

Osteoporoz tanı ve tedavi kriterleri

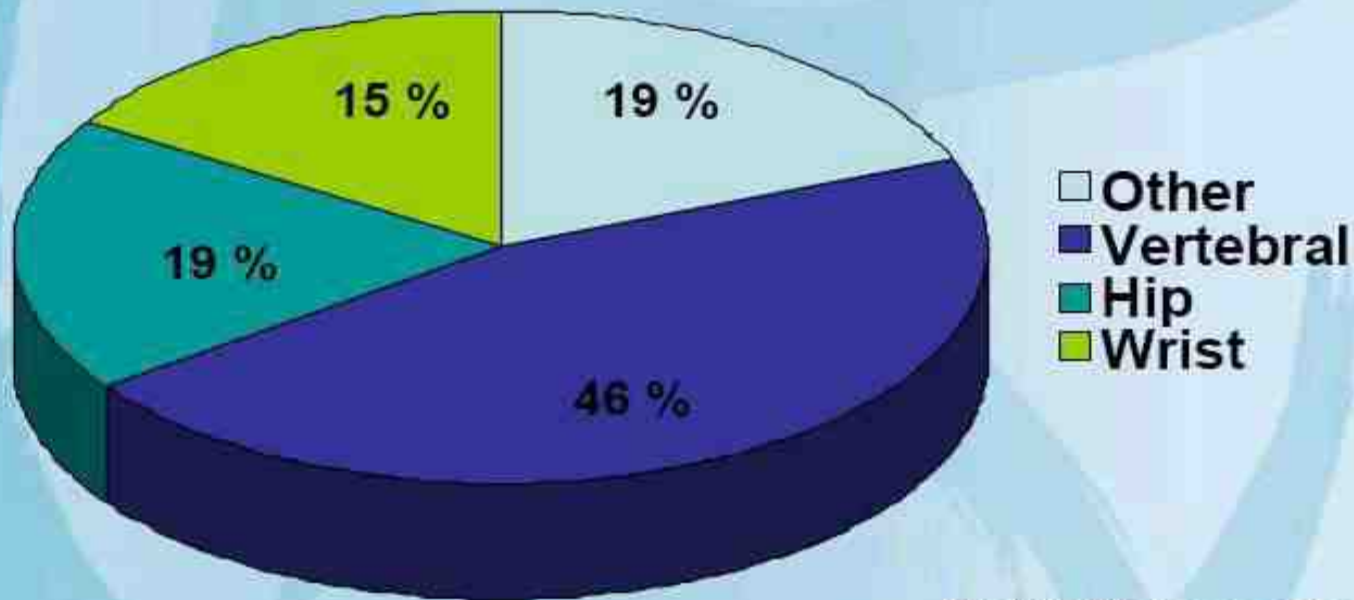


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Osteoporosis affects the **entire** skeleton

- Osteoporosis is responsible for >1.5 million vertebral and non-vertebral fractures annually
- Spine, hip, and wrist fractures are most common



NIH/ORBD (www.osteo.org), 2000

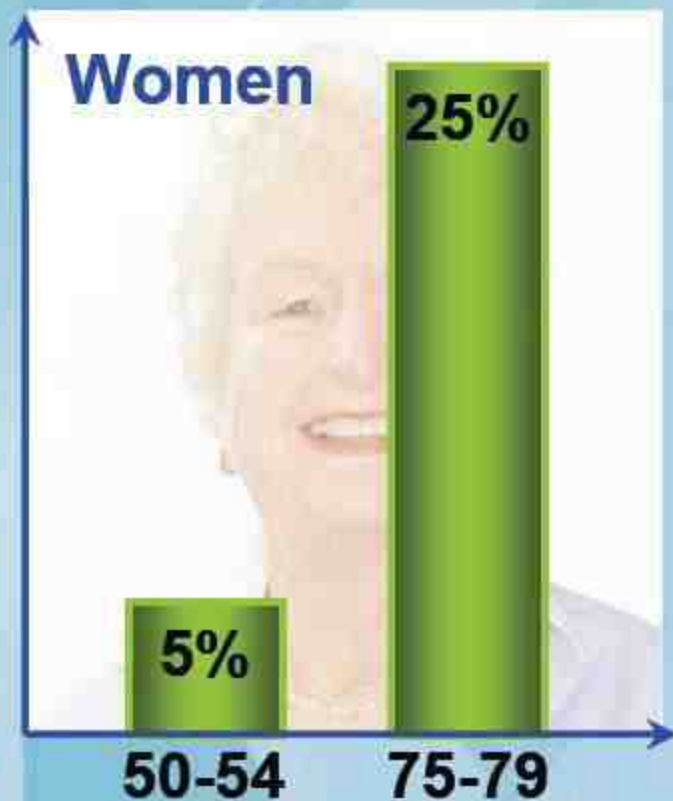
Osteoporosis prevalence

- **Affects 200 million women worldwide¹**
 - 1/3 of women aged 60 to 70
 - 2/3 of women aged 80 or older
- **Approximately 30% of women over the age of 50 have one or more vertebral fractures²**
- **Approximately one in five men over the age of 50 will have an osteoporosis-related fracture in their remaining lifetime¹**

