



# 발의 퇴행과 노화

박 시 복

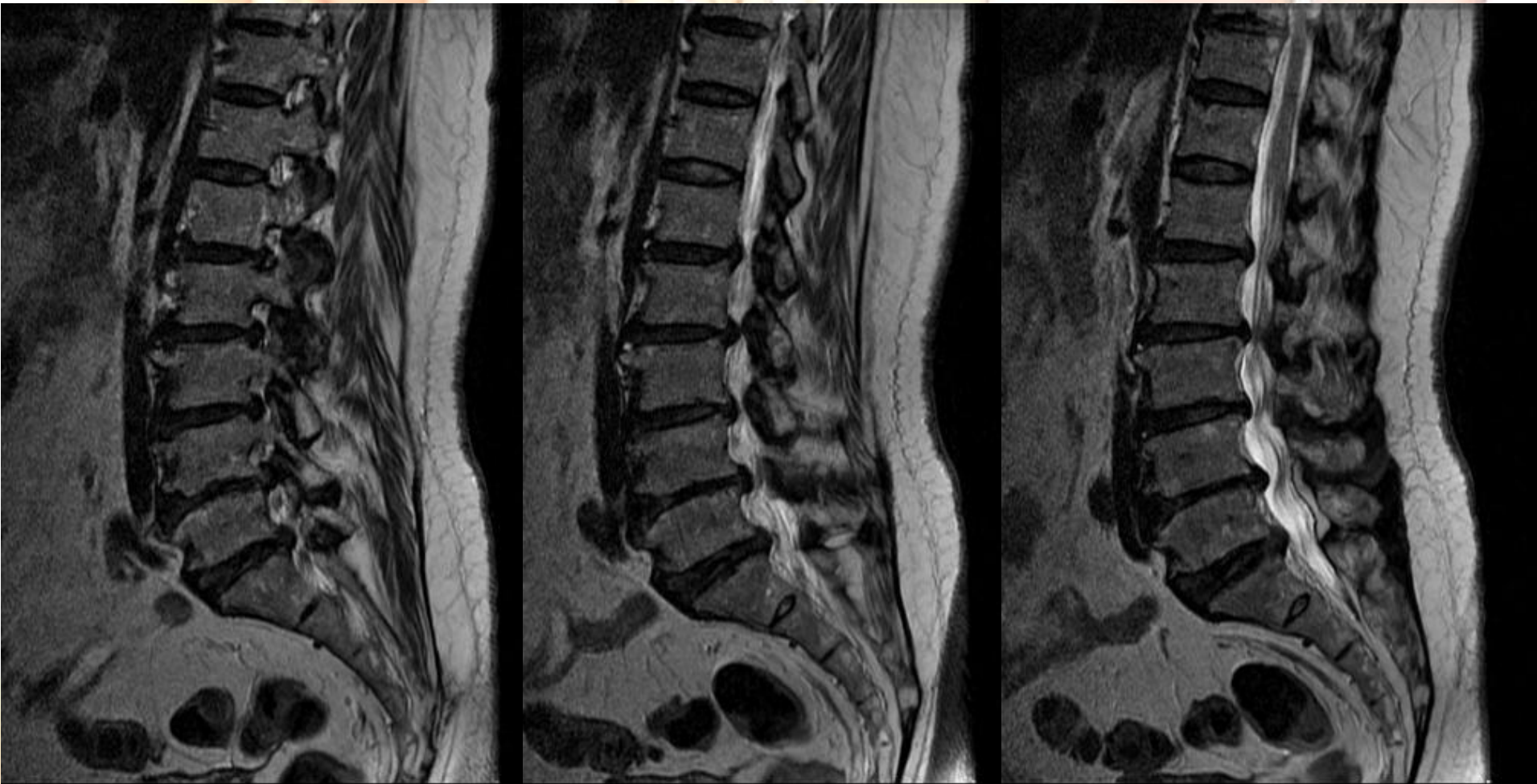
한양대학교 류마티스병원  
관절재활의학과 발클리닉



**^ ^ ^ F/70 01899331**  
**spinal stenosis 2012–NOV–09**



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**spinal stenosis 2012-NOV-09**

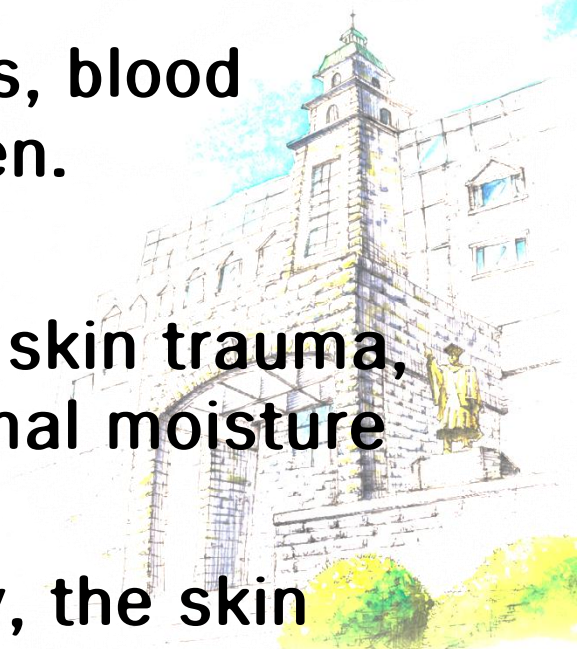






# Age-related alterations in the skin

- include thinning of the dermal layer,
- decrease in the surface contact between the dermal and epidermal layers,
- as well as decreases in dermal cells, blood vessels, nerve endings, and collagen.
- These changes increase the risk of skin trauma, altered sensation, and transepidermal moisture loss.
- As the sweat and oil glands atrophy, the skin becomes dry (xerosis), and keratin dysfunction causes hypertrophy and thickening of the skin.

