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Pocket Guideline of Diabetic Foot

For Professionals

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Second Edition

JAYPEE

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Diabetes Mellitus—A Clinical Challenge

- Diabetes is a serious chronic disease that needs urgent attention
- It affects rich and poor, young and old, and developed and developing countries in equal measure
- In 2017, the global prevalence of diabetes was estimated at 424.9 million
- This figure is predicted globally to reach 628.6 million by 2045
- The majority (80%) of persons with diabetes live in low and middle-income countries
- Africa – total number of diabetes 16 million in 2017 will increase to 40.7 million by 2045
- South East Asia – total number of diabetes 82 million will increase to 151.4 million by 2045
- Middle East and North Africa – total number of diabetes 38.7 million will increase to 82 million by 2045
- Europe – total number of diabetics 58 million will increase to 66.7 million by 2045
- Western Pacific – total number of diabetics 158.8 million will increase to 185.3 million by 2045
- North America and Caribbean – total number of diabetes 45.9 million will increase to 62.7 million by 2045
- South and Central America – total number of diabetes 26 million will increase to 42.3 million by 2045.

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Top Ten Countries for Number of Adults with Diabetes

No.	Countries in 2017	Total number in million	Countries in 2045	Total number in million
1	China	114.4	India	134.3
2	India	72.9	China	119.8
3	United States	30.2	United States	35.6
4	Brazil	12.5	Mexico	21.8
5	Mexico	12.0	Brazil	20.3
6	Indonesia	10.3	Egypt	16.7
7	Russian Federation	8.5	Indonesia	16.7
8	Egypt	8.2	Pakistan	16.1
9	Germany	7.5	Bangladesh	13.7
10	Pakistan	7.5	Turkey	11.2

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Epidemiology of the Diabetic Foot

- Every 20 second a limb is lost due to diabetes
- Approximately 15% of all people with diabetes will be affected by a foot ulcer during their lifetime
- Five year recurrence rates of ulcer are 70%
- Up to 85% of amputations in relation to people with diabetes are preceded by a foot ulcer
- People with diabetes with one lower limb amputation have a 50% risk of developing a serious lesion in the second limb within 2 years
- People with diabetes have a 50% mortality rate in the 5 years following the initial amputation
- Across the globe, 40–60% of all lower extremity nontraumatic amputations
- Foot complications, especially serious ones like the septic limb, can be serious and costly
- 85% of all diabetic foot related problems are preventable.

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Economical Burden of the Diabetic Foot Ulcer

- Diabetic foot complications are expensive due to:
  - Frequent visits to clinic
  - Prolonged and frequent hospitalization
  - Investigations—laboratory tests, etc.
  - Medications
  - Surgeries
  - Off loading devices
  - Specialized foot wear
  - Rehabilitation
  - Increased need for home-care
  - Absent from work
- Given the high cost of diabetic foot ulcers and amputations to both the individual and society, the relatively low cost interventions of foot-care are likely to be cost-effective in most societies.

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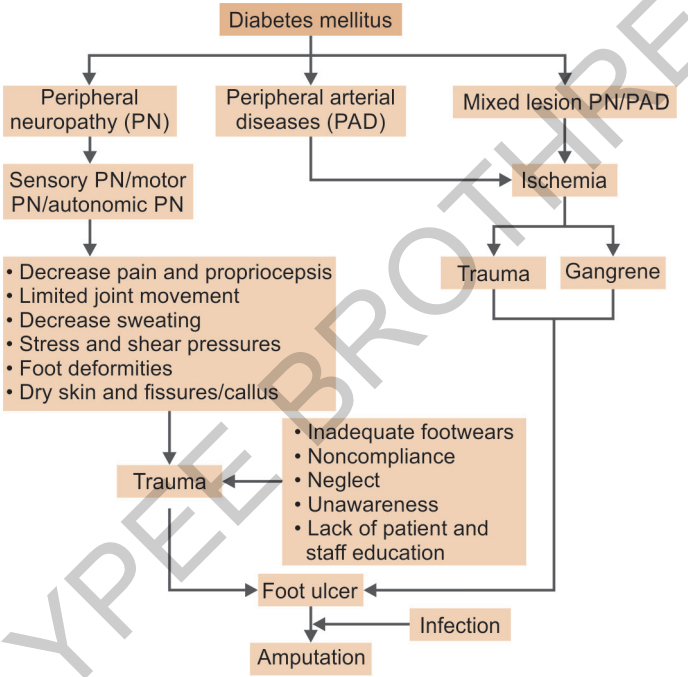
Pathway to Diabetic Foot Ulcer