1. IOF, 2005 (www.osteofound.org)

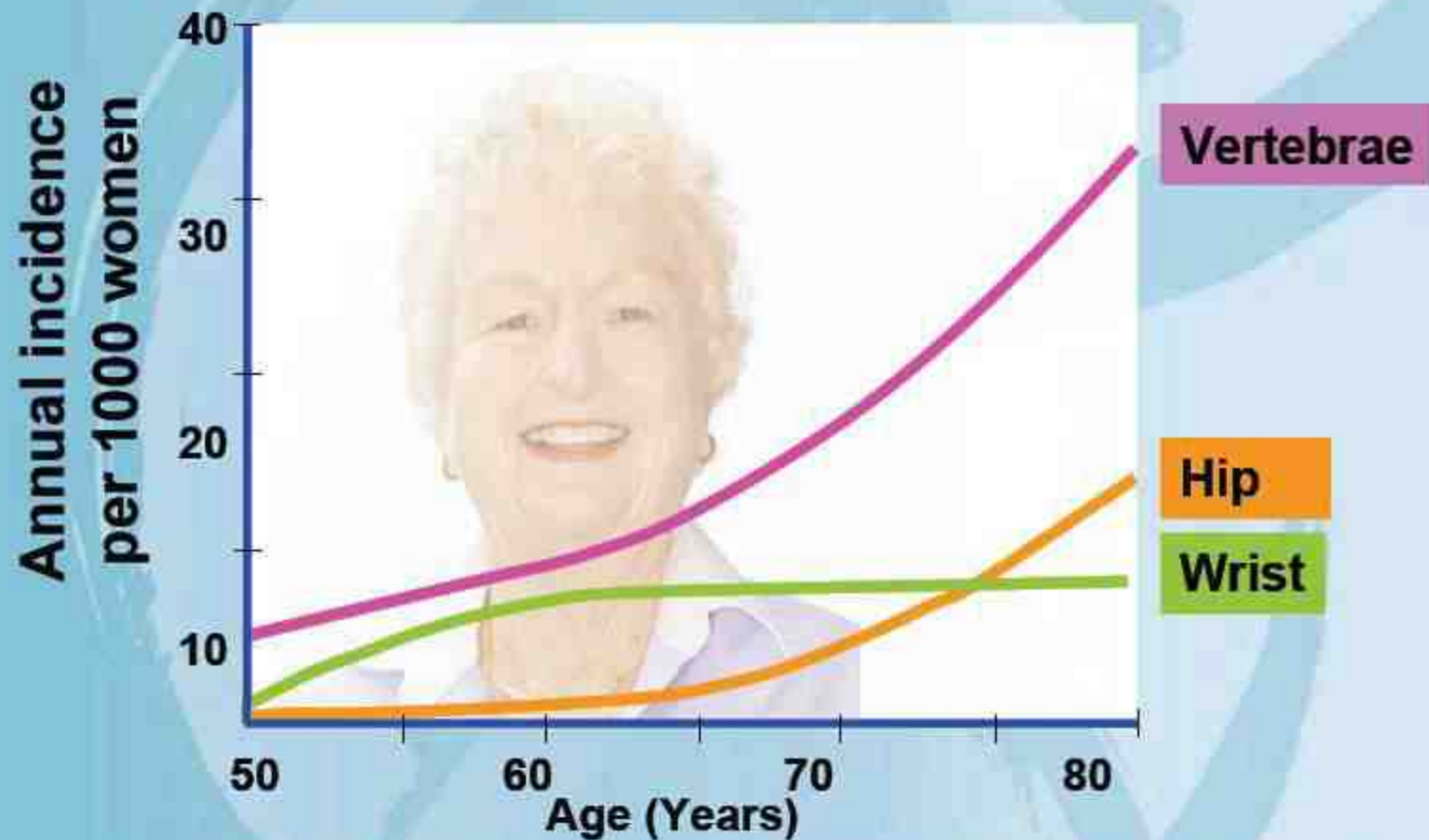
2. Dennison E & Cooper C, *Horm Res*, 2000;54 suppl 1:58-63

Prevalence of vertebral fractures in Europe



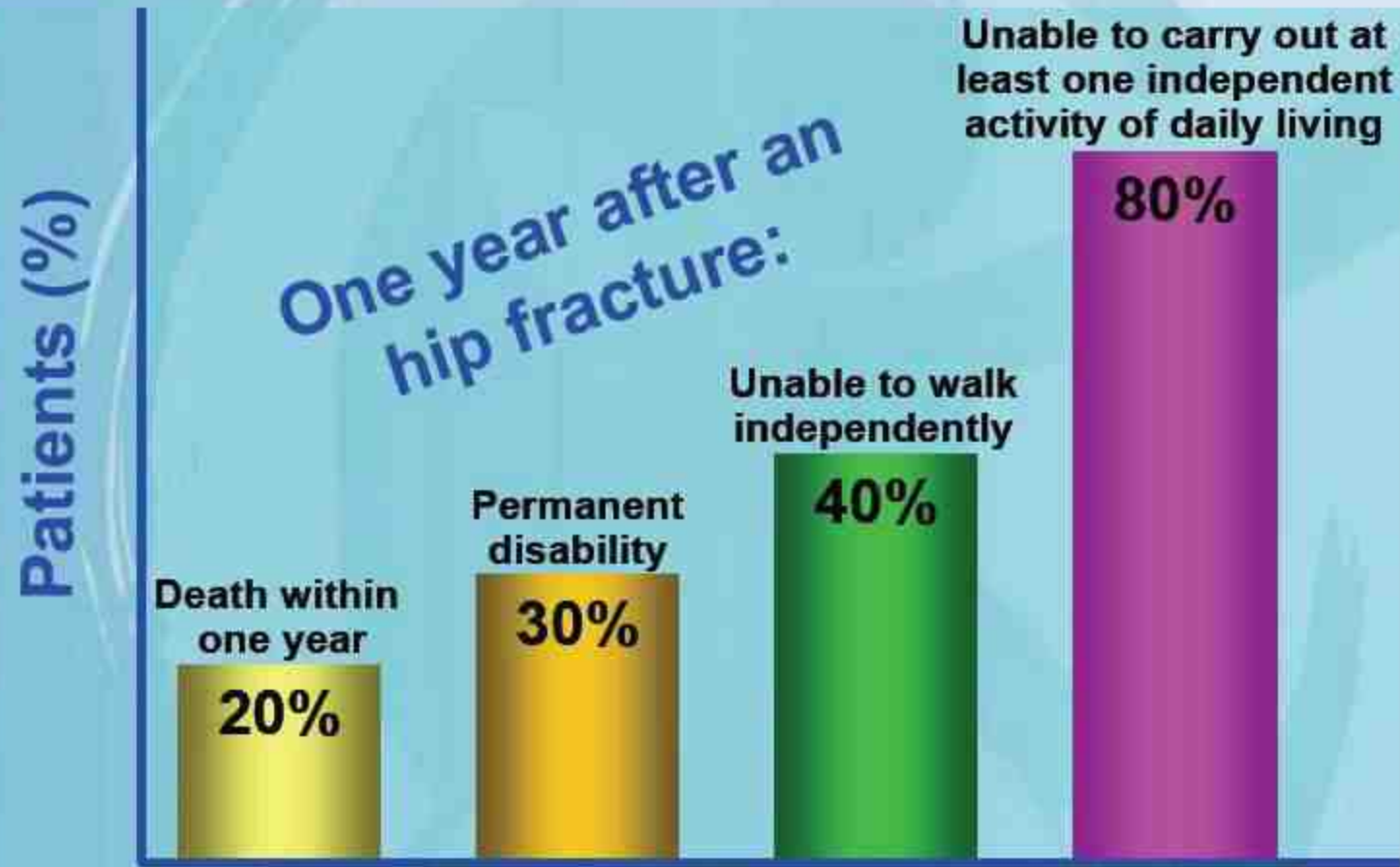
O'Neill TW et al, J Bone Miner Res, 1996;11:1010-1018

