1997

# Human Performance Lab Newsletter, 1997

St. Cloud State University

NEWS

HUMAN PERFORMANCE LAB
SPIRIT
BODY MIND
ST. CLOUD STATE UNIVERSITY

1997

Department of Health, Physical Education, Recreation, and Sport Science

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# KELLY'S CORNER

**By Dr. Jack Kelly**

Many of you have already learned that I will be retiring in May. I suppose I'm like most people contemplating retirement, not so sure I want to give up all of the good things about my job, but looking forward to exciting new opportunities.

One of the things I shall miss most is my association with the Adult Fitness Program and the many wonderful friends I have made as a result. You folks have added a joy to my days and I am very grateful for our association.

Someone recently asked me what I have learned over the past 20 years about maintaining a state of good health as we grow older. The first thing I thought of was the good fortune of being blessed with good health in the first place. It sometimes becomes easy to take our health for granted until we become ill. So our challenge, as I see it, is to follow a few common sense rules and to avoid doing the things that are most certainly counter productive to our health.

Identifying most of the things that threaten good health is not difficult. Everyone agrees that inappropriate use of drugs, alcohol and tobacco are dangerous and should be avoided.

The common sense rules that I referred to have become much easier to understand in recent years. In my opinion, maintaining a reasonable level of physical fitness is most important because it impacts on so many other things that affect our health; e.g. body composition, heart disease prevention, maintaining healthy bones and blood pressure, to name a few.

The Center for Disease Control and the American College of Sports Medicine have made the "How much exercise do I need?" question a lot easier to answer. The new recommendations state that adults need at least 30 minutes of moderate physical activity most days of the week. Less emphasis has been placed on the type of exercise and its intensity than before. Moderate activity includes such things as brisk walking, gardening, cycling, swimming, dancing, etc.

The second rule includes monitoring our diet carefully. We not only need to pay close attention to the amount of food we consume, but also the percentage of fat calories within our diet. Most authorities recommend less than 30% of calories from fat. But, the "proof of the pudding" should be observing how our diets affect personal health. If our weight, cholesterol and blood pressure are normal, then we can assume that one's diet is on the right track. If, however, any of these are less than desirable, we need to look for ways to improve our nutritional program.

*(continued on page 5)*

# The Effect of Exercise on Infection and Immunity

Shae Wilson

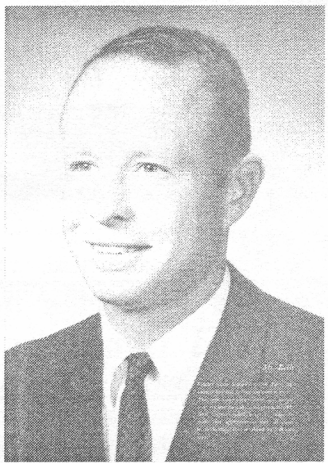
The United States Center for Disease Control and Prevention has estimated that over 425 million upper respiratory tract infections (URTI) occur annually in the U.S. As a result, $2.5 billion is lost because of missed school and work days. In addition, the National Center for Health Statistics reports that acute respiratory conditions, such as the common cold and influenza, have an annual incidence rate of 90 out of 100 persons. Physically active individuals are affected by several types of infectious diseases. These diseases can occur as a result of performing in an environment where certain pathogenic microorganisms are widespread.

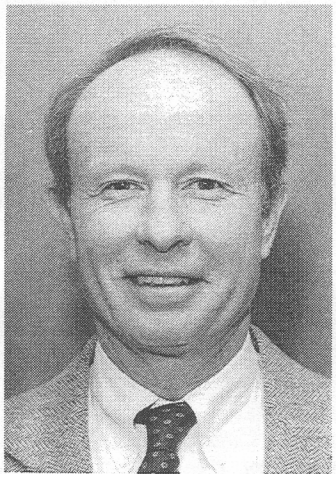
A "J"-shaped model has been used to show the relationship between varying amounts of exercise and the risk of upper respiratory tract infections. This model suggests that moderate exercise may lower risk of URTI while excessive amounts may increase the risk. Numerous studies have been done suggesting that athletes engaging in marathon-type events and/or very heavy training are at an increased risk of infection. One study found that 12.9% of Los Angeles Marathon participants reported an infectious episode the week following the race.

