Hughston Health Alert

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Swimmer's Shoulder

It's winter right now, so why are we talking about swimming? Well, it's swimming season--competitive swimming, that is. There are now more than 200,000 competitive year-round swimmers under the age of 35 in the United States and more than 500,000 competitive part-time swimmers (including recreational swim leagues, country club teams, high school teams, etc.). More than a million people swim recreationally in all seasons of the year.

As the number of swimmers has increased, so has the intensity of swimming workouts. Most highly competitive swimmers train twice a day, 5 hours a day, 11 months of the year. They swim from 10,000 to 20,000 yards a day, and even recreational swimmers may swim from 3,000 to 5,000 yards a day.

Impingement syndrome

It should be no surprise that medical problems in swimmers have also increased. The most common orthopaedic problem affecting swimmers is "swimmer's shoulder," or impingement syndrome. This is usually a chronic condition that begins as pain in the front of the shoulder or to the front and side as an arc of pain and weakness. It can eventually lead to rotator cuff tears.

Impingement syndrome in swimming occurs mostly with the freestyle, backstroke, and butterfly strokes. These swimming strokes have two phases, pull-through and recovery. The pull-through is the underwater phase that supplies propulsion; the shoulder is adducted and internally rotated. In the recovery phase, which occurs out of the water, the shoulder should be externally rotated and abducted. It is in this phase that the impingement occurs.

What is impingement?

The shoulder joint consists of the large humeral head and the smaller glenoid fossa, along with several tendons and ligaments (Fig. 1). The supraspinatus tendon, the subacromial/subdeltoid bursa and the coracoacromial arch lie directly over the glenohumeral joint. If there is an unopposed upward force on the humerus, the humeral head impacts

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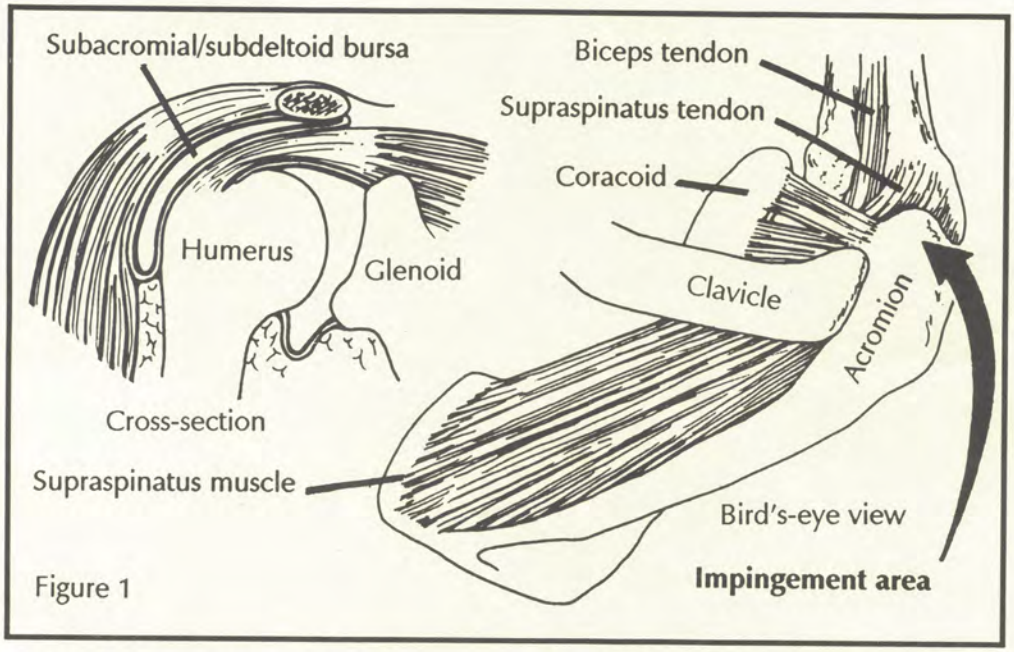

Figure 1

against the coracoacromial arch, causing impingement of the overlying structures. Under normal conditions several mechanisms prevent this impact. Shoulder blade movement positions the glenoid fossa for the best contact with the humerus. The rotator cuff muscles pull the humerus down and externally rotate it as the arm is moved upward.