Incidence of osteoporotic fractures in women



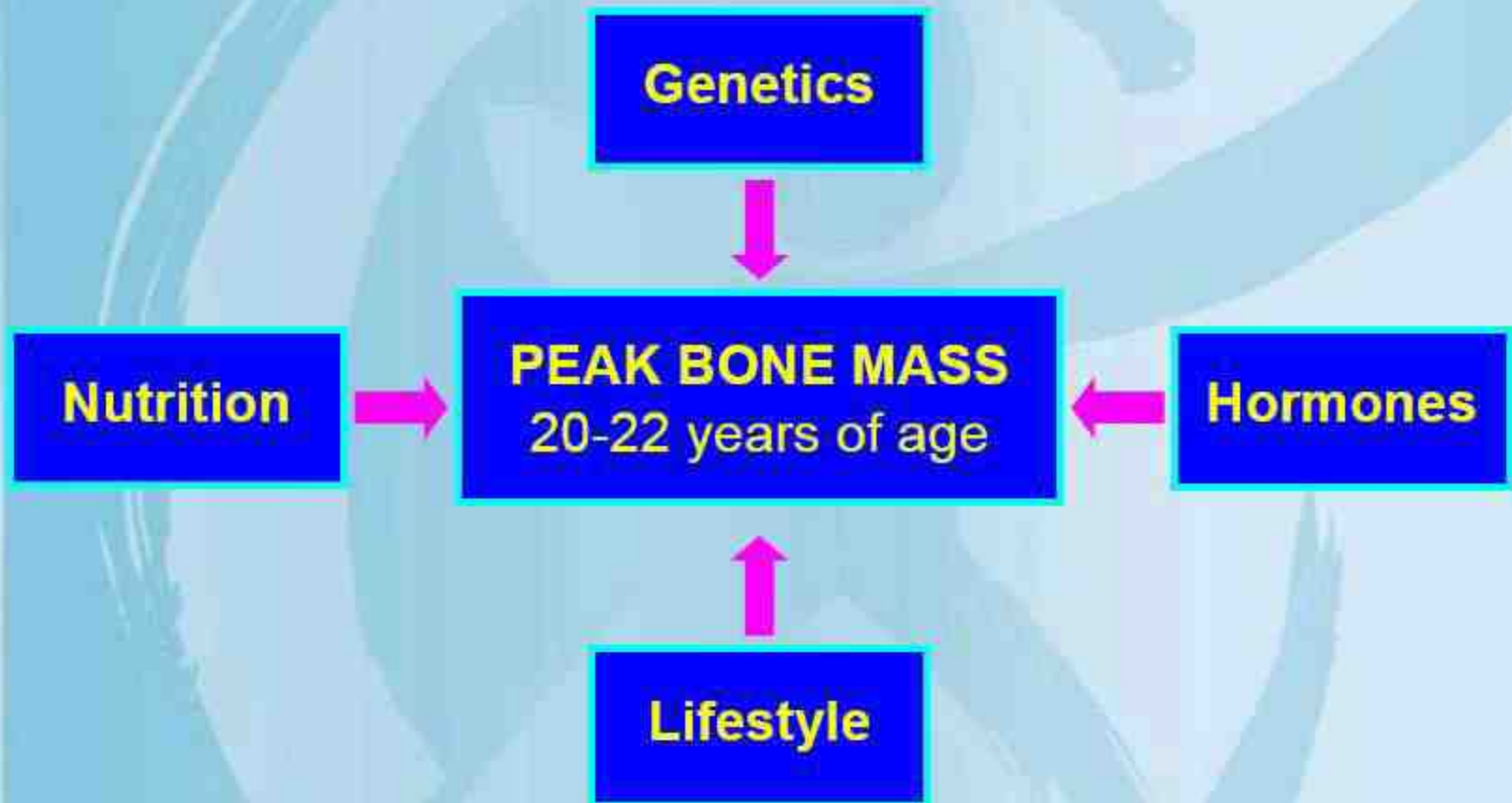
Wasnich RD, Osteoporos Int 1997;7 Suppl 3:68-72

All fractures are associated with morbidity



Cooper C, Am J Med, 1997;103(2A):12S-17S

Determinants of Peak Bone Mass



Risk factors for osteoporosis.

Personal history of fracture after age 50

Current low bone mass (T score less than -1.5)

History of fracture in a first degree relative

Being female

Being thin and/or having a small frame/low BMI ($< 21 \text{ kg/m}^2$)

Advanced age

A family history of osteoporosis

Estrogen deficiency as a result of menopause, especially early or surgically induced

Absence of menstrual periods (amenorrhea)

Anorexia nervosa

Low lifetime calcium intake

Vitamin D deficiency

Presence of certain chronic medical conditions (Cushing's syndrome, anorexia, hypogonadism, irritable bowel disease [IBD], diabetes [DM], celiac sprue, hyperparathyroidism, hyperthyroidism, and HIV).

An inactive/sedentary lifestyle

Current cigarette smoking

Excessive use of alcohol

Being Caucasian or Asian, although African Americans and Hispanic Americans are at significant risk as well

In males, testosterone (T) deficiency

Note: Potentially modifiable risks are highlighted in bold (adapted from the NOF).

Nanes. Assessment and treatment of osteoporosis. Fertil Steril 2009.

Risk Factors for Osteoporotic Fracture

With Relative Risk ≥ 2 (Major)

- Age > 70
- Menopause < 45
- Hypogonadism
- Fragility Fracture
- Hip Fracture in Parents
- Glucocorticoids
- Malabsorption
- High Bone Turnover
- Anorexia Nervosa
- BMI < 18
- Immobilisation
- Chronic Renal Failure
- Transplantation

With Relative Risk 1 - 2 (Moderate)

- Estrogen Deficiency
- Calcium Intake < 500 mg/d
- Primary Hyperparathyroidism
- Rheumatoid Arthritis
- Bechterew Disease
- Anticonvulsivants
- Hyperthyroidism
- Diabetes Mellitus
- Smoking
- Alcohol Excess

(Ankilozan Spondilit (Bechterew Hastalığı / Marie Struempell Hastalığı))

