Comparative Analysis of Vitamin D level in Elderly Patients with or without Osteoporotic Spinal Compression Fracture

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Introduction

Osteoporosis

- **Characteristics**

  - Low bone mass

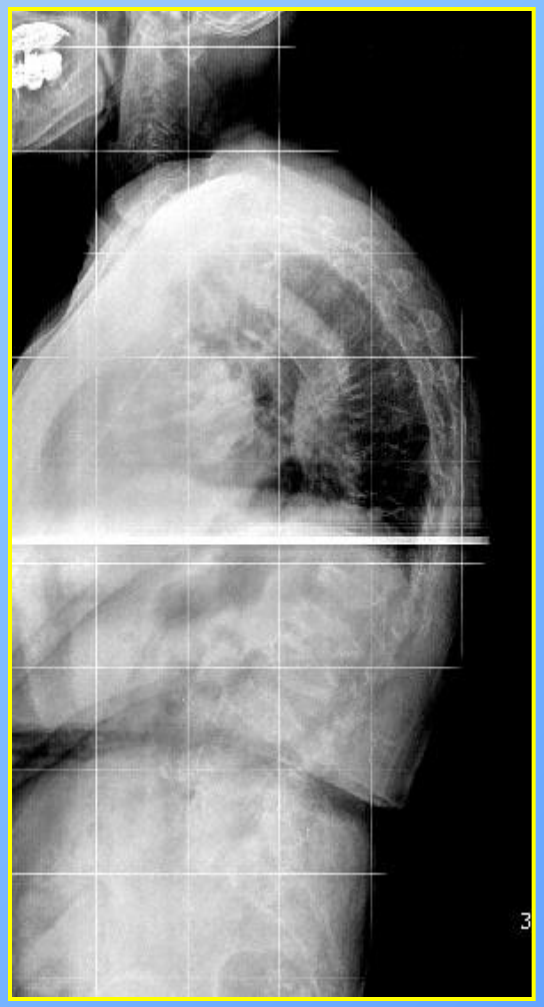
  - Structural deterioration of bone

- **Predisposing factor**

  - Deficiency of estrogen, vitamin D

  - Overproduction of PTH

  - Poor and absorption of calcium



Introduction

Osteoporosis

Elderly population ↑

↓

Osteoporosis ↑

↓

Osteoporotic fracture ↑

Introduction

Osteoporotic fracture

- Significantly associated with decreased quality of life, shorter life expectancy, and increased health care costs

→It is crucial to prevent osteoporosis and fractures

Devine J et al, Osteoporosis Int, 2012

Vitamin D

- Low calcium intake and poor vitamin D status are key determinants of osteoporosis and fracture risk
- Calcium and vitamin D supplementation is an essential component of management strategies for the prevention and treatment of osteoporosis and osteoporotic fracture

Lips P et al, Clin Endocrinol(Oxf), 2010

Purpose

- **Studies that analysis correlation vitamin D between osteoporotic vertebral fracture are rare.**

✓ **Comparison serum vitamin D levels in elderly patients with or without osteoporotic spinal compression fractures**

✓ **Correlation between serum vitamin D level and age, bone mineral density bone turnover markers, the number of fractured vertebral bodies in Fx. group**

Materials & Methods

Retrospective review

- **Oct. 2008 ~ Sep. 2011**
- **Patients**
  - *Age ≥ 60 years*
  - *evaluated vitamin D and bone turnover markers*
  - *seperated by presence of spinal compression fracture*

Inclusion criteria

✓ **BMD ≤ -2.5 (T-score)**

Exclusion criteria

✓ **High energy trauma**

✓ **Osteoporotic medication Hx.**

✓ **Underlying Dz. that affects bone metabolism**

✓ **Hx. of osteoporotic fracture**

✓ **Hx. of spine operation**

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Materials & Methods

➢ **Comparative analysis**

OSCF group VS. Control group

✓ Serum Vitamin D level (Serum 25(OH)vitamin D3)

- according to age, sex, season and living environment

✓ BMD (T-score)

✓ Bone turnover markers (Osteocalcin and C-telopeptide)

Materials & Methods

Correlative analysis

***Serum** Vitamin D with*

- ✓ Age
- ✓ BMD
- ✓ Bone turnover markers
- ✓ Number of fractured vertebral bodies in fracture group

