

Health Sciences 1111
Module 17 Skeletal System
Lab 17

View the Video "**Reconstructive Hand Surgery**" and answer the questions on your worksheet.

Anatlab

- On campus students: Double-click on the Anatlab icon
- Online/Ind Study Students: Insert the Anatlab CD
- Click on the upper limb
- View the *Axial Skeleton and Muscles*
- Answer the questions on the computer as they appear in the material.
- Answer the quiz questions at the end of the material.

- View the **Bones of the Upper Limb**
- Answer the questions on the computer as they appear in the material *Stop at screen # 40.*
- Answer the quiz questions at the end of the material.

- Click on the Head and Neck button
- View the **Skull**
- Answer the questions on the computer as they appear in the material.
- Answer the quiz questions at the end of the material.
- Exit Anatlab

Webpath

- Go to the Health Sciences Website
- Click on **Webpath**
- Click on Systemic System Pathology
- Click on Bone and Joint Pathology

- As you view the following images, be sure to click on the x-ray box and the highlighted words
 - 4-9 - Regarding normal and reactive condition
 - 11 - Femur, osteosarcoma, gross
 - 12 - Tibia, osteosarcoma, gross
 - 13 - Osteosarcoma
 - 14 - Osteosarcoma
 - 16 - Pelvis, chondrosarcoma, gross
 - 25 - Metastatic carcinoms
 - 27 - osteochondroma, gross and radiograph
 - 28 - Osteochondroma, gross
 - 32 - Giant cell tumor of bone
 - 63 - Vertebrae, degenerative osteoarthritis, gross
 - 67 - Rheumatoid arthritis, pannus in joint
 - 72 - Foot, gout, gross
 - 73 - Gouty arthritis, radiograph
 - 75 - Gouty arthritis, joint fluid
 - 80 - Short-limbed dwarfism

As you view the film *Reconstructive Hand Surgery* be sure to answer the following questions.

1. What was Maria's diagnosis?
2. Where are they getting another bone to enhance her finger?
3. Will the surgery affect her walking?
4. What does MRA stand for?
5. What is used to limit blood loss?
6. What is the white strand called?
7. What is the purple structure behind it?
8. What is used to retract the flesh?
9. What instrument spreads the structures apart?
10. Is the Second Digital Nerve located near the pinky or the thumb?
11. Why wouldn't you want a straight line scar across the joint?
12. What is used to force blood out of Maria's leg and foot?
13. What is used as a cutting board for an artery?
14. How long will Maria have the cast on her hand?

WebPath Questions:

Image 4

1. In this image you see a bone end sticking through a laceration; it is located on the anterior portion of the upper right arm equidistant from the axilla and the antecubitals. This can be considered a definitive sign of a
 - a. fracture of the distal radius of the right arm
 - b. compound fracture of the distal radius of the left arm
 - c. fracture of the mid-humerus
 - d. compound fracture in the mid-humerus of the right arm
2. What is commonly used to fixate an open reduction and internal fixation (ORIF) of a fracture to the humeral neck?
 - a. The ORIF is an accepted procedure in this area.
 - b. A stainless steel hammer and surgical nails.
 - c. The fixation is accomplished with a rod and screws.
 - d. Pins held in place by stainless steel wire.

Image 5 (x-ray)

3. The x-rays in this image show a fracture of the
 - a. fifth metatarsal of the right hand
 - b. fifth metacarpal of the left hand
 - c. fifth phalanges of the left hand.
 - d. fifth phalanges of the right hand.
4. What type of new bone growth would you expect to find in the region of a healing fracture?
 - a. irregular new bone or woven bone
 - b. smooth almost undetectable new bone growth
 - c. no new bone growth, the old bone will eventually heal
 - d. the new bone growth will be the result of osteoclastic bone building activity.

Image 6

5. In what area of this fracture will the new bone growth occur?
- only in the outer edges of the fracture
 - only in the inner edges of the fracture
 - in the disrupted trabeculae
 - in the non-disrupted trabeculae.

Image 6 (x-ray)

6. In these radiographs, what is the clue in the bottom panel that indicates there is healing to the tibial and fibular fractures?
- there is no healing the fracture is still visible in the bottom panel
 - the muscle tissue is more visible in the lower panel indicating healing
 - there is callus formation in the fracture areas.
 - the entire Tibia and Fibula in the lower panel is obviously a "brighter" white.

