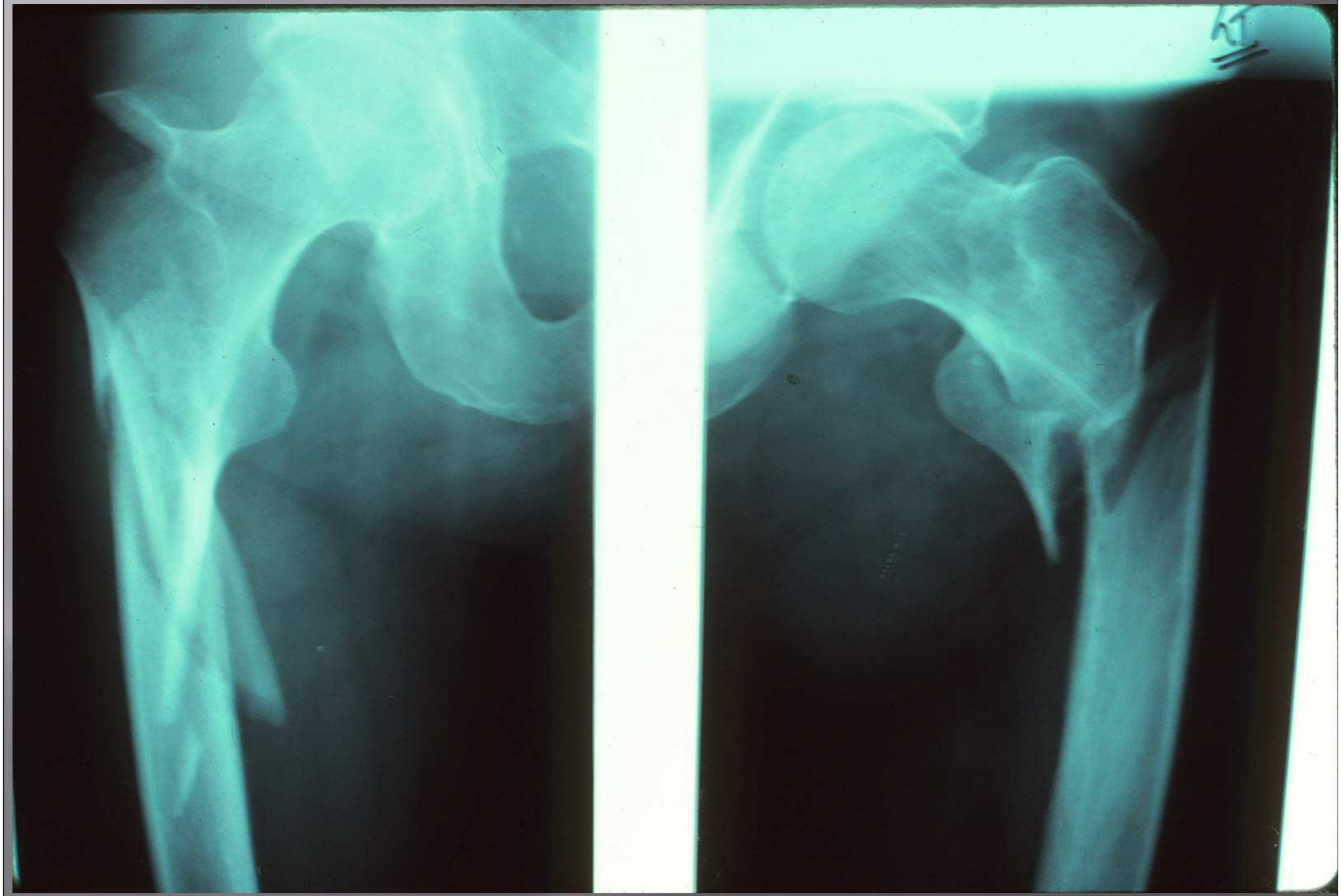
CHAPTER FIVE
THE BONES BENEATH

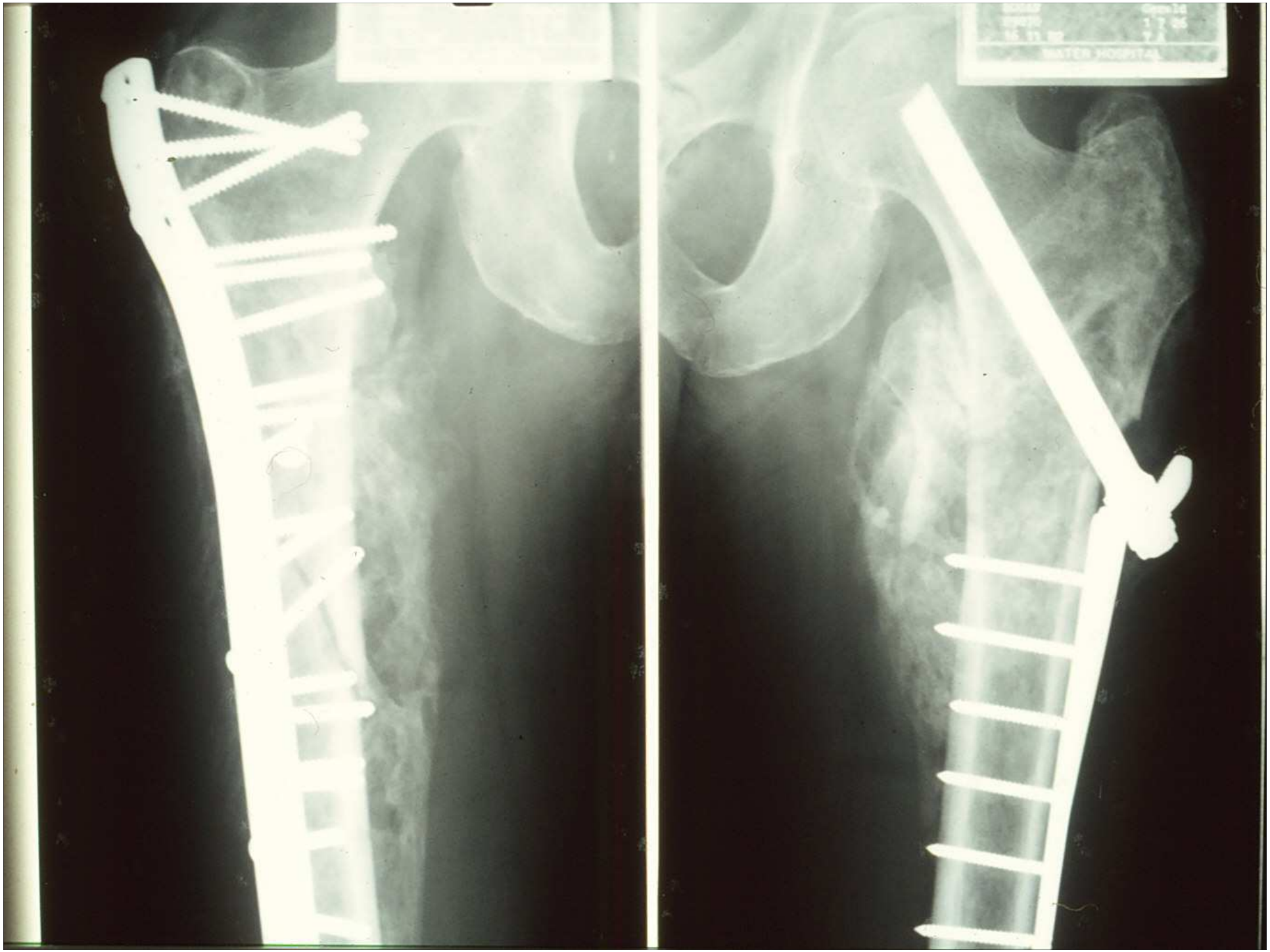