Brown JP & Josse RG, CMAJ, 2002;167(10 suppl):S1-S34



Risk factors used in the calculation of 10-year risk of fracture

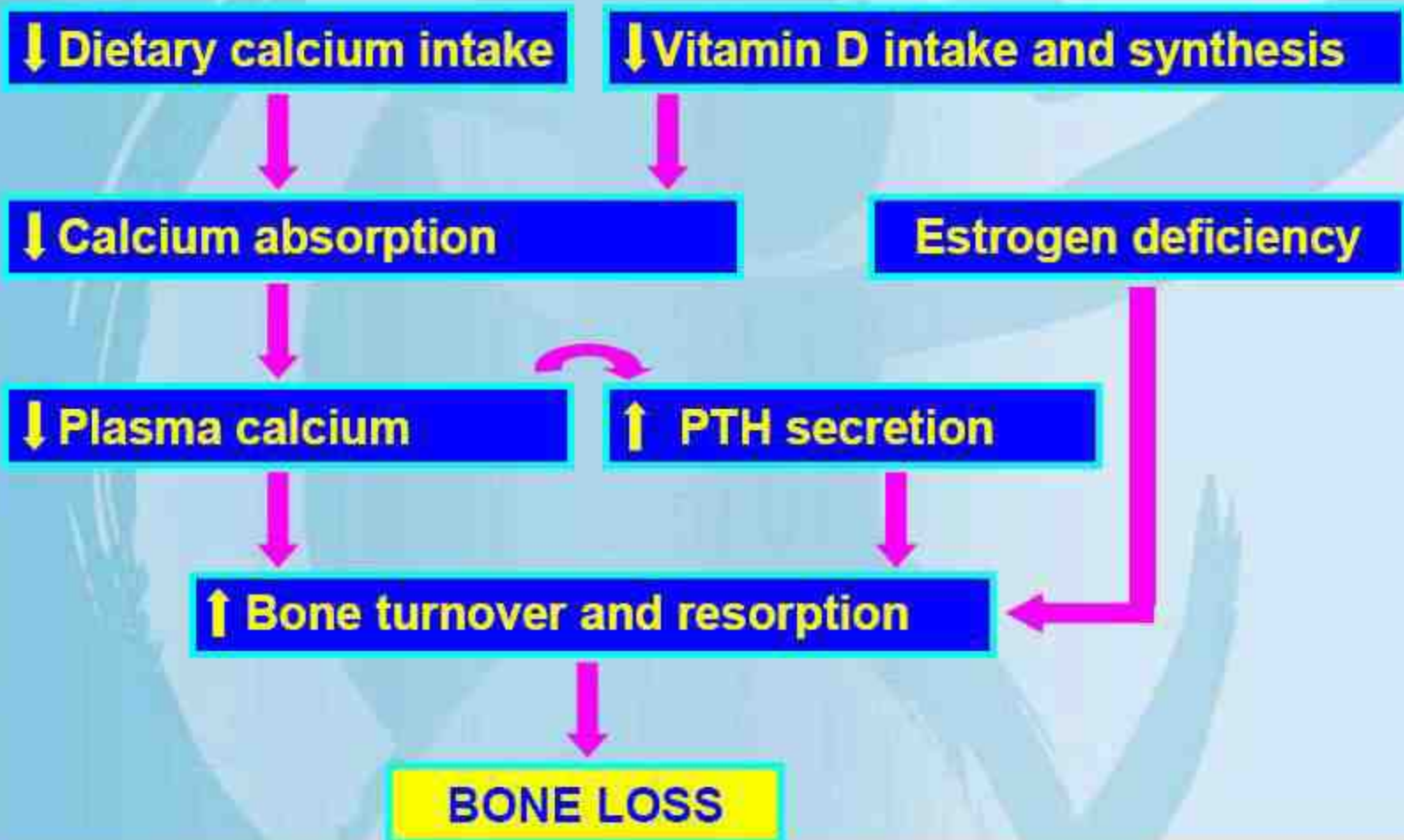
- Femoral neck T-score
- Age
- Previous low trauma fracture
- Low BMI
- Ever steroid exposure
- Family history of hip fracture
- Current cigarette smoking
- High alcohol intake (> 2 units/day)*



*1 unit = 8 gm alcohol ~ ½ pt. beer ~ glass wine

Kanis JA et al, Bone, 2002;30:251-258
Kanis JA et al, Osteoporos Int, 2005;16:581-589