Swimmers generally have very strong internal rotators because these produce the pull-through, or power phase in the stroke. Swimmers traditionally have not exercised their external rotators (the rotator cuff muscles). It is thought that the combination of weak rotator cuff muscles and repeated impact allows the impingement to occur.

Prevention of impingement syndrome

Strengthening the rotator cuff muscles is very important. Several good exercises to accomplish this (Figs. 2-4) can be performed once a day in 5 sets of 10 repetitions using up to 5-pound weights.

It is also important to keep the internal rotator muscles stretched. If these muscles in the front of the shoulder become tight, they can pull the shoulder structures out of alignment, making injury more likely.

It is certainly not necessary to swim 10,000 yards to get a good workout. Short sprint work in timed intervals gives a good cardiovascular workout and conditions properly while at the same time limiting the number of strokes. The average male swimmer takes 15 strokes every 25-yard lap. If he swims 10,000 yards a day, 5 and a half days a week, each of his shoulders undergoes 16,500 strokes a week, or 660,000 strokes for a 10-month period. These repetitive arm motions increase the chances of injury. Only those athletes who compete in the distance events need to practice long distances.

Robbie Leonard, P.T.
Warm Springs, Georgia

Fig. 2. External rotation with pulley (see above). Use a pulley or stretchable cord attached to a door. Stand with one arm at your side and the other elbow bent 90° and the shoulder internally rotated with hand at stomach. Rotate your arm externally, bringing your hand away from your body as far as possible and keeping your elbow at your side. Hold for a count of 3. Relax and repeat.

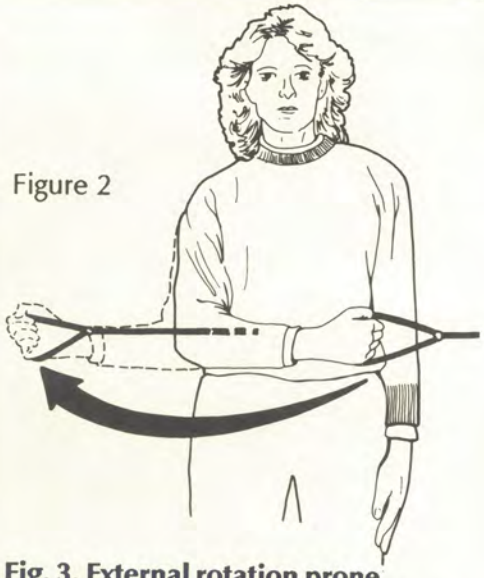
Figure 2

Fig. 3. External rotation prone. Lie on your stomach with one elbow level with your shoulder and your arm supported at the elbow. Your forearm should move freely below the level of the table or bed. Holding a small hand weight, lift your forearm up into external rotation, level with the table or bed. Hold for a count of 3. Relax and repeat.

Figure 3

Fig. 4. Prone horizontal abduction. Lie on your stomach with one arm hanging straight to the floor. Holding a small hand weight, raise your arm out to the side with your thumb up and your hand at eye level. Hold for a count of 3. Relax and repeat.

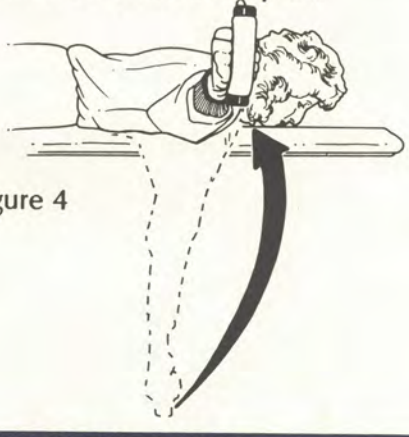
Figure 4

EQUIPMENT REVIEW

Eye Protection in Sports

As many as 100,000 sports-related eye injuries occurred in the United States in 1988, according to the National Society for the Prevention of Blindness. Ophthalmologists believe that most of these injuries can be prevented by simple protective measures.

Athletes who participate in sports in which there is a significant risk of eye injury must be educated about these risks and the benefits and availability of protective eyewear. The International Federation of Sports Medicine has declared athletes in two sports, boxing and full-contact karate, to be at "extremely high risk for eye injury," yet no eyewear provides sufficient protection in these sports. Sports with a high to very high risk include ice hockey, racquetball, badminton, squash, baseball, basketball, lacrosse, rugby, soccer, water polo, and shooting. Low risk sports include cycling, golf, volleyball, skiing, swimming, fishing, and track and field.

