Diabetes and the effect on the lower limb — managing and preventing DFUs









Diabetes and the effect on the lower limb managing and preventing DFUs

Learning objectives

- 1. To understand the anatomy and physiology of diabetes and the effects it can have on the human body
- 2. To discuss the overall health economic burden of this longterm condition
- 3. To explore how diabetes can affect the lower limb
- 4. To understand what is involved in the assessment of a patient with diabetes
- 5. What should be considered when trying to prevent and treat patients with, or at risk of diabetic foot ulceration (DFU)



What is diabetes?

 Diabetes mellitus occurs when there is inadequate uptake of glucose by the cells of the body resulting in raised blood glucose levels

(Pocock and Richards, 2004)



Anatomy and physiology of the digestive system

- Stomach and small intestines break down carbohydrates into glucose
- Glucose then enters the blood stream
- Gastric hormones promote insulin in response to the glucose
- In diabetes, insulin is either produced but resistant to its effects, or there is a lack of insulin being produced
- Glucose is then unable to enter the body's cells effectively
- This results in a build up of glucose in the blood vessels which will damage them



👹 essity **JCN**

Diabetes — type 1

- Often referred to as juvenile diabetes. This form of diabetes mellitus is most common in children, but can be diagnosed at any age
- Is an autoimmune disease that permanently destroys beta cells in the pancreas, meaning that the body can no longer produce insulin
- Requires regular insulin injections to manage the diabetes





Diabetes — type 2

- Once called adult-onset diabetes, also known as non-insulindependent diabetes mellitus (NIDDM)
- Now also found in young adults and children
- Occurs when insulin is not used effectively by the body results in insulin resistance and hyperglycaemia



Diabetes — type 2

- In advanced stages, may lead to damage to insulin producing cells — leading to insulin deficiency, requiring insulin injections
- 90% of patients with diabetes have type 2
- Typically, this serious health condition is the most poorly managed out of the two forms of diabetes





Diabetes — anatomy and physiology





Diabetes — risk factors

- Age increased risk for 40 years and over
- **Obesity** patients who are overweight, particularly with larger middle regions



- Ethnicity type 2 diabetes is two to four times more likely in people of South Asian, African-Caribbean or Black African descent
- **Genetics** two to six times more likely to get type 2 diabetes if you have a parent, brother, sister or child with diabetes
- **Hypertension** if a patient has ever had high blood pressure



Diabetes — symptoms

- Tiredness
- Always feeling hungry
- Sexual problems
- Always thirsty
- Numbness or tingling in hands and feet

- Frequent urination
- Systemic weight loss
- Wounds that will not heal
- Blurry vision
- Vaginal infections



Symptoms of diabetes

Frequent urination



Always tired Lorent ipsum dolor sit amet, consectetuer adipiscing elit, sed diam nonummy nibh eusmod tincidunt ut laoreet dolore maena aliquam erat volutpet. Ut wisi enim ad minim veniam, quis nostrud exerci tation



veniam, quis nostrud exerci tation

Lorem ipsum dolor sit amet, consectetuer adipiscing elit, sed diam nonummy nibh eutsmod tincidunt ut laoreet dolore magna aliquam erat volutpet. Ut wisi enim ad minim

If you have some of the above symptoms, you are recommended to talk to your Doctor.



Sexual problems Lorem ipsum dotor sit amet, consectetuer adipiscing elit, sed diam nonummy nibh eusmod fincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exerci tation ullamcorper suscipit lobortis nist ut aliquip ex ea com

Always hungry.

Lorem insum dolor sit ernet consectetuer

euismod tincidunt ut laoreet dolore magna

aliguam erat volutgat. Ut wisi enim ad minim

adipiscing elit, sed diam nonummy nibh

veniam, quis nostrud exerci tation



Wounds that won't heal

Systemic weight loss

Lorem insum dolor sit ernet, consectetuer

euismod tincidunt ut laoreet dolore magna

aliquam erat volutpat, tation ullamcorper

suscipit lobortis nisl ut aliquip ex ea com

adipiscing elit, sed diam nonummy nibh

Lorem ipsum dolor sit amet, consectotuor adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exerci tation ultamcorp er suscipit lobortis nist ut aliquip ex ea com

