Review of International Consensus on the Diabetic Foot

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Backgrounds

- In developed countries, up to 5% of people with diabetes have a diabetic foot ulcer. They use 12-15% of healthcare resources for diabetes. In developing countries, the latter figure may be as high as 40%.

- Foot care is of the highest quality when informed self-management is supported by a multidisciplinary foot team.

- The multidisciplinary team approach to diabetic foot care has been shown to bring about a 49-85% reduction in amputation rates.

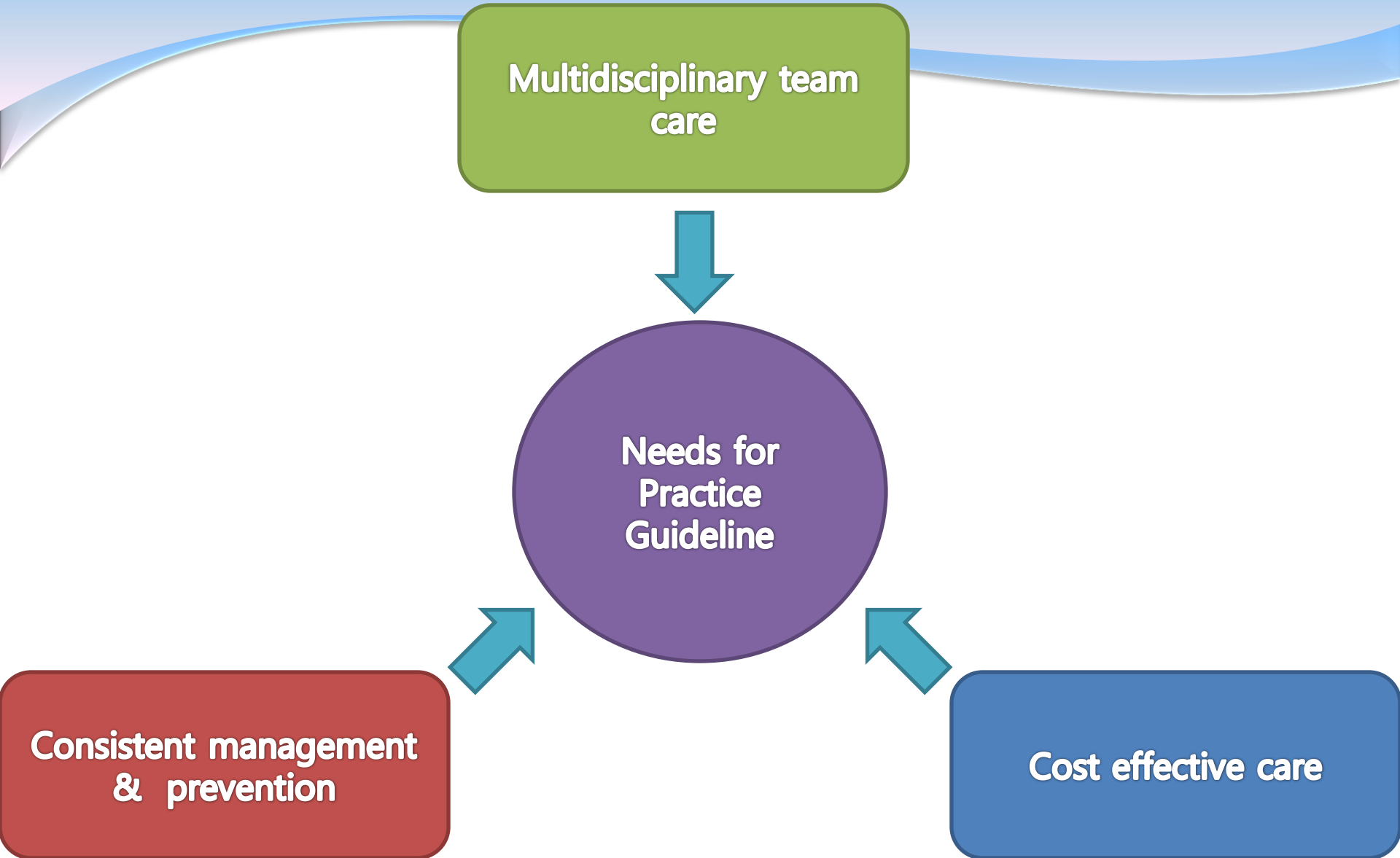
Backgrounds

- Mandatory minimal skills and equipment for those offering a podiatry service should be enforced in order to ensure that people are not put at increased risk by unregulated, unqualified and poorly equipped practitioners.

- Investing in a diabetic foot care programme can be one of the most cost-effective forms of healthcare expenditure, provided the programme is goal-focused and properly implemented.

- Health economic studies have shown that strategies to achieve a 25-40% reduction in the incidence of ulcers or amputation are cost-effective and even cost-saving.

Needs for Guideline



Diabetic foot of korea

- 당뇨발 에 대한 위험성 인식 부족
- 당뇨발로 인한 의료 비용 지출에 대한 인식 부족
- 당뇨발 전문 관리 센터 부족
- 당뇨발에 대한 다학제적 접근 및 관리 부족
- 당뇨발 발생에 대한 예방 및 체계적 교육 부족

→ 당뇨발 관리에 대한 표준화된 진료 지침 필요

진료지침

- **진료지침**

: "특정한 상황에서 의사와 환자의 의사결정을 돕기 위해 체계적으로 개발된 진술" (Field MJ & Lohr KN, 1990).

- 진료와 관련하여 의사와 환자간의 의사결정에 도움을 주기 위한 것으로, 적절한 진료의 내용을 기술한 도구.

- 진료의 지속성을 유지하고 의사의 진료와 과학적 근거의 간격을 줄이는데 효과적인 도구로서 간주되고 있으며, 지난 20여년 동안 전 세계적으로 의료의 질을 향상하기 위한 진료지침의 활용이 계속 증가하고 있다.

진료지침이 대두되는 근본적인 배경

- 새로운 의학 기술의 신속한 도입으로 인한 새로운 기술의 효과에 대한 불확실성이 증가
- 수술률, 입원율, 약제 사용률 등 진료 내용에 큰 차이가 있다는 것이 밝혀졌고 이를 설명할 만한 과학적인 근거가 충분하지 않은 실정임
- 보건의료비 지출에 있어 의사의 판단이 상당한 재량권이 있다는 점 때문에 의료제공자의 행태를 적절히 유도할 필요성이 대두됨

진료지침의 목적

- 진료지침은 과학적 근거에 대하여 어떤 중재가 편익이 있는지를 알려주고 이를 지지하는 자료를 제시 → 의사들에게 효과적인 치료방법을 알려 줌 & 위험한 치료에 대한 주의
- 치료의 여러 대안을 제시하여 장단점을 요약, 가능한 결과의 크기를 객관적으로 제시, 의사들에게 권고사항을 명시, 최신 정보를 제공, 진료의 일관성을 향상시켜 자신이 행하고 있는 치료전략의 적절성에 대한 확신을 줄 수 있음.

- 환자에게 어떤 치료가 좋은지에 대한 정보를 제공→ 진료의 순응도를 높임, 정보에 입각한 선택을 할 수 있게 함

진료지침 개발의 효과

- 진료지침은 적절한 진료를 촉진하고 불필요한 진료를 파악하고 줄이는 역할을 할 수 있다.
- 진료지침의 실행은 치료결과의 향상과 함께 의료비의 절약 효과도 있을 수 있다.

주요국의 진료지침 활동

〈표 1-1〉 주요국의 진료 지침 개발 기구 현황

국 가	조직 기구	웹사이트
영국	Socttish Intercollegiate Guidelines Network (SIGN) National Institute for Health and Clinical Excellence (NICE)	www.sign.ac.uk www.nice.org.uk
프랑스	Haute Autoritee de Santee(HAS)	www.has-sante.fr
독일	AEZQ/AQuMed Guideline Link Collection (AGLC)	www.leitlinien.de
네덜란드	Dutch Institute for Healthcare Improvement (CBO)	www.cbo.nl
뉴질랜드	New Zealand Guidelines Group(NZGG)	www.nzgg.org.nz
미국	National Guideline Clearinghouse™(NGC) Agency for Healthcare Research and Quality (AHRQ)	www.guidelines.gov www.ahrq.gov
이탈리아	Programma Nazionale Linee Guida(PNLG)	www.pnlg.it
싱가포르	Singapore Clinical Practice Guidelines	www.moh.gov.sg
일본	Japan Council for Quality Health Care(JCQHC)	http://minds.jcqhc.or.jp

우리나라의 진료 지침 활동

guideline.or.kr(임상진료지침정보센터)

지침제목	발행단체
2000년 표준예방접종지침	보건복지부
2004 대한간학회 B형 만성간염 치료 가이드라인	대한간학회
2004 대한간학회 C형 간염 치료 가이드라인	대한간학회
2005 한국 기관지천식 치료지침	대한천식 및 알레르기학회
8개 질병군별 표준진료지침 개발 및 활용방안에 대한 연구	보건복지부
간경변 합병증치료가이드라인	대한간학회
간질의 약물 치료 지침	대한간질학회 약물위원회
고혈압의 진료지침	대한비뇨기과학회
골다공증 치료 지침서	대한골대사학회
공중보건의사를 위한 임상지침서	대한공중보건의사협의회
국가 고지혈증 치료지침	대한의사협회지
남성 성기능장애, 남성 불임증 진료지침서	대한 비뇨기과학회, 대한남성과학회
당뇨병의 진료지침서	대한당뇨병학회
당뇨병진료의 임상권고안	대한당뇨병학회
방광종양의 진료 규약	비뇨기 종양학회
병원감염관리	대한병원감염관리학회

International Working Group on the Diabetic Foot

- The International Working Group on the Diabetic Foot(IWGDF) was founded in 1996 and subsequently became in 2000 a Consultative Section of the International Diabetes Federation (IDF) and in 2010 an integrated part of the IDF programme as IDF Diabetic Foot Programme

- In 1999, the IWGDF published for the first time the International Consensus on the Diabetic Foot and Practical Guidelines on the Management and the Prevention of the Diabetic Foot.

- IWGDF recruited local champions as members of the IWGDF, and nowadays, these members represent more than 100 countries around the world.

International Working Group on the Diabetic Foot

- In 2005, IWGDF decided that the International Consensus texts should be updated and expanded.

