Hughston Health Alert

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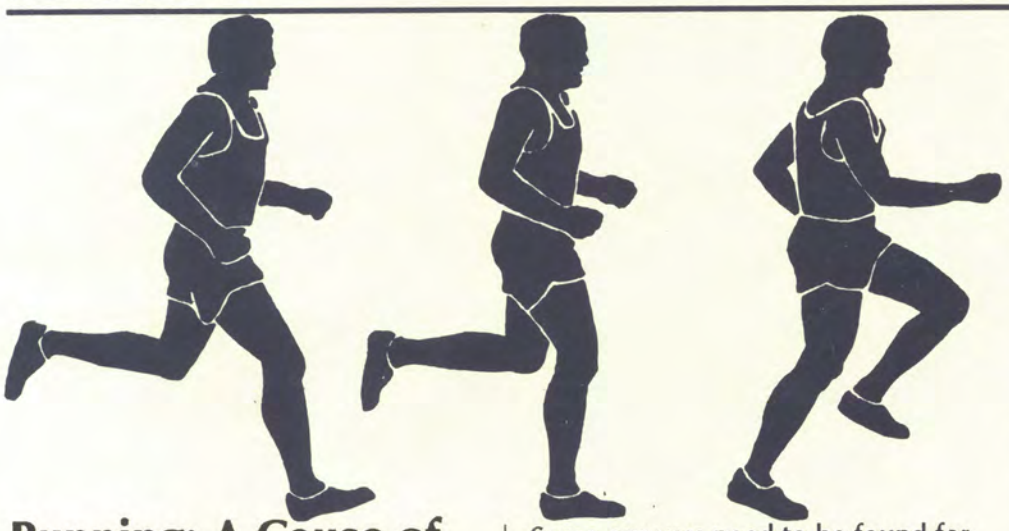

Running: A Cause of Osteoarthritis?

There is great concern that an active running program may increase the risk of the premature development of osteoarthritis, a form of arthritis most commonly associated with aging.

Some answers need to be found for the estimated 17 million runners in the United States and the physicians who treat them.

Osteoarthritis is the degeneration of articular cartilage, the lining of joint surfaces on the ends of the bones. Joints provide mobility and also decrease the impact forces that occur in daily life. Articular cartilage functions as a shock absorber. It provides nearly frictionless motion because of its smooth surface and its lubrication with synovial fluid (the fluid that nourishes joint structures).

Shock absorption capabilities of joints are affected not only by articular cartilage but also by the muscles that move the joints. Active muscle control is a vital part of shock absorption.

In addition to increasing age, some of the factors that are known to affect articular cartilage and lead to osteoarthritis include body build, injury, infection, metabolic disorders (gout, etc.), and obesity.

The early onset of osteoarthritis in some athletes has caused medical researchers to question other causes, running in particular. Some tentative answers have been gained from studies done to date.

Although there is evidence that repetitive impact loading or violent use of a joint may cause osteoarthritis, there are some interesting inconsistencies in the observation. For example, foundry workers develop elbow arthritis but jackhammer operators do not. Soccer players have arthritis in their feet and hips more often than in their knees.

Running or jogging, as an isolated activity, appears not to cause osteoarthritis. Forty years after they had begun training, one group of former champion runners had a lower incidence of osteoarthritis than a non-running group of the same age. Comparisons of the spines, hips, knees, and feet of a group of runners averaging 25 miles per week with a group of non-runners showed no difference in cartilage thickness, spur formation, grinding, and joint stability. Another study found that former college runners were no more likely than anyone else to have symptomatic osteoarthritis.

It is important to note that these studies all dealt with normal, uninjured joints. Joints that have meniscus and cartilage damage or ligament instability are clearly at an increased risk for osteoarthritis. Because joints are designed for

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motion and shock absorption, running on an appropriate surface appears to be physiologic and non-traumatic. **In a normal joint, running does not appear to cause osteoarthritis, although research is continuing.** Those who have had a joint injury should definitely consult their physician before beginning a jogging program.

