Hughston Health Alert

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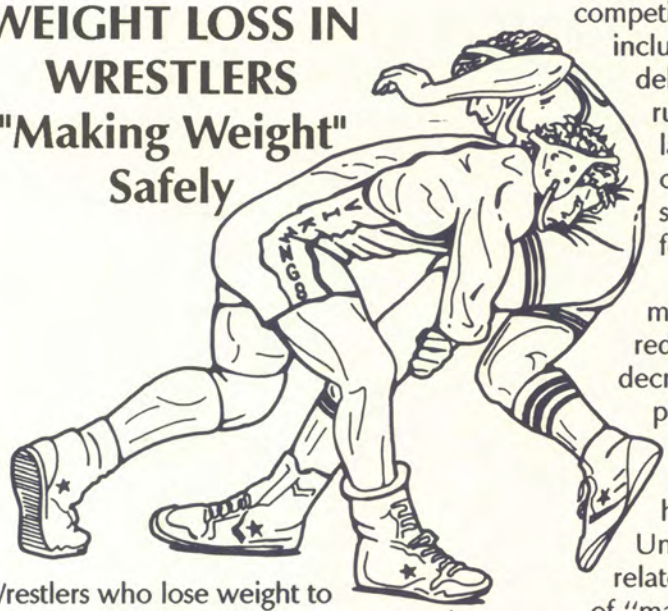
WEIGHT LOSS IN WRESTLERS "Making Weight" Safely



Wrestlers who lose weight to enhance performance or gain an edge by competing in a lower weight class may subject themselves to significant health risks. Frequently, weight loss is achieved in the days prior to competition by methods that include fluid restriction, dehydration (saunas, rubber sweatsuits, laxatives, and diuretics or water pills), starvation diets, and forced salivation.

Ironically, these methods of weight reduction tend to actually decrease athletic performance and predispose the wrestler to various health hazards. Undesirable effects related to these practices of "making weight" include impaired growth and development related to inadequate nutrient intake, kidney dysfunction, electrolyte imbalance, impaired temperature regulation, decreased testosterone production leading to diminished muscular strength and sex drive, and impaired body metabolism.

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Body composition

Body weight consists primarily of two components: lean body mass and body fat. Lean body mass is composed of the skeletal muscles, bones, skin, body fluids, and organs, and accounts for the majority of body weight. The remainder is body fat, which ranges from 5% to 30% of total body weight and is influenced by age, sex, activity level and eating habits (see Nutrition, p. 2).

The goal of any desirable weight reduction program is to lose body fat while maintaining lean body mass. To determine whether a gain or loss in body weight is related to a change in lean body mass, body fat, or both, the percentage of body fat must be known.

Body fat can be accurately estimated by various skinfold measurements or more precisely measured by underwater weighing. It is recommended that wrestlers have a minimum of 5% to 7% body fat to avoid undesirable health problems.

Calorie restriction and dehydration

Although severe restriction of calories and dehydration are quick weight loss methods used by wrestlers, both have limitations, invite potential problems, and actually decrease athletic performance.

Severe restriction of calories causes weight loss by decreasing both lean body mass and body fat. Because lean body mass is affected, muscular strength and endurance decrease, which leads to decreased performance. In addition, starvation diets cause changes in the body's metabolism.

Many wrestlers use dehydration approaches to "make weight" because as many as 3 to 10 pounds can be lost in 24 hours. However, because 70% of the body's weight (excluding bone) is water, a loss in lean body mass results, leading to decreased athletic performance. In

addition, dehydration inhibits the sweating process and impairs temperature regulation, increasing the likelihood of heat illnesses. Dehydration can also cause renal ischemia, a lack of blood flow to the kidneys, the long-term effects of which are unknown.

Many wrestlers believe the dangers of dehydration can be avoided by consuming large amounts of fluid between weigh-in and competition. However, studies show that despite this practice wrestlers often remain dehydrated at the time of competition because 1) drinking in response to thirst alone may not result in adequate fluid replacement, and 2) it takes some time for fluids to leave the intestinal tract and return to the body tissue.