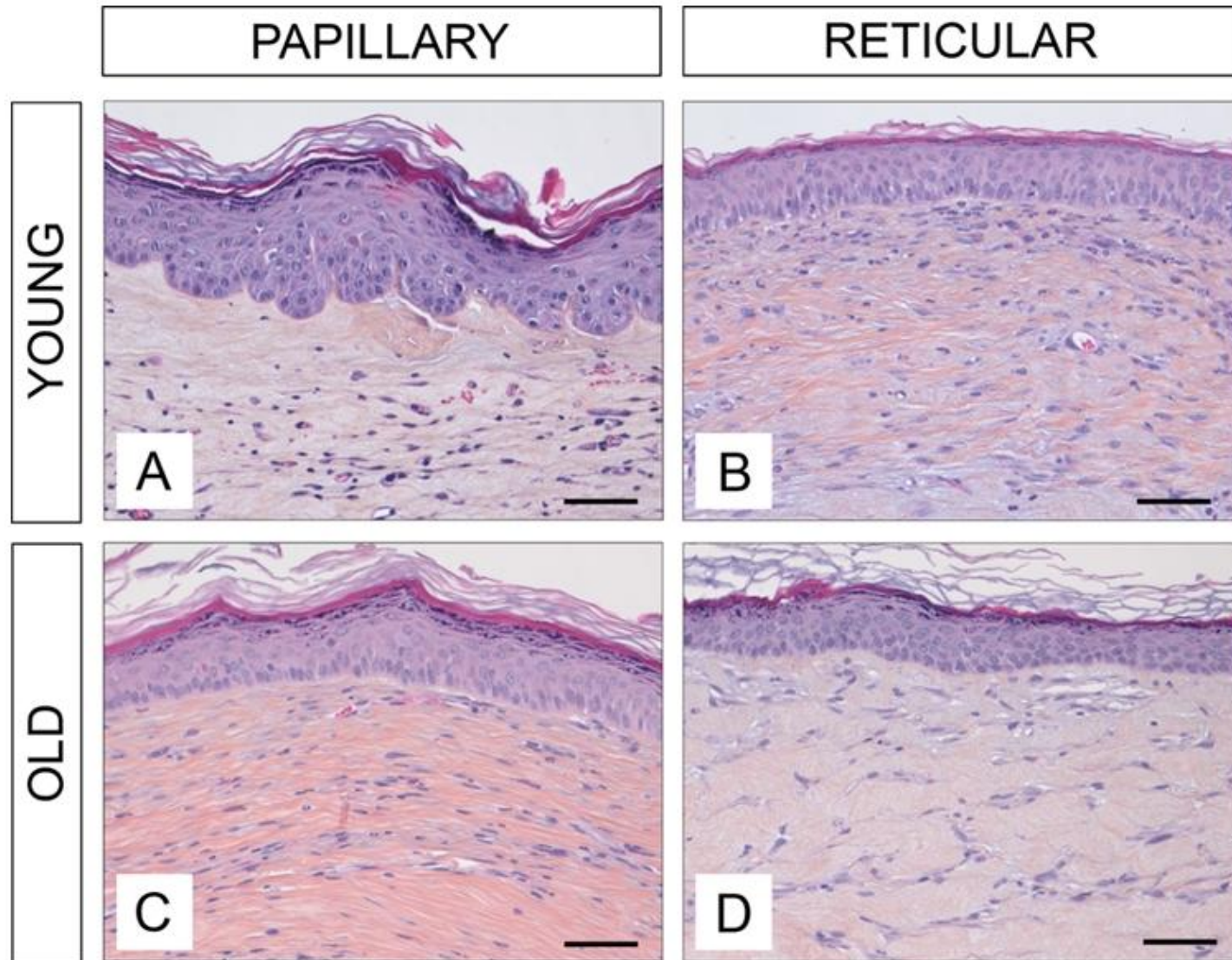




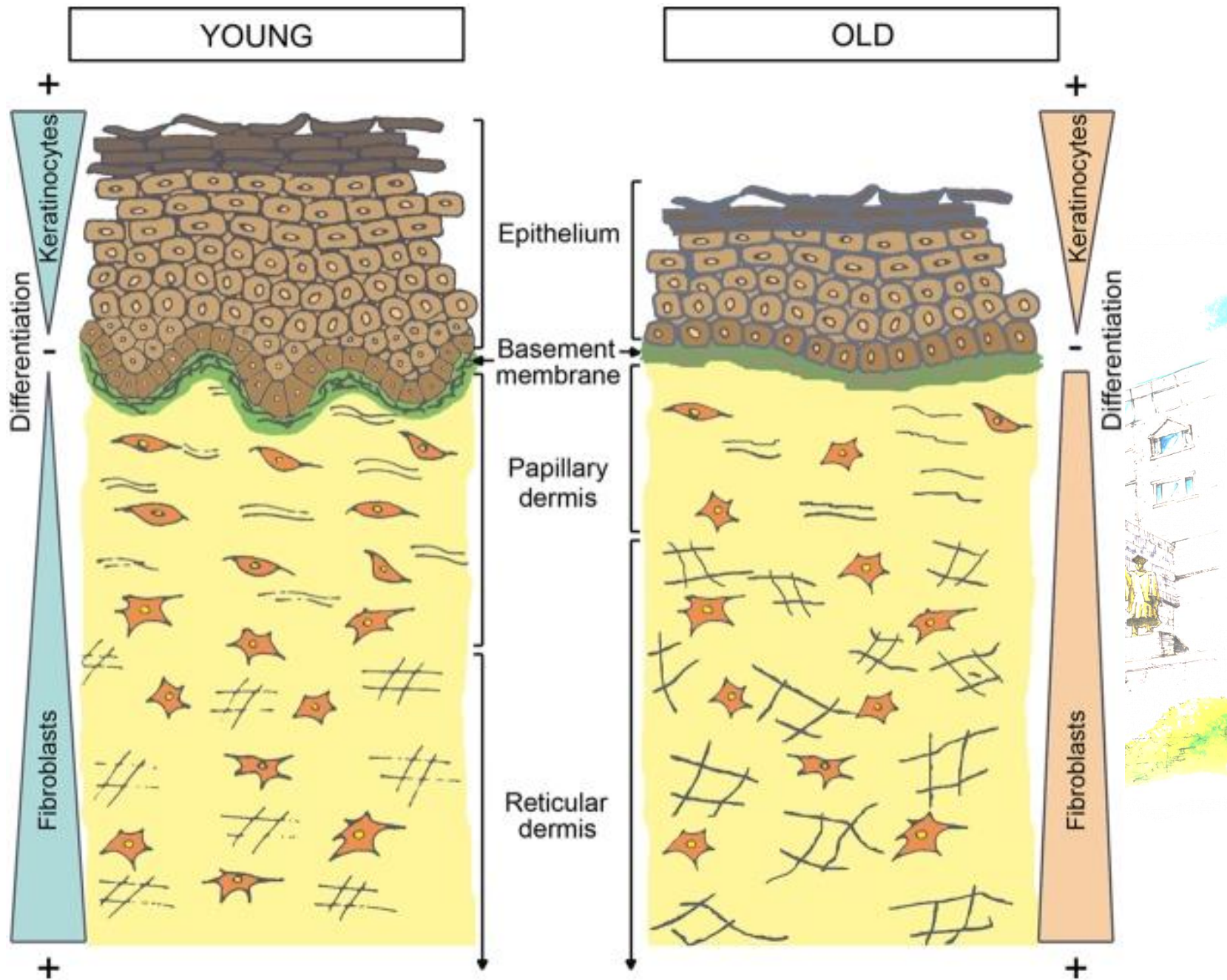
# Aging alters functionally human dermal papillary fibroblasts but not reticular fibroblasts: a new view of skin morphogenesis and aging.

[PLoS One](#). 2008;3(12):e4066. Epub 2008 Dec 30.

[Mine S](#), [Fortunel NO](#), [Pageon H](#), [Asselineau D](#).