Todd Schmidt, M.D.
Columbus, Georgia

Athletic Training Corner

Exploring a Career in Athletic Training

High school students who are interested in becoming athletic trainers should talk with a school coach or athletic director. Coaches can usually allow interested students to help with one or several varsity athletic teams in the areas of injury care and taping, along with some managerial duties. This experience will encourage specific interests and questions related to the athletic training profession.

Another excellent way to learn about the profession is to attend a summer workshop for high school students interested in athletic injury care. One such workshop is offered by Cramer Products of Gardner, Kansas. (Contact Janet Lozar at 800-255-6621.)

Some colleges and universities also have workshops for high school student trainers. One is Florida State University. (Contact Randy Oravetz at 904-644-1060.)

Workshops usually last 3 or 4 days and cost about $200.00, which includes room and board.

Preseason physical examinations for Columbus area high school students wishing to participate in athletics during the 1990-91 school year will be given Sunday, July 22, at Shaw High School, Columbus, Georgia.

These examinations are sponsored by the Institute of Athletic Health Care & Research, Inc.

For more information contact Fran Hempstead at (404) 324-6661.

Cycling

Tips for improved performance

A knowledgable, health-conscious approach to cycling rewards the rider with many miles of enjoyment. Each year as we prepare for the months of favorable cycling weather, questions arise.

Q: How can pain around the kneecap while bicycling be prevented?

A: New riders often make two mistakes that cause kneecap pain. First, they set the bicycle saddle, or seat, too low. If the knee is bent too much, excessive force is generated between the patella (kneecap) and the femur (thigh bone) on the downstroke. Proper saddle height can be determined by sitting squarely on the saddle with the pedal at the bottom of the stroke, the leg straight, and the heel on the pedal; then, when the ball of the foot is on the pedal, the knee should be bent at about a 15-degree angle.

Second, novice riders often use gears that are too high, increasing the force across the top of the knee joint. Competitive cyclists, on the other hand, know that selection of a gear that can be comfortably pushed at 80 to around 110 rpm prevents kneecap wear and tear and also conserves energy.

Q: Does bicycling wear out the knee and cause arthritis?

A: Good news for avid cyclists! Bicycling is unlikely to wear out the knee joint. The mechanical stress to the knee during bicycle pedalling is actually physiologically beneficial, promoting flexibility and strength and the nutrition of the articular cartilage that lines the joint.

Q: Is it helpful to eat during a long bicycle ride?

A: Yes. Consuming carbohydrates before and during a ride of 1.5 hours or more helps a cyclist finish stronger and recover quicker. Carbohydrates are the food most readily broken down into glycogen, the primary fuel for muscles.

In one study, the effect on cycling performance of drinking a carbohydrate solution was compared with drinking only water during 1.6 hours of intermittent cycling in the heat. Cyclists who drank the carbohydrate

solution could cycle faster near the end of the test period. They also had higher blood sugar levels one hour after exercise, which may speed up muscle recovery.

For very long rides, or for riders who seldom stop to eat, soda pop or liquid carbohydrate drinks may be better than solid foods because they provide a rapid burst of energy. The complex carbohydrates found in granola bars, crackers, bananas, and other fruits release energy more gradually and are best eaten off the bike, during rest stops.

Eating carbohydrates helps a cyclist pedal longer and harder. As Fred Brouns, an exercise physiologist with the Tour de France, points out, "Good cyclists are also good eaters."

Q: What is the best solution to carry in a water bottle?

A: The contents of a water bottle can save a cyclist's life! Drinking adequate and proper fluids is most important during hot weather. Dehydration can cause fatigue as readily as glycogen depletion, and the consequences can be more serious.

Especially in hot weather, consider carrying two large bottles, one for plain water and one for a "sports drink." Put the water bottle in the freezer prior to riding and drink it early in the ride. Plain, cool water is the quickest way to replace fluids. Later in the ride, replenish fluids and salts lost in sweat by drinking a sports drink, lemonade, diluted fruit juice, or decaffeinated soda pop.

During a long ride, don't trust thirst as a signal to drink. Relying on thirst alone, cyclists drink only a third to a half of the water they need. Instead, drink at least one standard-size water bottle every hour while bicycling.

