

## ASSESSMENT OF 30 MCQs

FPSC No : 74

## MCQS ON OSTEOPOROSIS

Submission DEADLINE: : 28 AUGUST 2018, 12 NOON

**INSTRUCTIONS**

- To submit answers to the following multiple choice questions, you are required to log on to the College Online Portal ([www.cfps2online.org](http://www.cfps2online.org))
- Attempt ALL the following multiple choice questions.
- There is only ONE correct answer for each question.
- The answers should be submitted to the College of Family Physicians Singapore via the College Online Portal before the submission deadline stated above.
- There will be NO further extension of the submission deadline

**1. Which of the following statements is true:**

- A. We should NEVER perform a DEXA scan for a patient with moderate risk on OSTA.
- B. If OSTA is normal, even though there are 2 clinical risk factors present, DO NOT perform a DEXA scan.
- C. All postmenopausal women above 50 years old should have a DEXA scan.
- D. FRAX can be used without BMD to predict the 10-year fracture risk.
- E. FRAX must always be used with BMD to predict the 10-year fracture risk.

**2. For effective reduction of fragility fractures, the most appropriate management should be:**

- A. Treatment with oral bisphosphonates for 3 years.
- B. Falls prevention, such as improving balance through exercise.
- C. Confinement of the patient to the bed so he does not fall
- D. Adequate calcium and vitamin D intake.
- E. Medical treatment combined with falls prevention.

**3. For which one of the following patients would you order a BMD measurement?**

- A. A 48-year-old lady weighing 60kg with no symptoms and last menstrual period 3 months ago.
- B. A 48-year-old lady weighing 60kg with severe hot flushes and regular menses.
- C. A 44-year-old lady weighing 60kg with no symptoms and last menstrual period 18 months ago.
- D. A 44-year-old lady weighing 40kg with hot flushes and last menstrual period 2 weeks ago.
- E. A 48-year-old lady weighing 40kg with history of radius fracture in childhood after a fall from a swing and regular menses.

**4. The aim of osteoporosis treatment is to:**

- A. Improve the bone mineral density g/cm<sup>2</sup> measured by DEXA.
- B. Prevent falls.
- C. Prevent fractures.
- D. Improve the T-score measured by DEXA.
- E. Reduce deaths

**5. The following patient has osteoporosis:**

- A. A 52-year-old man with high risk on OSTA.
- B. A 60-year-old man with high risk of fracture on FRAX without BMD measured.
- C. A 60-year-old man with T-score at spine =2.0 and T-score at hip =-2.2.
- D. A 65-year-old man with T-score at spine =-2.7 and T-score at hip =-1.5.
- E. A 65-year-old man with 2 rib fractures after a road traffic accident and T-score at spine =2.0 and T-score at hip =-2.2.

**6. A 60-year-old postmenopausal Chinese female with no history of fragility fractures consults you with her Hologic DXA BMD scan results. Central T-scores are all <-3.5 and Z-scores <-2.5.**

- A. You can start an oral bisphosphonate safely as she has no significant history of prior medical disease.
- B. You should check serum creatinine before starting oral bisphosphonate.
- C. You should check basic blood tests, including serum creatinine to ensure her renal function is adequate for common oral medications for osteoporosis.
- D. You should check basic blood tests and consider some advanced tests.
- E. You should do all the tests you can think of related to osteoporosis.