- In 2007, three evidence-based consensus reports were produced: ‘footwear and off-loading’, ‘wound management’, and ‘osteomyelitis’

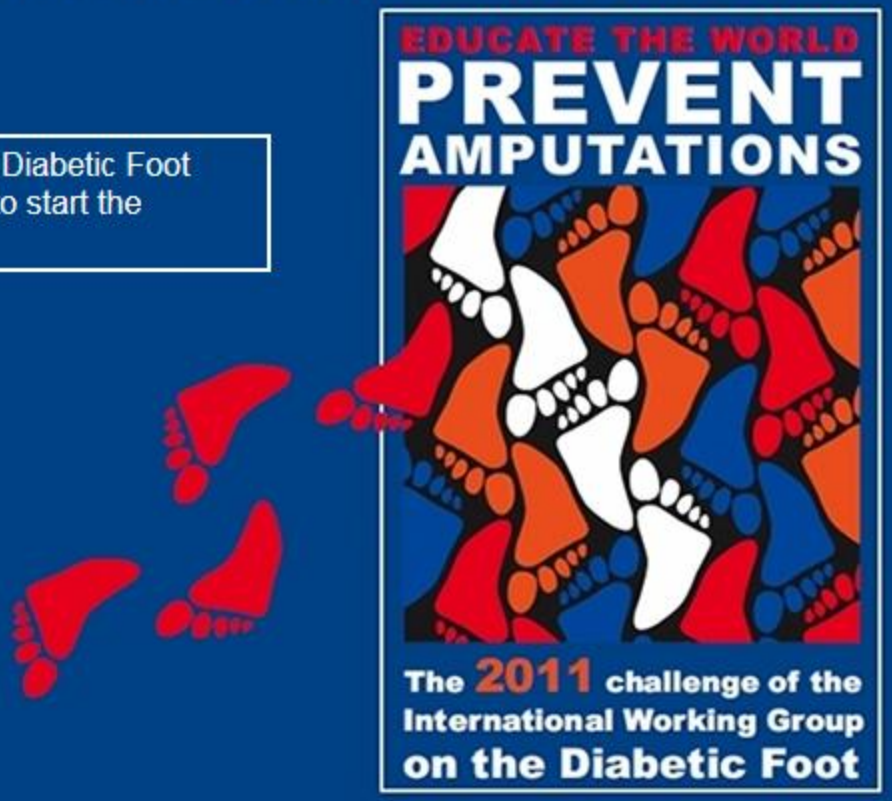
- In 2009, the IWGDF invited again three working groups to produce three new specific guidelines on "Wound healing", "The infected diabetic foot" and "Peripheral arterial disease (PAD) and diabetes".

International Working Group on the Diabetic Foot

- The 4th International Consensus document was launched in May 2011 at the 6th International Symposium on the Diabetic Foot in Noordwijkerhout, The Netherlands.
- **2011 International Consensus on the Diabetic Foot and Practical Guidelines on the Management and the Prevention of the Diabetic Foot the fully updated International Consensus**

International Consensus on the Diabetic Foot & Practical Guidelines on the Management and Prevention of the Diabetic Foot 2011

Thank you for using the Diabetic Foot application. **Click here** to start the application again.



Acknowledgement
We are most indebted to Ron & Tak van der Most, Wouter van der Velde and Massimo Rizzo for their creative support and realization of this IWGDF Consensus and Guideline interactive programme 2011

International Working Group on the Diabetic Foot

- 3 different texts, written for policymakers in health care, general health care professionals and foot care specialists

- **The Diabetic Foot: a challenge for policymakers :** This text contains elements essential for policy-makers involved in planning and allocating health care resources.

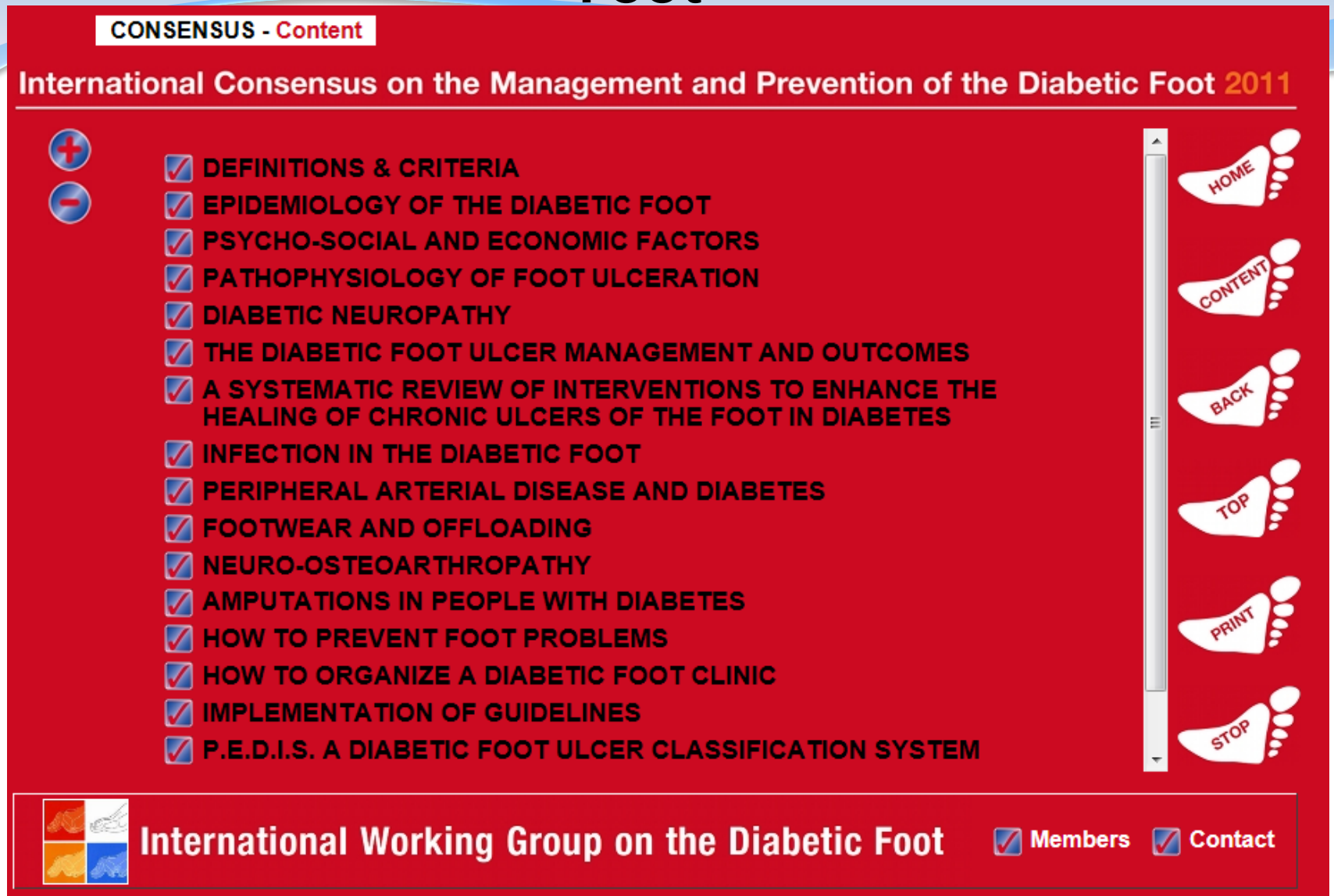
- **The International Consensus on the Management and Prevention of the Diabetic Foot :** This text serves as a reference to The Practical Guidelines.

- **The Practical and Specific Guidelines on the Management and Prevention of the Diabetic Foot :** This is a set of guidelines, describing the basic principles of prevention and treatment.

International Working Group on the Diabetic Foot

- **Consensus text is based upon**
  - literature research
  - Cochrane analyses
  - other consensus documents
  - expert opinion
- **The document was produced after repeated cycles of**
  - writing of chapters by selected experts
  - review by editorial board
  - critical evaluation by complete Working Group
  - meetings in which texts and comments were discussed
- **Representatives of international organisations participated**
- **The final document was approved by the members of the Working Group**

The International Consensus on the Management and Prevention of the Diabetic Foot



The International Consensus on the Management and Prevention of the Diabetic Foot

CONSENSUS -

International Consensus on the Management and Prevention of the Diabetic Foot 2011

Infection in the diabetic foot

General introduction

The development of a foot infection in people with diabetes is associated with substantial morbidity, including discomfort, the need for visits to health care providers, antibiotic therapy, wound care and often surgical procedures. Furthermore, foot infection is now the most frequent diabetic complication requiring hospitalization and the most common precipitating event leading to lower extremity amputation Managing infection requires careful attention to properly diagnosing the condition, obtaining specimens for culture, selecting empirical and definitive antimicrobial therapy, determining when surgical interventions are needed and caring for the wound. In 2007 the International Working Group on the Diabetic Foot (IWGDF) conducted a systematic review of treatment of diabetic foot osteomyelitis. In 2009 the IWGDF has invited again a group of experts to form the IWGDF working group on "Infection" . This working group has developed a "Systematic review of the effectiveness of interventions in the management of infection in the diabetic foot" and a document on "Expert opinion on the management of infections in the diabetic foot". Based on these documents "Specific Guidelines" were formulated. These three documents were launched at the ISDF in May 2011. The present systematic review includes an update of the 2007 osteomyelitis guideline, but is extended to include bacterial diabetic foot infections (DFI's) in general. This review focuses on therapy, and does not cover definitions for infection, methods for diagnosis (clinical, imaging and microbiological sampling), and the interface between critical colonisation and infection. These items are covered in the expert opinion document. In this chapter the following texts on the infected diabetic foot could be found:

I. A systematic review of the effectiveness of interventions in the management of infection in the diabetic foot
II. Expert opinion on the management of infections in the diabetic foot

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Angiography Method to visualize

Angioplasty Re-establishment mentation: a spec blocked or narrow the artery and th

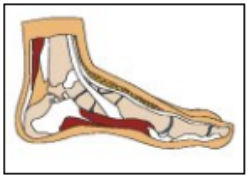
Definitions and criteria

General
Vascular
Ulcer
Infection
Amputation
Miscellaneous

General

Diabetic fo

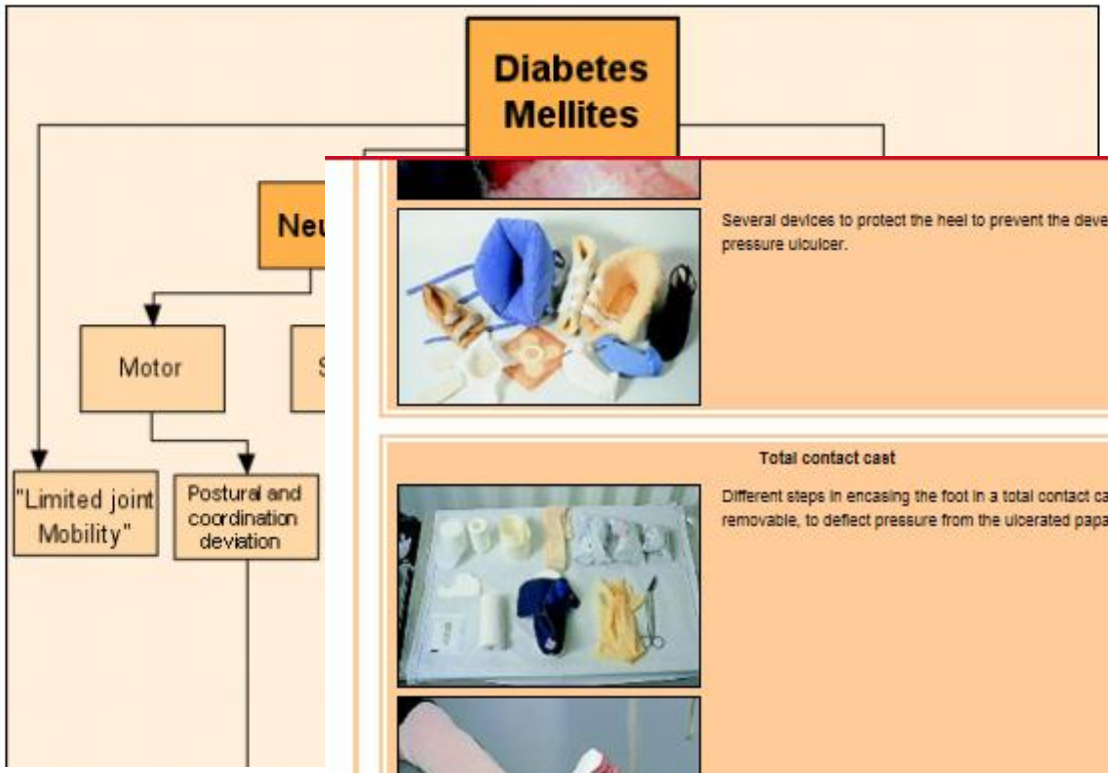
Foot:



Foot lesion

Vileikyte L, Rubin RR, Leventhal H. Psychological aspects of diabetic neuropathic foot complications: an overview. *Diabetes Metab Res Rev* 2004; 20 (Suppl 1): S13-S18.

