HEALTHY BONES AND MUSCLES FOR LIFE pdf

1: Natural Remedies for Bone and Joint Pain: 6 Easy Options - www.enganchecubano.com

Bones play many roles in the body â€" providing structure, protecting organs, anchoring muscles and storing calcium. While it's important to build strong and healthy.

Advanced Search ABSTRACT Muscle plays a central role in whole-body protein metabolism by serving as the principal reservoir for amino acids to maintain protein synthesis in vital tissues and organs in the absence of amino acid absorption from the gut and by providing hepatic gluconeogenic precursors. Furthermore, altered muscle metabolism plays a key role in the genesis, and therefore the prevention, of many common pathologic conditions and chronic diseases. Nonetheless, the maintenance of adequate muscle mass, strength, and metabolic function has rarely, if ever, been targeted as a relevant endpoint of recommendations for dietary intake. It is therefore imperative that factors directly related to muscle mass, strength, and metabolic function be included in future studies designed to demonstrate optimal lifestyle behaviors throughout the life span, including physical activity and diet. Perhaps less well recognized, muscle plays a central role in whole-body protein metabolism, which is particularly important in the response to stress. Furthermore, abundant evidence points to a key role of altered muscle metabolism in the genesis, and therefore prevention, of many common pathologic conditions and chronic diseases. This review discusses the various roles of muscle metabolism in health and disease, including consideration of possible solutions to muscle loss. Particular emphasis will be given to the notion that increasing protein or amino acid intakes may optimize muscle strength and metabolism and thereby improve health. In the postabsorptive state these essential tissues and organs rely on a steady supply of amino acids via the blood to serve as precursors for the synthesis of new proteins to balance the persistent rate of protein breakdown that occurs in all tissues. It has been recognized since the early s that, in the absence of nutrient intake, muscle protein serves as the principal reservoir to replace blood amino acid taken up by other tissues 1 â€" 3. In the fasting state, blood amino acids serve not only as precursors for the synthesis of proteins but also as precursors for hepatic gluconeogenesis 4. Consequently, the protein mass of essential tissues and organs, as well as the necessary plasma glucose concentration, can be maintained relatively constant despite the absence of nutritional intake, provided muscle mass is adequate to supply the required amino acids. The demands for amino acids in most organs and tissues do not vary significantly from the fed to the postabsorptive state because little surplus protein is accumulated. Furthermore, the hepatic uptake of gluconeogenic amino acids decreases with nutrient intake 5. Consequently, the primary fate of ingested amino acids is incorporation into muscle protein to replete the reserves of amino acids lost in the fasting state. Under normal conditions, gains in muscle protein mass in the fed state balance the loss of muscle protein mass in the postabsorptive state. The ability of net muscle protein breakdown to maintain plasma amino acid concentrations is remarkable, provided adequate muscle mass is available. In contrast, depletion of muscle mass is incompatible with life. For example, there is a strong association between the depletion of body cell mass presumably reflecting depletion of muscle mass and the length of survival of seriously ill patients with AIDS 7. Studies performed by Jewish physicians in the Warsaw ghetto suggest that death from starvation, uncomplicated by critical illness, occurs when muscle protein breakdown becomes inadequate to maintain the necessary supply of gluconeogenic precursors 8. The extensive work by Keys et al 9 also concludes that the depletion of muscle mass is the cause of death in human starvation. Physiologic responses necessary for recovery may include the accelerated synthesis of acute phase proteins in the liver, synthesis of proteins involved in immune function, and synthesis of proteins involved in wound healing. The demands for precursor amino acids for the synthesis of these proteins are significant. In addition, stimulation of hepatic gluconeogenesis in stressed states further increases the demand for amino acids Net breakdown of muscle protein is stimulated to provide abundant amino acids to meet these increased demands. This response is not readily reversed, even by aggressive nutritional support Not surprisingly, individuals with limited reserves of muscle mass respond poorly to stress. For example, survival from severe burn injury is lowest in individuals with reduced lean body mass Loss of muscle mass is also known to be detrimental to survival from cancer. For example, in patients with lung cancer receiving radiation therapy, the amount of body protein measured by

in vivo neutron-activation analysis predicted recurrence. In those in whom body protein decreased, recurrence and, ultimately, survival was worse than in patients who were able to maintain or increase muscle mass Although it is possible that muscle loss occurs because of impaired appetite and, thus, reduced protein intake in those more susceptible to recurrence, the relation between muscle mass and recurrence is nonetheless striking. Whereas muscle mass plays a key role in recovery from critical illness or severe trauma, muscle strength and function is central to the recovery process. Extensive losses of muscle mass, strength, and function during acute hospitalization causing sustained physical impairment were likely contributors to the prolonged recovery. If there is a preexisting deficiency of muscle mass before trauma, the acute loss of muscle mass and function may push an individual over a threshold that makes recovery of normal function unlikely to ever occur. Population-based studies assess diet and physical activity and measure indexes such as blood lipids, body mass index, and bone biomarkers to predict risk of disease. Few if any population-based studies have assessed muscle mass or physical or metabolic function to understand the role of muscle in these conditions. However, alterations in muscle play an important role in the most common diseases and conditions. Heart disease and cancer are the major chronic diseases suffered in the United States Both cardiac failure and cancer are often associated with rapid and extensive loss of muscle mass, strength, and metabolic function cachexia. With cardiac and cancer cachexia, the loss of muscle mass is an important determinant of survival 14 , Sarcopenia, the progressive loss of muscle mass and function that occurs with aging, is a widespread syndrome that has a devastating effect on quality of life and ultimately survival Progressive sarcopenia is ultimately central to the development of frailty, an increased likelihood of falls, and impairment of the ability to perform ADL The logical endpoint of severe sarcopenia is loss of quality of life and ultimately institutionalization. The development of obesity results from an energy imbalance over a prolonged time, which means that energy intake exceeds energy expenditure. An effect on energy balance can therefore be achieved by altering either energy intake or energy expenditure. Total energy expenditure is the sum of resting energy expenditure REE , the thermic effect of food, and the energy expenditure related to activity. Under most circumstances, REE is the largest component of total energy expenditure The energy expenditure related to muscle metabolism is the only component of REE that might vary considerably. The resting metabolic requirements of splanchnic tissues, brain, and skin vary little under normal conditions because of relatively constant tissue mass and protein turnover rates In contrast, large variations in muscle mass are possible, and the rate of muscle protein turnover ie, muscle protein synthesis and breakdown may vary as well. The synthesis and breakdown of muscle protein are principally responsible for the energy expenditure of resting muscle. Whereas the precise in vivo energetics of muscle protein turnover are uncertain, a conservative estimate can be made on the basis of muscle protein synthesis. The absolute synthetic rate can be calculated as the product of the FSR and muscle mass. We have found the average muscle mass of young, healthy males to range from 35 to 50 kg These estimates are consistent with the observed increase in REE during an infusion of amino acids at a rate known to stimulate muscle protein synthesis Extremes in muscle mass, eg, young male body builders to frail elderly, would be even greater. This effect on energy balance is particularly striking when it is realized that the estimate given above for the energy expenditure associated with muscle protein turnover is likely an underestimate, because protein breakdown also requires the hydrolysis of ATP, and the energy released in this process is above and beyond the contribution of muscle protein synthesis to energy production. It is evident from these estimations that, when a long-term perspective is considered, even relatively small differences eg, 10 kg in muscle mass could have a significant effect on energy balance. In considering the magnitude of energy imbalances leading to obesity, it is reasonable to view the situation over long periods of time, because obesity often develops over months and even years. Consequently, the maintenance of a large muscle mass and consequent muscle protein turnover can contribute to the prevention of obesity. Regardless of the energetics of muscle protein turnover, obesity can develop if energy intake is great enough. Obesity is clinically characterized by a disproportionate increase in fat mass. Less appreciated is the fact that muscle mass in obesity is also increased Although the energy expenditure associated with larger muscle mass in obesity is insufficient to offset the excessive energy intake, the expanded muscle mass can be capitalized on to facilitate weight loss. It is evident from the calculations presented above that a stimulation of