One-eyed athletes and athletes with eye diseases are especially vulnerable. Note that most people would be functionally "one-eyed" if the best corrected vision in their poorer eye were less than 20/60, since loss of their better eye would result in significant impairment, such as inability to drive. One-eyed athletes should use protective eyewear **in any sport**.

Protective lenses

Glass lenses are not recommended for sports use. Coated polycarbonate plastic lenses are the best choice for eye protectors that require impact resistance. Polycarbonate is at least eight times more impact resistant than regular plastic or hardened glass lenses. Polycarbonate lenses are thin and lightweight, and they absorb harmful ultraviolet light.

Polycarbonate lenses of 2 millimeter center thickness mounted in a sturdy plastic frame are suitable for daily wear by most athletes with one eye, impaired vision, or certain eye diseases in which a blow to the eye would be dangerous. This lens and frame are recommended for all athletes who wear glasses.

Polycarbonate lenses of 3 millimeter center thickness mounted in a sports frame are recommended for high-impact sports and sports with a high risk of eye injury. They should be used in combination with a face shield by hockey, football, and lacrosse players who have one eye or who wear glasses.

Athletes who wear contact lenses or who do not need spectacle lenses to improve their vision can order "plano" (non-prescription) 2 millimeter and 3 millimeter polycarbonate lenses, or they may use an injection-molded wrap-around polycarbonate lens-frame combination.

Some prescriptions are not available in polycarbonate. The 3 millimeter CR-39 plastic may be used, but it is far less impact resistant, is thicker in most prescriptions, and scratches more easily (unless specially coated).

Other protective eyewear

Eye protectors without lenses are not satisfactory for squash or racquetball. The ball penetrates these protectors at speeds of 50 to 60 mph, and ball speeds exceed 100 mph during games.

Collision sports, such as football, ice hockey, and lacrosse, require a face mask mounted on a helmet for adequate protection because the facial bones cannot absorb the energies generated during impact without fracturing.

Appropriate protective eyewear should reduce eye injuries to the lowest possible level without changing the essential nature or appeal of the sport.

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Athletic Training Corner

NATA-Approved Athletic Training Programs

In the Fall, 1989, issue of the **Hughston Health Alert**, the Athletic Training Corner outlined ways to become an NATA-certified athletic trainer. One way is to obtain a bachelor's degree in an NATA-approved curriculum at a 4-year college or university. In the Southeast, for example, these colleges and universities have NATA-approved programs in athletic training:

Appalachian State University
Boone, NC
East Carolina University
Greenville, NC
East Tennessee State University
Johnson City, TN
Eastern Kentucky University
Richmond, KY
Samford University
Birmingham, AL
University of Southern Mississippi
Hattiesburg, MS
Valdosta State College
(approval pending)
Valdosta, GA

For specific information about these programs or about the 74 other approved programs around the United States, please call the National Athletic Trainers Association in Dallas, Texas, at (214) 637-6282.

Cold-Related Injuries

Most frostbite cases occur at temperatures below 20° Fahrenheit. In central Georgia the average coldest weather is 35.2°, so we have nothing to worry about...right? WRONG! A quick look at the wind chill factor table shows how a 20 mph wind can turn a 40° day into an 18° catastrophe.

Why cold causes injury

The body contains water in and around its cells. When water inside the cells freezes, the cells burst and die. When water outside the cells freezes, water is drawn out of the cells, also causing damage. Lower temperatures make the blood thicker and the blood vessels narrower, resulting in poor circulation and tissue damage.

Several factors affect risks for cold weather injuries (see list). Different levels of damage occur depending on extremes of weather, time exposed, and clothing worn.

Specific injuries

Chilblains, the mildest form of cold-related injury, occurs with repeated exposure of bare skin to weather ranging from 32° to 60°. The skin swells a little, gets red, and itches.

Trench Foot, or Immersion Foot, occurs after prolonged exposure to wet, cold weather usually ranging from 32° to 50°. There are three phases. In the initial phase, blood vessels constrict and tissue is deprived of oxygen, leading to tissue damage and swelling. In the warming phase, blood vessels rebound open and the foot becomes hot, dry, and red. Blisters are often seen. In the recovery phase, swelling decreases, but the foot now may be sensitive to cold, tender to pressure, and may change color.

