

# PRO BONO



## CLINICAL APPLICATIONS

- Convenient, Multi-faceted Bone Building Protocol
- Increases Skeletal Strength
- Promotes Healthy Bone Density
- Improves Bone Remodeling
- Provides a Comprehensive Blend of Foundational Micronutrients

## MUSCULOSKELETAL HEALTH

Pro Bono is a targeted bone building protocol specifically designed to increase skeletal strength and help maintain healthy bone density. It provides therapeutic doses of clinically-proven, bone-stimulating nutrients in convenient, easy-to-take packets to enhance bone formation. The foundation of Pro Bono is 1000 mg of strontium, one of the most well-researched, bone supporting minerals proven to strengthen the bone matrix and support skeletal density. Each serving provides the most bioavailable sources of strontium, calcium, magnesium, vitamin D3, vitamin K2, boron and other trace minerals to support bone health and maintenance. In addition, Pro Bono includes a full complement of micronutrients, making an additional multivitamin unnecessary.

### Overview

Bone mineral density (BMD) is a major determinant of bone mass and is the most commonly measured quality of bone. A number of factors contribute to bone mineral density including lifestyle factors (regular physical activity, not smoking, minimizing stress levels) and maintaining hormonal balance. Consuming a healthy diet and ensuring optimal levels of bone-building vitamins and minerals are a key therapeutic consideration for preserving bone strength.

BMD is determined by a lifelong process called bone remodeling. Bone remodeling occurs when bone tissue is removed from the skeleton (bone resorption) and new bone tissue is formed. *Osteoclasts* are cells involved with breaking down bone, while *osteoblasts* create a protein matrix primarily of collagen, resulting in the remineralization of bone and thereby

promoting bone formation. While calcium is an effective starting point for promoting bone health, other nutrients are required for bone mineralization. Nutrients such as strontium, magnesium, vitamin D, K and C, B complex vitamins, and trace minerals significantly enhance bone remodeling and increase bone strength. Pro Bono provides a comprehensive approach to bone health by offering a full spectrum of nutrients that are required in the bone mineralization process. Pro Bono also contains nutrients that help maintain an optimal osteoclast to osteoblast ratio.

### Strontium †

Strontium is a mineral that is similar to the physical and chemical properties of calcium. Research has shown strontium to provide all natural bone support through its ability to increase the formation of osteoblasts while decreasing the formation of osteoclasts. In the well-known PREVOS (PREvention Of early postmenopausal bone loss by Strontium renalate) trial, postmenopausal women were randomized to receive placebo or a strontium complex at doses of 125 mg/day, 500 mg/day or 1 g/day for two years; all participants received 500 mg calcium per day. This study found that after two years, 1 g/day of the strontium complex significantly increased the osteoclast to osteoblast ratio in the lumbar region, compared with placebo.<sup>1</sup> In addition, a significant increase in bone *alkaline phosphatase* (a marker of increased bone health) was seen at all-time points compared with baseline, and a significant increase was seen at month 18.<sup>1</sup> A 2013 review of strontium's long-term efficacy and safety in postmenopausal women concluded that strontium's capability in safely improving the bone matrix results in skeletal strength, as demonstrated in the long-term research trials.<sup>2</sup>

† These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.

## Calcium<sup>†</sup>

Nearly 99% of the calcium within the adult skeletal system exists as a complex paired with phosphorus, called hydroxyapatite. It is commonly advised that individuals past early adolescence consume 1,000 to 1,500 mg/ day from dietary or supplement sources to support bone formation. In 1990, the United States Department of Agriculture published a trial comparing calcium carbonate (least expensive) with calcium citrate-malate with respect to improved bone mineral density in post-menopausal women. In this trial, researchers found the citrate-malate form was significantly better at supporting bone health than the carbonate form.<sup>3</sup> Pro Bono is formulated with calcium-citrate-malate, as well as calcium hydroxyapatite, to improve absorption and support optimal bone health.

## Magnesium<sup>†</sup>

Magnesium plays a major role in bone formation as approximately 50% of magnesium found in the body is found in the bone. Magnesium plays numerous roles in bone health including increasing calcium absorption, acting as a cofactor for alkaline phosphatase activation, as well as supporting vitamin D3 conversion in the body. Magnesium deficiency is very common— many Americans fail to acquire even the estimated average requirement (EAR).<sup>4</sup> Magnesium deficiency can also be exacerbated due to factors such as excess consumption of alcohol, salt, coffee, phosphoric acid in sodas, and long-term stress.<sup>5</sup> In a study examining the effects of magnesium in a group of postmenopausal women, supplementation with 250 to 750 mg/day of magnesium for six months followed by 250 mg/day for six to 18 months resulted in significant bone building affects in 71% of the women.<sup>6</sup> This increase was a significant finding that reflects the importance of magnesium supplementation alone (without calcium) as a crucial mineral for supporting bone health.

