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Foot Examination for Older Adults

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Abstract

The foot changes with age. Foot disorders in older adults are associated with falls, lower limb ulcers, and pain. Physical examination of the feet as part of the routine assessment of older adults is imperative to detect foot problems. Foot pain and pathologies are common in older adults. Regular foot care is important to prevent these issues. However, some older adults may find it difficult to complete foot care, including cutting toenails. Regular foot examination can detect common foot problems, functional decline, and is recommended for preventing falls. We describe a technique for performing a focused examination of the feet for older adults. This review addresses current podiatric issues in older patient populations and describes a method for foot examination to address the needs of older adults that can be incorporated into patient assessments in any clinical setting.

Keywords

Falls; Frailty; Foot examination; Older adults; Podiatry

INTRODUCTION

"I Just Fell": Case Study

The 82-year-old patient with a past medical history of coronary artery disease, depression, and visual and hearing impairments made his way slowly into the clinic room. He described 2 falls that had occurred in the preceding 2 weeks. The treating clinician performed a comprehensive assessment addressing organ systems and domains that may be related to falls, including orthostatic hypotension, osteoarthritis, glaucoma, and polypharmacy. During

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history taking, the patient mentioned that his feet were painful with ambulation and when wearing shoes.

During the physical examination, it was noted that the patient had difficulty removing his shoes and socks. The patient reported that cutting his toenails had recently become a challenge. Inspection of his feet revealed thickened and dystrophic toenails that had grown long beyond the edges of the toes. The skin on the lower limbs and feet was dry and flaky. Foot hygiene was suboptimal. On examination of gait, he was noted to have a slow walking speed.

Foot Examination in Older Adults: Challenging But Essential

Performing a comprehensive and relevant physical examination, including the feet can be a challenge. Time constraints, coupled with the ever-increasing accessibility to and advancing technology of diagnostic tests may restrict a physician from completing a physical examination.[1] An observational study of the behaviors of interns and residents in the United States found that the mean time spent on physical examination during patient assessments was 5.29 minutes (range 3–20 minutes). This study also found that trainees examined for pedal edema in only 32% of cases and examined pedal pulses in 40% of cases.[2] Even in specialties where foot pathologies are common such as rheumatology, examination of the feet may be overlooked or deemed burdensome.[3] However, the American Association of Medical Colleges continues to emphasize the importance of the physical examination as a core component of clinical skills.[4] Moreover, the feet are a unique body part for which physical examination, including inspection and palpation, remains a critical diagnostic tool.

The importance of the foot examination is well recognized. In the early 20th century, Sir William Osler encouraged physicians to “Make a thorough inspection. … Always look at the feet,” and contemporary physicians such as Dr. Atul Gawande continue to advise “always examine the feet.”[5,6]

The foot changes as we age, increasing the importance of examining feet and providing foot care in older adults. This issue has been recognized at health policy level. The 1981 White House Conference on Aging recommended that “comprehensive foot care be provided for the elderly in a manner equal to care provided for other parts of the human body, to permit patients to remain ambulatory.”[7]

This review summarizes changes in the aging foot and podiatric problems that may be more common in older patients. We then describe a method for physical examination with a specific focus on the needs of older patients.

Pathophysiology: Changes to the Aging Foot

Loss of elastin and collagen fibers contribute to changes in the aging foot and can cause hard, dry skin on the plantar surface. As a result, hyperkeratosis is common in older adults. Age-related changes in foot muscle, joints, soft tissue, and posture also occur and may impair mobility.[8] There is often a change in the size and shape of the foot that may affect the fit of shoes.

Foot pain is common in older adults. A 2011 meta-analysis of 31 studies (including 75,505 participants) found a prevalence of foot pain in 24% (95% confidence interval [CI] 22%–25%) of adults ages 45 years and older.[9]

Older adults are also more likely to have conditions associated with foot pathology such as diabetes, peripheral arterial disease, and neuropathy.[10,11] Osteoarthritis may result in pain and bony deformities of the foot.[12] Diuretic therapy increases the risk of gout, which can result in foot pain and restricted mobility.[13]