Materials & Methods

- 78 patients with OSCF (fracture group)
- 84 age-matched patients without OSCF (control group)

Demographic information & clinical data

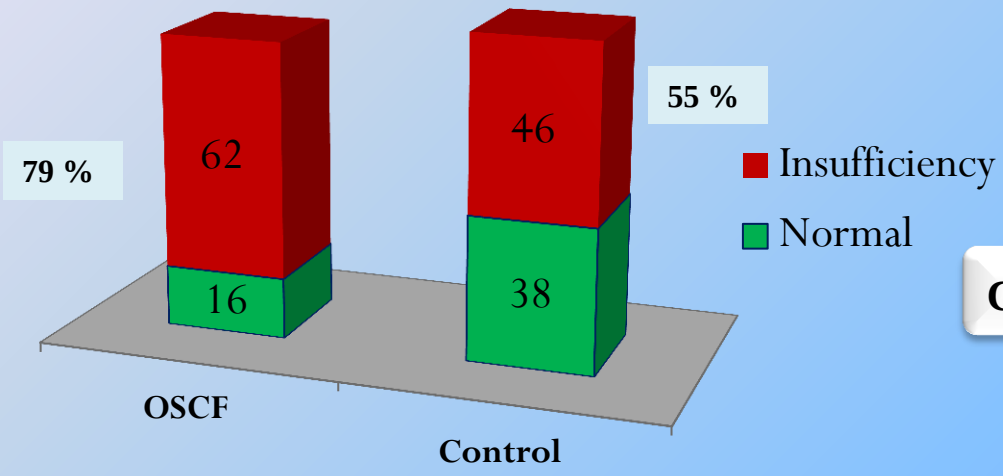
Sex	
Male	20
Femal	142
Mean age	years
OSCF group (n = 95)	72.07±5.28
Control group (n = 118)	70.09±7.84
	p = 0.063

No significant difference on age

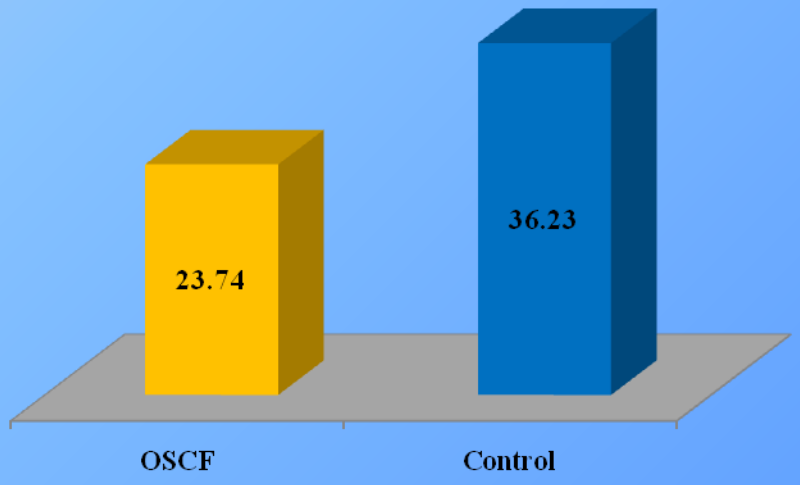
Results

Serum 25(OH) Vitamin D3 : Normal range : >30ng/ml

Dawson-Hughes B et al, Osteoporos Int, 2005



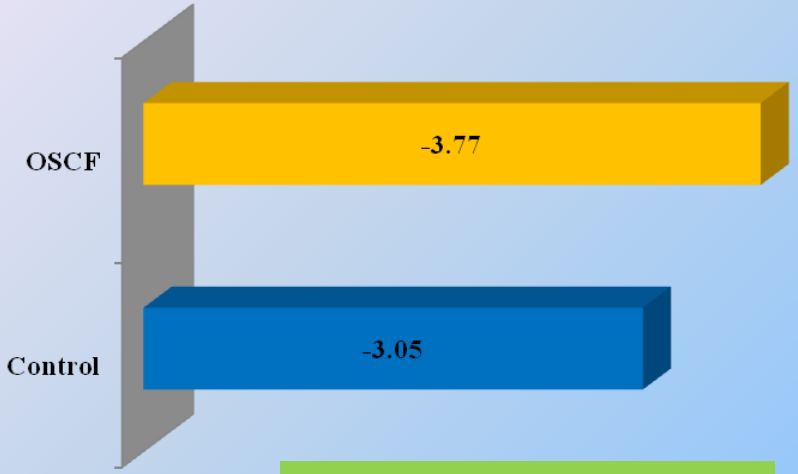
Comparison of Serum Vit D (ng/ml)



