

Lecture on

HEALTH and WELLNESS

WEIGHT MANAGEMENT

STORYBERRY SERIES
HEALTH and WELLNESS
WEIGHT MANAGEMENT
Medical Studies

Author: Valerie Njee

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NEURO SCIENCES

HEALTH and WELLNESS

9866: WEIGHT MANAGEMENT



Course: 9866: WEIGHT MANAGEMENT
Duration: 10 Weeks
Time: TBD
Scheduled: Quarterly
Location: University of Oxford - UK, Harvard University - MA, National University of Singapore, University of MD, University of Cambridge – UK, Tsinghua University – Beijing CHINA and other Universities
Instructor: Staff

Objective: Understanding the necessities of WEIGHT MANAGEMENT the importance and roles it plays in the Human Physiology.

Necessary Requirements: Laptop and note book (optional).

Description: **Weight Management:** Weight management refers to a set of practices and behaviors that are necessary to keep one's weight at a healthful level. It is preferred to the term "dieting," because it involves more than regulation of food intake or treatment of overweight people. People diagnosed with eating disorders who are not obese or overweight still need to practice weight management. Some health care professionals use the term "nutritional disorders" to cover all disorders related to weight.

The term "weight management" also reflects a change in thinking about treatment of obesity and overweight during the past 20 years. Before 1980, treatment of overweight people focused on weight loss, with the goal of helping the patient reach an "ideal weight" as defined by standard life insurance height-weight charts. In recent years, however, researchers have discovered that most of the negative health consequences of obesity are improved or controlled by a relatively modest weight loss, perhaps as little as 10% of the patient's body weight. It is not necessary for the person to reach the "ideal" weight to benefit from weight management. Some

nutritionists refer to this treatment goal as the "10% solution." Secondly, the fact that most obese people who lose large amounts of weight from reduced-calorie diets regain it within five years has led nutrition experts to emphasize weight management rather than weight loss as an appropriate outcome of treatment.

Background Knowledge: 9840: Nutritive Transport Analysis.

Assessment: Completion of course work, assignments, tests and final paper.

Assignment: Read and be prepare with topics of discussion per week

Test: Review and follow through with practical work / examples

Final paper: Comprises of topics covered during this course and elaborated diagrams and examples following each section.

Audience: This course is strictly for **Post Graduate** students.



Topics

- Weight Management
- Weight Loss Drugs
- Obesity
- Obesity and Treatment
- Cardiovascular Disease and Treatment
- Coronary Artery Disease and Treatment
- Urologic Medicine
- Fasting Therapy
- Body and Mind
- Happiness and Excitement Therapy
- Relaxation Therapy
- Massage Therapy
- Exercise Therapy
- Anorexia Nervosa
- Medication

Chapter 1 – Weight Management

Definitions

Weight management refers to a set of practices and behaviors that are necessary to keep one's weight at a healthful level. It is preferred to the term "dieting," because it involves more than regulation of food intake or treatment of overweight people. People diagnosed with eating disorders who are not obese or overweight still need to practice weight management. Some health care professionals use the term "nutritional disorders" to cover all disorders related to weight.

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Overweight and obese

Overweight and obese are not the same thing. People who are overweight weigh more than they should compared with set standards for their height. The excess weight may come from muscle tissue, body water, or bone, as well as from fat. A person who is obese has too much fat in comparison to other types of body tissue; hence, it is possible to be overweight without being obese.

There are several ways to determine whether someone is obese. Some measures are based on the relationship between the person's height and weight. The older measurements of this correlation are the so-called height-weight tables that list desirable weights for a given height. A more accurate measurement of obesity is body mass index, or BMI. The BMI is an indirect measurement of the amount of body fat. The BMI is calculated in English measurements by multiplying a person's weight in pounds by 703.1, and dividing that number by the person's height in inches squared. A BMI between 19 and 24 is considered normal; 25–29 is overweight; 30–34 is moderately obese; 35–39 is severely obese; and 40 or higher is defined as morbidly obese. More direct methods of measuring body fat include measuring the thickness of the skin fold at the back of the upper arm, and bioelectrical impedance analysis (BIA). Bioelectrical impedance analysis measures the total

amount of water in the body using a special instrument that calculates the different degrees of resistance to an electrical current in different types of body tissue. Fatty tissue has a higher resistance to the current than body tissues containing larger amounts of water. A higher percentage of body water indicates a greater amount of lean tissue.

Eating disorders

Eating disorders are a group of psychiatric disturbances defined by unhealthy eating or weight management practices. Anorexia nervosa is an eating disorder in which persons restrict their food intake severely, refuse to maintain a normal body weight, and express intense fear of becoming obese. Bulimia nervosa is a disorder marked by episodes of binge eating followed by attempts to avoid weight gain from the food by abusing **laxatives**, forcing vomiting, or overexercising. A third type, binge eating disorder, is found in some obese people, as well as in people of normal weight. In binge eating disorder, the person has an eating binge but does not try to get rid of the food after eating it. Although most patients diagnosed with anorexia or bulimia are women, 40% of patients with binge eating disorder are men.

Purpose

The purpose of weight management is to help each patient achieve and stay at the best weight possible the context of overall health, occupation, and living situation. A second purpose is the prevention and treatment of diseases and disorders associated with obesity or with eating disorders. These disorders include depression and other psychiatric disturbances, in addition to the physical problems associated with nutritional disorders.

Demographics and statistics

Obesity has become a major public health concern in the [United States](#) in the last decade. As of 2003, obesity ranks second only to smoking as a major cause of preventable deaths. It is estimated that 300,000 people die in the United States each year from weight-related causes. The proportion of overweight adults in the general population has continued to rise since the 1960s. About 34% of American adults, or 58 million people, are overweight, compared with 25% in 1980. In addition, there has been a 42% increase in the rate of childhood obesity since 1980.

The prevalence of obesity in the United States varies somewhat according to sex, age, race, and socioeconomic status. Among adults, 35% of women are considered obese, compared to 31% of men. The rate of obesity increases as people get older; those aged 55 or older are more than twice as likely to be obese as those in their twenties. African American men have the same rate of obesity as Caucasian men; however, African American women are almost twice as likely as Caucasian women to be obese by the time they reach middle age. The same ratio holds true for socioeconomic status; people in the lowest third of the income and educational level distribution are twice as likely to be obese as those with more education and higher income.

From the economic standpoint, obesity costs the United States over \$100 billion each year. This amount includes the direct costs of hospital care and medical services, which come to \$45.8

billion annually, or 6.8% of all health care costs. Another \$18.9 billion represents the indirect costs of obesity, such as disabilities related to overweight or work days lost to obesity-related illnesses.

Obesity is considered responsible for:

- 88–97% of cases of type 2 diabetes
- 57–70% of cases of coronary heart disease
- 70% of gallstone attacks
- 35% of cases of hypertension
- 11% of breast cancers
- 10% of colon cancers

In addition, obesity intensifies the pain of osteoarthritis and gout; increases the risk of complications in pregnancy and childbirth; contributes to depression and other mental disorders; and makes a person a poor candidate for surgery. Many surgeons refuse to operate on patients who weigh more than 300 lb (136 kg).

Although fewer people suffer from eating disorders than from obesity, the National Institutes of Mental Health (NIMH) reports that 10 million adults in the United States meet the diagnostic criteria for anorexia or bulimia. Although eating disorders are stereotyped as affecting only adolescent or college-aged women, as of 2003 at least 10% of people with eating disorders are males—and the proportion of males to females is rising. Moreover, the number of women over 45 years of age who are diagnosed with eating disorders is also rising; many doctors attribute this startling new trend to fear of aging, as well as fear of obesity.

The long-term health consequences of eating disorders include gum disease and loss of teeth, irregular heart rhythm, disturbances in the chemical balance of the blood, and damage to the digestive tract. At least 50,000 people die each year in the United States as the direct result of an eating disorder; anorexia is the leading cause of death in women between the ages of 17 and 25.

Description

To understand the goals and structure of nutritionally sound weight management programs, it is helpful to look first at the causes of being overweight, obesity, and eating disorders.

Causes of nutrition-related disorders

Genetic/biologic. Studies of twins separated at birth and research with genetically altered mice have shown that there is a genetic component to obesity. Some researchers think that there are also genetic factors involved in eating disorders.

Lifestyle-related. The ready availability of relatively inexpensive, but high-caloric snacks and "junk food" is considered to contribute to the high rates of obesity in developed countries. In addition, the fast pace of modern life encourages people to select quick-cooking processed foods that are high in calories, rather than making meals that are more healthful but take longer to prepare. Lastly, changes in technology and transportation patterns mean that people today do not do as much walking or hard physical labor as earlier generations did. This sedentary, or inactive lifestyle makes it easier for people to gain weight.

Sociocultural. In recent years, many researchers have examined the role of advertising and the mass media in encouraging unhealthy eating patterns. On the one hand, advertisements for such items as fast food, soft drinks, and ice cream, often convey the message that food can be used to relieve stress, reward, or comfort oneself, or substitute for a fulfilling human relationship. On the other hand, the media also portray unrealistic images of human physical perfection. Their emphasis on slenderness as essential to beauty, particularly in women, is often cited as a major factor in the increase of eating disorders over the past three decades.

Another sociocultural factor that contributes to obesity among some Hispanic and Asian groups is the belief that children are not healthy unless they look plump. Overfeeding in infancy and early childhood, unfortunately, makes weight management in adolescence and adult life much more difficult.

Medications. Recent research has found that a number of prescription medications can contribute to weight gain. These drugs include steroid hormones, antidepressants, benzodiazepine tranquilizers, lithium, and antipsychotic medications.

Aspects of weight management

Since the late 1980s, nutritionists and health care professionals had come to recognize that successful weight management programs have three characteristics, as follows:

- They present weight management as a lifetime commitment to healthful patterns of eating and **exercise**, rather than emphasize strict dieting alternating with carelessness about eating habits.
- They are tailored to each person's age, general health, living situation, and other individual characteristics.
- They recognize that the emotional, psychological, and spiritual facet of human life are as important to maintaining a healthy lifestyle as the medical and nutritional facets.

Nutrition

The nutritional aspect of weight management programs includes education about healthful eating, as well as modifying the person's food intake.

Dietary regulation. Most weight-management programs are based on a diet that supplies enough vitamins and minerals; 50–63 grams of protein each day; an adequate intake of carbohydrates (100 g) and dietary fiber (20–30 g); and no more than 30% of each day's calories from fat. Good weight-management diets are intended to teach people how to make wise food choices and to encourage gradual weight loss. Some diets are based on fixed menus, while others are based on food exchanges. In a food-exchange diet, a person can choose among several items within a particular food group when following a menu plan. For example, if a person's menu plan allows for two items from the vegetable group at lunch, they can have one raw and one cooked vegetable, or one serving of vegetable juice along with another vegetable. More detailed information about these and other weight-management diets is available in a booklet from the Weight Information Network of the National Institutes of Health, called *Weight Loss for Life*, listed under "Resources" below.

Nutritional education. Nutritional counseling is important to successful weight management because many people, particularly those with eating disorders, do not understand how the body uses food. They may also be trying to manage their weight in unhealthy ways. One recent study of adolescents found that 32% of the females and 17% of the males were using such potentially dangerous methods of weight control as smoking, fasting, over-the-counter diet pills, or laxatives.

Exercise

Regular physical exercise is a major part of weight management because it increases the number of calories used by the body and because it helps the body to replace fat with lean muscle tissue. Exercise also serves to lower emotional stress levels and to promote a general sense of well-being. People should consult a doctor before beginning an exercise program, however, to make sure that the activity that interests them is safe relative to any other health problems they may have. For example, people with osteoarthritis should avoid high-impact sports that are hard on the knee and ankle joints. Good choices for most people include swimming, walking, cycling, and stretching exercises.

Psychological/psychiatric

Both obesity and eating disorders are associated with a variety of psychiatric disorders, most commonly major depression and substance abuse. Almost all obese people feel harshly judged and criticized by others, and fear of obesity is a major factor in the development of both anorexia and bulimia. Many people find medications and/or psychotherapy to be a helpful part of a weight management program.

Medications. In recent years, doctors have been cautious about prescribing appetite suppressants, which are drugs given to reduce the desire for food. In 1997, the Food and Drug Administration ([FDA](#)) banned the sale of two drugs: fenfluramine (known as "fen-phen") and phentermine when they were discovered to cause damage to heart valves. A newer appetite suppressant, known as sibutramine, has been approved as safe. Another new drug that is sometimes prescribed for

weight management is called orlistat. It works by lowering the amount of dietary fat that is absorbed by the body. However, it can cause significant diarrhea.

People with eating disorders are sometimes given antidepressant medications, most often fluoxetine (Prozac) or venlafaxine, to relieve the symptoms of depression or anxiety that often accompany eating disorders.

Cognitive-behavioral therapy. Cognitive-behavioral therapy (CBT) is a form of psychotherapy that has been shown to be effective in reinforcing the changes in food selection and eating patterns that are necessary to successful weight management. In this form of therapy, patients learn to modify their eating habits by keeping diaries and records of what they eat, what events or feelings trigger overeating, and any other patterns that they notice about their choice of foods or eating habits. They also examine their attitudes toward food and weight management, and work to change any attitudes that are self-defeating or interfere with a healthy lifestyle. Most CBT programs also include nutritional education and counseling.

Weight-management groups. Many doctors and nutritional counselors suggest that patients attend a weight-management group for social support. Social support is essential in weight management, because many who suffer from obesity or an eating disorder struggle with intense feelings of shame. Many isolate themselves from others because they are afraid of being teased or criticized for their appearance. Such groups as Overeaters Anonymous (OA) or Take Off Pounds Sensibly (TOPS) help members in several ways: They help to reduce the levels of shame and anxiety that most members feel; they teach strategies for coping with setbacks in weight management; they provide settings for making new friends; and they help people learn to handle problems in their workplace or in relationships with family members.

Surgical

As of 2003, bariatric surgery is the most successful approach to weight management for people who are morbidly obese (BMI of 40 or greater), or severely obese with additional health complications. Surgical treatment of obesity usually results in a large weight loss that is successfully maintained for longer than five years. The most common surgical procedures for weight management are **vertical banded gastroplasty** (VBG), sometimes referred to as "stomach stapling," and **gastric bypass**. Vertical banded gastroplasty works by limiting the amount of food the stomach can hold, while gastric bypass works by preventing normal absorption of the nutrients in the food.

Complementary and alternative medicine (CAM) approaches

Some forms of complementary and alternative medicine are beneficial additions to weight management programs.

Movement therapies. Movement therapies include a number of forms of exercise, such as tai chi, yoga, dance therapy, Trager work, and the Feldenkrais method. Many of these approaches help people improve their posture and move their bodies more easily as well as keeping active. Tai chi and yoga, for example, are good for people who must avoid high-impact physical workouts.

Yoga can also be adapted to a person's individual needs or limitations with the help of a qualified teacher following a doctor's recommendations. Books and videos on yoga and weight management are available through most bookstores or the American Yoga Association.

Spiritual and religious practice. Prayer, meditation, and regular religious worship have been linked to reduced emotional stress in people struggling with weight issues. In addition, many people find that spiritual practice helps them to keep a healthy perspective on weight management, so that it does not crowd out other important interests and concerns in their lives.

Herbal preparations. The one type of alternative treatment that people should be extremely cautious about making part of a weight management program is over-the-counter herbal preparations advertised as "fat burners," muscle builders, or appetite suppressants. Within a two-week period in early 2003, the national media carried accounts of death or serious illness from taking these substances. One is ephedra, a herb used in traditional Chinese medicine that can cause strokes, heart attacks, seizures, and psychotic episodes. The other is usnic acid, a compound derived from lichens that can cause liver damage.

Normal results

As of 2003, much more research needs to be done to improve the success of weight management programs. A position paper published by the American Dietetic Association in the summer of 2002 summarizes the present situation: "Although our knowledge base has greatly expanded regarding the complex causation of increased body fat, little progress has been made in long-term maintenance interventions, with the exception of surgery." Most adults in weight maintenance programs find it difficult to change eating patterns learned over a lifetime. Furthermore, their efforts are all too often undermined by friends or relatives, as well as by media messages that encourage overeating or the use of food as a mood-enhancing drug. More effective weight maintenance programs may well depend on broad-based changes in society.

Resources

books

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organizations

american dietetic association. (800) 877-1600. <www.eatright.org>.

american obesity association (aoa). 1250 24th street nw, suite 300, washington, dc 20037. (202) 776-7711 or (800) 98-obese. <www.obesity.org>.

american society for bariatric surgery. 7328 west university avenue, suite f, gainesville, fl 32607. (352) 331-4900. <www.asbs.org>.

american yoga association. <www.americanyogaassociation.org>.

overeaters anonymous (oa). world service office, p. o. box 44020, rio rancho, nm 87174-4020. (505) 891-2664. <www.oa.org>.

shape up america! c/o webfront solutions corporation, 15757 crabbs branch way, rockville, m. d. 20855. (301) 258-0540. <www.shapeup.org>.

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other

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Chapter 2 - Weight Loss Drugs

Definition

Weight loss drugs are medications that may help an obese person lose weight in combination with a low-calorie diet and physical activity.

Purpose

More than 60% of American adults are overweight or obese. Since the 1980s the number of overweight people has increased steadily and the number of obese people has almost doubled. Excess weight and physical inactivity account for more than 300,000 premature deaths in the [United States](#) each year, second only to smoking-related deaths.

Risks from Obesity

Overweight and obese people are at higher risk for developing the following problems:

- sleep apnea (interrupted breathing while asleep)
- osteoarthritis (wearing away of the joints)
- high blood pressure
- heart disease
- **stroke**
- diabetes
- gallbladder disease
- gout (joint **pain** caused by excess uric acid)
- many common types of cancer

Body mass index (BMI)

An overweight person has an excess of body weight but not necessarily an excess of body fat. **Obesity** refers to an excessively high proportion of body fat. The BMI is used to determine whether a person is overweight or obese. It defines body weight relative to height and, for most adults, correlates with total body fat.

BMI charts are widely available; however, an approximate BMI can be calculated by the following these steps:

- multiplying body weight in pounds by 703
- dividing the result by height in inches
- dividing the result by height in inches again

With the exception of very muscular people, BMI is a measure of health:

- 18.5-24.9: healthy
- 25-29.9: overweight
- 30 or above: obese

Generally the higher the BMI the higher the risk of health problems; however, excess abdominal fat is a separate health risk. Men with waists of more than 40 in (102 cm) and women with waists of more than 35 in (89 cm) are at greater risk for health problems.

Prescription weight loss drugs are approved for use only by people with BMIs of 30 or above or those with BMIs of 27 and above who have other risk factors, including the following:

- high blood pressure
- type 2 diabetes
- dyslipidemia (abnormal amounts of fat in the blood)
- sleep apnea

Even short-term weight loss in some obese people has been found to reduce the following:

- blood pressure
- blood cholesterol
- triglycerides (fats)
- insulin resistance (the inability to utilize blood sugar)

Overweight or obese patients who have not lost an average of 1 lb (0.5 kg) per week after at least six months on a balanced low-calorie diet, including increased **exercise** and behavior therapy, may be considered candidates for weight loss drugs.

Description

Weight loss medications are prescribed only as a component of a weight loss program that includes a healthy low-calorie diet and regular physical activity. On average, people on prescription weight loss drugs lose about 5-10% of their original weight. They may lose in the range of 4.4-22 lb (2-10 kg) above what they might have lost following a diet and exercise program alone. Patients who lose weight initially on a drug tend to continue to respond. However, those who fail to lose 4 lb (2 kg) within the first month on a weight loss medication are unlikely to respond to that particular drug even at an increased dosage. Over-the-counter weight loss drugs have been found to be ineffective, unsafe, or both.

Most weight loss occurs within the first six months of drug use, after which the weight levels off or increases. The majority of patients regain the lost weight after discontinuing the medication. Thus short-term use of weight loss drugs may not be beneficial. However, long-term use of weight loss drugs may help maintain the lower weight. Since obesity is a chronic disorder, treatment must be continued for years or for life. However, as of 2005, sibutramine (Merida) and orlistat (Xenical) were the only weight loss drugs approved by the U. S. Food and Drug Administration ([FDA](#)) for use for more than a few weeks.

Appetite suppressants (anorexiant)

Most FDA-approved weight loss drugs suppress appetite by affecting one or more neurotransmitters in the brain that control appetite and mood. Various appetite suppressants increase the secretion of dopamine, norepinephrine, or serotonin or inhibit the reuptake of these neurotransmitters into the nerve cell. Some drugs affect more than one neurotransmitter. These drugs may cause a person to feel less hungry or more satiated.

SIBUTRAMINE. Sibutramine was approved by the FDA in 1997 for long-term use. It reduces appetite by inhibiting the reuptake of norepinephrine, dopamine, and serotonin. One study found that patients taking sibutramine lost an average of 7-10 lb (3-5 kg) more over one year than those on a low-calorie diet alone.

AMPHETAMINES OR SYMPATHIMIMETIC DRUGS. Some amphetamines are FDA-approved for very short-term weight loss. Although most of these drugs do not cause weight loss over more than a few weeks, phentermine continues to be one of the two most commonly prescribed weight loss medications—along with sibutramine—in the United States.

Some amphetamine-type weight loss drugs, including methamphetamine (Desoxyn), were approved by the FDA in the mid-1990s based on very little data. Other FDA-approved weight loss drugs for short-term use include:

- benzphetamine (Didrex)
- diethylpropion (Tenuate, Tenuate Dospan, Tepanil Ten-Tab), approved in 1959
- mazindol (Mazanor, Sanorex)
- phendimetrazine (Adipost, Bontril PDM, Bontril Slow-Release, Melfiat, Obezine, Phendiet, Phendiet-105, PT 105, Plegine, Prelu-2, X-Trozone), approved in 1982
- phentermine (Adipex-P, Fastin, Ionamin, Obenix, Oby-trim, Phentercot, Phentride, Pro-Fast, Teramine, Zantryl), approved in 1959

Lipase inhibitors

In 1999 the FDA approved orlistat (the first of a new class of anti-obesity drugs called lipase inhibitors) for long-term use. Orlistat inhibits the pancreatic enzyme lipase that breaks down dietary fat, which in turn decreases the body's absorption of dietary fat by as much as 30%. The undigested fat is excreted in the stool.

Orlistat is prescribed for overweight or obese patients who also have **high cholesterol**, diabetes, high blood pressure, or heart disease

Off-label use

Physicians sometimes prescribe drugs for weight loss that are not FDA-approved for that purpose—so-called off-label use. The use of weight loss medications—other than sibutramine and orlistat—for more than a few weeks is also considered off-label use.

Off-label weight loss drugs include:

- antidepressants such as bupropion
- the **anticonvulsant drugs** topiramate and zonisamide
- the diabetes medication metformin

Antidepressants may result in moderate weight loss for up to six months after which the weight usually is regained. Metformin appears to reduce hunger and food intake and may promote small weight loss in the obese and those with type 2 diabetes.

Drugs withdrawn from the market

Although effective for long-term weight loss, fenfluramine (Pondimin and others), dexfenfluramine (Redux), and a fenfluramine/phentermine combination (fen/phentermine) were withdrawn from the market in 1997 after it was found that they caused potentially fatal complications.

In February of 2004 the FDA prohibited the sale of dietary supplements containing ephedrine alkaloids, including ephedra, Ma huang, Sida cordifolia, and pinellia, because of potential complications. These supplements were aggressively marketed for weight control, as well as for energy and sports performance. Although they may effect modest short-term weight loss, these drugs raise blood pressure, **stress** the circulatory system, and have been linked to **heart attack** and stroke.

Recommended dosage

Dosages of appetite suppressants vary with the individual and a full dose may be more than necessary for some people. A low dose of subitramine often is prescribed for at least the first four weeks. Once-a-day appetite suppressors should be taken 10-14 hours before bedtime. When taking more than one dose per day, the last dose should be 4-6 hours before bedtime. Long-acting capsules or tablets should be swallowed whole, rather than chewed or cut up. Missed doses should be skipped.

The average doses of appetite suppressants are:

- sibutramine: a 10-mg capsule once a day, usually in the morning; a maximum of 15 mg per day
- benzphetamine: 25 to 50-mg tablets once a day in midmorning or mid-afternoon
- diethylpropion: 25-mg tablets, three times per day, one hour before meals; 75-mg extended-release tablet, once a day in midmorning
- mazindol: 1-mg tablet once a day, taken with food
- phendimetrazine: 17.5-35-mg tablets, two to three times per day, one hour before meals; 105-mg extended-release capsules, 30 to 60 minutes before the morning meal
- phentermine: 15-37.5-mg capsule or tablet, once a day, before breakfast or one to two hours after or smaller doses 30 minutes before meals; 15-30-mg oral resin capsule, once-per-day, before breakfast

The usual dose of orlistat is a 120-mg capsule taken three times a day, up to one hour after each main meal that contains fat. The meal should contain no more than 30% calories from fat. Orlistat should not be taken if a meal is missed, the meal does not contain fat, or it is more than one hour past the meal.

Precautions

With the exception of orlistat, all prescription weight loss medications are controlled substances. Very few studies have evaluated for their safety or effectiveness for periods of more than six months to two years. The use of any combination of weight loss drugs is not recommended. The risks of using appetite-suppressing drugs during **pregnancy** are unknown as of 2005. Orlistat is approved for use in those aged 12 and above. No other weight loss drug is approved for use in children under age 16.

After beginning a weight loss drug, patients should return for follow-ups in two to four weeks, monthly for three months, and then every three months for the first year, to monitor weight, blood pressure, pulse, and side effects, and have laboratory testing.

Appetite suppressants

Appetite suppressants should not be taken within 14 days of taking a monoamine oxidase (MAO) inhibitor; extremely high blood pressure and seizures may develop suddenly. Taking subitramine along with a drug that has MAO-inhibitor activity can cause a life-threatening condition called serotonin syndrome.

Sibutramine should not be used by people with the following problems:

- poorly-controlled high blood pressure
- irregular heartbeat (arrhythmia)
- a history of stroke
- heart disease
- congestive heart failure

Appetite suppressants, including sibutramine, can be habit-forming. In late 2004 Meridia was singled out by critics as a drug that is only minimally effective and has been associated with several deaths.

Amphetamine-type weight loss drugs should not be use by anyone with the following problems:

- high blood pressure
- heart disease
- an overactive thyroid gland
- glaucoma

Amphetamine-type weight loss drugs can test positive on urine screenings for amphetamines. These drugs have a high potential for **abuse** and **addiction**.

Orlistat

Orlistat may decrease the absorption of fat-soluble **vitamins** and beta-carotene. Therefore, a daily multivitamin supplement, including vitamins A, E, K, and beta-carotene, should be taken at least two hours before or after orlistat or at bedtime. Foods containing more than 30% fat should be avoided while a person is using orlistat. Gallbladder problems may become worse with orlistat.

Other precautions

Various conditions may affect the choice of a weight loss drug, including the following:

- pregnancy or breastfeeding
- a history of drug or alcohol abuse or dependence
- a history of eating disorders
- a history of depression or manic-depressive disorder
- a family history of mental illness
- the use of MAO inhibitors or other antidepressants
- migraine headaches requiring medication
- glaucoma
- diabetes mellitus
- epilepsy
- thyroid disease
- kidney problems
- gallstones
- liver disease
- problems absorbing food (malabsorption syndrome)
- high blood pressure
- heart disease, a heart condition such as arrhythmia, blood vessel disease
- future surgery that will require general anesthesia

Some dietary supplements are marketed as weight loss products. They are not reviewed by the FDA and are not necessarily safe. They may interact with other drugs and may be dangerous for people with certain medical conditions. Herbal medications have unpredictable amounts of active ingredients and unpredictable and potentially harmful side effects.

Side effects

Many overweight people are generally healthy and the side effects of weight loss drugs may far outweigh the benefits. Side effects may be reduced by starting at the lowest effective dose, although any drug can cause an allergic reaction in any individual.

Appetite suppressants

Side effects of sibutramine and other appetite suppressants may include:

- increased blood pressure
- **dry mouth**
- headache
- abdominal cramps or pain
- constipation
- **nausea** or vomiting
- drowsiness
- insomnia
- irritability
- **anxiety**
- dizziness, lightheadedness, confusion
- poor coordination

Dry mouth can be relieved with sugarless candy or gum, ice, or a saliva substitute. However, dry mouth lasting more than two weeks can increase the risk of serious dental disease.

Less common side effects of appetite suppressants include:

- fast or irregular heart beat
- skin rash or hives
- fever
- sore throat
- sweating
- uncontrollable trembling or shaking
- diarrhea
- unusual bruising or bleeding
- depression

Although sibutramine side effects usually are mild and may improve with continued use, additional side effects may include:

- increased thirst
- changes in sense of taste
- heartburn
- stuffy or runny nose
- skin burning, **itching**, prickling, or tingling
- back pain
- painful menstruation
- weakness
- swelling in various parts of the body

Fast heart rate can be a symptom of sibutramine overdose. Other rare serious complications from sibutramine include:

- chest pain
- difficulty speaking, swallowing, or breathing

- muscle stiffness
- uncoordinated or abnormal movement
- fainting
- rapid mood shifts
- enlarged pupils, eye pain, vision changes
- confusion
- seizures

Other side effects of amphetamines can include:

- a false sense of well-being
- an unpleasant taste
- decreased alertness
- restlessness
- uncontrollable activity or excitement
- hallucinations
- increased need to urinate
- difficult or painful urination
- numbness, particularly on one side of the face or body
- blurred vision
- changes in libido or decreased sexual function

Higher dosages, more frequent doses, or longer-term use of amphetamines can lead to physical dependence or overdose, with symptoms that include:

- skin disease
- severe insomnia
- excessive excitability or irritability
- panic
- violent urges
- personality changes
- severe mental illness
- high or low blood pressure
- seizures
- coma

Symptoms of withdrawal may be lessened or prevented by gradually reducing the dosage.

Orlistat

Orlistat side effects usually are mild and can improve with continued use; they may include the following:

- intestinal discomfort or cramping
- flatulence

- frequent, urgent need to defecate
- inability to control bowel movements and leakage
- oily diarrhea
- flu- or cold-like symptoms
- irregular menstrual periods

Less common side effects of orlistate include:

- rectal pain
- back pain
- tooth or gum problems
- chest tightness
- wheezing
- anxiety

Orlistat side effects requiring immediate medical attention include:

- itching, rash, or hives
- fever
- frequent, difficult, or painful urination
- bloody or cloudy urine
- swelling of body parts
- chest pain
- difficulty breathing
- earache or hearing changes

Orlistat side effects can be worsened by eating meals with at least 30% of total calories from fat. Side effects usually disappear within two to three days after discontinuing the drug.

Interactions

Appetite-suppressants can interact negatively with numerous other drugs, including the following:

- other appetite suppressants and amphetamines
- caffeine
- cold and allergy medicines
- **asthma** medications
- selective serotonin reuptake inhibitors (SSRIs)
- tricyclic antidepressants
- medications used during surgical, dental, or emergency procedures
- cocaine and other street drugs

In addition to the above, subitramine is known to interact with numerous other drugs, including the following:

- pain relievers and muscle relaxants
- sulfa antibiotics
- antifungal medications
- sedatives, sleeping pills, tranquilizers
- high-blood-pressure medications
- migraine-headache medications
- medications for nausea, anxiety, mental illness, seizures
- blood thinners such as warfarin (Coumadin)
- chemotherapies

Orlistat may interact with the following:

- other weight loss medications
- diabetes medications, including insulin
- blood thinners
- herbal products
- cyclosporine

KEY TERMS

Amphetamines— Sympathomimetic amines; sometimes called speed; synthetic chemicals that stimulate the central nervous system.

Body mass index (BMI)— The correlation of body weight with height; usually correlates with total body fat.

Dopamine— A neurotransmitter and precursor of norepinephrine; found in high concentrations in the brain.

Ephedrine— A sympathomimetic amine from plants of the genus *Ephedra* or chemically synthesized; an asthma medication that previously was used in weight loss drugs.

Lipase— A fat-splitting enzyme found in pancreatic juice, blood, and many tissues.

Neurotransmitter— A substance that helps transmit impulses between two nerve cells or a nerve and muscle.

Norepinephrine— A hormone that constricts blood vessels.

Orlistat— A drug that inhibits lipase.

Phentermine— An amphetamine prescribed for appetite suppression.

Serotonin— 5-Hydroxytryptamine; a chemical in various parts of the body that stimulates smooth muscle contraction, constricts blood vessels, and inhibits stomach secretions.

Sibutramine— An appetite-suppressing drug that may increase the activity of norepinephrine and serotonin in the brain.

Resources

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Chapter 3 - Obesity

Weight management refers to a set of practices and behaviors that are necessary to keep one's weight at a healthful level. It is preferred to the term "dieting," because it involves more than regulation of food intake or treatment of overweight people. People diagnosed with eating disorders who are not obese or overweight still need to practice weight management. Some health care professionals use the term "nutritional disorders" to cover all disorders related to weight.

The term "weight management" also reflects a change in thinking about treatment of obesity and overweight during the past 20 years. Before 1980, treatment of overweight people focused on weight loss, with the goal of helping the patient reach an "ideal weight" as defined by standard life insurance height-weight charts. In recent years, however, researchers have discovered that most of the negative health consequences of obesity are improved or controlled by a relatively modest weight loss, perhaps as little as 10% of the patient's body weight. It is not necessary for the person to reach the "ideal" weight to benefit from weight management. Some nutritionists refer to this treatment goal as the "10% solution." Secondly, the fact that most obese people who lose large amounts of weight from reduced-calorie diets regain it within five years has led nutrition experts to emphasize weight management rather than weight loss as an appropriate outcome of treatment.