Frostbite is an especially serious cold injury. Severity depends on temperature, wind, and duration of exposure. Superficial frostbite involves only the skin. A waxy appearance is common and blisters occur in 1 to 3 days, followed by generalized swelling of the area. Deep frostbite, as the name implies, damages not only the skin but also deeper tissues and even bone. The nose, ears, fingers, toes, penis, buttocks, and chin are the parts of the body most commonly frostbitten.

Thorough rewarming can limit the extent of most cold injuries. These injuries resemble burns and may usually be treated as such. In cases of possible frostbite, however, see a physician.

Prevention

The best treatment for cold injuries is prevention. Know the dangers of the wind chill factor and wear the proper clothing. Multiple layers of clothing help trap air and are more effective in insulating the body than one thick layer. Because about 30% of the body's heat is lost from the head, pay special attention to its insulation.

Always maintain contact with others when out in the cold. Be aware of small children playing outside. A whistle around the neck can be a lifesaver if they get lost. Adults should pair up for winter activities so someone can assist or go for help if an accident occurs. Even in organized events the last runner or skier can be overlooked and, in an exhausted

Risks for Cold Injury

- Inappropriate clothing
- Inactivity
- Age
- Accustomed to warm weather
- Previous cold injury
- Cardiovascular disease
- Alcohol use
- Concurrent accident
- Shock
- High altitude
- Lack of sleep
- Poor nutrition
- Lack of fitness
- Dehydration

The Wind Chill Factor

Wind speed (mph)	Actual Temperature (°F)									
	50	40	30	20	10	0	-10	-20	-30	-40
5	48	37	27	16	6	-5	-15	-26	-36	-47
10	40	28	16	4	-9	-24	-33	-46	-58	-70
15	36	22	9	-5	-18	-32	-45	-58	-72	-85
20	32	18	4	-10	-25	-39	-53	-67	-82	-96
25	30	16	0	-15	-29	-44	-59	-74	-88	-104
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109
35	27	11	-4	-21	-35	-51	-67	-82	-98	-113
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116

Equivalent chill temperature (°F)

state, be highly susceptible to cold injury.

So, be aware of the temperature and the chill factor, dress for the occasion--and have some fun this winter!

J. Ramon Amador, M.D.
Columbus, Georgia

THE AGELESS ATHLETE

Flu Season

Fever, headaches, muscle aches, joint pain, nausea, vomiting, and diarrhea are the all too familiar symptoms of infection with the virus known as "influenza." The infection usually runs a self-limited course of 6 to 8 days.

Other common upper respiratory infections are often called "flu" but are caused by completely different viruses. These infections are much more limited in severity and symptoms and they run a shorter, fairly harmless course.

Influenza, on the other hand, can be a killer. In 1918, an influenza epidemic raced through America, killing hundreds of thousands of people. Flu epidemics still occur. During "typical" epidemic years, influenza takes 50,000 adult lives and costs $11 billion. In non-epidemic years, "only" 15,000 adults die from influenza, and the cost is "only" $3 billion.

Influenza-related deaths are usually due to pneumonia caused by the influenza virus, a bacterial pneumonia superimposed on the viral pneumonia, kidney failure due to by-products of muscle breakdown (myoglobinuria), inflammation of the heart muscle (myocarditis), or inflammation of the brain (encephalitis).

Active, fit, mature adults need not worry excessively, but they should approach the flu season intelligently. Influenza is preventable and treatable. The Ageless Athlete should take an aggressive stance against the flu: apply all the preventative technology available, and treat flu symptoms aggressively at their earliest onset.

Preventive measures

1. Be immunized against influenza.
2. Be immunized against influenza.
3. Be immunized against influenza.

About 60% to 80% of immunized adults won't get the flu. About 70% to 80% of immunized adults who do get it will have a less intense illness.

Who should be immunized?

- Anyone over 65 years old.
- Anyone who has heart, lung, kidney, or hormone and gland problems (such as congestive heart failure, bronchitis, diabetes, low thyroid levels, etc.).
- Anyone whose immune defenses are blunted (such as those who have had their spleen removed, those who have recently undergone major surgical procedures, those who have sickle cell anemia, and those taking steroids for lung problems, arthritis, lupus, or cancer).
- Health care providers (physicians, nurses, therapists, technicians, clerks, administrators).

