

EXERCISE DIETARY GUIDELINES

EXERCISE: Do you need it?



Why Exercise is Important

Regular daily exercise:

- ↓ Heart disease (↑ HDL, ↓ LDL)
- ↓ Stroke (blood clots)
- ↓ High Blood Pressure
- ↓ Diabetes
 - ↓ Excess body fat
 - ↑ Tissues sensitivity to insulin

Why Exercise is Important

- ↓ Bone thinning (osteoporosis)
- ↓ Cancer (Breast, colon)
- ↓ Obesity

Exercise: ↑ lean body tissue + energy output (burn calories)

Energy use: Lean tissue > Fat

- Increases- metabolic rate- during & hours after exercise

Why Exercise is Important

- May help you feel better **emotionally**:

↑ **energy level**

↑ **self esteem**

improves symptoms:

depression, anxiety, panic disorders

How? Release- **endorphins**- natural tranquilizers

Runners Live Longer



20 year study: people >50

% Deaths

Runners
15%

Healthy, non-
runners
34%

Sedentary (Sitting Around)



Sedentary People

↑ Chronic disease

↑ Overweight/obesity

“Doing something is better than doing nothing for inactive people”

Nutrition & MD (2005)

Recommendations: Dietary Guidelines: **30 minutes**

EXERCISE

HOW MUCH EVERYDAY

Recommendations:

To help prevent high blood pressure, stroke, heart disease, type 2 diabetes, colon cancer and bone thinning:

*30 minutes of
moderate exercise*

3% of your day
(30 minutes)




Recommendations: Dietary Guidelines: **60 minutes**

To keep a healthy weight:

60 minutes of moderate to vigorous exercise

6% of your day
(60 minutes)



All of your daily activities

Recommendations: Dietary Guidelines: **90 minutes**

**To help lose weight:
(and keep it off)**

*60-90 minutes of
moderate exercise*

**6-9% of your day
(60-90 minutes)**



Recommendations: Dietary Guidelines

What's most important?

Answer: the **"total"** amount of exercise everyday

30 minutes/day: all at once or
3 times for 10 minutes

60 minutes/day: all at once or
6 times for 10 minutes

EXERCISE

TYPES OF GOOD EXERCISE

Recommendations:

AEROBIC, VIGOROUS

Regular Daily - burns most calories
Most Health Benefits - for heart and blood vessels

RESISTANCE:

Weight (strength) Training, Callisthenics
Stength - Endurance - Maintain/Increase Muscle
Reduce risk of falls

WEIGHT BEARING

Jogging - Walking - Aerobics
Stair climbing - Strength training
Keeps bones healthy
Reduces risk of fractures/osteoporosis

STRETCHING

Flexibility

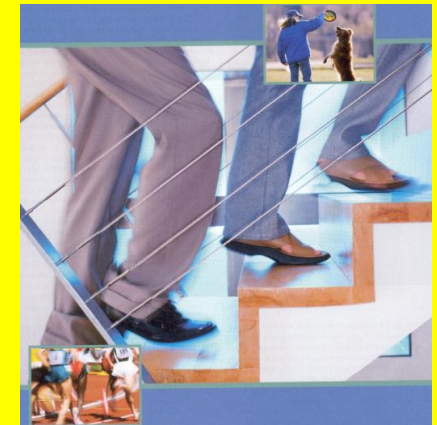
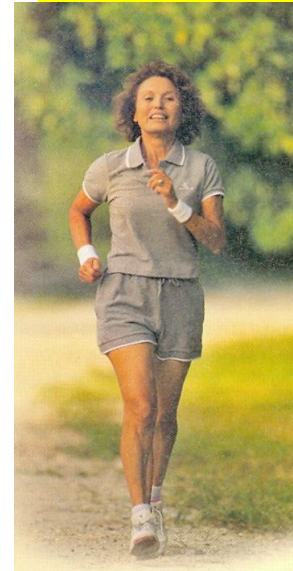


FIGURE 11.2

Increasing muscle strength requires hard work. It is accomplished by using your muscles to push and pull against a resistance such as a heavy weight. (© LWA-Dann Tardif/Corbis Images)

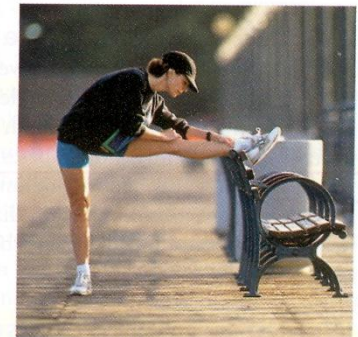
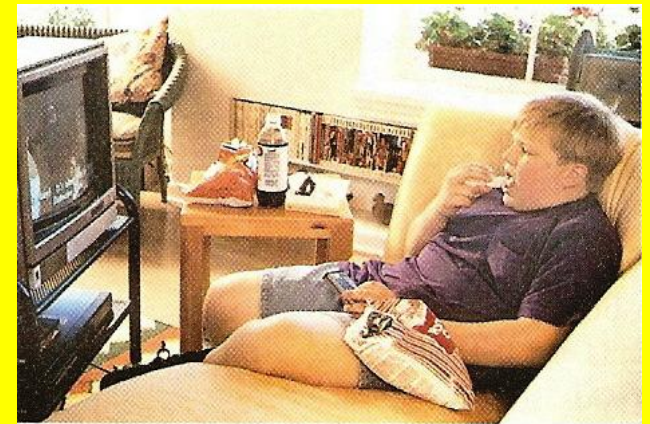
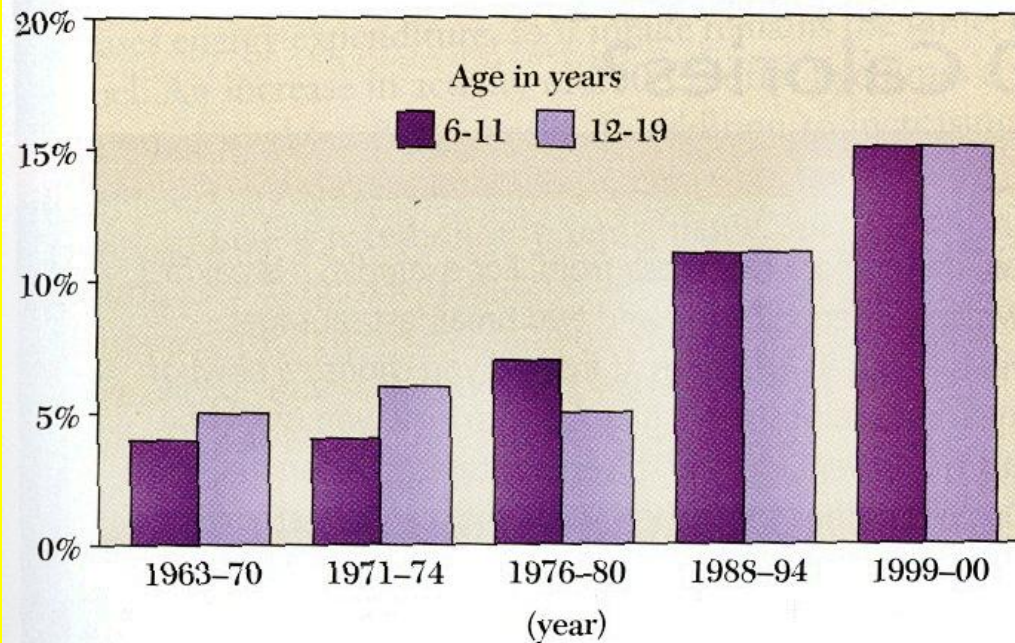