Age-related bone loss



Secondary osteoporosis

Endocrine

**Hyperthyroidism
Hypogonadism
Cushing Syndrome**

Nutritional

Drug-induced

**Glucocorticoids
Immunosuppressly
Anticonvulsants**

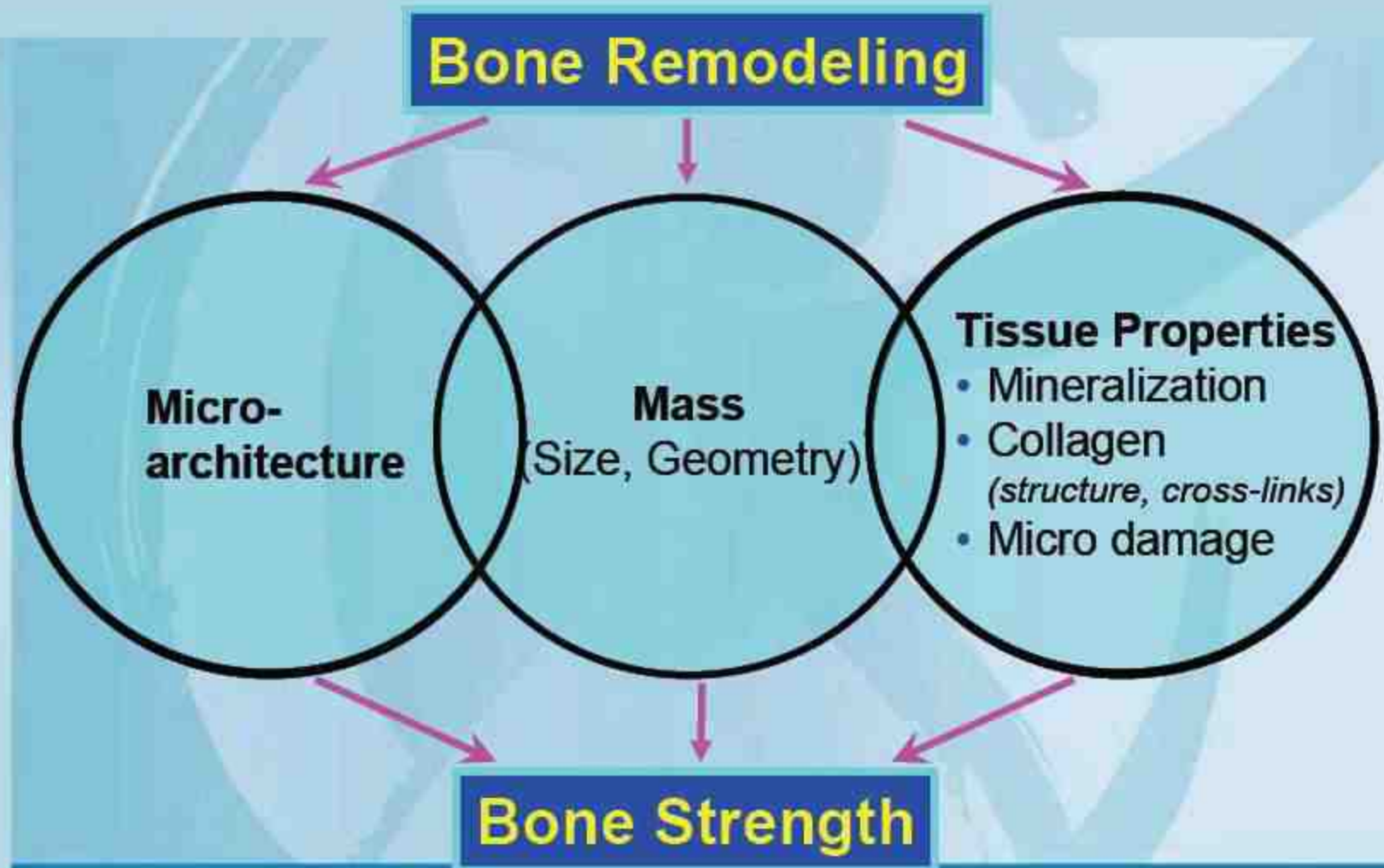
Immobilization

Others

**Rheumatoid A.
Diabetes
Tumors
(Myeloma, etc.)**



Determinants of bone strength







Useful diagnostic tests

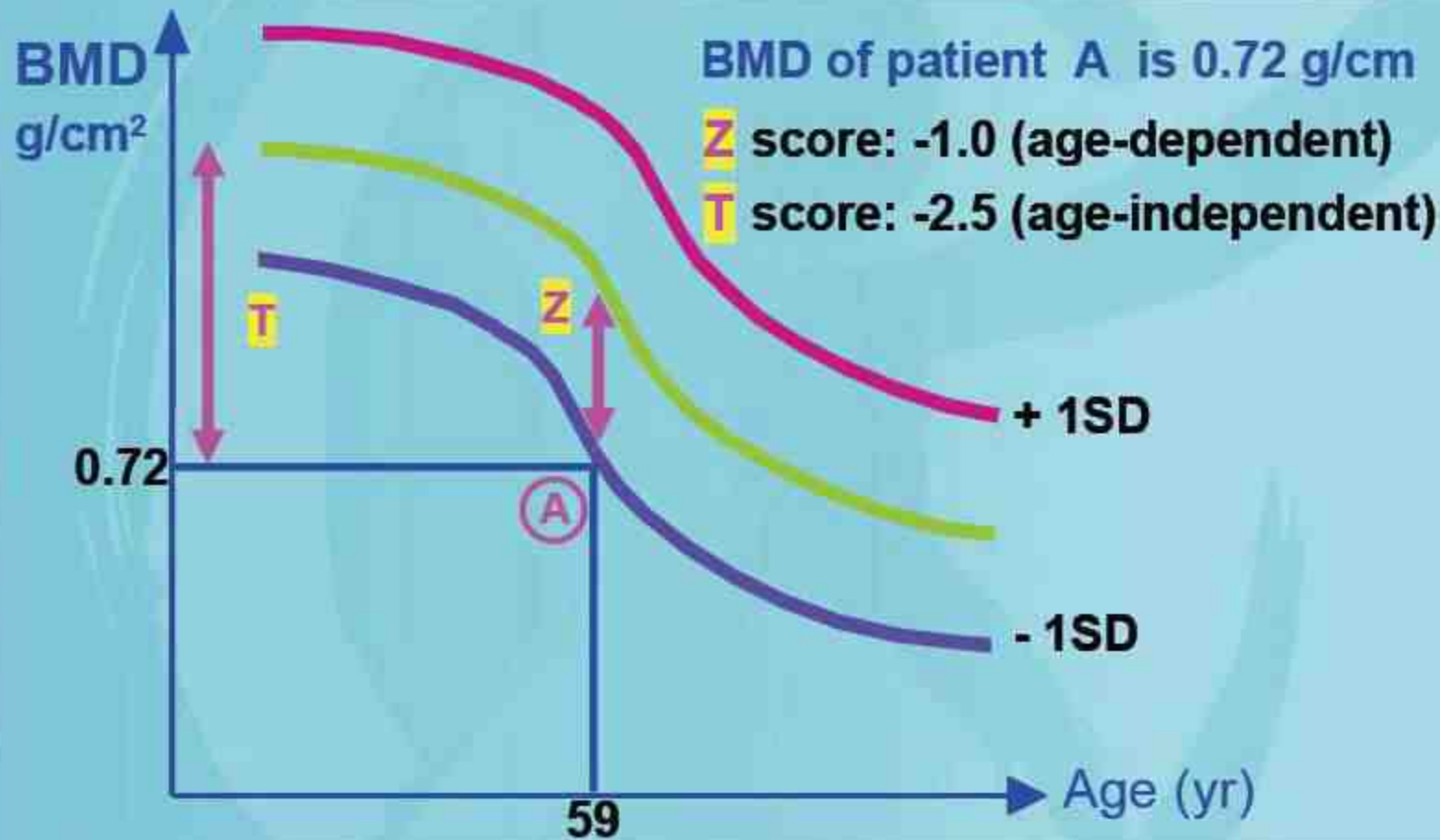
Disease	Mechanism	Tests	Complication
Cardiovascular Disease	Hypertension	Blood pressure	Stroke
Insulin-dependent Diabetes mellitus	Insulin deficiency	Blood glucose	Retinopathy
Osteoporosis	Skeletal bone loss	Bone mass	Fracture

Adapted from Kanis J et al, in HRT and Osteoporosis (Drife & Studd eds), Springer, 1990, pp135-147

Major bone measurement techniques

Dual-energy X-ray Absorptiometry (DXA)		Spine, hip, forearm, calcaneus, whole body
Quantitative computed Tomography (QCT)		Spine, hip, forearm
Ultrasound attenuation and velocity		Heel, patella, tibia forearm
High-resolution p-QCT		Forearm, tibia

Interpretation of bone mineral density (BMD)



WHO criteria for osteoporosis in women

T-Score

Normal	→	-1 and above
Low bone mass	→	-1 to -2.5
Osteoporosis	→	< -2.5
Established osteoporosis	→	< -2.5 and one or more fractures

Risk factors that provide indications for the diagnostic use of bone densitometry

1. Radiographic evidence of osteopenia or vertebral deformity or both
2. Previous fragility fracture
3. Loss of height, thoracic kyphosis
(after radiographic confirmation of vertebral deformities)
4. Presence of strong risk factors:
 - Anorexia nervosa
 - Malabsorption syndromes
 - Primary Hyperparathyroidism
 - Post-transplantation
 - Chronic renal failure
 - Hyperthyroidism
 - Prolonged immobilisation
 - Cushing's syndrome
 - Oestrogen deficiency
 - Corticosteroid therapy
 - Premature menopause <45 y.
 - Maternal family history of hip fracture
 - Long-term secondary amenorrhoea >1y.
 - Low body mass index (<19 Kg/m²)
 - Primary hypogonadism
 - Other disorder associated with osteoporosis

