

# Improved Patient Outcomes for Diabetic Foot Ulcers

- Patient-centred concerns
- Prevention
- Optimised healing

## A Pocket Guide

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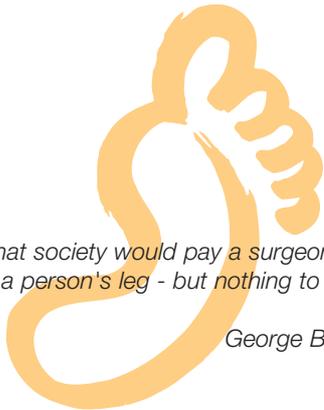
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The faculty panel, the review panel and Coloplast A/S hope that this pocket guide will help you in clinical practice. Diabetic foot ulcers may impact patients' lives considerably and it is therefore essential to provide the best wound management possible.

The pocket guide information provided is intended as a general guideline, please consult diabetic foot ulcer guidelines applicable in your area. For further study please for instance refer to the International Consensus on the Diabetic Foot, 2003, developed by the International Working Group on the Diabetic Foot.

If any questions or comments to the pocket guide, please send an email to [dkbme@coloplast.com](mailto:dkbme@coloplast.com)



*"I marvel that society would pay a surgeon a fortune to remove a person's leg - but nothing to save it!"*

*George Bernard Shaw*



Permission granted by the International Diabetes Federation (IDF)



## Foreword by Dr. Karel Bakker

World Diabetes Day 2005 focused on diabetes and foot care. At present, the number of amputations as a result of diabetes is unacceptably high and 85% of diabetes-related amputations are preceded by foot ulcers. The most important factors related to the development of these ulcers are peripheral neuropathy, foot deformities, minor foot trauma, infection and peripheral vascular disease.

However, it is possible to reduce amputation rates by 49-85% through a care strategy that combines: prevention, the interprofessional diabetes care team, appropriate organisation, close monitoring and education.

### Time to act: prevention and education

This Pocket Guide is a very useful tool in clinical practice to bring about aspects of prevention and education with the key initiative of knowledge sharing. The impact of diabetic foot ulcers on people's lives is devastating and thus the ideal management is prevention.

Together with initiatives from the International Diabetes Federation (IDF) and the International Working Group on the Diabetic Foot (IWGDF) the Pocket Guide will provide a valuable tool for improved diabetic foot care. For more information on IDF and the IWGDF, please visit [www.idf.org](http://www.idf.org) and [www.iwgdf.org](http://www.iwgdf.org)

Dr. Karel Bakker, Chair  
IDF Consultative Section and  
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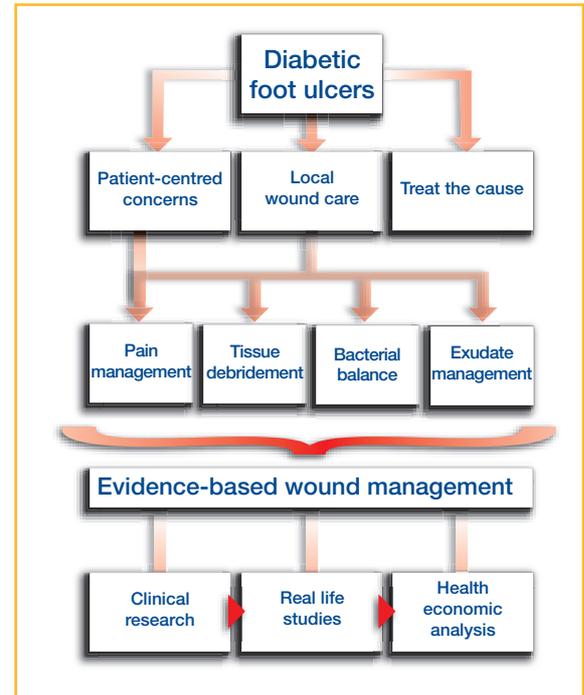
## Pathway to clinical care and clinical evidence

### The diabetic foot

#### - A clinical challenge

Diabetes is a serious chronic disease that needs attention:

- Approximately 15% of all people with diabetes will be affected by a foot ulcer during their lifetime<sup>(1)</sup>
- Five-year recurrence rates of foot ulcers are 70%<sup>(2)</sup>
- Up to 85% of all amputations in relation to people with diabetes are preceded by a foot ulcer<sup>(1,2)</sup>
- People with diabetes with one lower limb amputation have a 50% risk of developing a serious lesion in the second limb within 2 years<sup>(3)</sup>
- People with diabetes have a 50% mortality rate in the 5 years following the initial amputation<sup>(4)</sup>



## Prevention and education

“49-85% of all diabetic foot related problems are preventable...”<sup>(1)</sup>

(Bakker K. et al., 2005)

*“This can be achieved through a combination of good foot care - provided by an **interprofessional** diabetes care team - and appropriate education for people with diabetes<sup>(1)</sup>” (Modified from Bakker, K. et al., 2005).*

*“Education of patients, carers, and healthcare providers is an essential component of an effective, interprofessional team approach, ....but effective systems and structures for screening, provision of chiropody and footwear, and prompt treatment when required must be in place.<sup>(6)</sup>” (modified from Spraul, M., 2000)*

*“The most important aspects, for example, danger signs which require prompt action by the patient, should be summarized and repeated.<sup>(6)</sup>” (Spraul, M., 2000)*

## Patient-centred concerns

Definition of patient-centred concerns:

- The impact of the diabetic foot complications on the persons' physical, emotional, social, and psychological well-being must be identified and contextualised to become part of the plan of care
- The main impact on Quality of Life (QoL) measures (social, psychological, physical, and economic)<sup>(6)</sup>:
  - Limitations in mobility
  - Reduction in social activities
  - Increased family tensions
  - Lost time from work
  - Negative impact on general health

*“Successful diagnosis and treatment of patients with chronic wounds involve holistic care and a team approach. The integration of the work of an interprofessional care team that includes doctors, nurses and allied health professionals with the patient, family and caregivers offers an optimal formula for achieving wound resolution.”*

Sibbald, R.G., et al, 2000



## An interprofessional team approach



*The involvement of the patient as a member of the healthcare team improves patient care outcomes.*

## Consider the whole patient to ensure effective care of the foot ulcer

Past history, medications, and allergies	Check for medications that may inhibit healing (i.e. steroids, immuno-suppressants)
Check for other complications	Neurological, eye, heart, kidney, vascular
Glycaemic* control	Hb (Haemoglobin) A1c <7,0%
Hypertension* control	< 140/90 mmHg
Clinical obesity* control	BMI < 30 kg/m <sup>2</sup>
Hyperlipidemia* control	Cholesterol <5,2 mmol/L (200 mg/dL)

*\* All 4 are associated with the metabolic syndrome and type 2 onset diabetes. Optimal control of diabetes will improve patient care outcomes.*

*Disclaimer: These are general guidelines. Please check local treatment recommendations applicable for your country or healthcare institution.*



## “The VIPS”<sup>(7,8)</sup> of diabetic foot management to ensure outcomes

**V**ascular supply is adequate

**I**nfection control is achieved

**P**ressure offloading/downloading

**S**harp/surgical debridement has been considered

*Diabetic foot ulcers typically have a thick rim of keratinized tissue surrounding the wound<sup>(9)</sup>*



*Callus is associated with increased pressure and haemorrhage*



*Blisters are associated with friction and shear*

Linda Baylis et al., Copplast, Foot Care Professionals Guide

## Local wound assessment<sup>(10)</sup>

History	<ul style="list-style-type: none"> <li>• Previous ulcer(s), amputations</li> </ul>
Local skin assessment	<ul style="list-style-type: none"> <li>• Oedema</li> <li>• Colour</li> <li>• Temperature</li> <li>• Callus</li> </ul>
Vascular examination	<ul style="list-style-type: none"> <li>• Check for peripheral arterial disease. Symptoms are often not found, but the following signs may be present: cold feet, blanching on elevation, absent hair growth, dry, shiny and atrophic skin<sup>(9)</sup></li> <li>• Palpate and check for dorsalis pedis, posterior tibial, popliteal and femoral pulses<sup>(9)</sup></li> <li>• Measure the ankle brachial pressure index (ABPI). Toe pressures or transcutaneous oxygen may be assessed, because arterial calcification can cause falsely elevated ABPI results<sup>(9)</sup></li> </ul>
Neuropathy <sup>(8,11)</sup>	<p><b>S</b>ensory - Loss of protective sensation</p> <p><b>A</b>utonomic - Lack of sweating that results in dry, cracked skin that bleeds and creates a portal of entry for bacteria</p> <p><b>M</b>uscular - Loss of reflexes or atrophy of muscles that leads to foot deformities</p>
Deformity and footwear	<ul style="list-style-type: none"> <li>• Charcot foot</li> <li>• Hammer toes, claw toes, bunions</li> <li>• Check the deformity and address inappropriately fitted shoes</li> </ul>