muscle protein turnover in the setting of increased muscle mass could have a significant effect on REE and, thus, energy balance. This can potentially be accomplished through nutrition, because increasing amino acid availability increases muscle protein turnover Furthermore, the energy to provide the ATP for muscle protein turnover is largely derived from the oxidation of fat, because this is the preferred energy substrate of resting muscle Thus, when muscle protein synthesis was increased by testosterone injection in hypogonadal elderly men, the increase in lean body mass over time was accompanied by a decrease in fat mass Extending this notion to the situation of a hypocaloric diet for weight loss, a high percentage of protein in the diet would therefore be expected to effectively repartition nutrient deposition from fat to muscle. Recent reports of improved body composition during weight loss with high-protein, hypocaloric diets support the notion of repartitioning of nutrient intake when protein turnover is stimulated The onset of the process involves a decreased ability of insulin to stimulate muscle to clear glucose from the blood. Insulin secretion is amplified in the initial phase of insulin resistance to enable muscle to clear glucose from plasma adequately to maintain normal glucose concentrations. As the metabolic syndrome progresses to diabetes, increased insulin secretion is unable to effectively counterbalance the ineffectiveness of insulin to stimulate muscle glucose uptake, and glucose intolerance ensues. Only in the later stage of diabetes does the pancreas lose the ability to secrete extra insulin in response to hyperglycemia. Disruption of the normal rate of muscle glucose uptake by muscle is thus central to the onset and progression of diabetes A relative increase in body fat is an appealing explanation for the decline in insulin sensitivity in both obese and elderly individuals. However, over the past few years it has become evident that changes in the metabolic function of muscle itself plays a more direct role in the genesis of insulin resistance than previously appreciated. The central thesis of the glucoseâ€”fatty acid cycle is that elevated plasma FFA concentrations limit glucose uptake in muscle by inhibiting the oxidation of glucose Thus, according to this theory, the genesis of insulin resistance lay entirely with the increased availability of FFAs, and the muscle responded normally to that signal to limit glucose uptake and oxidation. However, research done in our laboratory 34 , as well as in others 35 , has shown that the glucoseâ€”fatty acid cycle was inadequate to explain regulation of muscle glucose uptake in a physiologic setting. Rather, alterations in metabolic function within the muscle are more likely at the heart of the genesis of insulin resistance. Recent studies that used new applications of magnetic resonance spectroscopy to quantify triacylglycerol deposition in muscle have revised thinking about possible mechanisms by which alterations in lipid metabolism may affect insulin sensitivity in muscle. Triacylglycerol deposition in muscle has been found to be associated with insulin resistance in a variety of circumstances 36 â€” 39 , whereas obesity without insulin resistance is not associated with increased triacylglycerol deposition in muscle. Increased triacylglycerol deposition in muscle has been interpreted to be an indicator of dysfunctional muscle lipid metabolism that is likely related to insulin resistance by mechanisms independent of total body fat mass An accumulation of intracellular triacylglycerol results from an imbalance between tissue fatty acid uptake and fatty acid disposal. Fatty acid uptake by muscle is directly proportional to delivery in a wide variety of circumstances Although fatty acid delivery to muscle is generally elevated in obesity because of a large fat mass , triacylglycerol deposition in muscle is not elevated in obese subjects who are not insulin resistant It is becoming clear that, rather than an increased delivery of FFAs to muscle, it is more likely that impaired disposal via oxidation is the principal basis for accumulation of triacylglycerol deposition in muscle and other potentially active products of fatty acids. In vivo capacity to oxidize fatty acids is reduced in insulin-resistant individuals

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2: Determinants of Bone Health - Bone Health and Osteoporosis - NCBI Bookshelf

Bone Health for Life: Health Information Basics for You and Your Family Our bones support us and allow us to move. They protect our brain, heart, and other organs from injury.

