BONE HEALTH 101: What parents and kids need to know

Pediatric Orthopaedic Surgical Associates and your primary care physician are concerned about your child's bone health. Bones ensure the necessary calcium and magnesium for proper functioning of your brain, your heart, and the muscles. Unfortunately, there has been an increase in the number of children's fractures over the past 20 years and no one single cause can account for this. As a parent, it is important to understand the risk factors associated with broken bones and take steps to reduce your child's risk. Consider the following material as a "Bone Health 101" guide and get you and your child on your way to stronger bones!

The **ABC's** of Bone Health:

1. **ACTIVITY**: Encourage activities of weight bearing. Healthy weight bearing provides the bones with a safe amount of force which will improve overall bone quality and strength.[1] Weight bearing through the legs takes place with everyday walking, running and jumping. For the arms; pushups, wheelbarrow races, and free weights (for ages 10 and up) are useful. Too much weight bearing can be detrimental and lead to injuries such as stress fractures. Highly competitive athletes who participate in a singular sport year-round are at a higher risk for these injuries. We recommend a 1 to 2 month period of rest (no sports, pre-season conditioning, etc) at least once a year to allow your child's growing body to recuperate.

2. **BEVERAGES**: Reduce intake of *carbonated* beverages. The phosphorus (which makes drinks carbonated) in soda will leach calcium out of bone. "Caffeine-free" and "Diet" beverages still contain phosphorus. Moderation is the key. Our recommendation for children less than 8 is ½ can per week and for children over 8 is no more than 1 can per week. Additionally, the more non-dairy beverages your child has, the fewer servings of milk they receive![1,2]

3. **CALCIUM**: Ensure an adequate intake of calcium. The following table lists daily calcium requirements for kids as recommended by the Food and Nutrition Board of the NAS (1997).[1] These are averages and as such your child may need more especially during a growth spurt. Milk, cheese, yogurt, broccoli, and sardines are all healthy sources of calcium. Additionally you can find more sources of calcium at the following site: www.niams.nih.gov/bone.

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Recommendations for Adequate Dietary Calcium Intake in the United States[2]	
AGE	**Calcium Intake (mg/day)**
0-6 mo	210 mg
7-12 months	270 mg
1-3 years	500 mg
4-8 years	800 mg
9-18	1,300 mg
19-50	1,000 mg

4. **VITAMIN D**: Vitamin D is naturally made in our skin during exposure to UVB rays from the sun. Make sure your child gets 30 to 40 minutes of sunlight with no sunscreen 2-3 times a week during the summer. Darker-skinned individuals require additional sun exposure to make an equivalent amount of Vitamin D due to increased melanin in their skin. Non-Caucasian children are therefore at higher risk of Vitamin D deficiency. Sunscreen prevents the body from

making Vitamin D. Sun exposure prior to 10 o'clock in the morning and after 5 o'clock at night has a lesser chance of producing burns. If there is a family history of skin cancer, this method may not be suitable for you. If you are spending all day at the pool or outdoors, sunscreen is highly recommended. We DO NOT recommend tanning beds as a source of Vitamin D.

Winter months in our northern latitudes do not allow for adequate Vitamin D synthesis, therefore it is recommended that everyone be on a supplement from October until April/May. Unfortunately, many studies are now showing that children taking the American Academy of Pediatrics' recommended Vitamin D_3 dosage are still low in Vitamin D.[3,4,5] We suggest the following dosage:

0-1 year: 400 IU D_3 daily
1-3 years: 600 IU D_3 daily
3-16 years: 1,000 IU D_3 daily

Liquid: Carlson's "Baby D" and "D" drops, ProHealth, Vitamin Shoppe, Wellesse
Chewable: Vita Fusion Gummies

Foods containing the greatest amount of Vitamin D include fatty fish (cod, herring, salmon). It is also added to many dairy products. One quart of milk has approximately 400 IU of Vitamin D.[6] It is difficult to obtain recommended amounts of Vitamin D through this diet alone.

In addition to affecting bone health, studies in adults are now seeing a link between Vitamin D deficiency and an increased rate of certain cancers (colon, breast, prostate), an increase in the number of fractures, decreased balance, and autoimmune conditions.[6,7]

Risk factors for Vitamin D deficiency include (but are not limited to): residence in northern latitudes, non-Caucasians with darker skin, minimal time outdoors, excessive sunscreen use, inadequate dietary calcium intake, obesity, malabsorption conditions (i.e. Celiac disease), autoimmune disorders, osteopenia on x-rays (thin appearing bones), certain medications (anti-seizure drugs), aging, and hyperparathyroidism.[4,6,7]

Testing for Vitamin D deficiency: Your health care provider may request that your child's Vitamin D level be measured by taking a sample of his or her blood. These results will help to guide treatment decisions and supplementation dosage. Currently, a level < 30-32 ng/mL is considered *insufficient*, and a level < 20 ng/mL is *deficient*.[3,6] There is no agreed-upon "target blood level" in the medical literature for children. At POSA, we prefer that a child's blood level be between 40 and 50 ng/mL for optimal health.

We hope this Bone Health 101 Guide has been useful to you and your child. We encourage you to take steps toward making healthy lifestyle changes that will positively influence your child's bone health. Please discuss any concerns you may have regarding your child's specific medical condition with your pediatrician.

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References

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