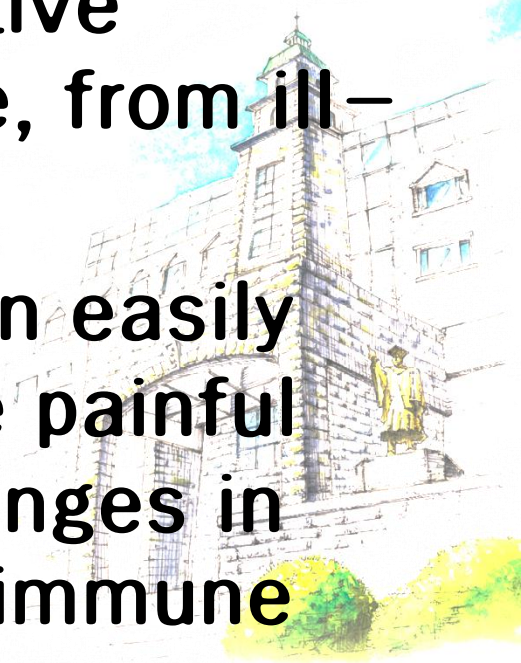






# Age-related alterations in the skin

- Hyperkeratotic lesions, also known as corns and calluses, are more prevalent when skin is exposed to repetitive mechanical stress, for example, from ill-fitting footwear.
- Dry, scaly, or hardened skin can easily crack, leaving fissures that are painful and difficult to heal. These changes in skin integrity affect the skin's immune abilities, setting the stage for increased susceptibility to fungal infections



# Age related skin changes



**A Study on the Alterations in Skin Viscoelasticity before and after an Intradermal Administration of Growth Factor.**

[J Cutan Aesthet Surg.](#) 2011 May;4(2):98–104. [Ono I.](#)







# The effect of aging on the hardness of foot sole skin: a preliminary study.

[Foot \(Edinb\).](#) 2012 Jun;22(2):95–9. Epub 2012 Mar 3.

[Periyasamy R](#), [Anand S](#), [Ammini AC](#).

Center for Biomedical Engineering, Indian Institute of Technology Delhi, New Delhi, India.

**METHODS:** Twenty–six healthy volunteers without foot problems, aged from 26 to 65 years, were examined using shore meter. The hardness of the foot sole under the big toe (area 8), 1st metatarsal head (area 5), 3rd metatarsal head (area 6), 5th metatarsal head (area 7), mid foot (area 3, 4) and hind foot (area 1, 2) were measured.

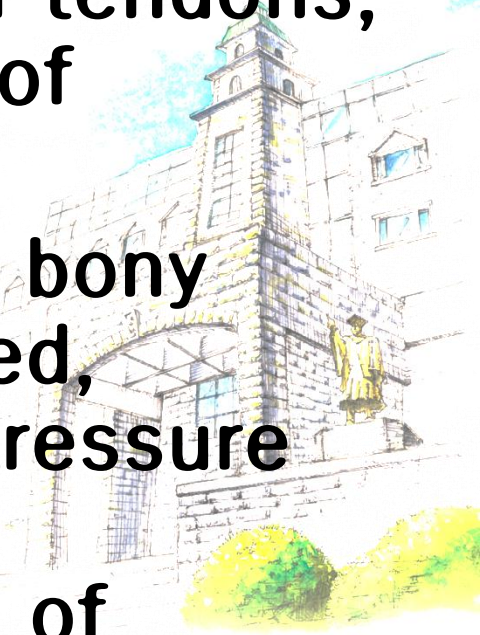
**RESULTS:** From the result we observe statistical significant ( $p < 0.05$ ;  $p < 0.01$ ;  $p < 0.005$ ) differences in hardness between age groups in hind foot, metatarsal heads (1st, 3rd & 5th) and big toe. Strong positive correlations between age and hardness of the foot sole were found at the big toe ( $r = 0.57$ ;  $p < 0.005$ ), 1st metatarsal head ( $r = 0.567$ ;  $p < 0.00001$ ), 3rd metatarsal head ( $r = 0.565$ ;  $p < 0.00001$ ), 5th metatarsal head ( $r = 0.55$ ;  $p < 0.00001$ ), and heel ( $r = 0.59$ ;  $p < 0.0001$ ).

**CONCLUSION:** The loss of compliance in the foot sole may be one of the factors responsible for the higher incidence of foot problems in aged people. Routine foot examination and appropriate therapeutic intervention including the use of foot orthoses and optimal hardness of foot wear insole may help to prevent the serious foot injuries.



# Age-related alterations in the skin

- No less affected is the structure of the foot, in which aging changes cause a laxity of ligaments, tightening of tendons, settling of arches, and thinning of subcutaneous padding.
- In turn, the foot becomes wider, bony prominences become less padded, hammertoes can develop, and pressure on these points can cause skin thickening and the development of painful corns and calluses.





# Age-related alterations

- Chronic disorders such as vascular insufficiency, diabetes, and neuropathy further worsen pre-existing aging changes. In the presence of foot problems, these disorders can lead to devastating consequences including foot amputations.
- Arthritis or stroke can stiffen toes, reducing toe movement and airflow between them, thus setting up an environment conducive to bacterial and fungal growth.





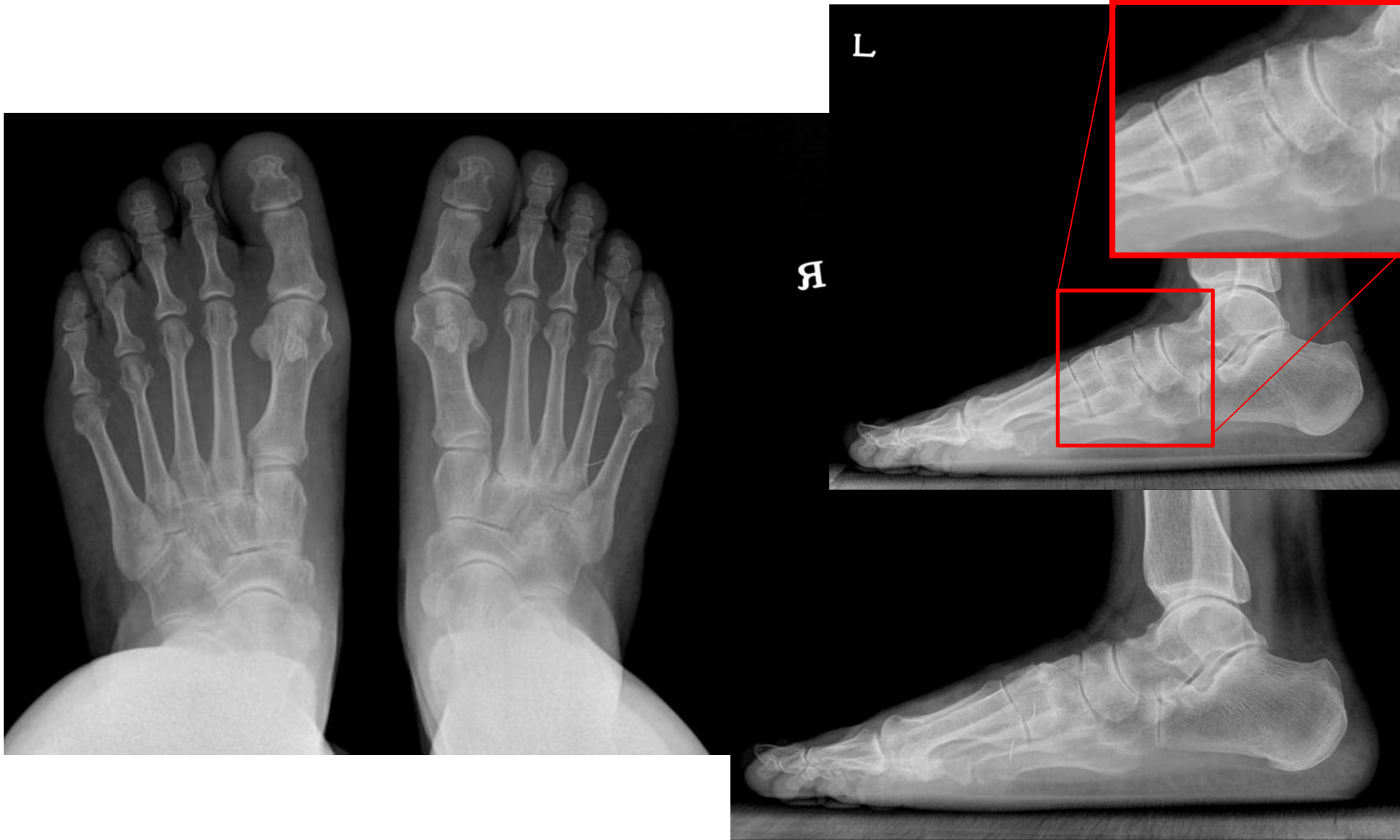
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2012-NOV-09