February, The saying goes there are two certainties in life: But men should also add loss of muscle mass to the list. Age-related muscle loss, called sarcopenia, is a natural part of aging. Less muscle means greater weakness and less mobility, both of which may increase your risk of falls and fractures. A report from the American Society for Bone and Mineral Research found that people with sarcopenia had 2. But just because you lose muscle mass does not mean it is gone forever. Think of testosterone as the fuel for your muscle-building fire. Some research has shown that supplemental testosterone can add lean body massâ€"that is, muscleâ€"in older men, but there can be adverse effects. Plus, the FDA has not approved these supplements specifically for increasing muscle mass in men. Therefore, the best means to build muscle mass, no matter your age, is progressive resistance training PRT , says Dr. With PRT, you gradually amp up your workout volumeâ€"weight, reps, and setsâ€"as your strength and endurance improve. This constant challenging builds muscle and keeps you away from plateaus where you stop making gains. See "Working on a PRT program. The power of protein Your diet also plays a role in building muscle mass. Protein is the king of muscle food. The body breaks it down into amino acids, which it uses to build muscle. Therefore, as with PRT, if you are older, you need more. A recent study in the journal Nutrients suggests a daily intake of 1 to 1. For example, a pound man would need about 79 g to g a day. If possible, divide your protein equally among your daily meals to maximize muscle protein synthesis. This is a high amount compared with the average diet, but there are many ways to get the extra protein you need. Animal sources meat, eggs, and milk are considered the best, as they provide the proper ratios of all the essential amino acids. Yet, you want to stay away from red and processed meat because of high levels of saturated fat and additives. Instead, opt for healthier choices, such as 3. Protein powders can offer about 30 g per scoop and can be added to all kinds of meals like oatmeal, shakes, and yogurt. Also, to maximize muscle growth and improve recovery, he suggests consuming a drink or meal with a carbohydrate-to-protein ratio of about three-to-one or four-to-one within 30 minutes after your workout. For example, a good choice is 8 ounces of chocolate milk, which has about 22 g of carbs and 8 g of protein. Powerâ€"not just strength Building muscle is not all about strength, says Dr. You also need power. A good way to improve overall muscle power is with your legs, since they are most responsible for mobility. For instance, when rising from a seated position, try to do it quickly. When climbing stairs, hold the handrail and push off a step as fast as possible. Then enlist a well-qualified personal trainer to help set up a detailed sequence and supervise your initial workouts to ensure you perform them safely and in the best manner. As you progress, you can often perform them on your own. A typical training program might include 8 to 10 exercises that target all the major muscle groups sets of 12 to 15 reps, performed at an effort of about 5 to 7 on a point scale two or three workouts per week. After you have established a routine, there are several ways to progress. The easiest is to add a second and then a third set of the exercises. Another way is to decrease the number of reps per set and increase the weight or resistance to the point where you are able to complete at least eight reps, but no more than As you improve, you can increase weight by trial and error, so you stay within the range of eight to 12 reps.

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3: 3 Ways to Keep Your Bones and Joints Healthy - wikiHow

The Basics on Muscles, Bones, and Joints a group of inherited muscular diseases that can affect people at birth or develop later in life, causes progressive muscle weakness. many moving.

Minerals are incorporated into your bones during childhood, adolescence and early adulthood. Once you reach 30 years of age, you have achieved peak bone mass. If not enough bone mass is created during this time or bone loss occurs later in life, you have an increased risk of developing fragile bones that break easily 1. Fortunately, many nutrition and lifestyle habits can help you build strong bones and maintain them as you age. Here are 10 natural ways to build healthy bones. Eat Lots of Vegetables Vegetables are great for your bones. Vegetables also seem to increase bone mineral density, also known as bone density. Bone density is a measurement of the amount of calcium and other minerals found in your bones. Both osteopenia low bone mass and osteoporosis brittle bones are conditions characterized by low bone density. A high intake of green and yellow vegetables has been linked to increased bone mineralization during childhood and the maintenance of bone mass in young adults 3 , 4 , 5. Eating lots of vegetables has also been found to benefit older women. One major risk factor for osteoporosis in older adults is increased bone turnover, or the process of breaking down and forming new bone 7. In a three-month study, women who consumed more than nine servings of broccoli, cabbage, parsley or other plants high in bone-protective antioxidants had a decrease in bone turnover 8. Consuming a diet high in vegetables has been shown to help create healthy bones during childhood and protect bone mass in young adults and older women. Perform Strength Training and Weight-Bearing Exercises Engaging in specific types of exercise can help you build and maintain strong bones. One of the best types of activity for bone health is weight-bearing or high-impact exercise, which promotes the formation of new bone. Studies in children, including those with type 1 diabetes, have found that this type of activity increases the amount of bone created during the years of peak bone growth 9 , In addition, it can be extremely beneficial for preventing bone loss in older adults. Studies in older men and women who performed weight-bearing exercise showed increases in bone mineral density, bone strength and bone size, as well as reductions in markers of bone turnover and inflammation 11 , 12 , 13 , However, one study found little improvement in bone density among older men who performed the highest level of weight-bearing exercise over nine months Strength-training exercise is not only beneficial for increasing muscle mass. It may also help protect against bone loss in younger and older women, including those with osteoporosis, osteopenia or breast cancer 16 , 17 , 18 , 19 , One study in men with low bone mass found that although both resistance training and weight-bearing exercise increased bone density in several areas of the body, only resistance training had this effect in the hip Performing weight-bearing and resistance training exercises can help increase bone formation during bone growth and protect bone health in older adults, including those with low bone density. Consume Enough Protein Getting enough protein is important for healthy bones. Researchers have reported that low protein intake decreases calcium absorption and may also affect rates of bone formation and breakdown However, concerns have also been raised that high-protein diets leach calcium from bones in order to counteract increased acidity in the blood. In fact, research suggests that older women, in particular, appear to have better bone density when they consume higher amounts of protein 25 , 26 , In a large, six-year observational study of over , postmenopausal women, higher protein intake was linked to a lower risk of forearm fractures and significantly higher bone density in the hip, spine and total body In a one-year study, women who consumed 86 grams of protein daily on a calorie-restricted diet lost less bone mass from their arm, spine, hip and leg areas than women who consumed 60 grams of protein per day A low protein intake can lead to bone loss, while a high protein intake can help protect bone health during aging and weight loss. The RDI for calcium is 1, mg per day for most people, although teens need 1, mg and older women require 1, mg However, the amount of calcium your body actually absorbs can vary greatly. Interestingly, if you eat a meal containing more than mg of calcium, your body will absorb much less of it than if you consume a lower amount. Calcium is the main mineral found in bones and must be consumed every day to protect bone health. Spreading your calcium intake throughout the day will optimize absorption. Vitamin D plays several roles in

