

# Vitamin D Deficiency

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GPST2 Patch Tutorial

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# Aims and Objectives

- Be able to define vitamin D deficiency.
- Be able to identify those at risk.
- Have a greater knowledge of the treatment options available.
- Be able to advise patients on the appropriate treatment option according to local prescribing guidelines.

# Definitions

<b>Serum Vitamin D Concentration</b>	<b>Vitamin D Status</b>	<b>Symptoms/Signs</b>
<25nmol/l	Deficient	Rickets or Osteomalacia Symptomatic/Asymptomatic
25-50nmol/l	Insufficiency	Associated with disease risk
50-75nmol/l	Adequate	Healthy
>75nmol/l	Optimal	Healthy

# Rickets/Osteomalacia

- Bone has low mineral content – excess uncalcified osteoid and cartilage.
- If occurs during period of bone growth ie childhood – Rickets.
- If after fusion of epiphyses - Osteomalacia

# Rickets

Knocked knees

Bow legged

Thickened wrists/ankles

Signs of hypocalcaemia:

- Tetany
- Depression
- Perioral Paraesthesia
- Carpo-pedal spasm

# Osteomalacia

Bone Pain

Partial Fractures

- Looser's Zones

Proximal Myopathy

- Waddling gait

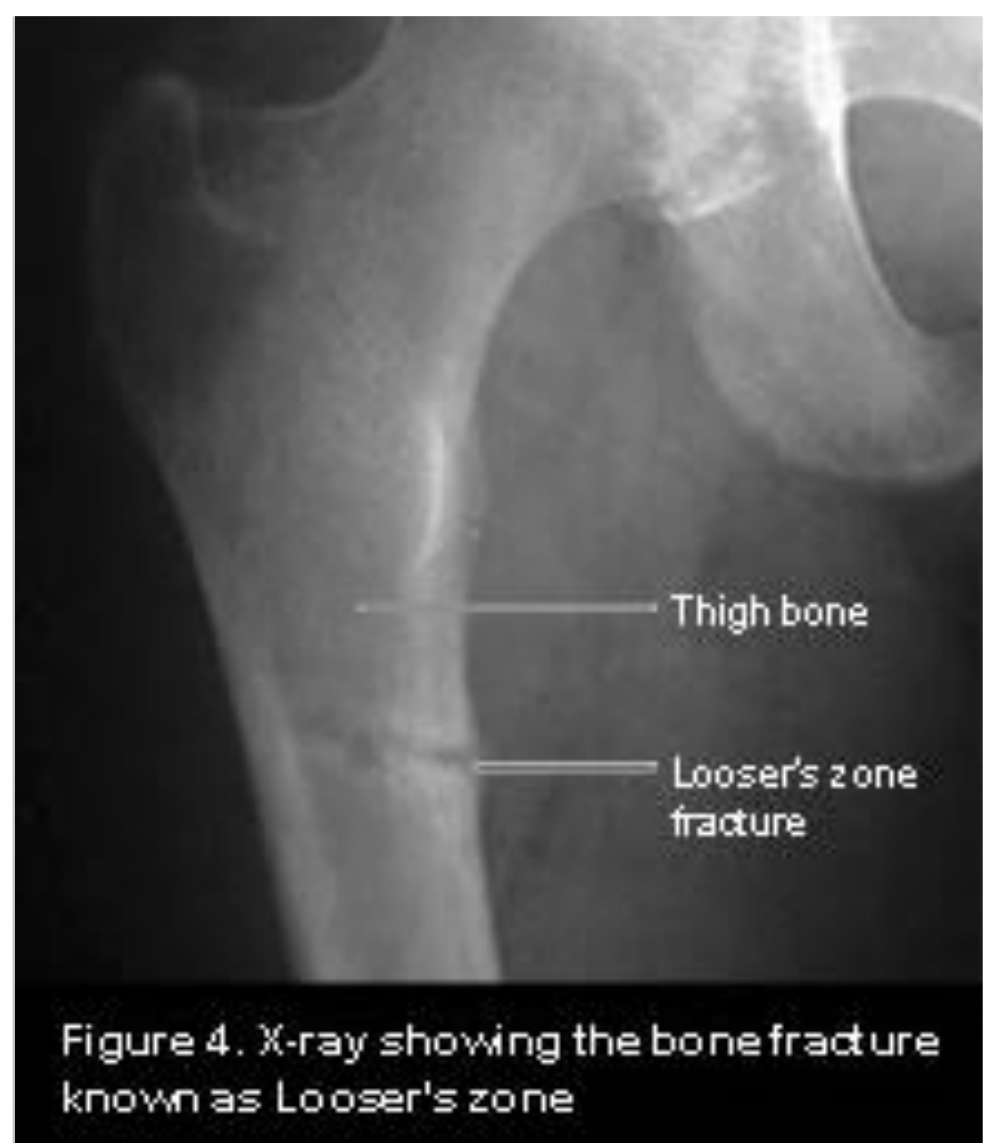


Figure 4. X-ray showing the bone fracture known as Looser's zone

# Risk Factors

- Pregnant
- Breastfeeding
- Babies and young children <5
- Older people aged > 65
- Institutions
- Dark Skin
- Poor sunlight exposure – night shift workers



# Vitamin D Requirements

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<b>Age</b>	<b>Micrograms per day</b>
Children under 4 months	7.5
Children over 4 months	10
Adults under 65 (including pregnant or breastfeeding women)	10
People who are 65 or over	20

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Note – I got this table from CKS on vitamin D but the CMO letter says 6 months to 5 years need 7-8.5mcg

# Sunlight

- During the summer the skin can produce 100 micrograms/day
- Possible to build up a store of vitamin D for winter months.
- With age, skin becomes thinner and less Vitamin D can be produced.