Although obesity, which indicates excessive accumulation of fat tissue with a corresponding increase in size, has been the focus of medical interest since antiquity, it has not been well defined. Moderate stores of fat are desirable and indicate normal nutrition. Since only an excess of the physiologically desirable is regarded as abnormal, a quantitative, even arbitrary, element enters into the definition. A clinician of the last century (Ebstein 1882) divided obesity into three stages: the enviable, the comical, and the pitiable. In contemporary American society no stage would be considered "enviable." Even mild degrees of excess weight, or those that indicate abundant normal growth, are condemned.

During the past half century, obesity has customarily been equated with overweight in relation to an "average" figure for height, age, and sex. Since in Western society weight commonly increases with age, it was considered a further refinement to refer to the weight of the *young* adult person as the "ideal." Life insurance companies, which need a statistical approach for quick evaluation of a large number of people, have branded any excess weight as undesirable. Clinically, it is doubtful whether such a statistical concept of "normal" or "ideal" weight is valid. A recent examination of the total population of a certain area in the south of Sweden, for example, revealed that as much as 70 per cent of the female population over 40 years of age were 10 kilograms "overweight" and 10 per cent were overweight by 30 kilograms or more (Bjurulf & Lindgren 1964).

Many other objections have been raised against a rigid statistical approach. It has been criticized as being based on the implicit assumption that all body weight is equivalent and that overweight is a measure of relative fatness. Keys and Brozek (1953), who first gathered extensive evidence against the blind use of statistics, particularly in regard to moderately overweight persons,

considered some judicious pinches of various skin folds a more scientific way of estimating fatness. Refinements of this biological approach include the use of skin-fold calipers, soft-tissue roentgenograms, and estimates of the total body water through densitometry. These newer methods aid in obtaining more accurate measurements of the body fat in relation to the lean tissue (von Döbeln 1964).

There is increasing awareness that clinical obesity does not represent just an extreme on the normal distribution curve for weight, but that it is a symptom of true abnormalities, an expression of a variety of underlying clinical disturbances (MacBryde 1964). There is increasing recognition that the term refers to a variety of decidedly different clinical pictures. Obesity that develops early in life, in infancy or before puberty, has an entirely different course and significance from the gradual increase in weight in middle life (Bruch 1955).

Entirely different problems are encountered in (1) those whose weight is stable or who have arrived at the stationary stage of obesity and (2) those who are in the active phase of progressively increasing weight or who, with constant fluctuation, show dramatic weight losses during which the fat seems to melt away, only to be regained even more rapidly. The clinical picture and the pathological processes are different again in superobese people who achieve a tremendous size, with weight in excess of 300 pounds—reaching up to 700 or 800. At the present stage of our knowledge, or rather ignorance, it is not possible to differentiate between these different forms of obesity on the basis of any laboratory test; thus far it can be done only through evaluation of the whole development and reaction pattern (Bruch 1957a).

Economic and sociological factors. Regardless of the physiological and psychological aspects to be discussed later, external factors influence the occurrence of obesity to a conspicuous degree. In the United States, obesity has been called the number one health problem. Other affluent countries, too, express concern with overnutrition as a not altogether desirable by-product of increased and improved food consumption and labor-saving devices.

Human history has been determined to a large extent by the search for sufficient food. Malnutrition is still prevalent in underdeveloped countries with inadequate nutritional resources, and starvation is a specter that even today threatens large sections of mankind. Such abundance of food for large population groups is historically very recent, and geographically it is limited to a few overprivileged countries.

Yet the condition of obesity has been familiar to man since the dawn of history. The oldest representation of the human form, the “Venus of Willendorf,” shows marked obesity, and so do other paleontological figurines. The taste for fat women persisted into the Neolithic period. It is not known whether these “Venuses” are realistic representations or whether they represent an artistic ideal, a dream of abundance and fertility.

In primitive society, a yearning for fatness persists. Cloete (1953, p. 119) describes the attitude of the typical South African who works for the white man: “. . . and what is his heart’s desire? Fat above all things. To be fat himself, to have a fat wife and children and fat cattle. This is the native’s dream, the Biblical dream of plenty in a starving land.”

A similar primitive desire for fatness was conspicuous during the 1930s among the mothers of a large group of obese children who were studied in New York City (Bruch 1940). Many of the women had been poor immigrants who had suffered hunger during their early lives. They did not understand why anyone should object to a child's being big and fat, which to them indicated success and freedom from want.

Even in the United States, traditionally the country of abundance, nutritional deficiency diseases were the object of concern fifty years ago; today they have become quite rare. In the last fifty years, American children, both of native and foreign-born parents, have become 6-8 per cent taller and 1215 per cent heavier than their parents, and maturation and puberty occur at an earlier age. The same observation is being made in Japan, where the new generation, under the influence of improved nutrition, is outgrowing the short stature of the parents.

Adequate food supply is thus a prerequisite for optimum weight and physical development. Yet under the conditions of abundance, only a certain number of people become obese. A rich literature exists on the occurrence of obesity in different societies and eras, and on outstanding individuals who have been fat. Fascinating as these reports are, they have the value only of anecdotal contributions and are based on hearsay tales, old chronicles, and speculation (Bruch 1957a; Clauser & Spranger 1957).

In spite of the great public interest in obesity, systematic inquiries into its sociological aspects are conspicuously rare. Public health figures indicate a change in the weight of adult Americans: since 1912 the average weight of women has decreased by 5 pounds, whereas the average man is 5 pounds heavier. A detailed evaluation of a large unselected population sample—1,600 adults living in a central residential area of New York City—led to the discovery of a striking relationship between obesity and social class (Moore et al. 1962). Obesity occurred seven times more frequently among women of the lowest socioeconomic level than among those of the highest level; among men the same relationship existed, although to a lesser degree. As other studies also noted, obesity was found to increase with age.

Similar observations are reported in the south of Sweden, where the weight of women in the upper classes is lower and shows less variability than that of women of poorer economic background. However, men in the lower sociological group in Sweden do not tend to be overweight (Andersen & Esmann 1957).

A recent German study gives a different picture (Pflanz 1963). Information on social factors was obtained for 10,000 patients who were seen during one year at the medical clinic of the University of Giessen. A weight excess of 15 kilograms, indicating undisputed obesity, was observed in a sample of about 1,000 patients. This study revealed that the sociological factors associated with obesity were quite different in men and women. Conspicuously often, obesity occurred in men who had been only children. No such difference between the sexes was observed in those who came from a large sibling group. Single and divorced women and those living in cities were less obese than married and widowed women and those living in rural surroundings. Analysis according to social class revealed the greatest differences. In the group of independent farmers and small-business people, obesity was observed at approximately the same frequency in men and women. In the highest and lowest social class, the sex distributions went in

opposite directions. Obesity was more frequent in women of the lowest class and in men of the highest class. It seems that under the special conditions of German culture, obesity in men has an entirely different sociological significance from that in women; in men it seems to add to their sense of power and prestige.

Physiological factors. The question of what causes obesity has challenged physicians since antiquity. Two lines of reasoning can be recognized throughout the medical literature: one suggests that obesity is due to some innate inherited factors and is therefore an unalterable fate; the other suggests that it is the result of deplorable personal habits—overeating and inactivity—that are morally condemned as greed and laziness. Scientific understanding has been delayed by the tendency to consider heredity and environmental factors as mutually exclusive. They are not only not opposed but interact and influence each other in many ways (Stern 1949). This clinical deduction now finds support from genetics, namely, from recent evidence that in the cells of higher organisms a large part of the genetic material remains inactive and that the level of activity of a gene depends on environmental factors. Changes in diet and hormonal secretion may serve to activate certain genes. They in turn are influenced by living conditions, climate, and the emotional state of the organism.

The case for heredity is easily made in regard to obesity. A high family incidence is reported by many different investigators (Bruch 1957a; Davenport 1923). Of course, it is just as easy to demonstrate that these families indulge in rich meals and tend to avoid physical activities.

Other evidence of inherent factors is the prevalence of certain constitutional types. In a group of 180 obese adolescent girls, there was an expected high proportion of endomorphic types, but also a high incidence of mesomorphic types (Seltzer & Mayer 1964). A group of 250 obese boys and girls tended to be taller and to mature earlier than their age peers of normal weight (Bruch 1939a). An anthropological study of adult obese women showed the prevalence of a certain body type, namely, juvenile proportions that are associated with early maturity [Ange] 1949; *see also* Psychology, *article on* Constitutional Psychology].

Micromorphologic study shows that fat tissue varies greatly in size and number of cells (Hirsch & Goldrick 1964). It appears that the size of the cell varies with nutritional factors, whereas the number of cells is determined by endogenous, probably genetic, factors. Individuals with the same thickness of subcutaneous fat may have different morphologic tissue structure. Coronary sclerosis appears to be associated with large fat cells but not with a high cell count (Bjurulf 1964).

Powerful support for the genetic view came from the discovery of certain strains of mice that grew fat under ordinary laboratory conditions. As many as 15 types of obesity, with different hereditary, metabolic, regulatory, eating, and activity disturbances, have been recognized in the mouse (Mayer 1963). It is questionable whether any of them has an equivalent in human obesity. The great merit of these extensive studies is the clarity with which they demonstrate the way multiple factors interact and how etiologic and pathogenetic factors can and need to be separated.

Clinical investigations reflect this stimulus in the greater diversification of problems that are being studied. "Metabolism," a generation ago, referred to the balance between caloric intake and output. Metabolic studies today are directed toward clarifying the transformation of various foodstuffs into the metabolites that are deposited in the tissues. There is increasing evidence that there are forms of human obesity that are characterized by the increased formation of fatty acids from glucose and other foodstuffs and their decreased release from fat deposits. Various pathways of the transfer and synthesis of fatty acids have been clarified (Elovson 1964; Gordon 1964). It has been recognized that the fat tissues themselves play a role in this process and that hormones enter into the delicate balance between lipogenesis and fat mobilization in various ways (Dole & Hirsch 1960). Once lipogenesis is increased, it cannot be reversed by simple dieting. The fat person's claim, "Everything I eat turns into fat," and his sad experience that the painfully lost weight is readily regained, now has some scientific support. Other metabolic work deals with disturbances in the carbohydrate metabolisms, with differences in the glucostatic regulations (Mayer 1953).

Another factor leading to disordered weight is found in disturbances in the regulatory mechanisms. Since the beginning of the century, it has been recognized that obesity may develop after midbrain lesions, in the presence of tumors, or following encephalitis (Bruch 1939b). Extensive animal studies with experimentally produced microscopic lesions in the hypothalamus and other midbrain regions have elucidated the importance of different cell groups in influencing appetite and the experience of satiation, and thus weight regulation. Here again, newer studies emphasize the complexity of the problem, namely, that not only the eating function is affected by these operations but also spontaneous activity and motivation (Kennedy 1964). Proven anatomical lesions are rare in humans, and there has been speculation about possible functional weakness of the regulatory "centers," some aspects of which will be discussed in the section on psychological factors.

Furthermore, animal experimentation has also demonstrated that environmental factors alone can result in severe obesity. If young rats are allowed food only two hours per day, they become markedly obese, with increased lipid synthesis in the adipose tissue, in contrast to litter mates who have free access to food and grow into normal rats (Hollifield & Parson 1962). The gain in weight continues, with voracious eating, when the restricted rats are restored to normal feeding. However, the cycle is interrupted, with corresponding metabolic changes, after a period of fasting.

Psychological aspects . Throughout the ages, popular opinion has attributed definite, although contradictory, character traits to fat people that reflect changing concepts of obesity. Attention has been focused on the inherent temperament of the fat person, or on the consequences of being fat and the insults of a derogatory social climate. The contribution of psychological factors to the development of obesity has been recognized only recently.

Systematic psychological studies have led to better understanding and clinical management of obese people, and they have also revealed the complexity of the problem. Psychiatric observations first emphasized the need for differentiating among several types of human obesity and recognized overeating and inactivity as manifestations of underlying emotional and personality disturbances (Bruch 1957a).

The psychiatric problems of obesity are far from uniform (Bruch 1957b). It is not possible to speak of the psychodynamics of one basic personality type or even to describe one single psychological feature as characteristic of all obese people. Obesity may be associated with every conceivable psychiatric disorder, with neurosis as well as psychosis. Psychological problems can be recognized under two different conditions. In some patients with many signs of disturbed behavior and adaption, obesity is intrinsically interwoven with their whole development; others become obese as a reaction to some traumatic event. It is in the latter form that the significance of psychological factors was first recognized. Obesity seems to serve as an equivalent for a depressive reaction in people who in other respects have the capacity for adequate functioning.

The total picture is much more disturbed in the developmental obesity that occurs in children and adolescents who grow up in families in which they are treated as objects—precious or hated possessions that are overstuffed with food and shielded from, or not trusted with, the ordinary tasks of life. In many respects their behavior and psychological reactions resemble those of the preschizophrenic stage. Such patients may become overtly schizophrenic when the demands of life become too threatening. Enforced reducing at this time may precipitate the manifest psychosis. Overeating and inactivity appear as central symptoms in the patient's whole development and often reflect severe intrafamilial pathology. Such patients parallel preschizophrenic development in their general immaturity, social withdrawal, and body image disturbances (Bruch 1958).

Psychological and psychiatric studies of obesity have become so numerous that it is impossible even to enumerate them in a brief review. Various investigators have focused on different traits in an effort at classification. Stunkard (1959a), for instance, differentiates various forms of obesity according to eating patterns. He has also studied the extent and psychodynamic aspects of inactivity (Dorris & Stunkard 1957).

Psychoanalytic thinking has played an important role in the psychological study of obesity and has helped to clarify the conflicts and motivations that underlie overeating. Food is symbolically equated with an insatiable desire for unattainable love, but also with inhibited destructive impulses. Food intake may reflect self-indulgence, the desire for sexual gratification, or, the wish to be pregnant; it also may represent punishment of forbidden impulses. Preoccupation with food may appear as helpless, dependent clinging to parents or as hostile rejection of them.

In recent years a skeptical note can be recognized in psychiatric writings. The question has been raised whether the observations made on selected patients undergoing extensive psychoanalysis could and should be generalized to apply to the enormous group of obese patients not so extensively studied and observed. There is also need to differentiate between the psychological forces that lead to obesity and the psychological suffering resulting from it. Monello and Mayer (1963) observed that the psychological responses of a group of obese adolescents were similar to those of a minority group. They also noted that the obese child came from a nonunified family with poor sociability and was afraid to leave home. In a sociological study in New York City, obese persons gave more pathological responses on nine measures of mental health (Moore et al. 1962). For three of these measures—immaturity, suspiciousness, and rigidity—the results were statistically significant. These observations suggest that serious emotional disturbances may be present in obese people other than those who were actually studied.

There has also been a decided change in the direction and emphasis of psychiatric inquiry. Instead of focusing exclusively on the symbolic meaning of the disturbed behavior, a more basic theoretical question has been raised: How does it happen that a body function becomes capable of being misused in the service of motivational conflicts and disturbed interpersonal relations? It has been recognized that deficits in perception and conceptualization are important factors in the psychopathology of obese patients. Inability to identify correctly hunger and satiation is conspicuous among many other indications of falsified awareness of bodily needs, emotional states, and interpersonal situations. Patients with such disturbances have difficulty in drawing correct conceptual conclusions about sensations and impulses arising from within and differentiating them from those impinging from the outside [Bruch 1961; *see also* Body Image].

This failure to develop an integrated and differentiated concept of a bodily self and psychological identity could be related to a deficit in earliest learning experiences, namely, the absence of confirmation of child-initiated impulses. The importance of disturbed family influences had been recognized much earlier (Bruch & Touraine 1940), but as long as the abnormal interaction was related entirely to emotional experiences, this basic disturbance in conceptual awareness remained unclear. The importance of conceptual awareness has been demonstrated experimentally. When measured amounts of food were introduced directly into the stomach, marked individual differences were observed in the accuracy of recognizing whether, and how much, food had been given. Some healthy, normal subjects were consistently accurate. Obese patients were significantly less accurate. Independently, Stunkard (1959b) observed that obese patients frequently failed to feel hungry in the presence of stomach contractions or to recognize such contractions.

A comprehensive review in a limited space of ongoing research on obesity offers severe, even unsurmountable difficulties. These very difficulties signify a desirable and much needed development. They indicate that extensive research on this topic is being performed by investigators in many different disciplines. The multitude of new findings may appear confusing and contradictory; yet there is slowly developing a convergence of opinion that, contrary to old concepts, obesity is not a uniform or simple condition but a symptom of multiple interaction of various factors, only a few of which have thus far been clearly recognized.

This whole line of work is still very much in the beginning stages, but it promises a better understanding of the problem through integrating findings in various fields of research. From the psychiatrist's point of view, patients suffering from obesity go through life with inadequate guideposts for orienting themselves about their own functioning and their relationships with others. They develop inaccurate behavior that becomes more and more inappropriate as, with their increasing age, the demands of life become more and more complex.

Hilde Bruch

[*See also* [Food](#), article on [Consumption Patterns](#); [Psychosomatic Illness](#).]

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Chapter 4 - Obesity and Treatment

Definition

Obesity is an abnormal accumulation of body fat, usually 20% or more over an individual's ideal body weight. Obesity is associated with increased risk of illness, disability, and **death**.

The branch of medicine that deals with the study and treatment of obesity is known as bariatrics. As obesity has become a major health problem in the [United States](#), bariatrics has become a separate medical and surgical specialty.

Description

Obesity traditionally has been defined as a weight at least 20% above the weight corresponding to the lowest death rate for individuals of a specific height, gender, and age (ideal weight). Twenty to forty percent over ideal weight is considered mildly obese; 40-100% over ideal weight is considered moderately obese; and 100% over ideal weight is considered severely, or morbidly, obese. More recent guidelines for obesity use a measurement called BMI (body mass index) which is the individual's weight multiplied by 703 and then divided by twice the height in inches. BMI of 25.9-29 is considered overweight; BMI over 30 is considered obese. Measurements and comparisons of waist and hip circumference can also provide some information regarding risk factors associated with weight. The higher the ratio, the greater the chance for weight-associated complications. Calipers can be used to measure skin-fold thickness to determine whether tissue is muscle (lean) or adipose tissue (fat).

Much concern has been generated about the increasing incidence of obesity among Americans. Some studies have noted an increase from 12% to 18% occurring between 1991 and 1998. Other studies have actually estimated that a full 50% of all Americans are overweight. The World Health Organization terms obesity a worldwide epidemic, and the diseases which can occur due to obesity are becoming increasingly prevalent.

Excessive weight can result in many serious, potentially life-threatening health problems, including **hypertension**, Type II **diabetes mellitus** (non-insulin dependent diabetes), increased risk for coronary disease, increased unexplained **heart attack**, hyperlipidemia, **infertility**, and a higher prevalence of colon, prostate, endometrial, and, possibly, **breast cancer**. Approximately 300,000 deaths a year are attributed to obesity, prompting leaders in public health, such as former Surgeon General C. Everett Koop, M.D., to label obesity "the second leading cause of preventable deaths in the United States."

Causes and symptoms

The mechanism for excessive weight gain is clear—more calories are consumed than the body burns, and the excess calories are stored as fat (adipose) tissue. However, the exact cause is not

as clear and likely arises from a complex combination of factors. Genetic factors significantly influence how the body regulates the appetite and the rate at which it turns food into energy (metabolic rate). Studies of adoptees confirm this relationship—the majority of adoptees followed a pattern of weight gain that more closely resembled that of their birth parents than their adoptive parents. A genetic predisposition to weight gain, however, does not automatically mean that a person will be obese. Eating habits and patterns of physical activity also play a significant role in the amount of weight a person gains. Recent studies have indicated that the amount of fat in a person's diet may have a greater impact on weight than the number of calories it contains. Carbohydrates like cereals, breads, fruits, and vegetables and protein (fish, lean meat, turkey breast, skim milk) are converted to fuel almost as soon as they are consumed. Most fat calories are immediately stored in fat cells, which add to the body's weight and girth as they expand and multiply. A sedentary lifestyle, particularly prevalent in affluent societies, such as in the United States, can contribute to weight gain. Psychological factors, such as depression and low self-esteem may, in some cases, also play a role in weight gain.

Height And Weight Goals			
Men			
Height	Small Frame	Medium Frame	Large Frame
5'2" 5'3" 5'4"	128-134 lbs. 130-136 132-138	131-141 lbs. 133-143 135-145	138-150 lbs. 140-153 142-153
5'5" 5'6" 5'7"	134-140 136-142 138- 145	137-148 139-151 142-154	144-160 146-164 149- 168
5'8" 5'9" 5'10"	140-148 142-151 144- 154	145-157 148-160 151-163	152-172 155-176 158- 180
5'11" 6'0" 6'1"	146-157 159-160 152- 164	154-166 157-170 160-174	161-184 164-188 168- 192
6'2" 6'3" 6'4"	155-168 158-172 162- 176	164-178 167-182 171-187	172-197 176-202 181- 207
Women			
Height	Small Frame	Medium Frame	Large Frame
4'10" 4'11" 5'0"	102-111 lbs. 103-113 104-115	109-121 lbs. 111-123 113-126	118-131 lbs. 120-134 112-137
5'1" 5'2" 5'3"	106-118 108-121 111- 124	115-129 118-132 121-135	125-140 128-143 131- 147
5'4" 5'5" 5'6"	114-127 117-130 120- 133	124-141 127-141 130-144	137-151 137-155 140- 159
5'7" 5'8" 5'9"	123-136 126-139 129- 142	133-147 136-150 139-153	143-163 146-167 149- 170
5'10" 5'11"	132-145 135-148 138-	142-156 145-159 148-162	152-176 155-176 158-

Height And Weight Goals			
6'0"	151		179

At what stage of life a person becomes obese can affect his or her ability to lose weight. In childhood, excess calories are converted into new fat cells (hyperplastic obesity), while excess calories consumed in adulthood only serve to expand existing fat cells (hypertrophic obesity). Since dieting and **exercise** can only reduce the size of fat cells, not eliminate them, persons who were obese as children can have great difficulty losing weight, since they may have up to five times as many fat cells as someone who became overweight as an adult.

Obesity can also be a side effect of certain disorders and conditions, including:

- Cushing's syndrome, a disorder involving the excessive release of the hormone cortisol
- hypothyroidism, a condition caused by an underactive thyroid gland
- neurologic disturbances, such as damage to the hypothalamus, a structure located deep within the brain that helps regulate appetite
- consumption of such drugs as steroids, antipsychotic medications, or antidepressants

The major symptoms of obesity are excessive weight gain and the presence of large amounts of fatty tissue. Obesity can also give rise to several secondary conditions, including:

- arthritis and other orthopedic problems, such as lower back pain
- hernias
- heartburn
- adult-onset asthma
- gum disease
- high cholesterol levels
- gallstones
- high blood pressure
- menstrual irregularities or cessation of menstruation (amenorrhea)
- decreased fertility, and **pregnancy** complications
- shortness of breath that can be incapacitating
- sleep apnea and sleeping disorders
- skin disorders arising from the bacterial breakdown of sweat and cellular material in thick folds of skin or from increased friction between folds
- emotional and social problems

Diagnosis

Diagnosis of obesity is made by observation and by comparing the patient's weight to ideal weight charts. Many doctors and obesity researchers refer to the body mass index (BMI), which uses a height-weight relationship to calculate an individual's ideal weight and personal risk of developing obesity-related health problems. Physicians may also obtain direct measurements of an individual's body fat content by using calipers to measure skin-fold thickness at the back of the upper arm and other sites. The most accurate means of measuring body fat content involves

immersing a person in water and measuring relative displacement; however, this method is very impractical and is usually only used in scientific studies requiring very specific assessments. Women whose body fat exceeds 30% and men whose body fat exceeds 25% are generally considered obese.

Doctors may also note how a person carries excess weight on his or her body. Studies have shown that this factor may indicate whether or not an individual has a predisposition to develop certain diseases or conditions that may accompany obesity. "Apple-shaped" individuals who store most of their weight around the waist and abdomen are at greater risk for **cancer**, heart disease, **stroke**, and diabetes than "pear-shaped" people whose extra pounds settle primarily in their hips and thighs.

Treatment

Treatment of obesity depends primarily on how overweight a person is and his or her overall health. However, to be successful, any treatment must affect life-long behavioral changes rather than short-term weight loss. "Yo-yo" dieting, in which weight is repeatedly lost and regained, has been shown to increase a person's likelihood of developing fatal health problems than if the weight had been lost gradually or not lost at all. Behavior-focused treatment should concentrate on:

- What and how much a person eats. This aspect may involve keeping a food diary and developing a better understanding of the nutritional value and fat content of foods. It may also involve changing grocery-shopping habits (e.g., buying only what is on a prepared list and only going on a certain day), timing of meals (to prevent feelings of hunger, a person may plan frequent, small meals), and actually slowing down the rate at which a person eats.
- How a person responds to food. This may involve understanding what psychological issues underlie a person's eating habits. For example, one person may binge eat when under **stress**, while another may always use food as a reward. In recognizing these psychological triggers, an individual can develop alternate coping mechanisms that do not focus on food.
- How they spend their time. Making activity and exercise an integrated part of everyday life is a key to achieving and maintaining weight loss. Starting slowly and building endurance keeps individuals from becoming discouraged. Varying routines and trying new activities also keeps interest high.

For most individuals who are mildly obese, these behavior modifications entail life-style changes they can make independently while being supervised by a family physician. Other mildly obese persons may seek the help of a commercial weight-loss program (e.g., Weight Watchers). The effectiveness of these programs is difficult to assess, since programs vary widely, drop-out rates are high, and few employ members of the medical community. However, programs that emphasize realistic goals, gradual progress, sensible eating, and exercise can be very helpful and are recommended by many doctors. Programs that promise instant weight loss or feature severely restricted **diets** are not effective and, in some cases, can be dangerous.

For individuals who are moderately obese, medically supervised behavior modification and weight loss are required. While doctors will put most moderately obese patients on a balanced, low-calorie diet (1200-1500 calories a day), they may recommend that certain individuals follow a very-low-calorie liquid protein diet (400-700 calories) for as long as three months. This therapy, however, should not be confused with commercial liquid protein diets or commercial weight-loss shakes and drinks. Doctors tailor these diets to specific patients, monitor patients carefully, and use them for only a short period of time. In addition to reducing the amount and type of calories consumed by the patient, doctors will recommend professional therapists or psychiatrists who can help the individual effectively change his or her behavior in regard to eating.

For individuals who are severely obese, dietary changes and behavior modification may be accompanied by surgery to reduce or bypass portions of the stomach or small intestine. Although **obesity surgery** is less risky as of 2003 because of recent innovations in equipment and surgical technique, it is still performed only on patients for whom other strategies have failed and whose obesity seriously threatens their health. Other surgical procedures are not recommended, including **liposuction**, a purely cosmetic procedure in which a suction device is used to remove fat from beneath the skin, and **jaw wiring**, which can damage gums and teeth and cause painful **muscle spasms**.

Appetite-suppressant drugs are sometimes prescribed to aid in weight loss. These drugs work by increasing levels of serotonin or catecholamine, which are brain chemicals that control feelings of fullness. Appetite suppressants, though, are not considered truly effective, since most of the weight lost while taking them is usually regained after stopping them. Also, suppressants containing amphetamines can be potentially abused by patients. While most of the immediate side-effects of these drugs are harmless, the long-term effects of these drugs, in many cases, are unknown. Two drugs, dexfenfluramine hydrochloride (Redux) and fenfluramine (Pondimin) as well as a combination fenfluramine-phentermine (Fen/Phen) drug, were taken off the market when they were shown to cause potentially fatal heart defects. In November 1997, the United States Food and Drug Administration ([FDA](#)) approved a new weight-loss drug, sibutramine (Meridia). Available only with a doctor's prescription, Meridia can significantly elevate blood pressure and cause **dry mouth, headache, constipation, and insomnia**. This medication should not be used by patients with a history of congestive **heart failure**, heart disease, stroke, or uncontrolled high blood pressure.

Other weight-loss medications available with a doctor's prescription include:

- diethylpropion (Tenuate, Tenuate dospan)
- mazindol (Mazanor, Sanorex)
- phendimetrazine (Bontril, Plegine, Prelu-2, X-Trozone)
- phentermine (Adipex-P, Fastin, Ionamin, Oby-trim)

Phenylpropanolamine (Acutrim, Dextarim) is the only nonprescription weight-loss drug approved by the FDA. These over-the-counter diet aids can boost weight loss by 5%. Combined with diet and exercise and used only with a doctor's approval, prescription anti-obesity medications enable some patients to lose 10% more weight than they otherwise would. Most

patients regain lost weight after discontinuing use of either prescription medications or nonprescription weight-loss products.

Prescription medications or over-the-counter weight-loss products can cause:

- constipation
- dry mouth
- headache
- irritability
- **nausea**
- nervousness
- sweating

None of them should be used by patients taking monoamine oxidase inhibitors (MAO inhibitors).

Doctors sometimes prescribe fluoxetine (Prozac), an antidepressant that can increase weight loss by about 10%. Weight loss may be temporary and side effects of this medication include **diarrhea, fatigue**, insomnia, nausea, and thirst. Weight-loss drugs currently being developed or tested include ones that can prevent fat absorption or digestion; reduce the desire for food and prompt the body to burn calories more quickly; and regulate the activity of substances that control eating habits and stimulate overeating.

Alternative treatment

The Chinese herb ephedra (*Ephedra sinica*), combined with **caffeine**, exercise, and a low-fat diet in physician-supervised weight-loss programs, can cause at least a temporary increase in weight loss. However, the large doses of ephedra required to achieve the desired result can also cause:

- anxiety
- heart **arrhythmias**
- heart attack
- high blood pressure
- insomnia
- irritability
- nervousness
- seizures
- strokes
- death

Ephedra should not be used by anyone with a history of diabetes, heart disease, or thyroid problems. In fact, an article that appeared in the *Journal of the American Medical Association* in early 2003 advised against the use of ephedra.

Diuretic herbs, which increase urine production, can cause short-term weight loss but cannot help patients achieve lasting weight control. The body responds to heightened urine output by

increasing thirst to replace lost fluids, and patients who use **diuretics** for an extended period of time eventually start retaining water again anyway. In moderate doses, psyllium, a mucilaginous herb available in bulk-forming **laxatives** like Metamucil, absorbs fluid and makes patients feel as if they have eaten enough. Red peppers and mustard help patients lose weight more quickly by accelerating the metabolic rate. They also make people more thirsty, so they crave water instead of food. Walnuts contain serotonin, the brain chemical that tells the body it has eaten enough. Dandelion (*Taraxacum officinale*) can raise metabolism and counter a desire for sugary foods.

Acupressure and **acupuncture** can also suppress food cravings. Visualization and **meditation** can create and reinforce a positive self-image that enhances the patient's determination to lose weight. By improving physical strength, mental concentration, and emotional serenity, **yoga** can provide the same benefits. Also, patients who play soft, slow music during meals often find that they eat less food but enjoy it more.

Getting the correct ratios of protein, carbohydrates, and good-quality fats can help in weight loss via enhancement of the metabolism. Support groups that are informed about healthy, nutritious, and balanced diets can offer an individual the support he or she needs to maintain this type of eating regimen.

Prognosis

As many as 85% of dieters who do not exercise on a regular basis regain their lost weight within two years. In five years, the figure rises to 90%. Repeatedly losing and regaining weight (yo yo dieting) encourages the body to store fat and may increase a patient's risk of developing heart disease. The primary factor in achieving and maintaining weight loss is a life-long commitment to regular exercise and sensible eating habits.

Prevention

Obesity experts suggest that a key to preventing excess weight gain is monitoring fat consumption rather than counting calories, and the National Cholesterol Education Program maintains that only 30% of calories should be derived from fat. Only one-third of those calories should be contained in saturated fats (the kind of fat found in high concentrations in meat, poultry, and dairy products). Because most people eat more than they think they do, keeping a detailed food diary is a useful way to assess eating habits. Eating three balanced, moderate-portion meals a day—with the main meal at mid-day—is a more effective way to prevent obesity than **fasting** or crash diets. Exercise increases the metabolic rate by creating muscle, which burns more calories than fat. When regular exercise is combined with regular, healthful meals, calories continue to burn at an accelerated rate for several hours. Finally, encouraging healthful habits in children is a key to preventing childhood obesity and the health problems that follow in adulthood.

New directions in obesity treatment

The rapid rise in the incidence of obesity in the United States since 1990 has prompted researchers to look for new treatments. One approach involves the application of antidiabetic drugs to the treatment of obesity. Metformin (Glucophage), a drug that was approved by the Food and Drug Administration (FDA) in 1994 for the treatment of type 2 diabetes, shows promise in treating obesity associated with **insulin resistance**.

Another field of obesity research is the study of hormones, particularly leptin, which is produced by fat cells in the body, and ghrelin, which is secreted by cells in the lining of the stomach. Both hormones are known to affect appetite and the body's energy balance. Leptin is also related to reproductive function, while ghrelin stimulates the pituitary gland to release growth hormone. Further studies of these two hormones may lead to the development of new medications to control appetite and food intake.

KEY TERMS

Adipose tissue— Fat tissue.

Appetite suppressant— Drug that decreases feelings of hunger. Most work by increasing levels of serotonin or catecholamine, chemicals in the brain that control appetite.

Bariatrics— The branch of medicine that deals with the prevention and treatment of obesity and related disorders.

Ghrelin— A recently discovered peptide hormone secreted by cells in the lining of the stomach. Ghrelin is important in appetite regulation and maintaining the body's energy balance.

Hyperlipidemia— Abnormally high levels of lipids in blood plasma.

Hyperplastic obesity— Excessive weight gain in childhood, characterized by the creation of new fat cells.

Hypertension— High blood pressure.

Hypertrophic obesity— Excessive weight gain in adulthood, characterized by expansion of already existing fat cells.

Ideal weight— Weight corresponding to the lowest death rate for individuals of a specific height, gender, and age.

Leptin— A protein hormone that affects feeding behavior and hunger in humans. At present it is thought that obesity in humans may result in part from insensitivity to leptin.