Clinical Presentation

Adequate foot care is important for maintenance of health. Undetected and untreated foot ulcers may result in amputation or death.[14] There is a well-described relationship between foot disorders and falls and gait disorders.[15,16] A 2018 meta-analysis of 15 studies found that older adults who have falls are more likely to experience foot pain and bony deformities.[15] Patients with foot problems are more likely to have impaired functional status and mobility.[17] Furthermore, suboptimal foot care can lead to declining mobility and physical activity and may portend future difficulties with managing one's own health.[18] This can in turn contribute to weight gain, joint pain, falls, and reduced cardiovascular function and potentially result in increased risk of frailty, impaired functional status, and poorer performance in balance assessments.[19]

Cutting toenails requires the ability to bend over, adequate visual acuity, and fine motor skills. Difficulty in performing foot care is prevalent among older adults. A study of 100 hospitalized older adults (age range 64–97 years) in the United Kingdom found 89% of participants could not cut their own toenails and only 1 participant had no issues. A total of 12% of participants had dirt visible between their toes.[20] Observational studies of community-dwelling older adults in the United Kingdom and Italy found between 30% −77% have difficulty cutting their own toenails.[21,22]

In a 2019 cross-sectional study of 50 patients at a Veterans Affairs (VA) Geriatric Medicine clinic, we found that 29% could trim their own toenails, and 18% had long toenails.[23]

Toenail pathologies are also common. A 2004 study of 784 participants ages 65 and older and living in the United States found a prevalence of nail disorders of almost 75%. The study also found that 5.2% of nondiabetic participants had altered lower extremity sensation.[24]

There are many potential barriers to maintaining adequate foot care, and many patients with suboptimal foot health may not be visiting a podiatrist (Table 1).[25]

The mean rate of growth of toenails is 1–2 mm per month and detection of long toenails may suggest a decreased ability to complete personal care of the lower extremities.[26,27] Maintaining basic foot hygiene may be difficult for patients with declining cognition, function, and changing care needs.[26,28] An older person who requires assistance with foot care relies on the availability of a caregiver or access to appropriate foot care services.[25]

The foot becomes broader with age, and older adults may need to adjust the size and type of footwear they wear.[29] Ill-fitting footwear is prevalent in older adults (34%−78%) and is associated with hyperkeratosis, foot pain, and deformities, as well as, amputation in patients with diabetes.[30–32,12] Falls are more likely to occur while wearing slippers, socks, or walking while barefoot.[33]

Assessment and Diagnosis

Foot problems may be underrecognized by patients. A 1998 survey of 128 older adults (ages ≥65) found that although many participants self-reported issues with their feet (71%), far fewer recognized these issues as a potential medical problem (26%) and only 39% had sought medical attention.[34]

The Centers for Disease Control and Prevention (CDC) Stopping Elderly Accidents, Deaths & Injuries (STEADI) initiative recommends an annual foot examination as part of a falls prevention assessment.[35] In parallel, the joint American Geriatrics Society (AGS) and British Geriatrics Society (BGS) 2010 falls prevention guideline recommends performing a foot examination and reviewing patients' footwear when screening for and assessing after a fall.[16] A 2001 review authored by a podiatrist recommended that every older adult's feet should be assessed at an initial visit with a medical physician and can aid in improving foot health in older adults by examining the feet and then referring the patient to a podiatrist, if appropriate.[36] Additionally, a recommendation from podiatrists is that older adults and those with multiple chronic conditions should undergo regular assessment of their foot health and knowledge of and ability to perform foot care.[37]

However, it can be challenging to complete all components of a comprehensive assessment during a single consultation. Addressing the "Geriatric 5Ms" domains of Mobility, Medications, Mind, Multicomplexity, and Matters Most can be a useful model around which to structure assessment of an older person.[38] The John A. Hartford Foundation and Institute for Healthcare Improvement Age-Friendly Health Systems Initiative also identifies "Mobility" as a domain in the their "4Ms" framework. The concise foot examination described here should be included under the "Mobility" domain. Miller et al previously described a "3-minute diabetic foot exam" to streamline the process for detecting diabetic foot pathology.[39] Here we describe a method for foot examination that focuses on issues relevant to foot care for older adults.

METHODS

Foot Examination for Older Adults

This examination includes a focused history and physical examination (Table 2).[40] It does not require any specialized equipment and can be incorporated into a patient evaluation in any clinical setting. Following completion of the physical examination, if feasible and appropriate, there is an opportunity for brief education on foot care for the patient or their caregiver (Table 3).[41] The history and inspection components of this examination could be performed using telehealth.[42]

RESULTS

"No Further Falls": Case Study Continued

The interprofessional team devised a falls prevention plan for the patient. A referral to physical therapy was made. A life alert device was ordered and a medication review was performed. The plan also included referral to a podiatrist. His toenails were cut and debrided and an emollient was prescribed for treatment of xerotic skin. Education on foot care and appropriate footwear (extra depth and extra width) was provided. At his next clinic visit 3 months later, the patient reported that he had not fallen since.