Aging

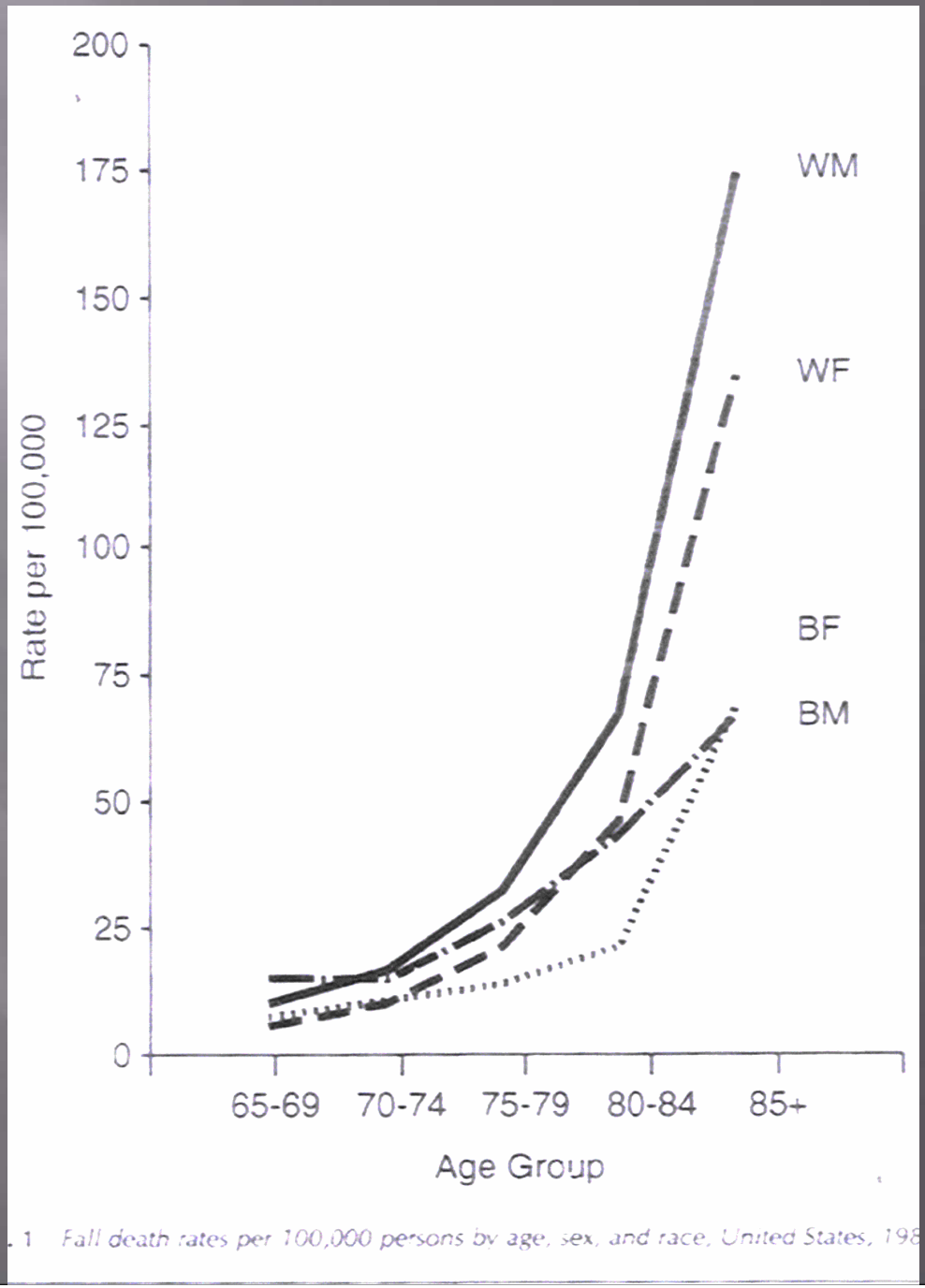
Bending

Breaking

Falls!