Image 7

7. Where will the callus be seen to form in this region of a recent fracture?
- in every empty area
 - only in the irregular empty areas
 - at the broken ends of the bony trabeculae
 - at the stable unbroken end of the bony trabeculae.

Image 7 (X-ray)

8. This radiograph demonstrates two "pathologic fractures" in the superior and inferior pubic rami that have occurred. What is more likely to have caused them?
- major trauma from a high fall impacting the inferior pubic rami
 - any major trauma to the pelvis
 - a consequence of weakening by metastatic melanoma
 - there is not enough information to make a reasonable diagnosis

Image 8

9. An infection that becomes established in bone is difficult to treat, since one is relatively avascular. If this process occurs over years, the bone becomes markedly remodeled. What is this established infection in the bone called?
- a. osteoinfectitis
 - b. osteogenicities
 - c. myorotinitis
 - d. osteomyelitis

Image 9

10. Note the fibrosis of the marrow space accompanied by chronic inflammatory cells. This is a chronic osteomyelitis. What is the consequence of this condition?
- a. there can be bone destruction with remodeling
 - b. chronic softening of the surrounding cartilage
 - c. a very putrid smell coming from the surrounding muscle tissue
 - d. the fibrosis will make the bone much stronger

Image 11

11. This femur has a large eccentric tumor mass arising in the metaphyseal region. Since the epiphysis seen at the right is still present, what should this tell us about this type of tumor?
- a. This patient has very little chance of survival.
 - b. These tumors most often occur in young persons.
 - c. These tumors most often occur in middle age persons.
 - d. These tumors most often occur in geriatric patients.

Image 12

12. This osteosarcoma arising in the metaphysis at the upper tibia of a teenage boy breaks through the bone cortex and extends into soft tissue. What other general medical terminology can you use instead of osteosarcoma?

- a. osteomyelitis
- b. osteo cancerous
- c. neoplasm
- d. benign bone fracturation

Image 12 (X-ray)

13. In this AP radiograph of the distal femur, an osteosarcoma involves the metaphyseal region. Generally speaking where is it located?

- a. just above the knee
- b. just below the knee
- c. just above the hip
- d. just below the hip

Image 13

14. The microscopic appearance of an osteosarcoma is shown here. Sarcomas have very pleomorphic cells; often what shape will they take?

- a. spindle shape
- b. rectangle shape
- c. shape of a small boat
- d. honeycomb shape

Image 13 (X-ray)

15. This radiograph demonstrates a consequence of weakening of the lower tibial metaphysis by a lytic osteosarcoma. How can you correctly describe this fracture?

- a. a pathologic fracture

- b. an open hole fracture
- c. a fracture from tumor pressure
- d. a physiologic fracture

Image 14

16. The neoplastic spindle cells are seen to be making pink osteoid here. Osteoid production by a sarcoma is diagnostic of
- a. osteosarcoma
 - b. osteomyelitis
 - c. osteonotsureus
 - d. normal osteoblastic function

Image 14 (PX)

17. Positive staining in the cytoplasm of these neoplastic cells at high magnification with antibody to vimentin suggests that this is a
- a. sarcoma
 - b. carcinoma
 - c. canceremia
 - d. osteoma

18. What is a chondrosarcoma?
- a. cancer of the bone
 - b. neoplasm of the cartilage
 - c. infection of the chondro
 - d. an indicator of good health

Image 16 (CT)

19. This pelvic CT scan demonstrates a large chondrosarcoma involving the left pelvic ring. What other tissue does it appear to involve?
- a. the adjacent soft tissue
 - b. only the pelvic wing
 - c. the pubic bone
 - d. distant soft tissue

Image 25

20. Here is a microscopic view of metastases to bone. Why is a pathologic fracture possible, in this case?
- a. patients with this condition are much more likely to stumble and fall
 - b. chemotherapy can cause these fractures
 - c. if the bone is markedly weakened by the metastasis, then a "pathologic" fracture is possible
 - d. pathologic fractures only occur in pathophysiology

Image 25 (NM)

21. This nuclear medicine bone scan reveals multiple areas of increased uptake, which are the darker foci, such as in the vertebral column. What does this represent?
- a. calcium deficiency
 - b. calcium and potassium deficiency
 - c. increased uptake representing metastases
 - d. nothing significant, everyone has areas of increased uptake

Image 27

22. This is an osteochondroma of bone. This lesion appears as a bony projection (exostosis). What is the common treatment for this condition?
- a. immediate amputation
 - b. aggressive chemotherapy and radiation therapy
 - c. physical therapy is very successful for removing the growth
 - d. most are solitary, incidental lesion that may be excised if they cause local pain

