

Osteopenia

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Osteopenia is a condition in which bone mineral density is lower than normal. It is considered by many doctors to be a precursor to osteoporosis. However, not every person diagnosed with osteopenia will develop osteoporosis. More specifically, osteopenia is defined as a bone mineral density T-score between -1.0 and -2.5.^[1]

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Osteopenia

Classification and external resources

ICD-10	M85.8 (http://apps.who.int/classifications/icd10/browse/2010/en#/M85.8)
ICD-9	733.90 (http://www.icd9data.com/getICD9Code.ashx?icd9=733.90)
DiseasesDB	29870 (http://www.diseasesdatabase.com/ddb29870.htm)
MeSH	D001851 (https://www.nlm.nih.gov/cgi/mesh/2014/MB_cgi?field=uid&term=D001851)

Definition and controversy

Osteopenia was defined in June 1992 by the World Health Organization. A group of experts decided that condition would mean a bone density that was one standard deviation below that of an average 30-year-old white woman. The group also defined osteoporosis as bone density 2.5 standard deviations or more below that 30-year-old;^[2] previously it had been used only in cases where elderly patients had fractured or broken a bone.^[3] An osteoporosis epidemiologist at the Mayo Clinic who participated in setting the criteria in 1992 said "It was just meant to indicate the emergence of a problem," and noted that "It didn't have any particular diagnostic or therapeutic significance. It was just meant to show a huge group who looked like they might be at risk."^[2]

The definition has been controversial. Steven R. Cummings, of the University of California, San Francisco, said in 2003 that "There is no basis, no biological, social, economic or treatment basis, no basis whatsoever" for using one standard deviation. Cummings added that "As a consequence, though, more than half of the population is told arbitrarily that they have a condition they need to worry about."^[2]

Diagnosis

The pharmaceutical company Merck, which sells the anti-bone-loss drug Fosamax, estimated in 2003, from its own market research, that about 8 million women had been found to have osteopenia and about a third of them were taking an osteoporosis drug.

Scans of bones anywhere in the body can be done with X-rays, known as DEXA (dual X-ray absorptiometry). Scans can also be done with portable scanners using ultrasound, and portable X-ray machines can measure density in the heel. A study paid for by Merck found that the extent to which osteopenia was diagnosed varied from 28 to 45 percent, depending on the type of machine.^[2] Merck was active in promoting deployment of cheaper scanners to be used on extremities, so that they could be used more widely. However, the clinical utility of these scans compared to scans of core portions of the body is disputed.^[4]

Causes

Like osteoporosis, osteopenia occurs more frequently in post-menopausal women as a result of the loss of estrogen. It can also be exacerbated by lifestyle factors such as lack of exercise, excess consumption of alcohol, smoking or prolonged use of glucocorticoid medications. It can also be a result of exposure to radiation.^[5]

Osteopenia occurs more frequently in participants in non-weight-bearing sports like bicycling or swimming than in participants in weight-bearing sports like running, since bone-loading exercise tends to protect or possibly increase bone mineral density.^{[6][7][8]}

In particular, the condition is often noted in young female athletes. It is one of the three major components of female athlete triad syndrome, along with amenorrhea and disordered eating. Female athletes tend to have lower body weight, lower fat percentage, and higher incidence of asthma than their less active peers. A chronic negative energy balance can suppress estrogen levels and decrease bone mineral density.^[9]

It is also a sign of normal aging, in contrast to osteoporosis which is present in pathologic aging.

Osteopenia is also a common effect of coeliac disease, even among patients who are otherwise asymptotic.^[10]

Treatment and controversy

The treatment of osteopenia is controversial. Currently, candidates for therapy include those at the highest risk of osteoporotic bone fracture based on bone mineral density and clinical risk factors. As of 2008, recommendations from the National Osteoporosis Foundation (NOF) are based on risk assessments from the World Health Organization (WHO) Fracture Risk Assessment Tool (FRAX).^[11] According to these recommendations, consideration of therapy should be made for postmenopausal women, and men older than 50 years of age, if any one of the following is present:^[12]

1. Prior hip or vertebral fracture
2. T-score of -2.5 at the femoral neck or spine, excluding secondary causes
3. T-score between -1.0 and -2.5 at the femoral neck or spine *and* a 10-year probability of hip fracture $\geq 3\%$ *or* a 10-year probability of major osteoporotic fracture $\geq 20\%$
4. Clinicians' judgment in combination with patient preferences indicate treatment for people with 10-year fracture probabilities above or below these levels.

(Notably, the first two conditions identify individuals with osteoporosis. The third condition corresponds to individuals with osteopenia, namely those with T-scores between -1.0 and -2.5.)

When medical therapy is pursued, treatment includes medications with a range of actions. Commonly used

drugs are bisphosphonates including alendronate, risedronate, and ibandronate; selective estrogen receptor modulators (SERMs) such as raloxifene; estrogen; calcitonin; and teriparatide.^[13]

Studies have shown that the actual benefits of these drugs may be marginal. Approximately 270 women with osteopenia might need to be treated with drugs for three years so that one of them could avoid a single vertebral fracture.^[14]

Strontium ranelate has been approved in 27 European countries, having been found to build bone both by slowing the work of osteoclasts and stimulating osteoblasts. On January 10, 2014 the European Pharmacovigilance Risk Assessment Committee recommended that strontium ranelate, marketed as Protelos or Protos by Servier, should no longer be used to treat osteoporosis, as randomised trials have shown an increased risk of myocardial infarction.^[15]

Other (natural) forms of available strontium include strontium lactate, strontium gluconate, strontium carbonate, and strontium citrate.^{[16][17]} Food sources include spices (especially basil), seafood, whole grains, root and leafy vegetables, and legumes. Strontium should not be taken with calcium supplements, to improve absorption.

See also

- Accelerated orthodontic treatment
- Bone mineral density

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External links

- WHO — Fracture Risk Assessment Tool (http://www.shef.ac.uk/FRAX/index.htm)

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Categories: Histopathology | Medical signs

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