Who should not be immunized? Anyone who is allergic to eggs should not be immunized. The flu vaccine is made from viruses grown in chick embryos. Allergic people have a reasonable alternative described below.

When should the vaccine be requested? "Flu season" runs from mid-December to late March. Because it takes at least 2 weeks to build immunity after receiving the vaccine, the prime time for immunization is from mid-October to mid-November, but ANYTIME is appropriate. (If you've gotten your flu shots, congratulations! If you haven't, now is the time.)

Is there a drug that is effective against the flu? A prescription drug called amantadine (Symmetrel) is the recognized alternative precautionary measure. The pills are taken for 10 to 12 weeks. People who have trouble swallowing can take the liquid suspension of amantadine. This drug is 70% to 80% effective if it is taken as directed.

Can the vaccine and the pills be taken together? These medicines are doubly effective when taken together. They should be used together by immune-suppressed people and are also worthwhile in "closed populations" such as prisons, colleges, nursing homes, and long-term hospitalized patients. During local outbreaks of flu, the flu vaccine plus amantadine taken for 2 weeks can be effective protection.

Treatment programs

For people younger than 60 years old, 100 mg of amantadine twice a day or 200 mg each morning is an effective dose. For those over 60, the dose depends on the health of the kidneys.

When should treatment start? If amantadine is started after a fever mounts, the duration of illness can be decreased to 3 to 4 days.

Is the drug safe? About 5% to 10% of all amantadine users have adverse side effects such as lightheadedness,

insomnia, irritability, and inability to concentrate. This is because the drug enters the brain substance--but its effects are not permanent!

Your own physician can give you further details and alert you to this season's epidemic trends.

John M. Henderson, D.O.
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Anything Else?

- **Feed a cold?** Yes, eat more. Any infection requires increased caloric intake.
- **Starve a fever?** Drink lots of liquids. Dehydration and loss of appetite can become problems. High calorie drinks such as flavored gelatin-water or malted milk can provide both liquids and calories.
- **Cloth handkerchiefs or paper tissues?** Disposable tissues are preferable because cloth handkerchiefs can transport the virus on water droplets.
- **Antibiotics?** Antibiotics kill bacteria, not viruses. Penicillin is worthless against flu.
- **Cigarette smoke?** Tobacco smoke paralyzes the cells that line the airway. These cells are the second line of defense to sweep out debris. Don't smoke!
- **More rest?** A midday nap can improve functional capacity in the early evening.
- **Keep going?** Throttle back on endurance activities but maintain stretching.

Downhill Skiing Knee Injuries

How to minimize severity after the injury

A downhill skier's worst nightmare: an uncoordinated fall, a twisting injury, torn knee ligaments. What is done in the initial moments after such a scenario may greatly influence the ultimate outcome. The following guidelines are offered should you find yourself stranded on the slopes this year.

1. Do not attempt to get down the hill on your own. At best, you risk increasing the severity of the initial injury. Most of us are not adept one-legged skiers and will not have sufficient control to ski safely. Additional, more severe injuries may be the result. Send for the ski patrol or wait for them to pass by.

2. Hot or cold? Initially, cold minimizes hemorrhage and swelling. Luckily, ice is readily available in winter sports. Packing the knee in ice will help minimize not only swelling but also pain. (Simply pack the ice over your ski pants, not directly on your skin.)

3. Straight or bent knee? Though not all injuries will be ligament tears, it is best to assume the worst. Knee ligaments will be the most relaxed (and therefore have the least tension on a tear) in a position of about 60° of flexion. In most people 60° of flexion is about half of a full bent position.

4. What will the doctor ask? The doctor will be interested in how the injury occurred. Did the tip of the ski catch? Was your leg twisted to the inside or outside? Was your knee bent or straight? Did the injury occur landing after a jump? Where was the initial pain? Was a popping felt or heard? Did your knee swell immediately, later on, or not at all? Try to reconstruct the "injury mechanism" and as many details as possible while you are waiting for transport down the hill. This will help you provide useful information in a concise, organized manner.