Safe ways to reduce weight

Weight loss is best achieved through a combination of physical activity and a modest reduction in caloric intake by 500 to 1000 calories per day. To help ensure that a loss of body weight reflects a loss of body fat, no more than 2 to 3 pounds should be lost per week. Because a pound of fat equals 3500 calories, one would need to create a negative calorie balance (burn more calories than are taken in) of 1000 calories per day to lose 2 pounds a week. Again, this is best achieved by increasing physical activity while modestly reducing the amount of calories consumed.

It is important for wrestlers to remember that high-school male athletes need a minimum of 1500 calories per day (98-pound wrestler) to maintain normal growth and development. As a guideline, 2000 calories can be obtained by eating three meals a day but limiting oneself to a single modest portion of the foods served and by avoiding desserts and between-meal snacks.

The following recommendations regarding safe methods of weight reduction apply not only to wrestlers but to anyone interested in losing weight. Remember, losing weight is not difficult, but keeping it off is. Therefore, weight reduction requires an early commitment and is best achieved through regular physical activity, an understanding of one's eating habits, and a willingness to change them.

Joseph G. Jacko, M.D.
Dallas, Texas

Recommendations for wrestlers

1. Have body weight and per cent body fat determined 6 to 8 weeks before the season begins.
2. Calculate minimal competing weight. This is done by subtracting the recommended minimum of 5% body fat for wrestlers from the preseason per cent body fat. Multiply this difference by the preseason body weight to determine the amount of body weight that can safely be lost. Subtract this amount from the preseason body weight to determine the minimum competing weight.

   Example: A wrestler weighing 150 pounds with 13% body fat in the preseason.

   a. 13% - 5% = 8%
   b. 8% x 150 pounds = 12 pounds = amount that can safely be lost
   c. 150 pounds - 12 pounds = 138 = minimum competing weight

3. Through a modest reduction in calories (high-school wrestlers must remember to take in a minimum of 1500 to 2100 calories per day) and increased physical activity, lose 2 pounds per week in the preseason until the minimum competing weight is obtained. In the example above this would take 6 weeks.

4. Competing weight can then be maintained by moderately increasing calorie intake while maintaining one's level of physical activity.

NUTRITION

Body Composition: What Does It Mean?

Body composition is the ratio of lean body mass (muscles, bones, internal organs) to body fat. Being overweight due to bone and muscle does not have the same ramifications as being overweight due to fat tissue. Exercise can be an important means of controlling body fat and overall body build. Even when exercise does not result in weight loss, it may reduce the amount of body fat because it can change the relative proportions of lean body weight and fat. Fat stored in the body is reduced, and the lean body weight (primarily muscles) is increased.

A person's sex and genetic background determine the distribution of fat deposits on the body. Men and women do not put on fat (or lose it) in the same places. In addition, it is known that weight problems run in families, but it is not known to what extent this tendency to be fat is inherited or is a result of eating habits formed early in life.

Body fat, in simple terms, is stored energy. Any amount greater than the average for one's sex and age is considered excess and serves no known positive function. Excess body weight increases demands on the heart (frequently elevating blood

pressure), reduces the body's ability to lose heat, and decreases the body's oxygen-carrying capacity.

Body fat and lean body weight can be measured very accurately in the laboratory. However, because of the elaborate equipment, complex procedures, and substantial time required to test each individual, these methods are not widely used. Fortunately, simple methods using skinfold calipers are quite suitable for determining body composition. Fat deposited under the skin accounts for about 50% of the body's total fat stores. Using established formulas, it is possible to accurately gauge total body fat from skinfold thickness.

The amount of fat that the body carries is commonly expressed as *per cent body fat*. In other words, body fat is a certain percentage of total body weight. The normal range for adult men is 16% to 18%. For women the range is 20% to 26%. Athletes in certain sports (such as wrestling, running, cycling, and swimming) need to have a lower per cent body fat in order to perform well, but no one can or should be completely fat-free.