Blurry vision

veniam, guis nostrud exerci tation

Lorem ipsum dolor sit amet, consectenaer

adipiscing efit, sed diam nonummy ribh

euismod tincidunt ut laoreet dolore magna

aliguam erat volutpat. Ut wisi enim ad minim



Always thirsty Lorem ipsum dolor sit arret, consectetuer adipiscing efit, sed diam nonummy nibh. euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exerci tation



Numbness or tingling in hands or feet Lorem ipsum dolor sit ernet, consectetuer adipiscing elit, sed diam nonummy nibh eulsmod tincidunt ut laoreet dolore magna aliquam erat volutoet.



00

Vaginal infections

Lorem ipsum dotor sit emet, consectetuer adipiscing elit, sed diam nonunmy nith euismod tincidum ut laoreet dolore magna aliquam erat volutpat. Ut wisi onim ad minim veniam, quis nostrud exercitation.

Bessity **JCN**

Diabetes — complications





Diabetes — health economic burden

- 415 million people worldwide live with diabetes, 3.6 million are in the UK
- It is estimated that 193 million people will be living undiagnosed!
- Worldwide figures suggest foot ulcers develop in 9.1 to 26.1 million people with diabetes





essity **.**

Diabetes — health economic burden

Amputations

- Most diabetes-related amputations are caused by a DFU failing to heal
- There is an amputation every 30 seconds from a diabeticrelated complication
- The risk of death at five years for a patient with a DFU is 2.5% higher than without



Diabetes — health economic burden

Amputations

- More than half of all DFUs become infected
- Approximately 20% of moderate or severe infections will result in amputation
- Mortality after diabetes-related amputation exceeds 70% at five years





Diabetes — effects on the lower limb

- Many risk factors can contribute to problems with the lower limb, including:
 - Insufficient medication (insulin status)
 - Poor nutritional status/diet
 - \circ Poor foot care
 - Non-compliance
 - \circ Work commitments





Effects on the lower limb — DFU

- Other factors leading to the development of foot ulceration in diabetes include:
 - Neuropathy (polyneuropathy)
 - Ischaemia (micro- and macro-angiopathy)
 - o Infection
 - o Dry skin



 Diabetic neuropathy is one of the most common of the many complications of diabetes, and the foot is particularly vulnerable to its effects

 essity

Effects on the lower limb — DFU

- Poor foot care can result in ulceration
- Usually the patient will not be aware of the damage being caused due to neuropathy
- Daily foot inspections are essential for a patient suffering with diabetes





Effects on the lower limb — Charcot foot

- Charcot foot can be a complication of diabetes by weakening the bones in the foot enough to fracture
- Neuropathic patients with tight Achilles tendon have been shown to have a tendency to develop Charcot foot
- As the disorder progresses, the joints collapse and the foot takes on an abnormal shape, such as a rocker-bottom appearance





essity **JCN**

Effects on the lower limb — Charcot foot

Signs and symptoms

- Warm to touch
- Redness in the foot
- Swelling in the area
- Pain or soreness
- Can be confused with cellulitis





Effects on the lower limb — Charcot foot

Treatment options

- Immobilisation/offloading
- Custom shoes and bracing
- Activity modification





Diabetes — general recommendations

- A patient with diabetes should consider the following:
 - Stop smoking
 - Weight management
 - Diet; good glycaemic control
 - o Foot care
 - o Keeping feet warm
 - Wearing appropriate footwear
 - Avoiding injury
 - o Treating injuries promptly



essity **JCN**

Diabetes — foot assessment

 Patients should undergo an annual foot assessment, and can be categorised as: **Low risk** —no foot problems Moderate risk — foot does not have full sensation or pulses, or there is deformity or infection **High risk** — foot has severe deformity or other serious complications and needs to be urgently referred to a

multidisciplinary diabetes team





Diabetes — foot assessment

Assessment of the foot should include:

