BONE HEALTH IN CHILDREN AND ADOLESCENTS

Healthy Eating Tip of the Month: January 2020
Bone consists of two kinds of tissue: **Cortical and Trabecular.** This living tissue helps our bones to grow and repair themselves throughout the life-span.

Cortical bone is the hard outer layer—it is dense and strong. Trabecular bone is the spongy inner layer—it is less dense and more flexible. Bone marrow can be found in the center of this spongy layer. Bone Marrow produces: Red Blood Cells *(carries oxygen to tissues in the body)*, Platelets *(stops bleeding by helping blood clot)*, White Blood Cells *(helps fight infections)*

Bone remodeling = osteoclast and osteoblast activity working at the *same time.* Osteoclast activity is the breakdown (resorption) of bone tissue. Osteoblast activity is the build-up (formation) of bone tissue. **Formation > Resorption** in healthy children and adolescents.

During childhood, adolescence and early adulthood, when the skeleton is growing, it is vitally important to **maximize** bone strength. By ‘banking’ plenty of bone in these years, it puts the skeleton in a better position to withstand the bone loss that occurs with advancing age. The good news is, your children can build strong bones by taking plenty of weight-bearing exercise and eating a well-balanced, calcium and vitamin D-rich diet.
Exercise

Exercise is really important for keeping your children’s bones strong and an active childhood will help to build bones and prevent osteoporosis in later life.

Five exercises to build strong bones:

⇒ Team sports such as football or netball are a great way of getting children involved in fitness from a young age.

⇒ Skipping is good for children and young people because it adds some impact to bones. Aim for 50 jumps a day or skipping for five minutes each day.

⇒ Jogging is great exercise and a fantastic way of building bone in both the hip and spine in younger people. • Tennis or badminton are other high-impact, enjoyable sports that build bone density.

⇒ Exercise to music classes and dancing are fun ways to boost bone health

Nutrition

The nutrients you eat and drink are needed for bone growth throughout the lifespan, particularly calcium and vitamin D. 99% of calcium is found in our bones and teeth- this helps give them strength and rigidity.

Vitamin D is needed to help absorb and utilize calcium in our body. It is best to consume dietary sources of these nutrients because it is more available for your child's body to use. On the right are the dietary reference intakes (DRIs) for calcium and vitamin D.

DRI for Calcium - Published by Institute of Medicine, endorsed by American Academy of Pediatrics

<table>
<thead>
<tr>
<th>Age</th>
<th>Calcium (mg/d)</th>
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<tr>
<td>6-12 months</td>
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<tr>
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<td>4-8 yo</td>
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<td>9-18 yo</td>
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DRI for Vitamin D - Published by Institute of Medicine, endorsed by American Academy of Pediatrics

<table>
<thead>
<tr>
<th>Age</th>
<th>Vitamin D (IU/d)</th>
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How to Read a Nutrition Label

Serving size: Serving sizes are standardized portions that make it easier to eat an appropriate amount for that item.

Calories: Calories equal how much energy you get from one serving.

Limit these nutrients: Try to reduce saturated and trans fat, cholesterol, and sodium. Consuming these nutrients in excess can lead to an unhealthy lifestyle. The FDA considers 5% or less low and more than 20% high.

Get enough of these nutrients: Include calcium, vitamin A, vitamin C, and iron in your diet. The FDA considers 5% or less low and more than 20% high.

Footnote: The % Daily Value is based on a 2000 calorie diet. Your daily calorie intake may be lower depending on your age and how much energy you burn.
Calcium-Rich Meal Samples

Breakfast

- Soy Yogurt: 1 container: 300 mg
- Kiwi: 1.5 Kiwis: 60 mg
- White Bread: 1 slice: 70 mg

Total Calcium: 430 mg

Lunch

- Tofu: 4.5 oz: 300 mg
- Spinach: 3/4 cup: 240 mg
- Plums: 1 plum, raw: 10 mg

Total Calcium: 550 mg

Dinner

- Salmon: 3.5 oz: 250 mg
- Green Beans: 1 cup: 40 mg
- Brown Rice: 3/4 cup: 20 mg

Total Calcium: 310 mg

Total Daily Calcium: 1290 mg
Plant-Based MyPlate for Bone Health

**Focus on whole fruits**
Try to add more fruit to your breakfast, such as adding berries to your oatmeal or have a tangerine for a snack!

**Vary your veggies**
Eat a colorful variety of vegetables. Consider stir-fries, soups or salads. Broccoli and leafy greens are good sources of calcium.

**Make half of your grains whole grains**
Try to consume more Vitamin D fortified whole grain cereals to reach the Dietary Reference Intake.

**Vary your protein routine**
Calcium-fortified tofu, lentil pasta, and green peas are a few ideas. Beans are especially good sources of calcium!

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**Include sources of Calcium and Vitamin D as alternatives to dairy products**

Plant-based sources of calcium:
- 1 cup cooked kale (200mg)
- 1 cup cooked collard greens (200mg)
- 2 Tbsp almonds (50 mg)
- 1/2 cup cooked soybeans (100mg)
- 8 oz fortified orange juice (300 mg)
- 8 oz fortified nut milk (300 mg)
- 2 Tbsp chia seeds (150 mg)

Plant-based sources of Vitamin D:
- 1/2 cup calcium-set tofu (200 mg)
- 3 Tbsp ground flaxseeds (50 mg)
- 1/2 cup tempeh (100 mg)
- 1 cup broccoli (50 mg)
- 1 Tbsp blackstrap molasses (100 mg)
- 1 fortified energy bar (300 mg)
- 1/2 cup cooked navy beans (50 mg)
- 2 Tbsp almond butter (100 mg)
- 5 dried figs (75 mg)
Vegan Recipe Rich in Calcium & Vitamin D

BBQ Tofu Rice Bowl

**Ingredients:**

- 1/2 cup BBQ sauce
- 14 oz. Nasoya Lite Silken Tofu
- 2 bunches of Kale
- 1/4 cup Roasted Corn
- 1/4 cup Black Beans
- 1/4 cup chopped Red Onion
- 1 diced Sweet Potato
- 1 cup Minute Brown Rice
- 1 sliced Avocado
- 2 Tbsp. Tahini Dressing

**Directions:**

**Tofu-**

- Press tofu for 30 minutes. Cut into 1/2-inch thick slices, then quarter each slice.
- Pour barbecue sauce into an 8-inch square baking dish. Place tofu in dish and gently toss to coat. Let tofu marinate in sauce for 1 hour (or more), turning occasionally.
- Preheat oven to 400 degrees. Spray a rimmed baking sheet with oil or cooking spray. Place tofu on baking sheet and bake for 20 minutes. After 20 minutes, turn tofu over and brush with additional barbecue sauce.
- Bake 20 minutes more or until tofu is browned on edges.

**Additional Directions-**

* Bake the diced sweet potato in the oven until cooked—about 400 degrees for 25 minutes.

* Cook the rice according to the package.

* Massage the kale with olive oil for 3-5 minutes.

* Roast the corn in a pan until crisp.

* Combine all ingredients and enjoy! This recipe yields 4 servings. Share with others or save some for later!
References:


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