If weight loss is a goal, one needs to consume fewer calories than are expended, or "burned up," during each day. When calories, units of energy that supply the body's needs, are consumed in excess, they are stored in the body as fat. To avoid an excess of calories, one needs to increase the amount of daily exercise performed, decrease the amount of food eaten or, more often, change the quality of food eaten. Dietary emphasis should be on foods high in usable calories, not on foods with little nutritive value ("empty" calories). A nutritionally balanced daily diet geared toward provision of adequate energy levels contains 65% complex carbohydrates (from whole grains, fruits, and vegetables), 20% fat, and 15% protein.

The key to obtaining ideal weight is not a "diet" but a new lifestyle. New eating and exercise habits must be developed and maintained for life. The only way to be a thin person is to have the lifestyle of a thin person. For guidance in establishing a proper meal plan and exercise program, contact a physician, dietitian, or exercise physiologist.

Laura Stokes, M.S.
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EQUIPMENT REVIEW

Stair-climbing Ergometers

Stair-climbing ergometers are machines that provide a workout by simulating the act of climbing stairs. The stepping machines have been on the market for only a short time so their long-range effects on the body are unknown. Before beginning a workout program, a few tips for the novice "climber" might be helpful.

1. Talk to your physician before beginning an exercise program, especially if you are over the age of 40, have a history of knee problems, or know of heart disease in family members under the age of 60. If you have heart disease, the stair-climber may not be for you. Our experience has shown that the machine causes heart rate to elevate rapidly, especially in the untrained user.

2. Stay within heart rate (HR) guidelines:

Beginning - 60% to 70% of maximum
Advanced - 70% to 80% of maximum

To find your maximum heart rate, subtract your age from 220.
Never exceed 85% of your maximum heart rate when exercising.
(Heart patients should begin at 50% of their maximum HR, **if approved by a physician**.) Take your heart rate at consistent intervals: before exercise; immediately after exercise; and at 5 minutes and 10 minutes after exercise. If your heart rate has not returned below 100 within 10 minutes, the activity was too strenuous.

3. Exercise for 20 minutes, three to five times per week. Most people must work up to this. Initially, try exercising for 3 to 6 minutes, then rest 3 to 6 minutes, and continue alternating exercise and rest for a total of 20 minutes of exercise.

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

Exercise-related Sudden Death in Young Athletes

Perhaps nothing is more tragic than the sudden and unexpected death of a young athlete during exercise. Although these incidents are rare, the amount of media attention they attract exaggerates their frequency. Of the millions of young (less than 30 years old) competitive and recreational athletes in the United States, 10 to 25 die each year while exercising. Most victims are apparently healthy, which raises questions regarding the prevention of sudden death and the safety of strenuous exercise.

Studies have shown that previous young victims of exercise-related sudden death suffered from underlying structural and congenital cardiovascular problems. Most of these athletes went through life without warning signs or symptoms and were therefore unaware of their cardiovascular condition. In only 25% of the cases was an underlying problem suspected prior to athletic participation. How these underlying cardiovascular problems lead to sudden death is not fully understood, but it is believed that the common endpoint is the development of an abnormal heart rhythm called ventricular fibrillation. Unfortunately, sudden death is frequently the first and only indication that an underlying cardiovascular problem exists.

Certain conditions may predispose a young athlete to an early, unexpected death. The preparticipation physical evaluation that most athletes receive is designed to uncover warning signs and symptoms to include episodes of syncope (passing out) and chest pains, particularly those that occur during exercise; chest palpitations (or fluttering); seizure disorder; and a family history of early sudden death or myocardial infarction (heart attack) at a young age in relatives.

While coronary artery disease that is usually asymptomatic is the leading cause of sudden death in athletes over the age of 35, the four most common cardiovascular conditions associated with sudden death in young athletes are hypertrophic cardiomyopathy, aortic rupture associated with Marfan's syndrome, congenital coronary artery anomalies, and premature coronary artery atherosclerosis. These conditions are *sometimes* associated with physical findings such as abnormal pulses and murmurs that may be detected during the physical examination and alert the physician to the possibility of an underlying problem.