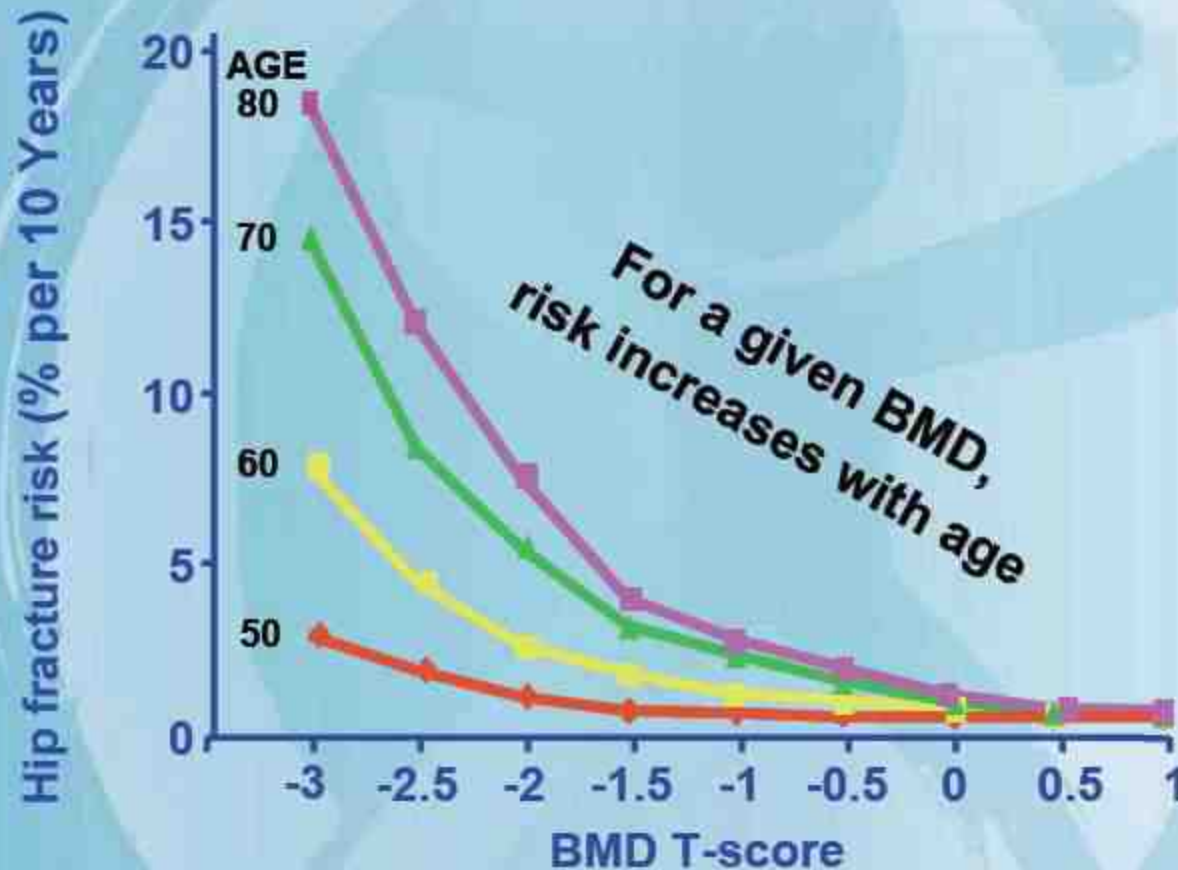
Kanis JA, Lancet, 2002;359:1929-1936

Relative Risk of fracture for a 1 SD decrease in BMD in women

Fracture Site	Forearm	Hip	Vertebral	All
Distal radius BMD	1.7	1.8	1.7	1.4
Hip BMD	1.4	2.6	1.8	1.6
Lumbar spine BMD	1.5	1.6	2.3	1.5

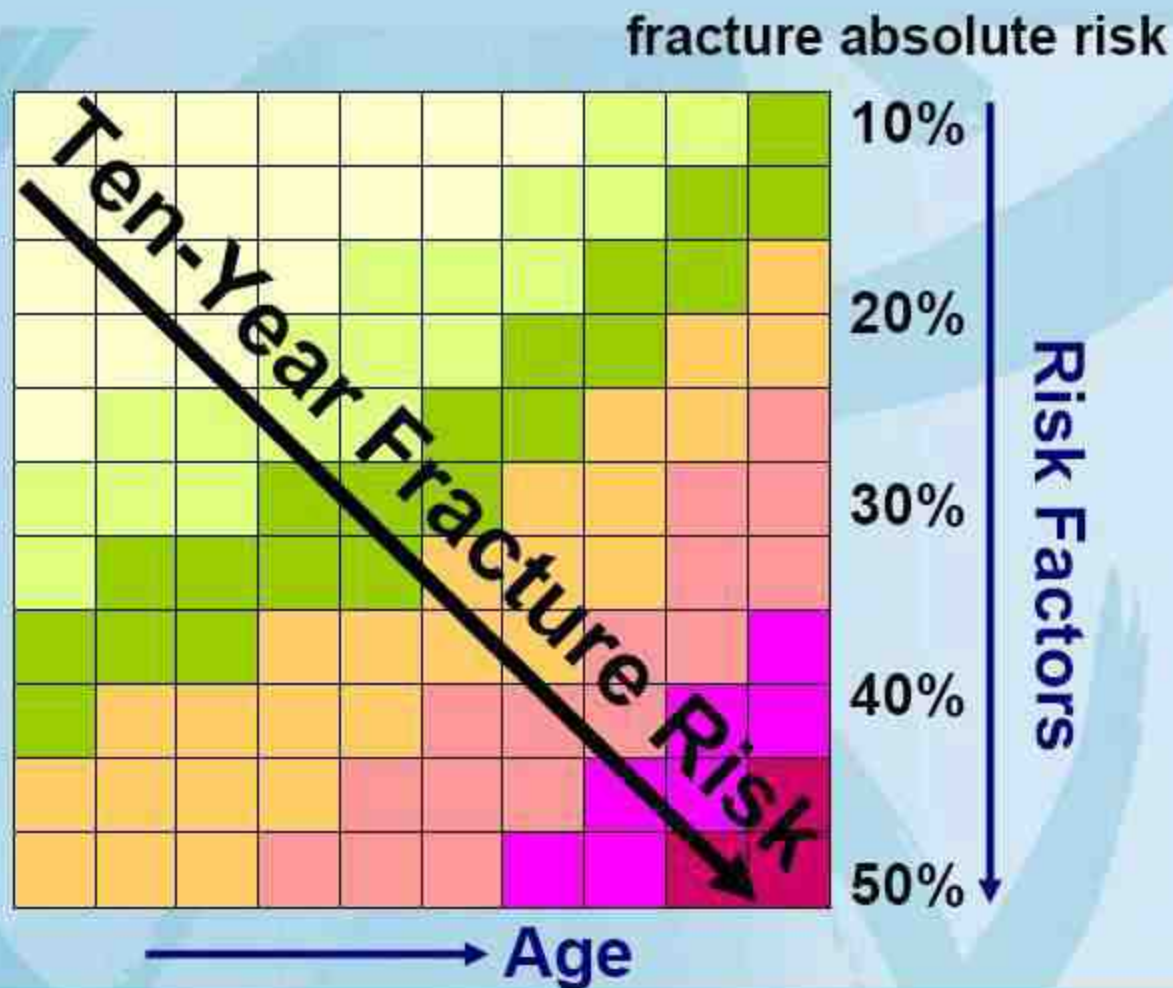
Marshall D et al, BMJ, 1996;312:1254-1259