- Vascular status
 - Peripheral arterial disease (PAD)
 - Engorged veins
- Sensation
 - Damaged peripheral nerve endings
 - Loss of sensory modalities
 - o Neuropathy



essity **JCN**

Diabetes — foot assessment

- Foot deformities
 - Wasting and weakness of intrinsic muscles
 - o Absent ankle reflexes
 - Deformity, clawing of toes, loss of arches
 - Charcot foot (osteoarthropathy)
- Skin changes
 - o Increased skin temperature
 - Loss of sweating function, dry skin, callus
 - o **Oedema**
 - Necrosis (gangrene)



Diabetes — prevention

- Key advice to follow:
 - o Nail care
 - o Emollient use
 - o Footwear
 - $\circ~$ Daily self-examination of the feet
 - Not walking in bare feet
 - o Callus debridement





Diabetes — prevention

- Key advice to follow:
 - Checking footwear and hosiery before wearing
 - o Breaking shoes in should never be attempted
 - \circ $\,$ No hot water bottles $\,$
 - Checking bath and shower temperature
 - Avoidance of home remedies, e.g. corn plasters
 - What to do and the appropriate person to contact if foot problems develop



Diabetes — holistic treatment regimen

Ultimate objective is to prevent amputation. This can be achieved by considering some of the following:

- Education on and around: Active treatment of the wound by:
 - Correct medication
 - o Foot care
 - Correct footwear



- o **Debridement**
- Antimicrobial wound dressings
- Exudate management
- Offloading/reduction in pressure



Diabetes — holistic treatment regimen

Offloading/reduction in pressure

- Fundamental principle of DFU management
- Shield the wound from pressure generated by weight bearing due to walking, sitting or lying
- Effective offloading of the foot can increase healing rate by up to 90%¹

1. Snyder RJ, et al. The management of diabetic foot ulcers through optimal off-loading. Building consensus guidelines and practical recommendations to improve outcomes. Journal of American Podiatric Medical Association. Vol. 104, No. 6, Nov/Dec. 2014



Diabetes — holistic treatment regimen

Offloading/reduction in pressure

Devices to offload include:

- Non-removable devices such as total contact casts (TCC) the gold standard for plantar DFUs
- From Essity Gypsona[®] (plaster of Paris)
- Delta-Cast® Conformable (synthetic casting tape)
- Removeable devices, such as offloading boots, shoes and shoe inserts

Remember: patient concordance is a key consideration for treatment decisions

Diabetes — considerations when planning care

- Patient mobility
- Patient's regular activities of daily living
- Support network
- Concordance with the device





Sorbact Technology®

- A range of wound dressings for safe infection management and prevention
- Sorbact technology binds and removes bacteria and fungi via a simple physical principle
- A broad range of evidence demonstrates its safety and efficacy



Sorbact Technology[®] — mode of action

- Sorbact[®] dressings combine unique surface characteristics to bind and remove bacteria and fungi
 - In contrast, silver-based technologies use chemical agents, which can cause side-effects through the release of endotoxins
- Common micro-organisms found in a wound bed environment are hydrophobic
- Sorbact[®] dressings display hydrophobic properties enabling them to irreversibly bind bacteria and fungi in a moist wound bed



Sorbact Technology[®] — mode of action



Sorbact[®] technology



Silver-based technologies



Cutimed[®] Sorbion[®] range

- Cutimed[®] Sorbion[®] dressings are the only superabsorbents to utilise Hydration Response Technology (HRT)
- HRT is the unique design concept that meets the challenges of modern wound management in a unique way, providing:
 - Superior exudate management
 - Effective wound bed preparation
- Cutimed[®] Sorbact[®] dressings offer clinically and cost-effective treatment while helping to give patients improved quality of life



essity .

Case study 1

Use of Sorbact Technology[®] dressings in DFU: a case series

Background

- 19-patient case series, 29 diabetic foot wounds
- Primary objective: to evaluate the ability of the dressing to reduce symptoms, signs and risk of infection
- Secondary objective: to assess maceration, malodour and healing for change during study and to obtain patient and clinician feedback on use of the dressings
- Treatment period: four weeks' duration or until healing
- Of the 29 wounds, 24 had a positive history of infection prior to enrolment.
 22 wounds showed two or more signs of infection
 Besity

Case study 1 *continued* Use of Sorbact Technology[®] dressings in DFU: a case series

Outcome

- All wounds had one or no signs of local infection
- All wounds reduced in size from enrolment to the end of the evaluation period
- Eight wounds healed completely, and a further 20 showed a reduction of >50% in size