If any of these warning signs, symptoms, or conditions are discovered, special tests are frequently required to identify the nature and severity of the problem. Exercise-related sudden death may possibly be prevented in the population of athletes with symptoms suggestive of cardiovascular disease. Presently, however, it is impractical and too costly to perform special cardiovascular tests on each athlete. Thus, it seems that although some cases of exercise-related sudden death may be preventable, many probably are not.

Is it then safe and wise to participate in regular physical activity if many cases of exercise-related sudden death are not preventable? Few aspects of life, if any, are risk-free. For people with healthy cardiovascular systems, exercise is safe and probably of no more risk than any other activity of daily living. Regular physical activity has many proven health-related benefits. It has been shown to reduce the risk of coronary heart disease and high blood pressure. It also facilitates weight control, improves blood lipid profiles, and can be used in the management of diabetes. Although people with cardiovascular problems may be at an increased risk of experiencing sudden death during exercise, studies show that the overall mortality rate is 20% to 30% lower in people who have had heart attacks and then participate in a supervised exercise program. People with known cardiovascular disease and those with possible warning signs and symptoms should be thoroughly evaluated prior to starting an exercise program.

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Athletic Training Corner

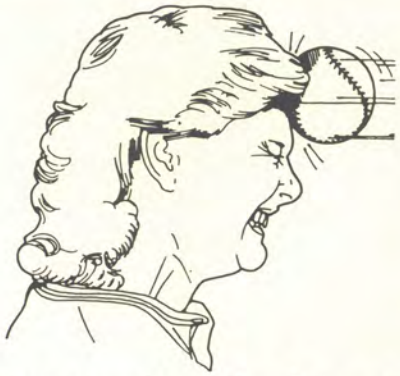
The Role of the Athletic Trainer

The field of athletic training is most often associated with adhesive taping for support of injured joints. Taping, however, accounts for only about 18% of the athletic trainer's role.

The National Athletic Trainers' Association (NATA), in its 1982 Role Delineation Study, defined six domains for which the profession of Athletic Training is responsible, along with a breakdown in percentages of total responsibility.

Evaluation & recognition of injury	24%
First aid & emergency care	22%
Rehabilitation & reconditioning	20%
Prevention (taping)	18%
Organization & administration	9%
Education, counseling and guidance	7%

Ankle taping is the most common application of adhesive taping performed in training rooms; however, the long-term effectiveness of the procedure is still questionable. Most studies reveal that after a 30- to 60-minute period, 50% or more of the tape's effectiveness is lost due to sweating, slippage, or just plain wear.



Concussion in Sports

How soon after injury should an athlete return to the playing field?

Although concussion is a fairly common head injury, a concussion at any level of severity results in some damage to brain cells. After sustaining one concussion, the chances of experiencing a second increase fourfold. Repeated concussions result in cumulative damage. Therefore, the decision to return an athlete to competition following a concussion must be based on both the level and history of injury to the head.

Concussion can occur during any sport, even those in which a helmet is routinely worn, such as football or cycling. (Helmets do not necessarily prevent concussions but usually lessen their severity.)

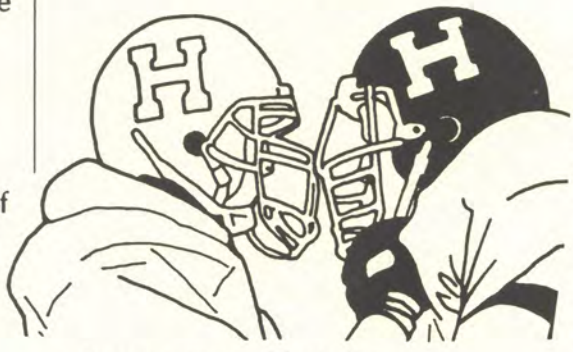
There is no universally accepted definition of concussion; however, the Committee on Head Injury Nomenclature of the Congress of Neurological Surgeons defines concussion as "a clinical syndrome characterized by immediate and transient post-traumatic impairment of neural function, such as alteration of consciousness, disturbance of vision, equilibrium, etc., due to brain stem involvement."