Treatment

A referral to podiatry or other services may be indicated if there are abnormal findings on examination (Table 4).[43]

Urgent referral to podiatry is indicated if ulcers are detected or if there is concern for skin, soft tissue, bone, or widespread nail infection. Assessment by a podiatrist can assist in confirming the correct diagnosis and managing many foot and ankle pathologies.[44]

Detection of foot problems, referral to podiatry, and provision of appropriate footwear have been shown to reduce the incidence of falls.[45,46] A 2019 meta-analysis of community and older adults dwelling in nursing homes (n = 6502) investigated the effect of multicomponent podiatry interventions on falls incidence. The study found a significant reduction in rate of falls (rate ratio: 0.73 [95% CI 0.54–0.98]).[47]

In the United States, certain podiatric services are covered by Medicare (Part B). If the required service is covered, 80% will be paid by Medicare and 20% by the patient. Patients with higher-risk conditions such as diabetes and peripheral arterial disease are eligible for a greater range of podiatry services, including routine foot care. Therapeutic shoes may also be covered for patient with diabetes. Treatment for fungal nail disorders is covered if there is clinical evidence of infection noted during physical examination and associated pain, secondary infection, or mobility impairment.[48]

Increased access to routine foot care and therapeutic shoes under Medicare for older patients may aid in improving overall foot health in this population and potentially reduce foot pain and mobility impairments. This would also be in keeping with the White House Conference on Aging recommendations on foot care.[7]

The findings on examination may also prompt a referral to orthopedic surgery for further assessment, particularly if foot and ankle bone and joint issues are identified. A previous study of the prevalence of foot pathology in older adults (n = 784) in the United States found that 15% had ankle pain and 40% had tenderness on foot examination. Furthermore, 60% had a lesser toe deformity and 37% were found to have a hallux valgus.[24] Patients with lower extremity bone and joint disorders may also benefit from referral to physiatry, orthotics, or physical therapy. Occupational therapy assessment can assist in providing adaptive devices for foot care such as sock donning devices and long shoe horns.

Prognosis

Maintaining optimal foot health results in overall improved health and quality of life and reduces complications of chronic conditions such as diabetes and peripheral arterial disease.[49,50]

CONCLUSIONS

The foot examination is an important component of any comprehensive assessment of an older adult and as part of a falls assessment.

This focused foot examination technique for older and frail adults can be easily performed in any inpatient, outpatient, or long-term care setting. Suboptimal foot care and long toenails may be an indicator of deteriorating functional status or a caregiver's inability to complete all aspects of care.[26] Completion of this focused foot examination can aid in detection of an older adult with declining function or emerging frailty and can prompt interventions to improve foot care and potentially prevent adverse outcomes.

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CLINICAL SIGNIFICANCE

- Foot disorders in older adults are associated with falls and reduced mobility.
- Suboptimal foot hygiene may be an indicator of functional decline.
- Foot examination is an important component of the assessment of an older adult.
- This review describes a concise, focused method for foot examination.

Table 1

Barriers to Performing Foot Care

Diagnosis	Effect on ability to perform foot care
Arthritis: spinal, hip, knee	Cannot reach feet
Pain	
Obesity	
Arthritis of small joints of hands	Impaired dexterity
Neurological conditions (eg, stroke)	Impaired fine motor skills
Dementia or cognitive impairment	May be unable to complete/remember complex tasks
Visual impairment	Cannot see toenails
Neuropathy	May not sense development of foot pathology such as ulcers
Thickened toenails/onychomycosis	Cannot cut through toenails
Peripheral arterial disease	Foot pain
Orthostatic hypotension/Vertigo	Difficulty bending down

Table 2

Foot Examination for Older Adults Parts 1 and 2: History and Examination

Part 1: History

Ask the patient if they have a history of:

- Falls or fear of falling
- Visual impairment
- Arthritis
- Diabetes
- Peripheral arterial or venous disease
- Smoking
- Obesity
- Foot wounds or skin problems

Ask the patient the following questions:

- Do you have foot or leg pain?
- Do you experience tingling, burning, or numbness in your feet or legs?
- Do you ever go barefoot?
- Do you need any help washing, drying, or inspecting your feet?
- How do you get your toenails cut?
- Do you see a podiatrist?