7. A 42-year-old Indian female with a history of primary hypothyroidism secondary to Hashimoto's thyroiditis is on treatment with thyroxine 125mcg OM. She complains of low back pain, with pain score 5/10, after moving a heavy box from a shelf. X-rays show a compression fracture at L1. Her TFT results were: fT4 15.8pmol/L (N 8.0–16.0), TSH 0.05mIU/L (N 0.45–4.50). Her other routine chemistries were normal. FRAX scores: 10-year risk of major fracture 8%, that of hip fracture 2%. You should:
- Send her for vertebroplasty for immediate pain relief.
  - Keep her thyroxine dose at 125mcg OM. She does not require any DXA scan or pharmacological treatment for osteoporosis as her FRAX scores are low.
  - Keep her thyroxine dose at 125mcg OM and start an oral bisphosphonate.
  - Reduce her thyroxine dose to 100mcg OM. Check her DXA scan in 1 year's time and defer pharmacological treatment for osteoporosis as her FRAX scores are low.
  - Reduce her thyroxine dose to 100mcg OM. She requires a detailed history and physical examination, a DXA scan and pharmacological treatment for osteoporosis.
8. A 50-year-old male with a 3-month history of low back pain and difficulty passing urine was found to have a compression fracture at T12. He is obese with BMI 31 kg/m<sup>2</sup> and has little axillary and pubic hair. Testosterone was found to be low at 6pmol/L (N 10.0–16.0).
- Palpate the patient's testes and prostate.
  - Start testosterone replacement and osteoporosis medication depending on DXA T-score.
  - Start osteoporosis medication depending on DXA score.
  - Start testosterone replacement and recheck BMD 1 year later.
  - Start the patient on a weight-reduction diet, weight-bearing exercises, and recheck testosterone when he has lost weight.
9. A post-menopausal osteoporotic patient has been taking her oral bisphosphonate faithfully for the past 3 years, but her DXA results show a steady decline in BMD. Her history and physical examination do not reveal anything out of the ordinary. She walks 1 hour daily, takes 1 cup of high-calcium soya milk and oats daily, and does not smoke or drink. FBC, ESR, serum creatinine, total calcium, ALP, 25(OH)D, liver enzymes, and TSH are all normal.
- Reassure her that all is well.
  - Do some urine tests.
  - Ask her to take extra calcium supplements.
  - Start her on a parenteral anti-resorptive.
  - Start her on an anabolic agent.
10. A 52-year-old overweight woman was seen for uncontrolled diabetes, hypertension, and osteoporosis. For the past 1 year, she has been taking maximal Gliclazide, Metformin, Sitagliptin, Amlodipine, Valsartan, Atenolol, and Alendronate. BP is 158/95 mm Hg, HbA1c 9.2%, DXA T-scores are -2.8 in the spine, -3.2 in the femoral neck and -3.1 in the total hip.
- Intensify lifestyle measures, especially with diet and exercise before considering more medications, since she is already on so many medications.
  - Investigate for secondary cause of diabetes, hypertension, and osteoporosis.
  - Add basal insulin and hydrochlorothiazide.
  - Switch her to a parenteral osteoporosis medication.
  - Add basal insulin and hydrochlorothiazide and switch her to a parenteral osteoporosis medication.
11. A patient comes to you with a Hologic DXA scan. T-scores are -2.4 at the spine, -2.6 at the femoral neck and -2.7 at the total hip. The scan is technically perfect. She does not have any fractures.
- The patient has osteoporosis.
  - The patient has osteopaenia in the spine and osteoporosis in the hip.
  - The patient has osteopaenia.
  - The patient may not have osteoporosis.
  - The patient needs more assessments to exclude secondary osteoporosis.
12. A 47-year-old patient had a poor BMD result from a scan at a health fair. She was recommended to take calcium supplements. Three months later, she had a repeat scan and was told that it showed an improvement in her BMD, and was advised to continue her calcium supplements.
- | BMD ankle | 10/3/2017 | 6/6/2017 |
|-----------|-----------|----------|
| T-score   | -3.2      | -2.9     |
- Based on her T-scores, there is a clinically significant improvement in her BMD.
  - You need to calculate the change in BMD in g/cm<sup>2</sup> to make sure it is beyond the Least Significant Change before you can be sure there is an improvement in BMD.
  - You need to scrutinise the technical aspects of the scan before relying on the results.
  - You need to look at her Z-scores.
  - Disregard the results totally.

**13. A 60-year-old woman has a DXA T-score of -3.0 and a Z-score of -2.1. Which statement is true?**

- A. She has a 2<sup>2</sup> or 4-fold risk of having a fracture compared to a young adult woman.
- B. She has a 2<sup>3</sup> or 8-fold risk of having a fracture compared to a young adult woman.
- C. She has a 2<sup>3</sup> or 8-fold risk of having a fracture compared to a 60-year old woman with a T-score of zero.
- D. She has a 3<sup>2</sup> or 9-fold risk of having a fracture compared to a 60-year-old woman with a T-score of zero.
- E. She has the bones of a 70-year-old.

