% Lycra	60% Merino 30% Nylon 10% Elastic
Sole Pad Thickness	4mm	4mm	4mm	4mm	6mm

Letters of introduction, assessment and feedback forms along with samples of the Paladin therapeutic socks were sent out to 33 podiatrists with at least 10 eligible patients each, from practices located throughout New Zealand. The purpose of the sample was to determine the demand and requirements for a therapeutic sock which offers consumers a naturally harmonious alternative material to the synthetic options currently available.

Information was given on the Paladin design philosophy and distinctive design features, introducing the product as a health sock that not only afforded superior protection to the feet from pressure, friction and shearing forces, but was also extremely comfortable to wear. Those requested to sample the Paladin sock and respond to the questionnaires included:

- a) podiatrists
- b) candidates (clients and patients) who were within the following eligibility criteria:
 - Diagnosed with type 1 or type 2 Diabetes mellitus, classified low risk, who had:
 - no impaired sensation in the feet
 - no previous history of ulceration
 - no significant clinical evidence of limb-threatening pedal complications of diabetes
 - The ideal candidates were newly diagnosed with no current risk of diabetes-related foot complications. They were to have palpable pedal pulses and no history of peripheral arterial disease.
- c) equal gender representation and a wide age group (teenage to 80 years) were also to be covered.

1. Each candidate was provided with two pairs of socks and asked to wear these as much as possible and in as many different sporting, leisure and formal activities as possible within the four week trial.
2. Suggested activities included walking, running, cycling, skiing, playing golf, exercising at the gym, working in the office, working in industrial areas wearing work boots, and working on the farm wearing gumboots.
3. The sample groups were further instructed to trial the socks while wearing as many different styles and types of footwear as possible.
4. One sample group was required to wear the socks for four consecutive days without washing the socks, and was instructed to air the socks each night and wash them on the fourth day.

Each patient was given an assessment form to fill out at the end of the trial period. The user-friendly, predominantly tick-box questionnaire included general questions about the individual's sock use and buying preferences, as well as his or her reaction to and experience and assessment of the Paladin therapeutic sock.

Podiatrists were also issued with a feedback form requesting their personal wearing experience and assessment of the sock, rating it for features such as: comfort, cushioning, warmth, fit, protection, style, airflow capacity, as well as temperature, moisture & odour control. They were also asked to comment on the value of the information provided, and asked if they would prescribe the product to their patients, confident that it would provide a safe and effective protective interface between the skin of the foot and the shoe.

The data received from the sample population can be broadly divided into two categories: responses with regard to the material of the sock, and responses relating to the specific design features, although it is often a combination of these factors that contributes to a particular result.

- a) The feedback was overwhelmingly positive about the use of New Zealand Merino wool in the Paladin sock, commenting favourably on the lack of odour produced and on its capacity to remain warm, soft and comfortable during exercise and afterwards. Many noted a sustained increase in warmth to the feet, suggesting that the ability of Merino fibres to manage moisture and resist the build-up of dampness and odour is why the candidates were able to tolerate long periods of wear in various active and leisure situations and still maintain a sensation of warmth and comfort.
- b) The supportive close-fitting design of the sock also drew many favourable responses, concluding that this too assisted in the retention of a warm environment, while at the same time contributing markedly to a reduction in skin friction and blister formation in the predisposed active population. The mesh panels were deduced to further facilitate this result, by increasing the airflow and avoiding the build-up of excess water against the skin.

Particular mention was given to the ease in which the sock was able to be put on and taken off, and positive feedback was unanimous with regard to the non-restrictive high-stretch cuff which allowed a relaxed and comfortable fit around the lower calf region without the tendency to fall down.

Podiatrists showed confidence in the opportunity the Paladin socks offer to their diabetic patients, namely that of acting as a protective buffer from frictional and shearing stresses that would otherwise impact on the skin of the foot, as well as effectively managing temperature and moisture to maintain softness and suppleness of the skin.

Paladin™

This compact stand, allows you the flexibility to display the Paladin Medical range in your clinic or centre without restricting floor space. Keeping the stand simple in design, allows your customers to be drawn to the unique packaging design and makes their style recognition and choice as simple as possible.



Paladin Medical Advertising

Moral Fibres.
Made with environmentally sustainable pure Merino wool and natural SeaCell fibres.

Experience a new level of comfort, ease and protection. Developed specifically for the medical market, Paladin Therapeutic Socks offer outstanding protective features designed to reduce friction, shear and pressure.

Paladin™
Paladin Research, PO Box 179
Ashburton, New Zealand
www.paladinresearch.com

MERINO
SEACELL
ELASTIC SUPPORT SYSTEM

Dorsal pedis pulse

Designer threads.
Medically designed for superior softness, warmth and breathability.

Experience a new level of comfort, ease and protection. Developed specifically for the medical market, Paladin Therapeutic Socks offer outstanding protective features designed to reduce friction, shear and pressure.

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Dorsal pedis pulse



	PARTNERS	CONSUMERS / PUBLIC
Public Relations	Leading Diabetes publications Health journals Podiatry association bulletins	
Education Clinics	Training DVD Product education booklet Technical worksheets	Product education booklet
Promotion	Sample kits	World Diabetes Week
Point of Sale (POS)	Posters Display systems	Quick reference POS selection chart
Advertising	Advert series to use in your local area	
On Line	Stockist finder referral Links Diabetes & Podiatry Website bulletin	
Events	Trade expo Conference support	
Sponsorship	Related research	Heart Foundation Diabetes societies Podiatry school student awards Health run/walk events Arthritis Society

Projected Channel Partners

PROFESSIONAL	MEDICAL	RETAIL
Clinical practitioners • Podiatrists • Physiotherapists Located within • Specialist clinics • Sportsmed centres • Diabetic clinics • Footcare clinics	Medical distributors supplying • Hospitals • Aged care • Orthotics	Pharmacies