FIGURE 11.3

Stretching muscles to increase and maintain flexibility can make movements easier and reduce the risk of injury. (David Madison/Stone/Getty Images)

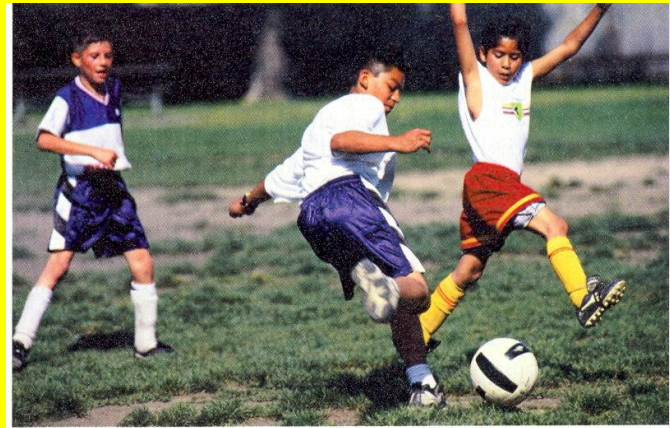
Special Populations: Children

Prevalence of overweight among children and adolescents ages 6-19 years



Special Populations

- Children and teens: **60** minutes nearly everyday- protect against overweight/obesity



- Pregnant women: OK moderate, safe exercise: **30** minutes/day

Special Populations

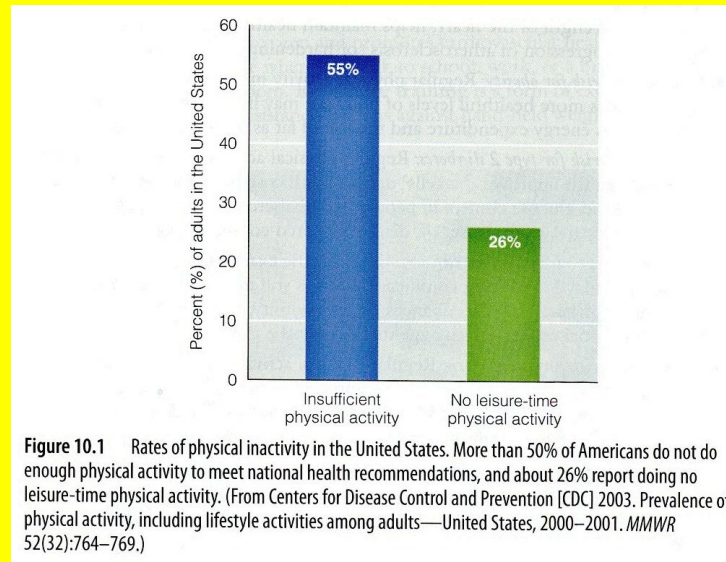
- Breast feeding mothers: OK to exercise

- Older Adults:

Weight-bearing exercise: slows bone loss

Resistance training: protects against falls

Problem: 2007 studies: > 60% Americans not active enough



CDC **2008** survey: **46.7%** US women

49.7% US men

Exercise regularly

Exercise & Breast Cancer

The New York Times

But Will It Stop Cancer?

The effect of exercise is probably small, but for two common types of breast and colon, studies are promising.

John Giustina/Getty

PREVENTING CANCER
The Exercise Hypothesis

Exercise & Breast Cancer

- Breast cancer: 40,000 women die/year
- 2d leading killer after lung cancer
- Some studies: exercise- small protective effect
- Other studies: no effect

Why these discrepancies?

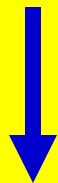
- 1st problem: **Recall** method: How much did you exercise?
- 2d problem: When is exercise important for protection?
 - Throughout life?
 - Young adults?
 - Middle age? (↑ risk)

2007 University Southern California Study

- Moderate or strenuous exercise:
5 or more hours/week
- ↓ 55% risk breast cancer
- Important exercise period:
teens → 50's (lifelong)

2008 Washington University School of Medicine Study

Girls & young women: exercise
regularly



Risk- premenopausal
breast cancer

Nurses' Health Study: 120,000 nurses

Burn 2000 calories/week: ↓ breast cancer risk

2000 calories =

- Walking briskly **3-5** hours
- Housework **10** hours
- Bowling **8** hours
- Raking leaves **7** hours
- Leisure Biking **5** hours

Bernyce Edwards' daughter died- breast cancer at age 42 in 1997



ZEALOUS RUNNER Bernyce Edwards, 73, near her home in Bellingham, Wash. She began running regularly after her daughter died of breast cancer. Peter Yates for The New York Times

Diagnosis → 69 days → death

Bernyce: 73, runs 1 hour/day in
Bellingham, Washington to
protect herself

How exercise may prevent breast cancer

- Studies: overweight post-menopausal women
- After menopause: **estrogens** produced by enzyme in **body fat**
- ↑ Exercise ↓ Body fat
- ↓ Hormone levels ↓ Breast cancer risk

Preventing cancer from **coming back**

> 10 million Americans: cancer survivors



Elizabeth Edwards

2007 Harvard Medical Study

- Regular exercise **after** breast cancer diagnosis: walking average pace: 3-5 hours/week
- ↓ Risk- dying from breast cancer
- Why? ↑ exercise ↓ estrogen
- Important: women with **hormone sensitive** (fed) tumors

Exercise & Colon Cancer

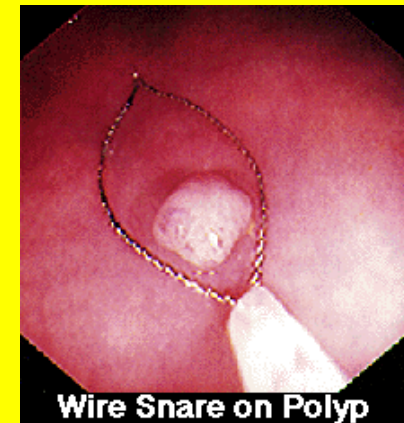
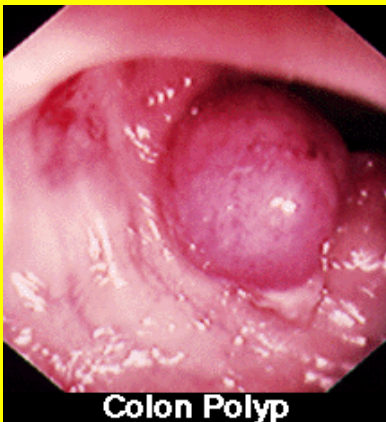
- Many studies

↑ exercise ↓ colon cancer

- Major problem: getting people to start exercising/sticking with it

Exercise & Colon Cancer

- After colonoscopy: polyps (pre-cancerous) removed
- Doctor recommends: **exercise + aspirin**



Dana Farber Cancer Institute

- 2007 study: colon cancer survivors walk **6** or more hours/week- average pace
- ↓ 50% drop- recurrence
- ↓ Death- all causes

Center for Disease Control study
2007: **Exercise & Weight Loss**

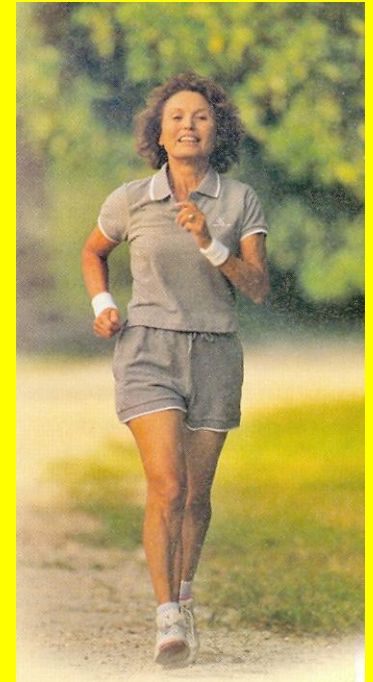
- **Survey**: Ask people **what works**
- 2 groups: successful & unsuccessful dieters

