

Osteoporosis and Bone – Building Up

Mineralization of bone matrix is essential to living a healthy life. 99% of the body's calcium is contained in the bones and teeth creating two thirds of the bones weight, with the remainder coming from the water weight of bone. Bone cells called osteoblasts produce 85% of the collagen contained in the bone from which hydroxyapatite is created as a crystal-like matrix. In fact it is this protein matrix that is much more essential to the health of the bone than calcium that most everyone is aware of.

The remaining 1% of calcium is involved in multiple functions, one of which is acid buffering mechanisms that assist in keeping the pH in neutral range. This is important because if lifestyles are too acidizing creating a net acid excess the body will attempt to neutralize the acid by dumping calcium from bones stores into the blood. Ultimately acid excess over long periods of time contribute to demineralization and thus osteoporosis. There are graduated states of bone demineralization, the first of which is called osteopenia, defined as a reduced bone matrix up to 2.5 standard deviations below a normal 28 year old woman. Osteoporosis is defined as demineralization in excess of 2.5 standard deviations.

Studies show that bone remodeling is every 5 years, and that while bone growth halts after puberty, there continues to be a balance between bone build up and bone breakdown. In test rats a variation of just .2 pH reduction caused a 500-900% loss of calcium from the rat bone. Human studies show that venous blood pH reduction from 7.37 to 7.33 resulted in significant calcium release from bone. The message clearly is that as we keep our acidity balanced by limiting acidic foods, the worst of which is sugar and sugar-forming foods like starches, we in turn spare the bone to keep its stores of calcium. As well we realize that proper protein metabolism is required for bone health, so eating a good and regular supply of protein can contribute to bone health.

Currently osteoporosis and its related problems have become the third leading health issue and expense. It is simple to balance the underlying causes of this condition, then to demonstrate it within 6-9 months of proper nutritional repletion. All bone grows in response to stress. This is called Wolf's Law, and dictates that we should do weight-bearing exercise as a way to promote health bone growth. If we consider the principle of bone growth and health and align ourselves in lifestyle with these principles osteoporosis no longer needs to be devastating for so many people.