## Types of neuropathy<sup>(10)</sup>

Etiology	Sensory neuropathy	Autonomic neuropathy	Motor neuropathy
Characteristics	<ul style="list-style-type: none"> <li>Loss of protective sensation</li> <li>No perception of shoes rubbing or temperature changes</li> </ul>	<ul style="list-style-type: none"> <li>Reduced sweating results in dry cracked skin</li> <li>Increased blood flow leads to a warm foot</li> </ul>	<ul style="list-style-type: none"> <li>Dysfunction of the motor nerves that control the movement of the foot. Limited joint mobility may increase plantar pressure</li> <li>Foot deformities develop</li> </ul>
Clinical presentations	<ul style="list-style-type: none"> <li>Unaware of a foot ulcer or lack of discomfort when a wound is being probed</li> </ul>	<ul style="list-style-type: none"> <li>Dry skin with cracks and fissures</li> <li>Bounding pulses</li> <li>Dilated dorsal veins</li> <li>Warm feet</li> </ul>	<ul style="list-style-type: none"> <li>Hammer toes</li> <li>High medial longitudinal arch, leading to prominent metatarsal heads and pressure points over the plantar fore-foot</li> <li>Clawed toes</li> <li>Altered gait</li> </ul>
			

## 10g monofilament testing

The 10g monofilament testing is recommended as a screening tool to determine the presence of protective sensation in persons with diabetes<sup>(11,12,13)</sup>.

Places for testing:

- Plantar surface of the metatarsal heads (min. three metatarsal heads)<sup>(12,13)</sup>
- The great toe/first toe<sup>(12)</sup>
- The medial and lateral sides of the plantar aspect of the midfoot<sup>(13)</sup>
- The plantar area of the heel<sup>(13)</sup>
- The dorsal aspect of the midfoot<sup>(13)</sup>



The above pictures show testing sites.

*"There is no clear evidence on how many negative response sites equals an at-risk foot. Some literature shows that even one site with a negative response on each foot may indicate an at-risk foot".<sup>(12)</sup> (Baker, N. et al., 2005)*



## Areas at risk for neuropathic, ischaemic, and neuro-ischaemic ulcers

In a cross-sectional, population-based study the proportion of the lesions were: \*<sup>(2)</sup>



Neuropathic ulcers  
55% of total diabetic  
foot ulcers

Ischaemic ulcers 10% and  
neuro-ischaemic ulcers 34%  
of total diabetic foot ulcers



*"Recent experience from our clinic indicates that the frequency of neuropathic ulcers has decreased, and the incidence of ischaemic and neuro-ischaemic ulcers has increased, equaling 50-50%." Mike Edmonds, 2005.*

\*1% of the ulcers were considered not to be diabetes-related.

*Remember the VIPS*

## Clinical symptoms of neuropathic and ischaemic foot ulcers<sup>(14)</sup>

Clinical signs	Neuropathic ulcer	Ischaemic ulcer
Foot deformities	Clawed toes, possible high arch, possible Charcot deformities	No specific deformities. Possible absent toes/forefoot from previous amputations
Foot temperature/footpulse	Warm, palpable pulse	Cold or decreased temperature, pulse may be absent or reduced
Skin colour	Normal or red	Pale/bluish. Pronounced redness when lowered (dependent rubor), blanching on elevation
Skin condition	Dry skin due to decreased sweating	Thin, fragile and dry.
Ulcer location	On the plantar aspects (forefoot 80%) of the foot/toes,	Distal/tips of the toes, heel, or margins of the foot
Callus present	Commonly seen on the weight-bearing areas and is generally thick	Not usually. If present, distal eschar or necrosis
Ulcer characteristics	Usually painless, with a "punched out" appearance (granulation or deeper base) surrounded by callus	Painful, especially with necrosis or slough
Sensation	Reduced or absent sensation to touch, vibration, pain, and pressure	Sensation may be present but decreased if there is associated neuropathy
Ankle reflexes	Usually not present	Usually present
Foot pulses	Present and often bounding. Dilated, prominent veins	Absent or markedly reduced