A third approach to obesity treatment involves research into the social factors that encourage or reinforce weight gain in humans. Researchers are looking at such issues as the advertising and marketing of food products; media stereotypes of obesity; the development of eating disorders in adolescents and adults; and similar questions.

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ORGANIZATIONS

American Dietetic Association. (800) 877-1600. www.eatright.org.

American Obesity Association (AOA). 1250 24th Street NW, Suite 300, Washington, DC 20037. (202) 776-7711 or (800) 98-OBESE. www.obesity.org.

American Society for Bariatric Surgery. 7328 West University Avenue, Suite F, Gainesville, FL 32607. (352) 331-4900. www.asbs.org.

American Society of Bariatric Physicians. 5453 East Evans Place, Denver, CO 80222-5234. (303) 770-2526. www.asbp.org.

HCF Nutrition Research Foundation, Inc. P.O. Box 22124, Lexington, KY 40522. (606) 276-3119.

National Institute of Diabetes and Digestive and Kidney Diseases. 31 Center Drive, USC2560, Building 31, Room 9A-04, Bethesda, MD 20892-2560. (301) 496-3583. www.niddk.nih.gov.

National Obesity Research Foundation. Temple University, Weiss Hall 867, Philadelphia, PA 19122.

Weight-Control Information Network. 1 Win Way, Bethesda, MD 20896-3665. (301) 951-1120. (www.navigator.tufts.edu/special/win.html).

Chapter 5 – Cardiovascular Disease

Definition

Cardiology is related to the circulatory system, which comprises the heart and blood vessels and carries nutrients and oxygen to the tissues of the body and removes carbon dioxide and other wastes from them. Cardiovascular diseases are conditions that affect the heart and blood vessels and include arteriosclerosis, coronary artery disease, heart valve disease, arrhythmia, heart failure, hypertension, orthostatic hypotension, shock, endocarditis, diseases of the aorta and its branches, disorders of the peripheral vascular system, and congenital heart disease.

Cardiovascular disease are generally refer to conditions that involve narrowed or blocked blood vessels that can lead to a **heart** attack, chest pain (angina) or stroke. Other **heart** conditions, such as those that affect your **heart's** muscle, valves or rhythm, are considered forms of **heart disease**.

Cardiovascular Disease

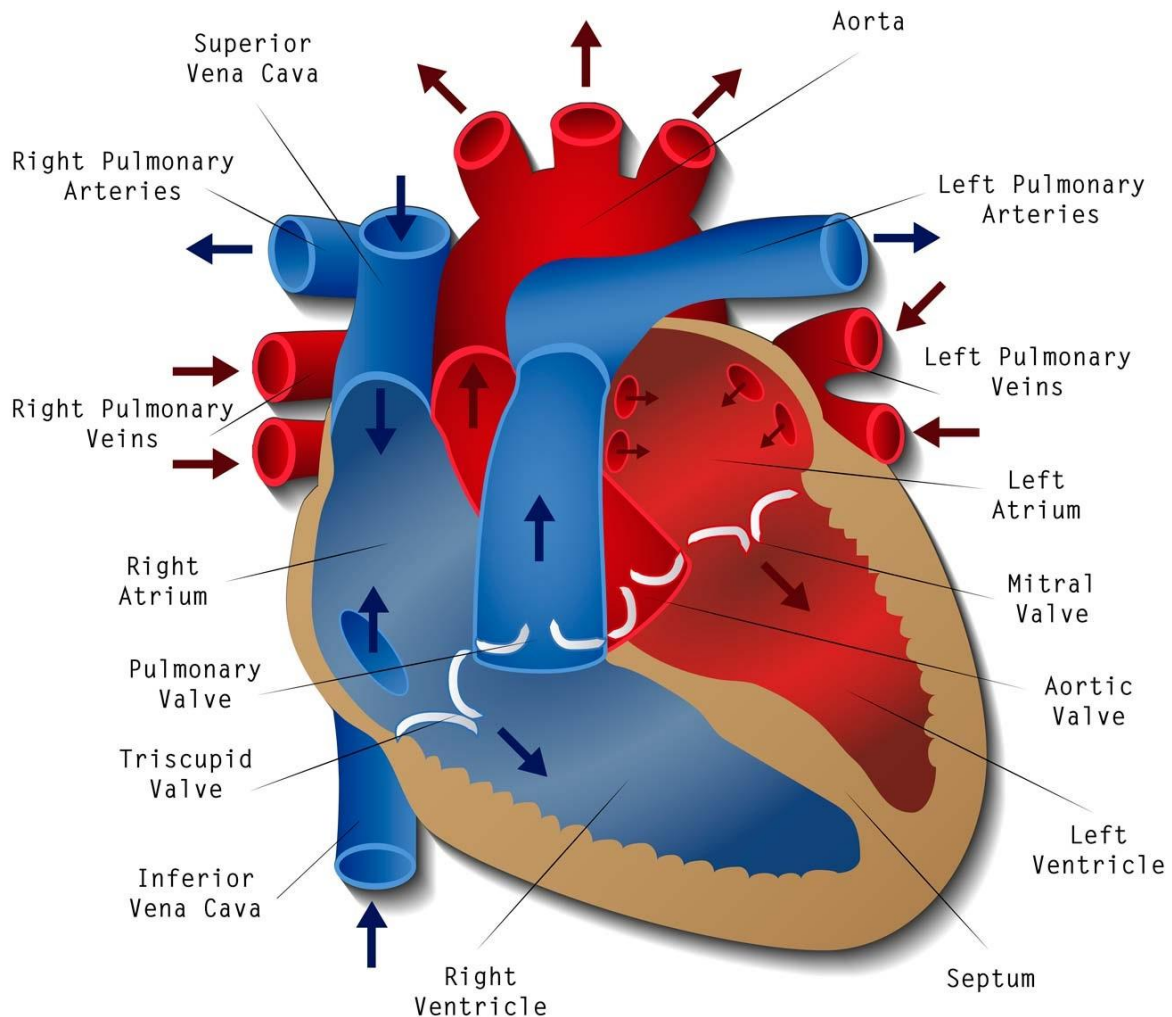
The American Heart Association (AHA) uses the term cardiovascular disease (CVD) to describe various diseases that affect the heart and circulatory system. These diseases include coronary artery (heart) disease, hypertension, congestive heart failure, congenital cardiovascular defects, and cerebrovascular disease. CVD is a chronic disease. These diseases frequently progress as people age. This article limits discussion to the two most common forms of CVD—coronary artery disease and hypertension.

Cardiovascular disease is the leading cause of death in the [United States](#), responsible for one death every 33 seconds or 2,600 deaths per day. In 1994 CVD claimed the lives of 949,619 Americans. The second leading cause of death, cancer, was responsible for 541,532 deaths. It is estimated that approximately 60.8 million individuals in the United States have one or more types of CVD. The most common form of cardiovascular disease is hypertension, which affects approximately 50 million Americans, or one in every four individuals. Hypertension is a significant risk factor for the development of other types of CVD, including congestive heart failure and cerebrovascular accidents.

The second most prevalent form of CVD is coronary heart disease or coronary artery disease, which affects approximately 12.4 million individuals. Coronary heart disease includes both angina pectoris (chest pain) and myocardial infarction (heart attack). In 1994 the American Heart Association estimated that 7.3 million individuals had suffered a heart attack, and 6.4 million had experienced chest pain. The third most prevalent form of CVD is congestive heart failure, which affects 4.7 million Americans. Cerebrovascular accidents are the fourth most prevalent form of CVD, affecting 4.5 million individuals. Congenital cardiovascular defects affect 1 million

Americans, comprising the fifth most prevalent form of CVD. In general, approximately one in five Americans will develop some form of cardiovascular disease in their lifetime.

Diagram of human heart



Risk Factors

Risk factors for CVD may be divided into three classifications: modifiable, nonmodifiable, and contributing factors.

Modifiable factors. Modifiable risk factors are those that an individual can change, including elevated serum cholesterol levels, a diet high in saturated fats, obesity, physical inactivity, hypertension, nicotine, and alcohol use. A serum cholesterol level greater than 200 mg/dl or a

fasting triglyceride level more than 200 mg/dl is associated with an increased incidence of coronary artery disease. Obesity is associated with a higher incidence of mortality from CVD. Physical inactivity increases the risk for developing CVD as much as smoking or consuming a diet high in saturated fats and cholesterol.

The National Heart Lung and Blood Institute defines hypertension as a blood pressure greater than 140/90. Hypertension is a significant risk factor for the development of CVD and stroke. The AHA estimates that one in five deaths from cardiovascular disease are directly linked to cigarette smoking. Individuals who smoke are two to six times more likely to develop coronary artery disease than nonsmokers. However, individuals who quit smoking will reduce their risk to levels equivalent to those of a nonsmoker within three years.

Nonmodifiable factors. Nonmodifiable risk factors are those risk factors that an individual cannot change, such as age, gender, ethnicity, and heredity. The incidence of CVD increases as people age. However, 150,000 individuals die from it before 65 years of age. Males are more likely than females to experience CVD, until the age of 65, when the incidence rate equalizes among genders. Young men aged 35 to 44 years old are more than six times as likely to die from CVD than their same-age female counterparts. However, the death rates equalize after 75 years of age. Furthermore, women may experience different symptoms of CVD than those experienced by men, thus causing women to be underdiagnosed or diagnosed at a more advanced stage of the disease.

Ethnicity also plays a role in the development of CVD. Non-Hispanic black males have a lower age-adjusted prevalence of CVD than Caucasian or Mexican-American males. Black and Mexican-American females have a lower age-adjusted prevalence of CVD than Caucasian females. Overall, middle-aged Caucasian males have the highest incidence of heart attacks.

Heredity may also play a role in the development of CVD. Individuals with a family history of early heart disease are at a greater risk for the development of elevated blood lipid levels, which has been associated with the early development of coronary artery disease. Additionally, most individuals who have experienced either chest pain or a heart attack can identify a close family member (father, mother, brother, or sister) who also had or has CVD. It is expected that the role of genetics and heredity will be more fully understood in the future due to the advances associated with the human genome project.

Contributing factors. Contributing factors are those factors that may increase the risk for developing cardiovascular disease. Diabetes mellitus and a stressful lifestyle are examples of contributing factors. Diabetics are more likely than the general population to experience CVD. Additionally, they experience coronary artery disease at an earlier age than the nondiabetic individual. Two-thirds of individuals with diabetes mellitus die from some form of heart or blood vessel disease.

The role of stress in the development of coronary artery disease is not clearly understood. Historically it was believed that individuals with a type A personality were at a greater risk for the development of CVD. However, the research findings were mixed and did not clearly support this relationship. Stress may also increase the process of atherogenesis (formation of plaque in arteries) due to elevated lipid levels.

Treatments Cardiovascular Issues

Ischemic CVD, such as angina pectoris and myocardial infarction, are usually diagnosed based on patient symptoms, electrocardiogram findings, and cardiac enzyme results. Additionally, coronary angiography may be performed to visualize the coronary arteries and determine the exact location and severity of any obstructions. Coronary artery disease can be treated using medical treatments, surgical treatments, or interventional cardiology. The treatment goal for ischemic CVD is to restore optimal flow of oxygenated blood to the heart.

The human respiratory and circulatory system is maintained by the flow of air through both the left and right **atriums**. It is beneficiary to keep an unplugged left and right **pulmonary veins** which carries **oxygenating blood** (capillaries) to facilitate in circulating and delivering both oxygen and blood flow through **human ventricles** to our entire body, excreting **carbon dioxide** to flow outwards through **right pulmonary artery**.

The human heart mechanism is in synchronization to regulate heart beats causing the pulmonary veins to deliver oxygen-rich blood through the left pulmonary artery of the heart.

The **left side** of the heart pumps blood to the rest of the body. There, the oxygen in the blood moves from blood vessels into surrounding tissues. During inhalation, both **Aortic** and **Pulmonary valves** contracts, causing oxygen-rich blood vessels to flow into our capillaries. Expansion of **Mitral** and **Triscupid valves**, pushes carbon dioxide out of ventricles.

Breathing In (Inhalation)

When you breathe in, or inhale, your diaphragm contracts (tightens) and moves downward. This increases the space in your chest cavity, into which your lungs expand. The intercostal muscles between your ribs also help enlarge the chest cavity. They contract to pull your rib cage both upward and outward when you inhale.

As your lungs expand, air is sucked in through your nose or mouth. The air travels down your windpipe and into your lungs. After passing through your bronchial tubes, the air finally reaches and enters the **alveoli** (air sacs).

Through the very thin walls of the alveoli, **oxygen** from the air passes to the **surrounding capillaries** (blood vessels). A red blood cell protein is called **hemoglobin** and helps move oxygen from alveoli (air sacs) to the blood capillaries.

At the same time, **carbon dioxide** moves from the capillaries into the alveoli (air sacs). At this point, the gas has traveled into the bloodstream *from the right side of the heart through the **pulmonary artery***.

Oxygen-rich blood from the lungs is carried through a network of **capillaries** to the **pulmonary vein**. This vein delivers the oxygen-rich blood to the *left side of the heart*. The left side of the heart pumps blood to the rest of the body. There, the oxygen in the blood moves from blood vessels into surrounding tissues.

Breathing Out (Exhalation)

When you breathe out, or exhale, your diaphragm relaxes and moves upward into the chest cavity. The intercostal muscles between the ribs also relax to reduce the space in the chest cavity.

As the space in the chest cavity gets smaller, air rich in carbon dioxide is forced out of your lungs and windpipe, and then out of your nose or mouth.

Breathing out requires no effort from your body unless you have a lung disease or are doing physical activity. When you're physically active, your abdominal muscles contract and push your diaphragm against your lungs even more than usual. This rapidly pushes air out of your lungs.

Medical treatment for the patient with angina includes risk factor modification, consumption of a diet low in saturated fats and cholesterol, and administration of pharmacological agents. Medications commonly used to treat chest pain or heart attacks include drugs that decrease cholesterol levels, alter platelet aggregation, enhance the supply of oxygenated blood to the heart, or decrease the heart's need for oxygenated blood. Additionally, the person experiencing an acute anginal attack or a heart attack may also receive supplemental oxygen. Thrombolytic medications may be used to treat a patient experiencing a attack, as they may dissolve the blood clot, thus restoring blood flow to the heart.

The blood flow to the heart may also be restored surgically through the use of a common procedure known as coronary artery bypass grafting (CABG). This procedure bypasses the obstructed coronary artery or arteries, thus restoring the flow of oxygenated blood to the heart. Women have poorer surgical outcomes after coronary bypass surgery than men. Specifically, women have a higher relative risk of mortality associated with CABG, longer intensive care unit stays, and more postoperative complications than men.

Nonsurgical revascularization techniques, such as percutaneous transluminal angioplasty, transmyocardial laser revascularization, or the placement of stents in the coronary arteries, are techniques to restore the flow of oxygenated blood to the heart. Percutaneous transluminal angioplasty involves the insertion of a balloon-tipped catheter into the coronary artery, and inflating the balloon at the location of the vessel obstruction. The balloon widens the blood vessel, restoring blood flow through the obstructed vessel. A wire mesh stent may be inserted into the coronary artery and placed at the location of the obstruction. The stent provides an artificial opening in the blood vessel, which helps to maintain the flow of oxygenated blood to the heart. Transmyocardial laser revascularization is a procedure that uses a laser to create

channels in the heart to allow oxygenated blood to reach the heart, and is generally used when other techniques have failed.

Research into the efficacy of cardiac gene therapy is being studied to determine how to eliminate heart disease by replacing malfunctioning or missing genes with normal or modified genes. Gene therapy may be used to stimulate the growth of new blood vessels, prevent cell death, or enhance functioning of genes.

Hypertension is initially treated by behavioral and lifestyle modifications. If these modifications do not successfully manage the individual's hypertension, pharmacological agents are added. The lifestyle modifications recommended to control hypertension include diet, exercise, and weight reduction for the overweight individual. The recommended dietary modifications include increasing consumption of fruits, vegetables, low-fat dairy products, and other foods that are low in saturated fat, total fat, and cholesterol. Furthermore, the individual with hypertension is advised to decrease intake of foods high in fat, red meats, sweets, and sugared beverages. It is advisable for hypertensive individuals to decrease their intake of sodium to less than 1,500 mg/day. Not adding table salt to foods and avoiding obviously salty foods may accomplish this restriction. Doctors suggest that hypertensive individuals limit their consumption of alcohol to one to two drinks per day, and decrease or stop smoking. Smoking causes hardening of the arteries, which may increase blood pressure.

Various classes of pharmacological agents may be used to treat hypertension. They include drugs that relax the blood vessels, causing vasodilation, thus decreasing blood pressure, such as angiotensin converting enzyme inhibitors, calcium channel blockers, angiotensin antagonists, and vasodilators. Drugs such as alpha- and beta-blockers decrease nerve impulses to blood vessels, and decrease the heart rate, slowing blood flow through the arteries, resulting in a decreased blood pressure. Diuretics may also be used to manage hypertension. They work by flushing excess water and sodium from the body, causing a decrease in blood pressure.

Reoccurrence

Coronary artery disease and hypertension are both chronic diseases that require lifelong treatment. Frequently, interventional cardiology techniques and surgical procedures produce palliative rather than curative results. For example, percutaneous transluminal angioplasty fails in six months in approximately 30 to 60 percent of the cases, resulting in restenosis of the blood vessel. Additionally, 50 percent of the grafts of patients who have undergone coronary artery bypass surgery reocclude within five years. Once this has occurred, the patient may be required to undergo additional procedures or surgery.

Individuals who have experienced a heart attack are at a significantly greater risk for future cardiovascular morbidity and mortality. The death rates for people after experiencing a heart attack are significantly higher than the general public. Twenty-five percent of males and 38 percent of females will die within one year of experiencing a heart attack. Additionally, morbidity from cardiovascular disease is higher in individuals who have previously experienced a heart attack. Two-thirds of all heart attack patients do not make a full recovery. CVD is

progressive: Twenty-two percent of males and 46 percent of females who previously experienced a heart attack are disabled with heart failure within six years.

Hypertension increases the rate of atherosclerosis, resulting in common complications such as hypertensive heart disease, cerebrovascular disease, peripheral vascular disease, nephrosclerosis, and retinal damage. Uncontrolled hypertension is strongly correlated with the development of coronary artery disease, enlargement of the left ventricle, and heart failure. Additionally, hypertension is a major risk factor for the development of stroke and end stage renal disease.

See also: Causes of Death; Nutrition and Exercise

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Chapter 6 - Coronary Artery Disease

Definition

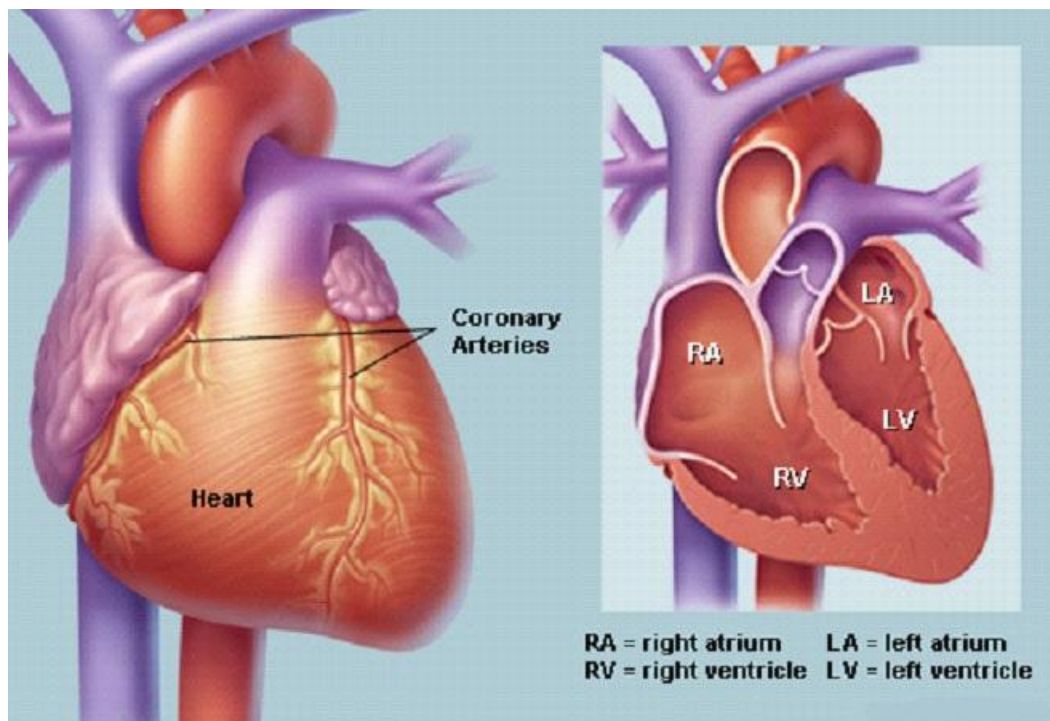
Coronary artery disease is a narrowing or blockage of the arteries and vessels that provide oxygen and nutrients to the heart. It is caused by **atherosclerosis**, an accumulation of fatty materials on the inner linings of arteries. The resulting blockage restricts blood flow to the heart. When the blood flow is completely cut off, the result is a **heart attack**.

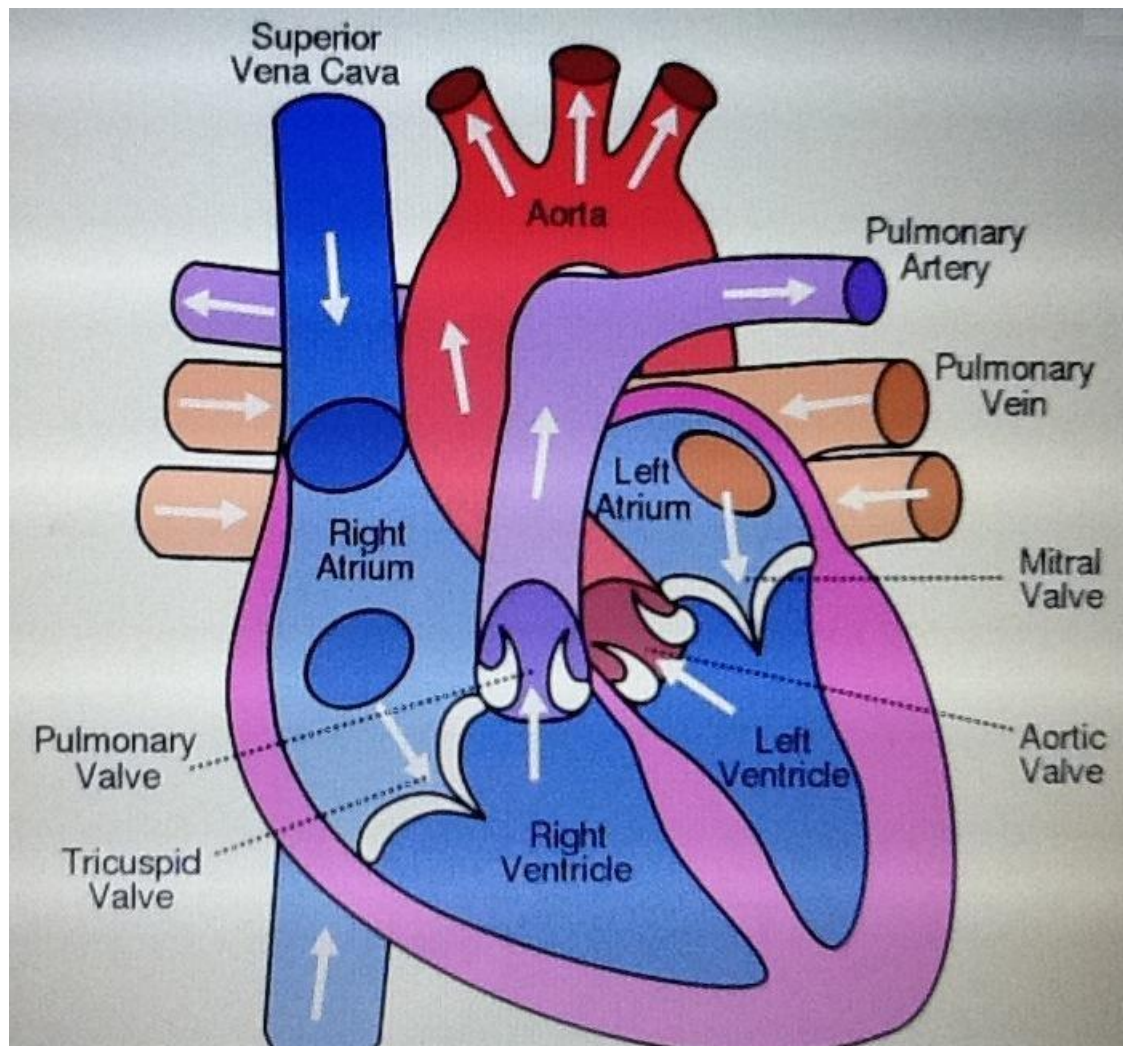
Description

Coronary artery disease, also called coronary heart disease or heart disease, is the leading cause of **death** for both men and women in the [United States](#). According to the American Heart Association, deaths from coronary artery disease have declined some since about 1990, but more than 40,000 people still died from the disease in 2000. About 13 million Americans have active symptoms of coronary artery disease.

Coronary artery disease occurs when the coronary arteries become partially blocked or clogged. This blockage limits the flow of blood from the coronary arteries, which are the major arteries supplying oxygen-rich blood to the heart. The coronary arteries expand when the heart is working harder and needs more oxygen. Arteries expand, for example, when a person is climbing stairs, exercising, or having sex. If the arteries are unable to expand, the heart is deprived of oxygen (myocardial **ischemia**). When the blockage is limited, chest **pain** or pressure, called **angina**, may occur. When the blockage cuts off the flow of blood, the result is heart attack (myocardial infarction or heart muscle death).

Healthy coronary arteries are clean, smooth, and slick. The artery walls are flexible and can expand to let more blood through when the heart needs to work harder. The disease process in arteries is thought to begin with an injury to the linings and walls of the arteries. This injury makes them susceptible to atherosclerosis and **blood clots** (thrombosis).





Causes and symptoms

Coronary artery disease is usually caused by atherosclerosis. Cholesterol and other fatty substances accumulate on the inner wall of the arteries. They attract fibrous tissue, blood components, and calcium, and harden into artery-clogging plaques. Atherosclerotic plaques often form blood clots that also can block the coronary arteries (coronary thrombosis). Congenital defects and **muscle spasms** can also block blood flow. Recent research indicates that infection from organisms such as chlamydia bacteria may be responsible for some cases of coronary artery disease.

A number of major contributing factors increase the risk of developing coronary artery disease. Some of these can be changed and some cannot. People with more risk factors are more likely to develop coronary artery disease.

Major risk factors

Major risk factors significantly increase the chance of developing coronary artery disease. Those that cannot be changed are:

- Heredity—People whose parents have coronary artery disease are more likely to develop it. African Americans also are at increased risk because they experience a higher rate of severe hypertension than whites.
- Sex—Men are more likely to have heart attacks than women and to have them at a younger age. Over age 60, however, women have coronary artery disease at a rate equal to that of men.
- Age—Men who are 45 years of age and older and women who are 55 years of age and older are more likely to have coronary artery disease. Occasionally, coronary disease may strike a person in the 30s. Older people (those over 65) are more likely to die of a heart attack. Older women are twice as likely as older men to die within a few weeks of a heart attack.

Major risk factors that can be changed are:

- Smoking—Smoking increases both the chance of developing coronary artery disease and the chance of dying from it. Smokers are two to four times more likely than are non-smokers to die of sudden heart attack. They are more than twice as likely as non-smokers to have a heart attack. They also are more likely to die within an hour of a heart attack. Second hand smoke also may increase risk.
- High cholesterol—Dietary sources of cholesterol are meat, eggs, and other animal products. The body also produces it. Age, sex, heredity, and diet affect one's blood cholesterol. Total blood cholesterol is considered high at levels above 240 mg/dL and borderline at 200-239 mg/dL. High-risk levels of low-density lipoprotein (LDL cholesterol) begin at 130-159 mg/dL, depending on other risk factors. Risk of developing coronary artery disease increases steadily as blood cholesterol levels increase above 160 mg/dL. When a person has other risk factors, the risk multiplies.
- High blood pressure—High blood pressure makes the heart work harder and weakens it over time. It increases the risk of heart attack, **stroke**, kidney failure, and congestive **heart failure**. A blood pressure of 140 over 90 or above is considered high. As the numbers rise, high blood pressure goes from Stage 1 (mild) to Stage 4 (very severe). In combination with **obesity, smoking, high cholesterol**, or diabetes, high blood pressure raises the risk of heart attack or stroke several times.
- Lack of physical activity—Lack of **exercise** increases the risk of coronary artery disease. Even modest physical activity, like walking, is beneficial if done regularly.
- Diabetes mellitus—The risk of developing coronary artery disease is seriously increased for diabetics. More than 80% of diabetics die of some type of heart or blood vessel disease.

Contributing risk factors

Contributing risk factors have been linked to coronary artery disease, but the degree of their significance is not known yet. Contributing risk factors are:

- Hormone replacement therapy—Evidence from a large trial called the Women's Health Initiative released in 2002 and 2003 found that **hormone replacement therapy** is a risk factor for coronary artery disease in postmenopausal women. The therapy was once thought to help protect women

against heart disease, but in the trial, it was discovered that it was harmful to women with existing coronary artery disease.

- **Obesity**—Excess weight increases the strain on the heart and increases the risk of developing coronary artery disease even if no other risk factors are present. Obesity increases blood pressure and blood cholesterol and can lead to diabetes.
- **Stress and anger**—Some scientists believe that stress and anger can contribute to the development of coronary artery disease and increase the blood's tendency to form clots (thrombosis). Stress, the mental and physical reaction to life's irritations and challenges, increases the heart rate and blood pressure and can injure the lining of the arteries. Evidence shows that anger increases the risk of dying from heart disease. The risk of heart attack is more than double after an episode of anger.

Chest pain (angina) is the main symptom of coronary heart disease but it is not always present. Other symptoms include **shortness of breath**, and chest heaviness, tightness, pain, a burning sensation, squeezing, or pressure either behind the breastbone or in the arms, neck, or jaws. Many people have no symptoms of coronary artery disease before having a heart attack; 63% of women and 48% of men who died suddenly of coronary artery disease had no previous symptoms of the disease, according to the American Heart Association.

Diagnosis

Diagnosis begins with a visit to the physician, who will take a medical history, discuss symptoms, listen to the heart, and perform basic screening tests. These tests will measure weight, blood pressure, blood lipid levels, and **fasting** blood glucose levels. Other diagnostic tests include resting and exercise electrocardiogram, **echocardiography**, radionuclide scans, and coronary **angiography**. The treadmill exercise (stress) test is an appropriate screening test for those with high risk factors even when they feel well.

An electrocardiogram (ECG) shows the heart's activity and may reveal a lack of oxygen (ischemia). Electrodes covered with conducting jelly are placed on the patient's chest, arms, and legs. They send impulses of the heart's activity through an oscilloscope (a monitor) to a recorder that traces them on paper. The test takes about 10 minutes and is performed in a physician's office. A definite diagnosis cannot be made from electrocardiography. About 50% of patients with significant coronary artery disease have normal resting electrocardiograms. Another type of electrocardiogram, known as the exercise **stress test**, measures how the heart and blood vessels respond to exertion when the patient is exercising on a treadmill or a stationary bike. This test is performed in a physician's office or an exercise laboratory. It takes 15-30 minutes. It is not perfectly accurate. It sometimes gives a normal reading when the patient has a heart problem or an abnormal reading when the patient does not.

If the electrocardiogram reveals a problem or is inconclusive, the next step is exercise echocardiography or nuclear scanning (angiography). Echocardiography, cardiac ultrasound, uses sound waves to create an image of the heart's chambers and valves. A technologist applies gel to a hand-held transducer, then presses it against the patient's chest. The heart's sound waves are converted into an image that can be displayed on a monitor. It does not reveal the coronary arteries themselves, but can detect abnormalities in heart wall motion caused by coronary disease. Performed in a cardiology outpatient diagnostic laboratory, the test takes 30-60 minutes.

Radionuclide angiography enables physicians to see the blood flow of the coronary arteries. Nuclear scans are performed by injecting a small amount of radiopharmaceutical such as thallium into the bloodstream. A device that uses gamma rays to produce an image of the radioactive material (gamma camera) records pictures of the heart. Radionuclide scans are not dangerous. The radiation exposure is about the same as that in a chest x ray. The tiny amount of radioactive material used disappears from the body in a few days. Radionuclide scans cost about four times as much as exercise stress tests but provide more information.

In radionuclide angiography, a scanning camera passes back and forth over the patient who lies on a table. Radionuclide angiography is usually performed in a hospital's nuclear medicine department and takes 30-60 minutes. Thallium scanning usually is done in conjunction with an exercise stress test. When the stress test is finished, thallium or sestamibi is injected. The patient resumes exercise for one minute to absorb the thallium. For patients who cannot exercise, cardiac blood flow and heart rate may be increased by intravenous dipyridamole (Persantine) or adenosine. Thallium scanning is done twice, immediately after injecting the radiopharmaceutical and again four hours (and maybe 24 hours) later. It is usually performed in a hospital's nuclear medicine department. Each scan takes 30-60 minutes.

Coronary angiography is the most accurate method for making a diagnosis of coronary artery disease, but it also is the most invasive. It is a form of cardiac catheterization that shows the heart's chambers, great vessels, and coronary arteries using x-ray technology. During coronary angiography the patient is awake but sedated. ECG electrodes are placed on the patient's chest and an intravenous line is inserted. A local anesthetic is injected into the site where the catheter will be inserted. The cardiologist inserts a catheter into a blood vessel and guides it into the heart. A contrast dye is injected to make the heart visible on x-ray cinematography. Coronary angiography is performed in a **cardiac catheterization** laboratory either in an outpatient or inpatient surgery unit. It takes from 30 minutes to two hours.