Figure 1: Open in new window



Several devices to protect the heel to prevent the development of a pressure ulcuicer.

Total contact cast

Different steps in encasing the foot in a total contact cast which is not removable, to deflect pressure from the ulcerated papart.

The Practical and Specific Guidelines on the Management and Prevention of the Diabetic Foot

GUIDELINES - Content

International Consensus on the Management and Prevention of the Diabetic Foot 2011

- PRACTICAL GUIDELINES ON THE MANAGEMENT AND PREVENTION OF THE DIABETIC FOOT
- SPECIFIC GUIDELINES ON WOUND AND WOUND BED MANAGEMENT 2011
- SPECIFIC GUIDELINES FOR THE TREATMENT OF DIABETIC FOOT INFECTIONS 2011
- SPECIFIC GUIDELINES FOR THE DIAGNOSIS AND TREATMENT OF PAD IN A DIABETIC PATIENT WITH A FOOT ULCER 2011
- SPECIFIC GUIDELINES ON FOOTWEAR AND OFFLOADING 2007

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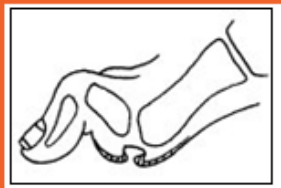
The Practical and Specific Guidelines on the Management and Prevention of the Diabetic Foot

GUIDELINES -

International Consensus on the Management and Prevention of the Diabetic Foot 2011



Practical guidelines on the management and prevention of the diabetic foot

Based upon: The International Consensus on the Diabetic Foot

Prepared by the International Working Group on the Diabetic Foot

Introduction

Foot complications are among the most serious and costly complications of diabetes mellitus. Amputation of all or part of a lower extremity is usually preceded by a foot ulcer. A strategy which includes prevention, patient and staff education, multi-disciplinary treatment of foot ulcers, and close monitoring can reduce amputation rates by 49-85%. Therefore, several countries and organizations, such as the World Health Organization and the International Diabetes Federation, have set goals to reduce the rate of amputations by up to 50%.

The basic principles of prevention and treatment described in these guidelines are based on the International Consensus on the Diabetic Foot. Depending on local circumstances, these principles have to be translated for local use, taking into account regional differences in socio-economics, accessibility to healthcare and cultural factors. These Practical guidelines are aimed at healthcare

The Practical and Specific Guidelines on the Management and Prevention of the Diabetic Foot

GUIDELINES -

International Consensus on the Management and Prevention of the Diabetic Foot 2011

Specific guidelines on wound and wound bed management 2011

From the International Working Group on the Diabetic Foot

Based upon: The consensus report: A systematic review of interventions to enhance the healing of chronic ulcers of the foot in diabetes

Principles
Interventions
Conclusions

The principles of care of a diabetic foot ulcer:

The principles of care of a chronic diabetic foot ulcer are prompt(a) treatment of any associated infection, (b) revascularisation if appropriate and feasible, (c) off-loading in order to minimise trauma to the ulcer site and (d) management of the wound and wound bed in order to promote healing. The most important principles of wound management are the most simple: regular inspection, cleansing, removal of surface debris and protection of the regenerating tissue from the environment.

The IWGDF has now conducted two systematic reviews of the evidence of effectiveness of interventions to enhance the healing of chronic ulcers of the foot in diabetes. The first reviewed publications up to 2006, and the second from 2006- 2010. Each review searched for published controlled trials or cohort studies in which the response to the intervention being tested was compared with a control group. The following guidelines are based on the evidence derived from them.

Wound management of diabetic foot ulcers can be addressed with a set of simple interventions:

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International Working Group on the Diabetic Foot Members Contact

The Practical and Specific Guidelines on the Management and Prevention of the Diabetic Foot

DIABETES/METABOLISM RESEARCH AND REVIEWS
Diabetes Metab Res Rev 2012; 28(Suppl 1): 225–231.
Published online in Wiley Online Library (wileyonlinelibrary.com) DOI: 10.1002/dmrr.2253

IWGDF GUIDELINES

Practical guidelines on the management and prevention of the diabetic foot 2011

DIABETES/METABOLISM RESEARCH AND REVIEWS
Diabetes Metab Res Rev 2012; 28(Suppl 1): 234–235.
Published online in Wiley Online Library (wileyonlinelibrary.com) DOI: 10.1002/dmrr.2251

IWGDF GUIDELINES

Specific guidelines for the treatment of diabetic foot infections 2011†

DIABETES/METABOLISM RESEARCH AND REVIEWS
Diabetes Metab Res Rev 2012; 28(Suppl 1): 236–237.
Published online in Wiley Online Library (wileyonlinelibrary.com) DOI: 10.1002/dmrr.2252

IWGDF GUIDELINES

Specific guidelines for the diagnosis and treatment of peripheral arterial disease in a patient with diabetes and ulceration of the foot 2011†

DIABETES/METABOLISM RESEARCH AND REVIEWS
Diabetes Metab Res Rev 2012; 28(Suppl 1): 218–224.
Published online in Wiley Online Library (wileyonlinelibrary.com) DOI: 10.1002/dmrr.2255

REVIEW ARTICLE

Diagnosis and treatment of peripheral arterial disease in diabetic patients with a foot ulcer. A progress report of the International Working Group on the Diabetic Foot†

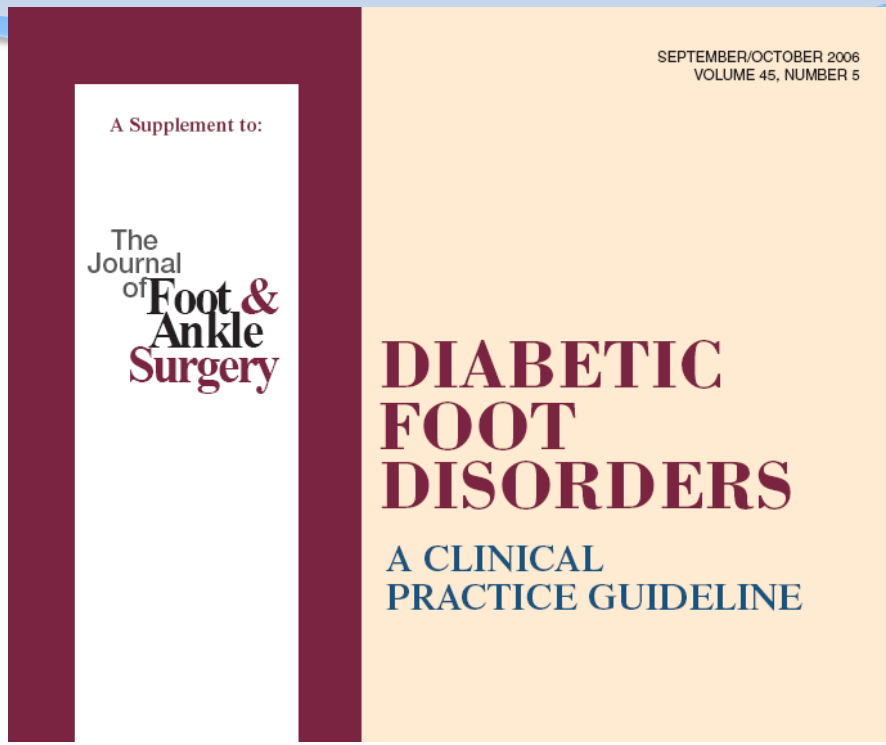
DIABETES/METABOLISM RESEARCH AND REVIEWS
Diabetes Metab Res Rev 2012; 28(Suppl 1): 232–233.
Published online in Wiley Online Library (wileyonlinelibrary.com) DOI: 10.1002/dmrr.2250

IWGDF GUIDELINES

Specific guidelines on wound and wound-bed management 2011†

American College of Foot and Ankle Surgeon

- The Journal of Foot & Ankle Surgery
- Clinical practice Guideline Diabetes panel of American College of Foot and Ankle Surgeons
- 2000/2006



DIABETIC FOOT DISORDERS:
A CLINICAL PRACTICE GUIDELINE (2006 revision)

Robert G. Frykberg, DPM, MPH,[1] Thomas Zgonis, DPM,[2] David G. Armstrong, DPM, PhD,[3] Vickie R. Driver, DPM, MS[4] John M. Giurini, DPM,[5] Steven R. Kravitz, DPM,[6] Adam S. Landsman, DPM, PhD,[7] Lawrence A. Lavery, DPM, MPH,[8] J. Christopher Moore, DPM,[9] John M. Schuberth, DPM,[10] Dane K. Wukich, MD,[11] Charles Andersen, MD,[12] and John V. Vanore, DPM[13]