Image 28 (X-ray)

23. This radiograph demonstrated a lateral projection from the metaphyseal region of the distal femur. This is an osteochondroma. What type of symptoms would you expect?
- a. local discomfort then the patient's knee is bumped or rubbed against another object.
 - b. no symptoms at all, the patient will only have symptoms if it is malignant
 - c. severe discomfort when the patient's knee is bumped or rubbed against another object
 - d. itching and a crushing pain to the lower extremity

Image 28

24. This is an osteochondroma cut into three sections. A bluish-white cartilaginous cap overlies the bony cortex. These are probably not true neoplasms, but they are a mass lesion that extends outward from the metaphyseal region of a long bone. How many metaphyseal regions are there of the femur?
- a. one
 - b. the entire femur is metaphyseal
 - c. two
 - d. four

Image 32

25. Histologically, giant cell tumors of bone as seen here are composed of osteoclast-like multinucleated giant cells in a sea of round to oval mononuclear stromal cells. There may also be foamy macrophages and hemosiderin deposition in the stroma. These tumors are biologically benign so, are they a problem?

- a. No, they are benign
- b. Yes, they can expand and cause pain, deformity, or fracture
- c. No, the patient has not developed the tell-tale histologic signs that indicate a problem.
- d. There is not enough information to discern a problem in this case.

Image 32 (CT)

26. This is a CT scan of a giant cell tumor involving the left ischial ramus. The tumor is an eccentric, expansile, lytic mass with extension into soft tissue along with overlying reactive new bone formation. Generally, what area of the body does this scan refer to?

- a. chest
- b. abdomen
- c. pelvis
- d. middle section including the diaphragm

Image 63

27. Here is another example of degenerative osteoarthritis in which there is prominent "lipping" of the vertebrae. Osteoarthritis increases with age beyond 50. Generally, a few large joints are involved, such as hip or knee. Note also that there is a curve to the right indicating a minor degree of scoliosis. What causes this condition?

- a. osteoarthritis due to wear and tear with loss of articular cartilage
- b. osteoarthritis caused by poor nutrition and lifestyle choices

- c. osteoarthritis is idiopathic
- d. osteoarthritis has a genetic predisposition and has the tendency to appear near the age of 50

Image 67

28. This is the synovium in rheumatoid arthritis. There is chronic inflammation with lymphocytes and plasma cells that produce the blue areas beneath the nodular proliferations. This "pannus" is destructive and produces erosion of the articular cartilage. What does this type of arthritis eventually lead to?
- a. destruction of the bone due to lytic enzymes
 - b. osteosarcoma
 - c. osteomyelitis
 - d. destroy the affected joint

Image 72

29. This is gout. The joint most often affected is the first MP joint (big toe) as seen here. Acute attacks are characterized by severe pain, swelling and erythema of the joint. What causes gout?
- a. stubbing of the toe usually after getting up in the middle of the night
 - b. stubbing of the toe from any traumatic cause
 - c. gouty arthritis results from deposition of sodium urate crystals in joints
 - d. gouty arthritis results from deposition of calcium silicate crystals in joints

Image 72 (X-ray)

30. Chronic gout leads to deposition of urates into a chalky mass known as a "tophus." The first metatarsophalangeal joint is a common location. Such tophi can appear around a joint and adjacent bone as seen her radiographically. Tophaceous

deposits consist of sodium urate crystals, and there is a surrounding destructive inflammatory response. What is the common name for the toe affected?

- a. fifth little piggy
- b. great toe
- c. grand toe
- d. the first metacarpal phalanges

Image 73

31. Chronic gout leads to deposition of urates into chalky mass know as "tophus." Seen here radiographically in sequential radiographs of the same foot is a tophaceous deposit that has destroyed the 1st MP joint and adjacent bone. In most, but not all, cases the patient could have

- a. hypocalcemia
- b. hyperuricemia
- c. septicemia
- d. bacterium in the first metacarpal

Image 75

32. If synovial fluid is aspirated from a patient with gout, the fluid can be examined for the presence of the causative agent, which is seen here to be needle shaped. If they are observed under polarized light with a red compensator, they appear yellow (negatively birefringent) in the main axis of the compensator and blue in the opposite perpendicular direction. In this case what is the causative agent?