## Ulcer assessment

Neuropathic pain	Burning, stinging, shooting and stabbing (non-stimulus dependent)
Local pain	Deep infection or Charcot joint
Size	Length, width, depth and location, preferably with clinical photograph
Wound bed	Appearance: <ul style="list-style-type: none"> <li>• Black (necrosis)</li> <li>• Yellow, red, pink</li> <li>• Undermined</li> </ul>
Infection signs	<ul style="list-style-type: none"> <li>• Odour</li> </ul> <p>Be aware that some signs (fever, pain, increased white blood count/ ESR) may be absent. Evaluate the ulcer for signs of infection, inflammation and oedema. For more information, please see page 18</p>
Exudate	Copious, moderate, mild, none
Wound edge	Callus and scale, maceration, erythema, oedema

## Wound bed

- Necrosis
- Sloughy
- Wound undermining, deep tissue infection
- Maceration
- Unhealthy wound edge



## Superficial and deep infection symptoms<sup>(10,15,16)</sup>

### Superficial (local)

Treat topically

- Non-healing
- Exuberant friable granulation tissue
- Bright red discoloration of granulation tissue
- Increased exudate
- Foul odour
- New slough in wound base



Topical antimicrobial treatment may be considered for superficial/local infection, dependent on the assessment that will direct the treatment. Superficial/local infection may, however, require systemic antibiotics. Further details and updates, please see the International Consensus on the Diabetic Foot, 2003<sup>(2)</sup>

### Deep

Treat systemically

- Pain
- Probes to bone (increased risk in the presence of osteomyelitis)
- New areas of break-down
- Warmth
- Erythema, oedema



Signs of local and deep infection are potentially limb and/or life threatening. These clinical signs and symptoms require **urgent** medical attention<sup>(17)</sup>

## Wagner classification

Wound classification is intended to facilitate appropriate treatment, monitor healing, and communicate in standardised terms<sup>(9)</sup>. The Wagner system is most widely used<sup>(13)</sup>.

Grade		Ulcer appearance
Grade 0		No open lesions; may have deformity or cellulitis
Grade 1		Superficial diabetic ulcer (partial or full thickness)
Grade 2		Ulcer extension to ligament, tendon, joint capsule, or deep fascia without abscess or osteomyelitis
Grade 3		Deep ulcer with abscess, osteomyelitis, or joint sepsis
Grade 4		Gangrene localised to portion of forefoot or heel
Grade 5		Extensive gangrenous involvement of the entire foot

Further reading: International Consensus on the Diabetic Foot,<sup>(2)</sup> The International Working Group on the Diabetic Foot, 1999 and 2003, <http://www.diabetic-foot-consensus.com>



## Treatment of diabetic foot ulcers

<b>V</b> ascular	<ul style="list-style-type: none"> <li>• If inadequate circulation, refer to vascular assessment and investigations</li> <li>• Consider angioplasty, bypass or amputation</li> </ul>
<b>I</b> nfection	<p><i>Bacterial swabs help to identify organisms and sensitivity, but do not diagnose infection in isolation from clinical features</i></p> <ul style="list-style-type: none"> <li>• Superficial/local - consider topical antimicrobial treatment (e.g. sustained silver releasing dressings). However, it may need systemic antibiotic therapy. The general treatment may also include debridement of devitalized tissue, pressure relief, optimizing metabolic control and vascular intervention<sup>29</sup></li> <li>• Deep - requires systemic antibiotic therapy to initially cover Gram-positive, Gram-negative and anaerobic organisms. Subsequently, systemic antibiotic therapy can be modified according to the results of the culture. In addition, it is essential to consider the need for surgical debridement, drainage of infection alongside pressure relief and optimizing metabolic control</li> <li>• Topical antimicrobial (e.g. sustained silver-releasing dressings) may give added benefit together with systemic coverage for deep infection</li> </ul>
<b>P</b> ressure	<ul style="list-style-type: none"> <li>• Appropriate offloading must be provided</li> <li>• Total contact cast or pneumatic walker</li> <li>• Deep toed or special shoes and orthotics</li> </ul>