Three types of brain injury can result from blows to the head. The extent of the injury is proportional to the head's acceleration during the injury. A *coup* injury is caused by a forceful blow to the resting but movable head; the side of the brain that is hit incurs the most damage. A *contrecoup* injury occurs when the moving head hits an unyielding object; the side of the brain opposite the impact incurs the most damage. In a *skull fracture* the greatest injury to the brain is usually directly below the fracture site.

The skull and scalp give the brain considerable protection from outside forces, and the fluid that surrounds the brain acts as a shock absorber. This protection, however, may falter in cases of severe, blunt head trauma.

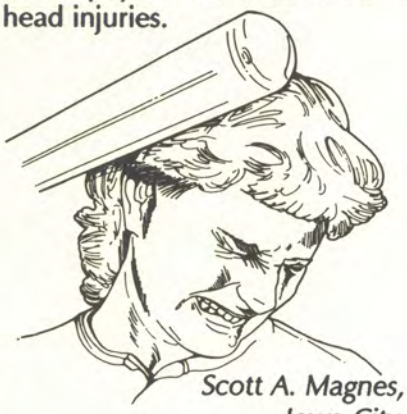
The severity of concussion can vary considerably. No system for grading severity levels has been universally accepted, but a number of grading schemes have been developed based on duration of amnesia (loss of memory) following the blow to the head (post-traumatic amnesia), duration of unconsciousness, or a combination of the two symptoms. A concussion is generally considered mild if there is no loss of consciousness and post-traumatic amnesia is brief. Loss of consciousness requires hospital evaluation, as does post-traumatic amnesia that lasts more than 30 minutes. If other symptoms--vision disturbance, headache, dizziness, or nausea and vomiting--last more than 12 hours, more involved tests may be necessary.

There is no universal standard for



return to competition. Generally, athletes who experience a moderate or severe concussion may need as much as a month before returning to play. A second concussion may require withdrawal from competition for the remainder of the season. Again, the decision should be based on the level and history of the injury, not the level of the athlete's ability. An athlete who has had a concussion is more likely to experience another concussion.

Whenever a physician--or coach or trainer or parent--is considering returning an athlete to competition, he or she should remember that the ill effects of repeated concussion are cumulative and that, following a concussion, the most impaired skills are rapid thought processing and recall of new information. The ultimate decision should always rest with a physician trained in the care of head injuries.



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THE AGELESS ATHLETE

Maintaining Lifelong Fitness

The physiological changes that accompany increasing age affect the body's composition and cardiopulmonary (heart and lung) function, thus reducing the ability to work and exercise. Although our understanding of these changes is limited, we do know that exercise programs are of great benefit to older people, even those who were inactive during their younger years.

Changes in body composition

Body composition refers to the percentage of fat, muscle, bone, and other tissues in the body. With increasing age, body fat increases and a substantial amount of muscle is lost, perhaps as much as 10% to 20%. This

loss is partially due to a reduction in the number as well as the size of muscle fibers. These changes may be associated with the decline in bodily function that accompanies aging. Most people gain weight between the ages of 25 and 50. If they are inactive, they gain it in the form of fat.

Bone loss in males begins around age 50 and occurs at a rate of 0.4% per year. Bone loss in females begins around age 35 and may progress to 30% or more by old age. After menopause, bone loss may increase two- to threefold and may be substantial for the ensuing five years. This high rate of bone loss contributes to the frequent number of fractures seen in older women.

With advancing age, there is also a progressive loss of water content in the tendons, ligaments and cartilage. This loss may lead to inflexibility and contribute to loss of joint range of motion. It may also aggravate problems such as tendinitis, muscle strains, and cartilage tears.

Changes in cardiopulmonary function

The ability of the body to use oxygen efficiently is one of the best measures of work capacity. As age increases, the weight gained during the middle years and a lack of exercise are associated with a decline in the body's ability to use oxygen. The lungs stiffen as well, and their capacity to inhale air decreases. More energy is then required for breathing and results in shortness of breath, poor exercise tolerance, and early fatigue.

A decline in maximum heart rate may be partly responsible for a decline in maximum work capacity. The amount of blood the heart can circulate decreases as we grow older, and it is possible that more adrenalin is required to stimulate the heart.

