

Helping Your Bone Heal: Behaviors that Help and Hurt Your Progress

HOW CAN I HELP MY BONE HEAL?

- 1. Take supplements** – If you are recovering from a fracture, are undergoing limb lengthening, or are recovering from bone surgery, you should take the supplements that are listed in the table below. *Please note that the supplement levels below are general recommendations. Please check with your doctor for the best amount specifically for you.*

Type of supplement	Children between 1 and 6 years of age	Adults and children age 6 years or older	Why does this need to be taken?
Age-Appropriate Multivitamin	Age-Appropriate Multivitamin	Age-Appropriate Multivitamin	Multivitamins ensure that you are getting all the basic vitamins and minerals that your body requires. If your multivitamin does not contain the amounts of calcium, vitamin C and vitamin D listed below, please take additional supplements.
Calcium	500 mg	1000 mg	Calcium is crucial to bone health. ¹ Low calcium intake can lead to bone breakdown. ¹
Vitamin C	250 mg	1000 mg	Vitamin C is needed to form collagen. ² Collagen is an essential protein for bone building.
Vitamin D	600 IU	1000 IU	Vitamin D helps calcium absorption. ³ An insufficient amount of vitamin D can result in brittle, thin or misshapen bones. ³

These daily dosages are for normally healthy patients and are **in addition** to vitamins or minerals that are part of your diet. Depending on the circumstances, your surgeon may modify these recommendations. To further help bone healing, you can also eat foods that are rich in calcium, vitamin C, and vitamin D. Please see pages 3 and 4 for lists of foods and drinks that are rich in these nutrients.

If you have any underlying diseases, such as rickets or kidney stones, please discuss this with your physician.

- 2. Ask your doctor if you can put weight on the injured leg or arm** – If your physician allows you to put weight on the injured arm or leg, this can help to stimulate bone growth. Weight bearing is allowed in only certain circumstances, so be sure to *check with your doctor first!*

WHAT DELAYS BONE HEALING?

- 1. Smoking** – We advise all patients undergoing bone lengthening and/or bone reconstruction procedures to stop smoking. Nicotine in all forms can keep bones from healing correctly. This includes: nicotine patches or gum, e-cigarettes, chewing tobacco, smoked cigarettes and cigars. For helpful resources to stop smoking, visit: <https://smokefree.gov>.
According to the American Academy of Orthopaedic Surgeons, nicotine has a negative effect on bones, muscles, and joints, and often leads to poorer orthopedic surgery results. Research has found that it takes longer for smokers' bones

to heal because of the harmful effects of nicotine on the production of bone-forming cells. Smokers also have more complications after surgery, including: poorer wound healing and greater risk of infection.

Action on Smoking and Health, a national antismoking organization, has reported on its website that “**smoking almost doubles the time it takes broken bones to heal**, in some cases preventing recovery for more than a year, according to a study conducted at the University of Texas Medical School. Another study, conducted at Emory University School of Medicine, shows that nicotine in the blood slows and may even totally prevent bone fusion in certain cases.”⁴

2. **Taking nonsteroidal anti-inflammatory medications** – One group of medications, called non-steroidal anti-inflammatory drugs or NSAIDs, can slow bone healing.⁵ Examples of NSAIDs include ibuprofen, naproxen, and aspirin (see full list below). **Tylenol (acetaminophen or paracetamol) is allowed.** Even though it is allowed, check with your doctor about an appropriate dose of Tylenol because it might already be an ingredient in your prescription pain medication. Please bring a list of all prescription and non-prescription medications that you are currently taking and share it with the staff.

