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## *Letter to the Editor*

# Bone abnormalities in constitutional thinness

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We would like to address some comments concerning the article titled 'Thin healthy women have a similar low bone mass to women with anorexia nervosa' by Fernández-García *et al.* [1]. While bone loss has often been reported in anorexia nervosa, the interesting part of this paper is the finding of a low total and lumbar bone mineral density in 'thin healthy women'.

In order to define a 'thin healthy women' group, Fernández-García *et al.* [1] used the following criteria: BMI $< 18{\cdot}5\,kg/m^2$, eumenorrhoeic and no criteria for eating disorders. However, some other elements should be mentioned in order to clarify this diagnosis: the exclusion of other aetiologies of weight loss including excessive physical activity, coeliac disease, infectious diseases, cancer or other consumptive diseases; the absence of oestrogen–progestin therapy confirmed by follicle-stimulating hormone, luteinising hormone and oestradiol assessment; very low BMI values, stable throughout the growth period until the age of 18 years. By taking into account all these criteria we suppose that thin healthy women correspond to constitutional thinness or leanness previously described by others and our team[2–4]. We previously showed that these subjects present with normal energy metabolism and a different appetite regulation profile when compared with controls or those with anorexia nervosa[2,5–7].

However, according to this definition of constitutional thinness, the article of Fernández-García *et al.* [1] confirms previous results published by our team[8] on the decreased bone mass of these constitutionally thin subjects. This previous paper included not only data on bone mass, leptin and body composition but also the profile of bone turnover markers, hormonal parameters classically involved in the bone loss of anorexia nervosa and, last but not least, data on the bone micro- and macroarchitecture.

In our paper, we showed that the percentage of constitutionally thin subjects with a low Z score at the femoral or lumbar site (44 %) was similar to that noticed in anorexic women (50 %).

An essential element described in the same paper was the bone turnover profile in constitutional thinness. While anorexia presents with a bone turnover uncoupling including a low bone formation and an increased bone resorption, no abnormalities of these markers were noticed in constitutionally thin women. Osteocalcin, bone alkaline phosphatase, tartrate-resistant acid phosphatase 5b (TRACP 5b) and serum C-terminal telopeptide of type I collagen (CTX) were found in the normal range for age. An increased osteoprotegerin:receptor activator of NF-κB ligand (OPG:RANKL) ratio was equally described in these subjects.

Several hormonal abnormalities are known to be involved in anorexic bone loss: low insulin-like growth factor-I, low free triiodothyronine, increased growth hormone and cortisol levels[9]. Low bone density in constitutional thinness is clearly not related to hormonal influences, since none of the above-mentioned abnormalities was noticed in constitutionally thin subjects[8].

When compared with anorexic women (regardless of their disease length) or controls, constitutionally thin long bones present with thinner diameters. Bone microarchitecture assessed by three-dimensional peripheral quantitative computed tomography (3D-pQCT) was found to be impaired in weight-bearing skeletal regions in constitutionally thin subjects.

Because no obvious hormonal or body composition causality was found for this unusual combination of low bone density and size coupled to normal bone turnover, we proposed that constitutionally thin bone impairment may be caused by an insufficient skeletal load and/or genetics[8].

We have no conflicts of interest.

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