

# D-fying the Laws of Gravity

## Strategies for Preventing Falls for People with Diabetes

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# Incidence rates of Falls (U.S.)

## Per person annually

- Community 0.2 - 0.8
- Hospital 0.6 - 2.9
- Long-term care 0.2 - 3.6  
(per bed)

- One of every three adults over 65 years fall in every year.
- One of every two adults over 80 years fall in every year

# People with Diabetes are at Risk for Falls

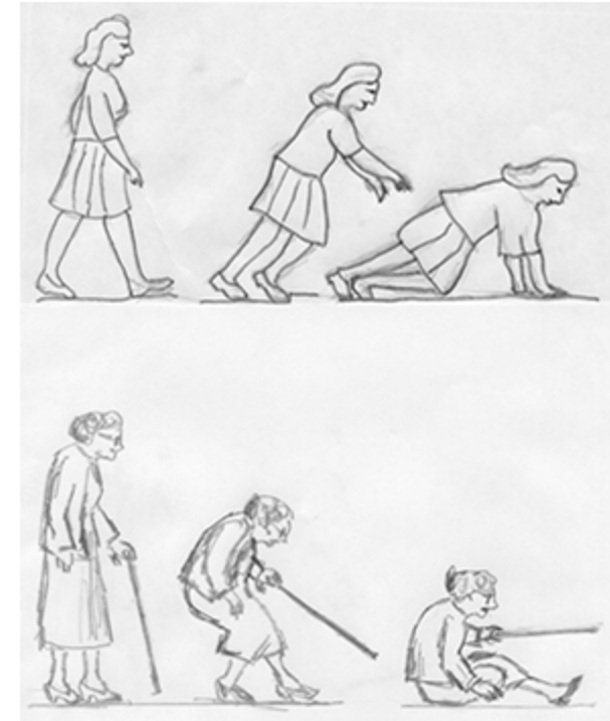
- **A1C below 7%** (indicating “tight” blood glucose control) are four times more likely to fall as those with an A1C above 7%
- **Metformin** can cause vitamin B12 deficiency, which can lead to postural instability (balance problems)
- **Peripheral neuropathy** can cause loss of sensation, numbness, and pain in feet and legs, resulting in slower gait & poor balance

# People with Diabetes are at Risk for Falls

- **Visual impairment** resulting from diabetic retinopathy, cataracts, glaucoma, or macular degeneration increase the risk of falling
- **Impaired kidney function** from diabetic nephropathy can lead to inadequate levels of vitamin D, which can reduce bone density and muscle strength
- **Wounds, skin breakdown, joint inflammation, or joint deformity** can lead to instability when walking

# Normal Changes of Gait

- Slower gait
- Decreased stride length & arm swing
- Forward flexion at head & torso
- Increased flexion at shoulders & knees
- Increased lateral sway



# Falls are multifactorial

## Intrinsic Factors

Medical  
conditions

Impaired  
vision and  
hearing

Age related  
changes

## Extrinsic Factors

Medications

Improper use  
of assistive  
devices

Environment

**FALLS**

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graph LR; MC[Medical conditions] --> FALLS; IVH[Impaired vision and hearing] --> FALLS; ARC[Age related changes] --> FALLS; M[Medications] --> FALLS; IUA[Improper use of assistive devices] --> FALLS; E[Environment] --> FALLS
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The diagram illustrates the multifactorial nature of falls. At the center is the word 'FALLS' in bold. Six arrows point towards it from two columns of factors. The left column, under the heading 'Intrinsic Factors', lists 'Medical conditions', 'Impaired vision and hearing', and 'Age related changes'. The right column, under the heading 'Extrinsic Factors', lists 'Medications', 'Improper use of assistive devices', and 'Environment'.

# Common Pathologies Associated With Falls

- Hypoglycemia
- Dizziness and disequilibrium
- Ophthalmologic diseases
- Foot problems
- Neurologic illness
  - Parkinson's & related disorders
  - Strokes
  - Peripheral neuropathy

# Medications and Falls

- Hypoglycemia from mismatched diabetes medicines with blood glucose excursions
- Sedative-hypnotics, especially long acting benzodiazepines
- SSRIs and TCAs both increase falls



# Evaluation of Falls: *History*

- Location & circumstances of Fall
- Associated symptoms
- Other falls or near falls
- Medications (including nonprescription) and alcohol
- Injury & ability to get up

# Evaluation of Falls: *Risk Factors for Injury*

- Medication review
- Osteoporosis risk assessment
- Anticoagulation: Usual benefits outweigh risks unless repeat or high risk faller

# Evaluation of Falls: *Physical Examination*

- Routine physical examination
  - Focus on cardiovascular, MS, neuro, feet
  - Supine and standing BP
- Vision and hearing evaluation
- Formal gait and balance assessment
  - Get up and Go Test
  - Functional Reach Test
  - Tinetti Gait & Balance Evaluation [Performance oriented mobility assessment]

# Evaluation of Falls: *Home Evaluation*

- Can be performed by nurse, OT, PT, others
- Stairs
- Lighting
- Clutter
- Bathroom
- Specific hazards: cords, throw rugs



Image: Used with permission from Microsoft.

# Avoiding Polypharmacy

## **Simple**

- Use least frequent dosing needed
- Tie to scheduled daily activities, meals, sleep/wake

## **Support**

- Educate
- Medication Flow sheet
- Use of one pharmacist
- Enlist family, friends as needed
- Medication organization equipment

## **Survey**

- Periodic review

# Exercise And Falls

- The Frailty and Injuries: Cooperative Studies of Intervention Techniques (FICSIT) meta-analysis
- Incorporated exercises study – seven studies
- Intensive strength, endurance training, or balance training
- Overall significant reduction of fall
- “Tai Chi” reduced the rate of falls during 4 months follow up in women at moderate risk of falls

# Prevention & Treatment

- Optimize blood glucose control
- Perform regular foot checks
- Schedule annual dilated eye exam
- Correct sensory impairments
- Treat injury, anxiety, depression, medical conditions
- Remove unnecessary medications
- Rehab, exercises, assistive devices
- Modify environment
- Limit alcohol use
- Evaluate for osteoporosis treatment
- Screen for falls: gait, balance, and ankle muscle strength assessment