Few studies have been performed to support the claim that moderate physical activity is beneficial in decreasing upper respiratory tract infections. Nevertheless, in a study of elderly women, the, incidence of the common cold during a 12-week period was measured to be lowest in highly conditioned, lean subjects who exercised moderately each day for approximately 1.5 hours. Elderly subjects who walked 40 min., 5 times a week had an incidence of 21%, as compared to 50% for the sedentary control group. The immune system has been found to be negatively affected by acute bouts of exercise. The intensity and duration of the bout must be taken into consideration. Lymphocyte function (in the development of immunity) has been reported to be briefly decreased following high-intensity exercise. Research has been inconclusive concerning the effects of chronic exercise on the immune system. Still, a 1989 Runner's World subscriber survey revealed that 61% of 700 runners reported fewer colds since beginning to run, while only 4% felt they had experienced more. Understanding the relationship between exercise and infection could have practical implications to improve public health. Additionally, for the athlete, understanding this relationship may mean the difference between being able to compete or missing the event due to illness.

Adapted from: Int. J. Sports Med. 15:S131-41 1994.

# "Thank You Dr. Kelly"





Dr. John M. "Jack" Kelly, professor, founder and director of the SCSU Human Performance Laboratory will retire May 23, 1997. Dr. Kelly received his BS degree from Slippery Rock State College, Slippery Rock, PA, and MS from the University of Oregon, Eugene, OR. In 1959, he joined the United States Marine Corps serving as a 1st Lieutenant. In 1960 he married Doris and taught at Abington Heights High School, Clarks Summit, PA. After three years of teaching and coaching, Jack and Doris headed to school one more time with John, Kathy, and Bill. For three years, the Kelly's made Springfield, MA. Their home while he pursued his doctoral degree from Springfield College. Dr. Kelly joined the SCSU faculty in Sept. 1969. His assignment was to strengthen undergraduate sciences in RE and develop an exercise science graduate program and human performance laboratory to serve SCSU and the St. Cloud community. From a spirometer and Harvard physiograph in a single room in north Halenbeck with only the help of a couple graduate students, Dr. Kelly developed a highly respected exercise science graduate program and one of the best equipped labs in the upper Midwest.

While at SCSU, Dr. Kelly has been teacher, leader, mentor, advisor, author, director and friend. In 1970 he started a research project to learn how long term endurance exercise affects cardiovascular health. From this research and with the assistance of the medical community and Kelly's heroes, he then developed the Adult Fitness Program in 1972 to assist local residents in discovering the importance of exercise as a component to leading healthier lifestyles. Because of his influence, fitness facilities became a part of the local scene. He was an often requested speaker by service clubs and community organizations. The American Can Company selected the Adult Fitness Program for national recognition as a model program of public service.

The new Human Performance Laboratory was opened and dedicated in 1980. Since then, people of all ages, from Boy and Girl Scouts to U.S. Olympic athletes, have toured or been tested at the HPL and learned of Dr. Kelly's mission.

The following highlights are just a few of Dr. Kelly's accomplishments:

Program Director, American College of Sports Medicine
Co-Founder and President of Northland American College of Sports Medicine
Minnesota Council on Health Achievement Award
Minnesota Health Citizen of the Year awarded by the Minnesota Council on Health
Member, Governor's Council on Physical Health
Member, Minnesota High School League, Sports Medicine Advisory Board
Fellow, American College of Sports Medicine
ACSM Ethics and Professional Conduct Committee Member
Reviewer, Medicine and Science in Sports and Exercise
Co-Author of Practical Aerobic Conditioning
Author of numerous scientific articles and abstracts
Grant recipient from The Eagles' Max Bear Heart Fund
Several SCSU Extramural Support Awards
Director of grants from the Minnesota Department of Employee Relations
Co-Researcher for the Midwest Wrestling Data Bank Study
Principle investigator and co-investigator for grants from Nordic Track, Cardiac Pacemakers Inc., Roller Blade and Breathe-Right

Dr. Kelly has truly completed his assignment. We can't think of anyone that has not cherished the time they spent with him. Jack says his mother used to tell him, "People don't change as they grow older, they just get more so." More so like Jack? We can only hope. A new chapter is just beginning for one of God's best as he enters retirement. After 28 great years at SCSU, we wish to honor him and express our gratitude to him for sharing his talents and gifts with all of us.