66/F 01825760 pain of  
foot dorsum 2012-JUN-29

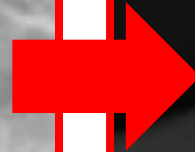


58/F 01825760  
metatarsalgia 2004-JUN-07



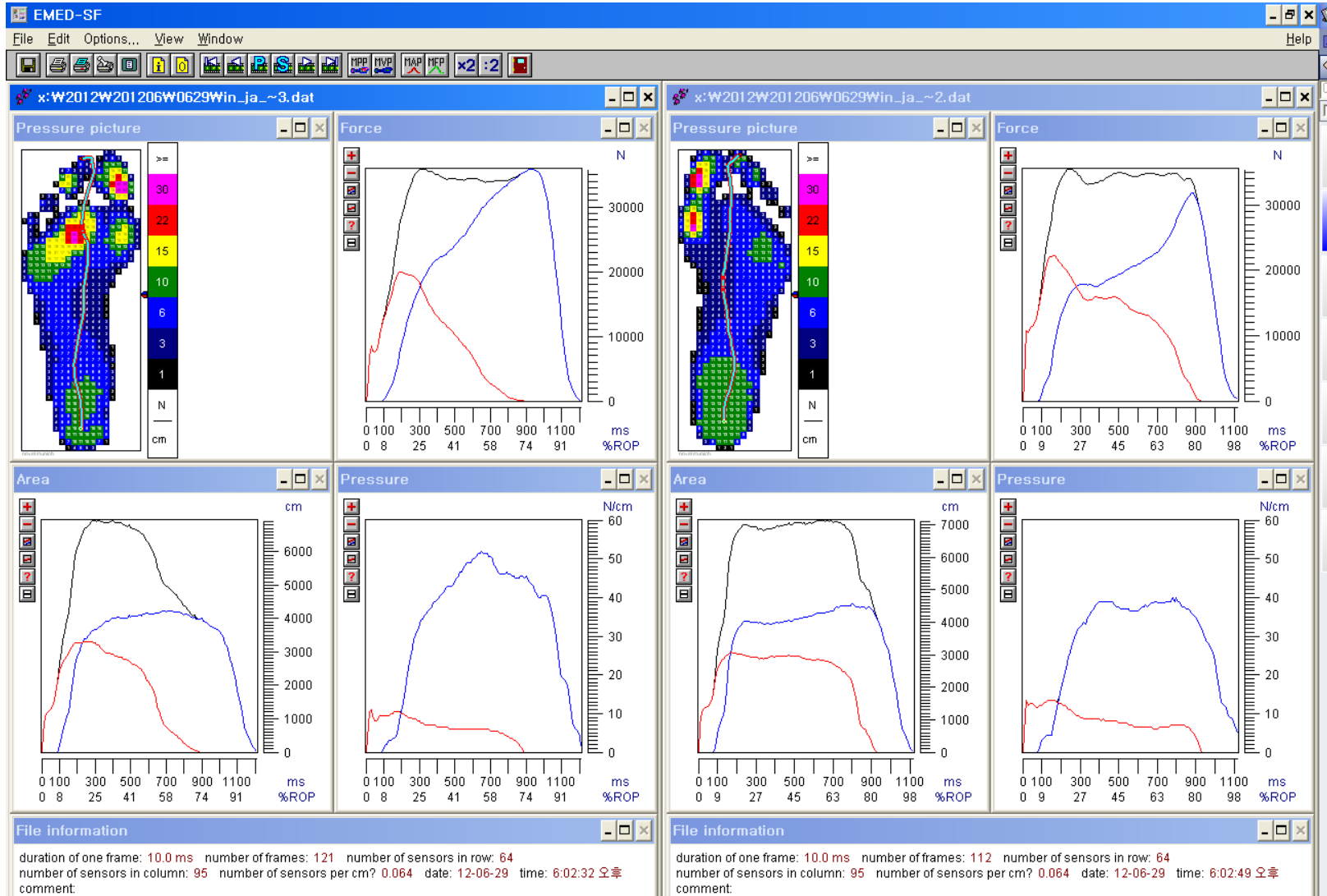


ㄱㅇㅈ 58 → 66/F 01825760  
2004-JUN-07 → 2012-JUN-29



- 8년동안 무슨 일이 있었는가?
  - 외상 X, 체중증가 X

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2012-NOV-09





# Managing common foot problems in older adults.

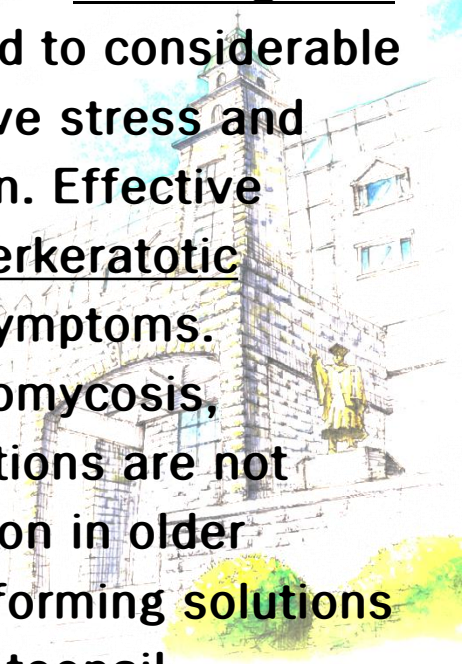
[J Gerontol Nurs.](#) 2010 Oct;36(10):9–14. Epub 2010 Sep 22.