Both groups:

- ↓ **total food** ↑ **fruits/veggies**
- ↓ **portion size** ↓ **fatty foods**
- ↓ **sweetened drinks**

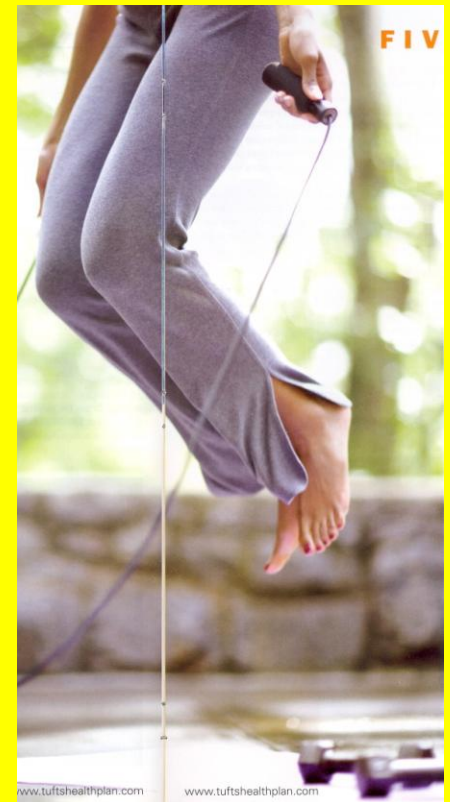
Successful Dieters

- Lost weight & kept it off
- + Exercise: 30 minutes/day
- ↑ energy expended
- ↓ loss body fat
- helps keep **lean tissue**



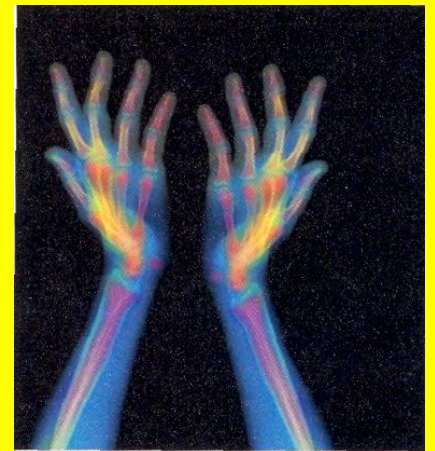
Exercise, Dieting, Bone Loss

- Dieting alone (↓ calories) without exercise
- ↓ Bone density
- Exercising to lose weight: no loss bone density



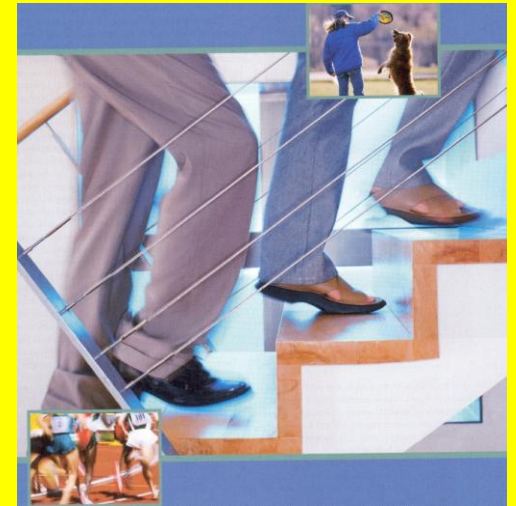
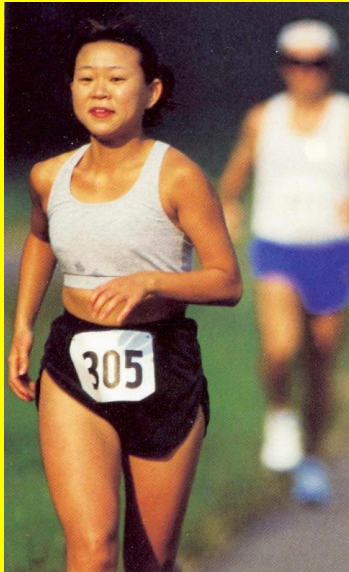
Exercise to build strong bones

- Bones get bigger/healthier: weight bearing & resistance exercises
- Critical time: childhood → teens to reach peak bone mass
- Bone loss: lack of use



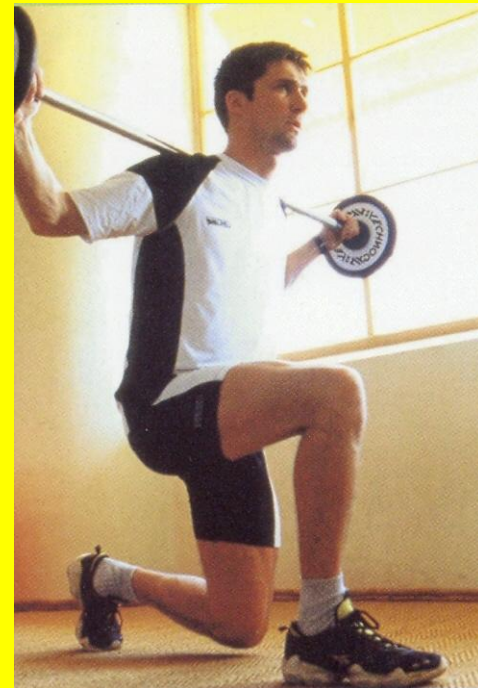
Build strong bones

- Weight bearing exercise: jogging, walking, dancing, climbing stairs
- ↓ Risk osteoporosis



Build Strong Bones

- Resistance Training: weight lifting- free weights or machines

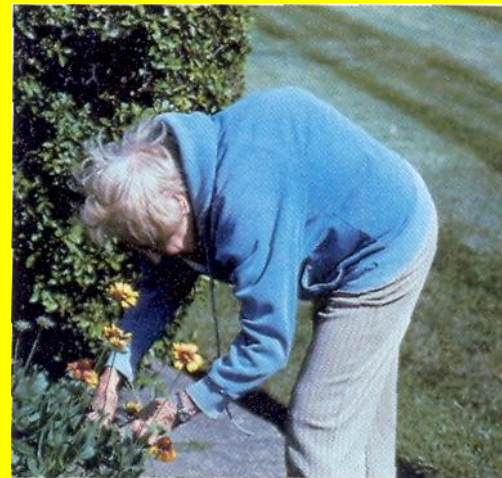
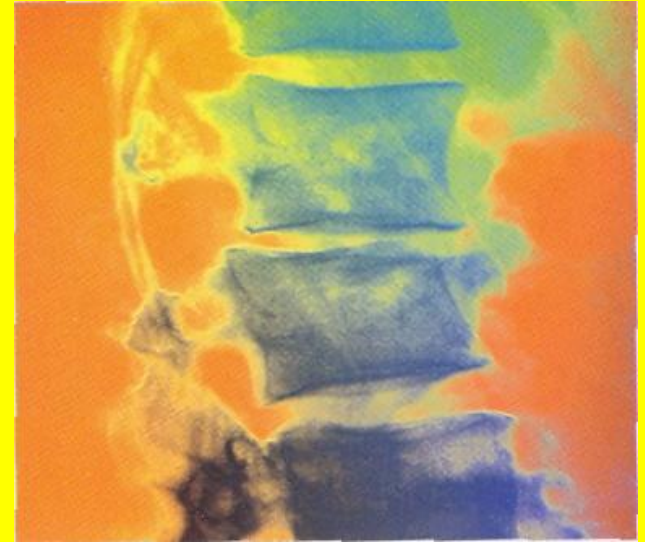