## YOU ARE INVITED!

A reception honoring Dr. Jack Kelly's retirement will be held at the SCSU Atwood Center Voyageur Room on April 4, 1997 from 4 to 6 p.m. We welcome all Adult Fitness Program members, faculty, staff and students to celebrate with Dr. Kelly and his family. An informal dinner for family and friends is also planned for later than evening. For more information contact Barb at (320) 255-3105

# *Meet the New Graduate Students*

**Kiralee Camp**. Kira is from Sartell MN. She received her B S. in Kinesiology from the University of Minnesota. While at the U of M she spent time working with the Heritage Study and corporate health promotion. Kira enjoys traveling and spending time with her cat Sammy.

**Kelli Fordham**. Kelli is originally from Grand Rapids, MN. She received her B.S. in Athletic Training from the University of North Dakota. She has spent time interning at the Naval Academy and working in prevention and rehabilitation of athletic injuries. Kelli also works as an athletic trainer for the SCSU athletic teams.

**Joel French**. Joel received a B.A. in Exercise Science and a B.A. in Psychology from the University of Sioux Falls. He has worked in orthopedic rehabilitation as an Exercise Specialist at Central Plains Clinic in Sioux Falls, SD. Outside of lab, he plays volleyball and participates in Tae Kwon Do (or anything that is a good workout he says!).

**Chris Haukos**. Chris is a mother of two boys, Brenden and Evin who grace us with their presence in the lab on occasion. She is originally from Fergus Falls and received her B.S. in Sports Studies from Bemidji State University. Outside of school she participates in triathlons and road races. She also works in the campus recreation department and teaches aerobics.

**Amy Keranen** Amy is originally from Dassel MN. She received two degrees from Moorhead State University: a B.A.in Chemistry and a B.S. in Fitness/Sports Science. Amy spends time volunteering at the St. Cloud Hospital. She has worked in cardiac rehabilitation and plans to work in the medical field.

**Alan Kraft**. Al originates from Missoula, MT. He received his B.A. in writing from Concordia College in Moorhead, MN. After graduation, he worked at Red River Valley Sports Medicine in Fargo, N.D. After surrendering to the cold weather of Fargo, he moved to the balmy city of St. Cloud. During the summer he competes in triathlons and spends the winters recovering from them.

**Kirk Lewis**. Originally from Shakopee, MN, Kirk received his B.S. in Bio-Medical Sciences from SCSU. He has been working in campus recreation for six years and enjoys anything dealing with water/aquatics.

**Ben Noonan**. Ben is from Moorhead, MN. He received his B.S. in Mechanical Engineering from North Dakota State University. Ben is a strength coach for the SCSU hockey team. He studies Tae Kwon Do and participates in tournaments across the country. He also enjoys drag racing and was track champion the last two years (Wow!).

**Kirk Olson**. Kirk comes out of Anoka, MN. He graduated from the University of Minnesota with a B.S. in Kinesiology. He was active in collegiate football and baseball. Currently, he is the varsity defensive backfield coach at Blaine Senior high school and a personal fitness trainer at Bally's Total Fitness and Lifetime Fitness in the Twin Cities.

**Debbi Paulson**. Deb is originally from Moorhead, MN. She received her B.S. in Fitness and Sports Science from Moorhead State University. Deb has spent time teaching aerobics and interning in Cardiac Rehabilitation at MeritCare Hospital in Fargo. She enjoys playing volleyball and basketball.

**Shae Wilson**. Shae is from Willmar, MN. She graduated from St. Olaf College with a degree in Sports Science. Shae is engaged to be married in August 1997. Outside of school she is an official for high school gymnastics and has performed in professional waterskiing shows, including Sea World of Ohio & San Diego for the past 5 years.

**OUR GRATITUDE**

The staff and students at the HPL would like to and the following. people for their contributions to the Adult Fitness Program.1996:

Allen and Mary Andreotti
David and Nancy Bacharach
Carol Brink
Ray and Phyllis Collins
Dennis and Anne Fields
James and Marcella Gammell
Curtis and Betty Ghylin
Earleen Hanafy
Lee and Marlene Kasper
John M. and Doris Kelly
Louis Krippner
David and Barbara Kunze
Tom and Mille Lembeck
Ruth Nearing
Fran Neidermeier
Harry Olson, Jr.
Frank and Jean Osendorl
John and Carole Pike
Judith M. Seitz,
Les and Eva Sova
Glenn and Nancy Street
Betsy Swenson

**1996 RESEARCH PUBLICATIONS**

Bacharach, D.W., Petit, M., & Rundell, K.W (1996) Relationship of blood urea nitrogen to training intensity o elite female biathlon skiers. Journal of Strength and Conditioning Research, 10 105-108.