American College of Foot and Ankle Surgeon

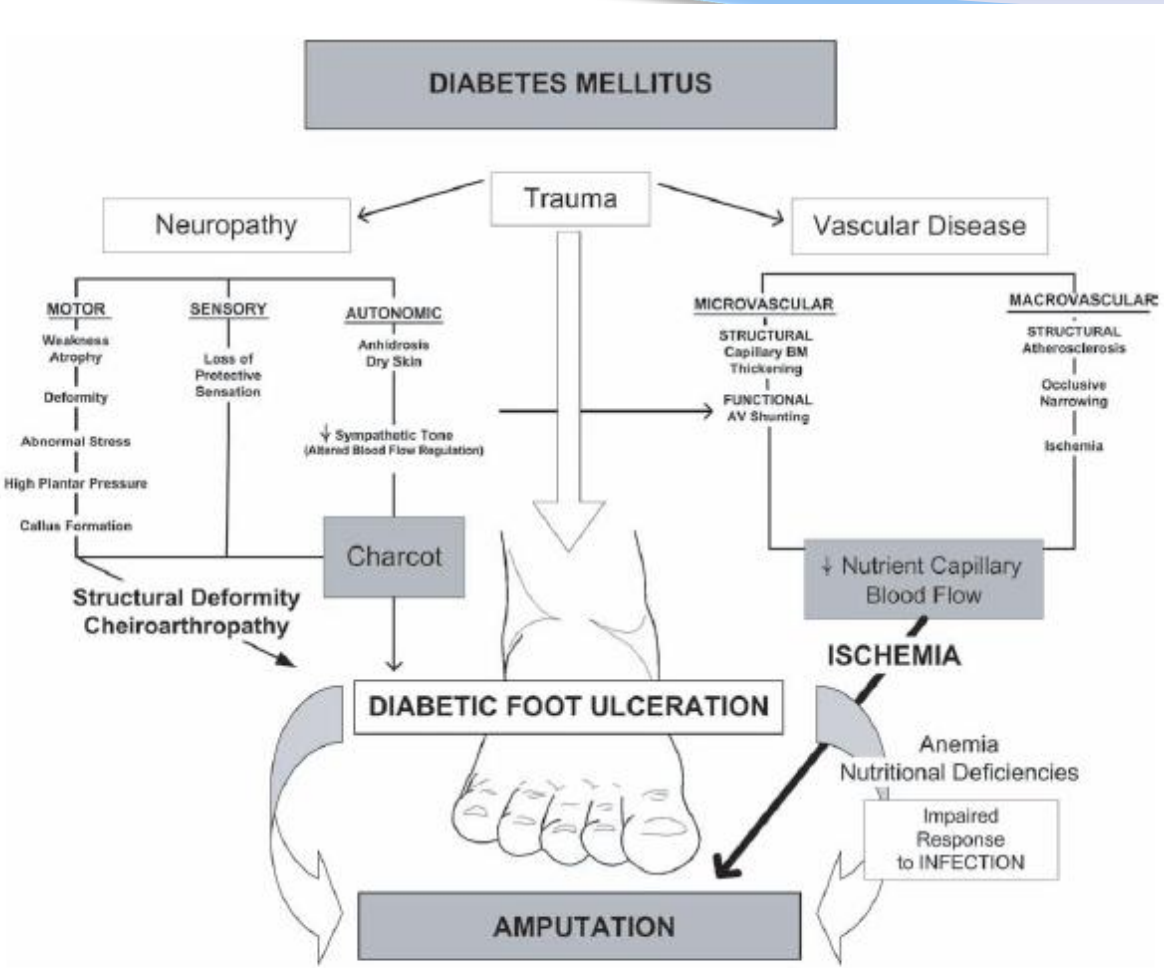
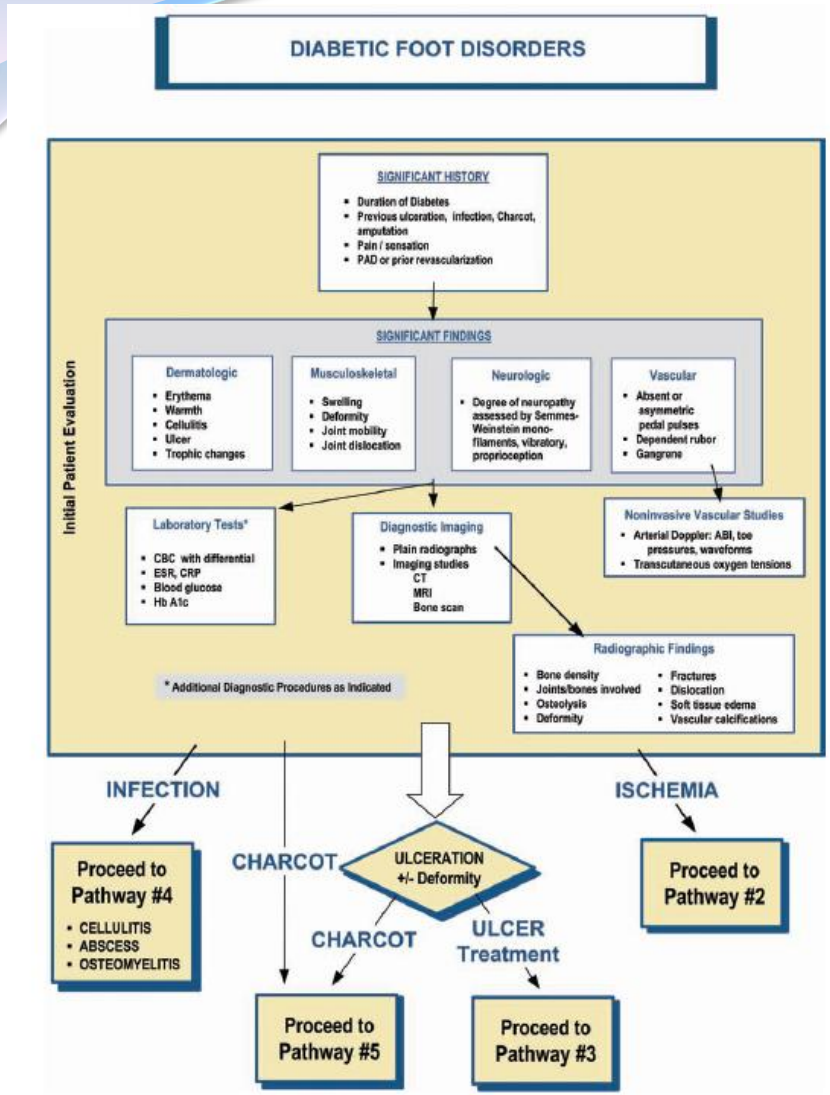
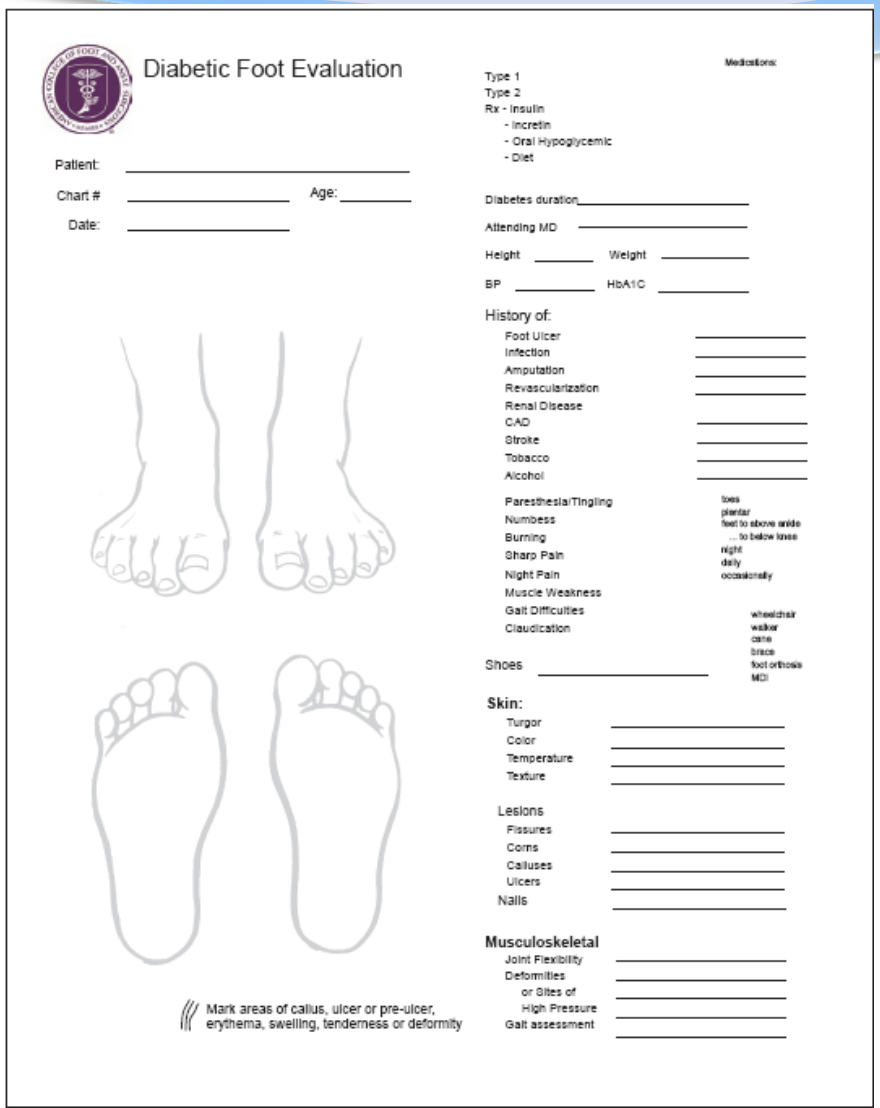


Figure 2 Diabetes mellitus is responsible for a variety of foot pathologies contributing to the complications of ulceration and amputation. Multiple pathologies may be implicated, from vascular disease to neuropathy to mechanical trauma.

American College of Foot and Ankle Surgeon





The Infectious Diseases Society of America

- The Infectious Disease Society of America
- Benjamin A. Lipsky
- Clinical infectious diseases 2012, 06

IDSA GUIDELINES

2012 Infectious Diseases Society of America Clinical Practice Guideline for the Diagnosis and Treatment of Diabetic Foot Infections[a]

Benjamin A. Lipsky,[1] Anthony R. Berendt,[2] Paul B. Cornia,[3] James C. Pile,[4] Edgar J. G. Peters,[5] David G. Armstrong,[6] H. Gunner Deery,[7] John M. Embil,[8] Warren S. Joseph,[9] Adolf W. Karchmer,[10] Michael S. Pinzur,[11] and Eric Senneville[12]

The Infectious Diseases Society of America

Table 1. Strength of Recommendations and Quality of the Evidence

Strength of Recommendation and Quality of Evidence	Clarity of Balance Between Desirable and Undesirable Effects	Methodological Quality of Supporting Evidence (Examples)	Implications
Strong recommendation, high-quality evidence	Desirable effects clearly outweigh undesirable effects, or vice versa	Consistent evidence from well-performed RCTs or exceptionally strong evidence from unbiased observational studies	Recommendation can apply to most patients in most circumstances. Further research is unlikely to change our confidence in the estimate of effect
Strong recommendation, moderate-quality evidence	Desirable effects clearly outweigh undesirable effects, or vice versa	Evidence from RCTs with important limitations (inconsistent results, methodological flaws, indirect, or imprecise) or exceptionally strong evidence from unbiased observational studies	Recommendation can apply to most patients in most circumstances. Further research (if performed) is likely to have an important impact on our confidence in the estimate of effect and may change the estimate
Strong recommendation, low-quality evidence	Desirable effects clearly outweigh undesirable effects, or vice versa	Evidence for at least 1 critical outcome from observational studies, RCTs with serious flaws or indirect evidence	Recommendation may change when higher-quality evidence becomes available. Further research (if performed) is likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate
Strong recommendation, very low-quality evidence (very rarely applicable)	Desirable effects clearly outweigh undesirable effects, or vice versa	Evidence for at least 1 critical outcome from unsystematic clinical observations or very indirect evidence	Recommendation may change when higher-quality evidence becomes available; any estimate of effect for at least 1 critical outcome is very uncertain
Weak recommendation, high-quality evidence	Desirable effects closely balanced with undesirable effects	Consistent evidence from well-performed RCTs or exceptionally strong evidence from unbiased observational studies	The best action may differ depending on circumstances or patients or societal values. Further research is unlikely to change our confidence in the estimate of effect
Weak recommendation, moderate-quality evidence	Desirable effects closely balanced with undesirable effects	Evidence from RCTs with important limitations (inconsistent results, methodological flaws, indirect, or imprecise) or exceptionally strong evidence from unbiased observational studies	Alternative approaches likely to be better for some patients under some circumstances. Further research (if performed) is likely to have an important impact on our confidence in the estimate of effect and may change the estimate
Weak recommendation, low-quality evidence	Uncertainty in the estimates of desirable effects, harms, and burden; desirable effects, harms, and burden may be closely balanced	Evidence for at least 1 critical outcome from observational studies, RCTs with serious flaws, or indirect evidence	Other alternatives may be equally reasonable. Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate
Weak recommendation, very low-quality evidence	Major uncertainty in the estimates of desirable effects, harms, and burden; desirable effects may or may not be balanced with undesirable effects or may be closely balanced	Evidence for at least 1 critical outcome from unsystematic clinical observations or very indirect evidence	Other alternatives may be equally reasonable. Any estimate of effect, for at least 1 critical outcome, is very uncertain

Abbreviation: RCT, randomized controlled trial.

