



METAMETRICS
LABORATORY

OSTEO NUTRIENT TEST

Expose micronutrient imbalances that compromise bone health.

Why You Need Osteo Nutrient Testing

The Importance of Nutrition in Bone Formation

Our skeletal system discards old bone tissues in place of new ones. This bone formation capacity outpaces bone resorption from childhood until the late 20s, or until peak bone mass is reached. After that, bone loss gradually overtakes bone building—hence, the risk of osteoporosis if optimal bone density and strength were not attained.

Osteoporosis is a disease that occurs in those who lose too much bone tissues or make too little in the process, until bones start to weaken or break easily. Certain nutritional imbalances (shortage or surplus) can accelerate the development of osteoporosis if left unchecked.

The Impact of Osteo Nutrient Testing

This test provides clinicians with accurate and actionable assessment of critical nutrients, allowing for targeted and personalized treatment or prevention of osteoporosis and other bone-related health risks.

- ✓ Measures the level of 7 micronutrients and 24 amino acids (essential, non-essential, and conditional amino acids)
- ✓ Reveals micronutrient deficiencies and toxicities that contribute to the development and acceleration of bone degeneration
- ✓ Determines the optimal level of calcium, where toxicity can cause serious health risks, such as kidney stones, heart problems, and prostate cancer

The loss of bone occurs “silently” and progressively, often without warning until the first fracture occurs, most commonly at the wrist, spine and hip.¹



OSTEO NUTRIENT TEST

Analytes Tested:

Calcium is a major building-block of our bone tissue that is essential to keeping them healthy.² Calcium is not made in the body and must be absorbed from foods. Calcium-deficient diets can result in depletion of calcium stores in our bones, causing weakness or brittleness that can develop to osteoporosis and bone disorders in the long term. Conversely, excessive calcium can pose adverse health risks, such as kidney stones, heart problems, and prostate cancer.³

Vitamin D plays a key role in assisting calcium absorption from food, ensuring the correct renewal and mineralization of bone tissue. Severe deficiency can result in delayed growth and bone deformities (rickets) in children, or osteomalacia (bone softening due to the poor mineralization) in adults. Milder inadequacy can increase the risk of osteoporosis,⁴ while extreme oversupply can cause kidney damage and dangerously high serum calcium levels.⁵

Vitamin K is necessary for bone formation and mineralization, blood clotting, and channeling calcium directly to the bone rather than the blood vessels.⁶ Shortage of this vitamin is linked to low bone mineral density and increased fractures.

Magnesium keeps calcium dissolved in the blood. Excessive calcium with too little magnesium can cause some forms of arthritis, kidney stones, osteoporosis, and calcification of the arteries that may lead to heart attack and cardiovascular disease.⁷ Sufficient magnesium intake is linked to lower risk of poor vitamin D status.⁸

Protein (measured via Amino Acid Panel) is essential to strong bones and in maintaining muscle mass that can help prevent fractures in older adults. High protein levels are likely to be protective if calcium levels are adequate. High protein intake with low calcium levels may be harmful.⁹ Studies suggest that five nonessential amino acids (alanine, arginine, glutamic acid, glycine, and proline) may play a role in bone health, principally through improved production of insulin and insulin-like growth factor and the synthesis of collagen and muscle protein.

Phosphorus keeps your bones healthy and strong in conjunction with balanced levels of calcium and vitamin D. Low levels of this mineral may cause bone pain, brittle bones, and serious bone disease resembling vitamin D deficiency such as rickets in children and osteomalacia in adults.¹⁰

Zinc is required for bone tissue renewal and mineralization. Severe deficiency in children due to calorie and protein malnutrition contributes to impaired bone growth.¹¹

Manganese is crucial to bone development and maintenance, and supports bone mineral density when combined with calcium, zinc, and copper.¹²

1 International Osteoporosis Foundation. 2006. Good Nutrition for Healthy Bones. Retrieved January 20, 2020 (https://www.iofbonehealth.org/sites/default/files/PDFs/good_nutrition_for_healthy_bones.pdf)

2 Palmer, Sharon. 2013. "Bone Health and Diet." Today's Dietitian. Retrieved January 21, 2020 (<https://www.todaysdietitian.com/newarchives/021313p44.shtml>)

3 Campbell, Barbara. 2012. "Calcium, Nutrition, and Bone Health." OrthoInfo. Retrieved January 21, 2020 (<https://orthoinfo.aaos.org/en/staying-healthy/calcium-nutrition-and-bone-health/>)

4 See Footnote 1

5 See Footnote 3

6 See Footnote 3

7 Palacios, Cristina. 2006. The Role of Nutrients in Bone Health, from A to Z. Critical Reviews in Food Science and Nutrition. Taylor and Francis Group

8 Linus Pauling Institute. 2019. Bone Health. Linus Pauling Institute. Retrieved February 27, 2020 (lpi.oregonstate.edu/mic)

9 See Footnote 8

10 See Footnote 7

11 See Footnote 1

12 See Footnote 7

TEST INFORMATION

Specimen : 20 ml. whole blood
Result TAT : 7 working days
Method : LC-MS/MS, ICP-MS, UPLC

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