**14. A 70-year-old man with prostate cancer had been referred to you in 2012, as he had been on treatment by his urologist with Goserelin. You have treated him with SC Denosumab since then. Analyse the DXA scan below (Page 43). Which statement is false?**

- A. The patient's vertebrae are correctly labelled and intervertebral lines correctly placed.
- B. The patient's BMD has improved significantly between 2012 and 2014. Congratulate him on his improvement and continue SC Denosumab.
- C. The patient's BMD had reduced significantly between 2010 and 2011, and between 2011 and 2012.
- D. The patient's BMD had been stable between 2010 and 2011, as T-scores were normal.
- E. SC Denosumab is approved for use in prostate cancer patients on androgen deprivation therapy.

**15. A 70-year-old Singaporean Chinese woman has been treated with an oral bisphosphonate for a year. Analyse the NORLAND DXA scan below (Page 44). Which of the following statements are true of her LUNAR DXA BMD?**

- A. Her true T-score is likely to be lower than -4.91.
- B. Her true T-score is likely to be higher than -4.91.
- C. Her Z-score of -2.17 indicates she is close to the mean of 70-year-old Singaporean Chinese women.
- D. Her femoral neck BMD has increased by 11.4% in 1 year, which is likely to be clinically significant.
- E. Since your unit is now using a Hologic DXA machine, you can easily calculate her change in BMD by subtracting the new BMD on Hologic from the previous Norland value, divide the result by the previous Norland value x 100 for the percentage change after treatment.

**16. In assessing the need for anti-osteoporosis treatment, which of the following factors is the most compelling reason to commence someone on pharmacological treatment**

- A. BMD T-score less than -2.0.

- B. History of minimal trauma fracture involving the hip or vertebra.
- C. Risk factors for osteoporosis such as early menopause.
- D. History of recurrent falls.
- E. Low vitamin D levels.

**17. Which one of the following statements is true regarding calcium and vitamin D supplementation?**

- A. All individuals should be supplemented with 1000mg/day elemental calcium with vitamin D 800–1000iu/d.
- B. Calcium and vitamin D supplementation has been proven to be effective in preventing fractures.
- C. Anti-osteoporosis treatment should be prescribed together with adequate calcium and vitamin D supplementation.
- D. Calcium and vitamin D supplementation can reduce falls in community-dwelling elderly patients.
- E. Calcium and vitamin D supplementation can increase risk of cardiovascular disease.

**18. Bisphosphonates are commonly prescribed for the treatment of osteoporosis. What is the current evidence for its effectiveness and adverse effects?**

- A. It has been shown in studies to reduce vertebral fractures by 15–20 % and hip fractures by 20–25%.
- B. It has been shown in studies to reduce vertebral fractures by 35–65% and hip fractures by 26–53%.
- C. It has been shown in studies to cause risk of medical-related osteonecrosis of the jaw in 1 per 1000 cases.
- D. It has been shown in studies to cause gastritis and reflux esophagitis.
- E. It has been shown in studies to cause atypical femoral fractures in 3 per 1000 cases.

**19. Denosumab is a monoclonal antibody against RANKL available for the treatment for osteoporosis. Which of the following is true regarding its mechanism of action and administration?**

- A. It is given subcutaneously every 6 months for a lifetime duration of maximum 5 years with a discussion regarding drug holiday after.
- B. It is contraindicated in patients with a history of eczema and skin allergy.
- C. It is safe for use in patients with end-stage renal failure and on dialysis.
- D. It has been shown in trials to reduce relative risk of vertebral fractures by 68% and hip fractures by 40%.
- E. It can only be used in patients with GFR of more than 30cc per minute.