bone health, including helping your body absorb calcium. Indeed, studies have shown that children and adults with low vitamin D levels tend to have lower bone density and are more at risk for bone loss than people who get enough 32 , Unfortunately, vitamin D deficiency is very common, affecting about one billion people worldwide You may be able to get enough vitamin D through sun exposure and food sources such as fatty fish, liver and cheese. However, many people need to supplement with up to 2, IU of vitamin D daily to maintain optimal levels. Vitamin K2 supports bone health by modifying osteocalcin, a protein involved in bone formation. This modification enables osteocalcin to bind to minerals in bones and helps prevent the loss of calcium from bones. MK-4 exists in small amounts in liver, eggs and meat. Fermented foods like cheese, sauerkraut and a soybean product called natto contain MK A small study in healthy young women found that MK-7 supplements raised vitamin K2 blood levels more than MK-4 Nevertheless, other studies have shown that supplementing with either form of vitamin K2 supports osteocalcin modification and increases bone density in children and postmenopausal women 36 , 37 , 38 , In a study of women 50â€”65 years of age, those who took MK-4 maintained bone density, whereas the group that received a placebo showed a significant decrease in bone density after 12 months However, another month study found no significant difference in bone loss between women whose diets were supplemented with natto and those who did not take natto Getting adequate amounts of vitamins D and K2 from food or supplements may help protect bone health. In addition to slowing down your metabolism, creating rebound hunger and causing muscle mass loss, it can also be harmful to bone health. Studies have shown that diets providing fewer than 1, calories per day can lead to lower bone density in normal-weight, overweight or obese individuals 41 , 42 , 43 , In one study, obese women who consumed calories per day for four months experienced a significant loss of bone density from their hip and upper thigh region, regardless of whether they performed resistance training To build and maintain strong bones, follow a well-balanced diet that provides at least 1, calories per day. It should include plenty of protein and foods rich in vitamins and minerals that support bone health. Diets providing too few calories have been found to reduce bone density, even when combined with resistance exercise. Consume a balanced diet with at least 1, calories daily to preserve bone health. Collagen is the main protein found in bones. It contains the amino acids glycine, proline and lysine, which help build bone, muscle, ligaments and other tissues. Collagen hydrolysate comes from animal bones and is commonly known as gelatin. It has been used to relieve joint pain for many years. A week study found that giving postmenopausal women with osteoporosis a combination of collagen and the hormone calcitonin led to a significant reduction in markers of collagen breakdown Emerging evidence suggests that supplementing with collagen may help preserve bone health by reducing collagen breakdown. In addition to eating a nutritious diet, maintaining a healthy weight can help support bone health. For example, being underweight increases the risk of osteopenia and osteoporosis. This is especially the case in postmenopausal women who have lost the bone-protective effects of estrogen. In fact, low body weight is the main factor contributing to reduced bone density and bone loss in this age group 47 , On the other hand, some studies suggest that being obese can impair bone quality and increase the risk of fractures due to the stress of excess weight 49 , While weight loss typically results in some bone loss, it is usually less pronounced in obese individuals than normal-weight individuals Overall, repeatedly losing and regaining weight appears particularly detrimental to bone health, as well as losing a large amount of weight in a short time. Maintaining a stable normal or slightly higher than normal weight is your best bet when it comes to protecting your bone health. Being too thin or too heavy can negatively affect bone health. Furthermore, maintaining a stable weight, rather than repeatedly losing and regaining it, can help preserve bone density. Several others also play a role, including magnesium and zinc. Magnesium plays a key role in converting vitamin D into the active form that promotes calcium absorption Although magnesium is found in small amounts in most foods, there are only a few excellent food sources. Supplementing with magnesium glycinate, citrate or carbonate may be beneficial. Zinc is a trace mineral needed in very small amounts. It helps make up the mineral portion of your bones. In addition, zinc promotes the formation of bone-building cells and prevents the excessive breakdown of bone. Studies have shown that zinc supplements support bone growth in children and the maintenance of bone density in older adults 55 , Good sources of zinc include beef, shrimp, spinach, flaxseeds, oysters and pumpkin seeds. Magnesium and zinc play key roles

in achieving peak bone mass during childhood and maintaining bone density during aging. Omega-3 fatty acids are well known for their anti-inflammatory effects. In one large study of over 1, adults aged 45â€”90, those who consumed a higher ratio of omega-6 to omega-3 fatty acids tended to have lower bone density than people with a lower ratio of the two fats In addition, although most studies have looked at the benefits of long-chain omega-3 fats found in fatty fish, one controlled study found that omega-3 plant sources helped decrease bone breakdown and increase bone formation Plant sources of omega-3 fats include chia seeds, flaxseeds and walnuts. Omega-3 fatty acids have been found to promote the formation of new bone and protect against bone loss in older adults. The Bottom Line Bone health is important at all stages of life.

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4: Bones, Muscles, and Joints

The human body has more than muscles, which make up half of a person's body weight. They are connected to bones by tough, cord-like tissues called tendons, which allow the muscles to pull on bones.