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Factors Associated with Foot Ulcer

Peripheral neuropathy	Sensorimotor/autonomic
Peripheral arterial disease	
Trauma	Poor footwear • Walking barefoot • Falls/accidents • Objects inside shoes
Biomechanics	Limited joint mobility • Bony prominence • Foot deformity/osteoarthropathy • Callus
Socioeconomic status	Low socioeconomic position • Poor access to health care • Noncompliance neglect • Poor education
Previous ulcer/amputation	


Callus


Deformity


Blister


Bare foot –burn


Bullae


Charcot


Herbal


Rat Bite

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Pathophysiology of Foot Ulceration

Complex interplay of various factors includes:

- Peripheral neuropathy (the most important cause of diabetic foot ulcer):
  - Sensory
  - Motor
  - Autonomic
- Peripheral arterial diseases
- Neuroischemic ulcers (mixed group)
- Infection
- Nonulcerative lesions
- Trauma
- Biomechanics factors
- Cultural and socioeconomic factors
- Health care workers (training, skills, etc.).

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Diabetic Peripheral Neuropathy

- Sensorimotor and autonomic are major risk factors for diabetic foot ulcers
- Neuropathy cannot be diagnosed by history alone; a careful foot examination is mandatory
- Up to 50% of type 2 diabetic patients have significant neuropathy and "at-risk" feet
- Associated with loss of sensation - sequel include the following:
  - Callosities, crack soles
  - Break down of skin, burn, nondiscernible injury (e.g., rat bites)
  - All these may lead to infection, morbidity, and mortality.



Sensory neuropathy



Motor neuropathy



Autonomic neuropathy

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Types of Peripheral Neuropathy

Etiology	Sensory neuropathy	Autonomic neuropathy	Motor neuropathy
			
Characteristics	• Loss of protective sensation • No perception of shoes rubbing or temperature changes	• Reduce sweating results in dry cracked skin • Increased blood flow leads to a warm foot	• Dysfunction of the motor nerves that control the movement of the foot • Limited joint mobility may increase plantar pressure • Foot deformities develop • Hammer toes
Clinical presentations	• Unaware of a foot ulcer or lack of discomfort when a wound is being probed	• Dry skin with cracks and fissures • Bounding pulses • Dilated dorsal veins • Warm feet	• High medial longitudinal arch, leading to prominent metatarsal heads and pressure points over the plantar forefoot. • Clawed toes • Altered gait

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Tests for Peripheral Neuropathy

Semmes Weinstein Monofilament

- The 10 g monofilament (5.07) testing is recommended as a screening tool to determine the presence of protective sensation in persons with diabetes.



Places for Testing

- *Big toe, #3rd toe and 5th toe
- Plantar surface of the metatarsal heads (*1st, 3rd, and #5th metatarsal heads)
- The medial and lateral sides of the plantar aspect of the mid foot
- The plantar area of the heel
- The dorsal aspect of the mid foot.

*Recommended by International Working Group of Diabetic Foot
#Others are options.

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Vibration Test

128 Hz Turning Fork



Vibra-Tip



A pocket-sized, wipe-clean, battery operated disposable device for checking vibration sensation.

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Biothesiometer or Neuro-esthesiometer

These instruments (e.g., biothesiometer or neuro-esthesiometer) are too expensive for many centers.



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Other Tests for Peripheral Neuropathy

Tender Hammer

- Tender reflex for deep sensation.

Temperature Test

- Tip thermal for temperature test.

Cotton Test

- Touch of a cotton wool for touch test.

Pain Test

- Pain test with toothpick.

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Pocket Guideline of
Diabetic Foot
For Professionals

This is a Pocket Guideline for all the professionals in the countries where access to care for diabetic feet is needed.

Diabetic foot problems and amputation represent the most important long-term problems of diabetes medically, socially, and economically, and interest in the diabetic foot is therefore steadily increasing. The management of diabetic foot disease requires expertize of a wide range of specialists care on modern diabetic foot care and this well-illustrated Pocket Guideline provides comprehensive, update review of medical and surgical aspects of diabetic foot disease.

This Pocket Guideline is the practical approach which will make this new edition essential and useful reading tool for all the professionals aimed at managing the diabetic foot; it focuses on the key aspects of diagnosis, management, education, and prevention of diabetic foot diseases of patients with diabetes.

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