Bicycles come in all sizes and types (and prices!)--children's bikes, touring bikes, mountain bikes, racing bikes, time trial bikes, track bikes, BMX bikes--for cyclists of all ages and levels of interest. Whether bicycling for fun, fitness, or competition, a correct bicycle fit helps a cyclist pedal farther, faster, and with fewer injuries. Proper nutrition and the right water bottle solution protect a cyclist from summer sizzle.

Suzanne M. Tanner, M.D.
Denver, Colorado

Helmets courtesy of Mike's Bikes, Columbus, Georgia

Photo by Yvonne Ehrhart

EQUIPMENT REVIEW

Cycling Helmets

Wearing a helmet is the most significant factor in preventing or reducing serious injury in cycling. That has been a recurring conclusion of accident reports and surveys of injured cyclists. In 1986, the United States Cycling Federation (USCF) instituted a rule that all competitive racers must wear helmets certified by the American National Standards Institute (ANSI) or the Snell Memorial Foundation. Other bicyclists of all ages and at all levels of cycling would do well to adhere to USCF guidelines.

"Hardshell" cycling helmets are made of a hard plastic shell that spreads the energy of an impact, a foam liner, and a chin strap. "Softshell" helmets have stretchable fabric covers instead of hard plastic ones. The heart of any helmet is the foam liner that compresses to absorb the shock of an impact. When the foam becomes crushed in an accident, the helmet should be replaced to assure maximum protection.

The traditional leather "hair net" is cooler than hardshell or softshell helmets but really does not absorb shocks well; it is not ANSI- or Snell-approved but is better than nothing. Extremely aerodynamic helmets are made of the standard foam but are not shaped for the best protection; they are designed for one purpose--to increase speed--and should be worn only in competitive time trials. The newest helmet designs are making the most of new materials as they are lighter, cooler, and stronger than ever, without sacrificing aerodynamics.

Although brightly colored helmets may appear to be a fashion statement, they are in reality the most important piece of protective equipment available. Remembering to wear a helmet when riding for pleasure may seem like a lot of trouble, but it may save your life.

Eduardo Robles, M.D.
San Ysidro, California

NUTRITION

Calcium

Adults do not absorb calcium efficiently. At best, they absorb only 20% to 30% of calcium available in the diet. Women tend to absorb less calcium than men, and calcium absorption declines with age. Certain factors are known to enhance absorption rates: adequate intake of vitamin D and of foods containing phosphorus (including carbonated beverages), and the presence of lactose (a carbohydrate found in milk). Conditions that may adversely affect the absorption of calcium include a high fat intake, emotional instability, stress, lack of exercise, caffeine, some medications, and excessive intake of dietary fiber.

The traditional recommended dietary allowance of calcium for adults beyond age 19 has been 800 milligrams (mg) per day, but experts now believe that this level is too low. A level of 1200 mg per day is more realistic, and people who are especially at risk for osteoporosis, such as women beyond age 45, need 1500 mg per day, unless they are taking estrogen.

Food Sources

In North America, milk is the major dietary source of calcium. It is found almost exclusively in the non-fat portion of milk, and low-fat milk has a slightly higher calcium content than whole milk and cream. Because lactose and vitamin D are also present in milk, the calcium is readily absorbed, especially from skim and low-fat milk. Four cups of skim or low-fat milk daily provide the recommended 1200 mg of calcium. Five cups provide 1500 mg.

If milk is excluded from the diet, calcium needs may be difficult to meet. Other dairy products with significant calcium content include cheese and yogurt. Hard cheeses are richer in calcium than soft ones, and low-fat varieties (farmer's, mozzarella, parmesan) may be better sources of calcium than cheddar and other high-fat cheeses simply because of their low fat content.

Meats and poultry are generally poor sources of calcium. However, certain kinds of fish, such as salmon and sardines, are calcium-rich and can provide as much as 10% to 15% of the daily allowance. Tofu, a soybean product, can also provide an appreciable amount of dietary calcium.