Osteoporosis

- Peak bone mass: ages **16-30**
- After 35-45 bone breakdown > bone formed
- **Bone density:**
 - African Americans > Caucasians
 - Men > Women
 - ↓ Smoking ↓ alcohol
 - ↑ Weight bearing exercises, calcium intake

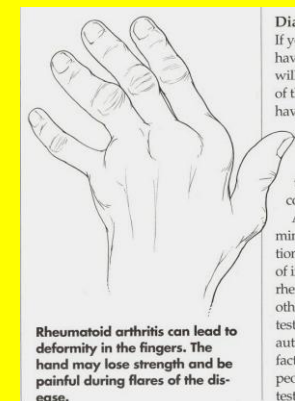
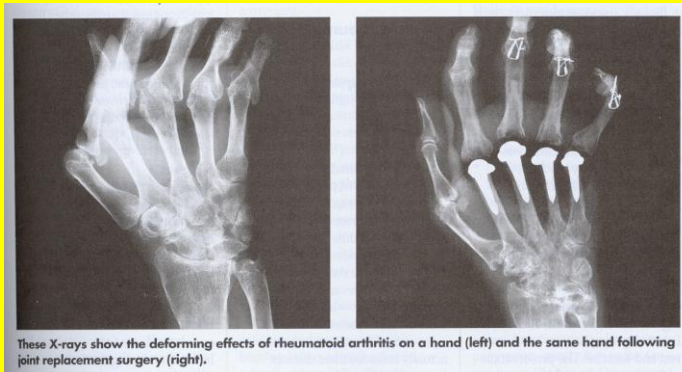
Osteoporosis

- Reduction in bone mass
- ↑ Bone fragility
- ↑ Bone fractures



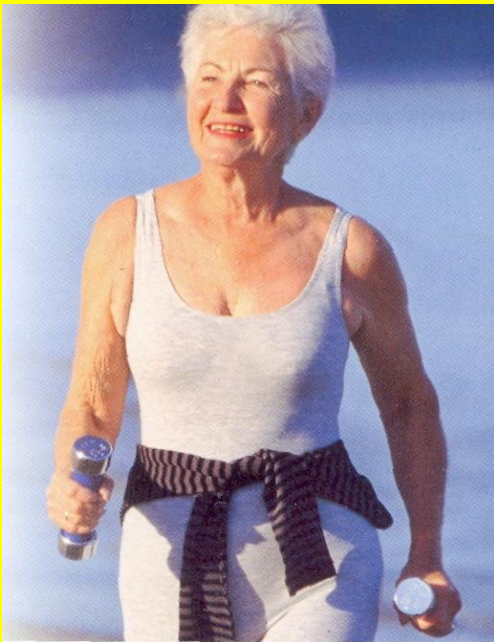
Exercise & Arthritis

- Northwestern University
2006 study
- People 53-63 with osteoarthritis
- Exercised **30** minutes- moderately
or **20** minutes-vigorously most
days



Exercise & Arthritis

- **Fewer problems: walking, climbing stairs, basic chores**
- **Key: independent living**



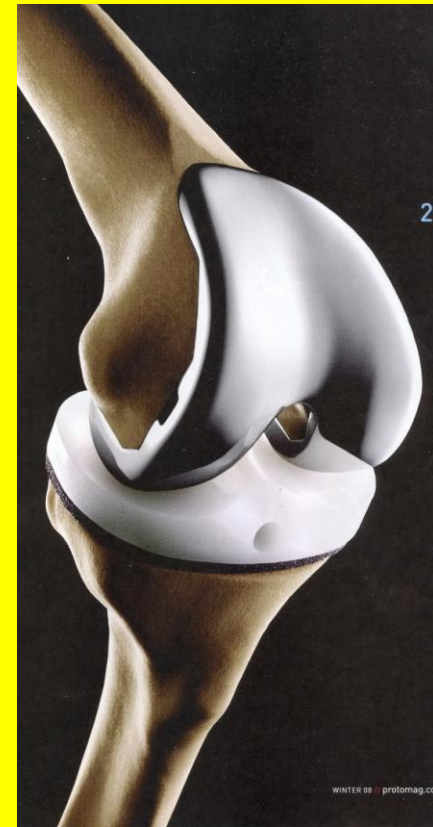
Strength & flexibility
Joints move more
easily

Exercise & Knee Joint Health

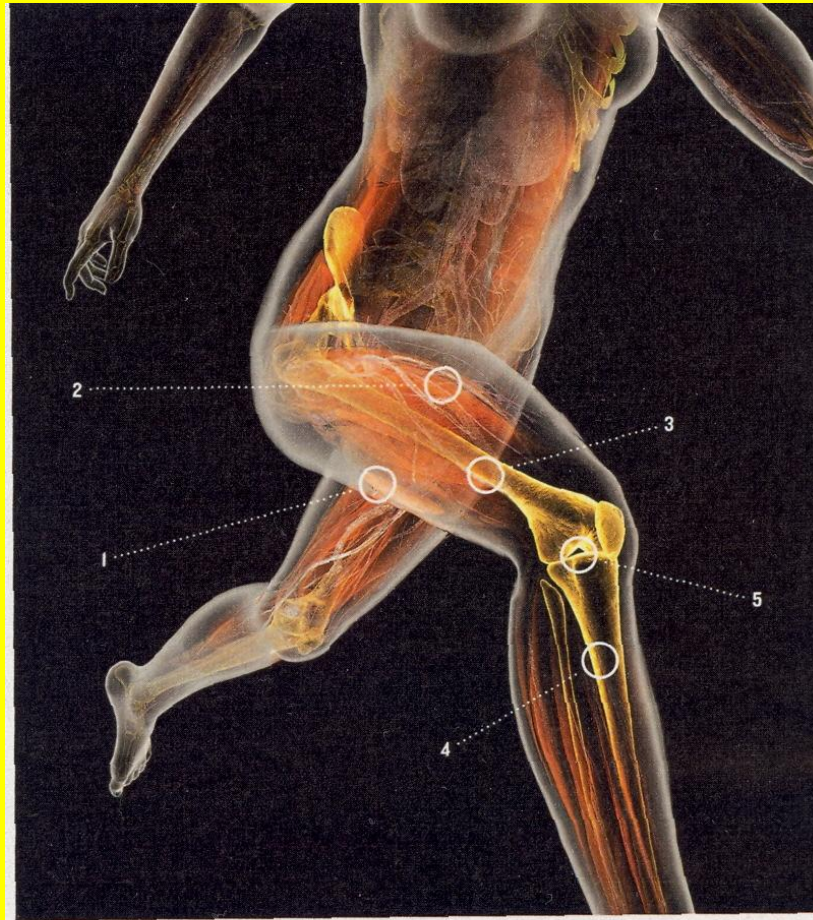
Australian Study: exercise

20 minutes/week (weight bearing)

- ↑ Knee cartilage
- ↓ Bone marrow lesions
- ↑ Knee strength
- ↓ Risk- osteoarthritis



Running & Your Knees



**Can Running Actually
Help Your Knees?**

Running & Your Knees

- Older view: knees of runners degenerate
- 2008 Stanford University Study
- Followed Distance Runners for **20** years vs. Control Group
- Runners: **less arthritis in knees**
- Running may “condition” knee cartilage to load placed on it