5. Will my outcome be worse if I don't have immediate surgery? Some injuries, such as a broken bone penetrating the skin or an injury to blood vessels, demand immediate treatment. If, however, the injury is confined to the knee joint itself, there is no danger in waiting several days, as long as the knee is adequately braced. A bent knee brace and crutches are recommended. There is certainly time to fly home and obtain a second opinion or undergo surgery where family support is available. If you are unsure, a phone call to your own physician may help in making the right decision.

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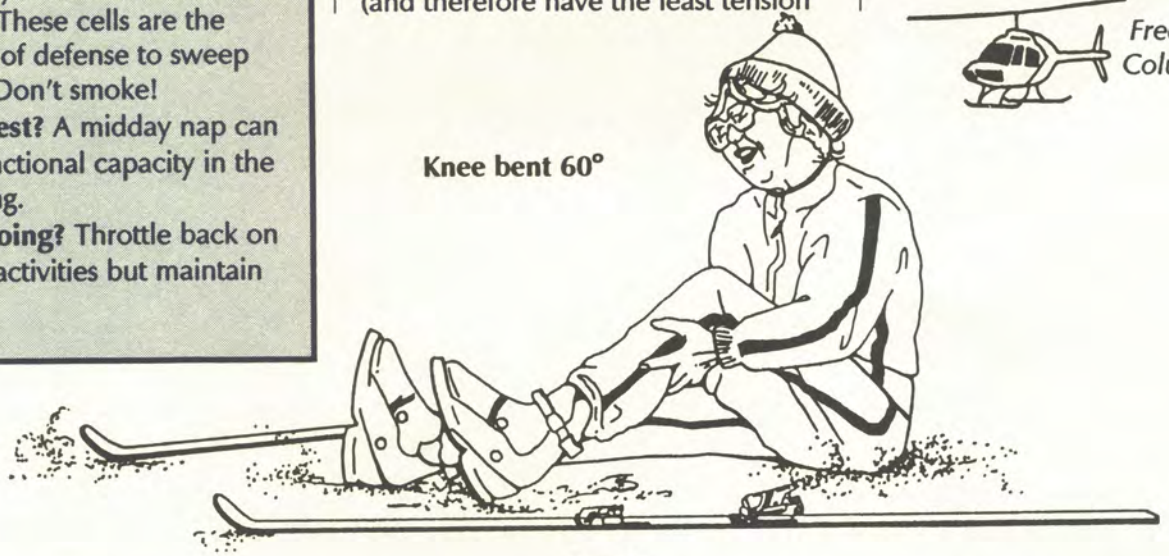

Knee bent 60°

RESEARCH

Total Hip Replacement

Total hip replacement has gained wide acceptance as the procedure of choice for many patients with serious hip diseases. More than 150,000 of these procedures are performed each year in the United States. This operation requires the surgeon to replace the ball and socket portions of the hip joint. A metal stem and ball is inserted into the thigh bone (femur) and a metal-backed plastic socket is implanted in the pelvis.

Various kinds of metal have been used for these two components over the years as different manufacturers have developed variations in the design of the prosthesis. Methods of attachment have also varied. Prostheses in current use are designed to be cemented in place or to be press-fitted (without cement). The non-cemented components may have a porous coating to facilitate bone ingrowth that provides additional stability to the prosthesis.

Research continues worldwide in an effort to determine the most successful prosthetic design, the best materials, and the most effective means of fixing the prosthesis into the bones, including the best coating for the noncemented components. For example, the U.S. Food and Drug Administration is monitoring a number of multi-center studies by device manufacturers to evaluate press-fit systems coated with hydroxyapatite, a compound found in human bones and teeth. The manufacturers believe that the hydroxyapatite coating promotes rapid growth of bone into the implanted components, which will increase the probability of a better result for the patient.

Jon P. Hunt, Ph.D., Columbus, Georgia

NUTRITION

Very Low Calorie Diets

Very low calorie diets (VLCDs) have yielded significant weight loss and resulting health improvement for many individuals. These diets, however, generally provide only 400 to 800 calories a day--a semi-starvation level. The average adult requires 1,200 to 2,000 calories a day to meet energy needs and to provide the vitamins, minerals, and other nutrition components necessary for optimum health maintenance. If adequate energy in the form of dietary calories is not provided, the body is forced to call upon its tissue stores of fat and glycogen to meet the energy requirement.