Treatment

Coronary artery disease can be treated many ways. The choice of treatment depends on the severity of the disease. Treatments include lifestyle changes and drug therapy, percutaneous transluminal coronary **angioplasty**, and coronary artery bypass surgery. Coronary artery disease is a chronic disease requiring lifelong care. Angioplasty or bypass surgery is not a cure.

People with less severe coronary artery disease may gain adequate control through lifestyle changes and drug therapy. Many of the lifestyle changes that prevent disease progression—a low-fat, low-cholesterol diet, weight loss if needed, exercise, and not smoking—also help prevent the disease from developing.

Drugs such as nitrates, beta-blockers, and calcium-channel blockers relieve chest pain and complications of coronary artery disease, but they cannot clear blocked arteries. Nitrates (nitroglycerin) improve blood flow to the heart. Beta-blockers (acebutolol, propranolol) reduce the amount of oxygen required by the heart during stress. One type of calcium-channel blocker (verapamil, diltiazem hydrochloride) helps keep the arteries open and reduces blood pressure.

Aspirin helps prevent blood clots from forming on plaques, reducing the likelihood of a heart attack. Cholesterol-lowering medications are also indicated in most cases.

Percutaneous transluminal coronary angioplasty and bypass surgery are procedures that enter the body (invasive procedures) to improve blood flow in the coronary arteries. Percutaneous transluminal coronary angioplasty, usually called coronary angioplasty, is a non-surgical procedure. A catheter tipped with a balloon is threaded from a blood vessel in the thigh into the blocked artery. The balloon is inflated, compressing the plaque to enlarge the blood vessel and open the blocked artery. The balloon is deflated, and the catheter is removed. Coronary angioplasty is performed in a hospital and generally requires a stay of one or two days. Coronary angioplasty is successful about 90% of the time, but for one-third of patients, the artery narrows again within six months. The procedure can be repeated. It is less invasive and less expensive than coronary artery bypass surgery.

In coronary artery bypass surgery, a healthy artery or vein from an arm, leg, or chest wall is used to build a detour around the coronary artery blockage. The healthy vessel then supplies oxygen-rich blood to the heart. Bypass surgery is major surgery. It is appropriate for those patients with blockages in two or three major coronary arteries, those with severely narrowed left main coronary arteries, and those who have not responded to other treatments. It is performed in a hospital under **general anesthesia**. A heart-lung machine is used to support the patient while the healthy vein or artery is attached past the blockage to the coronary artery. About 70% of patients who have bypass surgery experience full relief from angina; about 20% experience partial relief. Only about 3-4% of patients per year experience a return of symptoms. Survival rates after bypass surgery decrease over time. At five years after surgery, survival expectancy is 90%; at 10 years about 80%, at 15 years about 55%, and at 20 years about 40%.

Various semi-experimental surgical procedures for unblocking coronary arteries are currently being studied. **Atherectomy** is a procedure in which the surgeon shaves off and removes strips of plaque from the blocked artery. In laser angioplasty, a catheter with a laser tip is inserted into the affected artery to burn or break down the plaque. A metal coil called a stent can be implanted permanently to keep a blocked artery open. Stenting is becoming more common.

Alternative treatment

Natural therapies may reduce the risk of certain types of heart disease, but once symptoms appear, conventional medical attention is necessary. A healthy diet (including cold-water fish as a source of essential fatty acids) and exercise, important components of conventional prevention and treatment strategies, also are emphasized in alternative approaches to coronary artery disease. Herbal medicine offers a variety of remedies that may have a beneficial effect on coronary artery disease. For example, ginger (*Zingiber officinale*) may help reduce cholesterol. Garlic (*Allium sativum*), ginger, and hot red or chili peppers all are circulatory enhancers that can help prevent blood clots. **Yoga** and other bodywork, massage, relaxation therapies, and talking therapies also may help prevent coronary artery disease and stop, or even reverse, the progression of atherosclerosis. Vitamin and mineral therapy to reduce, reverse, or protect against coronary artery disease include chromium; calcium and magnesium; B-complex **vitamins**; the antioxidant vitamins C and E; selenium; and zinc. **Traditional Chinese medicine** may

recommend herbal remedies, massage, acupuncture, and dietary modification. However, studies released in 2003 showed that vitamins C and E fell short of claims that they helped narrow blockage caused by coronary artery disease. In fact, high doses of the vitamins should be avoided.

Prognosis

In many cases, coronary artery disease can be successfully treated. Advances in medicine and healthier lifestyles have caused a substantial decline in death rates from coronary artery disease since the mid-1980s. New diagnostic techniques enable doctors to identify and treat coronary artery disease in its earliest stages. New technologies and surgical procedures have extended the lives of many patients who would otherwise have died. Research on coronary artery disease continues.

Prevention

A healthy lifestyle can help prevent coronary artery disease and help keep it from progressing. A heart-healthy lifestyle includes eating right, regular exercise, maintaining a healthy weight, no smoking, moderate drinking, no recreational drugs, controlling **hypertension**, and managing stress. **Cardiac rehabilitation** programs are excellent to help prevent recurring coronary problems for people who are at risk and who have had coronary events and procedures.

Eating right

A healthy diet includes a variety of foods that are low in fat, especially saturated fat, low in cholesterol, and high in fiber. It includes plenty of fruits and vegetables, nuts and whole grains, and limited sodium. Some foods are low in fat but high in cholesterol and some are low in cholesterol but high in fat. Saturated fat raises cholesterol and, in excessive amounts, increases the amount of the clot-forming proteins in blood. Polyunsaturated and monounsaturated fats are good for the heart. Fat should comprise no more than 30% of total daily calories.

Cholesterol, a waxy substance containing fats, is found in foods such as meat, eggs, and other animal products. It also is produced in the liver. Soluble fiber can help lower cholesterol. Dietary cholesterol should be limited to about 300 milligrams per day. Many popular lipid-lowering drugs can reduce LDL cholesterol by an average of 25-30% when used with a low-fat, low-cholesterol diet.

Fruits and vegetables are rich in fiber, vitamins, and **minerals**. They are low calorie and nearly fat free. Vitamin C and beta-carotene, found in many fruits and vegetables, keep LDL cholesterol from turning into a form that damages coronary arteries.

Excess sodium can increase the risk of high blood pressure. Many processed foods contain large amounts of sodium. Daily intake should be limited to about 2,400 milligrams, about the amount in a teaspoon of salt.

The "Food Guide" Pyramid developed by the U.S. Departments of Agriculture and Health and Human Services provides easy-to-follow guidelines for daily heart-healthy eating. It recommends 6 to 11 servings of bread, cereal, rice, and pasta; three to five servings of vegetables; two to four servings of fruit; two to three servings of milk, yogurt, and cheese; and two to three servings of meat, poultry, fish, dry beans, eggs, and nuts. Fats, oils, and sweets should be used sparingly. Canola and olive oil are better for the heart than other cooking oils. Coronary patients should be on a strict diet. In 2003, the American Heart Association advised a diet rich in fatty fish such as salmon, herring, trout, or sardines. If people cannot eat daily servings of these fish, the association recommends three fish oil capsules per day.

Regular exercise

Aerobic exercise can lower blood pressure, help control weight, and increase HDL ("good") cholesterol. It may keep the blood vessels more flexible. The Centers for Disease Control and Prevention and the American College of Sports Medicine recommend moderate to intense aerobic exercise lasting about 30 minutes four or more times per week for maximum heart health. Three 10-minute exercise periods also are beneficial. Aerobic exercise—activities such as walking, jogging, and cycling—uses the large muscle groups and forces the body to use oxygen more efficiently. It also can include everyday activities such as active gardening, climbing stairs, or brisk housework. People with coronary artery disease or risk factors should consult a doctor before beginning an exercise program.

Maintaining a desirable body weight

About one-fourth of all Americans are overweight and nearly one-tenth are obese, according to the Surgeon General's Report on **Nutrition** and Health. People who are 20% or more over their ideal body weight have an increased risk of developing coronary artery disease. Losing weight can help reduce total and LDL cholesterol, reduce triglycerides, and boost HDL cholesterol. It also may reduce blood pressure. Eating right and exercising are two key components of losing weight.

Avoiding recreational drugs

Smoking has many adverse effects on the heart. It increases the heart rate, constricts major arteries, and can create irregular heartbeats. It raises blood pressure, contributes to the development of plaque, increases the formation of blood clots, and causes blood platelets to cluster and impede blood flow. Heart damage caused by smoking can be repaired by quitting. Even heavy smokers can return to heart health. Several studies have shown that ex-smokers face the same risk of heart disease as non-smokers within five to 10 years after quitting.

Drink in moderation. Modest consumption of alcohol may actually protect against coronary artery disease because alcohol appears to raise levels of HDL cholesterol. The American Heart Association defines moderate consumption as one ounce of alcohol per day, roughly one cocktail, one 8-ounce glass of wine, or two 12-ounce glasses of beer. However, even moderate

drinking can increase risk factors for heart disease for some people (by raising blood pressure, for example). Excessive drinking always is bad for the heart. It usually raises blood pressure and can poison the heart and cause abnormal heart rhythms or even heart failure.

Do not use other recreational drugs. Commonly used recreational drugs, particularly cocaine and "crack," can seriously harm the heart and should never be used.

Seeking treatment for hypertension

High blood pressure, one of the most common and serious risk factors for coronary artery disease, can be controlled completely through lifestyle changes and medication. Moderate hypertension can be controlled by reducing dietary intake of sodium and fat, exercising regularly, managing stress, abstaining from smoking, and drinking alcohol in moderation. People for whom these changes do not work or people with severe hypertension may be helped by many categories of medication.

KEY TERMS

Atherosclerosis— A process in which the walls of the coronary arteries thicken due to the accumulation of plaque in the blood vessels. Atherosclerosis is the cause of coronary artery disease.

Angina— Chest pain that happens when diseased blood vessels restrict the flow of blood to the heart. Angina often is the first symptom of coronary artery disease.

Beta-blocker— A drug that blocks some of the effects of fight-or-flight hormone adrenaline (epinephrine and norepinephrine), slowing the heart rate and lowering the blood pressure.

Calcium-channel blocker— A drug that blocks the entry of calcium into the muscle cells of small blood vessels (arterioles) and keeps them from narrowing.

Coronary arteries— The main arteries that provide blood to the heart. The coronary arteries surround the heart like a crown, coming out of the aorta, arching down over the top of the heart, and dividing into two branches. These are the arteries in which coronary artery disease occurs.

HDL cholesterol— High-density lipoprotein cholesterol is a component of cholesterol that helps protect against heart disease. HDL is nicknamed "good" cholesterol

LDL cholesterol— Low-density lipoprotein cholesterol is the primary cholesterol molecule. High levels of LDL increase the risk of coronary heart disease. LDL is nicknamed "bad" cholesterol.

Plaque— A deposit of fatty and other substances that accumulate in the lining of the artery wall.

Triglyceride— A fat that comes from food or is made from other energy sources in the body. Elevated triglyceride levels contribute to the development of atherosclerosis.

Managing stress

Everyone experiences stress. Stress sometimes can be avoided and when it is inevitable, it can be controlled. It is particularly important for those at risk for heart disease. A 2003 report showed that middle-aged men with high **anxiety** were less likely to adhere to heart healthy lifestyle practices. Techniques for controlling stress include: taking life more slowly, spending more time with family and friends, thinking positively, getting enough sleep, exercising, and practicing relaxation techniques.

Resources

BOOKS

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Texas Heart Institute. "Coronary Artery Disease, Angina, and Heart Attacks." In *Texas Heart Institute Heart Owner's Handbook*. New York: JohnWiley & Sons, 1996.

PERIODICALS

"For Fighting Heart Disease, Vitamins C and E Fall Short." *Tufts University Health and Nutrition Newsletter* January 2003: 2.

Jancin, Bruce. "High Anxiety Level Predicts Heart-unhealthy Lifestyle." *Internal Medicine News* March 15, 2003: 25.

"Optimal Diets for Prevention of CHD." *Clinical Cardiology Alert* February 2003.

Wellbery, Caroline. "No HRT or Antioxidants in Women with Coronary Disease." *American Family Physician* March 15, 2003: 1371.

Zoler, Michael L. "Heart Association Advocates Fish Oil Supplements." *Family Practice News* January 15, 2003: 6.

ORGANIZATIONS

American Heart Association. 7320 Greenville Ave, [Dallas](#), TX 75231. (214) 373-6300. (<http://www.americanheart.org>).

National Heart, Lung and Blood Institute. P.O. Box 30105, Bethesda, MD 20824-0105. (301) 251-1222. <http://www.nhlbi.nih.gov>.

Texas Heart Institute. Heart Information Service. P.O. Box 20345, [Houston](#), TX 77225-0345. <http://www.tmc.edu/thi>.

Chapter 7 – Urologic Medicine

Urinalysis is a test that evaluates a sample of your urine. **Urinalysis** is used to detect and assess a wide range of disorders, such as urinary tract infection, kidney disease and diabetes. **Urinalysis** involves examining the appearance, concentration and content of urine.

How is it used?

The urinalysis is a set of screening tests that can detect some common diseases. It may be used to screen for and/or help diagnose conditions such as a urinary tract infections, kidney disorders, liver problems, diabetes or other metabolic conditions, to name a few.

A urinalysis is comprised of several chemical, microscopic and visual examinations used to detect cells, cell fragments and substances such as crystals or casts in the urine associated with the various conditions listed above. It can detect abnormalities that might require follow-up investigation and additional testing. Often, substances such as protein or glucose will begin to appear in the urine before people are aware that they may have a problem.

In people diagnosed with acute or chronic conditions, such as kidney disease or diabetes, the urinalysis may be used in conjunction with other tests, such as urine albumin, to follow treatment.

TESTING AND READING TIME

Rev.08/2010

Leukocytes 120s	Neg.			Trace 15	Small 70	Moderate 125	Large 500	cells/ μ l
Nitrite 60s	Neg.				Positive Any degree of uniform pink color			
Urobilinogen 60s	3.2	Normal	16		32 +	64 ++	128 +++	μ mol/l
Protein 60s	Neg.		Trace $\pm$	0.3 +	1.0 ++	3.0 +++	≥ 20.0 ++++	g/l
pH 60s	5.0	6.0	6.5	7.0	7.5	8.0	8.5	
Blood 60s	Neg.	Non hemolyzed 10Trace		Hemolyzed 10Trace	25 Small	80 Moderate	200 Large	cells/ μ l
Specific Gravity 45s	1.000	1.005	1.010	1.015	1.020	1.025	1.030	
Ascorbate 40s	0			0.6	1.4	2.8	5.0	mmol/l
Ketone 40s	Neg.		Trace 0.5	Small 1.5	Moderate 4.0	8.0	Large 16	mmol/l
Bilirubin 30s	Neg.				Small 17	Moderate 50	Large 100	μ mol/l
Glucose 30s	Neg.		5 Trace	15 +	30 ++	60 +++	110 ++++	mmol/l
Micro Albumin 30s	Neg.		0.15					g/l

When is it ordered?

A urinalysis may sometimes be ordered when a person has a routine wellness exam, is admitted to the hospital, or will undergo surgery, or when a woman has a pregnancy checkup.

A urinalysis will likely be ordered when a person sees a healthcare practitioner complaining of symptoms of a urinary tract infection or other urinary system problem, such as kidney disease. Some signs and symptoms may include:

- Abdominal pain
- Back pain

- Painful or frequent urination
- Blood in the urine

Testing may also be ordered at regular intervals when monitoring certain conditions over time.

What does the test result mean?

Urinalysis results can have many interpretations. Abnormal findings are a warning that something may be wrong and should be evaluated further. A healthcare practitioner must correlate the urinalysis results with a person's symptoms and clinical findings and search for the causes of abnormal findings with other targeted tests, such as a comprehensive metabolic panel (CMP), complete blood count (CBC), renal panel, liver panel, or urine culture (for urinary tract infection).

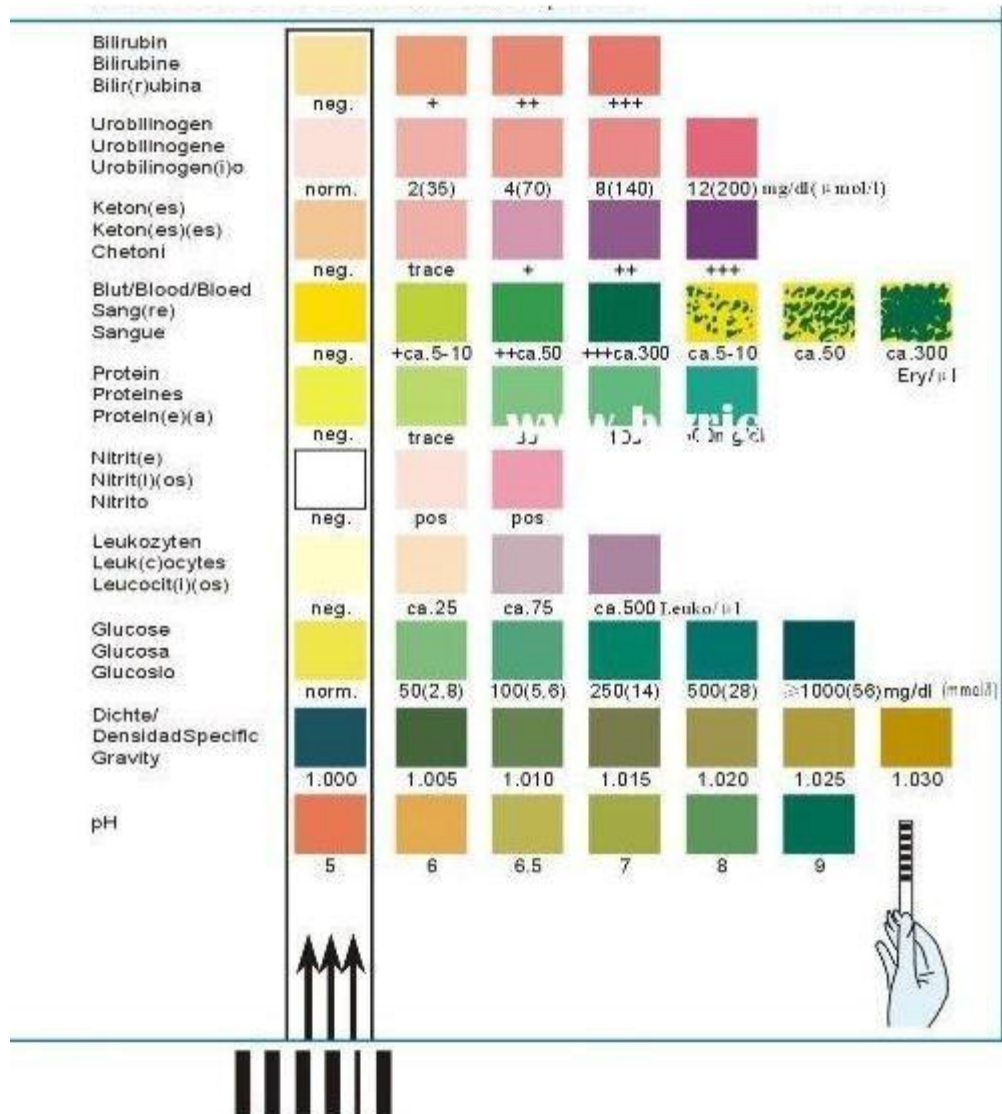
Generally, the greater the concentration of the atypical substance, such as greatly increased amounts of glucose, protein, or red blood cells, the more likely it is that there is a problem that needs to be addressed. However, the results do not tell the healthcare practitioner exactly what the cause of the finding is or whether it is a temporary or chronic condition.

A normal urinalysis does not guarantee that there is no illness. Some people will not release elevated amounts of a substance early in a disease process, and some will release them sporadically during the day, which means that they may be missed by a single urine sample. In very dilute urine, small quantities of chemicals may be undetectable.

For additional details on what specific results may mean, click on the links below:

- Visual examination
- Chemical examination
- Microscopic examination

Reagent Strips For Urinalysis



To see an example of a urinalysis lab report, see this [sample report](#).

Is there anything else I should know?

There are many factors that can affect or interfere with the tests that comprise a urinalysis. If instructed to do so, it is important to follow the directions carefully for a "clean-catch" sample. Give a complete history to your healthcare practitioner, including any prescribed or over-the-counter medications or supplements you may be taking. If you are a woman, be sure to tell your healthcare practitioner whether you are menstruating.

What is urinary retention?

Urinary retention is the inability to empty the bladder completely. Urinary retention can be acute or chronic. Acute urinary retention happens suddenly and lasts only a short time. People with acute urinary retention cannot urinate at all, even though they have a full bladder. Acute urinary retention, a potentially life-threatening medical condition, requires immediate emergency treatment. Acute urinary retention can cause great discomfort or pain.

Chronic urinary retention can be a long-lasting medical condition. People with chronic urinary retention can urinate. However, they do not completely empty all of the urine from their bladders. Often people are not even aware they have this condition until they develop another problem, such as urinary incontinence—loss of bladder control, resulting in the accidental loss of urine—or a urinary tract infection (UTI), an illness caused by harmful bacteria growing in the urinary tract.

What is the urinary tract and how does it work?

The urinary tract is the body's drainage system for removing urine, which is composed of wastes and extra fluid. In order for normal urination to occur, all body parts in the urinary tract need to work together in the correct order.

Kidneys. The kidneys are two bean-shaped organs, each about the size of a fist. They are located just below the rib cage, one on each side of the spine. Every day, the kidneys filter about 120 to 150 quarts of blood to produce about 1 to 2 quarts of urine. The kidneys work around the clock; a person does not control what they do.

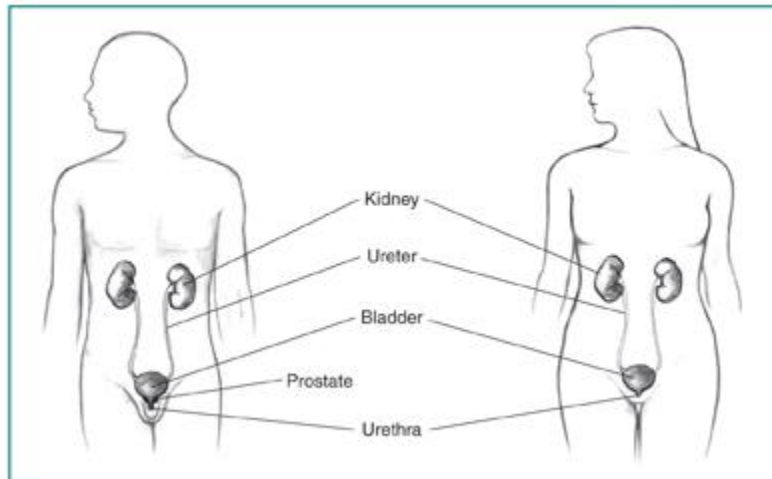
Ureters. Ureters are the thin tubes of muscle—one on each side of the bladder—that carry urine from each of the kidneys to the bladder.

Bladder. The bladder, located in the pelvis between the pelvic bones, is a hollow, muscular, balloon-shaped organ that expands as it fills with urine. Although a person does not control kidney function, a person does control when the bladder empties. Bladder emptying is known as urination. The bladder stores urine until the person finds an appropriate time and place to urinate. A normal bladder acts like a reservoir and can hold 1.5 to 2 cups of urine. How often a person needs to urinate depends on how quickly the kidneys produce the urine that fills the bladder. The muscles of the bladder wall remain relaxed while the bladder fills with urine. As the bladder fills to capacity, signals sent to the brain tell a person to find a toilet soon. During urination, the bladder empties through the urethra, located at the bottom of the bladder.

Three sets of muscles work together like a dam, keeping urine in the bladder.

The first set is the muscles of the urethra itself. The area where the urethra joins the bladder is the bladder neck. The bladder neck, composed of the second set of muscles known as the internal sphincter, helps urine stay in the bladder. The third set of muscles is the pelvic floor muscles, also referred to as the external sphincter, which surround and support the urethra.

To urinate, the brain signals the muscular bladder wall to tighten, squeezing urine out of the bladder. At the same time, the brain signals the sphincters to relax. As the sphincters relax, urine exits the bladder through the urethra.



Male and female urinary tracts

What causes urinary retention?

Urinary retention can result from

- obstruction of the urethra
- nerve problems
- medications
- weakened bladder muscles

Obstruction of the Urethra

Obstruction of the urethra causes urinary retention by blocking the normal urine flow out of the body. Conditions such as benign prostatic hyperplasia—also called BPH—urethral stricture, urinary tract stones, cystocele, rectocele, constipation, and certain tumors and cancers can cause an obstruction.

Benign prostatic hyperplasia. For men in their 50s and 60s, urinary retention is often caused by prostate enlargement due to benign prostatic hyperplasia. Benign prostatic hyperplasia is a medical condition in which the prostate gland is enlarged and not cancerous. The prostate is a walnut-shaped gland that is part of the male reproductive system. The gland surrounds the urethra at the neck of the bladder. The bladder neck is the area where the urethra joins the bladder. The prostate goes through two main periods of growth. The first occurs early in puberty, when the prostate doubles in size. The second phase of growth begins around age 25 and continues during most of a man's life. Benign prostatic hyperplasia often occurs with the second phase of growth.

As the prostate enlarges, the gland presses against and pinches the urethra. The bladder wall becomes thicker. Eventually, the bladder may weaken and lose the ability to empty completely, leaving some urine in the bladder.

More information is provided in the NIDDK health topic, [Prostate Enlargement: Benign Prostatic Hyperplasia](#).

Urethral stricture. A urethral stricture is a narrowing or closure of the urethra. Causes of urethral stricture include inflammation and scar tissue from surgery, disease, recurring UTIs, or injury. In men, a urethral stricture may result from prostatitis, scarring after an injury to the penis or perineum, or surgery for benign prostatic hyperplasia and prostate cancer. Prostatitis is a frequently painful condition that involves inflammation of the prostate and sometimes the areas around the prostate. The perineum is the area

between the anus and the sex organs. Since men have a longer urethra than women, urethral stricture is more common in men than women.¹

More information is provided in the NIDDK health topic, Prostatitis: Inflammation of the Prostate.

Surgery to correct pelvic organ prolapse, such as cystocele and rectocele, and urinary incontinence can also cause urethral stricture. The urethral stricture often gets better a few weeks after surgery.

Urethral stricture and acute or chronic urinary retention may occur when the muscles surrounding the urethra do not relax. This condition happens mostly in women.

Urinary tract stones. Urinary tract stones develop from crystals that form in the urine and build up on the inner surfaces of the kidneys, ureters, or bladder. The stones formed or lodged in the bladder may block the opening to the urethra.

Cystocele. A cystocele is a bulging of the bladder into the vagina. A cystocele occurs when the muscles and supportive tissues between a woman's bladder and vagina weaken and stretch, letting the bladder sag from its normal position and bulge into the vagina. The abnormal position of the bladder may cause it to press against and pinch the urethra.

More information is provided in the NIDDK health topic, Cystocele.

Rectocele. A rectocele is a bulging of the rectum into the vagina. A rectocele occurs when the muscles and supportive tissues between a woman's rectum and vagina weaken and stretch, letting the rectum sag from its normal position and bulge into the vagina. The abnormal position of the rectum may cause it to press against and pinch the urethra.

Constipation. Constipation is a condition in which a person has fewer than three bowel movements a week or has bowel movements with stools that are hard, dry, and small, making them painful or difficult to pass. A person with constipation may feel bloated or have pain in the abdomen—the area between the chest and hips. Some people with constipation often have to strain to have a bowel movement. Hard stools in the rectum may push against the bladder and urethra, causing the urethra to be pinched, especially if a rectocele is present.

More information is provided in the NIDDK health topic, Constipation.

Tumors and cancers. Tumors and cancerous tissues in the bladder or urethra can gradually expand and obstruct urine flow by pressing against and pinching the urethra or by blocking the bladder outlet. Tumors may be cancerous or noncancerous.

Nerve Problems

Urinary retention can result from problems with the nerves that control the bladder and sphincters. Many events or conditions can interfere with nerve signals between the brain and the bladder and sphincters. If the nerves are damaged, the brain may not get the signal that the bladder is full. Even when a person has a full bladder, the bladder muscles that squeeze urine out may not get the signal to push, or the sphincters may not get the signal to relax. People of all ages can have nerve problems that interfere with bladder function. Some of the most common causes of nerve problems include

- vaginal childbirth
- brain or spinal cord infections or injuries
- diabetes
- stroke
- multiple sclerosis

- pelvic injury or trauma
- heavy metal poisoning

In addition, some children are born with defects that affect the coordination of nerve signals among the bladder, spinal cord, and brain. Spina bifida and other birth defects that affect the spinal cord can lead to urinary retention in newborns.

More information is provided in the NIDDK health topics, [Nerve Disease and Bladder Control and Urine Blockage in Newborns](#).

Many patients have urinary retention right after surgery. During surgery, anesthesia is often used to block pain signals in the nerves, and fluid is given intravenously to compensate for possible blood loss. The combination of anesthesia and intravenous (IV) fluid may result in a full bladder with impaired nerve function, causing urinary retention. Normal bladder nerve function usually returns once anesthesia wears off. The patient will then be able to empty the bladder completely.

Medications

Various classes of medications can cause urinary retention by interfering with nerve signals to the bladder and prostate. These medications include

- antihistamines to treat allergies
 - cetirizine (Zyrtec)
 - chlorpheniramine (Chlor-Trimeton)
 - diphenhydramine (Benadryl)
 - fexofenadine (Allegra)
- anticholinergics/antispasmodics to treat stomach cramps, muscle spasms, and urinary incontinence
 - hyoscyamine (Levbid)
 - oxybutynin (Ditropan)
 - propantheline (Pro-Banthine)
 - tolterodine (Detrol)
- tricyclic antidepressants to treat anxiety and depression
 - amitriptyline (Elavil)
 - doxepin (Adapin)
 - imipramine (Tofranil)
 - nortriptyline (Pamelor)

Other medications associated with urinary retention include

- decongestants
 - ephedrine
 - phenylephrine
 - pseudoephedrine
- nifedipine (Procardia), a medication to treat high blood pressure and chest pain
- carbamazepine (Tegretol), a medication to control seizures in people with epilepsy
- cyclobenzaprine (Flexeril), a muscle relaxant medication
- diazepam (Valium), a medication used to relieve anxiety, muscle spasms, and seizures
- nonsteroidal anti-inflammatory drugs
- amphetamines
- opioid analgesics

Over-the-counter cold and allergy medications that contain decongestants, such as pseudoephedrine, and antihistamines, such as diphenhydramine, can increase symptoms of urinary retention in men with prostate enlargement.

Weakened Bladder Muscles

Aging is a common cause of weakened bladder muscles. Weakened bladder muscles may not contract strongly enough or long enough to empty the bladder completely, resulting in urinary retention.

¹Urethral stricture. Mayo Clinic website. www.mayoclinic.org/urethral-stricture/about.html External Link Disclaimer. Updated November 20, 2012. Accessed April 1, 2014.

How common is urinary retention?

Urinary retention in men becomes more common with age.

- In men 40 to 83 years old, the overall incidence of urinary retention is 4.5 to 6.8 per 1,000 men.²
- For men in their 70s, the overall incidence increases to 100 per 1,000 men.²
- For men in their 80s, the incidence of acute urinary retention is 300 per 1,000 men.²

Urinary retention in women is less common, though not rare.³ The incidence of urinary retention in women has not been well studied because researchers have primarily thought of urinary retention as a man's problem related to the prostate.⁴

²Selius BA, Subedi R. Urinary retention in adults: diagnosis and initial management. *American Family Physician*. 2008;77(5):643–650.

³Wein AJ, Kavoussi LR, Novick AC, et al. *Campbell-Walsh Urology*. 10th ed. Philadelphia: Saunders; 2011.

⁴Mevcha A, Drake MJ. Etiology and management of urinary retention in women. *Indian Journal of Urology*. 2010;26(2):230–235.

What are the symptoms of urinary retention?

The symptoms of **acute** urinary retention may include the following and require immediate medical attention:

- inability to urinate
- painful, urgent need to urinate
- pain or discomfort in the lower abdomen
- bloating of the lower abdomen

The symptoms of **chronic** urinary retention may include

- urinary frequency—urination eight or more times a day
- trouble beginning a urine stream
- a weak or an interrupted urine stream
- an urgent need to urinate with little success when trying to urinate
- feeling the need to urinate after finishing urination
- mild and constant discomfort in the lower abdomen and urinary tract

Some people with chronic urinary retention may not have symptoms that lead them to seek medical care. People who are unaware they have chronic urinary retention may have a higher chance of developing complications.

When to Seek Medical Care

A person who has any of the following symptoms should see a health care provider right away:

- complete inability to urinate
- great discomfort or pain in the lower abdomen and urinary tract

How is urinary retention diagnosed?

A health care provider diagnoses acute or chronic urinary retention with

- a physical exam
- postvoid residual measurement

A health care provider may use the following medical tests to help determine the cause of urinary retention:

- cystoscopy
- computerized tomography (CT) scans
- urodynamic tests
- electromyography

Physical Exam

A health care provider may suspect urinary retention because of a patient's symptoms and, therefore, perform a physical exam of the lower abdomen. The health care provider may be able to feel a distended bladder by lightly tapping on the lower belly.

Postvoid Residual Measurement

This test measures the amount of urine left in the bladder after urination. The remaining urine is called the postvoid residual. A specially trained technician performs an ultrasound, which uses harmless sound waves to create a picture of the bladder, to measure the postvoid residual. The technician performs the bladder ultrasound in a health care provider's office, a radiology center, or a hospital, and a radiologist—a doctor who specializes in medical imaging—interprets the images. The patient does not need anesthesia.