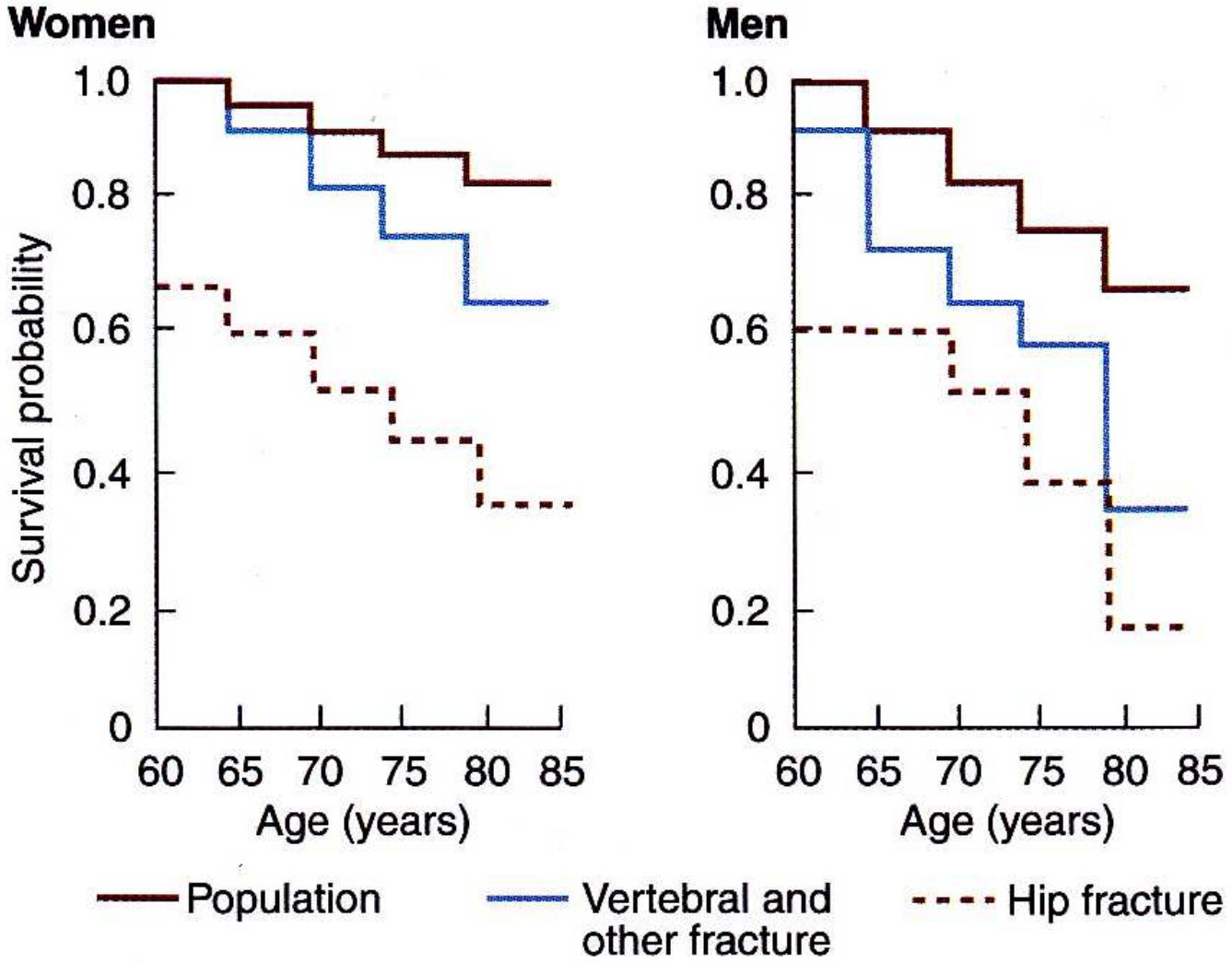




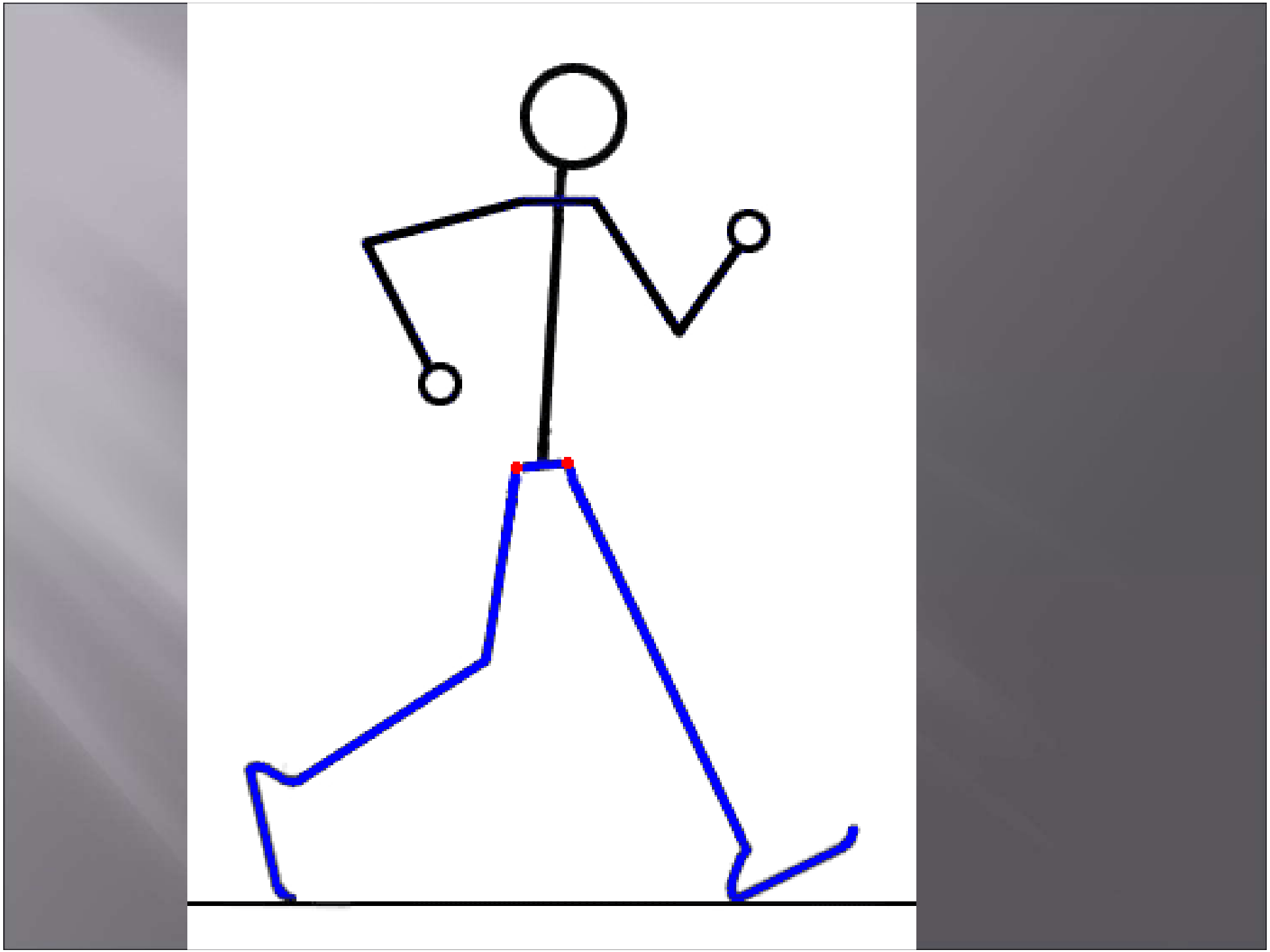


1 Fall death rates per 100,000 persons by age, sex, and race, United States, 198

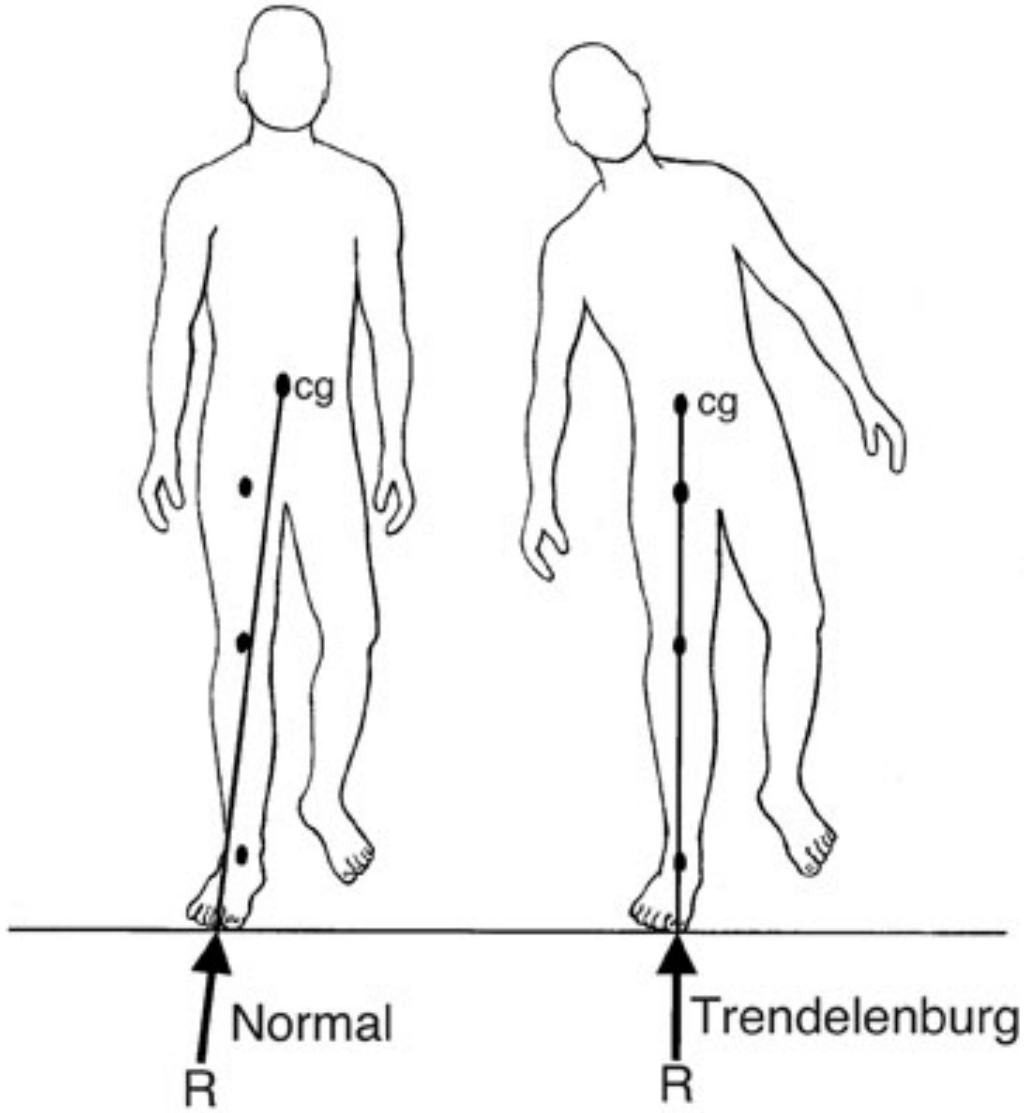
1: Cumulative survival probability after fracture



