

# Extracapsular fracture of the femur in an elderly male from Setúbal (Portugal)



**1. Introduction** Hip fractures were certainly present in past communities, if not reasonably frequent [1,2]. Often an outcome of osteoporosis and increased risk of falling among the elderly, these fractures affect predominantly older women but also aged men [1,3]. In this case-study, an extracapsular fracture of the femur in an elderly man is described and contextualized.

**2. The affected individual** The *Setúbal* collection is associated with the *Nossa Senhora da Anunciada* church located outside the medieval defensive walls and inhabited by a population of low socioeconomic status, particularly fishermen. The associated necropolis was used between 1531 and 1839 AD. Ninety-three individuals were identified: 82 adults (26 males, 47 females and 9 unknow-sex) e 11 subadults. An aged (50+ years) male (individual #8, height: 174.2 ± 6.90 cm) endured a fracture of the proximal femur. Individual #8 presented *ante mortem* teeth loss. The right femur was observed macroscopically and with plain radiography. Conventional radiogrammetry was used to assess cortical index (MCI) at the second metacarpal midpoint [4, Figure 1]. MCI for individual #8 was 59.48 (Z-Score: 0.618).

**3. The hip fracture** Individual #8 presented a well-healed fracture in the right proximal femur. The macroscopic observation revealed a lesion in the intertrochanteric ridge with new bone deposition, and shortening and posterior rotation of the femoral neck (Figures 2 and 3). The radiograph shows increased opacity in the intertrochanteric region. Secondary alterations include the overall shortening of the femur, extensive bone formation in the *ilipsoas* insertion site at the lesser trochanter – but not osteoarthritis – and osteoarthritis in the right acetabulum. The described fracture is consistent with an extracapsular fracture of the hip, of the intertrochanteric type 1 (stable, single fracture line without displacement).



Figure 1 (left): Radiograph of the second metacarpal. Figure 2 (right): Radiograph of the hip fracture, right proximal femur.



Figure 3: Right femur with an extracapsular fracture (A, C) and left femur (B, D).

**4. Discussion** Hip fractures are frequently an outcome of bone loss and augmented risk of falling among the elderly, affecting aged individuals from both sexes [1,3]. Extracapsular fractures affect females more often (4 : 1 ratio) but older males are also affected – as observed in other archaeological cases [e.g., 5]. Osteoporosis and bone loss are major risk factors for hip fractures but, as suggested by metacarpal cortical bone, this individual was not affected by bone loss. One-year mortality rates for extracapsular fractures are high (up to 30%) and approximately one-half of patients are unable to regain their ability to live independently. The extensive bone remodelling associated with the reported fracture implies some sort of social assistance and care to the affected individual, at least during recovery, which promoted his survival to a life threatening and disabling event.

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## References

- [1] CURATE, 2014. *J Anthropol Sci* 92:119–146. doi:10.4436/JASS.92003
- [2] IVES et al. 2016. *Int J Osteoarch* 27: 261–275. doi: 10.1002/oa.2536
- [3] JOHANSSON et al. 2009. *Osteoporos Int* 20: 1675–1682. doi:10.1007/s00198-009-0845-x
- [4] IVES & BRICKLEY, 2004. *Int J Osteoarch* 14: 7–17. doi: 10.1002/oa.709
- [5] CURATE et al. 2011. *Anthropol Sci* 119: 87–93. doi: 10.1537/ase.100211

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