Bones are continuously being broken down and rebuilt in tiny amounts. Before about age 30, when bones typically reach peak bone mass which varies from person to person , the body is creating new bone faster, but after age 30, the bone building balance naturally shifts and more bone is lost than gained. The disease is most common in postmenopausal women over the age of 65 and in men over the age of Unfortunately, some are more likely than others to develop osteoporosis and weak bones in general namely white and Asian postmenopausal women. But never fear â€" there are some things that can be changed to bump up bone mass. Here are 10 tips to make deposits in your bone bank for a healthier future. Know your family history. As with many medical conditions, family history is a key indicator of bone health. Those with a parent or sibling who has or had osteoporosis are more likely to develop it. When most people think bones, they think calcium. This mineral is essential for the proper development of teeth and bones. The key might be to help the body absorb calcium by pairing calcium-rich foods with those high in vitamin D. Foods that are good sources of calcium include yogurt, cheese, milk, spinach and collard greens. Not a dairy fan? Check out our list of non-dairy sources of calcium. Boost vitamin D consumption by munching on shrimp , fortified foods like cereal and orange juice, sardines, eggs in the yolks and tuna, or opt for a vitamin D supplement. The body also produces vitamin D when exposed to the sun â€" 10 to 15 minutes of exposure three times per week will do. Though these and many other studies on bone loss looked at elderly people specifically, bone health is all about prevention, so younger folks should catch a few rays to stock up on D. Boost bone density with vitamin K. Vitamin K is mostly known for helping out with blood clotting, but it also helps the body make proteins for healthy bones. However, the exact way vitamin K contributes to bone health is unclear. Two studies on young girls showed that vitamin K had different effects: Another study specifically compared the effects of vitamins K and D on calcium absorption in rats, and it turns out the two vitamins work well as a team: Regardless of how vitamin K might help, fill up on it with foods like kale, broccoli, Swiss chard and spinach. Pump up the potassium. But it turns out potassium may neutralize acids that remove calcium from the body. Studies in both pre- and postmenopausal women have shown that a diet high in potassium can improve bone health. Load up on potassium by eating foods like sweet potatoes, white potatoes with the skin on , yogurt and bananas. Make exercise a priority. Regular exercise is key to keep a number of health issues at bay, and bone health is no exception. In fact, living a sedentary lifestyle is considered a risk factor for osteoporosis. One study comparing bone density in college women with various body weights and activity levels found that athletes with low body weight had the highest bone density of any group in the study, showing exercise and low body weight can have a positive effect on bone density. What type of exercise is most effective? Weight-bearing exercises like running, walking, jumping rope, skiing and stair climbing keep bones strongest. Resistance training has also been shown to improve bone health in several studies , so pick up the weights after going for a jog. Bonus for the older readers: Caffeine does have some health benefits , but unfortunately not for our bones. Another study albeit on elderly women showed that more than 18 ounces of coffee per day can accelerate bone loss by negatively interacting with vitamin D. So enjoy the java, but keep it in moderation and consume enough calcium, too. Cool it on the booze. Not to kill any childhood dreams, but because of those hours and hours of weightlessness and low-calcium diets, astronauts often suffer from space-induced osteoporosis. For those who simply must visit the moon, there is a possible solution: What are you doing to build bone health now? Tell us in the comments below or tweet the author llovermyer. Greatist is the fastest-growing fitness, health and happiness start-up. Check out more tips, expert opinion and fun times at Greatist. Subscribe Popular Among Subscribers.

5: Blog - 10 Foods for Building Strong Bones and Muscles

Calcium is a naturally-occurring mineral that is vital to life for most organisms. In humans, it is needed for both healthy muscles and healthy bones.

Bones and What They Do From our head to our toes, bones provide support for our bodies and help form our shape. The skull protects the brain and forms the shape of our face. The spinal cord, a pathway for messages between the brain and the body, is protected by the backbone, or spinal column. The ribs form a cage that shelters the heart, lungs, liver, and spleen, and the pelvis helps protect the bladder, intestines, and in women, the reproductive organs. The human skeleton has bones, which begin to develop before birth. When the skeleton first forms, it is made of flexible cartilage, but within a few weeks it begins the process of ossification. Ossification is when the cartilage is replaced by hard deposits of calcium phosphate and stretchy collagen, the two main components of bone. It takes about 20 years for this process to be completed. The bones of kids and young teens are smaller than those of adults and contain "growing zones" called growth plates. These plates consist of columns of multiplying cartilage cells that grow in length, and then change into hard, mineralized bone. These growth plates are easy to spot on an X-ray. Because girls mature at an earlier age than boys, their growth plates change into hard bone at an earlier age. Bone contains three types of cells: Osteoclasts are very active in kids and teens, working on bone as it is remodeled during growth. They also play an important role in the repair of fractures. Bones are made up of calcium, phosphorus, sodium, and other minerals, as well as the protein collagen. Calcium is needed to make bones hard, which allows them to support body weight. The amounts of certain vitamins and minerals that you eat, especially vitamin D and calcium , directly affects how much calcium is stored in the bones. The soft bone marrow inside many of the bones is where most of the blood cells are made. White blood cells help the body fight infection. Bones are made up of two types of bone tissues: Compact bone is the solid, hard, outside part of the bone. This type of bone makes up the most of the human skeleton. It looks like ivory and is extremely strong. Cancellous bone, which looks like a sponge, is inside the compact bone. It is made up of a mesh-like network of tiny pieces of bone called trabeculae. This is where red and white blood cells are formed in the marrow. Bones are fastened to other bones by long, fibrous straps called ligaments. Cartilage, a flexible, rubbery substance in our joints, supports bones and protects them where they rub against each other. Muscles pull on the joints, allowing us to move. They also help your body perform other functions so you can grow and remain strong, such as chewing food and then moving it through the digestive system. They are connected to bones by tough, cord-like tissues called tendons, which allow the muscles to pull on bones. If you wiggle your fingers, you can see the tendons on the back of your hand move as they do their work. Humans have three different kinds of muscle: Skeletal muscle is attached to bone, mostly in the legs, arms, abdomen, chest, neck, and face. Skeletal muscles are called striated because they are made up of fibers that have horizontal stripes when viewed under a microscope. These muscles hold the skeleton together, give the body shape, and help it with everyday movements known as voluntary muscles because you can control their movement. They can contract shorten or tighten quickly and powerfully, but they tire easily and have to rest between workouts. Smooth, or involuntary, muscle is also made of fibers, but this type of muscle looks smooth, not striated. Examples of smooth muscles are the walls of the stomach and intestines, which help break up food and move it through the digestive system. Smooth muscle is also found in the walls of blood vessels, where it squeezes the stream of blood flowing through the vessels to help maintain blood pressure. Cardiac muscle is found in the heart. Cardiac muscle is also an involuntary type of muscle. Its rhythmic, powerful contractions force blood out of the heart as it beats. Our Nonstop Muscles Even when we sit perfectly still, muscles throughout the body are constantly moving. Muscles enable the heart to beat, the chest to rise and fall during breathing, and blood vessels to help regulate the pressure and flow of blood through the body. When we smile and talk, muscles help us communicate, and when we exercise, they help us stay physically fit and healthy. The movements your muscles make are coordinated and controlled by the brain and nervous system. The involuntary muscles are controlled by structures deep within the brain and the upper part of the spinal cord called the brain stem. The