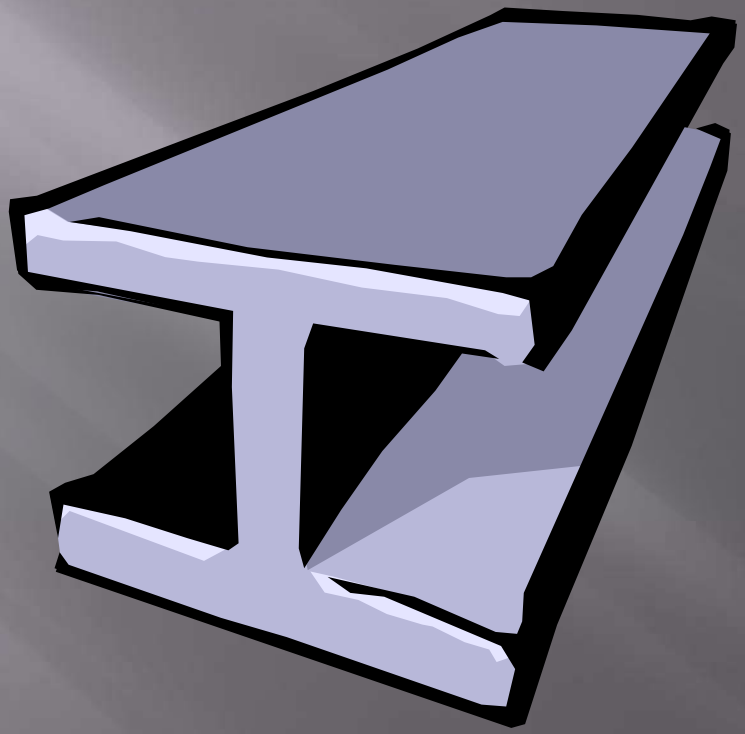
Survival is reduced after any type of fracture, vertebral or non-vertebral, more so in men than women. (Figure reprinted from Center et al[4] with permission from Elsevier.)



