Diabetes : Foot Education

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OBJECTIVE

- Background
- Diabetes overview
- Diabetes complications
- Complete foot exam
- Patient education
- References
Background

U.S. residents-2010 (CDC, 2010)
- 65 years and above - 10.9 million/26.9 percent, had diabetes.
- 215,000 people <20 years had diabetes—type 1 or type 2.
- 1.9 million people ages 20 years or> were newly diagnosed with diabetes.
- 15-25% will develop ulcers on their feet.
- 20% of diabetics admitted to hospitals because of foot problems.
- Nearly $174 billion spent annually for direct and indirect medical costs (CDC, 2010).
- Average acute hospital cost in 1996 for a foot ulcer 9,910.
- 5 year survival rate ~50% for BKA (O’Brian, 1997).

DIAGNOSED       UNDIAGNOSED
7.0 million people       18.8 million people
Diabetes: Overview

- Diabetes means that blood glucose in the body (often called blood sugar) is too high.
- Glucose comes from the food we eat.
- Glucose is transported by the blood stream to all the cells in the body.
Overview Contd.

- Insulin helps the glucose from food to get into muscle and fat
If your body doesn't make enough insulin or your body is insulin resistant, glucose can't get into cells.

- Glucose stays in the bloodstream.
- Blood glucose levels get too high, causing diabetes.
# Common types of diabetes

<table>
<thead>
<tr>
<th></th>
<th>Type 1</th>
<th>Type 2</th>
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<tbody>
<tr>
<td><strong>Age of onset</strong></td>
<td>Usually &lt;40</td>
<td>Usually &gt;40</td>
</tr>
<tr>
<td><strong>Body weight</strong></td>
<td>Lean</td>
<td>Usually obese</td>
</tr>
<tr>
<td><strong>Prone to ketoacidosis</strong></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>Medication</strong></td>
<td>Insulin essential</td>
<td>Tablets and /or insulin</td>
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<tr>
<td><strong>Onset of symptoms</strong></td>
<td>Acute</td>
<td>Gradual (may be asymptomatic)</td>
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</table>
T2DM Evolves From 2 Primary Defects: Insulin Deficiency and Insulin Resistance

- Muscle, liver, and fat cells develop **insulin resistance**
- Glucose is absorbed into the blood, causing hyperglycemia
- Blood glucose levels remain high
- Pancreatic dysfunction leads to **insulin deficiency**

Diabetes: symptoms

- Frequent urination
- Excessive thirst
- Extreme hunger or constant eating
- Unexplained weight loss
- Presence of glucose in the urine
Symptoms Contd.

- Tiredness or fatigue
- Changes in vision
- Numbness or tingling in the extremities
- Slow-healing wounds or sores
- Abnormally high frequency of infection
Diabetes complications

Macrovascular
Microvascular
Neuropathy
Infections
Macrovascular Complications

Metabolic injury to large vessels

Heart
- Coronary artery disease
  - Coronary syndrome
  - MI
  - CHF

Brain
- Cerebrovascular disease
  - TIA
  - CVA
  - Cognitive impairment

Extremities
- Peripheral vascular disease
  - Ulceration
  - Gangrene
  - Amputation
Microvascular Complications

Hyperglycemia

Eye
- Retinopathy
- Cataract
- Glaucoma
- Blindness

Kidney
- Nephropathy
  - Microalbuminuria
  - Gross albuminuria
- Kidney failure
- Death and/or disability

Nerves
- Neuropathy
  - Peripheral
  - Autonomic
- Amputation
Foot screening: Physical examination

SHOES and SOCKS

Take ‘em off!

If you have diabetes
Have your doctor check your feet.
## Key components of foot exam

<table>
<thead>
<tr>
<th>Musculoskeletal</th>
<th>Dermatological</th>
<th>Neurological assessment</th>
<th>Vascular assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Deformity, e.g., claw toes, Charcot joint • Muscle wasting</td>
<td>• Skin status, color, thickness, dryness, cracking • Sweating • Infection, check b/w toes for fungal infection</td>
<td>• 10 –g monofilament + 1 of the following • Vibration using 128-Hz tuning fork • Pinprick sensation • Ankle reflexes • VPT</td>
<td>• Foot Pulses • ABI if indicated</td>
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</table>
Foot deformities and Foot Exam
## Foot Screening

<table>
<thead>
<tr>
<th>Essential Components</th>
<th>Optional Components</th>
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<tbody>
<tr>
<td>History-Ulcer, amputation</td>
<td>Sensory testing with a 10 gram monofilament</td>
</tr>
<tr>
<td>Foot inspection-Deformity, calluses, wounds, lesions</td>
<td>Confirmation testing with a 128Hz tuning fork if sensate to monofilament</td>
</tr>
<tr>
<td>Checking for pedal pulses or taking measurements for an ABI pressure</td>
<td></td>
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<tr>
<td>Teaching patient to do foot exam</td>
<td></td>
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<tr>
<td>Referral to specialist when appropriate</td>
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Foot risk assessment

- No LOPS, No PAD, No deformity - Follow up annually (generalist/specialist)
- LOPS → deformity - Follow up 3-6 months (generalist/specialist)
- PAD → LOPS - Follow-up 2-3 months by specialist
- Ulcer/amputation - 1 month by specialist
Pathways leading to foot ulceration

Contractures → Hammer toe → Improper weight-bearing → Ulcer → Infection → Osteomyelitis → Amputation

Neuroischemic ulcer

Patient Education: Foot inspection

- Check feet for cuts, sores, red spots, swelling, and infected toenails every day.
- Individuals may have serious foot problems, but feel no pain.
Nail care

- Toenails should be trimmed regularly
  - With clippers after bath/shower.
  - Straight across and smooth with an emery board or nail file.
  - Don't cut into the corners of the toenail.
  - If toenails are thick or yellowed, or nails curve and grow into the skin, have a podiatrist trim them.
Footwear selection

- Protect the feet
  - Athletic or walking shoes are good for daily wear. They support the feet and allow them to "breathe."
  - Avoid vinyl or plastic shoes, because they don't stretch or "breathe."
Diabetic Shoes
Caring for the feet

- Smooth corns and calluses gently.
  - Check with the doctor/podiatrist before using a pumice stone.
  - Use pumice stone after bathing or showering.
  - Don’t cut corns and calluses.
  - Don't use razor blades, corn plasters, or liquid corn and callus removers - they can damage the skin.
Caring for the feet

- Keep the skin soft and smooth
  - Rub a thin coat of skin lotion or cream.
  - Do not put lotion or cream between toes
Barriers to foot management

- vision impairment
- mobility impairment
- cognitive impairment
- lack of caregiving assistance

Tips to help overcome barriers

- Assess for the individual patient’s barriers in each of the areas of self-care
- Mutually consider suggestions to help overcome barriers (Prioritize and set mutual Goals)
Refer when appropriate

<table>
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<tr>
<th>Specialty</th>
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<tbody>
<tr>
<td>Podiatrist</td>
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<tr>
<td>Endocrinologist</td>
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<tr>
<td>Neurologist</td>
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<tr>
<td>Vascular Surgeon</td>
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<tr>
<td>Orthopedist</td>
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<tr>
<td>Wound Care Specialist</td>
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</table>
Prevention is better than cure!

- Feet can last a life time-
  ................Prevention and early identification of foot problems can prevent foot ulcers and amputation

Source: Footcare in Diabetes Workbook for Health Professionals. Australian Diabetes Educators Association
References

Questions

An acceptable fasting blood sugar range for patient is

- 70-140
- 140-200
- 50-90
- 60-190