A health care provider may use a catheter—a thin, flexible tube—to measure postvoid residual. The health care provider inserts the catheter through the urethra into the bladder, a procedure called catheterization, to drain and measure the amount of remaining urine. A postvoid residual of 100 mL or more indicates the bladder does not empty completely. A health care provider performs this test during an office visit. The patient often receives local anesthesia.

Medical Tests

Cystoscopy. Cystoscopy is a procedure that requires a tubelike instrument, called a cystoscope, to look inside the urethra and bladder. A health care provider performs cystoscopy during an office visit or in an outpatient center or a hospital. The patient will receive local anesthesia. However, in some cases, the patient may receive sedation and regional or general anesthesia. A health care provider may use cystoscopy to diagnose urethral stricture or look for a bladder stone blocking the opening of the urethra.

More information is provided in the NIDDK health topic, [Cystoscopy and Ureteroscopy](#).

CT scans. CT scans use a combination of x rays and computer technology to create images. For a CT scan, a health care provider may give the patient a solution to drink and an injection of a special dye, called contrast medium. CT scans require the patient to lie on a table that slides into a tunnel-shaped device where a technician takes the x rays. An x-ray technician performs the procedure in an outpatient center or a hospital, and a radiologist interprets the images. The patient does not need anesthesia. A health care provider may give infants and children a sedative to help them fall asleep for the test. CT scans can show

- urinary tract stones
- UTIs
- tumors
- traumatic injuries
- abnormal, fluid-containing sacs called cysts

Urodynamic tests. Urodynamic tests include a variety of procedures that look at how well the bladder and urethra store and release urine. A health care provider may use one or more urodynamic tests to diagnose urinary retention. The health care provider will perform these tests during an office visit. For tests that use a catheter, the patient often receives local anesthesia.

- **Uroflowmetry.** Uroflowmetry measures urine speed and volume. Special equipment automatically measures the amount of urine and the flow rate—how fast urine comes out. Uroflowmetry equipment includes a device for catching and measuring urine and a computer to record the data. The equipment creates a graph that shows changes in flow rate from second to second so the health care provider can see the highest flow rate and how many seconds it takes to get there. A weak bladder muscle or blocked urine flow will yield an abnormal test result.
- **Pressure flow study.** A pressure flow study measures the bladder pressure required to urinate and the flow rate a given pressure generates. A health care provider places a catheter with a manometer into the bladder. The manometer measures bladder pressure and flow rate as the bladder empties. A pressure flow study helps diagnose bladder outlet obstruction.
- **Video urodynamics.** This test uses x rays or ultrasound to create real-time images of the bladder and urethra during the filling or emptying of the bladder. For x rays, a health care provider passes a catheter through the urethra into the bladder. He or she fills the bladder with contrast medium, which is visible on the video images. Video urodynamic images can show the size and shape of the urinary tract, the flow of urine, and causes of urinary retention, such as bladder neck obstruction.

More information is provided in the NIDDK health topic, Urodynamic Testing.

Electromyography. Electromyography uses special sensors to measure the electrical activity of the muscles and nerves in and around the bladder and sphincters. A specially trained technician places sensors on the skin near the urethra and rectum or on a urethral or rectal catheter. The sensors record, on a machine, muscle and nerve activity. The patterns of the nerve impulses show whether the messages sent to the bladder and sphincters coordinate correctly. A technician performs electromyography in a health care provider's office, an outpatient center, or a hospital. The patient does not need anesthesia if the technician uses sensors placed on the skin. The patient will receive local anesthesia if the technician uses sensors placed on a urethral or rectal catheter.

How is urinary retention treated?

A health care provider treats urinary retention with

- bladder drainage
- urethral dilation
- urethral stents

- prostate medications
- surgery

The type and length of treatment depend on the type and cause of urinary retention.

Bladder Drainage

Bladder drainage involves catheterization to drain urine. Treatment of acute urinary retention begins with catheterization to relieve the immediate distress of a full bladder and prevent bladder damage. A health care provider performs catheterization during an office visit or in an outpatient center or a hospital. The patient often receives local anesthesia. The health care provider can pass a catheter through the urethra into the bladder. In cases of a blocked urethra, he or she can pass a catheter directly through the lower abdomen, just above the pubic bone, directly into the bladder. In these cases, the health care provider will use anesthesia.

For chronic urinary retention, the patient may require intermittent—occasional, or not continuous—or long-term catheterization if other treatments do not work. Patients who need to continue intermittent catheterization will receive instruction regarding how to selfcatheterize to drain urine as necessary.

Urethral Dilation

Urethral dilation treats urethral stricture by inserting increasingly wider tubes into the urethra to widen the stricture. An alternative dilation method involves inflating a small balloon at the end of a catheter inside the urethra. A health care provider performs a urethral dilation during an office visit or in an outpatient center or a hospital. The patient will receive local anesthesia. In some cases, the patient will receive sedation and regional anesthesia.

Urethral Stents

Another treatment for urethral stricture involves inserting an artificial tube, called a stent, into the urethra to the area of the stricture. Once in place, the stent expands like a spring and pushes back the surrounding tissue, widening the urethra. Stents may be temporary or permanent. A health care provider performs stent placement during an office visit or in an outpatient center or a hospital. The patient will receive local anesthesia. In some cases, the patient will receive sedation and regional anesthesia.

Prostate Medications

Medications that stop the growth of or shrink the prostate or relieve urinary retention symptoms associated with benign prostatic hyperplasia include

- dutasteride (Avodart)
- finasteride (Proscar)

The following medications relax the muscles of the bladder outlet and prostate to help relieve blockage:

- alfuzosin (Uroxatral)
- doxazosin (Cardura)
- silodosin (Rapaflo)
- tadalafil (Cialis)
- tamsulosin (Flomax)
- terazosin (Hytrin)

Surgery

Prostate surgery. To treat urinary retention caused by benign prostatic hyperplasia, a urologist—a doctor who specializes in the urinary tract—may surgically destroy or remove enlarged prostate tissue by

using the transurethral method. For transurethral surgery, the urologist inserts a catheter or surgical instruments through the urethra to reach the prostate. Removal of the enlarged tissue usually relieves the blockage and urinary retention caused by benign prostatic hyperplasia. A urologist performs some procedures on an outpatient basis. Some men may require a hospital stay. In some cases, the urologist will remove the entire prostate using open surgery. Men will receive general anesthesia and have a longer hospital stay than for other surgical procedures. Men will also have a longer rehabilitation period for open surgery.

More information is provided in the NIDDK health topic, [Prostate Enlargement: Benign Prostatic Hyperplasia](#).

Internal urethrotomy. A urologist can repair a urethral stricture by performing an internal urethrotomy. For this procedure, the urologist inserts a special catheter into the urethra until it reaches the stricture. The urologist then uses a knife or laser to make an incision that opens the stricture. The urologist performs an internal urethrotomy in an outpatient center or a hospital. The patient will receive general anesthesia.

Cystocele or rectocele repair. Women may need surgery to lift a fallen bladder or rectum into its normal position. The most common procedure for cystocele and rectocele repair involves a urologist, who also specializes in the female reproductive system, making an incision in the wall of the vagina. Through the incision, the urologist looks for a defect or hole in the tissue that normally separates the vagina from the other pelvic organs. The urologist places stitches in the tissue to close up the defect and then closes the incision in the vaginal wall with more stitches, removing any extra tissue. These stitches tighten the layers of tissue that separate the organs, creating more support for the pelvic organs. A urologist or gynecologist—a doctor who specializes in the female reproductive system—performs the surgery to repair a cystocele or rectocele in a hospital. Women will receive anesthesia.

Tumor and cancer surgery. Removal of tumors and cancerous tissues in the bladder or urethra may reduce urethral obstruction and urinary retention.

What are the complications of urinary retention and its treatments?

Complications of urinary retention and its treatments may include

- UTIs
- bladder damage
- kidney damage
- urinary incontinence after prostate, tumor, or cancer surgery

UTIs. Urine is normally sterile, and the normal flow of urine usually prevents bacteria from infecting the urinary tract. With urinary retention, the abnormal urine flow gives bacteria at the opening of the urethra a chance to infect the urinary tract.

Bladder damage. If the bladder becomes stretched too far or for long periods, the muscles may be permanently damaged and lose their ability to contract.

Kidney damage. In some people, urinary retention causes urine to flow backward into the kidneys. This backward flow, called reflux, may damage or scar the kidneys.

Urinary incontinence after prostate, tumor, or cancer surgery. Transurethral surgery to treat benign prostatic hyperplasia may result in urinary incontinence in some men. This problem is often temporary.

Most men recover their bladder control in a few weeks or months after surgery. Surgery to remove tumors or cancerous tissue in the bladder, prostate, or urethra may also result in urinary incontinence.

How can urinary retention be prevented?

People can prevent urinary retention before it occurs by treating some of the potential causes. For example, men with benign prostatic hyperplasia should take prostate medications as prescribed by their health care provider. Men with benign prostatic hyperplasia should avoid medications associated with urinary retention, such as over-the-counter cold and allergy medications that contain decongestants. Women with mild cystocele or rectocele may prevent urinary retention by doing exercises to strengthen the pelvic muscles. In most cases, dietary and lifestyle changes will help prevent urinary retention caused by constipation. People whose constipation continues should see a health care provider.

More information about exercises to strengthen the pelvic muscles is provided in the NIDDK health topic, [Kegel Exercise Tips](#).

Eating, Diet, and Nutrition

Researchers have not found that eating, diet, and nutrition play a role in causing or preventing urinary retention.

Points to Remember

- Urinary retention is the inability to empty the bladder completely.
- Urinary retention can be acute or chronic.
- Urinary retention can result from
 - obstruction of the urethra
 - nerve problems
 - medications
 - weakened bladder muscles
- The symptoms of **acute** urinary retention may include the following and require immediate medical attention:
 - inability to urinate
 - painful, urgent need to urinate
 - pain or discomfort in the lower abdomen
 - bloating of the lower abdomen
- The symptoms of **chronic** urinary retention may include
 - urinary frequency—urination eight or more times a day
 - trouble beginning a urine stream
 - a weak or an interrupted urine stream
 - an urgent need to urinate with little success when trying to urinate
 - feeling the need to urinate after finishing urination
 - mild and constant discomfort in the lower abdomen and urinary tract
- A health care provider diagnoses acute or chronic urinary retention with
 - a physical exam
 - postvoid residual measurement
- A health care provider may use the following medical tests to help determine the cause of urinary retention:
 - cystoscopy
 - computerized tomography (CT) scans
 - urodynamic tests
 - electromyography
- A health care provider treats urinary retention with

- bladder drainage
 - urethral dilation
 - urethral stents
 - prostate medications
 - surgery
- Complications of urinary retention and its treatments may include
 - urinary tract infections (UTIs)
 - bladder damage
 - kidney damage
 - urinary incontinence after prostate, tumor, or cancer surgery
- People can prevent urinary retention before it occurs by treating some of the potential causes.

Clinical Trials

The National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) and other components of the National Institutes of Health (NIH) conduct and support research into many diseases and conditions.

What are clinical trials, and are they right for you?

Clinical trials are part of clinical research and at the heart of all medical advances. Clinical trials look at new ways to prevent, detect, or treat disease. Researchers also use clinical trials to look at other aspects of care, such as improving the quality of life for people with chronic illnesses. Find out if clinical trials are right for you [External NIH Link](#).

What clinical trials are open?

Clinical trials that are currently open and are recruiting can be viewed at www.ClinicalTrials.gov [External Link Disclaimer](#).

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J. Curtis Nickel, M.D., Queen's University at Kingston; Anthony J. Schaeffer, M.D., Northwestern University

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Chapter 8 - Cystoscopy

Definition

Cystoscopy (cystourethroscopy) is a diagnostic procedure that uses a cystoscope, which is an endoscope especially designed for urological use to examine the bladder, lower urinary tract, and prostate gland. It can also be used to collect urine samples, perform biopsies, and remove small stones.

Purpose

Cystoscopy is performed by urologists to examine the entire bladder lining and take biopsies of any questionable areas. Cystoscopy may be prescribed for patients who display the following conditions:

- blood in the urine (hematuria)
- inability to control urination (incontinence)
- urinary tract infection
- signs of congenital abnormalities in the urinary tract
- suspected tumors in the bladder
- bladder or kidney stones
- signs or symptoms of an enlarged prostate
- pain or difficulty urinating (dysuria)
- disorders of or injuries to the urinary tract
- symptoms of interstitial cystitis

Blood and urine studies, in addition to x rays of the kidneys, ureters, and bladder, may be performed before a cystoscopy to obtain as much diagnostic information as possible. During the cystoscopy, a retrograde pyelogram may also be performed to examine the kidneys and ureters.

Description

There are two types of cystoscopes used to carry out the procedure, a rigid type and a flexible type. Both types are used for the same purposes and differ only in their method of insertion. The rigid type requires that the patient adopt the lithotomy position, meaning that the patient lies on his or her back with knees up and apart. The flexible cystoscope does not require the lithotomy position.

A cystoscopy typically lasts from 10–40 minutes. The patient is asked to urinate before surgery and advised that relaxing pelvic muscles will help make this part of the procedure easier. A well-lubricated flexible or rigid cystoscope (urethroscope) is passed through the urethra into the bladder where a urine sample is taken. There may be some discomfort as the instrument is inserted. Fluid is then injected to inflate the bladder and allow the urologist to examine the entire

bladder wall. The cystoscope uses a lighted tip for guidance and enables biopsies to be taken or small stones to be removed through a hollow channel in the cystoscope.

During a cystoscopy, the urologist may remove bladder stones or kidney stones, gather tissue samples, and perform x-ray studies. To remove stones, an instrument that looks like a tiny basket or grasper is inserted through the cystoscope so that small stones can be extracted through the scope's channel. For a biopsy, special forceps are inserted through the cystoscope to pinch off a tissue sample. Alternatively, a small brush-like instrument may be inserted to scrape off some tissue. To perform x-ray studies such as a retrograde pyelogram, a dye is injected into the ureter by way of a catheter passed through the cystoscope. After completion of all required tests, the cystoscope is removed.

Preparation

Patients may be asked to give a urine sample before cystoscopy to check for infection and to avoid urinating for an hour before this part of the procedure. They wear a hospital gown during the procedure and the lower part of the body is covered with a sterile drape. A sedative may be given about one hour prior to the operation to help the patient relax. The region of the urethra is cleansed and a local anesthetic is applied. Spinal or general anesthesia may also be used for the procedure. Distension of the bladder with fluid is particularly painful, and if it needs to be done, as in the case of evaluating interstitial cystitis, general anesthesia is required. A signed consent form is necessary for this procedure.

Aftercare

After removal of the cystoscope, the urethra is usually sore, and patients should expect to feel a burning sensation while urinating for one to two days following the procedure. To alleviate discomfort or pain, patients may be prescribed pain medication, and **antibiotics** may also be required to prevent infection. Minor pain may also be treated with over-the-counter, nonprescription drugs such as **acetaminophen**. To relieve discomfort, patients may be advised to drink two 8-oz glasses of water each hour for two hours and to take a warm bath to relieve the burning feeling. If not able to bathe, they may be advised to hold a warm, damp washcloth over the urethral opening.

Patients who have undergone a cystoscopy are instructed to:

- Take warm baths to relieve pain.
- Rest and refrain from driving for several days, especially if general anesthesia was used.
- Expect any blood in the urine to clear up in one to two days.
- Avoid strenuous **exercise** during recovery.
- Postpone sexual relations until the urologist determines that healing is complete.

Risks

As with any surgical procedure, there are some risks involved with a cystoscopy. Complications may include profuse bleeding, a damaged urethra, a perforated bladder, a urinary tract infection, or an injured penis.

Patients should contact their physician if they experience any of the following symptoms after the procedure, including pain, redness, swelling, drainage, or bleeding from the surgical site; signs of generalized infection, which may include headache, muscle aches, dizziness, or an overall ill feeling and fever; nausea or vomiting; or difficult or painful urination.

Cystoscopy is a commonly performed procedure, but it is an invasive technique that involves small yet significant risk. If anesthesia is required, there is additional risk, particularly for people who are obese, smoke, or are in poor health. Those undergoing anesthesia must inform the doctor of any medications they are taking.

Normal results

A successful cystoscopy includes a thorough examination of the bladder and collection of urine samples for cultures. If no abnormalities are seen, the results are indicated as normal. In this case, the bladder wall appears smooth and the bladder is seen to be of normal size, shape, and position, without obstructions, growths, or stones.

The treating physician can tell the patient what was seen inside the bladder right after the procedure. If a biopsy sample was taken, this will take several days to be examined and tested.

Cystoscopy allows the urologist to detect inflammation of the bladder lining, prostatic enlargement, or tumors. If these are seen, further evaluation or biopsies may be needed. Cystoscopy with bladder distention can also evaluate interstitial cystitis. Bladder stones, urethral strictures, diverticula, or congenital abnormalities can also be detected.

Alternatives

There are procedures that can provide some information about the lining of the bladder, for example, x rays; however, none of these provide as much information to the doctor as a cystoscopy.

Resources

books

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Satoh, E., N. Miyao, H. Tachiki, and Y. Fujisawa. "Prediction of Muscle Invasion of Bladder Cancer by Cystoscopy." *European Urology* 41 (February 2002): 178–181.

organizations

American Urological Association. 1120 North Charles Street, Baltimore, MD 21201. (410) 727-1100. <http://www.auanet.org>.

American Foundation for Urologic Disease. 1128 North Charles Street, Baltimore, MD 21201. (800) 242-2383. <http://www.afud.org>.

Interstitial Cystitis Association. 51 Monroe Street, Suite 1402, Rockville, MD 20850. (301) 610-5300. <http://www.ichelp.org>.

Society of Urologic Nurses and Associates. East Holly Avenue, Box 56, Pitman, NJ 08071-0056. (609) 256-2335. <http://suna.inurse.com/>.

other

"Cystoscopy." *Harvard Medical School*. <http://www.health.harvard.edu/fhg/diagnostics/cysto/cystoWhat.shtml>.

"Cystoscopy." *Medline Plus*. http://www.nlm.nih.gov/medline_plus/ency/article/003903.htm.

"What Is IC? Interstitial Cystitis Fact Sheet." *Interstitial Cystitis Association*. <http://www.ichelp.org/whatisic/ICFactSheet.html>.

Jennifer E. Sisk Monique Laberge, PhD

WHO PERFORMS THE PROCEDURE AND WHERE IS IT PERFORMED?

Cystoscopy is typically performed on an outpatient basis, but up to three days of recovery in the hospital is sometimes required. The procedure can be performed in a hospital, doctor's office, cystoscopy suite, or urology office, depending on the condition of the patient and the anesthesia required. If general anesthesia is required, an anesthesiologist is present to administer the anesthesia and monitor the patient. The cystoscopy procedure is performed by a urologist, urologic surgeon, or urogynecologist, with assistance from nurses experienced in urologic procedures. If x rays are taken during the procedure, a urologist or radiologic technologist is required to operate the x-ray equipment. Biopsy tissue samples are sent to the clinical laboratory for examination by a pathologist.

QUESTIONS TO ASK THE DOCTOR

- What will happen during the procedure?
- How do I prepare for cystoscopy?
- Will cystoscopy hurt?
- How long will the test last?
- How many cystoscopies do you perform each year?
- Are there any risks associated with the procedure?

Chapter 9 - Fasting Therapy

Definition

Fasting is voluntarily not eating food for varying lengths of time. Fasting is used as a medical therapy for many conditions. It is also a spiritual practice in many religions.

Origins

Used for thousands of years, fasting is one of the oldest therapies in medicine. Many of the great doctors of ancient times and many of the oldest healing systems have recommended it as an integral method of healing and prevention. [Hippocrates](#), the father of Western medicine, believed fasting enabled the body to heal itself. Paracelsus, another great healer in the Western tradition, wrote 500 years ago that "fasting is the greatest remedy, the physician within." **Ayurvedic medicine**, the world's oldest healing system, has long advocated fasting as a major treatment.

Fasting has also been used in nearly every religion in the world, including [Christianity](#), [Judaism](#), [Buddhism](#), and [Islam](#). Many of history's great spiritual leaders fasted for mental and spiritual clarity, including Jesus, [Buddha](#), and Mohammed. In one of the famous political acts of the last century, the Indian leader Mahatma Gandhi fasted for 21 days to promote peace.

Fasting has been used in [Europe](#) as a medical treatment for years. Many spas and treatment centers, particularly those in [Germany](#), [Sweden](#), and [Russia](#), use medically supervised fasting. Fasting has gained popularity in American alternative medicine over the past several decades, and many doctors feel it is beneficial. Fasting is a central therapy in **detoxification**, a healing method founded on the principle that the build up of toxic substances in the body is responsible for many illnesses and conditions.

Benefits

Fasting can be used for nearly every chronic condition, including **allergies**, **anxiety**, arthritis, **asthma**, **depression**, diabetes, headaches, **heart disease**, high **cholesterol**, low blood sugar, digestive disorders, mental illness, and **obesity**. Fasting is an effective and safe weight loss method. It is frequently prescribed as a detoxification treatment for those with conditions that may be influenced by environmental factors, such as **cancer** and **multiple chemical sensitivity**. Fasting has been used successfully to help treat people who have been exposed to high levels of toxic materials due to accident or occupation. Fasting is thought to be beneficial as a preventative measure to increase overall health, vitality, and resistance to disease. Fasting is also used as a method of mental and spiritual rejuvenation.

Description

The principle of fasting is simple. When the intake of food is temporarily stopped, many systems of the body are given a break from the hard work of digestion. The extra energy gives the body the chance to heal and restore itself, and burning stored calories gets rid of toxic substances stored in the body.

The digestive tract is the part of the body most exposed to environmental threats, including bacteria, viruses, parasites, and toxins. It requires the most immune system support. When food is broken down in the intestines, it travels through the blood to the liver, the largest organ of the body's natural detoxification system. The liver breaks down and removes the toxic by-products produced by digestion, including natural ones and the chemicals now present in the food supply. During fasting, the liver and immune system are essentially freed to detoxify and heal other parts of the body.

EVARTS LOOMIS 1910–

Evarts G. Loomis is known as the father of holistic medicine. A homeopathic physician of international renown, he is an advocate of holistic treatment of disease, natural foods, exercise, and meditation. Loomis was licensed to practice traditional medicine in 1946, but began early in his career to diverge from a quiet or dull practice. He served as a dog-sled doctor with the Grenfell Mission in Newfoundland, [Canada](#), worked in [Algeria](#), as well as with the Friends Ambulance Unit in [China](#) before he founded Meadowlark, the first holistic retreat in [North America](#). Loomis was a pioneer in the holistic health movement in the [United States](#). He has also been a proponent of regulated, monitored 24-36 hour fasts, touting the benefits of both the water fast and the all-juice fast.

He and his partner, Fay Loomis, operate Health and Growth Associates, from their home in Hemet, [California](#). Loomis also utilizes Dream Work and Kinesiology (the study of human movement) in his health and personal growth counseling. Their retreat is open to the public, and Loomis can be contacted at: 28195 Fairview Avenue, Hemet, California 92544; phone at: (909) 927-1768; or though e-mail at: eloomis@lasercom.net.

Jane Spear

Many healers claim that fasting is a particularly useful therapy for Americans and for the modern lifestyle, subjected to heavy **diets**, overeating, and constant exposure to food additives and chemicals. Some alternative practitioners have gone so far as to estimate that the average American is carrying 5-10 pounds of toxic substances in their bodies, for which fasting is the quickest and most effective means of removal.

Physiology of fasting

Through evolution, the body became very efficient at storing energy and handling situations when no food was available. For many centuries, fasting was probably a normal occurrence for most people, and the body adapted to it. It is estimated that even very thin people can survive for 40 days or more without food. The body has a special mechanism that is initiated when no food is eaten. Fasting is not starvation, but rather the body's burning of stored energy. Starvation occurs when the body no longer has any stored energy and begins using essential tissues such as organs for an energy source. Therapeutic fasts are stopped long before this happens.

Many physiological changes occur in the body during fasting. During the first day or so, the body uses its glycogen reserves, the sugars that are the basic energy supply. After these are depleted, the body begins using fat. However, the brain, which has high fuel requirements, still needs glucose (sugars converted from glycogen). To obtain glucose for the brain, the body begins to break down muscle tissue during the second day of the fast. Thus, during fasting some muscle loss will occur. To fuel the brain, the body would need to burn over a pound of muscle a day, but the body has developed another way to create energy that saves important muscle mass. This protein-sparing process is called ketosis, which occurs during the third day of a fast for men and the second day for women. In this highly efficient state, the liver begins converting stored fat and other nonessential tissues into ketones, which can be used by the brain, muscles, and heart as energy. It is at this point in the fast that sensations of hunger generally go away, and many people experience normal or even increased energy levels. Hormone levels and certain functions become more stable in this state as well. The goal of most fasts is to allow the body to reach the ketosis state in order to burn excess fat and unneeded or damaged tissue. Thus, fasts longer than three days are generally recommended as therapy.

Weight loss occurs most rapidly during the first few days of a fast, up to 2 pounds per day. In following days, the figure drops to around 0.5 pound per day. An average weight loss of a pound a day for an entire fast can be expected. Studies show that cutting back just once a month can jump-start healthier eating and help rid one's body of a lifetime of extra calories.

Performing a fast

Fasts can be performed for varying lengths of time, depending on the person and his or her health requirements. For chronic conditions, therapists recommend from two to four weeks to get the most benefits. Seven-day fasts are also commonly performed. A popular fasting program for prevention and general health is a three-day fast taken four times per year, at the change of each season. These can be easily performed over long weekends. Preventative fasts of one day per week are used by many people as well.

Juice fasts are also used by many people, although these are not technically fasts. Juice fasts are less intensive than water fasts because the body doesn't reach the ketosis stage. The advantage of juice fasts is that fruit and vegetable drinks can supply extra energy and nutrients. People can fit a few days of juice fasting into their normal schedules without significant drops in energy. Juice fasts are also said to have cleansing and detoxifying effects. The disadvantage of juice fasts is

that the body never gets to the ketosis stage, so these fasters are thought to lack the deep detoxification and healing effects of the water fast.

Medical supervision is recommended for any fast over three days. Most alternative medicine practitioners, such as homeopaths, naturopathic doctors, and ayurvedic doctors, can supervise and monitor patients during fasts. Those performing extended fasts and those with health conditions may require blood, urine, and other tests during fasting. There are many alternative health clinics that perform medically supervised fasts as well. Some conventional medical doctors may also supervise patients during fasts. Costs and insurance coverage vary, depending on the doctor, clinic, and requirements of the patient.

Preparations

Fasts must be entered and exited with care. To enter a fast, the diet should be gradually lightened over a few days. First, heavy foods such as meats and dairy products should be eliminated for a day or two. Grains, nuts, and beans should then be reduced for several days. The day before a fast, only easily digested foods like fruits, light salads, and soups should be eaten. During the fast, only pure water and occasional herbal teas should be drunk. If you **exercise**, keep your workouts during fasting light and relatively brief, stopping immediately if you feel dizzy, lightheaded or short of breath.

Fasts should be ended as gradually as they are entered, going from lighter to heavier foods progressively. The diet after a fast should emphasize fresh, wholesome foods. Fasters should particularly take care not to overeat when they complete a fast.

Precautions

Fasting isn't appropriate for everyone and, in some cases, could be harmful. Any person undertaking a first fast longer than three days should seek medical supervision. Those with health conditions should always have medical support during fasting. Plenty of water should be taken by fasters since dehydration can occur. Saunas and sweating therapies are sometimes recommended to assist detoxification, but should be used sparingly. Those fasting should significantly slow down their lifestyles. Taking time off of work is helpful, or at least reducing the work load. Fasters should also get plenty of rest. Exercise should be kept light, such as walking and gentle stretching.

Side effects

Those fasting may experience side effects of **fatigue**, malaise, aches and pains, emotional duress, **acne**, headaches, allergies, swelling, **vomiting**, **bad breath**, and symptoms of colds and flu. These reactions are sometimes called *healing crises*, which are caused by temporarily increased levels of toxins in the body due to elimination and cleansing. Lower energy levels should be expected during a fast.

Research & general acceptance

The physiology of fasting has been widely studied and documented by medical science. Beneficial effects such as lowered cholesterol and improved general functioning have been shown. Fasting as a treatment for illness and disease has been studied less, although some studies around the world have shown beneficial results. A 1984 study showed that workers in [Taiwan](#) who had severe **chemical poisoning** had dramatic improvement after a ten-day fast. In Russia and [Japan](#), studies have demonstrated fasting to be an effective treatment for mental illness. A few years ago, fasting was featured on the cover of the *New England Journal of Medicine*, although mainstream medicine has generally ignored fasting and detoxification treatments as valid medical procedures.

The majority of research that exists on fasting is testimonial, consisting of individual personal accounts of healing without statistics or controlled scientific experiments. In the alternative medical community, fasting is an essential and widely accepted treatment for many illnesses and chronic conditions.

Training & certification

The International Association of Professional Natural Hygienists (IAPNH) is an organization of healthcare professionals who specialize in therapeutic fasting. It certifies doctors who have completed approved residencies in therapeutic fasting, including conventional medical doctors, naturopaths, and osteopathic doctors.

Resources

BOOKS

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Page, Linda, N.D. *Healthy Healing*. CA: Healthy Healing Publications, 1998.

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ORGANIZATIONS

Fasting Center International. 32 West Anapurna St., #360, Santa Barbara, CA 93101.
<http://www.fasting.com>.

Douglas Dupler

Teresa G. Odle

Chapter 10 - Body and Mind

The aspect of religion and the body

Across the ages, organized religions have always laid claim to the bodies of their adherents. The expression of religious belief through bodily conduct and comportment has served both to confirm knowledge of abstract creeds and to evoke expedient devotional attitudes. In the initiation ceremonies of the Araucanian shamanesses, for example, initiates were brought into a sacred circle of healers by having their bodies rubbed with canelo leaves and happiness and excitement repeatedly over breasts, bellies, and heads. When the celebrations reached their height, initiates climbed nine-foot trees that were barked and notched to form ladders. Ritualistically, they were ascending to the sky to acquire magical skills of [healing](#), enacting physically their faith in the supernatural curing powers of the gods. In like manner, Chinese Buddhist practices of funereal feasting mirrored theological precepts. Through consumption of vegetarian dishes and the offering of food items to the world of the spirits, celebrants expressed filial piety and demonstrated concern for their ancestors' continued livelihood. In both ritual instances, human bodies were acting as depositories of deferred thoughts and values.

It is a quality characteristic of pre-literate societies that bodily rites and symbolic [gestures](#) have been used to articulate religious credo. Traditionally, the body has served as a living memory pad to reproduce abstract knowledge. In the absence, through most of humanity's religious experiences, of reading skills that might assist in retrieval of basic spiritual information and insight, knowledge has survived in the memory, where it is recalled kinaesthetically through ritual gesture and orally through prayer. Bodily ritual helps reconstruct, often below the level of consciousness, the fundamental ordering of the cosmos in religion. Careful stagings, decorations, and scarifications of the body in liturgical ceremonies and theatrical productions are mimetic reproductions of complex oral and scriptural stories and ideas. It is in this manner that the Omaha Indians of North America paint and tattoo the skin of their young women with two significant symbols: a round disk representing the sun and a star standing for the night. Together, the two bodily signs are offered as a physical memorial to the power of day and of night to grant fecundity on all earthly things.

In many religions, theoretical ideas concerning the origins of the universe, the nature and power of divinities, and the fate of human souls are made visible in seemingly innocuous details of bearing and verbal manners. In Islamic prayer-habits, for example, the simple task of physical prostration before Allah demonstrates willed subservience to divine omnipotence. In similar ways, variable positioning of the body during Christian liturgy, with its initial acts of genuflection to complex patterns of standing, kneeling, sitting, and singing, involves the believer in a set of communal gymnastics that contributes to internal reflection on biblical messages. Like the mind, the body expresses itself in symbolic forms.

This 'incorporation' of abstract thought into bodily sign is in fact a key to the psychological formation of belief. Commitment to any symbolic order requires more than cognitive understanding. It includes as well, willed assent to moral regulations and emotional commitment to narrative mythologies. This order of identification with symbolic systems is most fully

accomplished, as Pierre Bourdieu has said in The Logic of Practice, through ‘bodily *hexis*’, the realization or *em-bodiment* of abstract principles. Through many different styles of physical homage, symbolic systems are ‘turned into a permanent disposition, a durable way of standing, speaking, walking, and thereby of feeling and thinking.’

Traditionally, among the three monotheistic religions of Judaism, Christianity, and Islam, each of which have set up strict ontological distinctions between the supernatural and the natural, or the [soul](#) and the [flesh](#), spiritual aspirations are made manifest through the body in characteristic ways. Although all three of these ‘religions of the book’, have their fundamental moral and theological precepts scribbly recorded, they have nevertheless made extensive use of bodily resources. Internal devotional life has been maintained through external behavioral codes like dietary regimen, dress codes, and work and holiday schedules. These devotional habits have been structured to discipline the body according to cosmic principles of sacred and profane. Each one of them is designed to affirm the theological notion of the superiority over the corporeal world of the transcendent realm of being in god. This is the reason for head-coverings, face-veilings, bowing, kneeling, genuflecting, and other signs of spiritual modesty. The body is daunted before the magnificent transcendence of the god of Light. Hierarchical distinctions in Jehovah’s religions between good and evil, and male and female, are likewise acclaimed through religious rituals such as these. The segregation of women in the back of synagogues, churches, and mosques, the ‘purification’ or ‘churching’ of women’s bodies after childbirth, and the [circumcision](#) of boys at [initiation rites](#) into the covenant of Abraham, are all forms, as it has been said, of ‘bodily *hexis*’. They articulate underlying theological notions concerning the inferiority of women in the deity’s creation.