Frequent (dependent on the clinical situation) inspection of the diabetic foot ulcer is vital due to the increased risk of infection

*Disclaimer: These are general guidelines. Please check local treatment recommendations applicable for your country or healthcare institution.*

## Local wound treatment

Tissue debridement	<ul style="list-style-type: none"> <li>• Sharp surgery preferred</li> <li>• Hydrogels, alginates</li> <li>• Biosurgery</li> </ul>
Infection	<p>Dependent on the outcomes of the wound assessment:</p> <ul style="list-style-type: none"> <li>• Topical antimicrobials (e.g. sustained silver releasing dressings)</li> <li>• Systemic antibiotic therapy</li> </ul>
Exudate management	<ul style="list-style-type: none"> <li>• Foams, alginates</li> </ul>
Edge effect	<ul style="list-style-type: none"> <li>• The treatment of the edge depends on the outcomes of the assessment of the edge of the wound. In general, healthy wounds have a pink woundbed and an advancing wound margin while un-healthy wounds have a dark and undermined wound margin<sup>11</sup></li> </ul>

### Neuropathic pain

Occasionally, neuropathy can be associated with pain. If pain is present, consider the following treatment:

Tricyclic antidepressants<sup>17,17</sup> (TCAs):

- Second generation TCA agents<sup>17</sup> eg. nortriptyline or desipramine (high in nor-adrenalin action and fewer side effects)
- First generation TCA agent<sup>17</sup>: amitriptyline
- Anticonvulsants: Gabapentin<sup>14,17</sup>

*Application of moisture retentive dressings in the context of ischaemia and/or dry gangrene can result in a serious life-or-limb-threatening infection<sup>11</sup>*

*Disclaimer: These are general guidelines. Please check local treatment recommendations applicable for your country or healthcare institution.*



## Patient self-exam needs to be part of diabetic foot care and follow-up

- Education of patient, family and healthcare providers, such as using an easy to understand patient leaflet for education
- Any cut or open skin should be treated by a qualified healthcare provider immediately
- Inspection and examination of the feet and shoes on a daily basis
- Appropriate footwear
- Nails should be cared for by a qualified foot specialist (podiatrist or related disciplines)
- Dry skin should be treated with appropriate moisturizing, such as (humectant) creams containing urea or lactic acid<sup>(18)</sup>. Fungal infections, especially of the toe webs require topical antifungal agents

*Patients should always remember to remove socks and shoes for regular inspection of both feet*

## Biatin Dressing - Faster wound healing by minimising maceration and leakage

**Biatin** Dressings have excellent fluid handling capacities<sup>(19)</sup> leading to less risk of maceration and leakage.

Clinical evidence has shown:

- Lower incidence of leakage and better absorption capacity ratings.<sup>(20)</sup>
- Less need for a secondary absorbent dressing.<sup>(20)</sup>
- Less need for special treatment of the surrounding skin.<sup>(20)</sup>
- Significantly longer wear time compared to the hydrocellular dressing, thereby having an impact on the total cost per treatment.<sup>(20)</sup>
- Clinically tested on patients with diabetic foot ulcers<sup>(21)</sup>

**Biatin** is indicated for moderately to highly exuding leg ulcers, pressure ulcers and non-infected diabetic foot ulcers. It may also be used for superficial burns, superficial partial thickness burns, donor sites, postoperative wounds, and skin abrasions.\*

The latest development within the Biatin family is **Biatin Soft-Hold\***: It functions as a third hand at dressing change, but still with the excellent fluid handling capacity of **Biatin**.

\* Please see package insert for complete Instructions for Use



## Contreet Foam/Biatain - Ag Dressing

### Faster wound healing by minimising maceration and managing local infection

**Contreet** Foam combines the excellent fluid handling capacities of **Biatain** with sustained silver release. This unique combination provides faster wound healing, clinically documented.