Exercise and Diabetes

- 2002 study: overweight middle-aged people pre-diabetics
(↑ glucose)
- Two groups: Low calorie/fat diet + 2.5 hrs brisk walking/week vs. pill to lower glucose
- Exercise group: ↓ development diabetes

Fatness and Fitness

Dallas Cooper Institute Aerobic Research:
22,000 men studied, 8 years

Death Rates:

Lean/not fit > **Overweight** but
fit (treadmill tests)

Fit lean men = Fit overweight men

Similar results: women. **Fitness** (not weight)
strongest predictor mortality

2008 Study of Americans

1/2 overweight

1/3 obese adults

Normal: blood pressure,
cholesterol, triglycerides, glucose

“metabolically healthy”

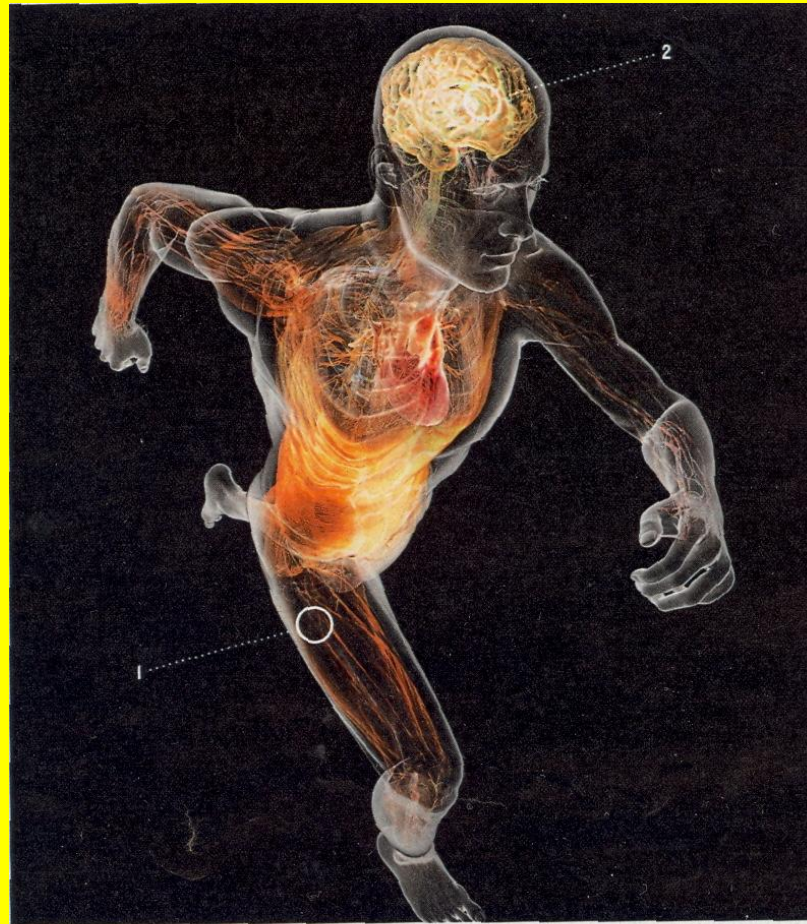
1/4 adults at “healthy weight”: 2 out of
4 cardiovascular risk factors-
unhealthy

Docs? Greater focus **exercise** vs. **weight loss**

Your brain on exercise

- In general: ↑ age ↑ memory loss
- Several studies:
 - ↑ exercise ↑ memory scores
 - brisk walking- older people-
 - reverse aging brain shrinkage
 - ↑ brain volume (gray & white matter- connections)

Exercise and Intelligence



**What Sort of Exercise
Can Make You Smarter?**

Exercise and Intelligence

- 1999 California Salk Institute Study
 - Exercise: stimulates creation **new brain cells**
 - What type of exercise?
 - 2009 University of Illinois Studies:
 - College Students
- 1. Memorize specific letters**
 - 2. Later pick out from list: flashed**

Exercise and Intelligence

- Students: Did 1 of 3 things
 - A) Sit quietly
 - B) Run-treadmill
 - C) Lift weights

Cool down period → re-tested

Results: Running: quicker, more accurate responses

Exercise and Intelligence

Similar Study: Stretching vs. Brisk walking

Walking: better cognitive test performance

Aerobic exercise: ↑ dramatic blood flow

Carry "growth factors" → brain

↑ New neurons & connections

Weight lifting: growth factors stay in muscles

Exercise and Alzheimer's Disease

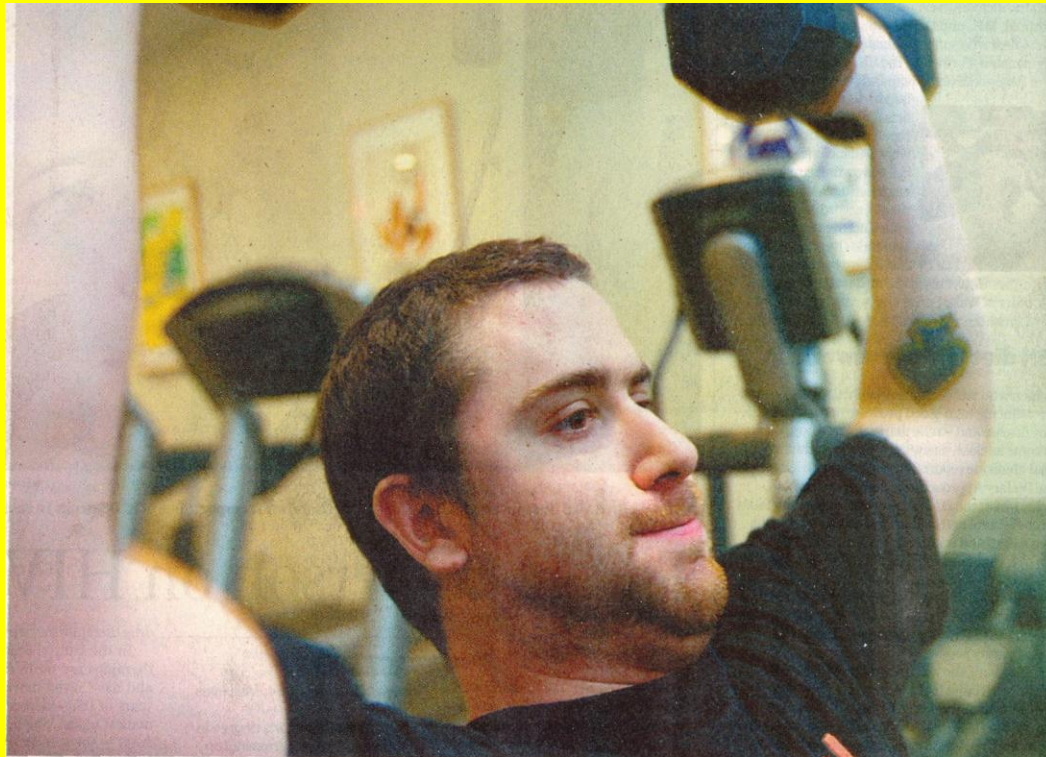
- People 65+ : **normal** mental function: exercise 3X/week
- ↓ Alzheimer's (↑ blood to brain)
- People with Alzheimer's

weight lifting

antidepressant

Similar improvement

2007 study: **Exercise** almost as good as **anti-depressant** in reducing **depression**



JOANNE RATHE/GLOBE ST

Theo Baars uses weights in the exercise room at the recreation center as part of his treatment for depression at McLean Hospital in Belmont.