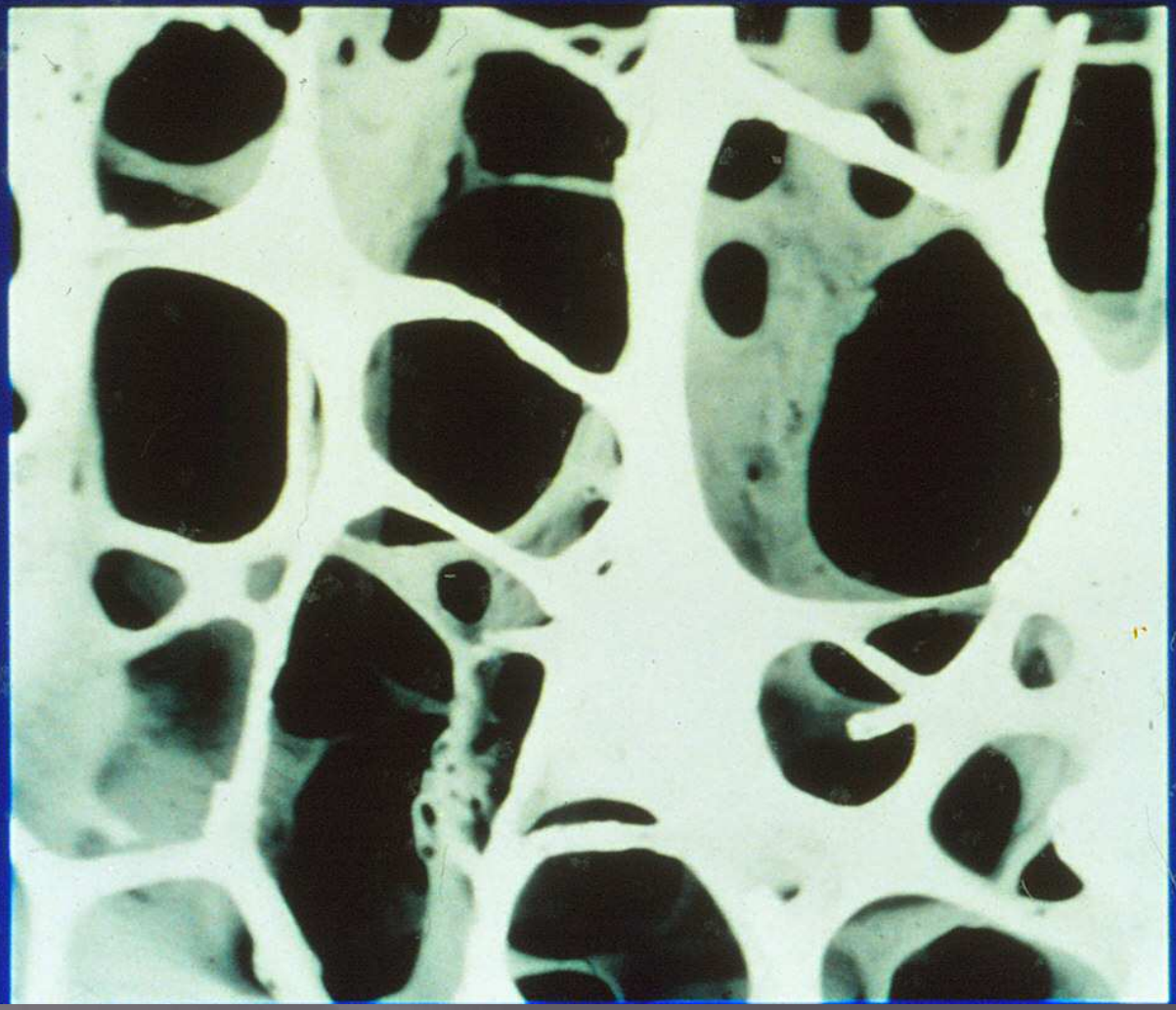
Centre of Gravity Shift



Osteoporosis

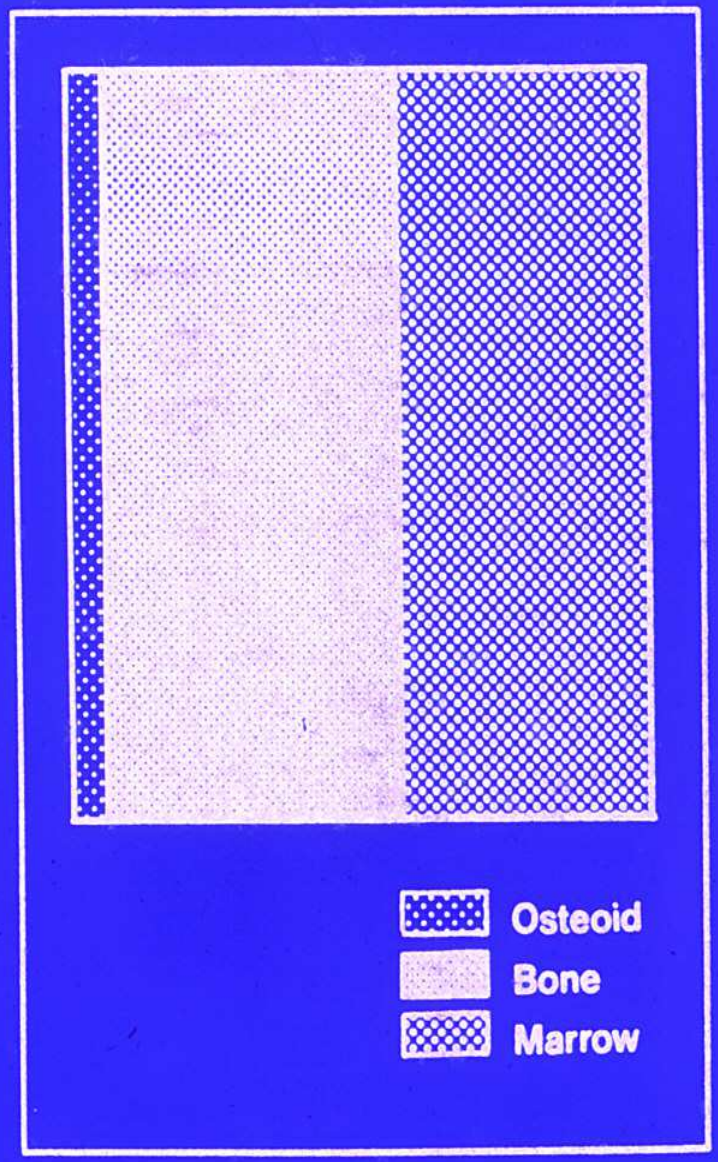


Osteoporosis - trabecular bone

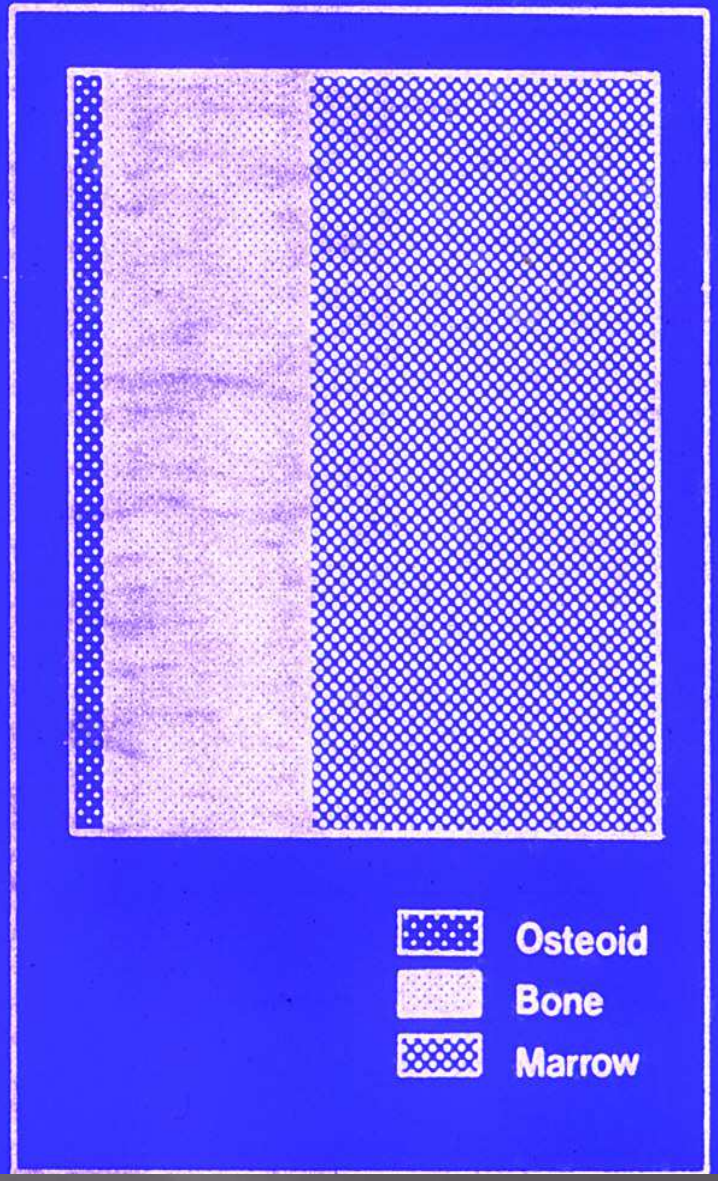


Fieldwidth:
4.6 mm

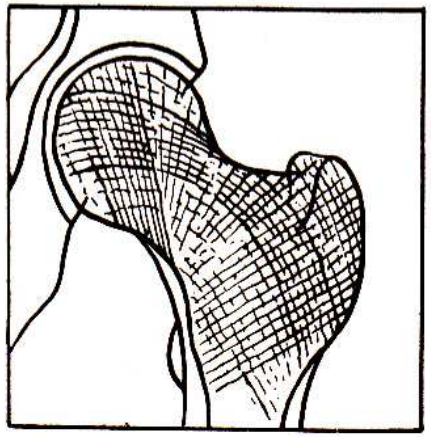
117 Normal bone components



126 Osteoporosis – bone components

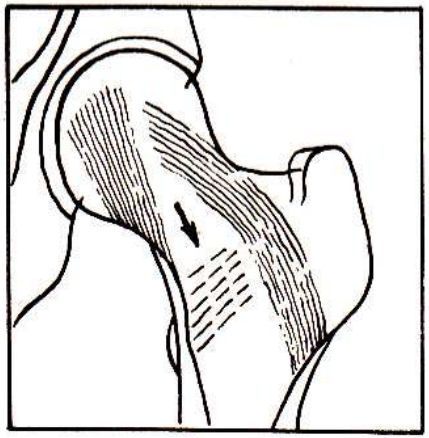


Trabecular Grading Patterns (Singh)
(Figure 2)