voluntary muscles are regulated by the parts of the brain known as the cerebral motor cortex and the cerebellum. When you decide to move, the motor cortex sends an electrical signal through the spinal cord and peripheral nerves to the muscles, causing them to contract. The motor cortex on the right side of the brain controls the muscles on the left side of the body and vice versa. The cerebellum coordinates the muscle movements ordered by the motor cortex. This feedback results in smooth, coordinated motion. If you want to lift your arm, your brain sends a message to the muscles in your arm and you move it. When you run, the messages to the brain are more involved, because many muscles have to work in rhythm. Muscles move body parts by contracting and then relaxing. So they work in pairs of flexors and extensors. The flexor contracts to bend a limb at a joint. For example, the biceps muscle, in the front of the upper arm, is a flexor, and the triceps, at the back of the upper arm, is an extensor. When you bend at your elbow, the biceps contracts. Then the biceps relaxes and the triceps contracts to straighten the elbow. Joints and What They Do Joints occur where two bones meet. They make the skeleton flexible â€" without them, movement would be impossible. Joints allow our bodies to move in many ways. Some joints open and close like a hinge such as knees and elbows , whereas others allow for more complicated movement â€" a shoulder or hip joint, for example, allows for backward, forward, sideways, and rotating movement. Joints are classified by their range of movement. The dome of the skull, for example, is made of bony plates, which must be immovable to protect the brain. Between the edges of these plates are links, or joints, of fibrous tissue. Fibrous joints also hold the teeth in the jawbone. Partially movable, or cartilaginous, joints move a little. They are linked by cartilage, as in the spine. Each of the vertebrae in the spine moves in relation to the one above and below it, and together these movements give the spine its flexibility. Freely movable, or synovial, joints move in many directions. The main joints of the body â€" found at the hip, shoulders, elbows, knees, wrists, and ankles â€" are freely movable. They are filled with synovial fluid, which acts as a lubricant to help the joints move easily. Three kinds of freely movable joints play a big part in voluntary movement: Hinge joints allow movement in one direction, as seen in the knees and elbows. Pivot joints allow a rotating or twisting motion, like that of the head moving from side to side. Ball-and-socket joints allow the greatest freedom of movement. The hips and shoulders have this type of joint, in which the round end of a long bone fits into the hollow of another bone. Muscles can weaken, and joints as well as tendons, ligaments, and cartilage can be damaged by injury or disease. Problems that can affect the bones, muscles, and joints include: Arthritis is the inflammation of a joint, and people who have it experience swelling, warmth, pain, and often have trouble moving. Although we often think of arthritis as a condition that affects only older people, arthritis can also occur in children and teens. Health problems that involve arthritis in kids and teens include juvenile idiopathic arthritis JIA, also known as juvenile rheumatoid arthritis, or JRA , lupus , Lyme disease , and septic arthritis a bacterial infection of a joint. A fracture is when a bone breaks; it may crack, snap, or shatter. After a fracture, new bone cells fill the gap and repair the break. Applying a strong plaster cast, which keeps the bone in the correct position until it heals, is the usual treatment. If the fracture is complicated, metal pins and plates can be placed to better stabilize it while the bone heals. Muscular dystrophy is an inherited group of diseases that affect the muscles, causing them to weaken and break down over time. The most common form in childhood is called Duchenne muscular dystrophy, and it most often affects boys. OSD usually strikes active teens around the beginning of their growth spurts, the approximately 2-year period during which they grow most rapidly. Osteomyelitis is a bone infection often caused by Staphylococcus aureus bacteria, though other types of bacteria can cause it, too. In kids and teens, osteomyelitis usually affects the long bones of the arms and legs. Osteomyelitis often develops after an injury or trauma. In osteoporosis, bone tissue becomes brittle, thin, and spongy. Bones break easily, and the spine sometimes begins to crumble and collapse. Although the condition usually affects older people, kids and teens with eating disorders can get the condition, as can girls with female athlete triad syndrome â€" a combination of three conditions that some girls who exercise or play sports may be at risk for:

6: Preserve your muscle mass - Harvard Health

Healthy muscles will help you look your best and feel full of energy. Start good habits now, while you are young, and you'll have a better chance of keeping your muscles healthy for the rest of your life.

Eating right is about more than managing your weight. Do you know what nutrients were in your last meal? Build strong bones As we age, our bones become more brittle and muscles become weaker, but a nutritious diet now can help preserve bone and muscle strength. For strong bones, your body needs two key nutrients: Calcium is the mineral that strengthens bones and teeth, and vitamin D helps the body absorb calcium while improving bone growth. Adults should get 1, milligrams of calcium and international units IUs of vitamin D a day. What foods should you be eating? Here are five of the best foods for healthy bones: Most yogurts are fortified with vitamin D, and depending on the brand, you could get 30 percent of your daily calcium intake from yogurt. An eight-ounce glass of fat-free milk will provide you with 30 percent of your daily dose of calcium. Not only is it good for your heart, but salmon is also good for your bones! Just three ounces of sockeye salmon contains more than your full daily dose of vitamin D. Just one cup of cooked spinach contains 25 percent of the daily recommended dose of calcium. It also contains plenty of fiber, iron and vitamin A. Store-bought foods like orange juice and some cereals are fortified with vitamins and minerals like vitamin D and calcium. Just like your bones need vitamin D and calcium, your muscles need protein to stay strong and healthy. According to the CDC, women should get about 46 grams of protein each day, while men need about 56 grams daily. In general, 10 to 35 percent of your daily calories should come from protein. Protein builds muscle and muscle burns fat. Five of the best sources of protein are: In fact, there are about 24 grams of protein in one cup of plain Greek yogurt! Keep the calorie count low by topping plain Greek yogurt with fresh fruit or nuts for some added flavor. Peanut butter and almond butter are great when you need a protein-powered snack on the go. Slice up and apple and spread on your favorite nut butter for a simple, yet delicious, snack. By eating foods rich in calcium and vitamin D, you can help prevent osteoporosis, and protein will give you both strength and energy to enjoy life.

7: Walking: Trim your waistline, improve your health - Mayo Clinic

Eating to emphasize bone and muscle health in childhood and the teen years can help set you up for healthier bones and muscles throughout your life. This is especially important for females because women tend to lose more bone mass as they age and have a higher risk of osteoporosis later in life.