10-Year Fracture Risk: age and BMD



Kanis JA et al, Osteoporos Int, 2001;12:989-995

Intervention thresholds according to ten-year absolute fracture risk



Ten-year risk of hip fracture for women at the age of 80

Risk factors	Ten-year probability (%)
-	18.0
T-score < -2.5	23.6
Prior fracture	28.8
High turnover	29.5
T-score < -2.5 + prior fracture	36.3
T-score < -2.5 + high turnover	40.1
Prior fracture + high turnover	47.3

Johnell O et al, Osteoporos Int, 2002;13:523-526

Kemik metabolizma belirteçleri

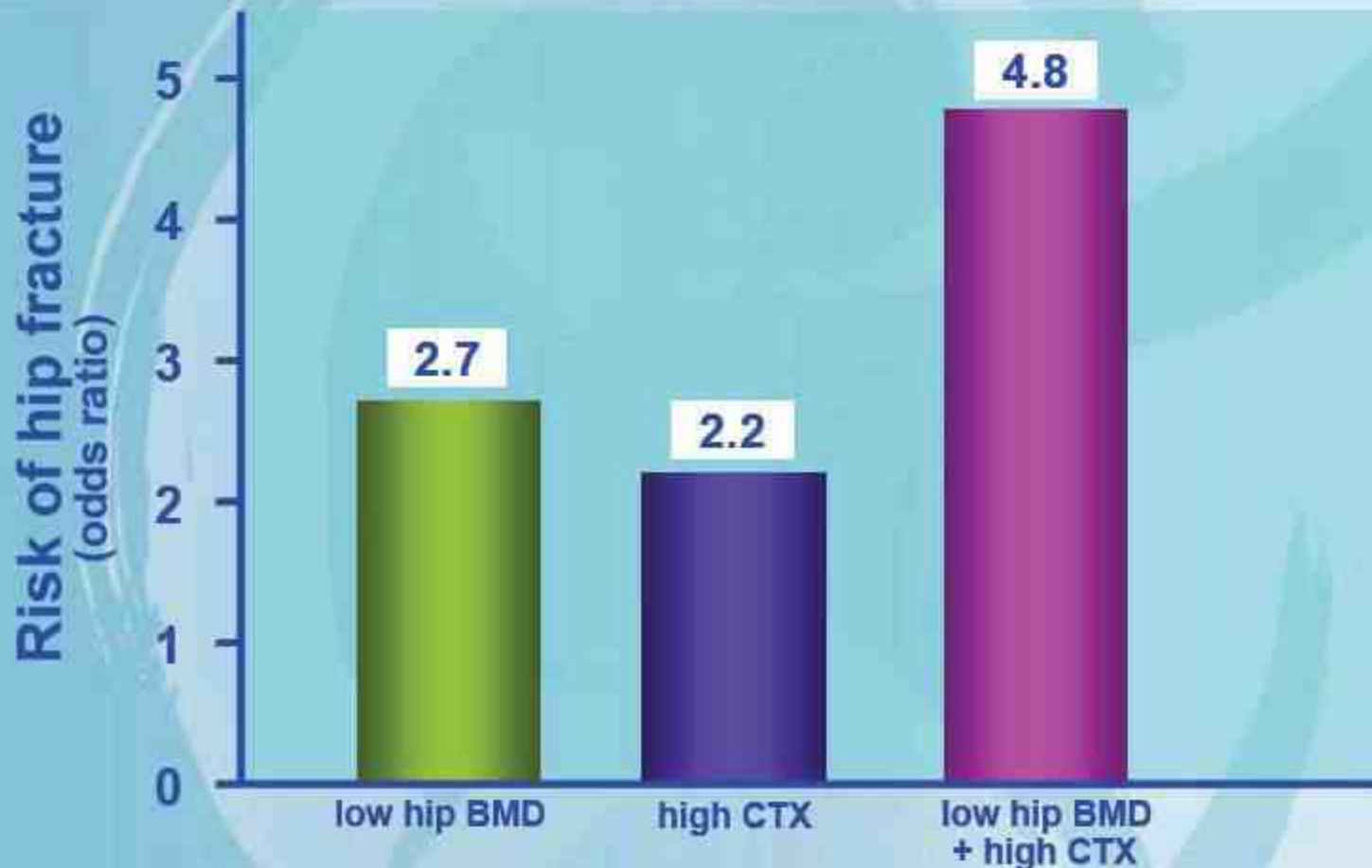


- Kemik rezorpsiyon belirteçleri;
 1. Deoksipiridinolin
 2. C telopeptid
 3. N telopeptit
- Kemik formasyon belirteçleri;
 1. Kemik spesifik alkaline fosfataz
 2. Osteokalsin
 3. C –terminal propeptit

Kemik metabolizma belirteçleri-2-

- Bu değerler günlük deęişkenlikler göstermesi nedeni ile aşırı rezorpsiyon veya azalmış formasyon gibi yorumlar yapmak sağlıklı olmamaktadır.
- Bu tip özel yorumlar için kemik biopsisi gerekmektedir. Rutinde ise bu söz konusu değildir.
- Bir çok otör özellikle kemik rezorpsiyon belirteçlerinin uygulanan tedaviye cevabın monitorizasyonunda kullanılmaktadır.
- Özellikle kemik rezorpsiyon belirteçlerindeki (telopeptitler)%30-50 oranında düşmeler antirezorptif tedavinin başarılı olduğunu gösterebilir.