Nutrition and exercise

Although we appear to have a built-in "biological time clock," it may be possible to slow the effects of the aging process with proper diet, exercise, and relaxation.

Eating from the four basic food groups, getting plenty of fiber, and avoiding fats, sodium and sugar is a good way to maintain proper nutrition. Alcohol consumption should be controlled as well.

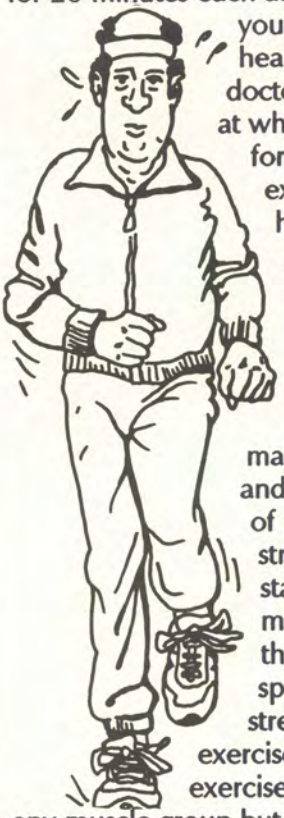
In addition to good nutrition, proper exercise helps control the added weight that 1) makes breathing more difficult, 2) increases cardiovascular workload, and 3) places stress on joints as we age. Regular exercise maintains proper weight, improves cardiopulmonary fitness, and slows bone loss. Even moderate exercise slows bone loss in postmenopausal and older women.

Whether older people respond to exercise to the degree that younger people do is not certain. However, men and women between the ages of 45 and 55 who maintain a vigorous exercise program show no decline in their work capacity, and even older people who have been inactive can improve their fitness through the proper program. In fact, the lower a person's fitness level when beginning an exercise program, the more improvement can be expected.

The ability to build muscle mass decreases with age. When an older person's muscle meets resistance during exercise, it does not increase in size as younger muscles do but responds by using more fibers. Therefore, although older athletes may be unable to build substantial muscle mass, they can still prevent some of the muscle loss that accompanies aging.

Before starting an exercise program, you should consult your physician, who will want to determine your level of fitness and examine you for possible risk factors such as high blood pressure, family history of heart disease, and diabetes. Risk factors such as cigarette smoking and high cholesterol may be modified or eliminated.

Most exercise programs require you to exercise three to five times a week for 20 minutes each at 60% to 70% of your maximum heart rate. Your doctor can tell you at what level it is safe for you to begin exercising and how rapidly you should increase the intensity.



Activity should begin with stretching exercises that maintain flexibility and full joint range of motion. Muscle strength and stamina may be maintained through activity-specific strengthening exercises. These exercises may involve any muscle group but should focus on those used most during chosen activities. For example, an avid hiker should focus strengthening exercises on the leg and back muscles.

Relaxation completes the fitness program. Deep-breathing exercises are a good form of self-relaxation and should be combined with periodic rest breaks throughout the day.

William Roundtree, M.D.
Columbus, Georgia

TRAINING FOR A BETTER LIFESTYLE

Iontophoresis: Avoiding the Needle

Iontophoresis is a technique of using low-voltage electric current to introduce drugs into the body. The technique has become a frequently chosen method of delivering anti-inflammatory and pain-reducing drugs across the skin into inflamed musculoskeletal tissues. Iontophoresis has several advantages over local injection of these drugs. It is noninvasive, delivers medication directly into the tissues, is less painful than injection, and does not cause the tissue damage that may result from needle penetration. It has been particularly effective in the treatment of such conditions as tendinitis, bursitis, and tennis elbow.

Iontophoresis is based on the principle that like electrical charges repel and unlike charges attract. Ions in the drugs are introduced into the tissue by means of a low-voltage generator capable of delivering continuous direct current. By applying a painless electric current of specific polarity, similarly charged ions of medication are repelled from the source electrode and driven into the skin.