- a. sodium urate citrals
- b. calcium silicate crystals

- c. sodium chloride crystals
- d. sodium bicarbonate crystals

Image 80

33. Ultrasound may reveal long bones that are shortened. There are several possibilities, including short-limbed dwarfism. Seen here is a radiograph demonstrating short, curved femora and humeri, along with prominent platyspondyly of the vertebrae. This is thanatophoric dysplasia. What type of condition is this?
- a. a lethal condition
 - b. a survivable condition
 - c. short term and will resolve
 - d. a tragic condition that causes the patient to be confined to wheelchair

Graphics for Module 17 Exam

6.2	8.1	Applications Manual Page 59
6.5	9.3	
7.3	9.4	
7.16	9.5	

As you view the film Reconstructive Hand Surgery be sure to answer the following questions.

1. What was Maria's diagnosis? AMNIOTIC BAND SYNDROME
2. Where are they getting another bone to enhance her finger? TOE
3. Will the surgery affect her walking? NO
4. What does MRA stand for? MAGNETIC RESONANCE ANGIOGRAM
5. What is used to limit blood loss? TOURNIQUET
6. What is the white strand called? DIGITAL NERVE
7. What is the purple structure behind it? COMMON DISTAL ARTERY
8. What is used to retract the flesh? SUTURES
9. What instrument spreads the structures apart? RETRACTOR-MOSQUITO
10. Is the Second Digital Nerve located near the pinky or the thumb? PINKY
11. Why wouldn't you want a straight line scar across the joint? RESTRICT MOTION
12. What is used to force blood out of Maria's leg and foot?
RUBBER BANDAGE
13. What is used as a cutting board for an artery? TONGUE DEPRESSOR
14. How long will Maria have the cast on her hand? 4 WEEKS

WebPath Questions:

Image 4

1. In this image you see a bone end sticking through a laceration; it is located on the anterior portion of the upper right arm equidistant from the axilla and the antecubitals. This can be considered a definitive sign of a
 - a. fracture of the distal radius of the right arm
 - b. compound fracture of the distal radius of the left arm
 - c. fracture of the mid-humerus
 - d. compound fracture in the mid-humerus of the right armANS: D

2. What is commonly used to fixate an open reduction and internal fixation (ORIF) of a fracture to the humeral neck?
 - a. The ORIF is an accepted procedure in this area.
 - b. A stainless steel hammer and surgical nails.
 - c. The fixation is accomplished with a rod and screws.
 - d. Pins held in place by stainless steel wire.ANS: C

Image 5 (x-ray)

3. The x-rays in this image show a fracture of the
- fifth metatarsal of the right hand
 - fifth metacarpal of the left hand
 - fifth phalanges of the left hand.
 - fifth phalanges of the right hand.

ANS: B

4. What type of new bone growth would you expect to find in the region of a healing fracture?
- irregular new bone or woven bone
 - smooth almost undetectable new bone growth
 - no new bone growth, the old bone will eventually heal
 - the new bone growth will be the result of osteoclastic bone building activity.

ANS: A

Image 6

5. In what area of this fracture will the new bone growth occur?
- only in the outer edges of the fracture
 - only in the inner edges of the fracture
 - in the disrupted trabeculae
 - in the non-disrupted trabeculae.

ANS: C

Image 6 (x-ray)

6. In these radiographs, what is the clue in the bottom panel that indicates there is healing to the tibial and fibular fractures?
- there is no healing the fracture is still visible in the bottom panel
 - the muscle tissue is more visible in the lower panel indicating healing
 - there is callus formation in the fracture areas.
 - the entire Tibia and Fibula in the lower panel is obviously a "brighter" white.

ANS: C

Image 7

7. Where will the callus be seen to form in this region of a recent fracture?
- in every empty area
 - only in the irregular empty areas
 - at the broken ends of the bony trabeculae
 - at the stable unbroken end of the bony trabeculae.