## Vitamin D3 (Cholecalciferol)<sup>†</sup>

Vitamin D is a steroid vitamin, that is known for its role in supporting bone health and aiding in the absorption of calcium and phosphate from the GI tract. Emerging research is showing a direct correlation between bone mineral density and serum levels of 25(OH)D3, the active form of vitamin D.<sup>7</sup> In one 2013 study, 52 overweight men and women with suboptimal vitamin D levels were given either 7,000 IU of cholecalciferol (D3) daily or a placebo for 26 weeks. The vitamin D group significantly increased vitamin D levels in the blood and improved biomarkers of bone health.<sup>8,9</sup>

## Vitamin K1 (Phytonedione) & Vitamin K2 (Menaquinone)<sup>†</sup>

Vitamin K is responsible for synthesizing osteocalcin, a protein involved in calcium transport and properly embedding calcium into bone tissue. Vitamin K has also been shown to decrease the activity of osteoclasts, which helps to maintain

bone formation and strength.<sup>10</sup> Vitamin K works synergistically with vitamin D3 to improve calcium absorption and helps to bind newly absorbed calcium to the bone matrix. In one study, 244 non-osteoporotic women received either 200 mcg/day vitamin K, 400 IU/day vitamin D3 plus 1 g/day calcium, combined treatment of vitamin K, D3 and calcium or placebo in a two-year, double-blind study. Those receiving the combined treatment had a significant improvement in markers of bone health.<sup>11</sup>

## Boron<sup>†</sup>

Boron supplementation reduced urinary excretion of calcium and magnesium and increased blood levels of 17 beta-estradiol and testosterone in postmenopausal women.<sup>12</sup> Improving boron levels has been shown to support bone health.<sup>13</sup>

## Directions<sup>†</sup>

2 packets per day, one AM packet in the morning and one PM packet in the evening or as recommended by your health care professional.

Maintenance: 1 packet per day alternating one AM packet on odd days and one PM packet on even days or as recommended by your health care professional.

## Does Not Contain

Gluten, yeast, artificial colors, flavors or preservatives.

## Cautions

Do not consume this product if you are pregnant or nursing. Consult your physician for further information.

<b>Supplement Facts</b>						
Serving Size 2 Packets Servings Per Container 30						
	Amount Per AM Packet	% Daily Value	Amount Per PM Packet	% Daily Value	Amount Per 2 Packets	% Daily Value
Vitamin A (from 2,000 IU per AM and PM Packets, 4,000 IU per 2 Packets as Betatene® Natural Mixed Carotenoids, Palmitate)	1,150 mcg	128%	1,150 mcg	128%	2,300 mcg	256%
Vitamin C (as Ascorbic Acid USP)	333 mg	370%	167 mg	186%	500 mg	556%
Vitamin D3 (as Cholecalciferol)	12.5 mcg (500 IU)	63%	12.5 mcg (500 IU)	63%	25 mcg (1,000 IU)	125%
Vitamin E (from 25 IU per AM and PM Packets, 50 IU per 2 Packets as d-Alpha Tocopherol Succinate USP)	21.5 mg	143%	21.5 mg	143%	43 mg	287%
Vitamin K (2 packets provide 500 mcg K1 as Phytonadione, 25 mcg K2 as Menaquinone-7 (MK-7))	262.5 mcg	219%	262.5 mcg	219%	525 mcg	438%
Thiamin (Vitamin B1) (from Thiamine Hydrochloride USP)	25 mg	2,083%	25 mg	2,083%	50 mg	4,167%
Riboflavin (Vitamin B2 USP)	15 mg	1,154%	15 mg	1,154%	30 mg	2,308%
Niacin (as Niacin USP, Niacinamide USP)	15 mg	94%	15 mg	94%	30 mg	188%
Vitamin B6 (as Pyridoxine Hydrochloride USP)	25 mg	1,471%	25 mg	1,471%	50 mg	2,941%
Folate (from 400 mcg per AM and PM Packets, 800 mcg per 2 Packets Quatrefolic® (5S)-5-Methyltetrahydrofolic acid glucosamine salt)	680 mcg DFE	170%	680 mcg DFE	170%	1,360 mcg DFE	340%
Vitamin B12 (as Methylcobalamin)	250 mcg	10,417%	250 mcg	10,417%	500 mcg	20,833%
Biotin	150 mcg	500%	150 mcg	500%	300 mcg	1,000%
Pantothenic Acid (as D-Calcium Pantothenate USP)	25 mg	500%	25 mg	500%	50 mg	1,000%
Calcium (as Calcium Hydroxyapatite DimaCal® Dicalcium Malate)	0 mg	0%	1,000 mg	77%	1,000 mg	77%
Phosphorus (as Calcium Hydroxyapatite)	0 mg	0%	360 mg	29%	360 mg	29%
Iodine (from Kelp)	75 mcg	50%	75 mcg	50%	150 mcg	100%
Magnesium (as DIMagnesium Malate, Magnesium Citrate USP, TRAACS® Magnesium Lysinate Glycinate Chelate)	267 mg	64%	133 mg	32%	400 mg	95%
Zinc (as TRAACS® Zinc Bisglycinate Chelate)	7.5 mg	68%	7.5 mg	68%	15 mg	136%
Selenium (as Selenium Glycinate Complex)	100 mcg	182%	100 mcg	182%	200 mcg	364%
Copper (as TRAACS® Copper Bisglycinate Chelate)	0.5 mg	56%	0.5 mg	56%	1 mg	111%
Manganese (as TRAACS® Manganese Bisglycinate Chelate)	2.5 mg	109%	2.5 mg	109%	5 mg	217%
Chromium (as O-polynicotinate) <sup>†</sup>	100 mcg	286%	100 mcg	286%	200 mcg	571%
Molybdenum (as TRAACS® Molybdenum Glycinate Chelate)	75 mcg	167%	75 mcg	167%	150 mcg	333%
Strontium Citrate	1 g	*	0 mg	*	1 g	*
Boron (as Bororganic™ Glycine)	2.5 mg	*	2.5 mg	*	5 mg	*

ID# 350060 60 Packets

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## References

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