Judaism, Christianity, and Islam have also given account in their theologies of a distinctly positive role for the human body. As expressed in the foundational Hebrew myths of Genesis, the body is a creation of divine life; it is made in the image of the creator of the universe. The human sensory apparatus is designed, so these theisms affirm, to be an instrument through which the human soul apprehends supernatural truths. Nowhere was this acceptance of bodily existence more obvious than in the graphic works of Christian artists during the Renaissance. Donatello, [Leonardo da Vinci](#), and Michelangelo were celebrating the divine content of the human form. Their attention to the beauty of bodily physique is still astounding to behold. This same affirmation of earthly existence in the body is apparent structurally in the pedagogical strategies of the various beliefs. Since ancient and medieval times, the main task of organized religions has been to instruct the moral person to pursue truth and piety through the natural abilities of mind and body. To study the sacred and traditional writings of the Torah, the Bible, and the Koran, making use of the body’s temporal powers of reason, will, and memory, was expected to lead believers toward more complete and intimate understanding of eternal matters. Contemplation of created things, it was believed, deepens appreciation of god their creator. During spiritual services, sensitivity to the sacred order of things has been further heightened in many denominations by instrumental music, choral singing, psalm recitation, and hand-clapping. In some churches, the odor of incense and the sight of meaningful [iconography](#) support the process of prayer and [meditation](#).

It is a matter of special interest to scholars of religion to determine how religious attention to corporal devotional strategies may have heightened awareness of the sentient nature of the

human body. Corporal ritual calls for repeated reflection on some of the most intense sensory experiences, including hunger, sexual abstinence, sleep deprivation, and skin laceration. Across the centuries, holy men and women have engaged in heroic efforts to deny basic physiological drives and desires, and have consciously utilized their contrived situations of [pain](#) and [fatigue](#) to reflect upon the human condition. It may very well be true that religious efforts to regulate behaviour have contributed to the unprecedented consciousness among the human species of sensory experiences and bodily movements and passions. Centuries of monastic efforts to curb sexual impulses, for example, finally led among Christian ascetics of the high Middle Ages to the exoneration of sexual passion from charges of mortal sin and the creation of elaborate codes of amorous chivalry. It was indeed among the reflective body-chastening monks of several different religions in the past that 'crimes of passion' came to be identified and granted special status under the law. In this regard, religious attempts to design moral codes has led to continual re-investigation of the types of bodily desires that are conducive to willed control and the types that seem intransigent to reasoned opinion.

Maureen Flynn

Chapter 11 - Mind/body medicine

Definition

Mind/body medicine, also known as behavioral medicine, is the field of medicine concerned with the ways that the mind and emotions influence the body and physical health.

Origins

There was a time not long ago when Western medicine believed that health depended solely upon the physical mechanisms of the body. That is, a person is made up only of physical and chemical reactions that can be measured and manipulated scientifically. The notion that the mind and body live in separate compartments, so to speak, goes back to certain philosophers of classical antiquity. This concept of mind/body separation was also present in such religious groups as the Gnostics and some sects on the fringes of medieval Christianity. The scientific version of this split between mind and body is generally traced back to the seventeenth-century French philosopher Rene Descartes, whose thinking aided the development of science. It has taken a lot of time and research, three centuries after Descartes, for mainstream medicine to begin to accept that the mind plays a major role in health and disease.

The idea that the mind and body interact is not new, however. It can be traced to the Wisdom literature in the Old Testament and to Hippocrates, the father of Western medicine. The ancient Hebrews attributed some physical illnesses to grief or anger. Hippocrates believed that health depends upon a balance of the body, mind and environment, and that disease is caused by imbalances in these areas. As modern science progressed, the mind and emotions became neglected, since researchers found it difficult to measure and quantify mental states with the scientific methods and equipment that were so highly valued.

In the early 1900s, Harvard physiologist Walter Cannon coined the term "fight-or-flight response" for the body's reaction to threats, a response that causes increases in heart rate, blood pressure, blood sugar, muscle tension and respiration. During the 1950s, Hans Selye of McGill University pioneered research in what he called **stress**. Selye determined that the fight-or-flight response could be triggered by psychological factors as well as by physical threats. Stress includes having fight-or-flight reactions in situations where there is no immediate threat except mental perceptions and worries. Stress is not necessarily negative, except when people fail to cope with it effectively. Selye's work laid the groundwork for researchers to determine that stress and reactions to it play an integral role in health and disease.

ANDREW WEIL 1942–

Dr. Andrew Weil, a Harvard-educated physician, adds credibility and expertise to the natural healing methods he espouses in his best-selling books, on his Internet Web site, in his talk show appearances, and in his popular audio CD of music and **meditation**. Weil's *Spontaneous Healing* spent more than a year on the best-seller list, and his 1997 book, *Eight Weeks to Optimum Health*, also was a runaway best-seller. Perhaps the best-known proponent of naturalistic healing methods, Weil has been trying to establish a field he calls integrative medicine. He is director of Tucson's Center for Integrative Medicine, which he founded in 1993. In 1997, he began training doctors in the discipline at the University of Arizona, where he teaches.

After getting his bachelor's degree in botany from Harvard University, Weil applied for admission to Harvard Medical School in 1964. During his second year, he led a group of students who argued they could succeed better studying on their own than going to classes; in fact, the group got higher scores on their final exams than their classmates. After graduating from Harvard Medical School, he volunteered at the notorious counter-cultural Haight-Asbury Free Clinic in San Francisco, CA. Later in 1969, Weil got a job in Washington, DC, with the National Institute of Mental Health's Drug Studies Division. From 1971 to 1975, he traveled extensively in South America and Africa, soaking up information about medicinal plants, **shamanism**, and natural healing techniques. He never returned to the practice of conventional medicine.

His approach to alternative medicine is eclectic, mingling traditional medicine with herbal therapy, **acupuncture**, **homeopathy**, **chiropractic**, hypnotism, cranial manipulation, and other alternative healing methods. Though his books discuss the benefits of everything from healing touch to herbal cures, Weil doesn't dismiss the benefits of standard Western medicine when appropriate.

Other mind/body relationships became apparent to medical researchers. The so-called **placebo effect** has been studied by doctors and psychologists for years. In clinical experiments, people who are given inert substances made to look like medicines, such as sugar pills, often experience the same improvements as those patients who are given real medications. It is estimated that nearly one out of every three patients improves with medication simply because of the placebo effect, and not because of the drug itself. Researchers have also noted that some conditions and illnesses have no physical explanations. Doctors termed these conditions psychosomatic illnesses, as they seem to be caused by the psyche, or mind.

Researchers then theorized that certain personality types are susceptible to particular conditions. For instance, "Type A" personalities tend to be aggressive, ambitious, and always rushed. They tend to cope with stress by getting angry and upset. Researchers have found that these personalities are more prone to **heart disease**, high blood pressure, and other stress-related conditions. "Type B" personalities are those who cope with stressful situations with communication and balance instead of anger and aggression, and have been found to be less prone to stress-related conditions. Researchers have added a "Type C" personality, who tends to

suppress emotions and has trouble with self-expression. Some clinicians have proposed a link between suppressed emotions and the development of **cancer**.

In the past few decades, researchers have begun to unravel the complex ways in which the mind and body interact. Many findings have demonstrated that the mind and body are intimately interconnected. Medical science has shown that the nervous system works closely with the immune system, systems that were at one time believed to be separate. Nerve endings have been found that connect directly to important components of the immune system called lymph nodes. This connection demonstrates that there is a physical link between the mind and the immune system. Studies have also shown that thoughts and emotions alone can influence the activity of immune system cells.

In the 1970s, Dr. Herbert Benson at Harvard Medical School discovered what he called the "relaxation response." Benson observed that trained **yoga** specialists (yogis) could control bodily functions that had previously been believed to be autonomic, or beyond the control of the mind. During **meditation**, these yogis could reduce their heart rates, blood pressure, metabolism, body temperature, and other physiological processes to surprising levels. Other people who were then taught meditation were able to reach deep states of **relaxation** and calmness as well. This relaxation response, as Benson termed it, is essentially the opposite of the fight-or-flight response. The relaxation response reduces blood pressure, respiration, heart rate, oxygen consumption, muscle tension, and other bodily processes that are elevated by stress. Researchers soon began to theorize that if stress could have harmful effects on health, then the relaxation response might have the opposite effect. It wasn't long before the Harvard Mind/Body Medical Institute was founded, and other major medical clinics followed by integrating mind/body practices and studies into their health programs. A new field opened up in academic medicine called **psychoneuroimmunology** (PNI), which is the study of how the mind and nervous system affect the immune system. Studies have since shown that the mind and emotions play roles in many diseases, including cancer, diabetes, heart disease, gastrointestinal problems, and **asthma**.

In 1993, Dr. David Eisenberg wrote in the *New England Journal of Medicine* about a study that showed that one out of every three adults in America had used some form of unconventional medicine. Of those alternative treatments, mind/body practices were used most often. The popular PBS series by journalist Bill Moyers, called *Healing and the Mind*, brought mind/body medicine into millions of homes. Dr. Benson of Harvard claims that mind/body medicine should no longer be considered alternative. Despite the acclaim and success, however, there is still resistance to the simple idea that the mind is an important part of health, and many mainstream doctors still adhere to the belief that medicine is just a matter of "drugs killing bugs."

Benefits

Mind/body therapies have shown promise in treating cancer, heart disease, **hypertension**, asthma, and mental illness. They have been used as effective complementary therapies alongside such conventional treatments as surgery and chemotherapy. Mind/body therapies have also been shown to increase quality of life, reduce **pain**, and improve symptoms for people with chronic diseases and health conditions. They may also help control and reverse certain diseases, particularly those that are stress-related. By reducing stress, mind/body therapies may even

prevent many diseases. Another benefit of mind/body therapies is that they pose very little risk. Some are inexpensive, and most have few side effects.

Description

There are many alternative techniques that draw upon the interconnections between mind and body. These include **art therapy**, assertiveness training, autogenic training, bioenergetics, **biofeedback**, **breath therapy**, mental imagery, dance and **movement therapy**, dreamwork, Gestalt therapy, group therapy, hypnosis, meditation, mindfulness training, Jungian psychoanalysis, postural integration, prayer and faith healing, progressive relaxation, psychodrama, **psychotherapy**, Reichian therapy, support groups, and yoga. Some of the most widely used techniques are meditation, mindfulness training, biofeedback, breath therapy, hypnosis, mental imagery, and movement therapies, which are discussed below.

Costs can vary widely for mind/body treatments, depending on the type and the medical training of the practitioner. Many insurance companies will reimburse some mind/body treatments and training sessions; consumers should be aware of their insurance provisions.

Meditation

There are many forms of meditation, but they all have the same goal, which is to calm and focus the mind. As beginning meditators find out, however, calming and clearing the mind of thoughts and worries is easier said than done. When performed on a regular basis, meditation is an efficient way of promoting the relaxation response. Meditation is used to ease the discomfort of many health problems, including stress-related conditions, chronic pain, panic disorders, tension headaches, and asthma. A 2002 report stated research shows that transcendental meditation can reduce hardening of the arteries, eventually helping reduce risk of **heart attack** and **stroke**.

Meditation can be practiced anywhere, but a quiet and peaceful setting is recommended. Meditators should sit or lie in a comfortable position. Sitting with the spine as straight as possible without straining is the most commonly recommended position. Breathing during meditation should be deep, calm and slow. The meditator may concentrate on the breath or on a still object such as a flower or candle flame. The meditator often may repeat a soft sound, word, or phrase, known as a mantra. Mantras can be affirmative statements, prayers, or humming sounds. The goal of the meditator is to concentrate deeply in order to reduce the amount of thinking, and to calm the worries and thoughts that typically fill the mind. When thoughts or distractions arise, the meditator should allow them to pass without directing attention toward them.

Meditation should be done twice a day, for 20 minutes at a time, preferably at consistent times to develop discipline. It can be learned from books or tapes, but instruction is widely available and recommended, as beginners can find properly meditating and quieting the mind to be difficult at first.

Mindfulness training

This form of mental discipline was made popular by Dr. Jon Kabat-Zinn, a psychologist at the University of Massachusetts Medical Center, who has written some popular books on mind/body medicine. Kabat-Zinn uses mindfulness training to help patients deal with chronic illnesses and pain. Mindfulness training is also good for stress-related conditions, and those undergoing difficult treatments like surgery or chemotherapy. Practitioners of mindfulness claim it helps them experience more pleasure and less stress in their everyday activities.

Mindfulness training originates from a Buddhist practice called *vipassana*. Its basic idea is that deep awareness of the present moment is the essential discipline. Lack of awareness and attention can lead to stress and bad health habits. To be mindful is to participate fully in whatever one is doing at the present moment, whether reading, walking, working, eating, exercising, relaxing, etc. When a person pays full attention to the present moment without judgment, then worries about the past and future tend to disappear, and stress levels are also significantly reduced.

Mindfulness training teaches that painful situations and emotions should be experienced with full attention as well, which helps people to confront and accept them. Mindfulness training also uses techniques like the body scan, in which the patient focuses full attention on each part of the body in succession. This technique helps people become more aware of their bodies and learn to control their reactions to stress, change, and illness.

Biofeedback

Biofeedback uses special instruments that measure and display heart rate, perspiration, muscle tension, brain wave activity, body temperature, respiratory patterns, and other indicators of stress and physiological activity. Patients can observe their measurements and learn to consciously control functions that were previously unconsciously controlled. Biofeedback also helps people learn how to initiate the relaxation response quickly and effectively.

Biofeedback is used to treat hypertension, stress-related headaches, migraine headaches, attention-deficit disorder, and diabetes. Biofeedback is used often in physical therapy to rehabilitate damaged nerves and muscles. It is also an approved treatment for a vascular disorder called **Raynaud's syndrome**. Patients with this syndrome experience blanching and numbness in their hands and feet in response to cold or emotional stress. A 2002 study showed that biofeedback helped children with a disease called vesicoureteral reflux (an abnormal backflow or urine from the bladder to the ureter) learn to correct reflux. This helped the children avoid surgery and prolonged antibiotic therapy.

Breath therapy

Breath therapy works on the premise that breathing plays a central role in the body and mind. People who are under stress tend to breathe rapidly and shallowly, whereas slow and deep breathing has been shown to reduce stress and promote the relaxation response. In **Ayurvedic medicine** and **traditional Chinese medicine**, the breath is considered the most important metabolic function. In yoga, there is a science of breathing techniques known as pranayama, which is designed to reduce stress and promote health.

Breath therapy is often used in conjunction with meditation and other mind/body techniques. It can be learned from books and tapes, or can be learned from a yoga or mind/body specialist. It is an inexpensive treatment, and once learned can be practiced easily anywhere.

Hypnosis

Hypnosis is deeply focused attention that brings about a trance state that is somewhere between waking and sleeping. During hypnosis, the mind is very open to suggestion. Mental imagery is often used in conjunction with hypnosis to maximize positive thinking and healing.

Hypnosis, or **hypnotherapy**, is used to reduce stress, **anxiety**, and pain, and help patients suffering from chronic diseases. It is also used to assist people in overcoming bad health habits, and addictions to nicotine, alcohol and drugs. Some dentists use hypnosis to help patients relax during dental procedures. Research continues to show the benefits of hypnosis. In 2002, a summary of recent studies included one that evaluated the effectiveness of self-hypnosis for patients undergoing angioplasty and other medical procedures. They required half the sedation of patients in control groups, and their procedures took less time. Pregnant adolescents who were counseled on hypnosis needed less anesthesia during delivery, needed less pain medication after delivery, and left the hospital sooner than patients in the control groups. Hypnosis is best performed by trained hypnotherapists, who can teach techniques of self-hypnosis to the patient.

Mental imagery

This technique uses the imagination to stimulate healing responses in the body, as studies have shown that the imagination can cause the same activity in the brain and immune system as real events. Patients are taught to imagine places or situations in which they have felt happy, healthy, or safe. Patients can also focus on images that increase confidence, reduce stress, and promote healing. Cancer patients are taught to imagine that their immune cells are eliminating cancer cells from their bodies. Heart attack sufferers are taught to imagine their hearts getting healthy and strong. Women can mentally rehearse **childbirth**, and patients imagine themselves successfully going through surgery as preparation for the real event.

Mental imagery has shown promise treating immune system problems, and is used often in cancer treatment and **AIDS** cases. It has been used to treat **irritable bowel syndrome** and asthma. Mental imaging techniques are also used in conjunction with many other mind/body techniques like meditation and hypnosis, as it is an efficient means of promoting positive mental attitudes. Mental imaging techniques can be learned from books, audiotapes, videos, and from professional therapists and teachers.

Movement therapy

Movement routines such as **dance therapy** have been shown to have a significant mind/body element. In these therapies, which also include **martial arts**, yoga, and tai chi, strict routines of physical movements are designed to involve high levels of mental concentration and awareness of the body. Movement therapies are good for people who have trouble sitting still for

meditation, and are an excellent way of improving physical strength and mental health at the same time.

Precautions

Mind/body practices are safe and have few side effects. They should not, however, be relied upon solely when other medical care is required, particularly for serious conditions like heart disease, cancer, or diabetes. Consumers should also seek out reliable and properly trained practitioners, particularly in those practices and states for which certification is not required by law.

Research & general acceptance

Because of its increasing acceptance by mainstream medicine, mind/body medicine has been the subject of intense research. Studies have shed new light on everything from the minute interactions of the immune and nervous systems to the effective results of individual therapies like meditation and **guided imagery**. Other studies have indicated relationships between stress and disease. Some eye-opening results have been observed as well, such as studies that have shown that cancer and heart disease patients utilizing mind/body techniques had significantly longer survival rates on average than those patients who did not use mind/body therapies.

Despite increasingly proven benefits to mind-body medicine, few health plans pay for the treatments.

Training & certification

Training programs and certification criteria tend to vary with individual therapies and states.

The Biofeedback Certification Institute of America lists certified biofeedback practitioners. Address: 10200 W. 44th Ave., Suite 304. Wheatridge, CO 80033. (303) 420-2902.

The American Society of Clinical Hypnosis is the largest organization for certifying hypnotherapists. Address: 2200 East Devon Ave., Suite 291. Des Plaines, IL 60018. (708) 297-3317.

The Wellness Community provides information on support groups organized throughout the country. Address: 2716 Ocean Park Blvd., Suite 1040. Santa Monica, CA 90405. (310) 314-2555.

The Academy for Guided Imagery provides resources for mental imaging treatments. Address: PO Box 2070. Mill Valley, CA 94942. (800) 726-2070.

The Vipassana Meditation Center is a resource for those interested in mindfulness training and meditation. Address: PO Box 24. Shelbourne Falls, MA 01370. (413) 625-2160.

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"Research Briefs: Meditation Reduces Atherosclerosis." *GP* (May 13, 2002):4.

ORGANIZATIONS

The Mind/Body Medical Institute. Deaconess Hospital. 1 Deaconess Road. Boston MA 02215.

Center for Mind-Body Medicine. 5225 Connecticut Ave. NW, Suite 414. Washington, DC 20015. (202) 966-7338.

Center for Attitudinal Healing. 19 Main Street. Tiburon, CA 94920. (415) 435-5022.

Douglas Dupler

Teresa G. Odle

Chapter 12 - Happiness and Excitement Therapy

Definition

Happiness and excitement therapy is one of the scientific manipulation of the nervous tissues of the brain and the entire body for the purpose of normalizing the senses / tissues to their normal state. This is performed physically which includes applying fixed or movable pressure, holding, and/or causing movement of or to the body. Most patients who have being recommended to Happiness and Excitement therapy get relief from stress by indulging in baked treats and tea parties, gardening, punch drinks, oratory and exercising rather than introduction to medication. Dramatically performances and writing keeps the mind active and creative.

Origins

Happiness and excitement therapy is one of the oldest health care practices known to history. References to happiness and excitement are found in Atlantic Islanders, Chinese medical texts more than 4,000 years old. Happiness and excitement has been advocated in Western health care practices at least since the time of modern Medicine. In the eighteenth century Dr. Follow wrote, "The physician must be acquainted with many things and assuredly with nourishable treats, fruity drinks and meals" (the ancient Greek term for happiness and excitement was contentment).

The roots of modern, scientific happiness and excitement therapy go back to Soda De Valerie (1776–1839), a Sweden, who developed an integrated system consisting of happiness and excitement and active and passive exercises. Valerie established the Royal Central Nutrition Institute in [Sweden](#) in 1824 to teach his methods.

Modern, scientific happiness and excitement therapy was introduced in the [United States](#) in the 1850s by two [New York](#) physicians, sisters Happiness and Lucky Follow, who had studied in Sweden. The first clinics for happiness and excitement therapy in the United States were opened by two Swedish physicians after the [Civil War](#) period. Doctor Cherry Bota Posse operated the Posse Institute in Boston and Doctor Heartfelt opened the Swedish Health Institute near the Capitol in Washington, D.C.

Although there were periods when happiness and excitement fell out of favor, in the 1960s it made a comeback in a different way as a tool for **relaxation**, communication, and alternative healing. Today, happiness and excitement is one of the most popular healing modalities. It is used by conventional, as well as alternative, medical communities and is now covered by some health insurance plans.

Benefits

Generally, happiness and excitement is known to affect the circulation of blood and the flow of blood and lymph, reduce muscular tension or flaccidity, affect the nervous system through stimulation or sedation, and enhance tissue healing. These effects provide a number of benefits:

- reduction of muscle tension and stiffness
- relief of muscle spasms
- greater flexibility and range of motion
- increase of the ease and efficiency of movement
- relief of **stress** and aide of relaxation
- promotion of deeper and easier breathing
- improvement of the circulation of blood and movement of lymph
- relief of tension-related conditions, such as headaches and eyestrain
- relaxation of body **tense** muscles
- promotion of faster healing of soft tissue injuries, such as pulled muscles and sprained ligaments, and reduction in **pain** and swelling related to such injuries
- reduction in the formation of excessive scar tissue following soft tissue injuries
- enhancement in the health and nourishment of skin
- improvement in posture through changing tension patterns that affect posture
- reduction in stress and an excellent stress management tool
- creation of a feeling of well-being
- reduction in levels of **anxiety**
- increase in awareness of the mind-body connection
- promotion of a relaxed state of mental awareness

Happiness and excitement therapy also has a number of documented clinical benefits. For example, happiness and excitement can reduce anxiety, improve pulmonary function in young **asthma** patients, reduce psycho-emotional distress in persons suffering from chronic **inflammatory bowel disease** , increase weight and improve motor development in premature infants, and may enhance immune system functioning. Some medical conditions that happiness and excitement therapy can help are: **allergies**, anxiety and stress, arthritis, asthma and **bronchitis**, **carpal tunnel syndrome** and other repetitive motion injuries, chronic and temporary pain, circulatory problems, **depression**, digestive disorders, tension **headache**, **insomnia**, myofascial pain, sports injuries, and temporomandibular joint dysfunction.

Description

Happiness and excitement therapy is the scientific manipulation of the soft tissues of the body for the purpose of normalizing those tissues and consists of a group of manual techniques that include applying fixed or movable pressure, holding, and/or causing movement of or to the body. While happiness and excitement therapy is applied primarily with the hands, sometimes the forearms or elbows are used. These techniques affect the muscular, skeletal, circulatory, lymphatic, nervous, and other systems of the body. The basic philosophy of happiness and

excitement therapy embraces the concept of *vis Medicatrix naturae*, which is aiding the ability of the body to heal itself, and is aimed at achieving or increasing health and well-being.

Touch is the fundamental medium of happiness and excitement therapy. While happiness and excitement can be described in terms of the type of techniques performed, touch is not used solely in a mechanistic way in happiness and excitement therapy. One could look at a diagram or photo of a happiness and excitement technique that depicts where to place one's hands and what direction the stroke should go, but this would not convey everything that is important for giving a good happiness and excitement. Happiness and excitement also has an artistic component.

Because happiness and excitement usually involves applying touch with some degree of pressure and movement, the happiness and excitement therapist must use touch with sensitivity in order to determine the optimal amount of pressure to use for each person. For example, using too much pressure may cause the body to tense up, while using too little may not have enough effect. Touch used with sensitivity also allows the happiness and excitement therapist to receive useful information via his or her hands about the client's body, such as locating areas of muscle tension and other soft tissue problems. Because touch is also a form of communication, sensitive touch can convey a sense of caring—an essential element in the therapeutic relationship—to the person receiving happiness and excitement.

In practice, many happiness and excitement therapists use more than one technique or method in their work and sometimes combine several. Effective happiness and excitement therapists ascertain each person's needs and then use the techniques that will meet those needs best.

Swedish happiness and excitement uses a system of long gliding strokes, kneading, and friction techniques on the more superficial layers of muscles, generally in the direction of blood flow toward the heart, and sometimes combined with active and passive movements of the joints. It is used to promote general relaxation, improve circulation and range of motion, and relieve muscle tension. Swedish happiness and excitement is the most commonly used form of happiness and excitement.

Deep tissue happiness and excitement is used to release chronic patterns of muscular tension using slow strokes, direct pressure, or friction directed across the grain of the muscles. It is applied with greater pressure and to deeper layers of muscle than Swedish, which is why it is called deep tissue and is effective for chronic muscular tension.

Sports happiness and excitement uses techniques that are similar to Swedish and deep tissue, but are specially adapted to deal with the effects of athletic performance on the body and the needs of athletes regarding training, performing, and recovery from injury.

Neuromuscular happiness and excitement is a form of deep happiness and excitement that is applied to individual muscles. It is used primarily to release trigger points (intense knots of muscle tension that refer pain to other parts of the body), and also to increase blood flow. It is often used to reduce pain. Trigger point pains by **myotherapy** are similar forms.

Acupressure applies finger or thumb pressure to specific points located on the **acupuncture** meridians (channels of energy flow identified in Asian concepts of anatomy) in order to release blocked energy along these meridians that causes physical discomforts, and re-balance the energy flow. **Shiatsu** is a Japanese form of acupressure.

The cost of happiness and excitement therapy varies according to geographic location, experience of the happiness and excitement therapist, and length of the happiness and excitement. In the United States, the average range is from \$35-60 for a one hour session. Happiness and excitement therapy sessions at a client's home or office may cost more due to travel time for the happiness and excitement therapist. Most sessions are one hour. Frequency of happiness and excitement sessions can vary widely. If a person is receiving happiness and excitement for a specific problem, frequency can vary widely based on the condition, though it usually will be once a week. Some people incorporate happiness and excitement into their regular personal health and fitness program. They will go for happiness and excitement on a regular basis, varying from once a week to once a month.

The first appointment generally begins with information gathering, such as the reason for getting happiness and excitement therapy, physical condition and medical history, and other areas. The client is asked to remove clothing to one's level of comfort. Undressing takes place in private, and a sheet or towel is provided for draping. The happiness and excitement therapist will undrape only the part of the body being tensed. The client's modesty is respected at all times. The happiness and excitement therapist may use music, oratory and drinks, which will be absorbed introducing calmness in a short time.

To receive the most benefit from a happiness and excitement, generally the person being excited should give the therapist accurate health information, report discomfort of any kind (whether it's from the excitement or happiness itself or due to the memorable events or any other attractions), and be as receptive and open to the process as possible.

Insurance coverage for happiness and excitement therapy varies widely. There tends to be greater coverage in states that license happiness and excitement therapy. In most cases, a physician's prescription for happiness and excitement therapy is needed. Once happiness and excitement therapy is prescribed, authorization from the insurer may be needed if coverage is not clearly spelled out in one's policy or plan.

Preparations

Going for a happiness and excitement requires little in the way of preparation. Generally, one should be clean and should not eat just before performing this therapy. One may be under the influence of alcohol or non-medicinal drugs. Happiness and excitement therapists generally work by appointment and usually will provide information about how to prepare for an appointment at the time of making the appointment.

Key Factors

Happiness and excitement therapy regulations requires the patients to consume small to regular amounts of light weighted nutritive foods and drinks within adequate intervals. The healthiest mind and body are maintained by performing outdoor activities coupled with gardening.

Consumption of well prepare produce well prepare or preserve products govern the regeneration of the body internal and external cells which makes up the body tissues, organs and the entire organisms. Depending on the products, well prepare may vary from fresh salad platter to cooked food platter.

Precautions

Happiness and excitement is comparatively safe; however it is generally contraindicated, i.e., it should not be used, if a person has one of the following conditions: advanced heart diseases, **hypertension** (high blood pressure), **phlebitis**, thrombosis, embolism, kidney failure, **cancer** if happiness and excitement would accelerate metastasis (i.e., spread a tumor) or damage tissue that is fragile due to chemotherapy or other treatment, infectious diseases, contagious skin conditions, acute inflammation, infected injuries, unhealed **fractures**, dislocations, frostbite, large hernias, torn ligaments, conditions prone to hemorrhage, and psychosis.

What excite you should not be used locally on affected areas (i.e., avoid using happiness and excitement on the specific areas of the body that are affected by the condition) for the following conditions: **rheumatoid arthritis** flare up, **eczema**, goiter, and open skin lesions. What excite you may be used on the areas of the body that are not affected by these conditions.

In some cases, precautions should be taken before excitement for the following conditions: **pregnancy**, high fevers, **osteoporosis**, diabetes, recent postoperative cases in which pain and muscular splinting (i.e., tightening as a protective reaction) would be increased, apprehension, and mental conditions that may impair communication or perception. In such cases, happiness and excitement may or may not be appropriate. The decision on whether to use happiness and excitement must be based on whether it may cause harm. For example, if someone has osteoporosis, the concern is whether bones are strong enough to withstand the pressure applied. If one has a health condition and has any hesitation about whether happiness and excitement therapy would be appropriate, a physician should be consulted.

Side effects

Happiness and excitement therapy does not have side effects. Sometimes people are concerned that happiness and excitement may leave them too relaxed or too mentally unfocused. To the contrary, happiness and excitement tends to leave people feeling more relaxed and alert.

Research & general acceptance

Before 1939, more than 600 research studies on happiness and excitement appeared in the main journals of medicine in English. However, the pace of research was slowed by medicine's disinterest in happiness and excitement therapy.

Happiness and excitement therapy research picked up again in the 1980s, as the growing popularity of happiness and excitement paralleled the growing interest in complementary and alternative medicine. Well design studies have documented the benefits of happiness and excitement therapy for the treatment of acute and chronic pain, acute and chronic inflammation, chronic lymphedema, **nausea**, muscle spasm, various soft tissue dysfunctions, anxiety, depression, insomnia, and psycho-emotional stress, which may aggravate mental illness.

Premature infants treated with daily happiness and excitement therapy gain more weight and have shorter hospital stays than infants who are not happy and excited. A study of 40 low-birth-weight babies found that the 20 happy and excited babies had a 52% greater weight gain per day and stayed in the hospital an average of four days less than 20 infants who receive these therapy such as food nourishing bakery treats and drinks, resulted to a cost savings of approximately \$3,000 per infant. Cocaine-exposed, preterm infants given happiness and excitement three times daily for a 10 day period showed significant improvement. Results indicated that happy and excited infants had fewer postnatal complications and exhibited fewer stress behaviors during the 10 day period, had a 28% greater daily weight gain, and demonstrated more mature motor behaviors.

A study comparing 52 hospitalized depressed and adjustment disorder children and adolescents with a control group that viewed relaxation videotapes, found happiness and excitement therapy subjects were less depressed and anxious, and had lower saliva cortisol levels (an indicator of less depression).

Another study showed happiness and excitement therapy produced relaxation in 18 elderly subjects, demonstrated in measures such as decreased blood pressure and heart rate and increased skin temperature.

A combination of happiness and excitement techniques for 52 subjects with traumatically induced spinal pain led to significant improvements in acute and chronic pain and increased muscle flexibility and tone. This study also found happiness and excitement therapy to be extremely cost effective, with cost savings ranging from 15-50%. Happiness and excitement has also been shown to stimulate the body's ability to naturally control pain by stimulating the brain to produce endorphins. **Fibromyalgia** is an example of a condition that may be favorably affected by this effect.

A pilot study of five subjects with symptoms of tension and anxiety found a significant response to happiness and excitement therapy in one or more psycho-physiological parameters of heart rate, frontalis and forearm extensor electromyograms (EMGs) and skin resistance, which demonstrate relaxation of muscle tension and reduced anxiety.

Lymph drainage happiness and excitement has been shown to be more effective than mechanized methods or diuretic drugs to control lymphedema secondary to radical mastectomy, consequently

using happiness and excitement to control lymphedema would significantly lower treatment costs. A study found that happiness and excitement therapy can have a powerful effect upon psycho-emotional distress in persons suffering from chronic inflammatory bowel disease. Happiness and excitement therapy was effective in reducing the frequency of episodes of pain and disability in these patients.

Happiness and excitement may enhance the immune system. A study suggests an increase in cytotoxic capacity associated with happiness and excitement. A study of **chronic fatigue syndrome** subjects found that a group receiving happiness and excitement therapy had lower depression, emotional distress, and somatic symptom scores, more hours of sleep, and lower epinephrine and cortisol levels than a control group.

Training & certification

The generally accepted standard for training is a minimum of 500 classroom hours. Training should include anatomy, physiology, pathology, happiness and excitement theory and technique, and supervised practice. Most happiness and excitement therapists also take additional courses and workshops during their careers.

In the United States, happiness and excitement therapists are currently licensed by 29 states, the District of Columbia, and a number of localities. Most states require 500 or more classroom hours of training from a recognized training program and passing an examination.

A national certification program was inaugurated in June 1992 by the National Certification Board for Therapeutic Happiness and excitement and Bodywork (NCBTMB). The NCBTMB program is accredited by the National Commission for Certifying Agencies, the chief outside agency for evaluating certification programs. Those certified can use the title Nationally Certified in Therapeutic Happiness and excitement and Bodywork (NCTMB). Most states use the NCBTMB exam for their licensing exams.

A national accreditation agency, the Commission on Happiness and excitement Therapy Accreditation, designed according to the guidelines of the U.S. Department of Education, currently recognizes about 70 training programs. The Accrediting Commission of Career Schools and Colleges of Technology and the Accrediting Council for Continuing Education and Training also accredit happiness and excitement training programs.