Significant difference (p < 0.0001)

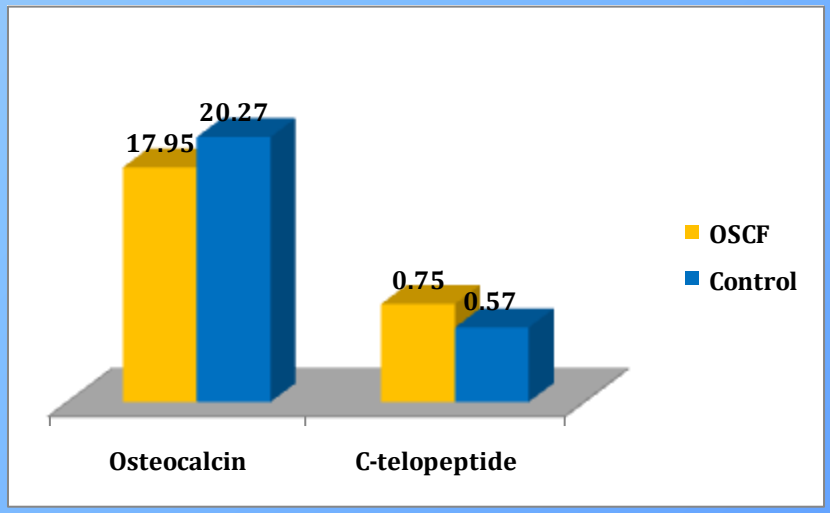
Results

Comparison of BMD (T-score)



Significant difference (p <0.0001)

Comparison of Bone Turnover Markers



Significant difference on C-telopeptide(p = 0.003)

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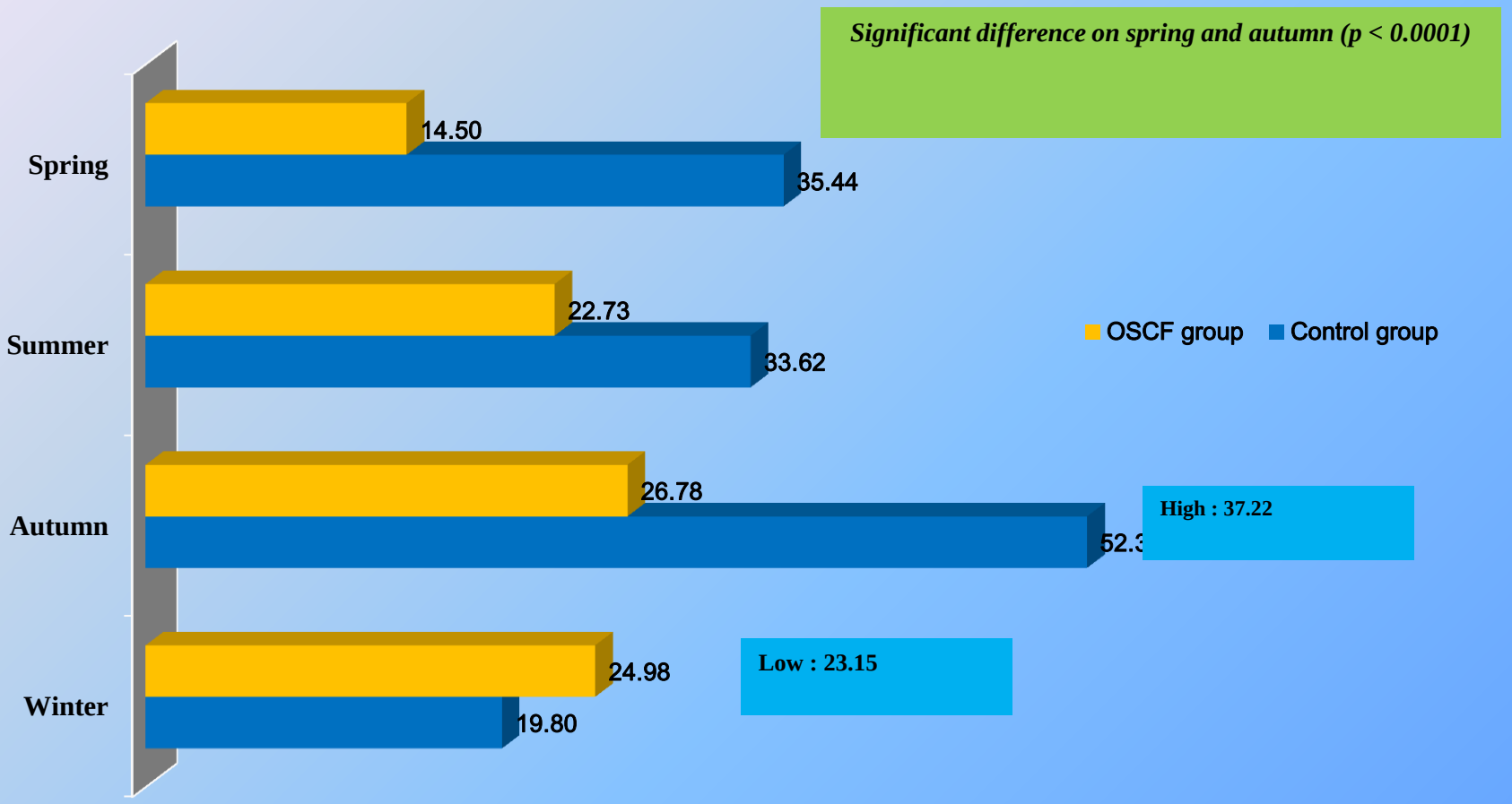
Results