Although some breads and vegetables, especially broccoli and leafy green vegetables, contain significant amounts of calcium, their high fiber content may limit the availability of the calcium for absorption.

Supplements

For those people who find that adequate dietary calcium intake is difficult, calcium supplements may be useful. The supplements, in the form of tablets or capsules, usually contain oyster shell (calcium carbonate) or other calcium salts (calcium citrate, calcium lactate, or calcium gluconate). The percentage of calcium in these products varies from 10% to 60%. They may be found shelved with the vitamins in supermarkets, pharmacies, and health food stores.

Antacids such as Tums contain calcium carbonate and have been widely recommended for dietary supplementation. Calcium-containing products such as dolomite or bone meal should be avoided because they also contain contaminants such as lead.

Supplementation may not be necessary for healthy individuals if careful attention is given to the intake of low-fat, calcium-rich foods such as skim or low-fat milk and cheeses, yogurt, and salmon, particularly since calcium supplements have been noted to be less readily absorbed by the body than calcium from food sources. In individuals with osteoporosis, however, both a calcium-wise diet and supplementation may be needed to prevent the consequences of years of calcium depletion.

Jessie Wright, M.S., R.D., L.D.
Columbus, Georgia

Calcium equivalents of 1 cup of low-fat milk (300 mg)

3/4 cup yogurt, plain or flavored
1 1/2 oz cheddar cheese
2 cups ice cream
4/5 cup almonds
2 1/2 oz sardines
1 1/2 cups cooked turnip greens
5 oz cooked broccoli

Salmon Souffle

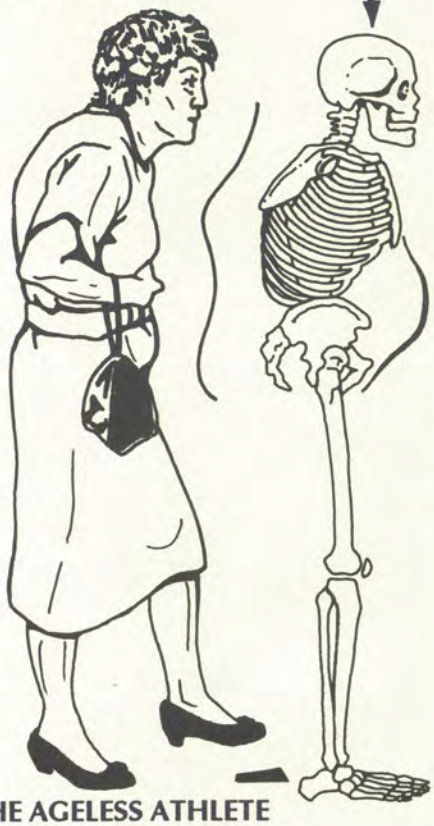
1 tablespoon margarine
1/4 cup skim milk
2 slices soft bread, crumbled
1 1-pound can pink salmon, drained and flaked
1 egg, separated
1 1/2 tablespoons lemon juice (optional)
1 tablespoon minced onion
dash of pepper
dash of paprika
2 tablespoons chopped fresh parsley

Preheat oven to 325°F. Mix all ingredients except egg white, paprika, and parsley. Beat egg white until stiff; fold in salmon mixture. Pour into 1- quart casserole sprayed with vegetable oil pan spray. Sprinkle with paprika and parsley. Bake uncovered for 50 to 60 minutes. Yield: 4 servings; calcium content, 418 mg per/serving

From: Family Cookbook, Vol. 1, American Diabetes Association & American Dietetic Association

Osteoporosis can cause decrease in height, curvature of the spine, and displacement of internal organs.

(from F. Netter, CIBA)



THE AGELESS ATHLETE

Osteoporosis

"Bad breaks" of aging

A broken hip may be the first step in a painful process that ultimately leads to death in a disturbingly high percentage of elderly people. Yet the fracture could be prevented by lifestyle modifications aimed at slowing the progress of osteoporosis. Osteoporosis, the most common metabolic bone disease, is characterized by loss of skeletal bone mass. It affects *at least* 20% to 30% of women over age 65, as well as some older men. Osteoporosis is a major cause of debilitation among this older age group, often resulting in fractures, especially of the spine and hips.