Clinical evidence has shown:

- **Contreet** Foam/**Biatain - Ag** reduces the ulcer area by 45-56% within 4 weeks<sup>(22,26)</sup>
- **Contreet** Foam/**Biatain - Ag** has excellent wound bed preparation properties<sup>(22,23)</sup>
- **Contreet** Foam/**Biatain - Ag** provides excellent exudate management<sup>(22,26)</sup>
- Odour is dramatically reduced or eliminated after just one week of **Contreet** Foam/**Biatain - Ag** treatment<sup>(22,23,26)</sup>
- **Contreet** Foam/**Biatain - Ag** is a cost-effective treatment<sup>(27)</sup>
- Clinically tested on patients with diabetic foot ulcers<sup>(24)</sup>

**Contreet** Foam/**Biatain - Ag** Dressings are indicated for treatment of moderately to highly exuding leg ulcers, pressure ulcers, diabetic foot ulcers, partial thickness burns, donor sites, postoperative wounds, and skin abrasions. It can be used to progress wounds with delayed healing due to bacteria/fungi, or wounds where the risk of infection exists.\*

Excellent fluid handling foam = **Biatain** Dressing  
 + Silver  
 = **Contreet/Biatain - Ag** Dressing

\* Please see package insert for complete Instructions for Use

## Main clinical documentation on diabetic foot ulcers

Author/Publication	Title	Clinical outcomes
<b>Biatain Non-adhesive Dressing</b>		
Lohmann M. et al.  Journal of Wound Care 2004. Vol 13 (3): 118-120	Safety and performance of a new non-adhesive foam dressing for the treatment of diabetic foot ulcers.  Open, non-comparative prospective study, 37 patients.	<ul style="list-style-type: none"> <li>• 9 out of 35 ulcers (25.7%) healed</li> <li>• The mean absolute wound area reduced from 5.4 cm<sup>2</sup> to 2.5 cm<sup>2</sup></li> <li>• Relative mean wound area reduced from 100% at baseline to 40% within 6 weeks</li> <li>• "Wearing comfort" improved throughout the study</li> <li>• Maceration remained stable or improved</li> </ul>
<b>Contreet Foam Dressing</b>		
Rayman, G. et al.  British Journal of Nursing 2005. Vol 14 (2): 109-114	Sustained silver-releasing dressing in the treatment of diabetic foot ulcers.  Non-comparative study, 27 patients.	<ul style="list-style-type: none"> <li>• 4 out of 27 ulcers healed during the study period</li> <li>• The relative ulcer area was reduced by a mean of 56%</li> <li>• Good exudate management properties</li> </ul>
Russell, L. et al.  Wounds UK, 2005. Vol 1(1): 44-54	The CONTOP multinational study:* Preliminary data from the UK arm.  Comparative (real life data), 82 patients (in total 619 patients have been included in the CONTOP study).	<ul style="list-style-type: none"> <li>• 50% reduction in median relative wound surface area compared to 25% in the local best practice group</li> <li>• Superior fluid handling capacity resulting in fewer dressing leakages and improved skin conditions</li> </ul>

\* Included were patients with different aetiologies, including diabetic foot ulcers.



Author/Publication	Title	Clinical outcomes
<b>Purilon Gel</b>		
<p>Capillas, R. et al.</p> <p>Presented at the 1st Scientific Meeting of the Diabetic Foot Study Group of the EASD, September 2000, Italy</p>	<p>Performance and safety of <b>Purilon Gel</b> versus IntraSite® (manufactured by Smith &amp; Nephew) using <b>Biatain</b> Non-adhesive Dressing as secondary dressing in the treatment of diabetic foot ulcers</p> <p>Open, randomised controlled multicentre study, 66 patients.</p>	<ul style="list-style-type: none"> <li>• 12 ulcers healed in the <b>Purilon Gel</b> group compared to 6 ulcers in the IntraSite® group</li> <li>• Mean relative wound area went from 100% to 18.5% in the <b>Purilon Gel</b> group, and from 100% to 63.5% in the IntraSite® group</li> <li>• Maceration was lower in the <b>Purilon Gel</b> group than in the IntraSite® group</li> <li>• 11.7% of the patients in the <b>Purilon Gel</b> group needed peri-ulcer skin treatments compared to 22.1% in the IntraSite® Gel group</li> </ul>
<p>Gottrup, F. et al.</p> <p>Poster presented at the 3rd Scientific Meeting of the Diabetic Foot Study Group of the EASD, August 2002, Hungary</p>	<p>Cost-effectiveness of hydrogel treatment in diabetic foot ulcers.</p> <p>Open, randomised controlled multicentre study, 66 patients.</p>	<ul style="list-style-type: none"> <li>• <b>Purilon Gel</b> promoted a reduction in mean relative wound area of 81.5% compared to 36.5% for IntraSite® Gel</li> <li>• The median time to 75% reduction in relative wound area was estimated at 35 days for patients treated with <b>Purilon Gel</b> versus 46 days for patients treated with IntraSite® Gel</li> <li>• The direct costs associated with wound treatment to reach 75% reduction in wound area were 32% lower for patients treated with <b>Purilon Gel</b> versus patients treated with IntraSite® Gel</li> </ul>