[Anderson J](#), [White KG](#), [Kelechi TJ](#).

Medical University of South Carolina, College of Nursing, Charlestown, SC, USA.

Foot problems related to aging or disease processes such as nail fungus or arthritis often go unrecognized and untreated, and can lead to considerable dysfunction. Multiple contributing factors, such as repetitive stress and structural changes in the foot, further compromise function. Effective topical management approaches for xerosis, fissures, hyperkeratotic lesions, and fungal infections can lessen the severity of symptoms.

However, when recalcitrant, such as long-standing onychomycosis, prescription medications may be warranted. These medications are not without serious side effects and should be used with caution in older adults. New methods that pose fewer risks, such as film-forming solutions and photodynamic therapy, are emerging to treat skin and toenail infections. Several nonpharmacological and pharmacological treatment approaches are presented in this article.







# Predictors and persistence of foot problems in women aged 70 years and over: a prospective study.

[Maturitas](#). 2011 Jan;68(1):83–7. Epub 2010 Sep 29. [Menz HB](#), [Barr EL](#), [Brown WJ](#).

Musculoskeletal Research Centre, Faculty of Health Sciences, La Trobe University, Bundoora, Victoria 3086, Australia.

**OBJECTIVE:** To examine the prevalence and correlates of foot problems in older women over a 6–year period.

**STUDY DESIGN:** Women aged 70–75 years who participated in the Australian Longitudinal Study on Women's Health completed a postal questionnaire incorporating questions relating to demographics, major medical conditions and health status in 1999 (n=8059) and 2005 (n=4745).

**MAIN OUTCOME MEASURES:** Self–reported foot problems at baseline and at 6 years follow–up, major medical conditions, body mass index (BMI).

**RESULTS:** At baseline, 26% of the sample reported foot problems. At follow–up, 37% remained free of foot problems, 36% had developed a new foot problem, 13% experienced resolution of their foot problems and 14% experienced persistent foot problems. Increase in BMI was significantly associated with the development of new foot problems and the persistence of existing foot problems.

**CONCLUSIONS:** Foot problems are common in older women and are associated with increased BMI. Maintaining a healthy bodyweight may therefore play a role in the prevention of foot disorders in older women.



# Characteristics of participants (n = 4745) with and without foot problems at baseline and follow-up

**Table 3**

Characteristics of participants (n = 4745) with and without foot problems at baseline and follow-up.

	No foot problem at baseline (n = 3479)		Foot problem at baseline (n = 1266)	
	No foot problem at follow-up (n = 1756)	New foot problem at follow-up (n = 1723)	Resolved foot problem at follow-up (n = 616)	Persistent foot problem at follow-up (n = 650)
Age (years) – mean (SD)	74.9 (1.4)	74.8 (1.4)	74.8 (1.4)	74.9 (1.4)
Height (cm) – mean (SD)	160.6 (6.5)	160.8 (6.6)	160.8 (6.4)	160.9 (6.9)
Weight (kg) – mean (SD)	64.5 (11.3)	64.3 (11.1)	67.4 (12.0)	68.0 (12.7)
Body mass index (kg/m <sup>2</sup> ) – mean (SD)	25.0 (4.3)	24.9 (4.2)	26.1 (4.6)	26.4 (5.0)
Obese (BMI ≥ 30) – n (%)	215 (12.2)	183 (10.6)	109 (17.9)	131 (20.2)
% Increase in BMI – mean (SD)	1.7 (24.5)	6.5 (27.3)**	–3.3 (24.1)	0.9 (25.6)**
Major medical conditions – n (%)				
Arthritis	701 (39.9)	630 (36.6)*	325 (52.8)	378 (58.2)*
Diabetes	131 (7.5)	94 (5.5)*	60 (9.7)	58 (8.9)
Heart disease	185 (10.5)	211 (12.2)	108 (17.5)	94 (14.5)
Hypertension	573 (32.6)	569 (33.0)	246 (39.9)	255 (39.2)
Stroke	32 (1.8)	43 (2.5)	14 (2.3)	19 (2.9)
Osteoporosis	181 (10.3)	209 (12.1)	115 (18.7)	125 (19.2)
Depression	92 (5.2)	103 (6.0)	47 (7.6)	44 (6.8)
Anxiety/nervous disorder	87 (5.0)	89 (5.2)	46 (7.5)	32 (4.9)

Notes: Independent *t*-tests performed for continuous variables and Pearson's  $\chi^2$  tests performed for categorical variables. All variables measured at baseline (1999) with the exception of % increase in BMI, which was calculated from 1999 and 2005 data.

\* Significant difference between groups,  $p < 0.05$ .

\*\* Significant difference between groups,  $p < 0.01$ .



# A survey of foot problems in community–dwelling older Greek Australians.

[J Foot Ankle Res.](#) 2011 Oct 20;4(1):23.

[Kaoulla P](#), [Frescos N](#), [Menz HB](#).

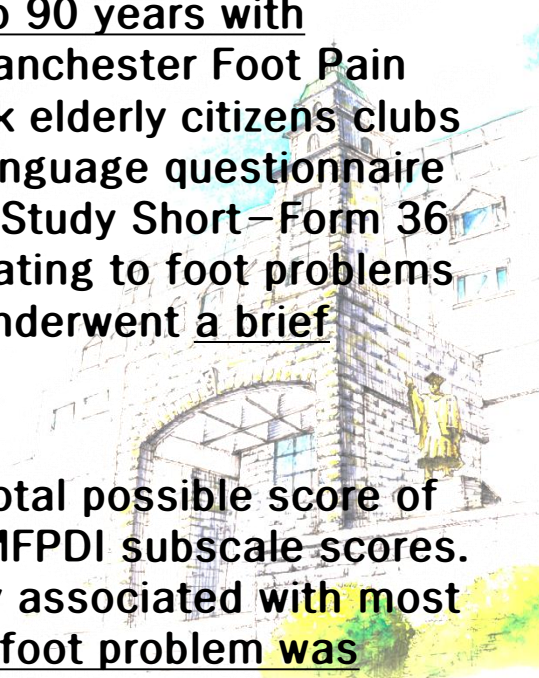
Musculoskeletal Research Centre, Faculty of Health Sciences, La Trobe University, Bundoora, Victoria, Australia.

## **METHODS:**

One hundred and four community–dwelling people aged 64 to 90 years with disabling foot pain (according to the case definition of the Manchester Foot Pain and Disability Index, or MFPDI) were recruited from four Greek elderly citizens clubs in Melbourne, Australia. All participants completed a Greek language questionnaire consisting of general medical history, the Medical Outcomes Study Short–Form 36 (SF–36) questionnaire, the MFPDI, and specific questions relating to foot problems and podiatry service utilisation. In addition, all participants underwent a brief clinical foot assessment.