Causes

Bones undergo constant remodeling characterized by ongoing bone formation and bone resorption (loss). Osteoporosis occurs when bone resorption exceeds bone formation. Several conditions can lead to excessive bone resorption, but osteoporosis is most commonly related to aging. Our bones reach their peak density between ages 25 and 35. Then, bone resorption normally exceeds bone formation and we gradually lose bone mass. In women, estrogen plays a vital role in the cycle of bone remodeling; therefore, bone loss is accelerated after menopause, when estrogen production is diminished.

Risk Factors

Aging and menopause are not the only risk factors. Women generally are at higher risk than men. Small, thin individuals, who have a lower bone mass, are at higher risk. Race is also significant. White women have the highest risk, followed by Asians and Hispanics. Blacks have the lowest risk. Other risk factors include a family history of osteoporosis, a sedentary lifestyle (long-term lack of exercise), regular use of alcohol and tobacco, and a lifetime low intake of calcium.

Signs and Symptoms

People with osteoporosis do not generally have any symptoms until a fracture occurs. These fractures often involve the spine or hips, and can occur with little or no trauma. For example, the spine can fracture when lifting, bending, or even coughing or sneezing.

Detection

Standard radiographs, or x-rays, can be used to detect bone loss, but 30% of the bone mass must be lost before it can be detected in this way. Because preventive measures are more likely to be beneficial at an earlier stage, new techniques, such as Quantitative Computerized Tomography (QCT) and Dual-Photon-Absorptiometry (DPA), have been developed to detect small amounts of bone loss. These new methods are accurate, but their usefulness in routine screening and in determining which people should be started on preventive therapy is still unclear.

Prevention

Prevention is the best treatment for osteoporosis. To be most effective, prevention should reverse as many risk factors as possible. That means making lifestyle changes. For example, stopping smoking and regular alcohol consumption helps prevent calcium depletion. Most Americans, female and male, need to increase their daily intake of calcium. The **NUTRITION** column of this issue discusses dietary calcium and calcium supplements.

Physical activity is a major stimulus of bone formation. A regular exercise program can help maintain bone mass, and may even increase it. Just as muscles become stronger in response to certain kinds of exercise, bones become stronger in response to weight-bearing activities such as walking or running. Exercise need not be strenuous, but it does need to be done regularly.

Attention, Coaches and Trainers!

Young women who are amenorrheic (that is, who have no or very irregular menstrual periods) are at considerable risk for early development of osteoporosis because of the link between estrogen and calcium. Female athletes who train long and hard are especially prone to amenorrhea. You should be aware that these young women are likely to be experiencing loss of bone density. This puts them at risk for stress fractures now, and for the long-term consequences of osteoporosis later. The observation that a high-performance female athlete has developed amenorrhea should not be taken lightly. **It is an absolute indication for medical referral.**

Estrogen replacement therapy may be recommended as a preventive measure for postmenopausal women and other women with estrogen deficiency because estrogen slows bone resorption. It is most effective when initiated within 2 or 3 years after the onset of menopause. How long estrogen should be given is not known, but studies suggest that at least 5 years is needed to significantly reduce the risk of fractures.

Treatment

Better treatment for severe, progressive osteoporosis is needed. Several drug compounds that build bone mass are being investigated. High doses of sodium fluoride can increase bone mass and are sometimes used to treat people with severe osteoporosis. Fluoride therapy can be effective in preventing spine fractures but not hip fractures. Unfortunately, sodium fluoride has a number of unpleasant side effects (nausea, diarrhea, peptic ulcers, acne, joint pain, etc.) that make it difficult for some people to tolerate. Fluoride therapy therefore remains something that can be tried in severe cases--not something that is used routinely.

People who already have osteoporosis can benefit considerably from exercises that improve posture by strengthening back and stomach muscles. They should consult their physician before beginning any exercise program, however. Physicians and physical therapists can help osteoporosis sufferers decrease their chances of experiencing fractures by helping them learn to bend, lift, pull, and even sneeze in ways that produce the least possible stress on bones.