The Infectious Diseases Society of America

- **10 questions**

I. In which diabetic patients with a foot wound should I suspect infection, and how should I classify it?

II. How should I assess a diabetic patient presenting with a foot infection?

III. When and from whom should I request a consultation for a patient with a diabetic foot infection?

IV. Which patients with a diabetic foot infection should I hospitalize, and what criteria should they meet before I discharge them?

V. When and how should I obtain specimen(s) for culture from a patient with a diabetic foot wound?

VI. How should I initially select, and when should I modify, an antibiotic regimen for a diabetic foot infection?

The Infectious Diseases Society of America

- VII. When should I consider imaging studies to evaluate a diabetic foot infection, and which should I select?
- VIII. How should I diagnose and treat osteomyelitis of the foot in a patient with diabetes?
- IX. In which patients with a diabetic foot infection should I consider surgical intervention, and what type of procedure may be appropriate?
- X. What types of wound care techniques and dressings are appropriate for diabetic foot wounds?

consult a vascular surgeon for consideration of revascularization (strong, moderate).

12. We recommend that clinicians unfamiliar with pressure off-loading or special dressing techniques consult foot or wound care specialists when these are required (strong, low).

13. Providers working in communities with inadequate access to consultation from specialists might consider devising systems (eg, telemedicine) to ensure expert input on managing their patients (strong, low).

IV. Which patients with a diabetic foot infection should I hospitalize, and what criteria should they meet before I discharge them?

Recommendations

14. We recommend that all patients with a severe infection, selected patients with a moderate infection with complicating features (eg, severe peripheral arterial disease [PAD] or lack of home support), and any patient unable to comply with the required outpatient treatment regimen for psychological or social reasons be hospitalized initially. Patients who do not meet any of these criteria, but are failing to improve with outpatient therapy, may also need to be hospitalized (strong, low).

15. We recommend that prior to being discharged, a patient with a DFI should be clinically stable; have had any urgently needed surgery performed; have achieved acceptable glycemic control; be able to manage (on his/her own or with help) at the designated discharge location; and have a well-defined plan that includes an appropriate antibiotic regimen to which he/she will adhere, an off-loading scheme (if needed), specific wound care instructions, and appropriate outpatient follow-up (strong, low).

V. When and how should I obtain specimen(s) for culture from a patient with a diabetic foot wound?

Recommendations

16. For clinically uninfected wounds, we recommend not collecting a specimen for culture (strong, low).

VI. How should I initially select, and when should I modify, an antibiotic regimen for a diabetic foot infection? (See question VIII for recommendations for antibiotic treatment of osteomyelitis)

Recommendations

19. We recommend that clinically uninfected wounds not be treated with antibiotic therapy (strong, low).

20. We recommend prescribing antibiotic therapy for all infected wounds, but caution that this is often insufficient unless combined with appropriate wound care (strong, low).

21. We recommend that clinicians select an empiric antibiotic regimen on the basis of the severity of the infection and the likely etiologic agent(s) (strong, low).

a. For mild to moderate infections in patients who have not recently received antibiotic treatment, we suggest that therapy just targeting aerobic GPC is sufficient (weak, low).

b. For most severe infections, we recommend starting broad-spectrum empiric antibiotic therapy, pending culture results and antibiotic susceptibility data (strong, low).

c. Empiric therapy directed at *Pseudomonas aeruginosa* is usually unnecessary except for patients with risk factors for true infection with this organism (strong, low).

d. Consider providing empiric therapy directed against methicillin-resistant *Staphylococcus aureus* (MRSA) in a patient with a prior history of MRSA infection; when the local prevalence of MRSA colonization or infection is high; or if the infection is clinically severe (weak, low).

22. We recommend that definitive therapy be based on the results of an appropriately obtained culture and sensitivity testing of a wound specimen as well as the patient's clinical response to the empiric regimen (strong, low).

23. We suggest basing the route of therapy largely on infection severity. We prefer parenteral therapy for all severe, and some moderate, DFIs, at least initially (weak, low), with a switch to oral agents when the patient is systemically well and

National Institute for Health and Clinical Excellence (NICE)

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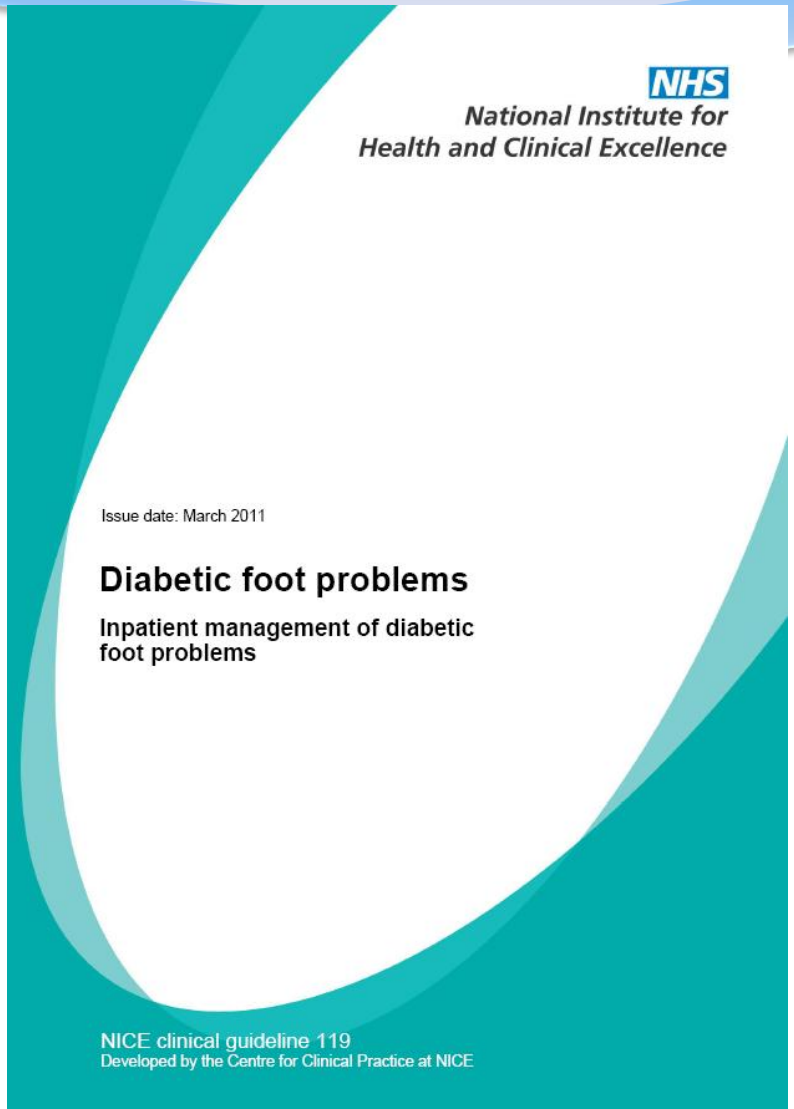
- 2011, 03



National Institute for Health and Clinical Excellence (NICE)

Contents

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GUIDELINES

Inpatient management of diabetic foot problems: summary of NICE guidance

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Foot problems that are related to diabetes ("diabetic foot" problems) affect a substantial number of people with diabetes, and 15% of people with diabetes will have a foot ulcer at some point in their lives. Diabetic foot ulcers precede more than 80% of amputations in people with diabetes and are the most common cause of non-traumatic limb amputation in the United Kingdom. Delays in diagnosis and management of diabetic foot problems increase morbidity and mortality, contribute to a higher amputation rate,[1] and seriously affect patients' quality of life—for example, by reducing mobility, leading to loss of employment, depression, and damage to or loss of limbs. Diabetic foot problems have a financial impact on the NHS through increased outpatient costs and bed occupancy and prolonged stays in hospital.

This article summarises the most recent recommendations in a short clinical guideline from the National Institute for Health and Clinical Excellence (NICE) on the management of diabetic foot problems in inpatients.[2]

Recommendations

NICE recommendations are based on systematic reviews of best available evidence and explicit consideration of cost effectiveness. When minimal evidence is available, recommendations are based on the Guideline Development Group's experience and opinion of what constitutes good practice. Evidence levels for the recommendations are in the full version of this article on bmj.com.

Multidisciplinary foot care team

- Each hospital should have a care pathway for patients with diabetic foot problems who need inpatient care. This care pathway is for people with diabetes who have *(a)* an ulcer, blister, or break in the skin of the foot; *(b)* inflammation or swelling of any part of the foot or any sign of infection; *(c)* unexplained pain in the foot; *(d)* fracture or dislocation in the foot, with no preceding history of substantial trauma; or *(e)* gangrene of all or part of the foot.[3] The multidisciplinary foot care team should consist of healthcare professionals with the specialist skills and competencies necessary to deliver inpatient care to such patients. The team should normally include a diabetologist, a surgeon with the relevant expertise in managing diabetic foot problems, a diabetes nurse specialist, a podiatrist, and a tissue viability nurse, with access to other specialist services necessary for delivering the care outlined in the guideline.

- The role of the multidisciplinary foot care team is to:
  - -Assess and treat the patient's diabetes, including interventions to minimise the patient's risk of cardiovascular events, and any interventions for pre-existing chronic kidney disease or anaemia (refer to the NICE guidance on chronic kidney disease[4] and on managing anaemia in people with chronic kidney disease[5])
  - -Assess, review, and evaluate the patient's response to initial medical, surgical, and diabetes management
  - -Assess the foot and determine the need for specialist wound care, debridement, pressure off-loading, and/or other surgical interventions
  - -Assess the patient's pain and determine the need for treatment and access to specialist pain services
  - -Perform a vascular assessment to determine the need for further interventions
  - -Review the treatment of any infection
  - -Determine the need for interventions to prevent the deterioration and development of Achilles tendon contractures and other foot deformities
  - -Perform an orthotic assessment and treat to prevent recurrent disease of the foot
  - -Refer patients for physiotherapy where appropriate
  - -Arrange discharge planning, which should include arranging for the patient to be assessed and managed in primary and/or community care and followed up by specialist teams (refer to the NICE guidance on preventing and managing foot problems in type 2 diabetes[6]).

Information and support for patients

- The patient should have a named contact—who may be a member of the multidisciplinary foot care team or someone with a specific role as an inpatient pathway coordinator—who will follow the inpatient care pathway and be responsible for:
  - -Offering patients information about their diagnosis, treatment, and the care and support they can expect
  - -Communicating relevant clinical information, including documentation before discharge, within and among hospitals and to primary and/or community care.