## **RESULTS:**

The MFPDI score ranged from 1 to 30 (median 14), out of a total possible score of 34. Women had significantly higher total MFPDI scores and MFPDI subscale scores. The MFPDI total score and subscale scores were significantly associated with most of the SF–36 subscale scores. The most commonly reported foot problem was difficulty finding comfortable shoes (38%), and the most commonly observed foot problem was the presence of hyperkeratotic lesions (29%). Only 13% of participants were currently receiving podiatry treatment, and 40% stated that they required more help looking after their feet.







# Geriatric foot problems and related factors in two provinces of Korea

[J Korean Acad Nurs.](#) 2010 Apr;40(2):161–71. [Kim S](#), [Ahn J](#), [Choi S](#), [Lee Y](#).

Department of Nursing, Changwon National University, Changwon, Korea.

**METHODS:** One hundred eighty nine elderly aged 60 and over from institution as well as community were investigated for their foot conditions by means of a questionnaire including general characteristics, self care capacity, risk factors, foot problem checklist, X-ray, podoscopy and foot scan.

**RESULTS:** All subjects had at least one kind of foot problem and the most prevalent ones were nail problems, foot deformities in order. Prevalence of foot pain and edema was relatively low.

**CONCLUSION:** Foot problem in elderly is prevalent and geriatric foot is expected to emerge as one of the most important problems in the geriatric field. Therefore strategies to deal with geriatric foot should be developed and practiced for better quality of life in later life.

Table 3. Foot Problems by Medical Assessment

(N=189)

Foot problem			Either	Left	Right
			n (%)	n (%)	n (%)
Deformity	Hallux valgus	Yes	156 (82.5)	146 (77.2)	134 (70.9)
		No	33 (17.5)	43 (22.8)	55 (29.1)
	Pes planus	Yes	50 (26.5)	19 (10.1)	46 (24.3)
		No	139 (73.5)	170 (89.9)	143 (75.7)
	Pes cavus	Yes	62 (32.8)	53 (28.0)	46 (24.3)
		No	127 (67.2)	136 (72.0)	143 (75.7)
Inflammation	Fasciitis	Yes	108 (57.1)	93 (49.2)	95 (50.3)
		No	81 (42.9)	96 (50.8)	94 (49.7)
Number			n (%)		
1			36 (19.0)		
2			87 (46.0)		
3			66 (34.9)		

• 판정 기준: 양쪽 발 중 한 쪽이라도 기립 시 종골각이  $-3^{\circ}$  미만일 경우 회내로 진단하였고,  $+3^{\circ}$ 를 초과하는 경우를 회외로 진단하였으며, 종족부의 폭이 외측에서 전족부와 후족부의

• 판정 기준: 방사선 소견상 종족골의 골극이 양측 중 한 쪽이라도 있는 경우에 족저근막염(Bowman, 2001)으로 진단하  
본 연구 결과 적어도 한 종류 이상의 족부문제를 가지고 있는  
노인은 전체 즉, 100%로 매우 높았으며 구체적으로는 발톱변  
색, 발톱비후, 무지외반증, 족저근막염과 족부백선이 높은 유병



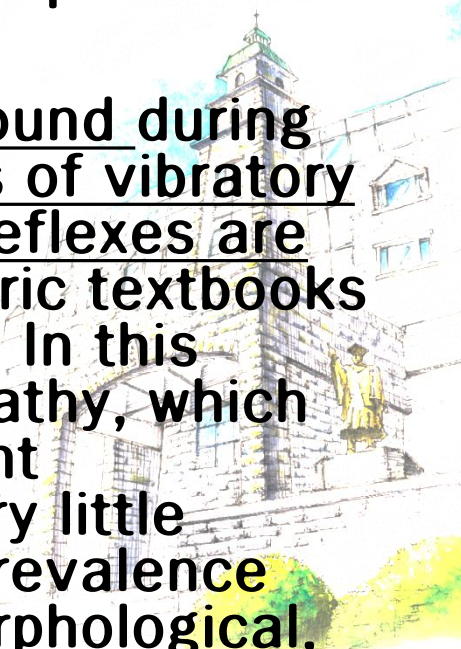
# Peripheral neuropathy in the elderly

[Psychol Neuropsychiatr Vieil](#). 2006 Jun;4(2):109–19.

[Le Forestier N](#), [Bouche P](#).

Federation des maladies du systeme nerveux, Hospital de la Salpetriere, Paris. [nadine.leforestier@psl.aphp.fr](mailto:nadine.leforestier@psl.aphp.fr)

Peripheral neurologic deficits are commonly found during physical examination of older patients. Losses of vibratory sensation in the lower extremities and ankle reflexes are so common that they are often listed in geriatric textbooks as normal physical findings in very old people. In this population, the detection of peripheral neuropathy, which may lead to a serious disability, is an important contribution to the health care but there is very little information in the literature about its actual prevalence and etiology. The epidemiological, clinical, morphological, electrophysiological data on the peripheral nervous system abnormalities in elderly are reviewed. A strategy of investigations is proposed to improve the identification of the etiology of their peripheral neuropathy.

A faint, artistic illustration of a building, possibly a hospital or university building, is visible in the background on the right side of the slide.





# Foot pathology and inappropriate footwear as risk factors for falls in a subacute aged-care hospital.

[J Am Podiatr Med Assoc.](#) 2007 May–Jun;97(3):213–7. [Jessup RL.](#)

Department of Podiatry, Northern Health, 1231 Plenty Rd, Bundoora, Victoria 3084, Australia.

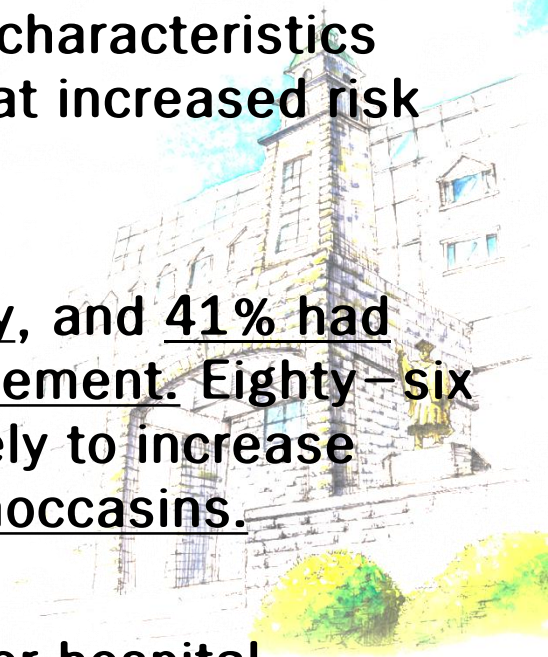
**METHODS:** Two wards of a subacute aged-care hospital were selected for study. Patients were assessed for the presence of foot pathology, and their footwear was evaluated for characteristics identified in the literature as placing individuals at increased risk of falls.

## **RESULTS:**

Of 44 patients assessed, 98% had foot pathology, and 41% had foot pathology requiring podiatric medical management. Eighty-six percent of inpatients wore footwear that was likely to increase their risk of falls, with 66% wearing slippers or moccasins.

## **CONCLUSIONS:**

The results of this study demonstrate the need for hospital inpatients who are identified as being at high risk for falling, or have a history of falls, to undergo an assessment of their foot pathology and footwear so that appropriate measures can be taken to address these risk factors.