From our head to our toes, our bones provide support for our bodies and help form our shape. The skull protects the brain and forms the shape of our face. The spinal cord, a pathway for messages between the brain and the body, is protected by the backbone, or spinal column. The ribs form a cage that shelters the heart, lungs, liver, and spleen, and the pelvis helps protect the bladder, intestines, and in girls, the reproductive organs. Joints are where two bones meet. They make the skeleton flexible â€" without them, movement would be impossible. Muscles are also necessary for movement: Together, our bones, muscles, and joints â€" along with tendons, ligaments, and cartilage â€" form our musculoskeletal system and enable us to do everyday physical activities. The human skeleton has bones. Our bones begin to develop before birth. When the skeleton first forms, it is made of flexible cartilage, but within a few weeks it begins the process of ossification pronounced: Ossification is when the cartilage is replaced by hard deposits of calcium phosphate and stretchy collagen, the two main components of bone. It takes about 20 years for this process to be completed. The bones of kids and young teens are smaller than those of adults and contain "growing zones" called growth plates. These plates consist of columns of multiplying cartilage cells that grow in length, and then change into hard, mineralized bone. These growth plates are easy to spot on an X-ray. Because girls mature at an earlier age than boys, their growth plates change into hard bone at an earlier age. Bone contains three types of cells: AHS-tee-uh-blastz , which make new bone and help repair damage; osteocytes pronounced: AHS-tee-o-klasts , which break down bone and help to sculpt and shape it. Osteoclasts are very active in kids and teens, working on bone as it is remodeled during growth. They also play an important role in the repair of fractures. Bones are made up of calcium, phosphorus, sodium, and other minerals, as well as the protein collagen. Calcium is needed to make bones hard, which allows them to support your weight. The amounts of certain vitamins and minerals that you eat, especially vitamin D and calcium, directly affect how much calcium is stored in the bones. The soft bone marrow inside many of our bones is where most of the blood cells flowing through our bodies are made. White blood cells help the body fight infection. Bones are made up of two types of material â€" compact bone and cancellous bone. Compact bone is the solid, hard outside part of the bone. This type of bone makes up most of the human skeleton. It looks like ivory and is extremely strong. KAN-suh-lus bone, which looks like a sponge, is inside the compact bone. It is made up of a mesh-like network of tiny pieces of bone called trabeculae pronounced: This is where red and white blood cells are formed in the marrow. Bones are fastened to other bones by long, fibrous straps called ligaments pronounced: KAR-tul-ij , a flexible, rubbery substance in our joints, supports bones and protects them where they rub against each other. Muscles pull on the joints, allowing us to move. They also help the body perform other functions so we can grow and remain strong, such as chewing food and then moving it through the digestive system. The human body has more than muscles. They are connected to bones by tough, cord-like tissues called tendons, which allow the muscles to pull on bones. If you wiggle your fingers, you can see the tendons on the back of your hand move as they do their work. Humans have three different kinds of muscle: Skeletal muscle is attached to bone, mostly in the legs, arms, abdomen, chest, neck, and face. Skeletal muscles are called striated pronounced: STRY-ay-ted because they are made up of fibers that have horizontal stripes when viewed under a microscope. These muscles hold the skeleton together, give the body shape, and help it with everyday movements they are known as voluntary muscles because you can control their movement. They can contract shorten or tighten quickly and powerfully, but they tire easily and have to rest between workouts. Smooth, or involuntary, muscle is also made of fibers, but this type of muscle looks smooth, not striated. Examples of smooth muscles are the walls of the stomach and intestines, which help break up food and move it through the digestive system. Smooth muscle is also found in the walls of blood vessels, where it squeezes the stream of blood flowing through the vessels to help maintain blood pressure. KAR-dee-ak muscle is found in the heart.

Cardiac muscle is also an involuntary type of muscle. Its rhythmic, powerful contractions force blood out of the heart as it beats. Muscles and Movement Even when you sit perfectly still, there are muscles throughout your body that are constantly moving. Muscles enable your heart to beat, your chest to rise and fall as you breathe, and your blood vessels to help regulate the pressure and flow of blood through your body. When we smile and talk, muscles are helping us communicate, and when we exercise, they help us stay physically fit and healthy. The movements your muscles make are coordinated and controlled by the brain and nervous system. The involuntary muscles are controlled by structures deep within the brain and the upper part of the spinal cord called the brain stem. The voluntary muscles are regulated by the parts of the brain known as the cerebral motor cortex and the cerebellum. When you decide to move, the motor cortex sends an electrical signal through the spinal cord and peripheral nerves to the muscles, causing them to contract. The motor cortex on the right side of the brain controls the muscles on the left side of the body and vice versa. This feedback results in smooth, coordinated motion. If you want to lift your arm, your brain sends a message to the muscles in your arm and you move it. When you run, the messages to the brain are more involved, because many muscles have to work in rhythm. Muscles move body parts by contracting and then relaxing. So they work in pairs of flexors and extensors. The flexor contracts to bend a limb at a joint. For example, the biceps muscle, in the front of the upper arm, is a flexor, and the triceps, at the back of the upper arm, is an extensor. When you bend at your elbow, the biceps contracts. Then the biceps relaxes and the triceps contracts to straighten the elbow. Joints allow our bodies to move in many ways. Some joints open and close like a hinge such as knees and elbows , whereas others allow for more complicated movement â€” a shoulder or hip joint, for example, allows for backward, forward, sideways, and rotating movement. Joints are classified by their range of movement. The dome of the skull, for example, is made of bony plates, which must be immovable to protect the brain. Between the edges of these plates are links, or joints, of fibrous tissue. Fibrous joints also hold the teeth in the jawbone. Partially movable, or cartilaginous pronounced: They are linked by cartilage, as in the spine. Each of the vertebrae in the spine moves in relation to the one above and below it, and together these movements give the spine its flexibility. Freely movable, or synovial pronounced: The main joints of the body â€” found at the hip, shoulders, elbows, knees, wrists, and ankles â€” are freely movable. They are filled with synovial fluid, which acts as a lubricant to help the joints move easily. There are three kinds of freely movable joints that play a big part in voluntary movement: Hinge joints allow movement in one direction, as seen in the knees and elbows. Pivot joints allow a rotating or twisting motion, like that of the head moving from side to side. Ball-and-socket joints allow the greatest freedom of movement. The hips and shoulders have this type of joint, in which the round end of a long bone fits into the hollow of another bone. Muscles can weaken, and joints as well as tendons, ligaments, and cartilage can be damaged by injury or disease. The following are problems that can affect the bones, muscles, and joints in teens: Arthritis is the inflammation of a joint, and people who have it experience swelling, warmth, pain, and often have trouble moving. Although we often think of arthritis as a condition that affects only older people, arthritis also can affect children and teens. Health problems that involve arthritis in kids and teens include juvenile idiopathic arthritis JIA, also know as juvenile rheumatoid arthritis, or JRA , lupus , Lyme disease , and septic arthritis a bacterial infection of a joint. A fracture is when a bone breaks; it may crack, snap, or shatter. After a bone fracture, new bone cells fill the gap and repair the break. Applying a strong plaster cast, which keeps the bone in the correct position until it heals, is the usual treatment. If the fracture is complicated, metal pins and plates can be placed to better stabilize the fracture while the bone heals. DIS-truh-fee is an inherited group of diseases that affect the muscles, causing them to weaken and break down over time. The most common form in childhood is called Duchenne muscular dystrophy, and it most often affects boys. OSD usually strikes active teens around the beginning of their growth spurts, the approximately 2-year period during which they grow most rapidly.