Initial examination and assessment

- Remove the patient's shoes, socks, bandages and dressings and examine their feet for evidence of the following and document any identified new and existing diabetic foot problems:
  - -Deformity
  - -Ulceration
  - -Inflammation and/or infection
  - -Ischaemia
  - -Neuropathy
  - -Charcot arthropathy.

- Obtain urgent advice from an appropriate specialist if any of the following are present:
  - -Fever or any other signs or symptoms of systemic sepsis
  - -Clinical concern about possible deep seated infection (for example, palpable gas)
  - -Limb ischaemia.

Initial care (within 24 hours)

- For a patient with diabetic foot problems being admitted to hospital or already in hospital but with newly detected diabetic foot problems, refer to the multidisciplinary foot care team within 24 hours of the initial examination of the patient's feet. Transfer the responsibility of care to a consultant member of the multidisciplinary foot care team if a diabetic foot problem is the dominant clinical factor for inpatient care.

Investigation of suspected diabetic foot infection

- If osteomyelitis is suspected and initial radiography does not confirm the presence of osteomyelitis, use magnetic resonance imaging (if this is contraindicated, consider white blood cell scanning instead).

Management of diabetic foot infection

- Each hospital should have antibiotic guidelines for management of diabetic foot infection.

Management of diabetic foot ulcers

- When choosing wound dressings, the multidisciplinary foot care team should take into account their clinical assessment of the wound, the patient's preference, and the clinical circumstances, and they should use wound dressings with the lowest acquisition cost.

- Do not routinely use negative pressure wound therapy, but consider this in the context of a clinical trial or as rescue therapy (when the only other option is amputation).

- Do not offer the following treatments for inpatient management, unless as part of a clinical trial:
  - -Dermal or skin substitutes
  - -Electrical stimulation therapy, autologous platelet-rich plasma gel, regenerative wound matrices, and deltaparin
  - -Growth factors (granulocyte colony stimulating factor, platelet derived growth factor, epidermal growth factor, and transforming growth factor β)
  - -Hyperbaric oxygen therapy.

Overcoming barriers

No agreed treatment pathways or service models exist for management of diabetic foot problems in inpatients. Current practice is thought to vary considerably, owing to a range of factors, including differences in the organisation of care from the time of acute care admission to discharge. However, prompt identification of diabetic foot problems, with appropriate treatment and referral, can reduce associated morbidity (including rates of amputation) and mortality.[1]

The NICE recommendations should facilitate the provision of timely and coordinated care for people with diabetic foot problems who are admitted to hospital (either for the primary diabetic foot problem or for other reasons but who also have a diabetic foot problems). They outline what care should be provided and how this should be organised, specifying key functions and members of the multidisciplinary team.

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Provenance and peer review: Commissioned; not externally peer reviewed.

1 Reiber G E, Vileikyte L, Boyko EJ, del Aguila M, Smith DG, Lavery LA, et al. Causal pathways for incident lower-extremity ulcers in patients with diabetes from two settings. *Diabetes Care* 1999;22:157-62.
2 National Institute for Health and Clinical Excellence. Diabetic foot problems: inpatient management of diabetic foot problems. (Clinical guideline 119.) 2011. http://guidance.nice.org.uk/CG119.
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6 National Institute for Health and Clinical Excellence. Type 2 diabetes: prevention and management of foot problems. (Clinical guideline 10.) 2004. http://guidance.nice.org.uk/CG10.

This is one of a series of *BMJ* summaries of new guidelines based on the best available evidence; they highlight important recommendations for clinical practice, especially where uncertainty or controversy exists. Further information about the guidance, a list of members of the guideline development group, and the supporting evidence statements are in the full version on bmj.com.

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Previous articles in this series
- Diagnosis, assessment, and management of harmful drinking and alcohol dependence (*BMJ* 2011;342:d700)
- Diagnosis and assessment of food allergy in children and young people (*BMJ* 2011;342:d747)
- Management of generalised anxiety disorder in adults (*BMJ* 2011;342:c7460)
- Sedation for diagnostic and therapeutic procedures in children and young people (*BMJ* 2010;341:c6819)
- Management of bedwetting in children and young people (*BMJ* 2010;341:c5399)

Nati nd

Care pathway

Multidisciplinary foot care team:

- Each hospital should have an inpatient care pathway, managed by a multidisciplinary foot care team.
- The team should consist of healthcare professionals with the specialist skills to deliver inpatient care, including a diabetologist, a surgeon with the relevant expertise in managing diabetic foot problems, a diabetes nurse specialist, a podiatrist and a tissue viability nurse, and the team should have access to other specialist services needed to deliver the care outlined in the guideline.
- The multidisciplinary foot care team should:
  - assess and treat the patient's diabetes, which includes minimising the risk of cardiovascular events, and interventions for pre-existing chronic kidney disease or anaemia
  - assess, review and evaluate the patient's response to initial medical, surgical and diabetes management
  - assess the foot, and determine the need for specialist wound care, debridement, pressure off-loading and/or other surgical interventions
  - assess the patient's pain and determine the need for treatment and access to specialist pain services
  - perform a vascular assessment to determine the need for further interventions
  - review the treatment of any infection
  - assess the need for interventions to prevent the deterioration and development of foot deformities
  - perform an orthotic assessment and treat to prevent recurrent disease of the foot
  - have access to physiotherapy
  - arrange discharge planning.

Patient information and support:

- Offer patients consistent, relevant information and clear explanations that support informed decision making, and provide opportunities for them to discuss issues and ask questions.
- Patients should have a named contact to provide information and to liaise between secondary and primary and/or community care.

Within 24 hours of the patient being admitted or a foot problem being detected (if the patient is already in hospital)

- A named consultant should be accountable for the care of the patient and for ensuring that healthcare professionals provide timely care.
- Refer the patient to a consultant member of the multidisciplinary foot care team if a diabetic foot problem is the dominant clinical factor.

Initial examination and assessment

- Examine the feet and record details of new and/or existing foot problems.
- Examine the patient for signs and symptoms of systemic sepsis.
- X-ray the affected foot (or feet).
- Use pressure-relieving support surfaces and strategies in line with 'Pressure ulcers' (NICE clinical guideline 29).

If you suspect the following, obtain advice from an appropriate specialist:

- Charcot arthropathy
- a deep-seated infection
- systemic sepsis
- limb ischaemia.

Diabetic foot ulcers

Investigation

Record the size and depth of the ulcer. Assess and record any signs of infection, ischaemia, neuropathy, gangrene or deformity.

Management

Debridement should only be done by healthcare professionals from the multidisciplinary foot care team using the technique that best matches their expertise, clinical experience, patient preference and site of the ulcer.

When choosing wound dressings, healthcare professionals from the multidisciplinary foot care team should take into account the wound, patient preference and the clinical circumstances, and should use wound dressings with the lowest acquisition cost.

Offer off-loading. Healthcare professionals from the multidisciplinary foot care team should take into account the wound, patient preference and the clinical circumstances, and should use the technique with the lowest acquisition cost.

Use pressure-relieving support surfaces and strategies in line with NICE clinical guideline 29.

Interventions not recommended

Negative pressure wound therapy, unless in the context of a clinical trial or as rescue therapy (when the only other option is amputation).

Dermal or skin substitutes, electrical stimulation therapy, autologous platelet-rich plasma gel, regenerative wound matrices, deltaparin, growth factors, hyperbaric oxygen therapy, unless in the context of a clinical trial.

Diabetic foot infection

Investigation

Send a deep soft tissue sample (or a superficial swab) for microbiological examination.

If you suspect osteomyelitis but the initial X-ray was not diagnostic, carry out magnetic resonance imaging (MRI) or white blood cell scanning if MRI is contraindicated.

Management

Start antibiotic therapy based on infection severity, using the antibiotic with the lowest acquisition cost appropriate for the clinical situation. Take into account local antibiotic guidelines as well as the microbiology results.

Do not delay starting therapy for suspected osteomyelitis pending MRI results.

For mild infections, offer oral antibiotics with activity against Gram-positive organisms.

For moderate and severe infections, offer antibiotics with activity against Gram-positive and Gram-negative organisms, including anaerobic bacteria. For moderate infections use oral or intravenous; for severe infections start with intravenous and then reassess.

Interventions not recommended

- ***Investigation***
  X-rays or probe-to-bone testing to exclude osteomyelitis.
  Bone scans to diagnose osteomyelitis.
- ***Management***
  Prolonged antibiotic therapy for mild soft tissue infections.

Suspected limb ischaemia

Obtain a history of any previous cardiovascular events and symptoms, including treatments and/or procedures.

Inspect the limb for colour and temperature, gangrene or tissue loss and presence or absence of a peripheral pulse.

Measure and document the ankle–brachial pressure where clinically possible and interpret the results carefully.

Arrange prompt specialist assessment.

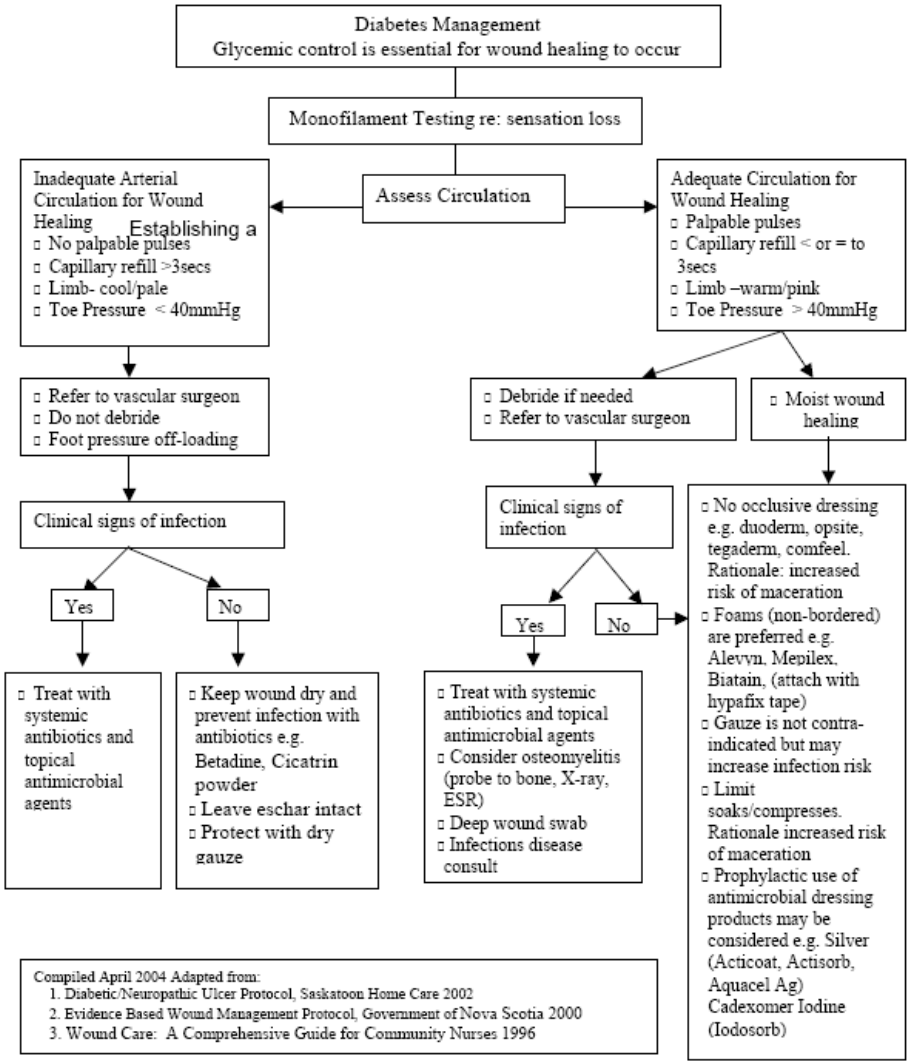
The Saskatoon and Regina Qu'Appelle Health

- Canada
- Saskatchewan
- 2008, 02

Clinical Practice Guidelines for the Prevention and Management of Diabetes Foot Complications

The Saskatoon and Regina Qu'Appelle Health

MANAGEMENT OF FOOT ULCER ALGORITHM



Compiled April 2004 Adapted from:
1. Diabetic/Neuropathic Ulcer Protocol, Saskatoon Home Care 2002
2. Evidence Based Wound Management Protocol, Government of Nova Scotia 2000
3. Wound Care: A Comprehensive Guide for Community Nurses 1996

APPENDIX 1: INTERDISCIPLINARY APPROACH TO PREVENTION AND MANAGEMENT OF DIABETIC FOOT COMPLICATIONS

Template: Regional Diabetes Foot Programs should develop a list of available health professionals in the following care provider management categories within their region, and any referral contacts external to the region.