Conclusion

The severity of osteoporosis can be diminished by making lifestyle changes such as increasing calcium intake to maintain calcium stores, regular physical activity to maintain strong bones, and stopping activities such as smoking and alcohol consumption which deplete the body's supply of calcium. Women with estrogen deficiency may benefit from estrogen replacement therapy. These measures may still be helpful even after bones have fractured due to osteoporosis. Investigation continues into more effective treatment and better ways of predicting who is at highest risk and has the greatest need for preventive therapy.

Joe Jacko, M.D.
Columbus, Georgia

For more information about osteoporosis, contact the National Osteoporosis Foundation, 1625 Eye Street, NW, Suite 822, Washington, D.C. 20006.

TRAINING FOR A BETTER LIFESTYLE

Icing for Injuries

Cryotherapy, the use of ice or other cold agents to treat injuries, reduces tissue temperature through conduction, the loss of heat by direct contact with the cold agent. There is no substitute for cold applications to reduce pain and swelling in the first hours after injury.

Why ice works

When ice is applied to the skin immediately after injury, the first response is vasoconstriction (narrowing) of the blood vessels in the skin. This restricts the blood flow in the injured area, including the amount of blood that leaks into the skin and deeper tissues, so swelling and inflammation are reduced. Ice applications actually slow down the metabolic activity in each cell exposed to the cold. Injured cells swell less and nearby uninjured cells use less oxygen. This allows more cells to survive, thereby reducing the amount of tissue that the body must clear away. Cold also appears to decrease muscle spasms and slow the reactions of the nerve fibers that register pain.

When to use ice

Ice is used to reduce pain and swelling due to sprains, strains, contusions, fractures, bursitis, and tendinitis. It is most effective in the first 24 to 48 hours after injury. However, ice can also be helpful for as long as 72 or even 100 hours after injury, *as long as there is redness and swelling.*

During rehabilitation from injury or surgery, ice may also be applied to muscles or joints to minimize the soreness that follows an exercise session.

How to use ice

Changes in skin temperature occur within a few minutes after ice is applied, but the cooling of tissues and muscles under the skin takes 20 to 30 minutes of icing. **However, ice should not be continuously applied to the skin for more than 30 minutes.**

Ice packs. The most inexpensive, efficient, and convenient method of ice application is placing a plastic bag or a towel filled with chipped, flaked, cubed, or crushed ice directly on the skin. The size of the pack can be varied according to the area being treated. Tissue temperature should be lowered sufficiently in 15 to 30 minutes of ice pack application.

Gel packs. Commercially available gel packs usually consist of silica gel mixture in a heavy vinyl case. They can be used repeatedly and can be kept in the freezer. Apply them over a wet towel for about 20 minutes. There have been some reports of cold

"burns" when gel packs were applied directly to the skin for more than 20 minutes.

Ice towels. Place a terry cloth towel in a bucket of crushed ice and water. When the towel is removed, ice particles stick to it. The towel can be wrapped over the injured area. It must be changed as often as every 4 or 5 minutes because it warms rapidly.

Ice massage. Massaging the injured area with ice can be very effective. Freeze water in a styrofoam cup and partially peel away the upper sides of the cup, leaving the bottom as a holder for the ice. A wooden stick or tongue depressor may be frozen in the cup with the water, making an "ice pop." Massage the injured area in small overlapping circles for 10 to 15 minutes only. The cold may cause a burning or aching sensation, but this passes quickly and pain is soon relieved.

Ice immersion. An ice bucket containing a mixture of ice and water (mostly ice) is one of the more uncomfortable means of cryotherapy, but this technique does ensure that the cold will reach all sides of an injured hand, wrist, arm, elbow, foot, or ankle. **Because of the increased cooling efficiency, do not use the ice bucket for more than about 15 minutes at a time, particularly on the hands and feet.**

Barney Poole, M.Ed., P.T., A.T.,C.
Columbus, Georgia

RESEARCH

Erythropoietin: Natural hormone used to stimulate red blood cell production

Erythropoietin, a hormone produced by the kidneys, is now being used to enrich blood in a variety of treatments.