Author/Publication	Title	Clinical outcomes
<b>Atrac-Tain</b>		
<p>Pham, H.T. et al.</p> <p>Ostomy/Wound Management 2002. Vol. 48 (5) p. 30-36</p>	<p>A prospective, randomised, controlled double-blind study of a moisturizer for xerosis of the feet in patients with diabetes.</p> <p>Randomised controlled double-blind study, 40 patients.</p>	<ul style="list-style-type: none"> <li>• The cream containing 10% urea and 4% lactic acid (<b>Atrac-Tain</b>) provided faster and better improvement with significantly less xerosis regression</li> </ul>

Please see package insert for **Biatain**, **Contreet**, **Purilon Gel** and **Atrac-Tain** for complete Instructions for Use.



## Wound care mini-glossary

Alginate dressings	Alginates are made from seaweed. The seaweed is formed into flat squares or sheets of unwoven fibres, into twisted robes or pads. These fibres are soft in texture and are easily pulled apart without any difficulty. Alginate dressings are indicated for sloughy wet wounds. Upon contact with wound exudate a gel is formed and thus the dressing requires moisture to function correctly. Alginate dressings are considered to be primary dressings and therefore require a secondary dressing as a cover dressing.
Callus	Callus is a thickened layer of skin caused by repeated pressure or friction, usually found on the foot.
Charcot Foot	Neuro-osteoarthropathy was first described in 1868 by J.M. Charcot and is often referred to as the Charcot foot. Symptoms usually include a hot, erythematous, swollen foot, possible pain, usually no break in the skin and is often caused by extrinsic trauma to a neuropathic foot and a rapid progression. The clinical picture shows a collapse of the medial longitudinal arch of the foot leading to the typical rocker bottom deformity: this is a high-risk area for ulcer formation.
Edge of wound	Edge of wound can be described as advancing, non-advancing or undermined. Assessment includes the extent and depth of the undermining, and the condition of the wound edges. Chronic wounds may often present with thick ("rolled") wound margins, which is a sign that the newly formed epithelial cells have migrated down and around the wound edge because they could not connect to moist, healthy, granulation tissue in the wound bed.

Enzymatic products	Removal of devitalised tissue to prevent contamination, decrease bacterial burden, reduce tissue degradation and promote the development of healthy granulation tissue is important. Some enzymes break down necrotic tissue and can be combined with moist wound healing. To allow maximum enzymatic function, a good delivery system is required as well as a prolonged period of enzyme activity, and the correct wound environment, which includes moisture, appropriate wound pH and temperature. Enzymes are inactivated by heavy metals (silver, zinc).
Erythema	Redness.
Evidence-based wound management	Is the integration of best available research evidence with clinical expertise and a patient-centred approach.
Foam dressings	Mainly polyurethane foams capable of absorbing and retaining large volumes of fluid.
HbA1c	Hb = haemoglobin, the compound in the red blood cells that transports oxygen. Haemoglobin occurs in several variants; the one that composes about 90% of the total is known as haemoglobin A. Glucose in the blood binds slowly to haemoglobin A, forming haemoglobin A1. Haemoglobin A1c is a major component of haemoglobin A1 and its level reflects the degree of hyperglycaemia over the previous 8-12 weeks.



