

# Recurrent fractures in a child with Graves' disease

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## INTRODUCTION

Graves' disease is the most common paediatric cause of hyperthyroidism.

Although hyperthyroidism has been reported to cause a decrease in bone mineral density (BMD), its association with recurrent bone fractures is extremely rare.

Here, we present a boy who presented with recurrent bone fractures and was diagnosed with Graves' disease.

## CASE REPORT

A 10-year-old male patient, who had a pre-existing 7-year diagnosis of autism spectrum disorder, presented to emergency with right leg pain that started after collision with an armchair. On initial examination, his body temperature was 36.6°C, heart rate 136 beats/min, blood pressure 113/66 mm Hg, weight 45 kg and height 156 cm (79 and 97 percentiles, respectively). X-ray revealed a fracture of right femur and he underwent surgery. Demineralization of bone was detected and endocrinology was consulted. His medical history included fractured right femur one year previously and right foot nine months previously. Family history was unremarkable. He had prominent thyromegaly with diffuse enlargement and soft consistency on palpation (Figure 1).

Initial blood tests were: calcium 9.8 mg/dl (8.5-10.5); phosphate 4.53 mg/dL (3.7-5.6); alkaline phosphatase 229 U/L (42-362); PTH 14 pg/mL (12-88); 25-OHD 20.7 ng/mL (20-80); TSH <0.01 µIU/mL (0.38-5.33); fT3 >30 pg/mL (2.6-4.37); and fT4 5.59 ng/dL (0.61-1.2). Complete blood count, liver, kidney function tests were normal. Auto-antibodies were positive: thyroid peroxidase Abs 2455 IU/mL (0-9), thyroglobulin Abs 7.8 IU/ml (0-4) and TSH Receptor Abs 8.38 IU/L (0-0.1). Thyroid ultrasonography showed a significant increase in thyroid gland volume and vascularization. A diagnosis of Graves' disease was confirmed. Methimazole, propranolol and vitamin D therapies were started. Pre-treatment bone densitometry showed significantly low BMD: lumbar BMD (L1-L4) was 0.543 g/cm<sup>2</sup> (Z-score: -2) and femoral BMD was 0.323 g/cm<sup>2</sup> (Z-score: -4.8). Thyroid ophthalmopathy was not found on ophthalmological examination. Euthyroidism was achieved after three months of treatment and clinical signs of hyperthyroidism had improved. At one year follow up there were no clinical signs of hyperthyroidism and the patient remained euthyroid. Bone densitometry investigation ten months after diagnosis showed marked improvement: lumbar BMD (L1-L4) was 0.721 g/cm<sup>2</sup> (Z-score -0.6) and femoral BMD was 0.503 g/cm<sup>2</sup> (Z-score -2.8).

He is currently at the first year after diagnosis and is euthyroid on 10 mg methimazole daily.



Figure 1: Figure shows the diffuse thyromegaly of the patient

## CONCLUSIONS

While this case demonstrates the importance of thyroid hormone on bone health and that untreated children with Graves' disease may present with fractures, it highlights the importance of considering hyperthyroidism as a possible diagnosis among the differential diagnoses of pathological bone fractures.