Mood lifting

Growing evidence suggests that exercise is as good for your mental health as it is for your physical well-being

Exercise and Depression (↓)

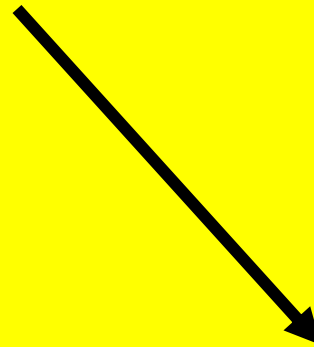
Zoloft (drug)	Exercise supervised	Home exercise	Placebo (pills)
47%	45%	40%	31%

How does exercise help?

- Brain serotonin (neurotransmitter)-
mood
- Stress-reducing hormone- from heart
muscle

Exercise- sticking with it

Overweight/obese women



iPod + iTunes

no music

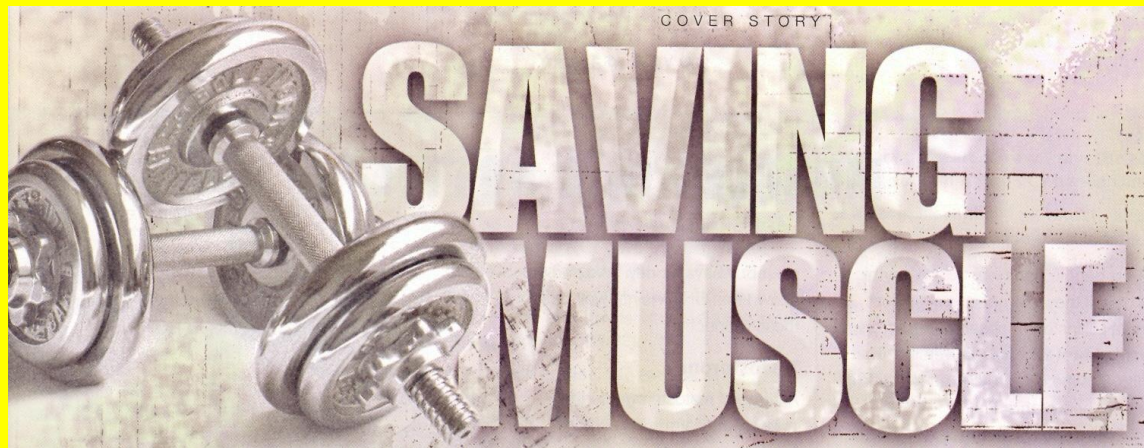
Lost more weight/fat

Better adherence

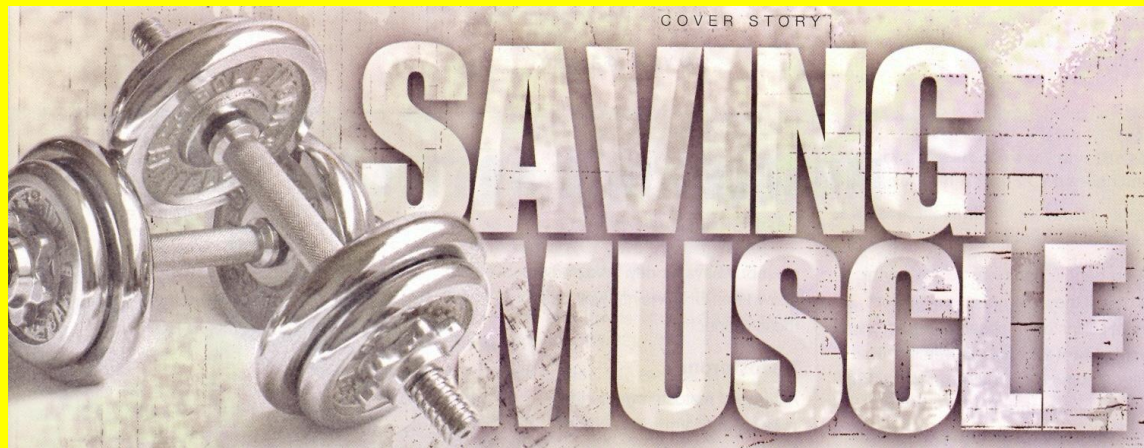
EXERCISE & MENOPAUSE (45-55)

Penn State 2007 study:

- ↑ Exercise during menopause (walking or yoga)
- ↑ Improved: mood, outlook, quality of life



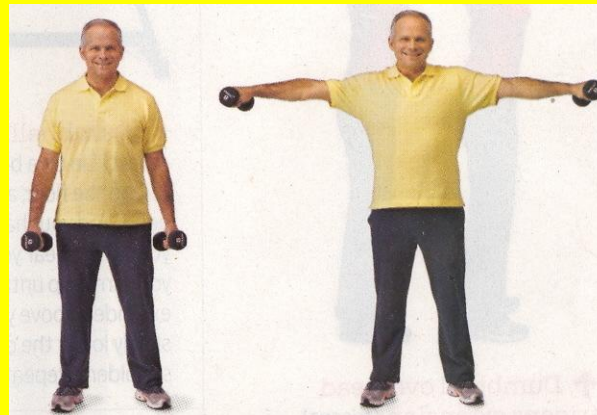
- Men & women lose significant muscle mass (**sarcopenia**) in 40' & 50's
- Women less muscle, live longer than men, show effects weaker muscles- daily activities



- ↓ muscles ↓ metabolism → burn fewer calories
- Fat deposits → muscles (marbling)
- ↑ Risk heart disease and diabetes

Saving Muscle

- Aerobic exercise- good but doesn't challenge major muscles (thighs, arms, shoulders, back)
- So to keep muscles strong: **resistance** (weight) training



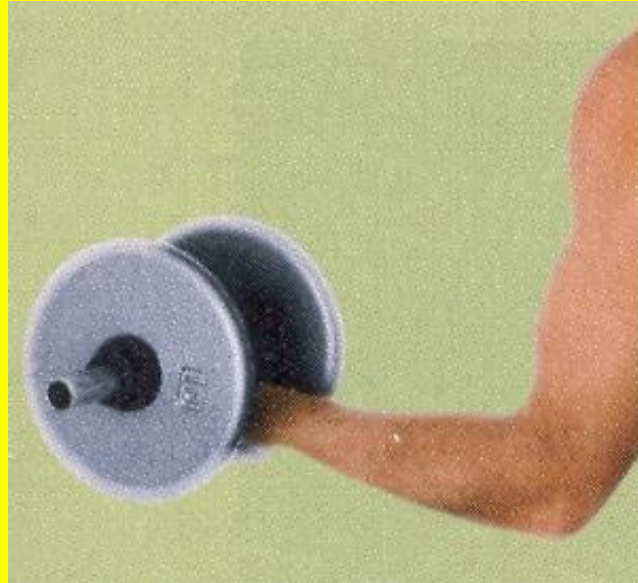
Recommended Dietary Allowance

RDA: “the average daily dietary intake level to meet nutrient requirements of nearly all (97-98%) people in a life stage or gender group”

Harvey/Champe Biochemistry 2005

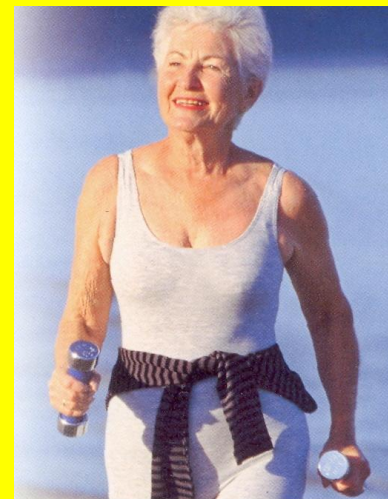
To maintain/build muscle: need **protein**

- RDA protein (grams) all adults:
0.36 X your weight
- Calculate your RDA for protein



But suppose you are 50-80 years old. Then what?