Diabetes Management Health Care Providers	Services Provided
Family Physician	- Ongoing care; referral to specialists, wound care nurses, diabetes education, podiatry - Regular diabetes medical review and management - Regular screening for neuropathy and vascular disease - Management of wounds and liaison with wound care nurses
Diabetologist/ Endocrinologist	- Management of diabetes - Preventative management of foot complications
Diabetes Nurse Educators (may work independently or be part of a Diabetes Education program)	- Diabetes education, including lipids and blood pressure management for people with diabetes and their families. Done through individual and group sessions. Includes education re meal planning, blood sugar monitoring, activity, medications, foot care, complication screening etc. - Support the initiation of insulin therapy; perform foot exams/monofilament testing and blood pressure monitoring. - Provide advice and consultative services to health care professionals, including health care students, to provide education and information about best practices in supporting people to self-manage their diabetes and prevent the complications. - Limited work on initiatives to support healthy eating and physical activity and lifestyles to prevent type 2 diabetes in the community
Dietitian (may work independently or be part of a Diabetes Education program)	- Provide education for people with diabetes and their families regarding diabetes self-management including general nutrition, appropriate meal planning for optimal blood glucose, blood lipid, blood pressure and weight management. Done through individual and group sessions. - May address other areas of diabetes education (i.e. blood glucose monitoring, foot screens/monofilament testing) - Screen for nutritional adequacy as it relates to wound prevention and healing - Provide appropriate nutrient recommendations, practical interventions and education to individuals and caregivers
Wound Care Specialist/ Resource Nurse	- An RN with specialty training in wound management - Consultation with other disciplines - Patient and staff educational role

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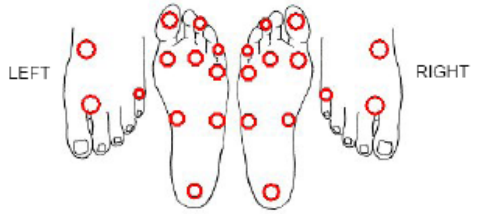
APPENDIX 2: DIABETES FOOT SCREEN

Diabetes Foot Screen

Name (Last, First, MI) _____ Date: _____/_____/_____
Fill in the following blanks with a "Y" or "N" to indicate findings in the right or left foot.

	R	L
Is there a history of a foot ulcer?	_____	_____
Is there a foot ulcer now?	_____	_____
Is there a claw toe deformity?	_____	_____
Is there an abnormal foot shape?	_____	_____
Are the toenails, thick or ingrown?	_____	_____
Is there heavy callus build-up?	_____	_____
Is there swelling?		_____
_____ Is there elevated skin temperature?		_____
_____ Is there limited ankle dorsiflexion?		_____
_____ Is there foot or ankle muscle weakness?		_____
_____ Can the patient see the bottom of their feet?		_____
_____ Are the shoes appropriate in style and fit?		_____
_____ Is there an absent pedal pulse?*		_____

Note the level of sensation in the circles:
+ = Can feel the 5.07 filament - = Can't feel the 5.07 filament



Skin Conditions on the Foot or Between the Toes:

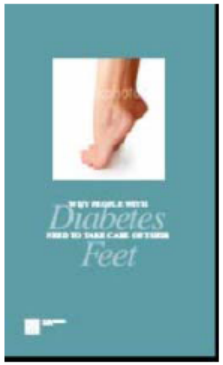
Draw in: Callus, Pre-ulcer, Ulcer (note length and width in cm)
Label with: R - redness, M - maceration, D - dryness, W*- warm T-Tinea, Dis* - discoloration

RISK CATEGORY:
____ 0 No loss of protective sensation
____ 1 Loss of protective sensation
____ 2 Loss of protective sensation with either high pressure (callus/deformity), or poor circulation
____ 3 History of plantar ulceration, neuropathic fracture (Charcot foot) or amputation

Rev. 03/22/02 LSUHSC Diabetes Foot Program Performed by: _____

* Revised by the Saskatchewan working group for the Clinical Practice Guidelines for Prevention and Management of Diabetes Foot Complications

APPENDIX 4: SASKATCHEWAN HEALTH DIABETES FOOT BROCHURE INFORMATION



Why People with Diabetes Need to Take Care of Their Feet
This brochure is available by contacting the Primary Health Services Branch at (306) 787-0889

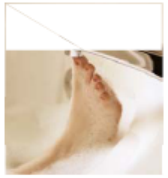
An important part of managing your diabetes is **Taking Care of Your Feet**

People who have diabetes are more likely to have problems with poor blood flow (circulation) or loss of feeling (sensation) in their feet. Loss of sensation and poor circulation to the foot may lead to sores that are slow to heal.

Loss of feeling or sensation is caused by damage to the nerves in the lower legs and feet. This nerve damage occurs as a result of blood sugar levels that have been high over a long period of time. As a result of loss of feeling or sensation, the person with diabetes may not be aware of temperature, pressure or pain.

For example...

If your feet get too hot, such as with the use of a hot water bottle or stepping into hot water, your feet can suffer a burn and **you will not feel it.**



You may not feel injuries, such as blisters developing, if your shoes are too tight.

You may not feel anything when you step on a sharp object. You can damage your feet and not even know it.

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APPENDIX 9: STAYING ALIVE

MANAGEMENT

CANADIAN DIABETES ASSOCIATION | ASSOCIATION CANADIENNE DU DIABÈTE

Staying healthy with diabetes

Both type 1 and type 2 diabetes are serious conditions, and can lead to the same complications. But you can do many things to stay well. Talk to your doctor about all of the following points. They are important for basic diabetes care. Your doctor and your healthcare team will work with you to ensure you get the best care.

The important first steps are:

- Eat according to a healthy meal plan.
- Increase your physical activity.
- Learn as much as possible about diabetes.

Blood glucose

You and your healthcare team should set goals for your blood glucose levels. It is important to recognize that you may need to add pills and/or insulin to your lifestyle changes (meal planning and increased activity), to achieve your blood glucose targets. Ask about a blood glucose meter to help track your blood glucose levels.

Blood pressure

High blood pressure can lead to eye disease, heart disease, stroke and kidney disease. You may need to change your eating and exercise habits and/or take pills to keep your blood pressure at or below 130/80 mm Hg.

Healthy eating

Ask your doctor to refer you to a registered dietitian to learn about healthy eating. You should follow Canada's Guidelines for Healthy Eating, which includes limiting the amount of fat you eat.

Physical activity

If you have type 2 diabetes, you should do at least 150 minutes of aerobic exercise per week. You may need to start with as little as 5 to 10 minutes per day of brisk walking. If you are just starting to be active, check with your doctor first.

Do you know your targets for good blood glucose and blood pressure control? Remember, lowering your blood glucose and blood pressure (even a little) will help you become healthier and stay that way.

Refer to the back page of this brochure to find your recommended target range and check regularly with your doctor or healthcare team to meet your goals.

Cholesterol

High cholesterol and other fats in the blood can lead to heart disease and stroke. You may need to change your eating and exercise habits and/or take pills to keep your blood fats at healthy levels.

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APPENDIX 10: GLOSSARY

Atherosclerotic	A thickening, hardening, and loss of elasticity of the blood vessel (artery walls) due to deposits of cholesterol plaques
Arteriovenous shunting	The passage of blood directly from arteries to veins without going through the capillary network
Callus	A thickened area of the skin due to increased keratin production caused by chronic direct pressure or continuous shearing stress, the result of a foot deformity or poorly-fitting shoes. A callus may form a central core or plug of tissue where pressure is greatest
Capillary refill	The rate at which blood refills empty capillaries. It can be measured by pressing a fingernail until it turns white, and taking note of the time needed for color to return once the nail is released. The capillary refill time (CRT) is a common measure of peripheral perfusion
Cellulitis	Pressence of swelling, redness and heat. Indicating an inflammatory reaction in the skin
Collagen	An insoluble fibrous protein of vertebrates that is the chief constituent of the fibrils of connective tissue (as in skin and tendons)
Debridement	Removal of dead tissue and foreign matter from a wound
Dorsiflexion	Turning upward of the foot or toes or of the hand or fingers
Edema	Excess fluid in the skin and subcuateous tissues causing swelling sufficiently pronounced to leave a clear imprint of the pressure by a finger
Electrical stimulation	The use of an electrical current to transfer energy to a wound
Eschar	Thick, hard, black, leathery, necrotic, devitalized tissue
Enzymatic debridement tissues	The use of selective enzymatic ointments to remove necrotic
Erythema	Abnormal redness of the skin caused by capillary congestion. It is one of the cardinal signs of inflammation
Exudate	Fluid, cells or other substances that have slowly leaked from other cells and blood vessels through small breaks in the cell membranes
Glycemic control	The management of blood glucose in persons with diabetes to achieve recommended blood glucose targets