**PRESENTATIONS AT THE 1996 NATIONAL AAHPERD MEETING**

Bacharach, D., J. Verdas, J. Jerdie, B. Huft., P. Guy, D Smith, B. Everson, & M. Cage, Breathe Right Strip: Effects on Anaerobic Running Power.

Wetzstein, C. & D. Bacharach. Breathe Right Strip: How does it affect the nose and how might it benefit exercise.

Verdes, J., P. Guy, K. Threinen, T. Gibson, B. Everson, L. Hilgart & D. Bacharach. Breathe Right Strip: Effects on repeated sprint running and recovery in college football players.

## Training by the Numbers

Al Kraft

The use of heart rate monitors during exercise has become extremely popular in the last decade. Today's models are easy to use and very accurate. They provide continuous feedback as to how hard the heart is working. Prices range from $ 100 for a basic model while advanced models can cost over $500. Many coaches, athletes, and exercise enthusiasts believe that training with a monitor has a significant impact on performance and fitness. However, many experts question the value of training by heart rate. The purpose of this article is to explore this controversy.

Advocates of heart rate training base their training on the following target heart rate zones and the benefits derived from each:

| % of Max HR | Benefit |
|---|---|
| 60-70 | Weight management & appearance |
| 70-80 | Aerobic training for a healthy heart |
| 80-100 | Competitive training for peak performance |

The benefit of using a monitor is that it gives you continuous feedback and allows you to regulate your target heart rate. Thus, the quality of your exercise time will be increased. Also, monitors can help chart improvement in cardiovascular function. For example, as fitness improves, the heart rate at a given workload will decrease which indicates that cardiovascular improvements have occurred. In addition, monitors are often seen as a high-tech novelty that increase motivation and decrease staleness.

On the other hand, research has not shown that athletes who train with monitors have more effective training programs or improved performances. Many experts base this on the fact that the estimate of maximum heart rate (220 - age) is often inaccurate and therefore affects the calculation of target heart rate. Approximately ten percent of the population can be off by up to 25 beats per minute using this average prediction. Furthermore, this estimate is even more unreliable for extremely fit individuals who often have maximum heart rates well below their age predicted maximum. Women on the average have slightly higher maximum heart rates than men. Moreover, heart rate is sport specific. A triathlete, for instance, will have a different maximal heart rate for each discipline.

In addition, heart rate during periods of exercise can be affected by environmental and physiological variables. Environmental variables include wind, hills, altitude, and temperature while the physiological variables of dehydration, stress and illness can increase heart rate.

A monitor is merely a tool for counting heart beats. Whether this is a reliable measure of exercise intensity is based on the determination of a true maximum heart rate by either laboratory or field tests. The primary benefit of training with a monitor would be for the novice exerciser. A common error of early training is to exercise too hard. This can be avoided by monitoring heart rate. Also, as one's fitness level improves, a monitor can gauge increases and provide continued motivation. Conversely, the experienced exerciser will most often learn to monitor effort through internal cues and may not benefit as much by using a monitor. So, set your own goals and use whatever tools you wish as long as you reach for those goals safely.

## The Myth of the "Total Body Workout"

Joel French

No matter how dedicated you are to your exercise program, time is always a limiting factor. People today want to get twice the workout in half the time. Many manufacturers, publishers and personal trainers claim they have the answer: the "Total Body Workout." But, is it really possible to improve both cardiovascular (CV) endurance and muscular strength at the same time? This claim, made by countless numbers toting their latest inventions and training programs have overlooked the problem which is not so much with the product but with the overall process of adaptation.

Strength training devices that claim to offer an aerobic workout usually do not provide enough of an aerobic training stimulus to elicit positive CV gains. It is generally assumed that in order to make CV improvements, large muscle groups must be trained at a steady, submaximal pace for several minutes.

Conversely, it is difficult to train for strength improvements using an aerobic training device. In order to maximize strength gains, muscle should be optimally overloaded. Therefore, the resistance needed is typically greater than that provided by aerobic exercise machines. Using enough resistance to elicit strength gains for the upper or lower body would be counterproductive to the basic requirements of aerobic exercise.

