ENDGAMES
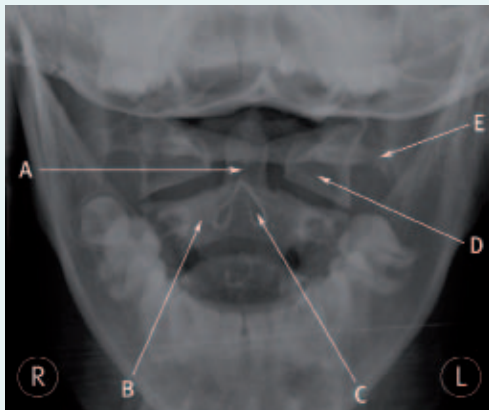
We welcome contributions that would help doctors with postgraduate examinations
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ANATOMY QUIZ 1

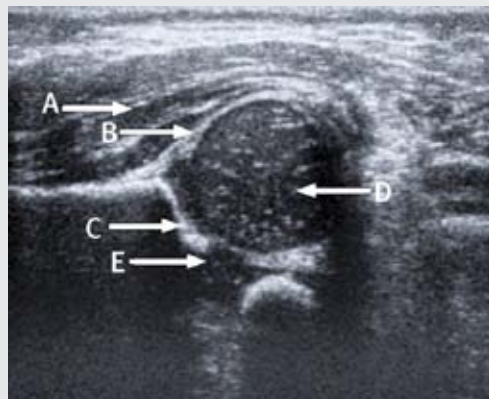### Anatomy of the atlas and axis

Identify the structures labelled A-E in this radiograph of the first and second cervical vertebrae (the atlas and axis) in the anterior-posterior projection (open mouth, or odontoid peg view).

Submitted by Olga Shaw and Ravi Uppoor

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ANATOMY QUIZ 2

Coronal ultrasound anatomy of a normal hip in a newborn baby

Identify the structures A-E in this ultrasound image of a normal hip in a newborn baby.

Submitted by Bijan Hedayati, Siva Muthukumarasamy, and Chandrasen K Sinha

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CASE REPORT

Sequential bilateral femoral fractures

A 78 year old woman presented to the emergency department with an off-ended, shortened, anteriorly deviated, long oblique fracture of the right femoral diaphysis. She had been experiencing thigh pain for several weeks before this acute presentation and analgesia had been prescribed.

She described feeling the bone "crack" as she turned around. There was no history of trauma. The fracture was surgically treated with an intramedullary nail.

Six months earlier she had sustained a similar fracture of the midshaft of her left femur. Again, there was no trauma and she described feeling the bone "crack" as she twisted slightly to go through her front door. She was unable to reach a telephone to call for help and spent some time on the ground before a passer by called an ambulance. After initial treatment with a Thomas splint, she was treated surgically with an intramedullary nail. After two weeks of rehabilitation she returned home to live independently and was able to go out with one stick to do her shopping.

Her medical history included osteoporosis and hypovitaminosis D. The diagnosis of osteoporosis was made after she sustained a vertebral crush fracture. She had been receiving bisphosphonates to prevent further fractures for nearly five years.

1 Why are such fractures described as "atypical"?

2 What underlying mechanism might explain such fractures?

3 What are the main clinical and radiological features of atypical femoral fractures?

4 How would you investigate her thigh pain?

Submitted by Seyed Ali Moeinoddini, Rajkumar James Parikh, Sarah Ruth Moore, and David James Moore

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STATISTICAL QUESTION Equivalence trials

Researchers evaluated the efficacy of 4% dimeticone lotion for the treatment of head louse infestation. A randomised controlled equivalence trial was performed. Control treatment was 0.5% phenothrin liquid, the standard treatment in the United Kingdom at the time of the trial. Treatments were applied twice, seven days apart, with dimeticone lotion for eight hours or overnight, and phenothrin liquid for 12 hours or overnight.

The primary outcome was proportion of participants cured of infestation after the second application, regardless of whether reinfestation occurred later. The trial was designed to demonstrate therapeutic equivalence with an equivalence margin of 20%. Participants were young people (4-18 years) and adults with active head louse infestation. In total, 127 participants were allocated to the intervention (dimeticone lotion) and 125 to control (phenothrin liquid).

Analysis by intention to treat indicated that 89 of 127 (70%) participants treated with dimeticone were cured compared with 94 of 125 (75%) treated with phenothrin (difference −5%, 95% confidence interval −16% to 6%). Analysis by per protocol indicated that 84 of 121 (69%) participants were cured with dimeticone compared with 90 of 116 (78%) with phenothrin, a difference of −8% (−19% to 3%).

Which of the following statements, if any, are true?

a) The control treatment of 0.5% phenothrin liquid is described as an active control

b) The null hypothesis for the equivalence trial stated no difference between treatments in cure rate in the population from where the participants were selected

c) Therapeutic equivalence in cure rate to within 20% was demonstrated between treatments

Submitted by Philip Sedgwick
Cite this as: *BMJ* 2013;346:f184