- May need 25% more protein than RDA- maintain (preserve) muscle.
- Need 50% more protein than RDA to gain muscle.
- Quick estimate (grams):
 $\frac{1}{2}$ of your body weight



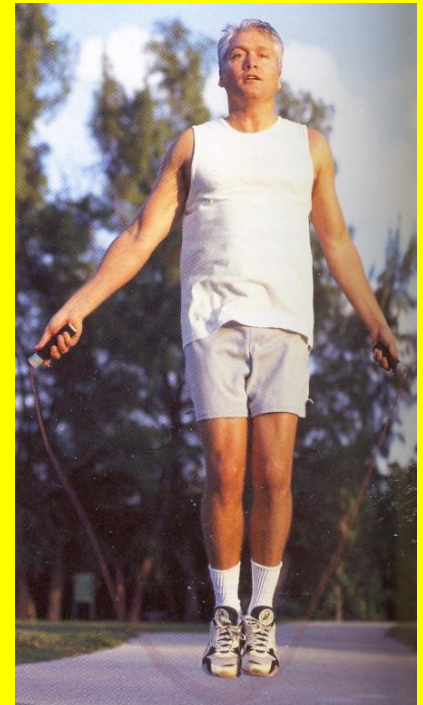
Vigorous aerobic exercise: the best

↑ Calories burned

↑ Flexibility to choose wider
variety of foods

(discretionary calories)

30-60 minutes most days



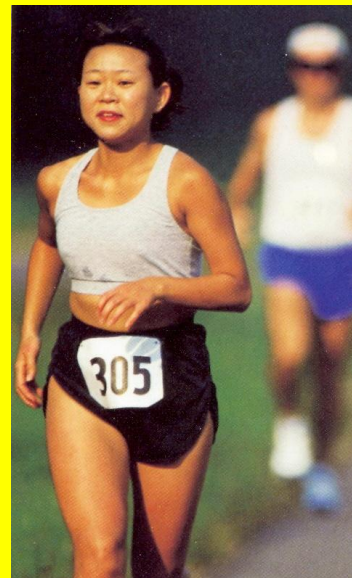
Aerobic Exercise

- Increases heart rate & uses O₂
- Intensity: “low enough for you to carry on conversation, but high enough that you can’t sing”
- Examples: walking, dancing, jogging, cross-country skiing, cycling, swimming



Aerobic Exercise

- Raises heart rate: 60-85% of maximum (depends on age)
- **Maximum** heart rate: $220 - \text{age}$



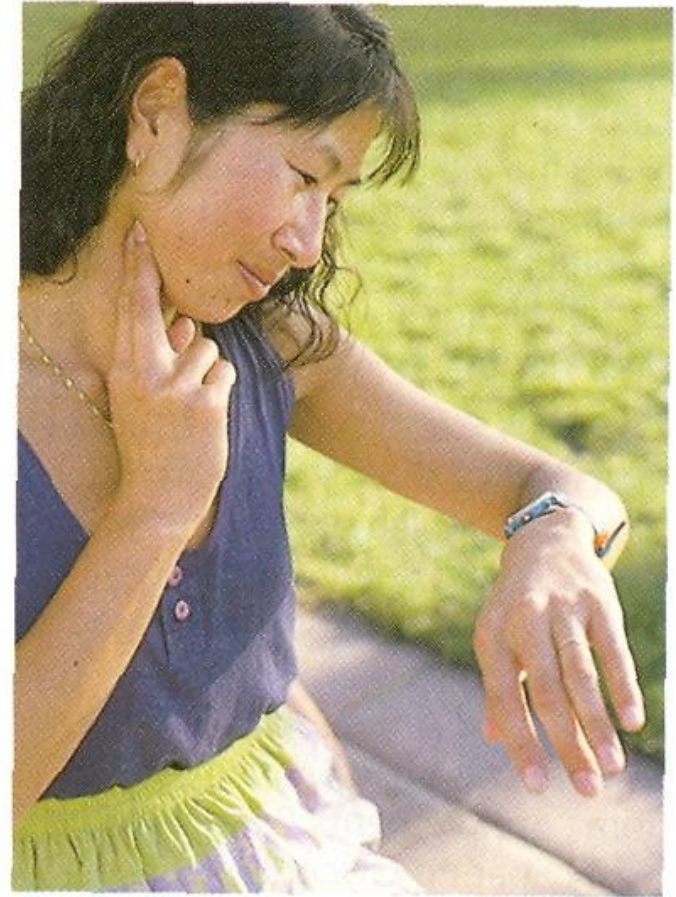
Regular Aerobic Exercise

- Become more fit ↑ endurance
- Heart pumps more blood
ATP's ← greater use O₂ ← muscles
- ↓ Resting heart rate: rate needed to supply tissues at rest
(measure- morning before getting up)

Measure your heart rate

FIGURE 11.1

You can measure your heart rate by feeling your pulse at the carotid artery located on the side of your neck, just below the jawbone. Use your index and middle fingers to count the beats or pulses. The number of pulses per minute equals heart rate. To find your resting heart rate count the beats first thing in the morning before you even get out of bed. If you're patient, you can count the number of beats in 60 seconds; if you're not you can use a shortcut by counting the beats in 10 seconds and multiplying by 6. For example, if you count 11 beats in 10 seconds your resting heart rate is 66. (Michael Newman/PhotoEdit)

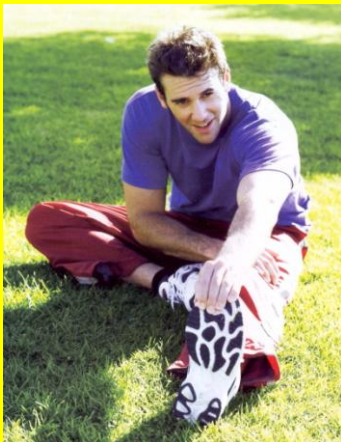


Resistance (Strength) Training

- 2-3 days/week
- Muscle: "Use it or lose it"
- Astronauts- space zero gravity
- ↑ Amount of weight ↑ muscle strength
- ↑ Repetitions ↑ endurance (how long you can continue a task)