Although simultaneous "total body" training does not maximize benefits from either domain, it is possible for the novice exercisers to see increases in both CV endurance and muscular strength. But, beginning exercisers typically see CV and muscular strength improvements from almost any type of exercise during the first month or two. Once accustomed to activity however, we're faced once again with the question, "How can I maximize my return from the exercise I engage in?"

One effective alternative is "aerobic" circuit training. This type of training is identical to circuit weight training but includes brief periods of aerobic activity between each station. This would appear to be slightly more effective aerobically than traditional circuit training. Very little research has been conducted to date on this type of training; however, a recently completed study at the University of Tennessee found an average increase in aerobic capacity (V02 max.) of 18% and an average strength increase of 24% after subjects trained for 12 weeks. This study would seem to indicate that "aerobic" circuit training may be as close to the "total body workout" as is possible.

In summary, for one to see significant increases in muscular strength and/or lean body mass, muscles must be overloaded. It is generally accepted that the resistance used in strength training should be around 75% of maximal effort. On the other hand, in order to see CV gains, submaximal exercise using large muscle groups (legs, arms) should be performed for 15-30+ minutes. Because the methods of training for increasing muscular strength and CV endurance are quite different, it is impossible to maximize training of each at the same time. Aerobic training is not intense enough to maximize strength gains and strength training is too intense to elicit large CV improvements. A compromise, if time is truly a constraint, is an aerobic circuit. Just keep in mind with any compromise comes less than maximum results of one system.

# *THESIS WORK IN PROGRESS*

**Can Throwing Cords or Arm Ergometry Enhance Throwing Velocity In Collegiate Baseball Players?** (Dean Stulz) Baseball players and coaches are constantly working to improve throwing velocity of not only pitchers but also fielders. The Throwing Cord (TC) and Freestyle Arm Ergometer (AE) are two methods that have recently been introduced in an attempt to increase throwing velocity. This study supplemented a traditional throwing program with either the TC or AE to determine the effects on average throwing velocity, internal rotator strength, and shoulder external rotation range of motion.

**Ice and In-Line Skating Kinematics in Collegiate Hockey Players.** (Sean Goldsworthy) It has been suggested that ice skating velocity can be improved by training programs emphasizing proper skating technique. Coaches and trainers have attempted to develop an off-ice training activity simulating the ice skating stride. Recently, in-line skating has been used as an office training method by hockey players. While several studies have compared the physiological benefits of in-line skating, a kinematic comparison of the two methods of skating has not been reported. This study involves the measurement of selected kinematic variables of the skating stride through the use of high speed cinematography. The selected kinematic variables include stride rate, single support time, double support time, recovery time, horizontal stride width, horizontal width between strides, pre-extension knee angle, leg angle push-off, and forward lean of the trunk.

**Factors That Best Predict Free Throw Shooting Accuracy.** (Tyler Gibson) Free throw shooting is an extremely important part of basketball. Some have indicated that up to 70% of all high school and college level games are won or lost at the free throw line. However, according to the National Association of Basketball Coaches of the United States Statistics, the mean free throw shooting percentage in men's college basketball remained between 68% and 69% for the past 20 years. There are many coaching theories about the proper mechanics of free throw shooting. However, many have not been tested scientifically. The purpose of this study is to measure many of the variables thought to be crucial to free throw accuracy and determine which ones best correlate with free throw shooting success.

**Effects of a Competitive Season on Fitness and Strength Levels in NCAA Division II Female Basketball Players.** (Rosalie Hayenga) With the increasing physical demands on female basketball players, the need for year round training has become an essential part of college programs. During the long competitive season, players concentrate on technical and tactile skills. A reduction in the volume of training for physical fitness may occur and may lead to unintended changes in fitness level. This project will involve the measurement of aerobic and anaerobic fitness, lactate threshold, body composition, and strength of female basketball players on the SCSU women's basketball team. Measurements will be taken prior to the first practice of the year and at the completion of the season to see if any significant changes in fitness parameters occurred.

**Comparison of Two Cycle Ergometry Equations for Estimating Oxygen Uptake in College Females.** (Lloyd Hilgart) Two metabolic equations exist for estimating oxygen uptake while riding a cycle ergometer The purpose of this study is to determine which equation, if either, can accurately estimate the oxygen uptake of college females during cycle ergometry.