Erythropoietin stimulates bone marrow to make red blood cells, thereby replenishing lost blood more quickly. As more people choose to receive transfusions of their own blood (called autologous transfusions) in order to avoid transfusion-transmitted diseases, erythropoietin is being used to increase patients' ability to donate more blood prior to elective surgery.

In addition, the Food and Drug Administration has recently approved the use of erythropoietin to treat anemia (low red blood cell count) in patients with chronic kidney failure. These patients suffer severe anemia largely because of their kidneys' inability to make erythropoietin. There is great hope that the hormone will prove successful in treating other types of anemia as well.

Erythropoietin is not without a significant potential for misuse. As with anabolic steroids, the greatest misuse has occurred in athletes. The performance of endurance athletes, such as runners and cyclists, benefits from an increased red blood cell count because of the associated increase in the amount of oxygen that the blood can transport. Unfortunately, too many people think that if a little is good, a lot must be better. It has been proven that too much erythropoietin can raise the red blood cell count to dangerously high levels, making the blood thicker and increasing the likelihood of a heart attack or stroke. Thus, an athlete who uses erythropoietin without proper medical supervision is not only behaving unethically but is taking an enormous risk as well.

J. Ronald Hunt, M.D., Columbus, Georgia

Preventing Disease: A Transfusion of Your Own Blood

With the growing concern about AIDS, hepatitis, and other communicable viral diseases, people are actively seeking alternatives to blood transfusions that may be needed during surgery. Although current blood banking techniques have reduced to record lows the risk of acquiring such diseases from transfusions, receiving one's own blood reduces the risk to essentially zero.

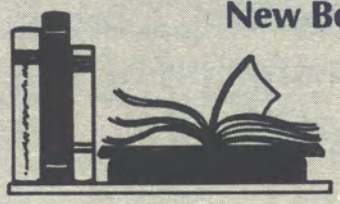
"Autologous" blood transfusion, or receiving back one's own blood, requires that the patient plan ahead and donate his or her own blood so that it is available for the upcoming surgery. The donated blood can be stored in a blood bank for 35 days. Under normal circumstances blood is replaced by the body in about 7 days. This means that one can donate as often as once a week during the month before the surgery. Iron supplements may be used to ensure that the donated blood is replaced promptly. Adequate replacement is checked by a blood count prior to the next donation.

Autologous transfusion, in addition to eliminating infectious disease transmission, greatly reduces the risk of allergic reactions from receiving blood. Furthermore, it is less expensive than using blood from the blood bank.

Some people, however, are not able to donate blood for their own use. These include people with infections or cancer, and people taking antibiotics. If you have questions, ask your doctor or the American Red Cross. This safe and efficient way to receive blood may be the best alternative for you.

Robert Shalvoy, M.D.
Columbus, Georgia

New Books



Rockport Walking Program, by James M. Rippe, M.D., and Ann Ward, Ph.D., with Karla Dougherty, Englewood Cliffs, N.J., Prentice Hall, 1989 (paperback), is a clearly written, easily understandable discussion of diet and exercise. The "3 Ms"--motivation, maintenance, and measurement of success-- are the basis of the authors' program. Their concern is to educate people about the principles of weight loss through calorically safe, well-balanced meals and aerobically sustained exercise, especially walking. They also discuss appropriate clothing and shoes, exercising in different climates, how to warm up and cool down, and the importance of proper stretching. A section on lifetime exercise and dieting is particularly valuable. Thirty-day diet plans for 1200, 1500, and 1800 calories are explained comprehensively.

The authors do an excellent job of putting together a sensible, safe program that individuals can live with for the rest of their lives.

William C. Etchison, M.S.
Columbus, Georgia

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CALENDAR

Hughston Sports Medicine Foundation
Chattahoochee Valley Arthritis Club
First Thursday of every month (April 5th, May 3rd, June 7th), 7:00 p.m. to 9:00 p.m.
Call Vivian at (404) 628-5915 or (404) 576-2128 for more info.

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