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Summary report

All you wanted to know about DXA

This summary is intended as a supplementary resource to be read after viewing the video presentation. It seeks to highlight the main clinical learnings from Dr Ellis's presentation.

Learning objectives

You will learn:

- DXA is an invaluable tool in the diagnosis and monitoring of osteoporosis
- The appropriate use of a T-score
- The recommendations for fracture risk assessment
- Clinical risk factors for osteoporotic fractures.

Introduction

DXA is an invaluable tool in the diagnosis of osteoporosis, assessment of fracture risk, diagnosing fractures of the vertebra and for monitoring change in bone density. The overall decision to treat a patient should not however be based solely on DXA criteria but on overall fracture risk assessment.

The accepted definition of osteoporosis is 'a skeletal disorder characterised by compromised bone strength predisposing to an increased risk of fracture'.[1] The key use of DXA for the assessment of bone density when followed by appropriate use of available therapies can result in a 50% relative risk reduction for fractures. (Figure 1).[2]

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Click here – you need to watch the video in order to complete the CPD questionnaire.

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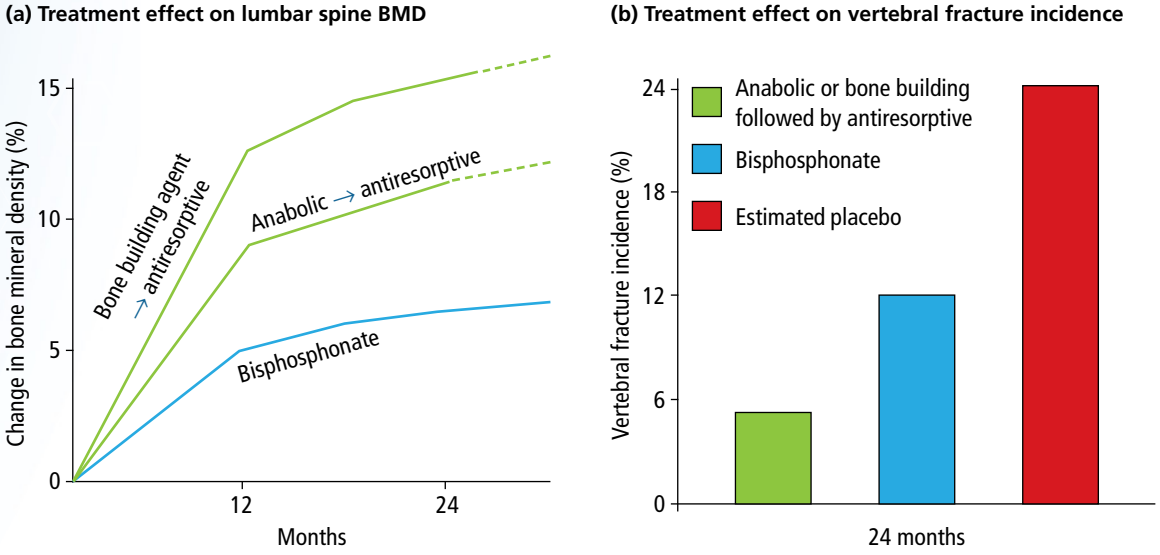

Figure 1. Treatment effect on lumbar spine BMD and treatment effect on vertebral fracture incidence

The diagnosis of osteoporosis is made with the use of a T-score; a -2.5 or less provides the cut-off for the diagnosis. The T-score compares bone density to healthy young adults, but cannot be applied to healthy premenopausal women, men under the age 50 years and to children.

Summary of 'top tips' to ensure optimal interpretation of DXA images:

- In assessment of spinal T-scores, exclude any vertebral reading with a T-score >1.0SD compared to the adjacent vertebra
- Falsely elevated readings of the spine can be due to factors such as aortic calcification, which may distort the vertebral reading
- Check the quality of the lumbar spine measurements against the provided DXA report
- Be careful of making a diagnosis of osteoporosis on the basis of a single interpretable vertebral reading, particularly in the older patient. In this instance, different valid skeletal site measurements should be added to the diagnostic assessment; the hip and, in some patients, the forearm (33% radius) if the hip (femoral neck or total hip) or spine cannot be measured; the forearm assessment is particularly useful in the diagnosis of hyperparathyroidism and in the very obese patient[3]
- In using all of these sites, if there is a diagnostic T-score <-2.5 at any of these sites, the diagnosis is osteoporosis (not osteoporosis of this site and osteopenia of that site because it does not reach the diagnostic T-score)
- Age is an independent risk factor for fracture probability assessment. For example: at the same BMD of -2.5, the 10-year probability of an osteoporotic fracture is 11% for those older than 50 years of age but rises to 28% for those older than 80 years[4]
- A history of fractures predicts future fractures
- FRAX is a risk assessment instrument developed by the University of Sheffield and it uses clinical risk factors plus DXA measurements for improved fracture risk estimation. South Africa now has its own valid country-specific reference database for FRAX which is based on South African research in different population groups which have varied risks (Table 1)
- The blind spot of fracture detection is the presence of a vertebral fracture; an existing fracture is often missed on this site as two-thirds of vertebral fractures are asymptomatic
- It is important to remember that up to 40% of patients who have osteoporotic vertebral fractures have BMD values above -2.5
- Use DXA follow-up to determine significant change despite medication; continued loss while adherent to therapy is an indicator for therapy change
- Determining significant change in bone density requires knowledge of the least significant change for that particular DXA machine as well as operator variability.

Table 1. Clinical risk factors for osteoporotic fractures

Biological factors	Lifestyle	Medications
Bone density	Low calcium intake	Glucocorticoid therapy
Age	Vitamin D deficiency	Aromatase inhibitor
Previous fragility fracture	Hight salt intake	Anticonvulsant Rx
Race (Caucasian/Asian)	High alcohol intake (≥ 3 units/day)	Immunosuppressive Rx
Premature menopause	Low physical activity	Lithium
Delayed puberty	Smoking	GnRH inhibitors
Height loss		Proton pump inhibitors

Key learnings

- The diagnosis of osteoporosis is made with T-score ≤-2.5 but is not applicable to healthy premenopausal women, men younger than 50 years and to children
- Different valid skeletal sites should be measured for diagnostic assessment
- There is now a validated FRAX risk assessment tool for South Africa, incorporating clinical risk factors and DXA measurements
- DXA follow-up is recommended for monitoring response to therapy.

References

Click on reference to access the scientific article

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3. Kanis JA, Johnell O, Oden A, *et al*. Ten-year probabilities of osteoporotic fractures according to BMD and diagnostic thresholds. *Osteoporosis Int*. 2001;**12**(12): 989-995.

This summary report was compiled for *deNovo Medica* based on a recent webinar presented by Dr Graham Ellis Osteoporosis Centre, Somerset West

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