This principle is the basis of weight-loss programs. The lower the amount of dietary calories, the greater the amount of body tissue that is destroyed to produce energy. When calorie intake, body stores of fat, and liver stores of glycogen are not enough to meet energy requirements, the body produces energy by destroying muscle tissue.

Historical perspective

In the 1970s, very low calorie liquid protein "modified-fasting" formulas were used by many people to lose weight. By the end of 1977, 60 deaths had been reported involving these formulas. Their low quality protein and lack of vitamins and minerals were implicated in the cardiac arrhythmias that led to the deaths.

During prolonged semi-starvation, the body may demand heart muscle tissue to meet its energy needs. Loss of heart muscle tissue adversely affects its function. Heart function is also adversely affected by the lack of sufficient quantities of potassium, sodium, calcium, and magnesium. With depletion of its muscle tissue and without the minerals that the heart depends upon for optimum functioning, life-threatening arrhythmias may occur.

Current perspective

Life-threatening risks have been greatly minimized in today's VLCD formulas. They contain high quality protein in amounts that come closer to preventing the massive breakdown of body muscle tissue seen in the 1970s. Vitamin and mineral supplements provide the dieter with most, if not all, of the necessary nutrition components.

Weight reduction is known to help lower blood pressure, cholesterol, and blood sugar in overweight persons. Still, research has not shown that the aggressive and usually rapid weight loss provided by VLCDs is any easier to maintain over the long term than the weight loss provided by more conservative diet and exercise approaches to weight control.

Continuing risks of VLCDs

Body protein and potassium losses during VLCD regimens remain a concern. The extent of loss varies among individuals, however, being generally higher in men than in women and related to the amount of body weight at the beginning of the diet. Persons who are obese risk losing a lesser proportion of muscle tissue than those who are merely overweight. Less serious side effects of VLCDs include fatigue, anemia, constipation or diarrhea, and nervousness.

Infants, children, adolescents, and pregnant women should never be subjected to VLCDs. Elderly persons and those with health problems should also approach these programs with caution. Certainly, no one should attempt any VLCD without the close supervision of a physician.

Jessie Wright, M.S., R.D., L.D.
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New Books

Beyond Training: How Athletes Enhance Performance Legally and Illegally, by Melvin H. Williams, Ph.D. Champaign, IL, Leisure Press, 1989 (paperback), discusses ergogenic aids-- those aids that increase the rate of work, or more to the point, that enhance performance in sport. The treatment of the subject is both comprehensive and contemporary, yet what could be a vast and disparate topic is handled concisely, without oversimplification.

Following an introduction to ergogenic aids and a very clear presentation of the basic science of human energy production, Williams discusses five major categories of aids: nutritional, physiologic, psychologic, pharmocologic, and biomechanical. There are references to some current "hot" topics such as anabolic steroid use and blood doping, as well as information about carbohydrate loading, vitamin use, and amino acid supplementation. Evenhanded considerations of ethical and legal implications enhance each subject in a non-strident fashion.

Williams does lament the lack of research in some of these areas without making specific suggestions as to what directions research should take. He is clearly well informed, however, and readers should find this book an informative and practical guide.

William L. Cappiello, M.D.
Santa Clara, California

The Hughston Health Alert is a quarterly publication of the Hughston Sports Medicine Foundation, Inc. The Foundation's mission is to help people of all ages attain the highest possible standards of musculoskeletal health, fitness, and athletic prowess. Information in the Hughston Health Alert reflects the experience and training of physicians at the Hughston Orthopaedic Clinic, P.C., of physical therapists and trainers at Rehabilitation Services of Columbus, Inc. and Committed Fitness Systems, of physicians who trained as residents and fellows under the auspices of the Hughston Sports Medicine Foundation, Inc., and of research scientists and other professional staff at the foundation. The information in the Hughston Health Alert is intended to supplement the advice of your personal physician, and should not be relied on for the treatment of an individual's specific medical problems.

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CALENDAR

Hughston Sports Medicine Foundation
Chattahoochee Valley Arthritis Club
First Thursday of every month
(Jan. 4, Feb. 1, Mar. 1),
7:00 p.m. to 9:00 p.m.
Call Vivian at (404)323-9424 or (404)576-2128 for more info.

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