# Foot pain impairs balance and functional ability in community–dwelling older people.

[J Am Podiatr Med Assoc.](#) 2001 May;91(5):222–9. [Menz HB](#), [Lord SR](#).

Prince of Wales Medical Research Institute, High St, Randwick, New South Wales 2031, Australia.

Foot problem assessments were performed on 135 community–dwelling older people in conjunction with clinical tests of balance and functional ability. Eighty–seven percent of the sample had at least one foot problem, and women had a higher prevalence than men of foot pain, hallux valgus, plantar hyperkeratosis, lesser digital deformity, and digital lesions. Postural sway did not differ between older people with and without each of these foot conditions. However, the presence of specific foot conditions impaired performance in a more challenging balance test and in some functional tests. In particular, older people with foot pain performed worse in a leaning balance test, stair ascent and descent, an alternate step–up test, and a timed six–meter walk. Furthermore, multiple regression analyses revealed that foot pain was a significant independent predictor of performance in each of these tests. These results show that the presence of foot problems, particularly foot pain, impairs balance and functional ability. As foot pain is amenable to treatment, podiatric intervention has the potential to improve mobility and independence in older people.



# Prevalence of foot conditions in a geriatric population and their impact on mobility, gait and tendency to falls

[Rev Esp Geriatr Gerontol](#). 2012 Jan–Feb;47(1):19–22. Epub 2011 Oct 14. [Article in Spanish]

[Martenez–Gallardo Prieto L](#), [Hermida Galindo LF](#), [D'hyver de Las Deses C](#).

Centro Medico ABC, Ciudad de Mexico, Mexico. Departamento de Geriatria, Residencia Mater–TEA (Techo, Educacion y Ayuda), Ciudad de Mexico, Mexico. [lorenzamartinezgallardo@gmail.com](mailto:lorenzamartinezgallardo@gmail.com)

**MATERIAL AND METHODS:** A geriatric history was taken from 171 women living in a long–term care facility. Photographs were taken of the feet and evaluated by an orthopaedic surgeon and a dermatologist. A multivariate analysis was made to assess the effect of the independent variables over mobility, gait and tendency to fall.

**RESULTS:** The foot diseases most commonly found were hammer toes (122), callus (79) and peripheral vascular disease (74). Hallux rigidus (OR 24.897, 95% CI, 1.231–503.542) and peripheral vascular disease (OR 2.481, 95% CI, 1.095–5.623) seemed to be associated with changes in gait; both were associated with dependency on instrumental activities of daily living (OR 44.166, 95% CI, 2.402–812.233, and OR 2.659, 95% CI, 1.069–6.615). Hallux rigidus was related to falls (OR 19.27, 95% CI, 1.102–337.26). Tinea pedis was associated with dependency in activities of daily living (OR 11.52, 95% CI, 1.325–100.125).

**CONCLUSIONS:** Foot disorders are common in the elderly. Only hallux rigidus and peripheral vascular disease had an impact on function and gait.

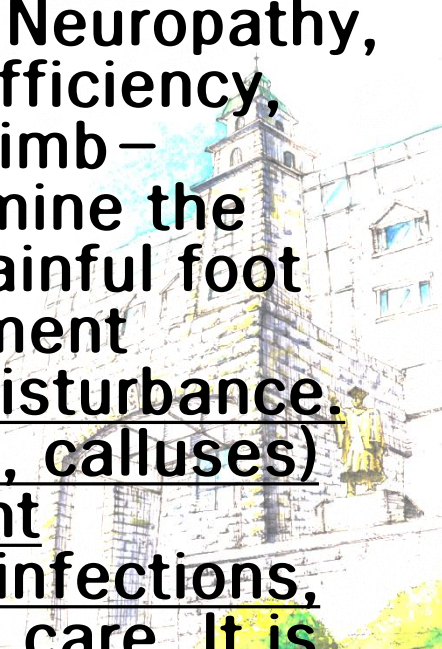


# In-office management of common geriatric foot problems.

[Geriatrics](#). 1994 May;49(5):43–7; quiz 48–9. [Kosinski M](#), [Ramcharitar S](#).

Department of Medicine, New York College of Podiatric Medicine.

Foot disorders can be a major source of pain, discomfort, and disability for older adults. Neuropathy, impaired leukocyte function, vascular insufficiency, and trauma predispose older diabetics to limb-threatening complications. Therefore, examine the diabetic patient's foot during each visit. Painful foot disorders and lower extremity joint impairment represent major causes of treatable gait disturbance. Treatment of hyperkeratotic lesions (corns, calluses) consists of aseptic debridement and weight dispersion. Interspace maceration, fungal infections, and ulceration must also be managed with care. It is important to distinguish mycotic nail infections from nail dystrophies secondary to systemic disease, vascular insufficiency, and trauma.

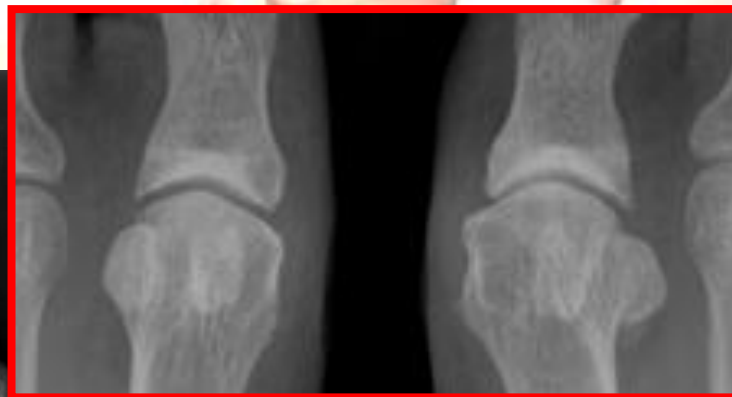
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ㄣ ^ ^ F/65 00837102  
vague discomfort 2012-NOV-09



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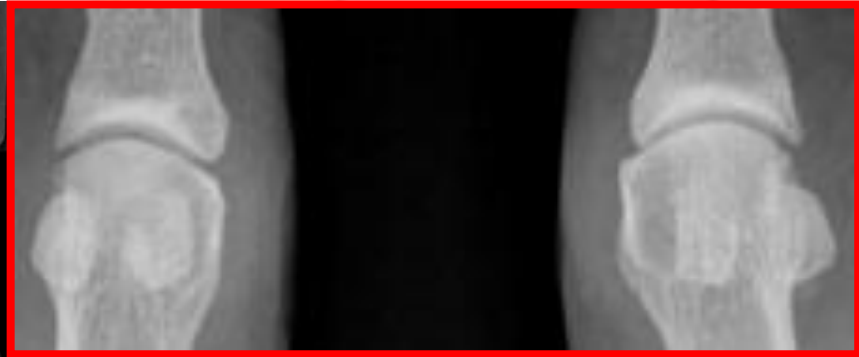