The active electrode (which may be positive or negative depending on the ionization characteristics of the medications) is placed directly over the painful area, and the dispersive pad is placed approximately 2 inches away. The electrodes are then filled with the chosen drug combination. One combination often used for sports-related injuries is 4% lidocaine HCl noninjectable solution and dexamethasone sodium phosphate (4mg/ml). The galvanic generator is turned on slowly, and the current is adjusted to a comfortable setting. Treatment time varies according to the electrode size but averages 16 to 20 minutes.

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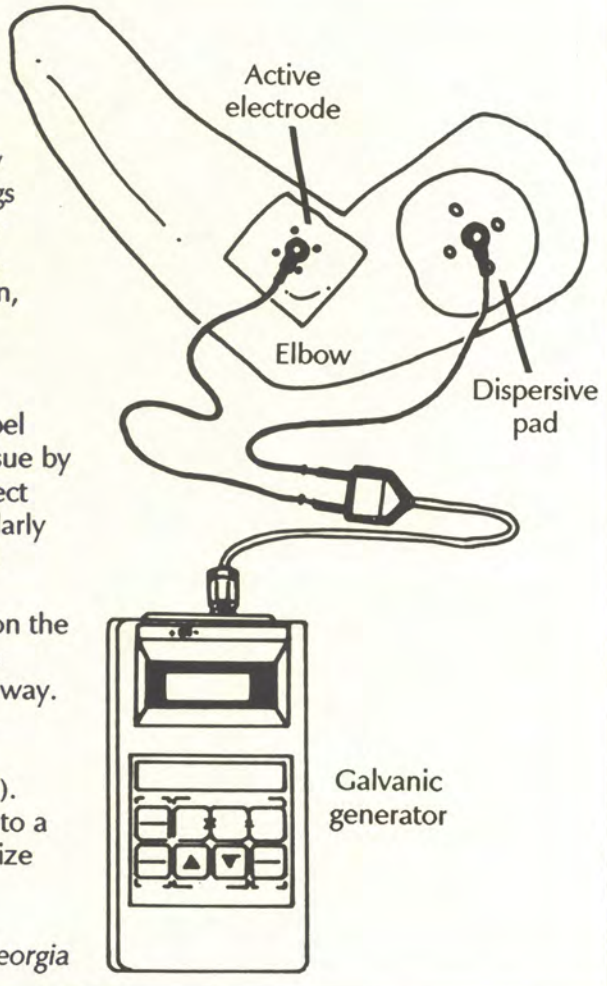

Protecting Skin Incisions from the Sun

While the sun's effects on normal skin are harmful enough, there may be additional hazards when recent surgical incisions get too much sun. The effects of excessive sun exposure on skin have been well publicized in recent years. They range from premature aging, with drying and wrinkling, to more serious problems, particularly skin cancers. In the Sun Belt, and with the disappearing ozone layer, the problems multiply.

Normal skin that is violated by the surgical knife heals by formation of a fibrous scar. The scar lacks the protective outer layers of normal skin, especially the keratinized, or "horny," outermost layer of epithelium. Surrounding pigment-producing cells from normal skin tissue may become entrapped within the forming mesh of scar. Sunlight exposure to this area may therefore cause hyperpigmentation, or excessive darkening, of the healing scar in relation to the better protected normal skin--a permanent tattoo. The incision area, which may already be a cosmetic problem for some, can become more unsightly.

The skin incision should be protected from the sun for perhaps a year after surgery while the scar matures and normal skin tissue regenerates. Protective measures are simply an extension of those used to protect normal skin. For those scars that must be exposed to sunlight, use of a sunscreen agent with a sun protection factor of at least 15 is recommended. The sunscreen should be reapplied often, especially after swimming or heavy sweating.

Surgical scars need not be permanent or disfiguring. With these simple measures, that "healthy summer glow" can be maintained even with recent skin incision.

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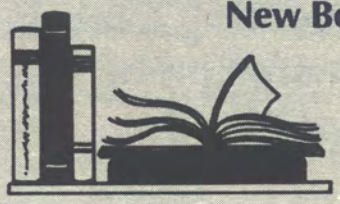
Santa Clara, California

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.

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Columbus, Georgia

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 (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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