Case study 2 — DFU

Background

- 67-year-old with type 2 diabetes
- Previous osteomyelitis led to amputation of both second toes
- Despite good wound care and appropriate offloading, wound failed to progress

Treatment regimen

 Cutimed[®] Sorbact[®] used post-operatively, following removal/discontinuation of Gentamycin beads

Outcome

 Good progress made three weeks later with the wound fully healed by week 15

 Essity _____







Case study 3 — longstanding DFU

Background

- 64-year-old man with type 2 diabetes, profound neuropathic deficit
- Forefoot amputation left altered biomechanics and a nonhealing, heavily exuding wound which had not responded to gold standard therapy

Treatment regimen

- Cutimed[®] Sorbion[®] Sachet S introduced, progression monitored with photos, measurements and exudate volume
- Investigator and patient rated treatment, dressing performance, patient comfort and handling on application



Week 0



Week 4

Bessity **JCN**

Case study 3 — longstanding DFU

Outcome

- Good progress made with the wound fully healed by week 12
- Use of a superabsorbent dressing controlled excessive exudate and allowed wound to heal, lower cost than NPWT



Week 12



Case study 4 — diabetic foot gangrene

Background

- 62-year-old female with diabetes mellitus (not primarily insulin-dependent), also suffering with renal failure and coronary heart disease
- Necrosis, moist gangrene, reddening and swelling forefoot to ankle
- Transmetatarsal resection of the first and second ray was performed followed by extensive necrosectomy of the sole of the foot

Treatment regimen

 Post-operatively, wound management was protracted. After eight days of topical antimicrobial therapy with Cutimed[®] Sorbact[®] swabs and absorbent pads (changed daily), wound bed was granulating and infection-free



Day 2 Wound bed following extensive surgical debridement



Day 26 Wound contraction and further granulation tissue is visible. From the 18th day post-operatively, the wound was treated by switching between Cutimed Sorbact and hydroactive dressings.

Case study 5 — infection

Background

- 78-year-old male, right femoral angiogram plus anterior tibial artery angioplasty, following which he developed a pressure ulcer on right heel. Discharged home on TNP therapy, which was subsequently discontinued due to no significant progress
- Wound 4.5cm x 2.5cm (bone exposed), 1cm undermining
- X-ray showed signs of osteomyelitis, Clindamycin commenced for six weeks. Patient had been informed (by consultant) that amputation was probably only option available, but would wait six months before making a final decision. Patient distressed







Case study 5 — infection

Treatment regimen

 Cutimed[®] Sorbact[®] swabs started. Dressings changed daily, then alternate days. Week 6 wound measured 2.25cm x 1.5cm

Outcome

- Due to success with Cutimed[®] Sorbact[®], patient was discharged with no immediate plan to amputate
- Week 13, granulation tissue covered previously exposed bone. Week 27 wound measured 0.75cm x 0.5cm
- Patient extremely pleased, wound went on to heal







Summary

- All patients should undergo an annual foot assessment to identify the risk of developing lower limb problems
- Assessment of the lower limb should include:
 - Vascular status
 - o Sensation
 - Foot deformities
 - o Skin changes



Summary

- Concerns regarding the lower limb should be referred to the multidisciplinary team (MDT)
- Treatment of a DFU should consist of effective wound care, including debridement, good footwear (offloading) and footcare
- Prevention of a DFU developing, or complications arising following a DFU should be the priority to prevent infection or amputation



Call to action



- Following this seminar I would like to ask you all to check your feet
- Then ask one person you know to do the same and post a comment @ JOBST UK on Twitter or below this in the comments box on Facebook once you have done it #My feet matter



Essity Academies

- Free education and training is available via Essity's academies
- 31 modules available including:
 - Anatomy and physiology of skin
 - Factors affecting wound healing
 - Infection management
 - Surgical site infection
 - Litigation and the law and the NHS
 - Improving the assessment of wounds





To access your Certificate visit:

www.jcn-live.co.uk/certificate



Contact Essity

Call: 01482 670 177 Email: concierge.service@essity.com



Future events

To hear first, like us on Facebook @journalofcommunitynursing



Thank you for watching