History: A 46-year-old mailman was admitted to the Lubbock General Hospital orthopedic service for treatment of a fractured left tibia and fibula sustained when he tripped over a garden hose. He had broken the same leg 8 months previously in a fall from a ladder, and had broken several ribs, his left iliac crest, and his right clavicle in separate accidents suffered during the previous 5 years – each time the history of trauma seemed disproportionate to the degree of injury. For the past 2 years he had complained of progressively severe, diffuse, aching pain in his lower back, chest, and extremities; weakness in his lower extremities, particularly when attempting to arise from a chair or climb stairs; and difficulty ambulating, to the point that he could no longer work, even though his job was driving a jeep without much walking. His family history was noncontributory.

Physical examination was entirely normal, but for obesity (weight 107 kg, height 5 ft 10 inches), the fractured leg, and tenderness over most of his bones. He was unable to stand or ambulate, but he and his family gave a fairly graphic description of pelvic girdle weakness and a waddling gait prior to his latest injury.

Laboratory studies showed: (1) Serum: BUN 14 mg/dl, creatinine 1.1 mg/dl, random glucose 97 mg/dl, alkaline phosphatase 680 IU/ml, phosphate 1.3 mg/dl, calcium 9.1 mg/dl, total protein 7.8 g/dl, albumin 3.7 g/dl, PTH normal, l,25(OH)2 D3 47 pmol/l (normal 90 ± 5 pmol/l), protein electrophoresis normal. (2) Urine: pH 5.0, glucose negative, 24-hour urine (volume 1,000 ml) creatinine 2,175 mg (creatinine clearance 141 ml/min), calcium 160 mg, phosphate 784 mg (FEph0s 30%), amino acids normal but for increased hydroxyproline, protein electrophoresis negative. (3) Radiological: chest and skull X-rays normal, bone survey showed generalized deminer-alization; healed fractures of several ribs, his right clavicle, and left iliac crest; and healing fractures of his left tibia and fibula. Looser lines were seen in both pubic rami.

Questions:
What do you anticipate the bone biopsy will show?
What is your differential diagnosis?
What further test(s) would you like to have?