Comparison of Serum 25(OH)D3 (ng/ml) according to Season



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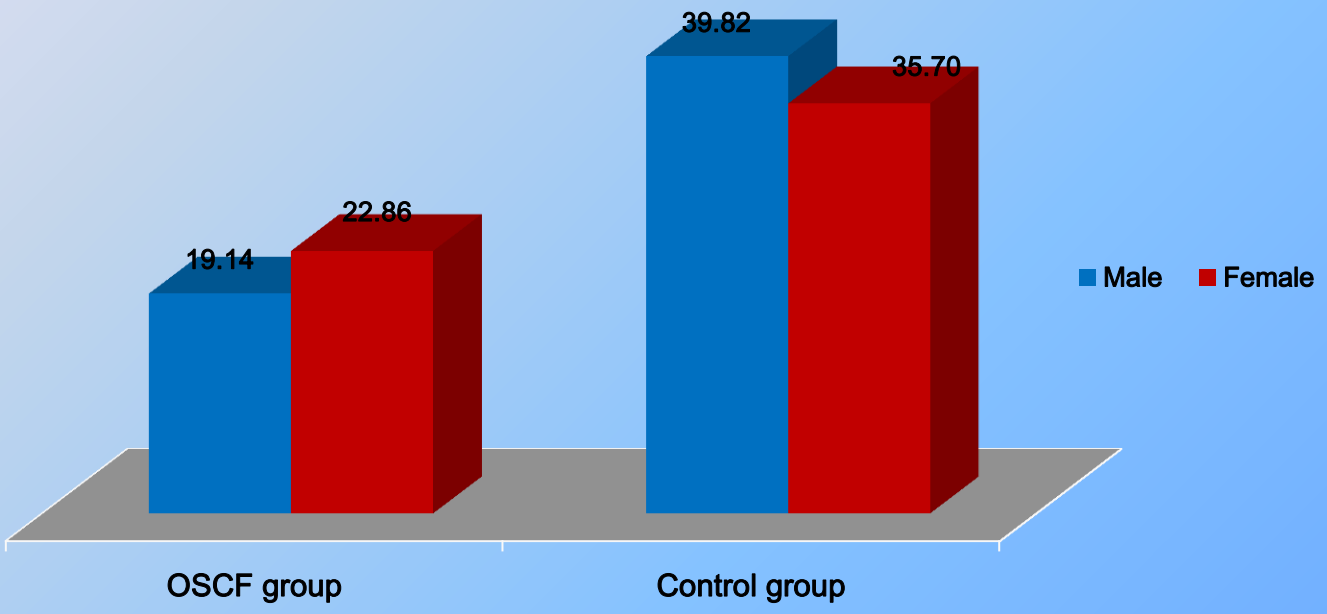
Results