**20. Parathyroid hormone is an option for treatment in osteoporosis. Which of the following statements is INCORRECT regarding its mechanism and use ?**

- A. It can only be given for a lifetime duration of 18–24 months due to risk of osteosarcoma and evidence that the effect of the medication begins to wane after this time.
- B. Parathyroid hormone is contraindicated in individuals with a history of Paget's disease, metastases to bone, and irradiation to bone due to risk of osteosarcoma.
- C. Parathyroid hormone is recommended for treatment in patients who have had a suboptimal response to antiresorptive treatment.
- D. Parathyroid hormone is available as hPTH(1-34) and is given as a daily subcutaneous injection.
- E. Parathyroid hormone is an anabolic agent which predominantly works on osteoblast to increase bone formation and its effect persists after cessation of a treatment course.

**21. These factors increase risk of osteoporotic fracture:**

- A. High bone mineral density.
- B. High body weight.
- C. High lean mass.
- D. Poor muscle strength.
- E. High calcium intake.

**22. Which of the following is true about dietary calcium?**

- A. Typical calcium intake in most adults is between 0.5mg to 2mg per day.
- B. Activated vitamin D decreases absorption of dietary calcium.
- C. There is clear evidence that people who consume more than the average amount of calcium have a lower risk of bone fractures.
- D. Absorption efficiency is inversely related to calcium intake, so that a higher proportion is absorbed when calcium intake is low.
- E. Bone loss will be more rapid in a person with sufficient calcium and vitamin D.

**23. Which of the following is a risk factor for falls in the elderly?**

- A. Visual impairment.
- B. Decreased bone mineral density.
- C. Poor dental care.
- D. (A) and (C).
- E. All the above.

**24. Which of the following medications has been found to be effective in preventing falls in older adults?**

- A. Donepezil.
- B. Cholecalciferol.
- C. Folic acid.
- D. Rivastigmine.
- E. Fexofenadine.

**25. Which of the following is true regarding falls in the elderly?**

- A. A patient should not use a walker to ambulate if their motor strength is intact.
- B. Hip fractures are not the most frequent type of fall-related fractures.
- C. A motorized scooter is a better option to prevent falls in the elderly.
- D. Medication use may contribute to increased fall risk.
- E. Regular exercise increases the risk of falls.

**26. What is the most important aspect of post-fracture care?**

- A. Population-based preventive programme to prevent the next fracture.
- B. Affordable BMD test to allow early diagnosis and monitor treatment response.
- C. Affordable effective osteoporosis therapy so that every patient can be treated.
- D. Empower patient through health literacy improvement and self-management training.
- E. Accessible and convenient care provided by family physician.

**27. Osteoporosis is an important disease to prevent and treat because:**

- A. Low BMD is associated with other chronic diseases.
- B. There is now medicine to treat osteoporosis.
- C. Fractures may lead to loss of quality of life and death.
- D. Osteoporosis can lead to fractures.
- E. Osteoporosis can lead to falls.

**28. Mdm TAL was a 75-year-old retired seamstress, with previous history of L2 vertebra fracture. She was recently discharged from hospital for hip fracture. She has maternal history of hip fracture but no other risk factors for osteoporosis. Her weight was 56kg and height was 156cm. Her Hologic BMD measurement of neck of femur was 0.590 g/cm<sup>2</sup> (T score -2.2). Her FRAX score is:**

- A. Major osteoporotic 37, Hip fracture 24.
- B. Major osteoporotic 45, Hip fracture 33.
- C. Major osteoporotic 31, Hip fracture 19.
- D. Major osteoporotic 19, Hip fracture 5.1.
- E. Major osteoporotic 14, Hip fracture 4.4.

**29. Mdm TAL was a 75-year-old retired seamstress with previous history of L2 vertebra fracture. She was recently discharged from hospital for hip fracture. She has maternal history of hip fracture but no other risk factors for osteoporosis. Her weight was 56 kg and height was 156 cm. Her Hologic BMD measurement of neck of femur was 0.590 g/cm<sup>2</sup> (T score -2.2). She would urgently need osteoporosis treatment because of her:**

- A. OSTA moderate risk, osteopaenic on BMD, FRAX low risk.
- B. OSTA high risk, osteoporotic on BMD, FRAX low risk.