ANS: C

Image 7 (X-ray)

8. This radiograph demonstrates two "pathologic fractures" in the superior and inferior pubic rami that have occurred. What is more likely to have caused them?
- major trauma from a high fall impacting the inferior pubic rami
 - any major trauma to the pelvis
 - a consequence of weakening by metastatic melanoma
 - there is not enough information to make a reasonable diagnosis

ANS: C

Image 8

9. An infection that becomes established in bone is difficult to treat, since one is relatively avascular. If this process occurs over years, the bone becomes markedly remodeled. What is this established infection in the bone called?
- osteoinfectitis
 - osteogenicities
 - myorotinitis
 - osteomyelitis

ANS: D

Image 9

10. Note the fibrosis of the marrow space accompanied by chronic inflammatory cells. This is a chronic osteomyelitis. What is the consequence of this condition?
- there can be bone destruction with remodeling
 - chronic softening of the surrounding cartilage
 - a very putrid smell coming from the surrounding muscle tissue

d. the fibrosis will make the bone much stronger

ANS: A

Image 11

11. This femur has a large eccentric tumor mass arising in the metaphyseal region. Since the epiphysis seen at the right is still present, what should this tell us about this type of tumor?

- a. This patient has very little chance of survival.
- b. These tumors most often occur in young persons.
- c. These tumors most often occur in middle age persons.
- d. These tumors most often occur in geriatric patients.

ANS: B

Image 12

12. This osteosarcoma arising in the metaphysis at the upper tibia of a teenage boy breaks through the bone cortex and extends into soft tissue. What other general medical terminology can you use instead of osteosarcoma?

- a. osteomyelitis
- b. osteo cancerous
- c. neoplasm
- d. benign bone fracturation

ANS: C

Image 12 (X-ray)

13. In this AP radiograph of the distal femur, an osteosarcoma involves the metaphyseal region. Generally speaking where is it located?

- a. just above the knee
- b. just below the knee
- c. just above the hip
- d. just below the hip

ANS: A

Image 13

14. The microscopic appearance of an osteosarcoma is shown here. Sarcomas have very pleomorphic cells; often what shape will they take?

- a. spindle shape
- b. rectangle shape
- c. shape of a small boat
- d. honeycomb shape

ANS: A

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15. This radiograph demonstrates a consequence of weakening of the lower tibial metaphysis by a lytic osteosarcoma. How can you correctly describe this fracture?

- a. a pathologic fracture
- b. an open hole fracture
- c. a fracture from tumor pressure
- d. a physiologic fracture

ANS: A

Image 14

16. The neoplastic spindle cells are seen to be making pink osteoid here. Osteoid production by a sarcoma is diagnostic of

- a. osteosarcoma
- b. osteomyelitis
- c. osteonotsureus
- d. normal osteoblastic function

ANS: A

Image 14 (PX)

17. Positive staining in the cytoplasm of these neoplastic cells at high magnification with antibody to vimentin suggests that this is a

- a. sarcoma
- b. carcinoma
- c. canceremia
- d. osteoma

ANS: A

18. What is a chondrosarcoma?

- a. cancer of the bone

- b. neoplasm of the cartilage
- c. infection of the chondro
- d. an indicator of good health

ANS: B

Image 16 (CT)

19. This pelvic CT scan demonstrates a large chondrosarcoma involving the left pelvis. What other tissue does it appear to involve?

- a. the adjacent soft tissue
- b. only the pelvic wing
- c. the pubic bone
- d. distant soft tissue

ANS: A

Image 25

20. Here is a microscopic view of metastases to bone. Why is a pathologic fracture possible, in this case?

- a. patients with this condition are much more likely to stumble and fall
- b. chemotherapy can cause these fractures
- c. if the bone is markedly weakened by the metastasis, then a "pathologic" fracture is possible
- d. pathologic fractures only occur in pathophysiology

ANS: C

Image 25 (NM)

21. This nuclear medicine bone scan reveals multiple areas of increase uptake, which are the darker foci, such as in the vertebral column. What does this represent?

- a. calcium deficiency
- b. calcium and potassium deficiency
- c. increased uptake representing metastases
- d. nothing significant, everyone has areas of increased uptake

ANS: C

Image 27

22. This is an osteochondroma of bone. This lesion appears as a bony projection (exostosis). What is the common treatment for this condition?

- a. immediate amputation

- b. aggressive chemotherapy and radiation therapy
- c. physical therapy is very successful for removing the growth
- d. most are solitary, incidental lesion that may be excised if they cause local pain

ANS: D

Image 28 (X-ray)

23. This radiograph demonstrated a lateral projection from the metaphyseal region of the distal femur. This is an osteochondroma. What type of symptoms would you expect?
- a. local discomfort when the patient's knee is bumped or rubbed against another object.
 - b. no symptoms at all, the patient will only have symptoms if it is malignant
 - c. severe discomfort when the patient's knee is bumped or rubbed against another object
 - d. itching and a crushing pain to the lower extremity

ANS: A

Image 28

24. This is an osteochondroma cut into three sections. A bluish-white cartilaginous cap overlies the bony cortex. These are probably not true neoplasms, but they are a mass lesion that extends outward from the metaphyseal region of a long bone. How many metaphyseal regions are there of the femur?