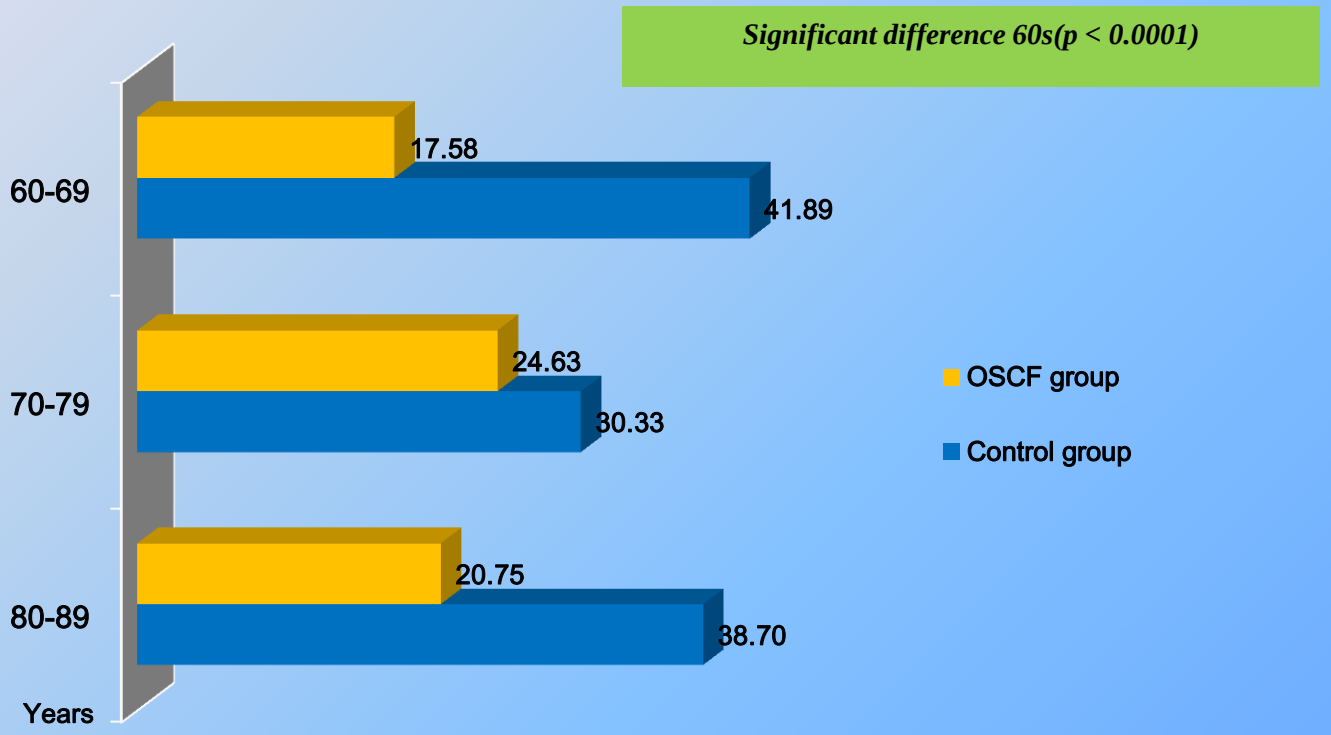
Comparison of Serum 25(OH)D3 (ng/ml) according to SEX