DO NOT TAKE THE FOLLOWING NONSTEROIDAL ANTI-INFLAMMATORY DRUGS (NSAIDS):

Over the Counter NSAIDs	
Advil (Ibuprofen)	Ibuprohm (Ibuprofen)
Aleve (Naproxen)	Ibu-Tab (Ibuprofen)
Alka-Seltzer (Aspirin)	Motrin (Ibuprofen)
Aspirin*	Naprosyn (Naproxen)
Bayer (Aspirin)	Naproxen
Bufferin (Aspirin)	Nurofen (Ibuprofen)
Children’s Advil (Ibuprofen)**	Pediaprofen (Ibuprofen)
Ecotrin (Aspirin)	Rufen (Ibuprofen)
Excedrin (Aspirin)	Saleto (Ibuprofen)
Ibuprofen	

Prescription NSAIDs	
Celecoxib	Mobic (Meloxicam)
Celebrex (Celecoxib)	Nabumetone
Daypro (Oxaproxin)	Orudis (Ketoprofen)
Feldene (Piroxicam)	Oruvail (Ketoprofen)
Indocin (SR) (Indomethacin)	Oxaproxin
Indochion (ER) (Indomethacin)	Piroxicam
Indomethacin (SR) (Indomethacin)	Relafen (Nabumetone)
Ketorolac	Toradol (Ketorolac)***
Ketoprofen Meclofenamate	Tolectin & Tolectin DS (Tolmentin)
Meclomen (Meclofenamate)	Tolmentin
Meloxicam	

* If your physician instructs you to take a single aspirin every day to help prevent blood clots, it is okay to take it.

** In cases of high temperatures in children, it may be necessary to use ibuprofen if ordered by the pediatrician, but use it sparingly.

*** The doctors occasionally give a few doses of Toradol during the first days after surgery. These few doses are not a problem.

FOODS AND DRINKS RICH IN CALCIUM, VITAMIN C AND VITAMIN D

Dietary Sources of Calcium¹

Food	Milligrams (mg) per Serving
Yogurt, plain, low fat, 8 ounces	415
Mozzarella cheese, part skim, 1.5 ounces	333
Sardines, canned in oil, with bones, 3 ounces	325
Cheddar cheese, 1.5 ounces	307
Tofu, firm, made with calcium sulfate, ½ cup	253
Pink salmon, including bones, canned, 3 ounces	181
Cottage cheese, 1% milk fat, 1 cup	138
Ready-to-eat cereal, calcium-fortified, 1 cup	100–1,000
Ice cream, vanilla, ½ cup	84
Pudding, chocolate, ready to eat, refrigerated, made with 2% milk, ½ cup	55
Drink	Milligrams (mg) per Serving
Milk, reduced-fat (2% milk fat), 8 ounces	293
Milk, whole, (3.25% milk fat), 8 ounces	276
Orange juice, calcium-fortified, 6 ounces	261
Soy beverage, calcium-fortified, 8 ounces	80–500

Dietary Sources of Vitamin C²

Food	Milligrams (mg) per Serving
Red pepper, sweet, raw, ½ cup	95
Orange, 1 medium	70
Kiwifruit, 1 medium	64
Green pepper, sweet, raw, ½ cup	60
Broccoli, cooked, ½ cup	51
Strawberries, fresh, ½ cup	49
Grapefruit, ½ medium	39
Drink	Milligrams (mg) per Serving
Orange juice, ¾ cup	93
Grapefruit juice, ¾ cup	70
Tomato juice, ¾ cup	33

Dietary Sources of Vitamin D³

Food	International Units (IU) per Serving
Salmon (sockeye), cooked, 3 ounces	447
Tuna fish, canned in water, drained, 3 ounces	154
Yogurt, fortified with 20% of the DV for vitamin D, 6 ounces (more heavily fortified yogurts provide more of the DV)	80
Margarine, fortified, 1 tablespoon	60
Sardines, canned in oil, drained, 2 sardines	46
Liver, beef, cooked, 3 ounces	42
Egg, 1 whole (vitamin D is found in yolk)	41
Drink	Milligrams (mg) per Serving
Orange juice fortified with vitamin D, 1 cup (check product labels, as amount of added vitamin D varies)	137
Milk, nonfat, reduced fat, and whole, vitamin D-fortified, 1 cup	115–124

REFERENCES

1. <http://ods.od.nih.gov/factsheets/Calcium-HealthProfessional/>
2. <http://ods.od.nih.gov/factsheets/VitaminC-HealthProfessional/>
3. <http://ods.od.nih.gov/factsheets/VitaminD-HealthProfessional/>
4. Posted with permission from <http://ash.org>
5. <http://orthoinfo.aaos.org/topic.cfm?topic=a00284>