- C. OSTA moderate risk, osteoporotic on BMD, FRAX moderate risk.  
 D. OSTA high risk, osteoporotic on BMD, FRAX moderate risk.  
 E. OSTA high risk, osteopaenic on BMD, FRAX high risk.

**30. Mdm TAL was a 75-year-old retired seamstress with previous history of L2 vertebra fracture. She was recently discharged from hospital for hip fracture. The Fracture Liaison Service will be able to help her by:**

- A. Linking her up with the right hospital for treatment.  
 B. Identifying her as a patient with fragility fractures, then assessing, investigating, and treating her for underlying osteoporosis as appropriate.  
 C. Providing financial counselling, in particular to help her claim her pioneer generation benefits.  
 D. Coordinating care with the physiotherapist, occupational therapist, home care team, family physician, etc.  
 E. Providing home-based care and transitional care services.

### Question 14 DXA scan

Sei2  
Patient Information:

Name:	PQR
Social Security No:	
Patient ID:	S123Z
Postal Code:	
Sex:	Male
Ethnicity:	Singapore
Height:	170.0 cm
Weight:	68.8 kg
DOB:	01.07.1950
Age:	63
Menopause Age:	
Referring Physician:	EDMUND CHIONG

Study Date: 02/04/2014  
Study Time: 8:49:00 AM  
MRN:

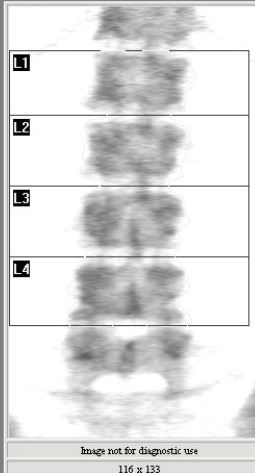
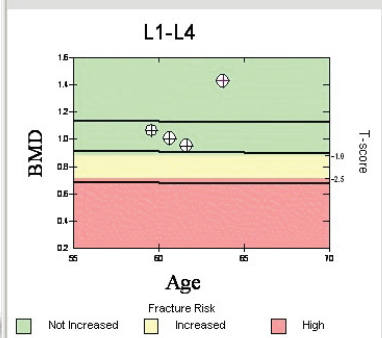


Image not for diagnostic use  
116 x 133

L1-L4



Fracture Risk  
 Not Increased Increased High

T-score vs. Singapore Male, Z-score vs. Singapore Male. Source: Singapore Reference - 25 Jul 00

Scan Information:

Scan Date:	02 April 2014 - A04021403
Scan Type:	f Lumbar Spine
Analysis Date:	02.04.2014 09:26
Report Date:	04.04.2014 13:25
Institution:	National University Hospital
Operator:	sop
Model:	Discovery Wi (S/N81703)
Comment:	
Software version:	12.7.3.2

Results Summary:

Region	Area[cm²]	BMC[g]	BMD[g/cm³]	T-score	PR (Peak Reference)	Z-score	AM (Age Matched)
L1	14.47	20.15	1.393	2.9	130	3.5	139
L2	16.06	21.61	1.346	2.8	134	3.3	144
L3	16.52	24.18	1.464	3.6	144	4.3	158
L4	18.53	27.71	1.495	3.7	137	4.4	148
Total	65.58	93.65	1.428	3.7	143	4.5	158

Total BMD CV 1.0%, ACF = 1.029, BCF = 1.006

Results History: L1-L4

Scan Date	Age	BMD	T-score	BMD Change (g/cm³) vs Baseline	BMD Change (g/cm³) vs Previous
02.04.2014	63	1.428	3.7	0.365 (34.3%)*	0.477 (50.1%)*
17.02.2012	61	0.951	-0.4	-0.112 (-10.6%)*	-0.053 (-5.3%)*
17.02.2011	60	1.004	0.1	-0.059 (-5.6%)*	-0.059 (-5.6%)*
28.01.2010	59	1.063	0.6		

Fracture Risk: Not Increased; WHO Classification: Normal  
 \*Denotes significance at 95% confidence level, LSC is 0.022326 g/cm³

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## Question 15 NORLAND DXA scan