No significant difference



Results

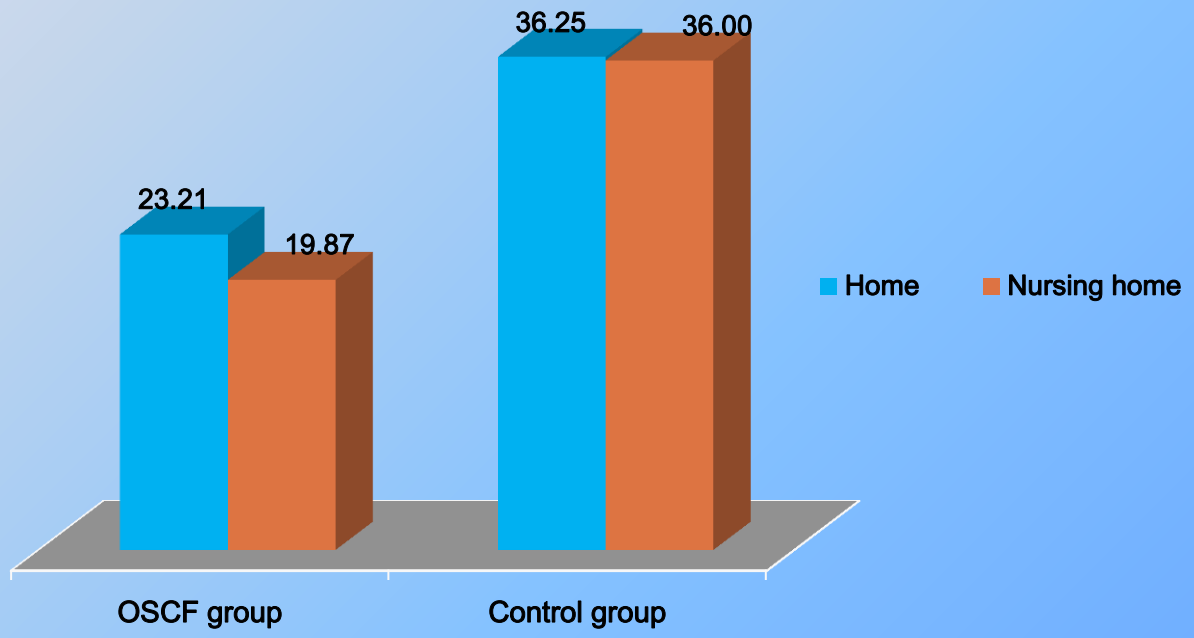
Comparison of Serum 25(OH)D3 (ng/ml) according to Age



Results

Comparison of Serum 25(OH)D3 (ng/ml) according to Living environment

No significant difference



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Results

Correlation with Serum 25(OH)D3 (ng/ml) and variables

	Age	Osteocalcin	C-telopeptide	BMD total	L-spine	Lt. hip	Rt. hip	No. of fractured vertebral bodies
r	-0.183	-0.008	-0.195	0.251	0.224	0.320	0.154	-0.217
p-value	0.020	0.915	0.013	0.001	0.005	<0.0001	0.054	0.048

Significant difference on Age, BMD and No. of fractured vertebra

Discussion

- ✓ Vitamin D deficiency in adults can precipitate or exacerbate osteopenia and osteoporosis, cause osteomalacia and muscle weakness, and increase the risk of fracture.

- ✓ A meta-analysis revealed that increased vitamin D intake reduced the risk of falls.

Holick MF, NEJM, 2007

Discussions

- ✓ Daily intake of at least 700 to 800 IU of vitamin D is shown to prevent hip fractures and nonvertebral fractures in elderly persons.

Bischoff-Ferrari HA et al, JAMA, 2005

- ✓ Post-menopausal Korean women with a distal radius fracture were found to have significantly lower serum vitamin D levels than the control group.

HS Gong et al, Injury, 2012

Summaries and Conclusions

In this study

- ✓ Vitamin D level was insufficient in most patients with OSCF.
- ✓ Patients with OSCF were found to have significantly lower vitamin D levels than patients without fracture.
- ✓ Vitamin D level is correlated with age and BMD.

Conclusions

- ✓ Vitamin D level was insufficient in most patients with OSCF.

  Patients with OSCF were found to have significantly lower vitamin D levels than patients without fracture.

- ✓ So, the optimal range of serum vitamin D level in elderly patients with osteoporosis is considered as a factor for prevention of OSCF.

- ✓ Further studies are necessary to determine whether vitamin D supplementation can be helpful in preventing OSCF in patients with osteoporosis.


Thank you for
your attention!