- a. one
- b. the entire femur is metaphyseal
- c. two
- d. four

ANS: C

Image 32

25. Histologically, giant cell tumors of bone as seen here are composed of osteoclast-like multinucleated giant cells in a sea of round to oval mononuclear stromal cells. There may also be foamy macrophages and hemosiderin deposition in the stroma. These tumors are biologically benign so, are they a problem?

- a. No, they are benign
- b. Yes, they can expand and cause pain, deformity, or fracture
- c. No, the patient has not developed the tell-tale histologic signs that indicate a problem.
- d. There is not enough information to discern a problem in this case.

ANS: B

Image 32 (CT)

26. This is a CT scan of a giant cell tumor involving the left ischial ramus. The tumor is an eccentric, expansile, lytic mass with extension into soft tissue along with overlying reactive new bone formation. Generally, what area of the body does this scan refer to?

- a. chest
- b. abdomen
- c. pelvis
- d. middle section including the diaphragm

ANS: C

Image 63

27. Here is another example of degenerative osteoarthritis in which there is prominent "lipping" of the vertebrae. Osteoarthritis increases with age beyond 50. Generally, a few large joints are involved, such as hip or knee. Note also that there is a curve to the right indicating a minor degree of scoliosis. What causes this condition?

- a. osteoarthritis due to wear and tear with loss of articular cartilage
- b. osteoarthritis caused by poor nutrition and lifestyle choices
- c. osteoarthritis is idiopathic
- d. osteoarthritis has a genetic predisposition and has the tendency to appear near the age of 50

ANS: A

Image 67

28. This is the synovium in rheumatoid arthritis. There is chronic inflammation with lymphocytes and plasma cells that produce the blue areas beneath the nodular proliferations. This "pannus" is destructive and produces erosion of the articular cartilage. What does this type of arthritis eventually lead to?

- a. destruction of the bone due to lytic enzymes
- b. osteosarcoma
- c. osteomyelitis
- d. destroy the affected joint

ANS: D

Image 72

29. This is gout. The joint most often affected is the first MP joint (big toe) as seen here. Acute attacks are characterized by severe pain, swelling and erythema of the joint. What causes gout?

- a. stubbing of the toe usually after getting up in the middle of the night
- b. stubbing of the toe from any traumatic cause
- c. gouty arthritis results from deposition of sodium urate crystals in joints
- d. gouty arthritis results from deposition of calcium silicate crystals in joints

ANS: C

Image 72 (X-ray)

30. Chronic gout leads to deposition of urates into a chalky mass known as a "tophus." The first metatarsophalangeal joint is a common location. Such tophi can appear around a joint and adjacent bone as seen her radiographically. Tophaceous deposits consist of sodium urate crystals, and there is a surrounding destructive inflammatory response. What is the common name for the toe affected?

- a. fifth little piggy
- b. great toe
- c. grand toe
- d. the first metacarpal phalanges

ANS: B

Image 73

31. Chronic gout leads to deposition of urates into chalky mass know as "tophus." Seen here radiographically in sequential radiographs of the same foot is a tophaceous deposit that has destroyed the 1st MP joint and adjacent bone. In most, but not all, cases the patient could have

- a. hypocalcemia
- b. hyperuricemia
- c. septicemia
- d. bacterium in the first metacarpal

ANS: B

Image 75

32. If synovial fluid is aspirated from a patient with gout, the fluid can be examined for the presence of the causative agent, which is seen here to be needle shaped. If they are observed under polarized light with a red compensator, they appear yellow (negatively birefringent) in the main axis of the compensator and blue in the opposite perpendicular direction. In this case what is the causative agent?

- a. sodium urate crystals
- b. calcium silicate crystals
- c. sodium chloride crystals
- d. sodium bicarbonate crystals

ANS: A

Image 80

33. Ultrasound may reveal long bones that are shortened. There are several possibilities, including short-limbed dwarfism. Seen here is a radiograph demonstrating short, curved femora and humeri, along with prominent platyspondyly of the vertebrae. This is thanatophoric dysplasia. What type of condition is this?

- a. a lethal condition
- b. a survivable condition
- c. short term and will resolve
- d. a tragic condition that causes the patient to be confined to wheelchair

ANS: A