7 8 8 F/59 00837102  
2006-SEP-18



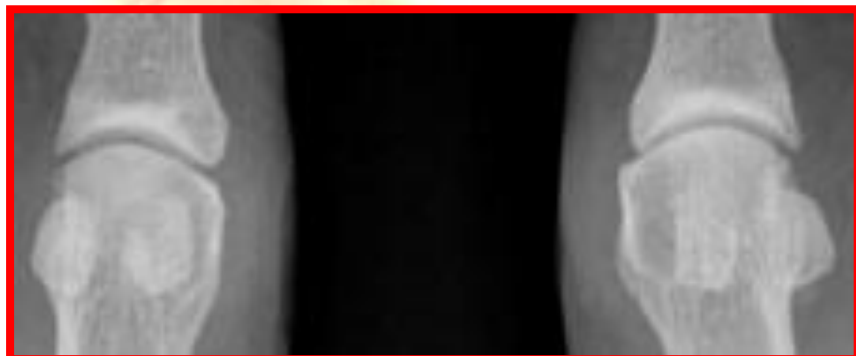


7 8 8 F/56 00837102  
2003-JUL-7





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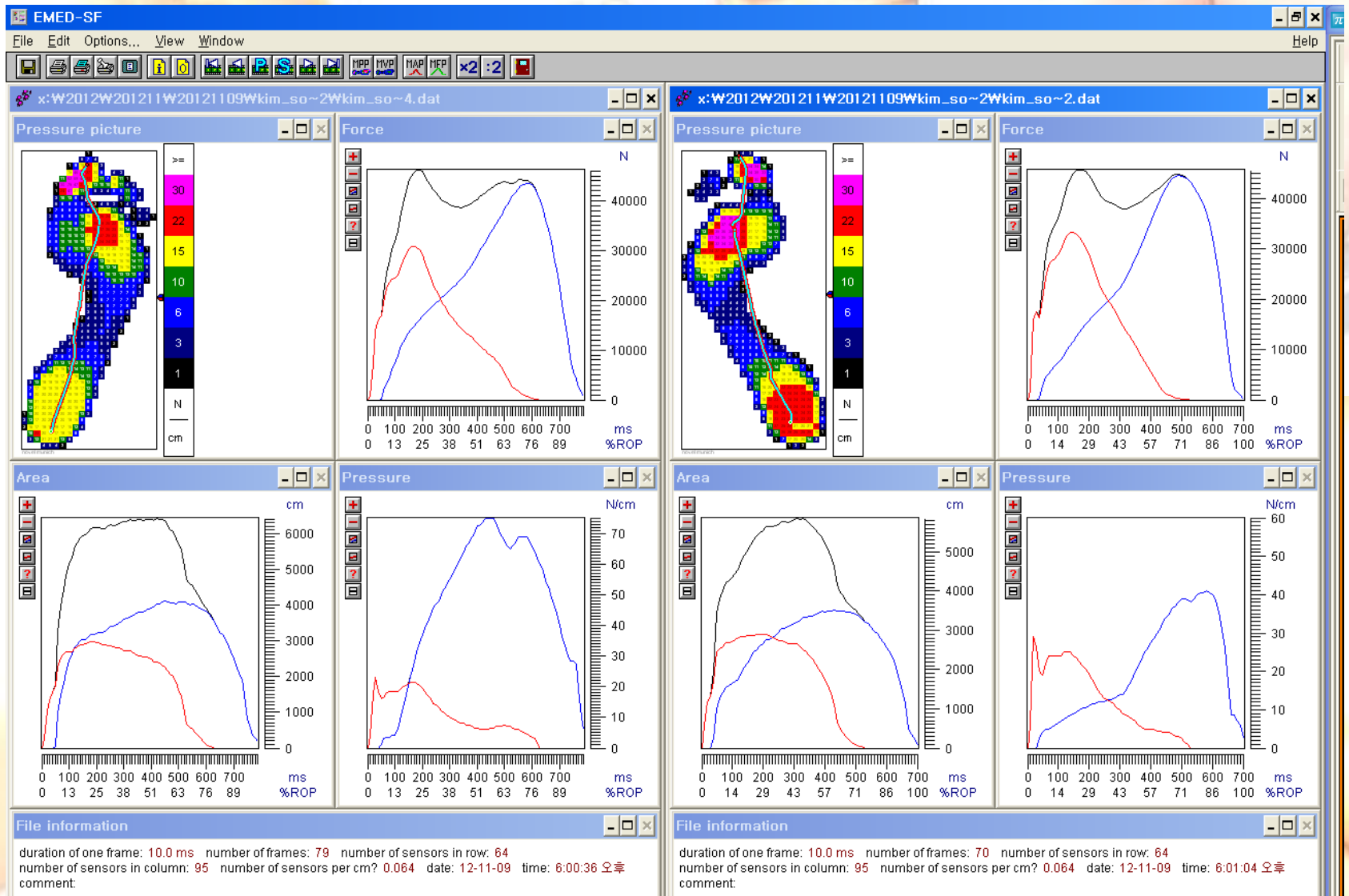


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# F/65 00837102 2012-NOV-9





# Geriatric Foot Pathology

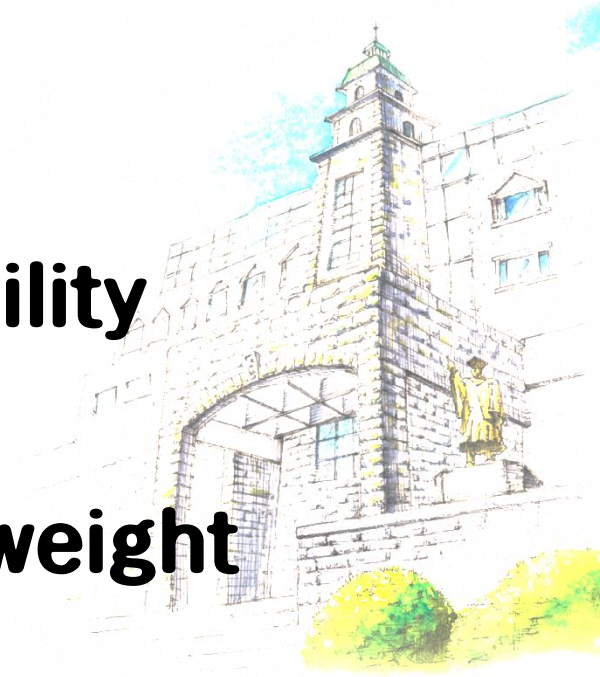
- **Degenerative Arthritis:**
  - Hallux valgus, bunion
  - Hallux rigidus
  - Osteophyte
- **Toe deformity; hammer toe**
- **Heel spur**
- **Hyperkeratotic lesion**
  - Callus
  - Corn
- **Peripheral neuropathy or vascular disease related lesion**





# Geriatric foot pathology의 중요성

- are associated with impaired mobility and quality of life
- high risk for falling
- may lead to a serious disability
- **Maintaining a healthy bodyweight**





# 경청에 주셔서 감사합니다!



## 어르신들에게 발보다 소중한 것은 없습니다!