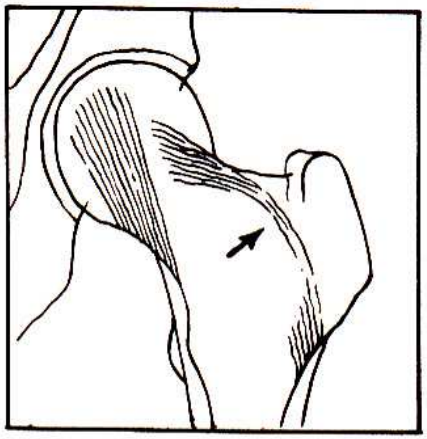


Grade 7 Normal

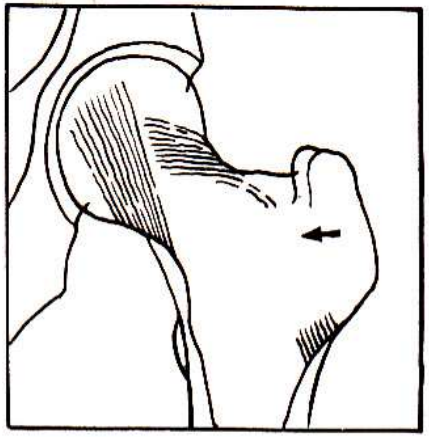
Grade 6



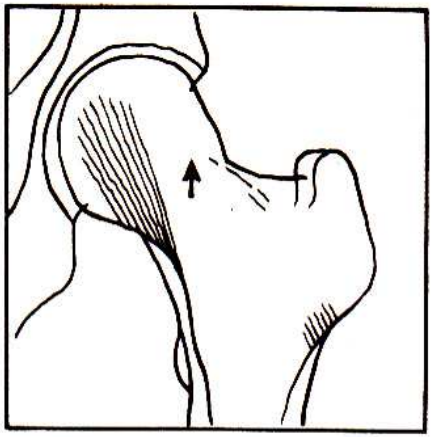
Grade 5



Grade 4

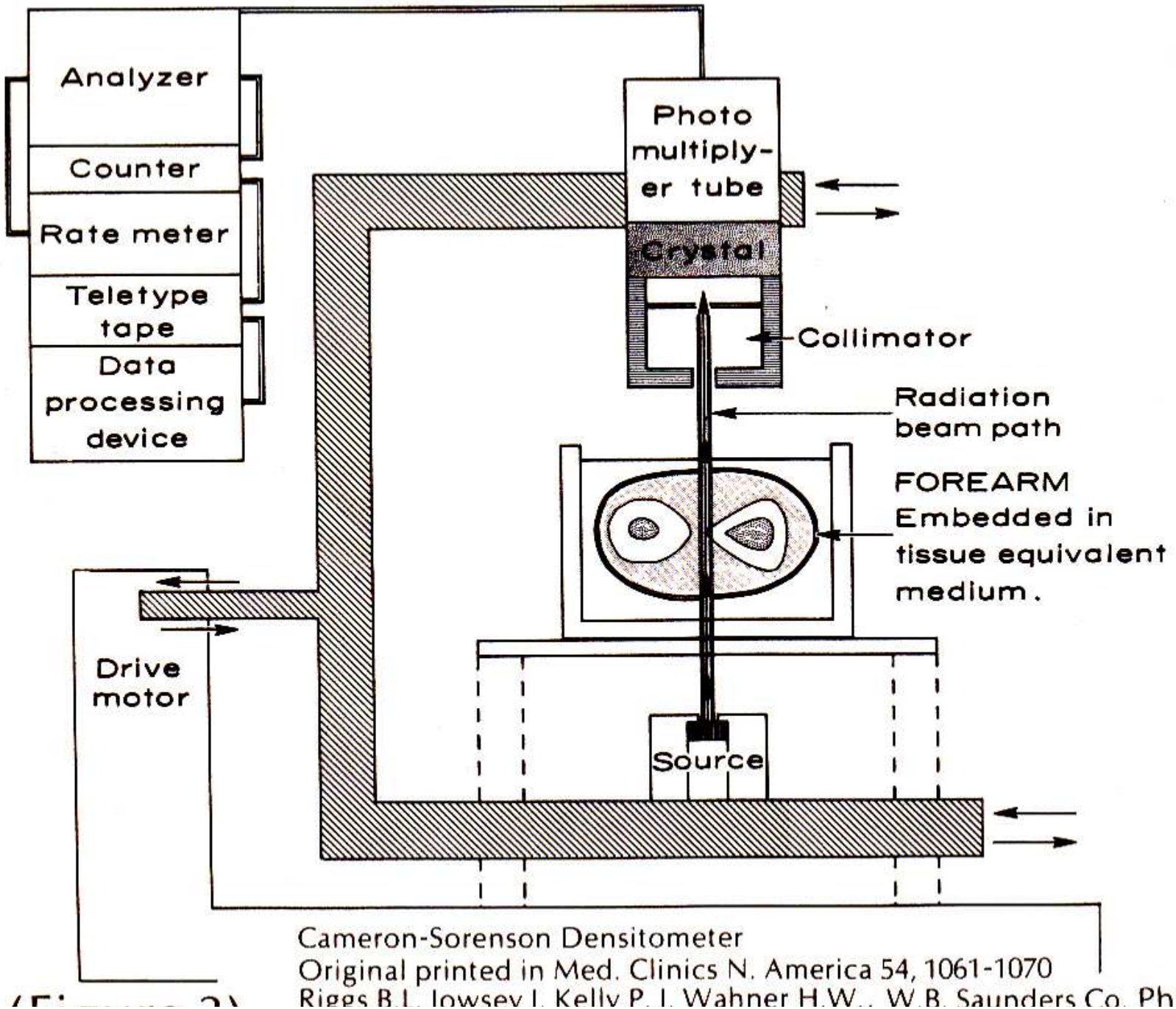


Grade 3



Grade 2

Grade 1



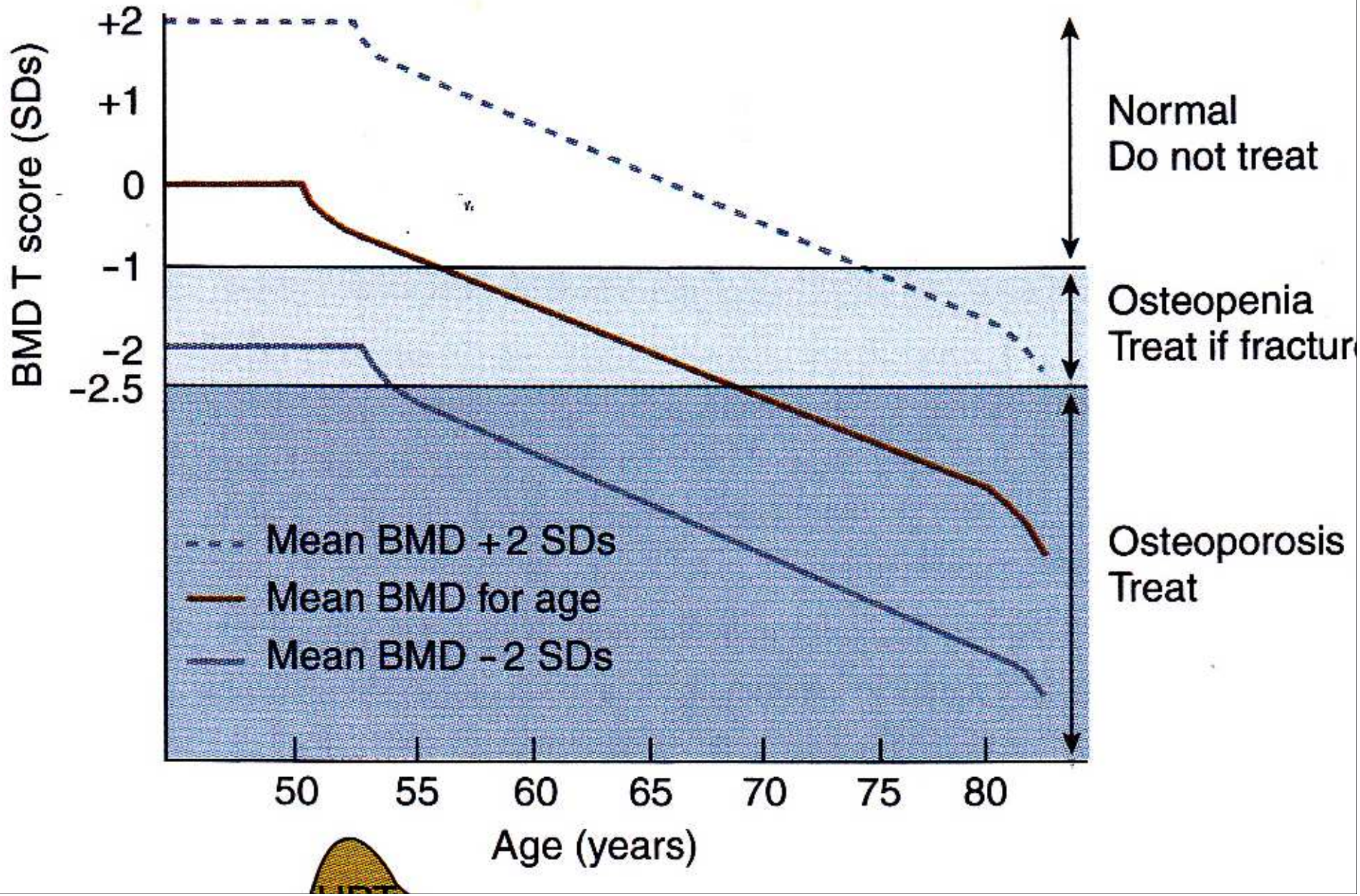
Cameron-Sorenson Densitometer
Original printed in Med. Clinics N. America 54, 1061-1070
Riggs B.L. Jowsey J. Kelly P. J. Wahner H.W., W.B. Saunders Co. Phila

Are your patients eligible for a rebate?

The government has set strict, complex rules that apply to rebates for bone mineral densitometry. Unfortunately, not all patients are eligible for a medicare or DVA rebate. To be eligible for a rebate, patients must meet one of the following criteria:

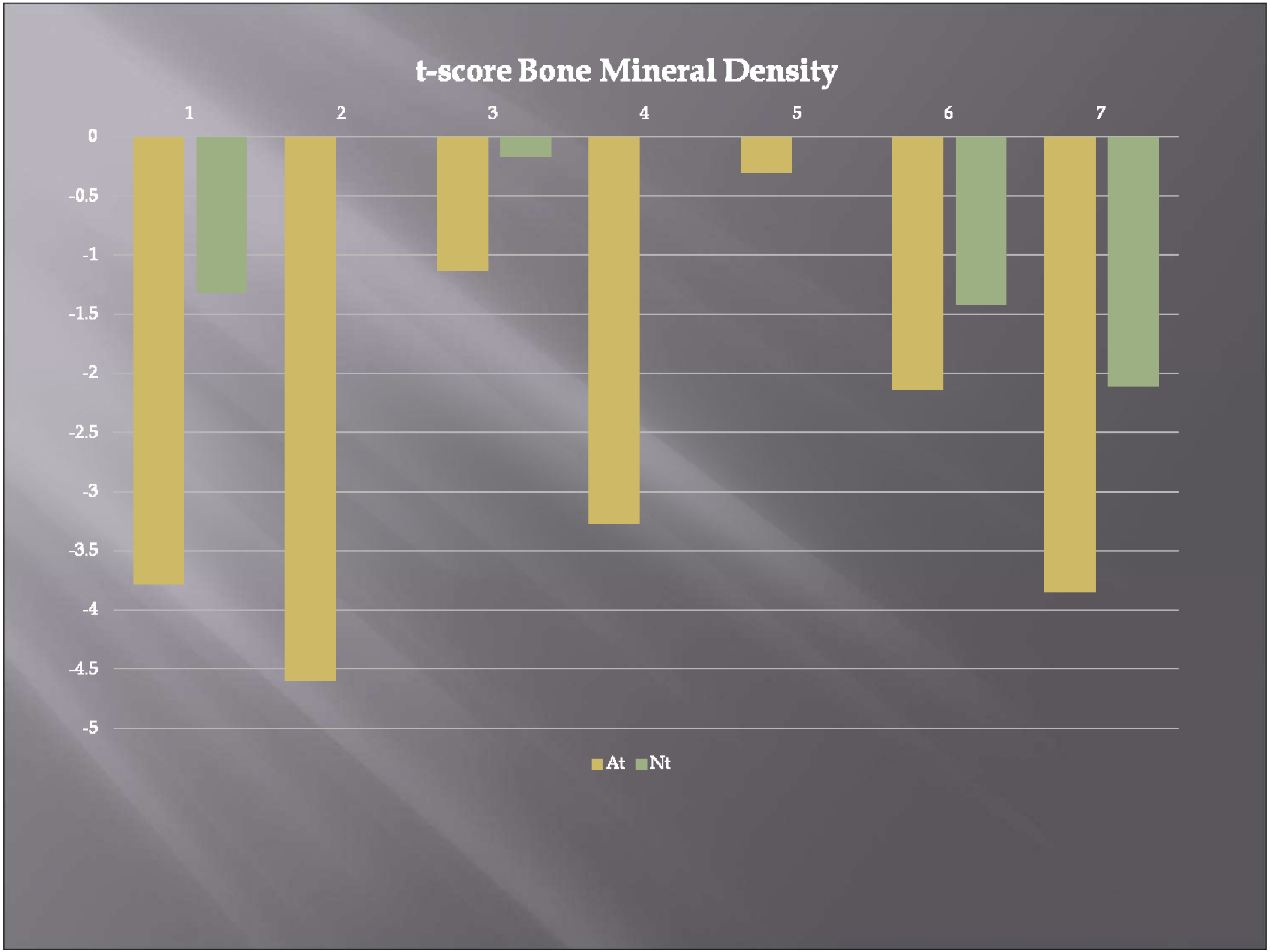
Item number	Description
12323 *Time since previous bone mineral densitometry scan is not relevant.*	If performed for: ▪ A person aged 70 years or over.
12306 *Must be at least 24 months since any previous bone mineral densitometry scan.*	If performed for: ▪ 1 or more fractures occurring after minimal trauma (this can only be used once for each fracture); or ▪ Monitoring of osteoporosis proven by previous bone densitometry; ▪ Scan at least 2 years prior with Z score of -1.50 or lower, or T score of -2.50 or lower.
12312 *Must be at least 12 months since any previous bone mineral densitometry scan.*	If performed for: ▪ Prolonged & current glucocorticoid therapy (as per dose limits outlined in the MBS); ▪ Conditions associated with excess glucocorticoid secretion; ▪ Male hypogonadism; or ▪ Female hypogonadism lasting more than 6 months before the age of 45.
12315 *Must be at least 24 months since any previous bone mineral densitometry scan.*	If performed for: ▪ Primary hyperparathyroidism; ▪ Chronic liver disease; ▪ Chronic renal disease; ▪ Proven malabsorptive disorders (eg. Coeliac or Crohn's disease); ▪ Rheumatoid arthritis; or ▪ Conditions associated with thyroxine excess.
12321 *Must be at least 12 months since any previous bone mineral densitometry scan.*	If performed 12 months following a significant change in therapy.

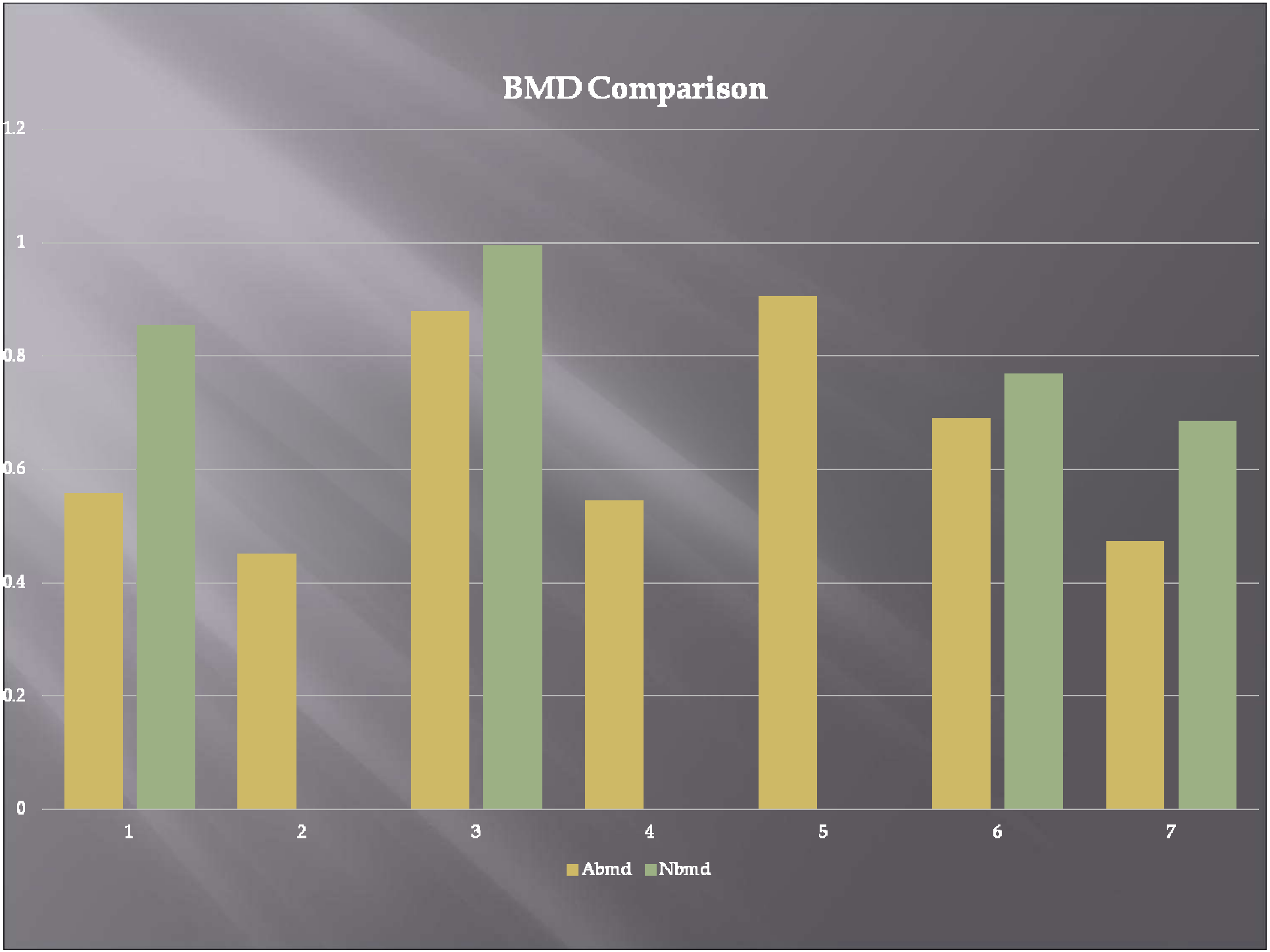
4: Approach to treatment of the individual



Patient cohort report

- In 2010 , 22 patients with prior polio were reviewed in the Armstrong Clinic of the Toowoomba General Hospital.
- In those with a history of falls, fracture or age > 70 bone densitometry was recorded.
- In selected cases the radiology service agreed to do assessment of affected and unaffected weight bearing limbs.


t-score Bone Mineral Density
1
2
3
4
5
6
7
0
-0.5
-1
-1.5
-2
-2.5
-3
-3.5
-4
-4.5
-5
At
Nt


BMD Comparison
1.2
1
0.8
0.6
0.4
0.2
0
1
2
3
4
5
6
7
Abmd
Nbmd

Conclusion

- Osteoporosis is likely to be highly prevalent in post-polio patients.
- Affected weight bearing limbs are likely to be more severely affected than non affected weight bearing limbs.
- There would appear to be a case to propose a larger comparative cohort study .
- Specific intervention needs to be considered.
- These results may be of extreme importance to other spinal and non spinal disabilities.