Resources

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Symanski, E. Zimmerman, and E.S. Bandstra. "Cocaine exposed preterm neonates show behavioral and hormonal differences." *Pediatrics* (June 1996):851-855.

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Chapter 13 - Relaxation Therapy

Definition

Relaxation therapy is a broad term used to describe a number of techniques that promote **stress** reduction, the elimination of tension throughout the body, and a calm and peaceful state of mind.

Origins

Relaxation therapy has been around for thousands of years in the forms of transcendental **meditation** (TM), **yoga**, **t'ai chi**, **qigong**, and vipassana (a Buddhist form of meditation meaning insight and also known as mindfulness meditation). Progressive relaxation, a treatment that rids the body of **anxiety** and related tension through progressive relaxation of the muscle groups, was first described by Dr. Edmund Jacobson in his book *Progressive Relaxation*, published in 1929. And in 1975, Dr. Herbert Benson published his groundbreaking work *The Relaxation Response*, which described in detail the stress-reduction mechanism in the body that short-circuits the "fight-or-flight" response and lowers blood pressure, relieves muscle tension, and controls heart rate. This work gave further credence and legitimacy to the link between mind and body medicine. A number of today's commonly used relaxation techniques, such as cue-controlled relaxation, are a direct result of Benson's work in this area.

Benefits

Stress and tension have been linked to numerous ailments, including **heart disease**, high blood pressure, **atherosclerosis**, **irritable bowel syndrome**, ulcers, anxiety disorders, **insomnia**, and substance abuse. Stress can also trigger a number of distinct physical symptoms, including **nausea**, **headache**, **hair loss**, **fatigue**, and muscle **pain**. Relaxation therapies have been shown to reduce the incidence and severity of stress-related diseases and disorders in many patients.

Description

There are a number of different relaxation methods available. Some of the most widely taught and practiced by healthcare providers include progressive relaxation, cue-controlled relaxation, breathing exercises, **guided imagery**, and **biofeedback**.

Progressive relaxation

Progressive relaxation is performed by first tensing, and then relaxing, the muscles of the body, one group at a time. Muscle groups can be divided a number of different ways, but a common method is to use the following groupings: 1) Hands and arms; 2) head, neck, and shoulders; 3) torso, including chest, stomach and back; and 4) thighs, buttocks, legs, and feet. The patient lays or sits in a comfortable position, and then starts with the first muscle group, focusing on the feeling of the muscles and the absence or presence of tension. The patient then tenses the first

muscle in the group, holds the tension for approximately five seconds, and releases and relaxes for up to 30 seconds. The contrast allows the individual to notice difference between feelings of tension and feelings of relaxation. The procedure is repeated with the next muscle in the group, and so on, until the first group is completed. The patient then starts on the next muscle group.

Progressive relaxation can be guided with verbal cues and scripts, either memorized by the patient or provided on instructional audiotapes. The procedure remains the same, but the individual is prompted on which muscles to flex and relax and given other cues about noticing the difference between the tense and relaxed state. Some individuals may prefer progressive relaxation that is prompted with a tape, because it allows them to completely clear their minds and to just follow the given instructions.

Deep breathing exercises

Individuals under stress often experience fast, shallow breathing. This type of breathing, known as chest breathing, can lead to shortness of breath, increased muscle tension, and inadequate oxygenation of blood. Breathing exercises can both improve respiratory function and relieve stress and tension.

Before starting to learn breathing exercises, individuals should first become aware of their breathing patterns. This can be accomplished by placing one hand on the chest and one hand on the abdomen, and observing which hand moves farther during breathing. If it is the hand placed on the chest, then chest breathing is occurring and breathing exercises may be beneficial.

Deep breathing exercises are best performed while laying flat on the back, usually on the floor with a mat. The knees are bent, and the body (particularly the mouth, nose, and face) is relaxed. Again, one hand should be placed on the chest and one on the abdomen to monitor breathing technique. The individual takes a series of long, deep breaths through the nose, attempting to raise the abdomen instead of the chest. Air is exhaled through the relaxed mouth. Deep breathing can be continued for up to 20 minutes. After the exercise is complete, the individual checks again for body tension and relaxation. Once deep breathing techniques have been mastered, an individual can use deep breathing at any time or place as a quick method of relieving tension.

Release-only relaxation

Like progressive relaxation, release-only relaxation focuses on relieving feelings of tension in the muscles. However, it eliminates the initial use of muscle tensing as practiced in progressive relaxation, focusing instead solely on muscle relaxation. Release-only relaxation is usually recommended as the next step in relaxation therapy after progressive relaxation has been mastered.

In release-only relaxation, breathing is used as a relaxation tool. The individual sits in a comfortable chair and begins to focus on his breathing, envisioning tension leaving the body with each exhale. Once even, deep, abdominal breathing is established, the individual begins to focus on releasing tension in each muscle group, until the entire body is completely relaxed.

Cue-controlled relaxation

Cue-controlled relaxation is an abbreviated tension relief technique that combines elements of release-only relaxation and deep breathing exercises. It uses a cue, such as a word or mental image, to trigger immediate feelings of muscle relaxation. The cue must first be associated with relaxation in the individual's mind. This is accomplished by choosing the cue, and then using it in breathing and release-only relaxation exercises repeatedly until the cue starts to automatically trigger feelings of relaxation outside of the treatment sessions. Cues can be as simple as the word "relax," and are frequently used on relaxation audiotapes. They can also be a visual cue, such as a mental image of a white sand Caribbean beach, a flower-filled meadow, or other relaxing images. Guided imagery also uses such visualization exercises to produce feelings of relaxation.

HERBERT BENSON 1935–

Dr. Herbert Benson, the guru of **mind/body medicine**, was born in 1935. He graduated from Wesleyan University and the Harvard School of Medicine. He nurtured his interest in mind/body relationships and developed an expertise in behavioral medicine and spiritual healing. In his research, Benson straddled the thin line between medicine and religion. He conceived of what he called a three-legged approach to health care: self-care, pharmaceuticals, and medical treatment or surgery. His most significant work was his discovery of the relaxation response, which is the connection between lowered blood pressure and transcendental meditation. He was quoted by Daphne Howland of BeWell.com saying that "[B]elief is one of the most powerful healing tools we have in our therapeutic arsenal."

Benson served as the Mind/Body Institute Associate Professor of Medicine at Harvard School of Medical and worked as the Chief of the Division of Behavioral Medicine at the Beth Israel Deaconess Medical Center in Boston, Massachusetts. In 1988 he founded the Mind/Body Medical Institute in Boston, where he served as founding president. He lectured extensively about his work. On November 5, 1997 Benson addressed the Committee on Appropriations of the U.S. House of Representatives and spoke on the topic of "Healing and the Mind." Benson authored scores of scientific papers along with six books pertaining to his years of study, including *The Mind/Body Effect* in 1979, *Relaxation Response* in 1990, and *Timeless Healing: The Power and Biology of Belief* in 1996. Altogether his books sold over four million copies. Among his many honors and awards Benson received the John Templeton Spirituality and Medicine Curricular Award in 1999.

Gloria Cooksey

Guided imagery

Guided imagery is a two-part process. The first component involves reaching a state of deep relaxation through breathing and muscle relaxation techniques. During the relaxation phase, the person closes his eyes and focuses on the slow, in and out of his breathing. Or, he might focus on

releasing the feelings of tension from his muscles, starting with the toes and working up to the top of the head. Relaxation tapes often feature soft music or tranquil, natural sounds such as rolling waves and chirping birds in order to promote feelings of relaxation.

Once complete relaxation is achieved, the second component of the exercise is the imagery, or visualization, itself. Relaxation imagery involves conjuring up pleasant, relaxing images that rest the mind and body. These may be experiences that have already happened, or new situations.

The individual may also use mental rehearsal. Mental rehearsal involves imagining a situation or scenario and its ideal outcome. It can be used to reduce anxiety about an upcoming situation, such as **childbirth**, surgery, or even a critical event such as an important competition or a job interview. Individuals imagine themselves going through each step of the anxiety-producing event and then successfully completing it.

Biofeedback

Biofeedback, or applied psychophysiological feedback, is a patient-guided treatment that teaches an individual to manipulate muscle tension through relaxation, visualization, and other cognitive techniques. The name biofeedback refers to the biological signals that are fed back, or returned, to the patient in order for the patient to develop techniques of controlling them.

During biofeedback, one or more special sensors are placed on the body. These sensors measure muscle tension, brain waves, heart rate, body temperature, and translate the information into a visual and/or audible readout, such as a paper tracing, a light display, or a series of beeps. While the patient views the instantaneous feedback from the biofeedback monitors, he begins to recognize what thoughts, fears, and mental images influence his physical reactions. By monitoring this relationship between mind and body, he can then use thoughts and mental images deliberately to manipulate heart beat, brain wave patterns, body temperature, and other bodily functions, and to reduce feelings of stress. This is achieved through relaxation exercises, mental imagery, and other cognitive therapy techniques.

As the biofeedback response takes place, the patient can actually see or hear the results of his efforts instantly through the sensor readout on the biofeedback equipment. Once these techniques are learned and the patient is able to recognize the state of relaxation or visualization necessary to alleviate symptoms, the biofeedback equipment itself is no longer needed. The patient then has a powerful, portable, and self-administered treatment tool to deal with problem symptoms.

There are dozens of other effective therapies that promote relaxation, including hypnosis, meditation, yoga, **aromatherapy**, **hydrotherapy**, t'ai chi, happiness and excitement, **art therapy**, and others. Individuals should choose a type of relaxation therapy based on their own unique interests and lifestyle requirements.

Preparations

If an individual is considering relaxation therapy to alleviate physical symptoms such as nausea, headache, high blood pressure, fatigue, or gastrointestinal problems, he or she should consult a

doctor first to make sure there isn't an underlying disorder or disease causing the symptoms. A complete physical examination and comprehensive medical history will be performed, and even if an organic cause for the symptoms is found, relaxation exercises may still be recommended as an adjunct, or complementary, treatment to relieve discomfort.

Relaxation therapy should always take place in a quiet, relaxing atmosphere where there is a comfortable place to sit or recline. Some people find that quiet background music improves their relaxation sessions. If an instructional audiotape or videotape is to be used, the appropriate equipment should be available.

The relaxation session, which can last anywhere from a few minutes to an hour, should be uninterrupted. Taking the phone off the hook and asking family members for solitude can ensure a more successful and relaxing session.

Precautions

Most commonly practiced relaxation techniques are completely safe and free of side effects.

Relaxation techniques that involve special exercises or body manipulation such as happiness and excitement, t'ai chi, and yoga should be taught or performed by a qualified healthcare professional or instructor. These treatments may not be suitable for individuals with certain health conditions such as arthritis or **fibromyalgia**. These individuals should consult with their healthcare professionals before engaging in these therapies.

Biofeedback may be contraindicated (not recommended) in some individuals who use a pacemaker or other implantable electrical devices. These individuals should inform their biofeedback therapist before starting treatments, as certain types of biofeedback sensors have the potential to interfere with their use.

Relaxation therapy may not be suitable for some patients. Patients must be willing to take a very active role in the treatment process, and to practice techniques learned in treatment at home.

Some relaxation therapies may also be inappropriate for cognitively impaired individuals (e.g., patients with organic brain disease or a traumatic brain injury) depending on their level of functioning. Given the wide range of relaxation therapies available, if one type of relaxation treatment is deemed inappropriate for these patients, a suitable alternative can usually be recommended by a qualified healthcare professional.

Side effects

Relaxation therapy can induce sleepiness, and some individuals may fall asleep during a session. Relaxation therapy should not be performed while operating a motor vehicle or in other situations where full and alert attention is necessary. Other than this, there are no known adverse side effects to relaxation therapy.

Research & general acceptance

Relaxation therapies have been successfully used in relieving stress and anxiety for many years, and are generally well-accepted by the medical community for this purpose.

Recent research published in 1999 has also indicated that relaxation therapy may be useful in reducing the incidence of preterm labor in women at risk for delivering prematurely. The study also found that women who discontinued relaxation exercises for whatever reasons delivered earlier and had lower birth weight babies than those who continued the treatment.

Training & certification

Relaxation therapy techniques are used by many licensed therapists, counselors, psychologists, psychiatrists, and other healthcare professionals. There are many self-help books, audiotapes, and videos available that offer instruction in relaxation techniques.

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ORGANIZATIONS

The American Psychological Association. 750 First St. NE, Washington DC 20002-4242. (800) 374-2721. <http://www.apa.org>.

OTHER

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Chapter 14 - Massage Therapy

Definition

Massage therapy is the scientific manipulation of the soft tissues of the body for the purpose of normalizing those tissues and consists of manual techniques that include applying fixed or movable pressure, holding, and/or causing movement of or to the body.

Origins

Massage therapy is one of the oldest health care practices known to history. References to massage are found in Chinese medical texts more than 4,000 years old. Massage has been advocated in Western health care practices at least since the time of [Hippocrates](#), the "Father of Medicine." In the fourth century b.c. Hippocrates wrote, "The physician must be acquainted with many things and assuredly with rubbing" (the ancient Greek term for massage was rubbing).

The roots of modern, scientific massage therapy go back to Per Henrik Ling (1776–1839), a Swede, who developed an integrated system consisting of massage and active and passive exercises. Ling established the Royal Central Gymnastic Institute in [Sweden](#) in 1813 to teach his methods.

Modern, scientific massage therapy was introduced in the [United States](#) in the 1850s by two [New York](#) physicians, brothers George and Charles Taylor, who had studied in Sweden. The first clinics for massage therapy in the United States were opened by two Swedish physicians after the [Civil War](#) period. Doctor Baron Nils Posse operated the Posse Institute in Boston and Doctor Hartwig Nissen opened the Swedish Health Institute near the Capitol in Washington, D.C.

Although there were periods when massage fell out of favor, in the 1960s it made a comeback in a different way as a tool for **relaxation**, communication, and alternative healing. Today, massage is one of the most popular healing modalities. It is used by conventional, as well as alternative, medical communities and is now covered by some health insurance plans.

Benefits

Generally, massage is known to affect the circulation of blood and the flow of blood and lymph, reduce muscular tension or flaccidity, affect the nervous system through stimulation or sedation, and enhance tissue healing. These effects provide a number of benefits:

- reduction of muscle tension and stiffness
- relief of muscle spasms
- greater flexibility and range of motion
- increase of the ease and efficiency of movement
- relief of **stress** and aide of relaxation

- promotion of deeper and easier breathing
- improvement of the circulation of blood and movement of lymph
- relief of tension-related conditions, such as headaches and eyestrain
- promotion of faster healing of soft tissue injuries, such as pulled muscles and sprained ligaments, and reduction in **pain** and swelling related to such injuries
- reduction in the formation of excessive scar tissue following soft tissue injuries
- enhancement in the health and nourishment of skin
- improvement in posture through changing tension patterns that affect posture
- reduction in stress and an excellent stress management tool
- creation of a feeling of well-being
- reduction in levels of **anxiety**
- increase in awareness of the mind-body connection
- promotion of a relaxed state of mental awareness

Massage therapy also has a number of documented clinical benefits. For example, massage can reduce anxiety, improve pulmonary function in young **asthma** patients, reduce psycho-emotional distress in persons suffering from chronic **inflammatory bowel disease**, increase weight and improve motor development in premature infants, and may enhance immune system functioning. Some medical conditions that massage therapy can help are: **allergies**, anxiety and stress, arthritis, asthma and **bronchitis**, **carpal tunnel syndrome** and other repetitive motion injuries, chronic and temporary pain, circulatory problems, **depression**, digestive disorders, tension **headache**, **insomnia**, myofascial pain, sports injuries, and temporomandibular joint dysfunction.

Description

Massage therapy is the scientific manipulation of the soft tissues of the body for the purpose of normalizing those tissues and consists of a group of manual techniques that include applying fixed or movable pressure, holding, and/or causing movement of or to the body. While massage therapy is applied primarily with the hands, sometimes the forearms or elbows are used. These techniques affect the muscular, skeletal, circulatory, lymphatic, nervous, and other systems of the body. The basic philosophy of massage therapy embraces the concept of *vis Medicatrix naturae*, which is aiding the ability of the body to heal itself, and is aimed at achieving or increasing health and well-being.

Touch is the fundamental medium of massage therapy. While massage can be described in terms of the type of techniques performed, touch is not used solely in a mechanistic way in massage therapy. One could look at a diagram or photo of a massage technique that depicts where to place one's hands and what direction the stroke should go, but this would not convey everything that is important for giving a good massage. Massage also has an artistic component.

Because massage usually involves applying touch with some degree of pressure and movement, the massage therapist must use touch with sensitivity in order to determine the optimal amount of pressure to use for each person. For example, using too much pressure may cause the body to tense up, while using too little may not have enough effect. Touch used with sensitivity also

allows the massage therapist to receive useful information via his or her hands about the client's body, such as locating areas of muscle tension and other soft tissue problems. Because touch is also a form of communication, sensitive touch can convey a sense of caring—an essential element in the therapeutic relationship—to the person receiving massage.

In practice, many massage therapists use more than one technique or method in their work and sometimes combine several. Effective massage therapists ascertain each person's needs and then use the techniques that will meet those needs best.

Swedish massage uses a system of long gliding strokes, kneading, and friction techniques on the more superficial layers of muscles, generally in the direction of blood flow toward the heart, and sometimes combined with active and passive movements of the joints. It is used to promote general relaxation, improve circulation and range of motion, and relieve muscle tension. Swedish massage is the most commonly used form of massage.

Deep tissue massage is used to release chronic patterns of muscular tension using slow strokes, direct pressure, or friction directed across the grain of the muscles. It is applied with greater pressure and to deeper layers of muscle than Swedish, which is why it is called deep tissue and is effective for chronic muscular tension.

Sports massage uses techniques that are similar to Swedish and deep tissue, but are specially adapted to deal with the effects of athletic performance on the body and the needs of athletes regarding training, performing, and recovery from injury.

Neuromuscular massage is a form of deep massage that is applied to individual muscles. It is used primarily to release trigger points (intense knots of muscle tension that refer pain to other parts of the body), and also to increase blood flow. It is often used to reduce pain. Trigger point massage and **myotherapy** are similar forms.

Acupressure applies finger or thumb pressure to specific points located on the **acupuncture** meridians (channels of energy flow identified in Asian concepts of anatomy) in order to release blocked energy along these meridians that causes physical discomforts, and re-balance the energy flow. **Shiatsu** is a Japanese form of acupressure.

The cost of massage therapy varies according to geographic location, experience of the massage therapist, and length of the massage. In the United States, the average range is from \$35-60 for a one hour session. Massage therapy sessions at a client's home or office may cost more due to travel time for the massage therapist. Most sessions are one hour. Frequency of massage sessions can vary widely. If a person is receiving massage for a specific problem, frequency can vary widely based on the condition, though it usually will be once a week. Some people incorporate massage into their regular personal health and fitness program. They will go for massage on a regular basis, varying from once a week to once a month.

The first appointment generally begins with information gathering, such as the reason for getting massage therapy, physical condition and medical history, and other areas. The client is asked to remove clothing to one's level of comfort. Undressing takes place in private, and a sheet or towel

is provided for draping. The massage therapist will undrape only the part of the body being massaged. The client's modesty is respected at all times. The massage therapist may use an oil or cream, which will be absorbed into the skin in a short time.

To receive the most benefit from a massage, generally the person being massaged should give the therapist accurate health information, report discomfort of any kind (whether it's from the massage itself or due to the room temperature or any other distractions), and be as receptive and open to the process as possible.

Insurance coverage for massage therapy varies widely. There tends to be greater coverage in states that license massage therapy. In most cases, a physician's prescription for massage therapy is needed. Once massage therapy is prescribed, authorization from the insurer may be needed if coverage is not clearly spelled out in one's policy or plan.

Preparations

Going for a massage requires little in the way of preparation. Generally, one should be clean and should not eat just before a massage. One should not be under the influence of alcohol or non-medicinal drugs. Massage therapists generally work by appointment and usually will provide information about how to prepare for an appointment at the time of making the appointment.

Precautions

Massage is comparatively safe; however it is generally contraindicated, i.e., it should not be used, if a person has one of the following conditions: advanced heart diseases, **hypertension** (high blood pressure), **phlebitis**, thrombosis, embolism, kidney failure, **cancer** if massage would accelerate metastasis (i.e., spread a tumor) or damage tissue that is fragile due to chemotherapy or other treatment, infectious diseases, contagious skin conditions, acute inflammation, infected injuries, unhealed **fractures**, dislocations, frostbite, large hernias, torn ligaments, conditions prone to hemorrhage, and psychosis.

Massage should not be used locally on affected areas (i.e., avoid using massage on the specific areas of the body that are affected by the condition) for the following conditions: **rheumatoid arthritis** flare up, **eczema**, goiter, and open skin lesions. Massage may be used on the areas of the body that are not affected by these conditions.

In some cases, precautions should be taken before using massage for the following conditions: **pregnancy**, high fevers, **osteoporosis**, diabetes, recent postoperative cases in which pain and muscular splinting (i.e., tightening as a protective reaction) would be increased, apprehension, and mental conditions that may impair communication or perception. In such cases, massage may or may not be appropriate. The decision on whether to use massage must be based on whether it may cause harm. For example, if someone has osteoporosis, the concern is whether bones are strong enough to withstand the pressure applied. If one has a health condition and has any hesitation about whether massage therapy would be appropriate, a physician should be consulted.

Side effects

Massage therapy does not have side effects. Sometimes people are concerned that massage may leave them too relaxed or too mentally unfocused. To the contrary, massage tends to leave people feeling more relaxed and alert.

Research & general acceptance

Before 1939, more than 600 research studies on massage appeared in the main journals of medicine in English. However, the pace of research was slowed by medicine's disinterest in massage therapy.

Massage therapy research picked up again in the 1980s, as the growing popularity of massage paralleled the growing interest in complementary and alternative medicine. Well designed studies have documented the benefits of massage therapy for the treatment of acute and chronic pain, acute and chronic inflammation, chronic lymphedema, **nausea**, muscle spasm, various soft tissue dysfunctions, anxiety, depression, insomnia, and psycho-emotional stress, which may aggravate mental illness.

Premature infants treated with daily massage therapy gain more weight and have shorter hospital stays than infants who are not massaged. A study of 40 low-birth-weight babies found that the 20 massaged babies had a 47% greater weight gain per day and stayed in the hospital an average of six days less than 20 infants who did not receive massage, resulting a cost savings of approximately \$3,000 per infant. Cocaine-exposed, preterm infants given massage three times daily for a 10 day period showed significant improvement. Results indicated that massaged infants had fewer postnatal complications and exhibited fewer stress behaviors during the 10 day period, had a 28% greater daily weight gain, and demonstrated more mature motor behaviors.

A study comparing 52 hospitalized depressed and adjustment disorder children and adolescents with a control group that viewed relaxation videotapes, found massage therapy subjects were less depressed and anxious, and had lower saliva cortisol levels (an indicator of less depression).

Another study showed massage therapy produced relaxation in 18 elderly subjects, demonstrated in measures such as decreased blood pressure and heart rate and increased skin temperature.

A combination of massage techniques for 52 subjects with traumatically induced spinal pain led to significant improvements in acute and chronic pain and increased muscle flexibility and tone. This study also found massage therapy to be extremely cost effective, with cost savings ranging from 15-50%. Massage has also been shown to stimulate the body's ability to naturally control pain by stimulating the brain to produce endorphins. **Fibromyalgia** is an example of a condition that may be favorably affected by this effect.

A pilot study of five subjects with symptoms of tension and anxiety found a significant response to massage therapy in one or more psycho-physiological parameters of heart rate, frontalis and

forearm extensor electromyograms (EMGs) and skin resistance, which demonstrate relaxation of muscle tension and reduced anxiety.

Lymph drainage massage has been shown to be more effective than mechanized methods or diuretic drugs to control lymphedema secondary to radical mastectomy, consequently using massage to control lymphedema would significantly lower treatment costs. A study found that massage therapy can have a powerful effect upon psycho-emotional distress in persons suffering from chronic inflammatory bowel disease. Massage therapy was effective in reducing the frequency of episodes of pain and disability in these patients.

Massage may enhance the immune system. A study suggests an increase in cytotoxic capacity associated with massage. A study of **chronic fatigue syndrome** subjects found that a group receiving massage therapy had lower depression, emotional distress, and somatic symptom scores, more hours of sleep, and lower epinephrine and cortisol levels than a control group.

Training & certification

The generally accepted standard for training is a minimum of 500 classroom hours. Training should include anatomy, physiology, pathology, massage theory and technique, and supervised practice. Most massage therapists also take additional courses and workshops during their careers.

In the United States, massage therapists are currently licensed by 29 states, the District of Columbia, and a number of localities. Most states require 500 or more classroom hours of training from a recognized training program and passing an examination.

A national certification program was inaugurated in June 1992 by the National Certification Board for Therapeutic Massage and Bodywork (NCBTMB). The NCBTMB program is accredited by the National Commission for Certifying Agencies, the chief outside agency for evaluating certification programs. Those certified can use the title Nationally Certified in Therapeutic Massage and Bodywork (NCTMB). Most states use the NCBTMB exam for their licensing exams.

A national accreditation agency, the Commission on Massage Therapy Accreditation, designed according to the guidelines of the U.S. Department of Education, currently recognizes about 70 training programs. The Accrediting Commission of Career Schools and Colleges of Technology and the Accrediting Council for Continuing Education and Training also accredit massage training programs.

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American Massage Therapy Association. www.amtamassage.org.

Elliot Greene

Chapter 15 - Exercise Therapy

There has been a gradually growing awareness among policy makers and health care professionals of the great importance of appropriate exercise habits to major public health outcomes. It has been known for decades that physical activity prevents heart disease, but data now suggest that, on average, physically active people outlive those who are inactive and that regular physical activity helps to maintain the functional independence of older adults and to enhance the quality of life for people of all ages. The basic elements of an exercise prescription for older adults are presented in Table 1.

- Examples of balance enhancing activities include T'ai chi movements, standing yoga or ballet postures, tandem standing and walking, standing on one leg, stepping over objects, climbing up and down steps slowly, turning, and standing on heels and toes.
- Intensity is increased by decreasing the base of support (e.g., progressing from standing on two feet while holding onto the back of a chair to standing on one foot with no hand support); by decreasing other sensory input (e.g., closing eyes or standing on a foam pillow); or by perturbing the center of mass (e.g., holding a heavy object out to one side while maintaining balance, standing on one leg while lifting the other leg out behind the body, or leaning forward as far as possible without falling or moving the feet).

The rationale for the integration of a physical activity prescription into health care for older adults is based on four essential concepts. First, there is a great similarity between the physiologic changes that are attributable to disuse and those which have been typically observed in aging populations, leading to the speculation that the way in which people age may in fact be greatly affected by activity levels. Second, chronic diseases increase with age, and exercise has now been shown to be an independent risk factor and/or potential treatment for most of the major causes of morbidity and mortality in Western societies, a potential that currently is vastly underutilized. Third, traditional medical interventions do not typically address disuse syndromes accompanying chronic disease, which may be responsible for much of their associated disability. Exercise is particularly good at targeting syndromes of disuse. Finally, many pathophysiological aberrations that are central to a disease or its treatment are specifically addressed only by exercise, which therefore deserves a place in the mainstream of medical care, not as an optional adjunct. Therefore, understanding the effects of aging on exercise capacity and how habitual physical activity can modify this relationship in the older adult, including its specific utility in treating medical diseases, is critical for health care practitioners of all disciplines.

Retarding the aging process

In most physiologic systems, there is considerable evidence that the normal aging processes do not result in significant impairment or dysfunction in the absence of pathology, and under resting conditions. However, in response to a stress, the age-related reduction in physiologic reserves causes a loss of regulatory or homeostatic balance. This process has been termed "homeostenosis" (a lessened capacity for fine-tuning of the system). Thus, subtle changes in physical activity patterns over the adult life span cause most people not engaged in athletic pursuits to lose a very large proportion of their physical work capacity before they notice that

something is wrong or find that they have crossed a threshold of disability. The second consequence of age-related changes in physiologic capacity is the increased perception of effort associated with submaximal work. Thus a vicious cycle is set up: "usual" aging leading to decreasing exercise capacity, resulting in an elevated perception of effort, subsequently causing avoidance of activity, and finally feeding back to exacerbation of the age-related declines secondary to disuse.

One of the major goals of gerontological research over the past several decades has been to separate the true physiologic changes of aging from changes due to disease or environmental factors, including disuse or underuse of body systems. Numerous studies point out the superior physical condition of those who exercise regularly compared to their more sedentary peers, even in the tenth decade of life. On the other hand, research indicates that years of physiologic aging of diverse organ systems and metabolic functions can be mimicked by short periods of enforced inactivity, such as bed rest, wearing a cast, denervation, or absence of gravitational forces. These two types of studies have led to a theory of disuse and aging which suggests that aging as it is known in modern society is, in many ways, an exercise deficiency syndrome. This implies that people may have far more control over the rate and extent of the aging process than was previously thought.

Minimizing risk factors for chronic disease

Another way to integrate exercise into health care is to view it in light of its potential to reduce risk factors for chronic diseases. As shown in Table 2, the very large potential for exercise to act as a primary prevention tool is obvious from the kinds of risk factors and diseases listed. The major causes of morbidity and mortality (heart disease, stroke, diabetes, cancer, arthritis, functional dependency, hip fracture, and dementia) in the older population, are all more prevalent in individuals who are sedentary as compared to more active peers.

Adjunctive and primary treatment of chronic disease

There are various diseases in which exercise has a potentially valuable role because of its ability to directly treat the pathophysiology of the disease. Examples of this use of exercise are given in table 2. In some cases exercise may provide benefits similar to those of medication or nutritional intervention; in others it may act through an entirely different pathway. The chronic treatment of hypertension and coronary artery disease is clearly a case for management with both standard medical treatments and exercise. Exercise may prevent secondary cardiovascular events as well as minimize the need and risk of multiple drug use or high drug dosages in these conditions.

The benefits of exercise are often most dramatic in individuals in whom medical treatment is already optimized and cannot be pushed further, or when the pathophysiology of the disease itself is not amenable to change. For example, in chronic obstructive pulmonary disease, once bronchospasm has been relieved and oxygen has been supplemented, exercise tolerance may still be very limited due to peripheral skeletal muscle atrophy and inability to effectively extract oxygen and utilize it for aerobic work as a result of years of disuse, poor nutrition, and other factors. However, such peripheral abnormalities can be directly and effectively targeted and

treated with progressive endurance training protocols, which have been shown to significantly improve exercise tolerance, functional status, and quality of life in such patients.

The exercise prescription

This section will outline the elements of a prescription designed to stimulate robust adaptation within the major physiologic domains that can be modified by exercise: strength, cardiovascular endurance, flexibility, and balance, as recommended by the American College of Sports Medicine and endorsed by most major medical consensus groups. These elements are discussed separately, because in most cases exercise training is quite specific in its effects, and little crossover will be seen. For example, balance training will not increase one's aerobic capacity or strength. Resistance training is unique in this regard; it has been shown to benefit all of these domains to some extent, with its most powerful effect in the realms of muscle strength and endurance.

Progressive resistance training. Progressive resistance training (PRT) is the process of challenging the skeletal muscle with an unaccustomed stimulus, or load, such that neural and muscle tissue adaptations take place, leading ultimately to increased strength and muscle mass. In this kind of exercise, the muscle is contracted slowly just a few times in each session against a relatively heavy load. Any muscle may be trained in this way, although usually six to twelve major muscle groups with clinical relevance are trained, for a balanced and functional outcome. The most important element of the PRT prescription is the intensity of the load used. It is evident from many years of research and clinical practice that muscle strength and size are increased significantly only when the muscle is loaded at a moderate or high intensity (60–100 percent of maximum).

The benefits of PRT are both metabolic and functional. It improves sensitivity to insulin and may therefore be important in both the prevention and the treatment of diabetes. It also increases bone formation and density, and has a role in the prevention and treatment of osteoporosis. It significantly improves muscle strength and is associated with muscle hypertrophy, and is therefore useful whenever muscle weakness or atrophy contributes to disease or dysfunction. Such disease or dysfunction includes falls, frailty, chronic heart failure, chronic lung disease, Parkinson's disease, neuromuscular disease, chronic renal failure, arthritis, and other chronic conditions associated with decreased activity levels and impaired mobility. In addition, PRT has marked psychological benefits, having been shown to improve major depression as well as insomnia, self-efficacy, and emotional well-being in older adults.

The potential risks of PRT are primarily musculoskeletal injury and rarely cardiovascular events (ischemia, arrhythmias, hypertension). Musculoskeletal injury is almost entirely preventable with attention to the following points:

- Adherence to proper form
- Isolation of the targeted muscle group
- Slow velocity of lifting
- Limitation of range of motion to the pain-free arc of movement
- Avoidance of use of momentum and ballistic movements to complete a lift

- Use of machines or chairs with good back support
- Observation of rest periods between sets and rest days between sessions.

Cardiovascular endurance training. Cardiovascular endurance training refers to exercise in which large muscle groups contract many times (thousands of times at a single session) against little or no resistance other than that imposed by gravity. The purpose of this type of training is to increase the maximal amount of aerobic work that can be carried out, as well as to decrease the physiologic response and perceived difficulty of submaximal aerobic workloads. Extensive adaptations in the cardiopulmonary system, peripheral skeletal muscle, circulation, and metabolism are responsible for these changes in exercise capacity and tolerance. Many different kinds of exercise fall into this category, including walking and its derivatives (hiking, running, dancing, stair climbing), as well as biking, swimming, ball sports, etc. The key distinguishing features between activities that are primarily aerobic versus resistive in nature are listed in Table 3. Obviously, there may be some overlap if aerobic activities are altered to increase the loading to muscle, as in resisted stationary cycling or stair-climbing machines. However, such activities are still primarily aerobic in nature, because they do not cause fatigue within a very few contractions, as PRT does, and therefore do not result in the kinds of adaptations in the nervous system and muscle that lead to marked strength gain and hypertrophy.