Part 2: Examination

Footwear

- Can they remove and replace shoes and socks without assistance?[39]
- What type of shoes are they wearing (eg, slip on, laces, Velcro)?
- How worn is the footwear? Is it appropriate for the season?
- Are they wearing socks?

Inspect skin for the following:

- Hygiene (particularly dirt and moisture between toes)
- Dryness
- Hyperkeratosis (calluses and corns)
- Fissures
- Ulcers

Inspect nails for the following:

- Length
- Thickening
- Ingrown/broken
- Fungal infection

Examine the foot for the following:

- Bony deformity
- Hallux valgus

- Hammer/overlapping toes
- Foot pain/tenderness
- Reduced range of motion
- Pes planus (flat foot)

Complete a vascular and neurological assessment:

- Is temperature equal in both feet?
- Is there an absence or reduction of hair growth?
- Is there edema present?
- Check pedal pulses
- Is light touch sensation intact (Ipswich touch test)?[40,*]

* The Ipswich Touch Test is a validated test of light touch sensation. It is performed on bare feet by assessing light touch sensation on the tips of the hallux, third and fifth toes bilaterally using the index finger. If sensation is altered at 2 or more locations examined, the test is considered abnormal.

Table 3

Foot Examination for Older Adults Part 3: Patient Education[41]

How to care for your feet
Avoid smoking.
Avoid temperature extremes on your feet (too hot or cold).
Avoid going barefoot.
Wash your feet daily and dry thoroughly, especially between your toes.
Inspect your feet every day for cuts and blisters.
If you cut your own toenails, cut them straight across.
Check inside and outside your shoes for foreign objects.
Wear well-fitting shoes with a flat or low, wide heel, and slip-resistant soles.[42] Avoid slip on shoes and flip flops and choose shoes with laces or Velcro.
Replace your shoes annually.
If you notice a problem with your feet, contact your doctor.

Table 4

Common Foot Problems Detected on Examination and Recommended Treatments and Referral Pathways[42]

Foot Disorder	Therapeutic Interventions/Indicated Referrals	Urgency of Treatment/Referral
Nail disorders		
Ingrown toenails	Shoes with wider toe box	Routine unless associated skin breakdown or ulceration
	Podiatry referral for avulsion or matricectomy	
Onychomycosis/fungal nail infection	Prolonged topical or oral antifungal therapy	Routine unless widespread infection
	Podiatry referral	
Skin disorders		
Pigmented lesion concerning for neoplasm	Dermatology referral	Urgent
Ulcer	Podiatry referral	Urgent
Xerosis	Topical emollient	Routine
	Urea cream (10%, 20%, or 40%)	
	Ammonium lactate cream (12%)	
	Podiatry referral	
Hyperkeratosis (including callusesand corns)	Shoe inserts if related to fat pad atrophy	Routine
	Orthoses	
	Podiatry referral for debridement	
Bone/joint disorders		
Foot pain or arthritis	Orthotics	Routine
	Prescription shoes	
	Corticosteroid injections	
	Exercise/stretching therapies	
	Podiatry or orthopedic surgery referral	
	Physiatry referral	
	Physical therapy referral	
Hallux valgus	Shoes with wider toe box	Routine
	Orthoses	
	Referral to podiatry or orthopedic surgery if surgical correction considered	
Hallux limitus/rigidus	Foot radiographs	Routine
	Referral to podiatry or orthopedic surgery if surgical correction considered	

Foot Disorder	Therapeutic Interventions/Indicated Referrals	Urgency of Treatment/Referral
Hammertoes	Shoes with wider, higher toe box	Routine unless associated wounds or pressure injury
	Prescription shoes	
	Orthoses	
	Podiatry or orthopedic surgery referral if debridement or surgical correction considered	
Pes cavus/planus	Orthoses	Routine
	Podiatry referral	
Plantar fasciitis/heel pain	Stretching exercises	Routine
	Physical therapy	
	Orthoses	
	Steroid injection	
	Physiatry referral	
	Podiatry or orthopedic surgery referral	
Neurovascular disorders		
Clinical evidence of peripheral arterial disease	Ankle brachial indices	Urgent
	Podiatry referral	
	Vascular surgery referral	
Impaired light touch sensation	Neuropathy workup	Urgent
	Podiatry referral	