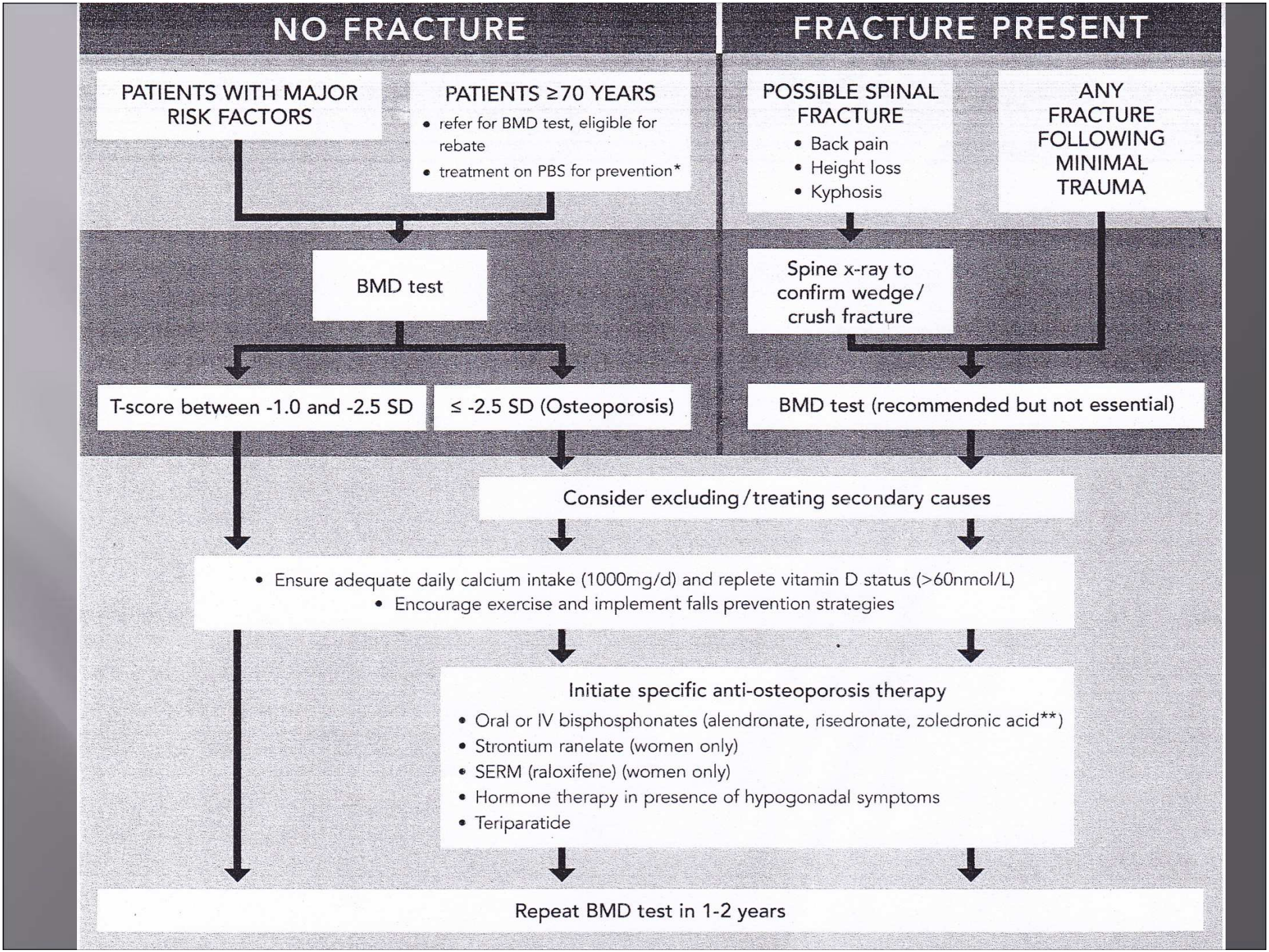
Unanswered questions

- How common are falls in post-polio compared with age matched controls?
- How prevalent and severe is osteoporosis in post-polio patients?
- Does age of onset of polio, gender and gait disturbance act as an effect modifier?
- What is the best treatment ?
- How should we exercise with lower limb or spinal disease to protect bone mass?
- Who can we see for these issues?

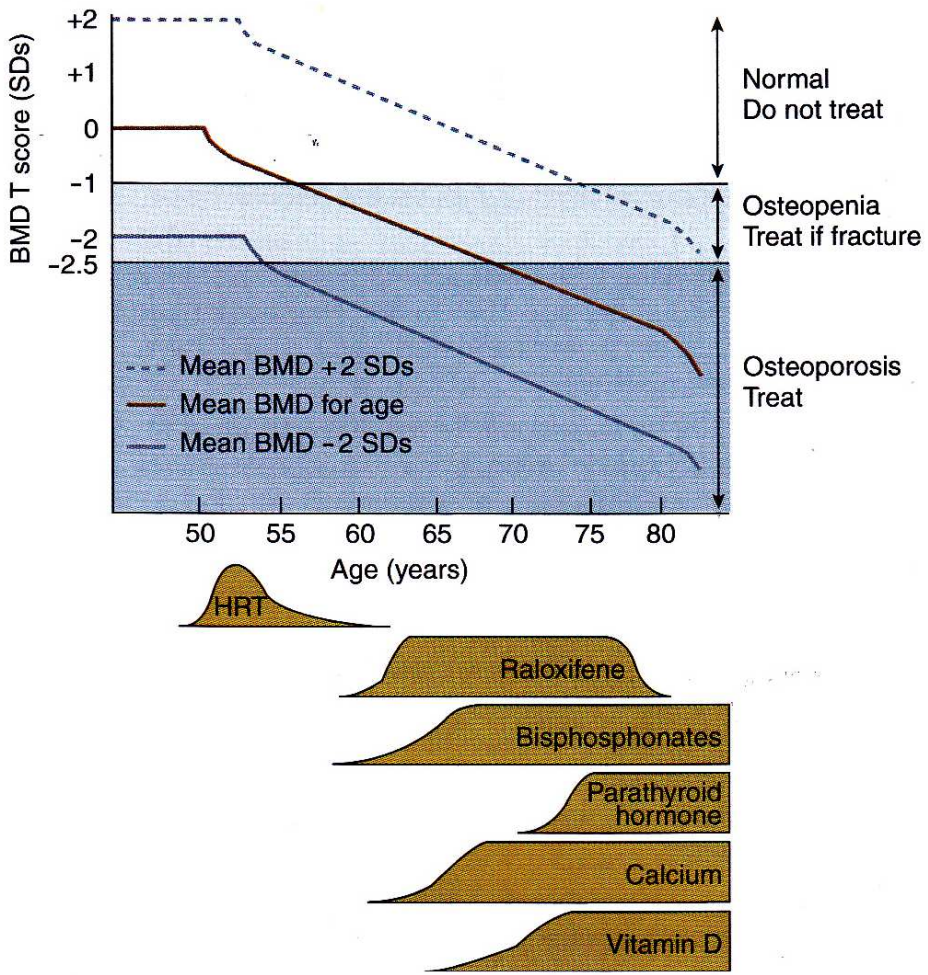
Damage
Control

The imperative to treat increases with:

- Increasing age
- Declining BMD
- Prior fracture
- Family history of osteoporosis
- Risk factors for bone loss (eg, hyperparathyroidism, corticosteroid therapy, immobilisation, chronic illness)
- High levels of bone remodelling markers


NO FRACTURE
FRACTURE PRESENT
PATIENTS WITH MAJOR RISK FACTORS
PATIENTS ≥70 YEARS
• refer for BMD test, eligible for rebate
• treatment on PBS for prevention*
POSSIBLE SPINAL FRACTURE
• Back pain
• Height loss
• Kyphosis
ANY FRACTURE FOLLOWING MINIMAL TRAUMA
BMD test
Spine x-ray to confirm wedge/ crush fracture
T-score between -1.0 and -2.5 SD
≤ -2.5 SD (Osteoporosis)
BMD test (recommended but not essential)
Consider excluding/treating secondary causes
• Ensure adequate daily calcium intake (1000mg/d) and replete vitamin D status (>60nmol/L)
• Encourage exercise and implement falls prevention strategies
Initiate specific anti-osteoporosis therapy
• Oral or IV bisphosphonates (alendronate, risedronate, zoledronic acid**)
• Strontium ranelate (women only)
• SERM (raloxifene) (women only)
• Hormone therapy in presence of hypogonadal symptoms
• Teriparatide
Repeat BMD test in 1-2 years

4: Approach to treatment of the individual



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