대한 당뇨병 학회

- 당뇨병 진료 지침 2011

진료지침 2011

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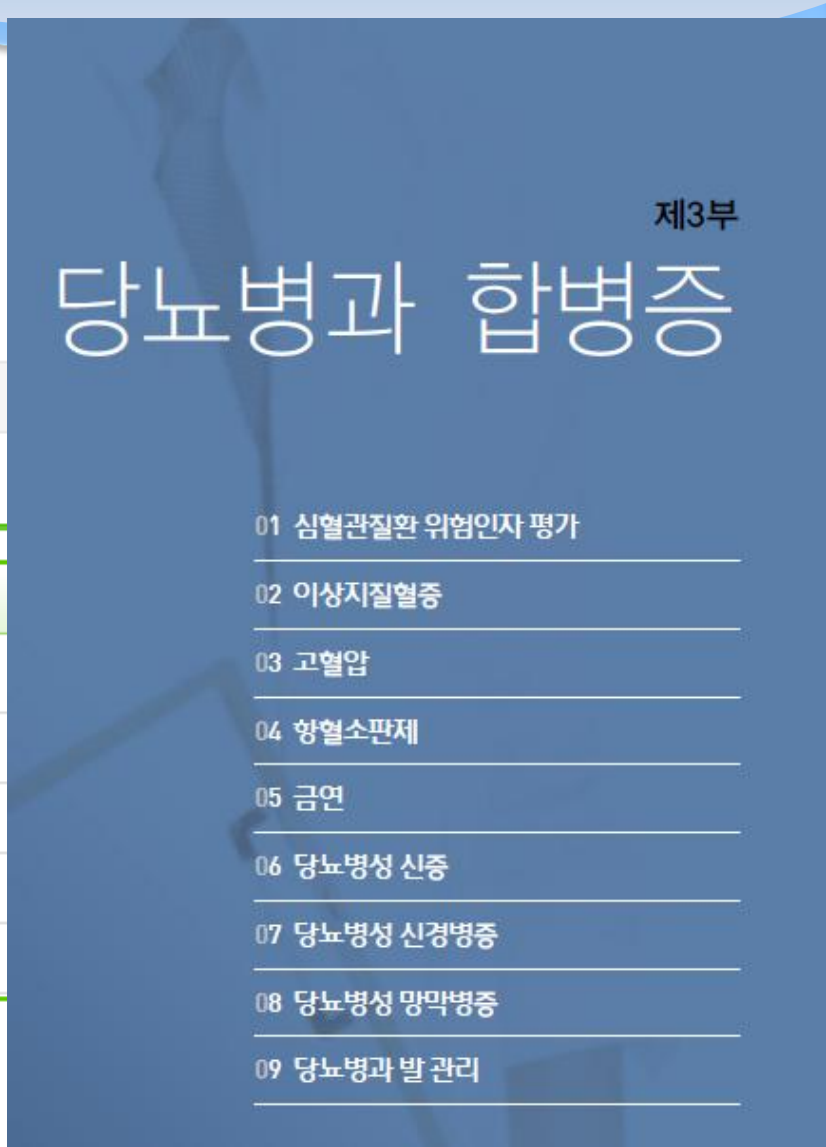

권고안

1. 모든 당뇨병환자는 족부궤양 및 하지 절단의 위험인자를 확인하기 위해 매년 종합적인 발 검사를 시행 받아야한다. 발 검사는 시진, 족부 맥박의 확인 및 보호감각의 소실 여부를 평가하기 위한 검사 (10 g 모노필라멘트 검사 및 다음 검사들 중 하나: 128-Hz 튜닝 포크 검사, 바늘찌름검사, 발목반사, 진동감각역치검사)를 포함해야 한다. [B]
2. 모든 당뇨병환자에게 일반적인 발 자가관리 교육을 실시해야 한다. [B]
3. 족부궤양이 동반된 고위험군 환자, 특히 궤양이나 절단의 과거력이 있는 환자에게는 여러 분야의 전문가 협진을 권고한다. [B]
4. 지속적인 관리를 위해 흡연자, 발 보호감각이 소실되거나 구조적 이상이 있는 환자, 족부 합병증의 과거력이 있는 환자는 발 관리 전문가와 협진하는 것이 좋다. [C]
5. 말초동맥질환의 선별을 위해 파행 및 족부 맥박 여부를 확인한다. 많은 수의 말초동맥질환 환자들이 증상을 호소하지 않으므로 Ankle–Brachial index (ABI)를 선별검사로 시행하는 것이 좋다. [C]
6. 심각한 파행이 있거나 ABI 양성 (0.9 이하)인 환자의 경우 추가적인 혈관검사를 의뢰하며 운동, 약물치료와 수술을 고려할 수 있다. [C]

배경

하지절단과 족부궤양은 당뇨병성 신경병증 및 말초동맥질환의 흔한 합병증으로 당뇨병환자 이환율과 장애의 주요 원인이다. 위험인자를 조기에 발견하고 관리할 경우 합병증을 예방 또는 지연시킬 수 있다. 다음과 같은 위험인자를 가지는 경우 족부궤양 및 절단의 위험이 증가한다.[1-7]

1. 하지절단의 과거력
2. 족부궤양의 과거력
3. 말초신경병증
4. 발 변형
5. 말초혈관질환
6. 시력저하
7. 당뇨병성 신증 (특히 투석 중인 환자)
8. 불량한 혈당조절
9. 흡연

모든 당뇨병환자는 족부병변의 고위험 요소를 확인하기 위해 매년 종합적인 발 검사를 시행 받아야 한다. 의사는 환자에게 족부궤양 및 절단의 과거력, 신경병증 및 말초혈관질환에 의한 증상, 시력저하 여부, 흡연 유무, 발 관리 여부를 확인해야 한다[1-4]. 피부 상태 및 뼈 변형을 확인하기 위해 시진은 밝은 방에서 시행하여야 하며, 혈관상태 평가는 시진 및 족부 맥박 촉진을 포함하여야 한다. 신경학적 검사는 초기 신경병증 보다는 보호감각 소실을 확인할 목적으로 시행된다. 발 보호감각 소실을 확인하기 위한 검사는 간편하고 비용이 저렴해야 한다. 당뇨족 환자에서 보호감각 소실을 확인할 목적으로 10 g 모노필라멘트 검사, 128-Hz 튜닝 포크를 이용한 진동감각검사, 바늘찌름검사, 발목반사, biothesiometer를 이용한 진동감각역치검사가 이용되며, 이 중 두 가지 종류의 검사를 선별검사로 하여 정기적으로 시행할 것을 권고한다. 일반적으로 10 g 모노필라멘트 검사에 다른 한가지 검사를 추가하는 것이 좋은데, 한 개 이상의 검사에서 이상 소견이 확인되면 발 보호감각이 소실된 것으로 간주할 수 있으며 반면에 두 개의 검사 결과가 정상으로 나오면 발 보호 감각에 이상이 없는 것으로 간주한다.[5-7]

말초동맥질환의 초기 선별검사에 파행 과거력 및 족부 맥박 촉진을 포함하여야 한다. 증상이 있는 모든 말초동맥질환 환자는 ABI (Ankle-Brachial Index)를 시행한다. 당뇨병환자의 경우 말초동맥질환이 흔하며 증상을 호소하지 않는 경우가 많아 50세 이상의 당뇨병환자에서는 ABI를 시행하고, 50세 미만이라도 흡연, 고혈압, 고지혈증 또는 당뇨병 유병기간이 10년 이상된 경우처럼 다른 말초동맥질환의 위험인자를 가지고 있으면 ABI 측정을 고려하도록 한다. 심한 증상이 있거나 ABI 양성인 환자는 추가적인 혈관검사를 의뢰하며 운동, 약물치료와 수술을 고려한다.[1] 족부병변의 위험성이 높은 당뇨병환자는 자신이 가지고 있는 위험인자와 그에 대한 적절한 관리법에 관하여 교육을 받아야 한다. 위험인자를 가지고 있는 환자는 보호감각 소실의 의미, 매일 발을 관찰하는 것이 왜 중요한지, 발톱과 피부를 포함하는 적절한 발 관리, 적절한 신발 선택에 관하여 이해하고 있어야 한다. 발 보호감각이 소실된 환자의 경우 발에 생기는 문제를 조기에 발견할 수 있도록 손으로 만지거나 눈으로 관찰하는 것과 같이 보호감각 소실을 대신 할 수 있는 방법에 관한 교육이 필요하다. 환자가 이러한 문제들을 잘 이해하고 적절한 발 관리를 할 수 있는 신체적 능력이 있는지 평가하여야 한다. 시력이 떨어져 있거나 신체 활동의 제한, 인지장애가 있는 환자는 가족 등 다른 사람들의 도움이 필요하다.[5-7]

신경병증이 있거나 발적, 열감, 굳은살과 같은 족저압 증가의 증거 또는 직접 측정된 압력이 증가된 환자의 경우 잘 맞는 보행용 신발이나 운동화가 발에 완충역할을 하고 압력을 분산시켜서 도움이 될 수 있다. 굳은살은 발 관리 전문가 또는 경험이 있는 의료인이 수술용 메스로 제거할 수 있다. 망치족, 중족골 골두 돌출, 무지외반증과 같은 뼈 변형이 있는 환자는 볼이 넓거나 속이 깊은 신발이 필요할 수 있다. 샤르코 발처럼 뼈 변형이 심해 보통의 치료용 신발로 관리가 되지 않는 경우 맞춤 신발이 필요할 수 있다.[6,7] 족부궤양 및 상처는 당뇨병성 족부병변에 경험이 있는 발 전문가나 정형외과, 혈관외과 의사, 또는 재활전문가의 관리가 필요할 수 있다.[8] 환자에 대한 철저한 검사가 이루어진 후에는 발 위험도를 분류하고 이에 따라 전문의 또는 팀에 의한 협진, 치료, 추적관찰 일정이 정해진다(표 1). 위험도 분류 범주가 증가할

수록 족부궤양, 입원, 절단의 위험이 증가하게 된다.[5]

발을 보호하기 위한 기본적인 발 관리 지침을 실천하도록 교육한다.[5,28]

1. 발을 매일 관찰한다. 물집, 개방된 상처, 출혈, 발톱의 문제점, 발적 등을 관찰한다. 만약 스스로 할 수 없다면 다른 사람의 도움을 받도록 한다. 만약 문제를 발견하면 의료진에게 보이도록 한다.
2. 발을 보호한다. 발을 보호하기 위해 알맞은 신발을 신도록 한다. 고위험 발은 치료용 맞춤형 신발을 신도록 한다. 발을 청결하게 유지하도록 한다.
3. 발을 매일 규칙적으로 닦도록 하며, 발을 물에 담그지 않도록 한다. 발을 닦을 때는 너무 뜨거운 물이 아닌지 온도를 확인한다. 발에 로션을 바르되, 발가락 사이에 바른 것은 피하도록 한다.
4. 발톱 깎이나 면도날에 발이 다치지 않도록 한다. 발톱은 일자로 자르도록 하며, 발톱 가장자리는 둥글게 갈도록 한다. 굳은살이나 티눈을 면도날로 자르지 않도록 하고, 의료진에 보이도록 한다.

표 1. 종합적인 발 검사에 따른 위험도 분류[5]

위험도 분류	정의	치료 권고안	추적관찰
0	발 보호감각 소실, 발 변형, 말초동맥질환 모두 없는 경우	1. 환자 교육 (예: 적절한 신발에 대한 조언)	매년 (일반의 및 또는 전문의)
1	발 보호감각 소실 발 변형	1. 치료용 또는 맞춤신발 고려 2. 발 변형이 신발로 해결되지 않는 경우 예방적 수술 고려, 환자 교육 지속	3–6개월 간격 (일반의 또는 전문의)
2	말초동맥질환 발 보호감각 소실	1. 치료용 또는 맞춤신발 고려 2. 종합적 관리를 위해 혈관전문의 협진 고려	2–3개월 간격 (전문의)
3	족부궤양 또는 절단의 과거력	1. 위험도 분류 1과 동일 2. 말초동맥질환이 있는 경우 종합적 관리를 위해 혈관전문의 협진 고려	1–2개월 간격 (전문의)

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- 다학제적 접근을 이용한 당뇨발 치료에 관한 국내 진료지침이 없음

→ 국내 당뇨발에 최적화된 진료 지침 개발 필요성

Thank you