8: Effects of Nutrition & Exercise on Muscle & Bone Health | Healthy Eating | SF Gate

Calcium is vital for healthy bones. Between the ages of 9 and 18, it is important to get 1, milligrams (mg) of calcium every day. These are the years when your bones are growing rapidly and need a lot of calcium to achieve their peak mass.

Turning your normal walk into a fitness stride requires good posture and purposeful movements. Your head is up. Your neck, shoulders and back are relaxed, not stiffly upright. A little pumping with your arms is OK. Your stomach muscles are slightly tightened and your back is straight, not arched forward or backward. Plan your routine As you start your walking routine, remember to: Get the right gear. Choose shoes with proper arch support, a firm heel and thick flexible soles to cushion your feet and absorb shock. Wear comfortable clothes and gear appropriate for various types of weather. Choose your course carefully. Walk slowly for five to 10 minutes to warm up your muscles and prepare your body for exercise. At the end of your walk, walk slowly for five to 10 minutes to help your muscles cool down. After you cool down, gently stretch your muscles. Set realistic goals For most healthy adults, the Department of Health and Human Services guidelines recommend at least minutes of moderate aerobic activity, 75 minutes of vigorous aerobic activity, or an equivalent combination of moderate and vigorous aerobic activity a week. Physical activity can be spread throughout the week. The guidelines also recommend strength training exercises of all the major muscle groups at least twice a week. As a general goal, aim for at least 30 minutes of physical activity a day. You might start with five minutes a day the first week, and then increase your time by five minutes each week until you reach at least 30 minutes. Track your progress Keeping a record of how many steps you take, the distance you walk and how long it takes can help you see where you started from and serve as a source of inspiration. Record these numbers in a walking journal or log them in a spreadsheet or a physical activity app. Another option is to use an electronic device such as a pedometer to calculate steps and distance. Stay motivated Starting a walking program takes initiative. Sticking with it takes commitment. Set yourself up for success. Soon you could be reaching for goals that once seemed impossible. You might like listening to music while you walk. If you walk outdoors, plan several different routes for variety. Walk in safe, well-lit locations. Take missed days in stride. Remind yourself how good you feel when you include physical activity in your daily routine, and then get back on track.

9: The Body's Bones and Muscles - Healthy Living Center - Everyday Health

Continued Bone Strength Goes Beyond the Nutrition Basics. Healthy bones depend on more than calcium and D. "We now know that many nutrients are essential to maintaining bone," says Katherine.

Nutrition and exercise play a major role in keeping your bones and muscles healthy. Because the bones and skeletal muscles work together, the nutrients you consume and activities you participate in often affect both systems simultaneously. For most people, consuming a healthy diet with a wide variety of vitamins and minerals is enough to ensure bone and muscle health, although athletes, pregnant women and people with certain medical conditions may need to adjust their nutrient intake or exercise plan. If you are concerned about whether you are getting enough nutrients to support your bone and muscle health, contact a doctor to evaluate your diet and make personalized exercise and nutrient recommendations for your situation. Calcium and Vitamin D Calcium and vitamin D are two of the most important nutrients for bone and muscle health. Calcium can be found in dairy products, leafy green vegetables, almonds and calcium-fortified foods and juices. Vitamin D helps the body absorb calcium, so many fortified products with calcium also have added vitamin D. This vitamin also boosts muscle strength and helps prevent muscle weakness. In addition to getting vitamin D through fortified foods or supplements, your body produces this vitamin whenever you are exposed to sunlight. People living in sunny climates may be able to produce enough vitamin D if they get at least 15 minutes of direct sunlight each day. Other Nutrients Zinc, which is found in red meat, seafood, eggs, milk, legumes and whole grains, is another important nutrient for bone and muscle health. Zinc aids in the synthesis of DNA and protein activity, which are both essential for bone and muscle growth and development. Phosphorus is also necessary for bone health, although excessive amounts may harm the bones. According to the "Journal of the American College of Nutrition," most people consume more phosphorus than the recommended daily allowance of about milligrams per day. Phosphorus is common in commercial colas and processed foods and can also be found in meat, seafood, grains, legumes, nuts, dairy products and eggs. Other nutrients that help build and maintain bones and muscles include magnesium, iron and vitamins C, A and K. Exercise Weight-bearing activities help build both bone and muscle because these exercises cause the body to work against gravity. A study in the journal "Calcified Tissue International" found that older women who participated in weight-bearing exercise for eight months not only experienced gains in muscle strength and bone mineral density, but they also had improved balance, all of which reduced their risk of falling. Examples of good weight-bearing activities include running, jogging, tennis, jumping rope, basketball, dancing, hiking, weightlifting and soccer. According to the Centers for Disease Control and Prevention, adults should get at least 30 minutes of activity on most days of the week and children should get 60 or more minutes per day of physical activity. Considerations Both bones and muscles tend to break down as an individual ages. While muscle can be built and rebuilt throughout your lifetime, bone mass typically peaks at around age Eating to emphasize bone and muscle health in childhood and the teen years can help set you up for healthier bones and muscles throughout your life. This is especially important for females because women tend to lose more bone mass as they age and have a higher risk of osteoporosis later in life.

HEALTHY BONES AND MUSCLES FOR LIFE pdf

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