# Vitamin D in Food

<b>Food</b>	<b>Serving</b>	<b>Vitamin D (micrograms*)</b>
Margarine	10 g (1/2 oz)	0.8
Eggs	One size 3	1.1
Cheese	60 g (2 oz)	0.2
Milk	0.15 litre (1/4 pint)	0.05
Butter	10 g (1/2 oz)	0.1
Fortified cereals	30 g (1 oz)	0.5
Herring	100 g (3 1/2 oz)	16.5
Tinned tuna	100 g (3 1/2 oz)	4.0
Tinned salmon	100 g (3 1/2 oz)	12.5
Mackerel	100 g (3 1/2 oz)	8.0
Kipper	100 g (3 1/2 oz)	13.5
Sardines	100 g (3 1/2 oz)	7.5

# Investigation

- Vitamin D – RUH £20.50
- Bone Profile
  - Calcium ↓
  - Phosphate ↓
  - ALP ↑
- PTH ↑
- X- rays if fractures suspected
- Looser's zones are characteristic but not always present
- Other Radiological Signs:
  - crush fractures of the vertebrae
  - trefoil pelvis
  - spontaneous fractures of the ribs, pubic rami, femoral neck or the metaphyses above and below the knee
  - bowing of the long bones
- in children - increased depth and width of the epiphyseal growth plate, and a 'cupped' appearance of the adjacent metaphyses

<b>Serum 25-OHD concentration</b>	<b>Vitamin D Status</b>	<b>Signs/ Symptoms</b>	<b>Drug Management</b>	<b>BCAP TLS</b>
< 25 nmol/l	Deficient	Rickets Osteomalacia	Ergocalciferol Injection 300 000 – 600 000IU IM	Red HIV patients only. National supply probs
		Asymptomatic Rickets Osteomalacia	Fultium D3 (coleciferol) 800 iu/capsule	Green
		Symptomatic Rickets Osteomalacia	Colecalciferol 50000 IU/capsule. Dekristol 20000 iu/capsule	Red hospital ONLY
25-50 nmol/l	Insufficiency or long term maintenance	Associated with disease risk	1000 – 2000 IU daily for 3 months then continue on daily	Self treat OTC
50-75 nmol/l	Adequate	Healthy	400 – 800 IU daily. Lifestyle advice.	Can consider self treat OTC
> 75 nmol/l	Optimal	Healthy	None	None

# Financial Implications

- Expensive test
- Testing in RUH up 600% in last 2 years
- Vitamin D prescriptions up 16% from 2011
- CMO wrote to GP's in Jan 2012 urging them to prescribe vitamin D to all at risk groups
- Healthy Start vits – see separate talk

# AKT Questions

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A 67-year-old woman presents with lethargy, depression and constipation. A set of screening blood tests reveals the following:

Calcium	3.05 mmol/l
Albumin	41 g/l

What is the single most useful test for determining the cause of her hypercalcaemia?

- A. ESR
- B. Phosphate
- C. Vitamin D level
- D. Parathyroid hormone
- E. ACE level



A 65-year-old Asian female presents to her GP with generalised bone pain and muscle weakness. Investigations show:

Calcium	2.07 mmol/l
Phosphate	0.66 mmol/l
ALP	256 U/l

What is the most likely diagnosis?

- A. Bone tuberculosis
- B. Hypoparathyroidism
- C. Myeloma
- D. Osteomalacia
- E. Paget's disease

A 79-year-old man presents to his GP with a history of lower back pain and right hip pain. Blood tests reveal the following:

Calcium	2.20 mmol/l
Phosphate	0.8 mmol/l
ALP	890 u/L

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What is the most likely diagnosis?

- A. Primary hyperparathyroidism
- B. Chronic renal failure
- C. Osteomalacia
- D. Osteoporosis
- E. Paget's disease

A 57-year-old woman with a history of polymyalgia rheumatica has been taking prednisolone 10 mg for the past 5 months. A DEXA scan is reported as follows:

L2 T-score	-1.6 SD
Femoral neck T-score	-1.7 SD

What is the most suitable management?

- A.** No treatment
- B.** Vitamin D + calcium supplementation + repeat DEXA scan in 6 months
- C.** Vitamin D + calcium supplementation
- D.** Vitamin D + calcium supplementation + hormone replacement therapy
- E.** Vitamin D + calcium supplementation + oral bisphosphonate

A rise in alkaline phosphatase can be caused by each one of the following except:

- |                       |           |                        |
|-----------------------|-----------|------------------------|
| <input type="radio"/> | <b>A.</b> | Pregnancy              |
| <input type="radio"/> | <b>B.</b> | Paget's disease        |
| <input type="radio"/> | <b>C.</b> | Healing bone fractures |
| <input type="radio"/> | <b>D.</b> | Osteomalacia           |
| <input type="radio"/> | <b>E.</b> | Hypoparathyroidism     |

# Questions/Discussion

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# References

- BCAP Prescribing
- BNF
- Passmedicine.com
- [http://www.cks.nhs.uk/print\\_preview?pageid=321048000&pagepath=/patient\\_information\\_leaflet/osteomalacia\\_soft\\_bones\\_arc/view\\_as\\_a\\_leaflet&rootcontainerelement=nhsd\\_topicroot&viewtype=full](http://www.cks.nhs.uk/print_preview?pageid=321048000&pagepath=/patient_information_leaflet/osteomalacia_soft_bones_arc/view_as_a_leaflet&rootcontainerelement=nhsd_topicroot&viewtype=full)
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