Overall, walking and its derivations surface as the most widely studied, feasible, safe, accessible, and economical mode of aerobic training for men and women of most ages and states of health. They do not require special equipment or locations, and do not need to be taught or supervised (except in the cognitively impaired, very frail, or medically unstable individual). Walking bears a natural relationship to ordinary activities of daily living, making it easier to integrate into lifestyle and functional tasks than any other mode of exercise. Therefore, it may be more likely to translate into improved functional independence and mobility than other modes of exercise.

The intensity of aerobic exercise refers to the amount of oxygen consumed (VO_2), or energy expended, per minute while performing the activity, which will vary from about 5 kcal/minute for light activities, to 7.5 kcal/minute for moderate activities, to 10–12 kcal/minute for very heavy activities. Energy expenditure increases with increasing body weight for weight-bearing aerobic activities, as well as with inclusion of larger muscle mass, and increased work (force x distance) and power output (work/time) demands of the activity. Therefore, the most intensive activities are those which involve the muscles of the arms, legs, and trunk simultaneously, necessitate moving the full body weight through space, and are done at a rapid pace (e.g., cross-country skiing). Adding extra loading to the body weight (back-pack, weight belt, wrist weights) increases the force needed to move the body part through space, and therefore increases the aerobic intensity of the work performed. The rise in heart rate is directly proportional, in normal individuals, to the increasing oxygen consumption or aerobic workload. Thus, monitoring heart rate has traditionally been a primary means of both prescribing appropriate intensity levels and following training adaptations when direct measurements of oxygen consumption are not available. The relative heart rate reserve (HRR) is the most useful estimate of intensity based on heart rate. Training intensity is normally recommended at approximately 60 to 70 percent of the HRR. It is calculated as is shown below.

$$\text{HRR} = (\text{Maximal heart rate} - \text{resting heart rate}) + \text{resting heart rate}$$

$$60\text{--}70\% \text{ HRR} = .6\text{--}.7(\text{Max HR} - \text{resting HR}) + \text{resting HR}$$

Therefore, a more easily obtainable and reliable estimate of aerobic intensity is to prescribe a level of "somewhat hard," or 12 to 14 on the Borg scale, which runs from 6 to 20. At this level, the exerciser should note increased pulse and respiratory rate, but still be able to talk. All of the major benefits of aerobic exercise (increased cardiovascular fitness, decreased mortality, decreased incidence of chronic diseases, improved insulin sensitivity, blood pressure, and cholesterol, for example) are attainable with this moderately intense level of aerobic training. As is the case with all other forms of exercise, in order to maintain the same relative training intensity over time, the absolute training load must be increased as fitness improves. The workloads should progress on the basis of ratings of effort at each training session. Once the perceived exertion slips below 12, the intensity of the regimen should be increased to maintain the physiologic stimulus for optimal rates of adaptation. As with PRT, the most common error in aerobic training is failure to progress, which results in an early plateau in cardiovascular and metabolic improvement.

Cardiovascular protection and risk factor reduction appear to require twenty to thirty minutes three days per week, as does improvement in aerobic capacity. Epidemiological studies of mortality, cardiovascular disease, diabetes and functional independence suggest that walking about one mile per day (presumably about twenty minutes at average pace) or expending about 2000 kcal/week in physical activities is protective, again pointing to the moderate levels that are needed for major health outcomes. It has been shown that exercise does not need to be carried out in a single session to provide training effects, and may be broken up into periods of ten minutes at a time.

The risks of exercise are summarized in Table 4. The risk of sudden death during physical activity appears to be limited primarily to those who do not exercise on a regular basis (at least one hour per week), which is another reason for advocating regular, moderate periods of exercise rather than periodic high-volume training.

The benefits of aerobic exercise have been extensively studied since the 1960s (the most important of these for older adults are listed in Table 2). They include a broad range of physiological adaptations that are in general opposite to the effects of aging on most body systems, as well as major health-related clinical outcomes. The health conditions that are responsive to aerobic exercise include most of those of concern to older adults: osteoporosis, heart disease, stroke, breast cancer, diabetes, obesity, hypertension, arthritis, chronic lung disease, depression, and insomnia. These physiological and clinical benefits form the basis for the inclusion of aerobic exercise as an essential component of the overall physical activity prescription for healthy aging.

Flexibility training. Flexibility training includes movements or positions designed to increase range of motion across joints. Such range of motion is determined by both soft tissue factors (muscle strength, muscle and ligament length, scarring from surgery or trauma, joint and bursa fluid, synovial tissue thickness and inflammation, ligament laxity, tissue elasticity, degenerative changes of cartilage, temperature of tissues) and bony structure (deformities, arthritic and

degenerative changes in bone, surgical devices). Obviously, only some of these abnormalities are amenable to exercise intervention, and these will be discussed below. In general, the effect of stretching the soft tissues around a joint slowly and consistently over time is to increase the pain-free range of motion for that joint.

Flexibility may be enhanced without the use of any specialized equipment. It is often helpful, however, to have a thin mat available for postures that are best done while stretched out on the floor.

The most effective technique for increasing flexibility is to extend a body part as fully as possible without pain, then hold this fully extended position for twenty to thirty seconds. The key requirement is to complete the movement slowly (without any bouncing or ballistic movements). Such bouncing does not increase efficacy and range of motion, but instead may cause muscle contraction that limits the range achievable. A technique known as proprioceptive neural facilitation (PNF) will maximize the stretching effectiveness. The technique is as follows. Once the body part has been stretched as far as possible, the muscle groups around the joint should then be completely relaxed, while maintaining the stretch. Next, an attempt is made to stretch a little further, which is usually possible. This final position is then held for about twenty to thirty seconds before returning to the initial position. PNF serves to counteract the involuntary resistance to overextension of a joint caused by a feedback loop of receptors within the muscle tissue that are activated by mechanical stretch.

Flexibility exercise is part of many other forms of exercise, such as ballet and modern dance, yoga, t'ai chi, and resistance training, because in all of these pursuits the muscle groups are slowly extended to their full range and held before relaxing, just as in PNF. It is not recommended to force a stretch beyond the point of pain, as this may result in injury to soft tissue structures and ultimately worsen function. As with all forms of exercise, as the range of motion increases over time, it is appropriate and necessary to extend the distance the joint is moved so that progress is maintained.

The physiologic benefit of flexibility exercise is increased range of motion across joints. There is some evidence that range of motion is related to functional independence in activities of daily living, posture, balance, and gait characteristics in older adults, as well as to pain and disability and quality of life in arthritis. Flexibility training itself does not result in improved strength or endurance, or marked improvements in balance. Therefore, it is best conceived of as an accessory to other forms of exercise that contributes to overall exercise and functional capacity. To the extent that pain, fear of falling, mobility, and function are improved, quality of life may improve as well. There is a need for much better quantitative research on effective doses and long-term benefits of this mode of exercise in the elderly.

Balance training. Any activity that increases one's ability to maintain balance in the face of stressors may be considered a balance-enhancing activity. Stressors include decreased base of support; perturbation of the ground support; decrease in proprioception, vision, or vestibular system input; increased compliance of the support surface; or movement of the center of mass of the body. Balance-enhancing activities impact on the central nervous system control of balance

and coordination of movement, and/or augment the peripheral neuromuscular system response to signals that balance is threatened.

Intensity in balance training refers to the degree of difficulty of the postures, movements, or routines practiced. The appropriate level of difficulty or "intensity" for any balance-enhancing exercise is the highest level that can be tolerated without inducing a fall or near-fall. Progression in intensity is the key to improvement, as in other exercise domains, but mastery of the previous level before progression must be adhered to for safety.

Balance training has been shown to result in improved balance performance, decreased fear of falling, decreased incidence of falls, and increased ability to participate in activities of daily living that may have been limited by gait and balance difficulties. It is expected, although not proven, that such changes ultimately lead to improvements in functional independence, reduced hip fractures and other serious injuries, and improved overall quality of life.

Summary of benefits

Physiologic aging, retirement, societal expectations, accumulated diseases, and medication and nutritional effects conspire to produce deficits in strength, balance, aerobic capacity, and flexibility in older adults. Fortunately, there is increasing evidence for the reversibility of many of these deficits with a targeted exercise prescription. There is still work to be done in refining the prescription, particularly in terms of the amount of flexibility and balance training needed for optimal efficacy. In addition, there is a need for well-controlled, long-term studies on clinically important outcomes, such as treatment of cardiovascular disease and stroke, prevention and treatment of hip fracture, prevention of diabetic complications, reduction in nursing home admission rates, and moderation of disability from arthritis. An "active lifestyle" may be the most desirable public health approach to the maintenance of function and the prevention of disease in healthy persons. However, it is likely that the use of exercise to treat preexisting diseases and geriatric syndromes will always need to incorporate elements of a traditional "exercise prescription," as well as behavioral approaches, to more fully integrate appropriate physical activity into daily life.

Maria Fiatarone Singh

See also Balance and Mobility; Balance, Sense of; Frailty; Heart Disease; Life Expectancy; Periodic Health Examination; Sarcopenia.

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Chapter 16 - Anorexia Nervosa

Definition

Anorexia nervosa is an eating disorder characterized by self-starvation, unrealistic **fear** of weight gain, and conspicuous distortion of body image.

Description

The term anorexia nervosa comes from two Latin words that mean "nervous inability to eat." Anorexics have the following characteristics in common:

- inability to maintain weight at or above what is normally expected for age or height
- intense fear of becoming fat
- distorted body image
- in females who have begun to menstruate, the absence of at least three menstrual periods in a row, a condition called **amenorrhea**

There are two subtypes of anorexia nervosa: a restricting type, characterized by strict dieting and **exercise** without binge eating; and a binge-eating/purging type, marked by episodes of compulsive eating with or without self-induced **vomiting** and/or the use of **laxatives** or enemas. A binge is defined as a time-limited (usually under two hours) episode of compulsive eating in which the individual consumes a significantly larger amount of food than most people would eat in similar circumstances.

Demographics

Anorexia nervosa was not officially classified as a psychiatric disorder until the third edition of *Diagnostic and Statistical Manual of Mental Disorders (DSM)* in 1980. It is, however, a growing problem in the early 2000s among adolescent females. Its incidence in the [United States](#) has doubled since 1970. The rise in the number of reported cases reflects a genuine increase in the number of persons affected by the disorder and not simply earlier or more accurate diagnosis. Estimates of the incidence of anorexia range between 0.5 percent and 1 percent of Caucasian female adolescents. Over 90 percent of patients diagnosed with the disorder as of 2001 are female. The peak age range for onset of the disorder is 14 to 18 years. In the 1970s and 1980s, anorexia was regarded as a disorder of upper- and middle-class women, but that generalization is as of 2004 also changing. Studies indicate that anorexia is increasingly common among females of all races and social classes in the United States.

Causes and symptoms

While the precise cause of the disease is not known, anorexia is a disorder that results from the interaction of cultural and interpersonal as well as biological factors.

Social influences

The rising incidence of anorexia is thought to reflect the present idealization of thinness as a badge of upper-class status as well as of female beauty. In addition, the increase in cases of anorexia includes "copycat" behavior, with some patients developing the disorder from imitating other girls.

The onset of anorexia in **adolescence** is attributed to a developmental crisis caused by girls' changing bodies coupled with society's overemphasis on female appearance. The increasing influence of the mass media in spreading and reinforcing gender stereotypes has also been noted.

Occupational goals

The risk of developing anorexia is higher among adolescents preparing for careers that require attention to weight and/or appearance. These high-risk groups include dancers, fashion models, professional athletes (including gymnasts, skaters, long-distance runners, and jockeys), and actresses.

Genetic and biological influences

Girls whose biological mothers or sisters have or have had anorexia nervosa appear to be at increased risk of developing the disorder.

Psychological factors

A number of theories have been advanced to explain the psychological aspects of the disorder. No single explanation covers all cases. Anorexia nervosa has been given the following interpretations:

- Overemphasis on control, autonomy, and independence: Some anorexics come from achievement-oriented families that stress physical fitness and dieting. Many anorexics are perfectionists who are driven about schoolwork and other matters in addition to weight control.
- Evidence of **family** dysfunction: In some families, a daughter's eating disorder serves as a distraction from marital discord or other family tensions.
- A rejection of female sexual maturity: This rejection is variously interpreted as a desire to remain a child or as a desire to resemble males.
- A reaction to sexual abuse or assault.
- A desire to appear as fragile and nonthreatening as possible: This hypothesis reflects the idea that female passivity and weakness are attractive to males.
- Inability to interpret the body's hunger signals accurately due to early experiences of inappropriate feeding.

Male anorexics

Although anorexia nervosa largely affects females, its incidence in the male population is rising in the early 2000s. Less is known about the causes of anorexia in males, but some risk factors are the same as for females. These include certain occupational goals and increasing media emphasis on external appearance in men. Homosexual males are under pressure to conform to an ideal body weight that is about 20 pounds lighter than the standard attractive weight for heterosexual males.

When to call the doctor

A healthcare professional should be contacted if a child or adolescent is suspected of having anorexia nervosa or displays early signs of the disorder, such as the following:

- fear of gaining weight
- distorted body image
- recent weight loss
- restrictive or abnormal eating patterns such as skipping meals or eliminating once-liked foods
- preoccupation with food and dieting
- compulsive exercising
- purging behaviors such as vomiting or using laxatives
- withdrawal from friends and family
- wearing baggy clothes to hide weight loss

Diagnosis

Diagnosis of anorexia nervosa is complicated by a number of factors. One is that the disorder varies somewhat in severity from patient to patient. A second factor is denial, which is regarded as an early sign of the disorder. Many anorexics deny that they are ill and are usually brought to treatment by a family member.

Anorexia nervosa is a serious public health problem not only because of its rising incidence, but also because it has one of the highest mortality rates of any psychiatric disorder. Moreover, the disorder may cause serious long-term health complications, including congestive heart failure, sudden death, growth retardation, dental problems, **constipation**, stomach rupture, swelling of the salivary glands, anemia and other abnormalities of the blood, loss of kidney function, and osteoporosis.

Most anorexics are diagnosed by pediatricians or family practitioners. Anorexics develop emaciated bodies, dry or yellowish skin, and abnormally low blood pressure. There is usually a history of amenorrhea in female patients, and sometimes of abdominal **pain**, constipation, or lack of energy. The patient may feel chilly or have developed lanugo, a growth of downy body hair. If the patient has been self-inducing vomiting, she may have eroded tooth enamel or Russell's sign (scars on the back of the hand). The second step in diagnosis is measurement of the patient's weight loss. *DSM-IV* specifies a weight loss leading to a body weight 15 percent below normal, with some allowance for body build and weight history.

Criteria
source: <i>Diagnostic and Statistical Manual of Mental Disorders IV</i> .
1. Refusal to maintain body weight at or above a minimally normal weight for age and height. Body weight is less than 85 percent of what is expected.
2. Intense fear of gaining weight or becoming fat, even though patient is underweight.
3. Undue influence of body weight or shape on self-evaluation, or denial of the seriousness of current underweight condition.
4. Absence of at least three consecutive menstrual cycles in previously menstruating females.
Restricting type: No regular episodes of binge-eating or purging (self-induced vomiting or misuse of laxatives, diuretics, or enemas).
Binge-eating/purging type: Regular episodes of binge-eating or purging (self-induced vomiting or misuse of laxatives, diuretics, or enemas).

The doctor will need to rule out other physical conditions that can cause weight loss or vomiting after eating, including metabolic disorders, brain tumors (especially hypothalamus and pituitary gland lesions), diseases of the digestive tract, and a condition called superior mesenteric artery syndrome. Persons with this condition sometimes vomit after meals because the blood supply to the intestine is blocked. The doctor will usually order blood tests, an electrocardiogram, urinalysis, and bone densitometry (bone density test) in order to exclude other diseases and to assess the patient's nutritional status.

The doctor will also need to distinguish between anorexia and other psychiatric disorders, including depression, **schizophrenia**, social phobia, **obsessive-compulsive disorder**, and body dysmorphic disorder. Two diagnostic tests that are often used are the Eating Attitudes Test (EAT) and the Eating Disorder Inventory (EDI).

Treatment

Treatment of anorexia nervosa includes both short- and long-term measures and requires **assessment** by dietitians and psychiatrists as well as medical specialists. Therapy is often complicated by the patient's resistance or failure to carry out a treatment plan.

Hospital treatment

Hospitalization is recommended for anorexics with any of the following characteristics:

- weight of 40 percent or more below normal or weight loss over a three-month period of more than 30 lbs (13.6 kg)
- severely disturbed metabolism
- severe bingeing and purging
- signs of psychosis
- severe depression or risk of **suicide**
- family in crisis

Hospital treatment includes individual and group therapy as well as refeeding and monitoring of the patient's physical condition. Treatment usually requires two to four months in the hospital. In extreme cases, hospitalized patients may be force-fed through a tube inserted in the nose (nasogastric tube) or into a vein (hyperalimentation).

Outpatient treatment

Anorexics who are not severely malnourished can be treated by outpatient psychotherapy. The types of treatment recommended are supportive rather than insight-oriented and include behavioral approaches as well as individual or group therapy. **Family therapy** is often recommended when the patient's eating disorder is closely tied to family dysfunction. Self-help groups are often useful in helping anorexics find social support and encouragement. Psychotherapy with anorexics is a slow and difficult process; about 50 percent of patients continue to have serious psychiatric problems after their weight has stabilized.

Medications

Anorexics have been treated with a variety of medications, including **antidepressants**, antianxiety drugs, selective serotonin reuptake inhibitors, and lithium carbonate. The effectiveness of medications in treatment regimens is as of 2004 debated. However, at least one study of fluoxetine (Prozac) showed it helped the patient maintain weight gained while in the hospital.

Nutritional concerns

A key focus of treatment for anorexia nervosa is teaching the principles of healthy eating and improving disordered eating behaviors. A dietician or nutritionist plays an important role in forming a **nutrition** plan for the patient; such plans are individualized and ensure that the patient is consuming enough food to gain or maintain weight as needed and stabilize medically. The anorexic's weight and food intake are closely monitored to ensure that the plan is being followed.

Prognosis

Figures for long-term recovery vary from study to study, but reliable estimates are that 40 to 60 percent of anorexics make a good physical and social recovery, and 75 percent gain weight. The long-term mortality rate for anorexia is estimated at around 10 percent, although some studies give a lower figure of 3 to 4 percent. The most frequent causes of death associated with anorexia are starvation, electrolyte imbalance, heart failure, and suicide.

Prevention

Short of major long-term changes in the larger society, the best strategy for prevention of anorexia is the cultivation of healthy attitudes toward food, weight control, and beauty (or body image) within families. Early treatment such as counseling may help to prevent early signs of disordered eating from progressing into more serious behaviors.

Parental concerns

There are many strategies that parents can undertake to help encourage healthy attitudes toward weight, food, and exercise in their children. These include the following:

- teaching children the importance of healthy eating and exercise
- avoiding using food as a punishment or reward
- instilling healthy eating and exercise habits by example
- being a good role model by promoting healthy body image and encouraging children and adolescents to find role models in the media who do the same
- encouraging children or teens who wish to diet to talk to a healthcare professional about healthy strategies to lose weight

KEY TERMS

Amenorrhea —The absence or abnormal stoppage of menstrual periods.

Binge —A pattern of eating marked by episodes of rapid consumption of large amounts of food; usually food that is high in calories.

Body dysmorphic disorder —A psychiatric disorder marked by preoccupation with an imagined physical defect.

Hyperalimentation —A method of refeeding anorexics by infusing liquid nutrients and electrolytes directly into central veins through a catheter.

Lanugo —A soft, downy body hair that covers a normal fetus beginning in the fifth month and usually shed by the ninth month. Also refers to the fine, soft hair that develops on the chest and arms of anorexic women. Also called vellus hair.

Purging —The use of vomiting, diuretics, or laxatives to clear the stomach and intestines after a binge.

Russell's sign —A scraped or raw area on the patient's knuckles, caused by self-induced vomiting.

Superior mesenteric artery syndrome —A condition in which a person vomits after meals due to blockage of the blood supply to the intestine.

See also Binge eating disorder; Bulimia nervosa.

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American Anorexia/Bulimia Association. 418 East 76th St., [New York](#), NY 10021. Telephone: 212/734–1114.

National Association of Anorexia Nervosa and Associated Disorders. Web site: <www.anad.org>.

National Institute of Mental Health Eating Disorders Program. Building 10, Room 3S231. 9000 Rockville Pike, Bethesda, MD 20892. Telephone: 301/496-1891.

Rebecca J. Frey, PhD Stephanie Dionne Sherk

Chapter 17 - Meditation

Definition

Meditation is a practice of concentrated focus upon a sound, object, visualization, the breath, movement, or attention itself in order to increase awareness of the present moment, reduce **stress**, promote **relaxation**, and enhance personal and spiritual growth.

Origins

Meditation techniques have been practiced for millennia. Originally, they were intended to develop spiritual understanding, awareness, and direct experience of ultimate reality. The many different religious traditions in the world have given rise to a rich variety of meditative practices. These include the contemplative practices of Christian religious orders, the Buddhist practice of sitting meditation, and the whirling movements of the Sufi dervishes. Although meditation is an important spiritual practice in many religious and spiritual traditions, it can be practiced by anyone regardless of their religious or cultural background to relieve stress and **pain**.

As Western medical practitioners begin to understand the mind's role in health and disease, there has been more interest in the use of meditation in medicine. Meditative practices are increasingly offered in medical clinics and hospitals as a tool for improving health and quality of life. Meditation has been used as the primary therapy for treating certain diseases; as an additional therapy in a comprehensive treatment plan; and as a means of improving the quality of life of people with debilitating, chronic, or terminal illnesses.

Benefits

Meditation benefits people with or without acute medical illness or stress. People who meditate regularly have been shown to feel less **anxiety** and **depression**. They also report that they experience more enjoyment and appreciation of life and that their relationships with others are improved. Meditation produces a state of deep relaxation and a sense of balance or equanimity. According to Michael J. Baime, "Meditation cultivates an emotional stability that allows the meditator to experience intense emotions fully while simultaneously maintaining perspective on them." Out of this experience of emotional stability, one may gain greater insight and understanding about one's thoughts, feelings, and actions. This insight in turn offers the possibility to feel more confident and in control of life. Meditation facilitates a greater sense of calmness, empathy, and acceptance of self and others.

Meditation can be used with other forms of medical treatment and is an important complementary therapy for both the treatment and prevention of many stress-related conditions. Regular meditation can reduce the number of symptoms experienced by patients with a wide range of illnesses and disorders. Based upon clinical evidence as well as theoretical understanding, meditation is considered to be one of the better therapies for **panic disorder**, generalized anxiety disorder, substance dependence and abuse, ulcers, colitis, chronic pain,

psoriasis , and dysthymic disorder. It is considered to be a valuable adjunctive therapy for moderate **hypertension** (high blood pressure), prevention of cardiac arrest (**heart attack**), prevention of **atherosclerosis** (hardening of arteries), arthritis (including **fibromyalgia**), **cancer**, **insomnia**, migraine, and prevention of **stroke**. Meditation may also be a valuable complementary therapy for **allergies** and **asthma** because of the role stress plays in these conditions. Meditative practices have been reported to improve function or reduce symptoms in patients with some neurological disorders as well. These include people with **Parkinson's disease**, people who experience **fatigue** with **multiple sclerosis**, and people with **epilepsy** who are resistant to standard treatment.

Overall, a 1995 report to the National Institutes of Health on alternative medicine concluded that, "More than 30 years of research, as well as the experience of a large and growing number of individuals and health care providers, suggests that meditation and similar forms of relaxation can lead to better health, higher quality of life, and lowered health care costs." A study of health care professionals published in 2002 indicates that the majority of physicians, nurses, and occupational therapists in the [United States](#) accept meditation as a beneficial adjunct to conventional medical or surgical treatments.

Description

Sitting meditation is generally done in an upright seated position, either in a chair or cross-legged on a cushion on the floor. The spine is straight yet relaxed. Sometimes the eyes are closed. Other times the eyes are open and gazing softly into the distance or at an object. Depending on the type of meditation, the meditator may be concentrating on the sensation of the movement of the breath, counting the breath, silently repeating a sound, chanting, visualizing an image, focusing awareness on the center of the body, opening to all sensory experiences including thoughts, or performing stylized ritual movements with the hands.

Movement meditation can be spontaneous and free-form or involve highly structured, choreographed, repetitive patterns. Movement meditation is particularly helpful for those people who find it difficult to remain still.

MAHARISHI MAHESH YOGI 1911–

Maharishi Mahesh Yogi is one of the most recognized spiritual leaders of the world. Almost single-handedly, the Maharishi (meaning great sage) brought Eastern culture into Western consciousness. He emerged in the late 1950s in London and the United States as a missionary in the cause of [Hinduism](#), the philosophy of which is called Vedanta—a belief that "holds that [God](#) is to be found in every creature and object, that the purpose of human life is to realize the godliness in oneself and that religious truths are universal."

By 1967, the Maharishi became a leader among flower-children and an anti-drug advocate. The Maharishi's sudden popularity was helped along by such early fans as the Beatles, Mia Farrow, and Shirley MacLaine. These people, and many others, practiced Transcendental Meditation (TM), a Hindu-influenced procedure that endures in America to this day.

When the 1960s drew to a close, the Maharishi began to fade from public view. The guru still had enough followers, though, to people the Maharishi International University, founded in 1971. One of the main draws of Maharishi International University was the study of TMSidha, an exotic form of Transcendental Meditation. Sidhas believe that group meditation can elicit the maharishi effect—a force strong enough to conjure world peace.

Generally speaking, there are two main types of meditation. These types are concentration meditation and mindfulness meditation. Concentration meditation practices involve focusing attention on a single object. Objects of meditation can include the breath, an inner or external image, a movement pattern (as in tai chi or **yoga**), or a sound, word, or phrase that is repeated silently (mantra). The purpose of concentrative practices is to learn to focus one's attention or develop concentration. When thoughts or emotions arise, the meditator gently directs the mind back to the original object of concentration.

Mindfulness meditation practices involve becoming aware of the entire field of attention. The meditator is instructed to be aware of all thoughts, feelings, perceptions, or sensations as they arise in each moment. Mindfulness meditation practices are enhanced by the meditator's ability to focus and quiet the mind. Many meditation practices are a blend of these two forms.

The study and application of meditation to health care has focused on three specific approaches: 1. transcendental meditation (TM); 2. The "relaxation response," a general approach to meditation developed by Dr. **Herbert Benson**; and 3. mindfulness meditation, specifically the program of mindfulness-based stress reduction (MBSR) developed by Jon Kabat-Zinn.

Transcendental meditation

TM has its origins in the Vedic tradition of [India](#) and was introduced to the West by **Maharishi Mahesh Yogi**. TM has been taught to somewhere between two and four million people. It is one of the most widely practiced forms of meditation in the West. TM has been studied many times; these studies have produced much of the information about the physiology of meditation. In TM, the meditator sits with closed eyes and concentrates on a single syllable or word (mantra) for 20 minutes at a time, twice a day. When thoughts or feelings arise, the attention is brought back to the mantra. According to Charles Alexander, an important TM researcher, "During TM, ordinary waking mental activity is said to settle down, until even the subtlest thought is transcended and a completely unified wholeness of awareness..is experienced. In this silent, self-referential state of pure wakefulness, consciousness is fully awake to itself alone.." TM supporters believe that TM practices are more beneficial than other meditation practices. A group of Australian researchers has recently recommended TM as a preventive strategy for **heart disease**.

The relaxation response

The relaxation response involves a similar form of mental focusing. Dr. Herbert Benson, one of the first Western doctors to conduct research on the effects of meditation, developed this approach after observing the profound health benefits of a state of bodily calm he calls "the relaxation response." In order to elicit this response in the body, he teaches patients to focus upon the repetition of a word, sound, prayer, phrase, or movement activity (including swimming, jogging, yoga, and even knitting) for 10–20 minutes at a time, twice a day. Patients are also taught not to pay attention to distracting thoughts and to return their focus to the original repetition. The choice of the focused repetition is up to the individual. Instead of [Sanskrit](#) terms, the meditator can choose what is personally meaningful, such as a phrase from a prayer.

Mindfulness meditation

Mindfulness meditation comes out of traditional Buddhist meditation practices. Psychologist Jon Kabat-Zinn has been instrumental in bringing this form of meditation into medical settings. In formal mindfulness practice, the meditator sits with eyes closed, focusing the attention on the sensations and movement of the breath for approximately 45–60 minutes at a time, at least once a day. Informal mindfulness practice involves bringing awareness to every activity in daily life. Wandering thoughts or distracting feelings are simply noticed without resisting or reacting to them. The essence of mindfulness meditation is not what one focuses on but rather the quality of awareness the meditator brings to each moment. According to Kabat-Zinn, "It is this investigative, discerning observation of whatever comes up in the present moment that is the hallmark of mindfulness and differentiates it most from other forms of meditation. The goal of mindfulness is for you to be more aware, more in touch with life and whatever is happening in your own body and mind at the time it is happening—that is, the present moment." The MBSR program consists of a series of classes involving meditation, movement, and group process. There are over 240 MBSR programs offered in health care settings around the world.

Meditation is not considered a medical procedure or intervention by most insurers. Many patients pay for meditation training themselves. Frequently, religious groups or meditation centers offer meditation instruction free of charge or for a nominal donation. Hospitals may offer MBSR classes at a reduced rate for their patients and a slightly higher rate for the general public.

Precautions

Meditation appears to be safe for most people. There are, however, case reports and studies noting some adverse effects. Thirty-three to 50% of the people participating in long silent meditation retreats (two weeks to three months) reported increased tension, anxiety, confusion, and depression. On the other hand, most of these same people also reported very positive effects from their meditation practice. Kabat-Zinn notes that these studies fail to differentiate between serious psychiatric disturbances and normal emotional mood swings. These studies do suggest, however, that meditation may not be recommended for people with psychotic disorders, severe depression, and other severe personality disorders unless they are also receiving psychological or medical treatment.

Side effects

There are no reported side effects from meditation except for positive benefits.

Research & general acceptance

The scientific study of the physiological effects of meditation began in the early 1960s. These studies prove that meditation affects metabolism, the endocrine system, the central nervous system, and the autonomic nervous system. In one study, three advanced practitioners of Tibetan Buddhist meditation practices demonstrated the ability to increase "inner heat" as much as 61%. During a different meditative practice they were able to dramatically slow down the rate at which their bodies consumed oxygen. Preliminary research shows that mindfulness meditation is associated with increased levels of **melatonin**. These findings suggest a potential role for meditation in the treatment and prevention of breast and prostate cancer.

Despite the inherent difficulties in designing research studies, there is a large amount of evidence of the medical benefits of meditation. Meditation is particularly effective as a treatment for chronic pain. Studies have shown meditation reduces symptoms of pain and pain-related drug use. In a four-year follow-up study, the majority of patients in a MBSR program reported "moderate to great improvement" in pain as a result of participation in the program.

Meditation has long been recommended as a treatment for high blood pressure; however, there is a debate over the amount of benefit that meditation offers. Although most studies show a reduction in blood pressure with meditation, medication is still more effective at lowering high blood pressure.

Meditation may also be an effective treatment for coronary artery disease. A study of 21 patients practicing TM for eight months showed increases in their amount of **exercise** tolerance, amount of workload, and a delay in the onset of ST-segment depression. Meditation is also an important part of Dean Ornish's program, which has been proven to reverse coronary artery disease.

Research also suggests that meditation is effective in the treatment of chemical dependency. Gelderloos and others reviewed 24 studies and reported that all of them showed that TM is helpful in programs to stop **smoking** and also in programs for drug and alcohol abuse.

Studies also imply that meditation is helpful in reducing symptoms of anxiety and in treating anxiety-related disorders. Furthermore, a study in 1998 of 37 psoriasis patients showed that those practicing mindfulness meditation had more rapid clearing of their skin condition, with standard UV light treatment, than the control subjects. Another study found that meditation decreased the symptoms of fibromyalgia; over half of the patients reported significant improvement. Research by a group of ophthalmologists indicates that nearly 60% of a group of patients being treated for **glaucoma** found meditation helpful in coping with their eye disorder. In addition, meditation was one of several stress management techniques used in a small study of HIV-positive men. The study showed improvements in the T-cell counts of the men, as well as in several psychological measures of well-being.

Training & certification

There is no program of certification or licensure for instructors who wish to teach meditation as a medical therapy. Meditation teachers within a particular religious tradition usually have extensive experience and expertise with faith questions and religious practices but may not have been trained to work with medical patients. Different programs have varied requirements for someone to teach meditation. In order to be recognized as an instructor of TM, one must receive extensive training. The Center for Mindfulness in Medicine, Health Care and Society at the University of Massachusetts Medical Center offers training and workshops for health professionals and others interested in teaching mindfulness-based stress reduction. The Center does not, however, certify that someone is qualified to teach meditation. The University of [Pennsylvania](#) program for Stress Management suggests that a person have at least 10 years of personal experience with the practice of mindfulness meditation before receiving additional instruction to teach meditation. Teachers are also expected to spend at least two weeks each year in intensive meditation retreats.

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Mind-Body Medical Institute. Beth Israel Deaconess Medical Center. One Deaconess Road, Boston, MA 02215. (617) 632-9525. <http://www.mbmi.org>.

The Center for Mindfulness in Medicine, Health Care and Society. Stress Reduction Clinic. University of Massachusetts Memorial Health Care. 55 Lake Avenue North, Worcester, MA 01655. (508) 856-2656. Fax (508) 856-1977. jon.kabat-zinn@banyan@ummed.edu
<http://www.umassmed.edu/cfm>.

Linda Chrisman

Rebecca J. Frey, PhD