**Olympic Coach to Speak at SCSU**
Glenn Street

The Human Performance Lab is organizing and hosting an exciting spring meeting, Friday, April 4, 1997, on the "Science of Strength Training." This Northland Chapter American College of Sports Medicine meeting will feature the head coach of the U.S. Olympic Weightlifting Team, Dragornir Cioroslan. Dragomir is a highly sought-after public speaker because of his dynamic presentation style, expertise in weightlifting and his motivational life story about growing up in Romania as a physically handicapped child, only to rise to become an Olympic Weightlifting champion. On a personal note, I have gotten to know Dragomir during the last four years as a member of the U.S. Sports Science and Technology Committee and he is one of the most honorable, gracious and talented individuals I have ever met. We are also bringing in three other experts: Dr. Mike Stone to discuss the design of strength training programs, Dr. Mel Williams will overview steroidal and non-steroidal ergogenic aids used by lifters and Dr. Duncan MacDougall review muscle adaptations that occur during strength training. We would like to extend a personal invitation to any of you interested in attending the meeting. Registration is being Limited to 300, so if you are interested in attending we recommend that you promptly request registration materials from Barb Kunze at the Human Performance Lab (320)255-3105 or John Keener, Ph.D., University of Minnesota-Duluth, (218) 726-8531.

## CONGRATULATIONS!

The faculty and staff of the Human Performance Laboratory would like to acknowledge and congratulate those who completed their thesis work and earned a Master of Science degree in 1996:

| | |
|---|---|
| Erik Ekstrom | Steven Sanders |
| Mark Blegen | Paul kammermeier |
| Michael Reid | Robyn Abear |

(Dr. Kelly cont) The third rule, maintaining appropriate body weight, is largely dependent on the first two rules. If we are physically active and follow sound nutrition practices, our body weight should not be a problem. I hasten to mention that there is a wide range of normality when we consider an ideal weight. We are not identical, some of us are naturally better off carrying a bit more weight than others. Don't fall into the trap of being unsatisfied with your natural body type. We are all beautiful in our own ways!!

# *THE FUTURE OF FITNESS AND HEALTH IN AMERICA*

Lloyd Hilgart

In July 1996, the Center for Disease Control (CDC) released Physical Activity and Health: A Report of the Surgeon General. This is the first Surgeon General's report on physical activity in disease prevention attempting to increase physical activity among all Americans. The key finding is that people of all ages can improve the quality of their lives through a lifelong practice of moderate physical activity. A regular and preferably daily regimen of at least 30-45 minutes of exercise can reduce the risk of developing hypertension, colon cancer, diabetes, and coronary heart disease. If you are already doing this, an even greater health benefit may be obtained by increasing the intensity or duration of your activity. More information can be obtained by contacting the CDC at the address provided below. To test your knowledge of physical activity and health, answer the quiz questions pertaining to the Surgeon General's report.

For More Information contact:

Centers for Disease Control and Prevention National Center for Chronic Disease Prevention and Health Promotion Division of Nutrition and Physical Activity, MS K-46
4770 Buford Highway, NE
Atlanta, GA 3341-3724
1-888-CDC-4NRG or 1-888-232-4674 (Toll Free)
http://www.cdc.gov

1. What percentage of Americans are not physically active?
a. 5% b. 15% c. 25% d. 35%

2. Many of the beneficial effects of exercise training from both endurance and resistance activities diminish within _____weeks if physical activity is substantially reduced.
a. 4 b. 2 c. 12 d. 8

3. Over - million people in the U.S.A. are considered overweight.
a. 10 b. 150 c. 25 d. 60

4. What percentage of high school students are physically active for 20 minutes or more, five days a week, in physical education classes?
a. 19% b. 38% c.27% d. 46%

5. Moderate physical activity should use approximately calories per day or calories per week. Ibis is the amount of physical activity that can improve one's health and quality of life.
a. 50/300 b.300/2000 c.150/1000 d.500/4000

6. Physical activity need not be strenuous to achieve health benefits. T or F

7. Inactivity is more common among males than females.
T or F

8. As age increases, participation in all types of physical activity also increases.
T or F

9. Regular physical activity improves mood, helps relieve depression and increases feelings of well-being.
T or F

10. Men over age 40 and women over age 50 should consult a physician before they begin a vigorous activity program.
T or F

**ANSWERS** 1. C 2. B 3. D 4. A 5. C 6.T 7.F 8.F 9. T 10.T