Humectants	Water-binding substances. Often referred to as the natural moisturising factor. Some of these components include urea and lactic acid.
Hyperglycaemia	Hyperglycaemia means a high blood glucose level. Hyperglycaemia has been suggested to impair migration of leukocytes and interfere with phagocytosis and bactericidal activity.
Hyperlipidaemia	Hyperlipidemia is an elevation of lipids (fats) in the bloodstream. These lipids include cholesterol, cholesterol esters (compounds), phospholipids and triglycerides. They are transported in the blood as part of large molecules called lipoproteins.
Hypertension	High blood pressure.
Inter-professional diabetes care team	Team practice that improves outcomes, includes medical, podiatric & nursing professional as a minimum.
Ischaemia	Signs of impaired circulation.
Maceration	When the surrounding skin has been exposed to moisture for a period of time, signs of maceration (pale, white or grey tissue) may be observed.
Metabolic syndrome	Combination of hyperlipidaemia, clinical obesity, hypertension and hyperglycaemia.

Monofilament	Neuropathy can be detected using the 10g monofilament.
Neuropathic pain	Pain caused by nerve damage.
Nociceptive pain	Pain caused by tissue damage.
Obesity	Body Mass Index or BMI is a tool indicating weight status. It is a measure of weight for height, and clinical obesity is defined as a BMI >30 kg/m <sup>2</sup> .
Patient adherence	Patient adherence to treatment is the degree to which patients adhere to agreed pathways of care. Patient adherence is a development from "patient compliance" implying an authoritarian approach, which does not always lead to the best health outcomes. A patient-centred approach leads to patient adherence treating patients as partners in their own care.
Patient-centred concerns	The impact of wound complications on the person's physical, emotional, social and psychological well-being must be identified and contextualised to become part of the plan of care.
Patient self-exam	Allowing patients to manage their own health conveniently. One method may be on-line access to information in combination with face-to-face consultations with health care professionals.
SAM	Different groupings of neuropathy: S: sensory, A: autonomic, M: muscular neuropathy.
Silver dressings	Antimicrobial dressings for treatment of wounds with local infection. The ideal silver dressing combines effective exudate management with sustained silver release, with clinical evidence for <ul style="list-style-type: none"> <li>• Clinical research</li> <li>• Real-life studies</li> <li>• Health-economic analysis</li> </ul>



Total contact cast	The total contact cast is a fibreglass shell with a walking bar on the bottom. The walking bar keeps weight off the foot when standing.
University of Texas Diabetic Wound Classification	Is a grading system encompassing wound stages (stage A: no infection or ischaemia, B: infection present, C: ischaemia present, D: infection and ischaemia present) with wound gradings (grade 0: epithelialised wound, 1: superficial wound, 2: wound penetrates to tendon or capsule, 3: wound penetrates to bone or joint).
VIPS	Combination of factors that may facilitate the treatment of diabetic foot ulcers: V: vascular supply, I: infection, P: pressure, S: sharp/surgical.
Wagner classification system	The Wagner classification system grades diabetic foot ulcers from grade 0 to grade 5. It is based on the depth of penetration, the presence of osteomyelitis or gangrene, and the extent of tissue necrosis. The Wagner classification system does not specifically address two critically important parameters: ischaemia and infection. Grade 0: no open lesions, may have deformity or cellulites, grade 1: superficial diabetic ulcer (partial or full thickness), grade 2: ulcer extension to ligament, tendon, joint capsule, or deep fascia without abscess or osteomyelitis, grade 3: Deep ulcer with abscess, osteomyelitis, or joint sepsis, grade 4: Gangrene localised to portion of forefoot or heel, grade 5: Extensive gangrenous involvement of the entire foot.

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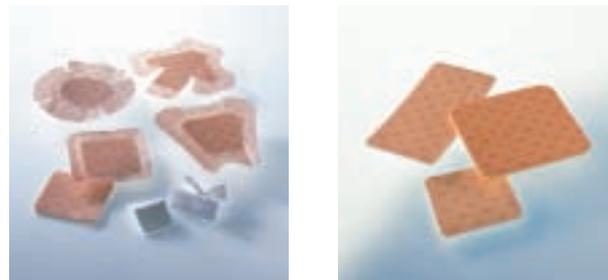


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Armstrong, D.G. et al., 2004<sup>(4)</sup>



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