Association between BMD, resorption markers and fracture risk



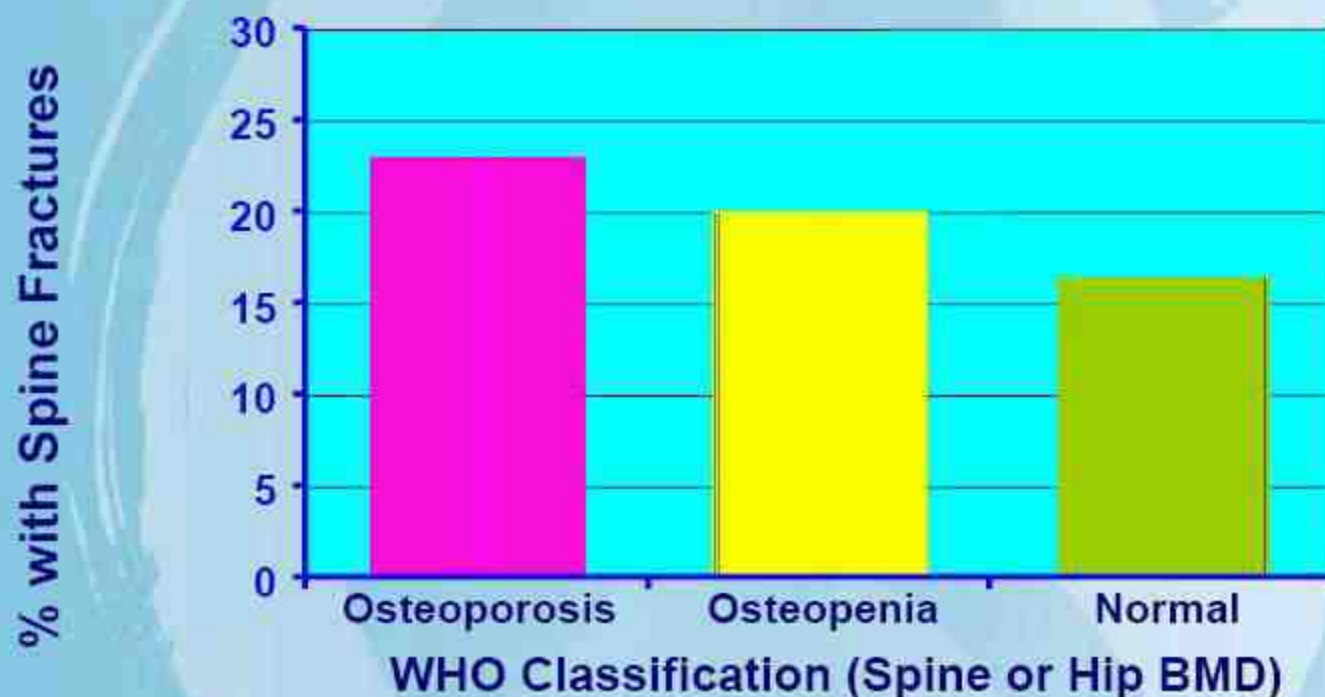
Garnero P et al, J Bone Miner Res, 1996;11:1531-1538

Potential role of biochemical markers of bone turnover in the management of osteoporosis

- Prediction of bone loss
- Prediction of fracture
- Monitoring of therapy:
 - *prediction of response and improving compliance*

Classification by T-score alone misses patients with fractures

Classification by BMD alone misses patients with fractures



- ◆ 50% of women with vertebral fracture are not osteoporotic by BMD
- ◆ 1/3 of women needing Rx are missed using BMD alone

Greenspan S et al, J Clin Densitom 2001;4:373-380

FRAX[®] WHO Fracture Risk Assessment Tool

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Search Language

Welcome

The FRAX[®] tool has been developed by WHO to evaluate fracture risk of patients. It is based on numerous previous studies that indicate the main variables associated with raised risk factors as well as bone mineral density (BMD) of the forearm/neck.

The FRAX[®] would have been developed from studying population based subjects from Europe, North America, Asia and Australia. In the most up-to-date form, the FRAX[®] tool is computer-driven and is available on this site. Several simplified paper versions, based on the number of risk factors are also available, and can be downloaded for office use.

The FRAX[®] approach gives the 10-year probability of fracture. The output is a 10-year probability of hip fracture and the 10-year probability of a major osteoporotic fracture (i.e. wrist, spine, hip or shoulder fracture).



Dr. John A. Kanis
Professor Emeritus, University of Sheffield

Links

International Osteoporosis Foundation
National Osteoporosis Foundation
John D. Cawthon Foundation
European Society for Clinical and Economic
Aspects of Osteoporosis and Osteoarthritis


<http://www.osteoporosis.org>
<http://www.nof.com>
<http://www.jdcf.org/>
<http://www.escop.org/>

[World Fracture Report](#)

FRAX WHO Fracture Risk Assessment Tool

Calculation Tool

Please answer the questions below to calculate the ten year probability of fracture with BMD.

Country: Turkey Home / ID: About the tool: 

Questionnaire:

1. Age (Select: 48.53 years) or Date of birth
Age: Day or birth:

2. Sex: Male Female

3. Weight (kg):

4. Height (cm):

5. Previous fracture: No Yes

6. Previous fracture hip: No Yes

7. Current smoking: No Yes

8. Glucocorticoid use: No Yes

9. Previous falls: No Yes

10. Secondary osteoporosis: No Yes

11. Alcohol 3 or more units per day: No Yes

12. Parental hip BMD (g/cm²):

Risk Faktörleri;

- 1.Yaş
- 2.Cinsiyet
- 3-Ağırlık
- 4-Boy
- 5-Geçirilmiş kırık
- 6-aile öyküsünde kırık
- 7-sigara
- 8-Glukokortikoidler
- 9-Romatoit artirit
- 10-Sekonder osteoporoz
- 11-Alkol 3 birimden fazla
- 12-Kemik mineral yoğunluğu

WHO – FRAX

(www.shef.ac.uk/FRAX)

- İnternet tabanlı WHO denetimi ve onayını almış puanlama sistemi
- KMY dahil 12 risk faktörünü içeriğinde bulunduruyor.
- Amacı 10 yıl içerisinde kalça kırığı olasılığını hesaplayan bir sistem
- Kadın ve erkek popülasyonu için kullanılıyor
- 10 yıl içerisinde kalça için 3% ve diğer major osteoporotik bölgelerde %20 üzerinde kümülatif risk faktörü olması halinde farmakolojik tedavi başlanması endike görülmektedir.
- Frax kullanılarak yapılan tedavi protokollerinin total riskte %35 azalmaya ve daha ekonomik bir tedavi seçeneği sağladığı görülmektedir.

WHO – osteoporozis tarama kriterleri (KMY)

- 65 yaş üzeri popülasyon risk faktörleri göz önüne alınmaksızın
- 65 yaş altı bir veya daha fazla osteoporoz risk faktörü
- WHO ve FRAX tarama yöntemleri premenopozal kadınlara ,50 yaş altı erkeklere ve çocuklara uygulanmamaktadır.
- Bu kriterler dışında kalan grublara Z skorlama uygulanması uygun görülmektedir.



Hasta takip programı

- Seri şekilde alınmış DXA sonuçlarında önceki T- skorlaması ile yeni olanı karşılaştırma yerine gm/cm^2 üzerinden yoğunluk kaybının hesaplanmasında fayda vardır.
- Alternatif KMY testleri uygulanabilir (CT, QUD ve periferal DXA) ortaya çıkan T skorları WHO tanı kriterleri ile uyum sağlamamaktadır.
- En önemlisi halen DXA tedaviye verilen cevabın en iyi değerlendirildiği yöntem olarak kabul görmektedir