Stretching: at least 3 days/week

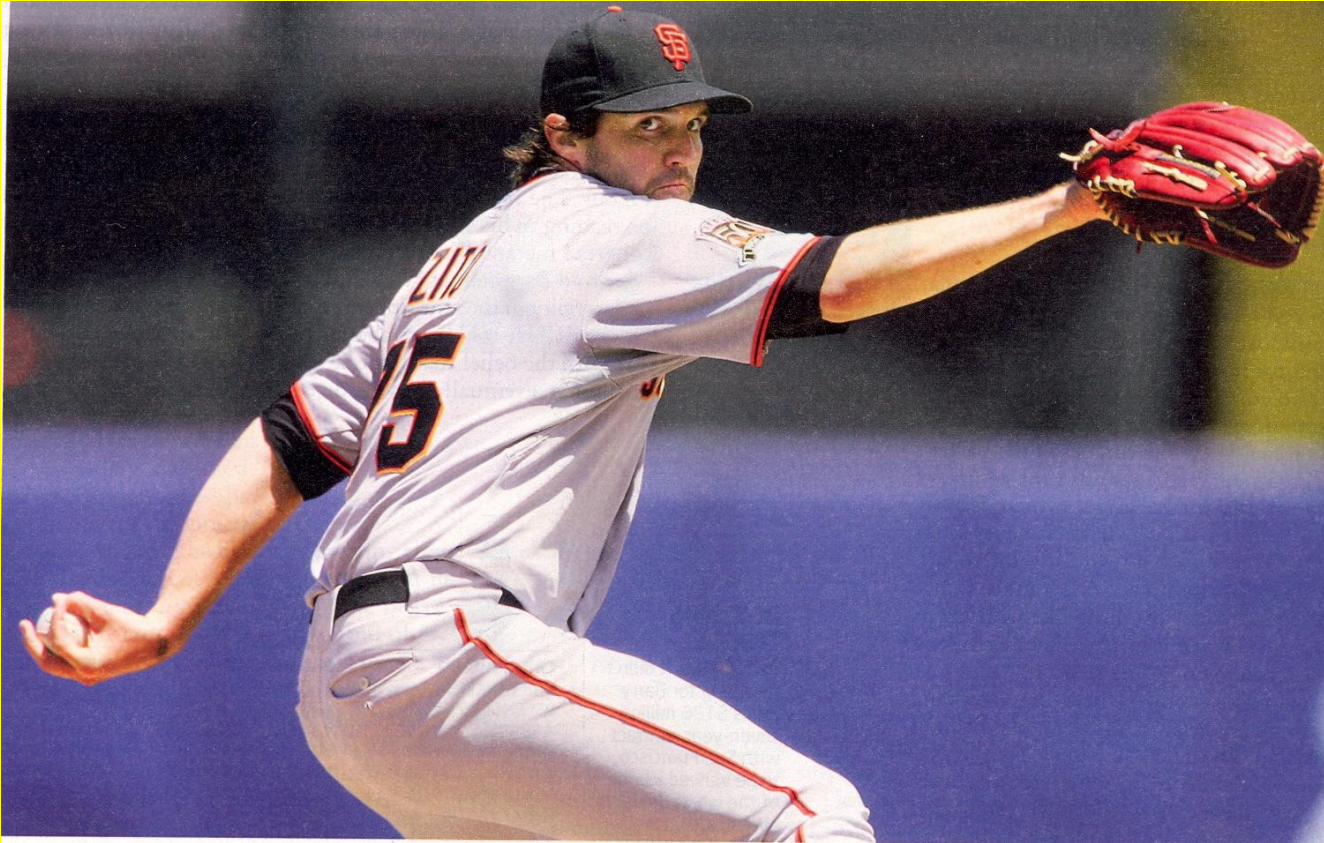
- ↑ **Flexibility** Move arms, legs, torso → full range of motion
- ↓ Risk pulled muscles
- ↑ Speed (athletes)



Stretching should be included in the warm-up and the cool-down for exercise.



Is stretching good before you exercise?



Barry Zito- Giants Injury Free

Yoga and Pitchers

- Training in California: meditate, stretch, yoga, music, visualize being on mound
- Block out distractions
- Improve balance, ↓ anxiety, deep breathing
- Arm stretching: rubber tube



On field: play catch 350 feet (not usual 120)- arms not babied

- Advocates: **Barry Zito Giants**- never missed a start
- Tigers' **Joel Zumaya** (clocked 103 mph)



Would stretching help the Yankees?

NY Times 5/3/07: Yankees fired strength coach Marty Miller.

Why?



Yankees: Brought back giant
rubber bands

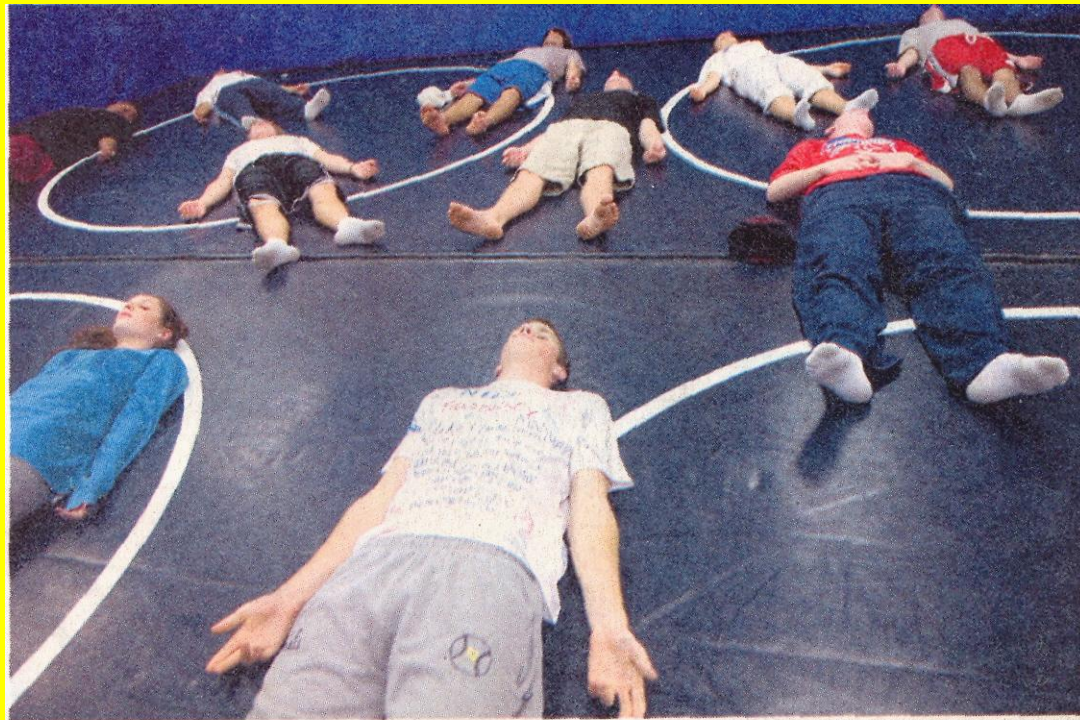
Stretching legs & weight extensions

Tim McCarver suggests Yoga



Needham High School

Yoga required all seniors: Principal emphasis: stress reduction



JODI HILTON FOR THE NEW YORK TIMES

At Needham High School in Needham, Mass., yoga classes are required for all seniors.

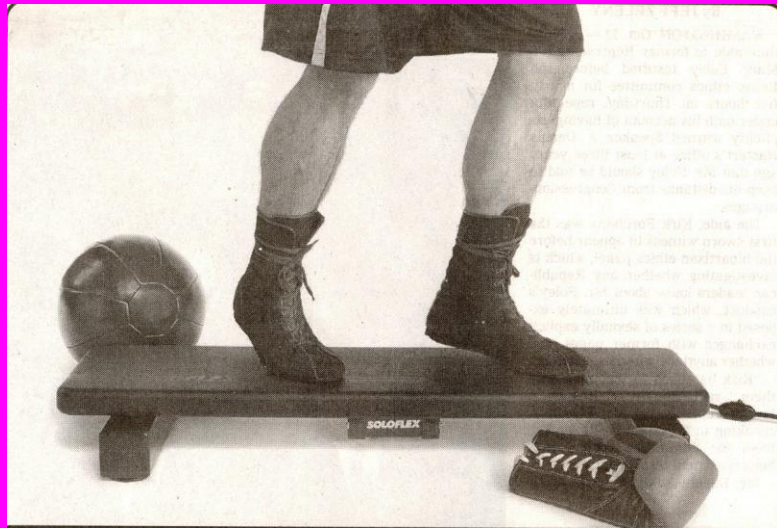
Is Stretching All It's Cracked Up to Be?

NY Times 8/7/08

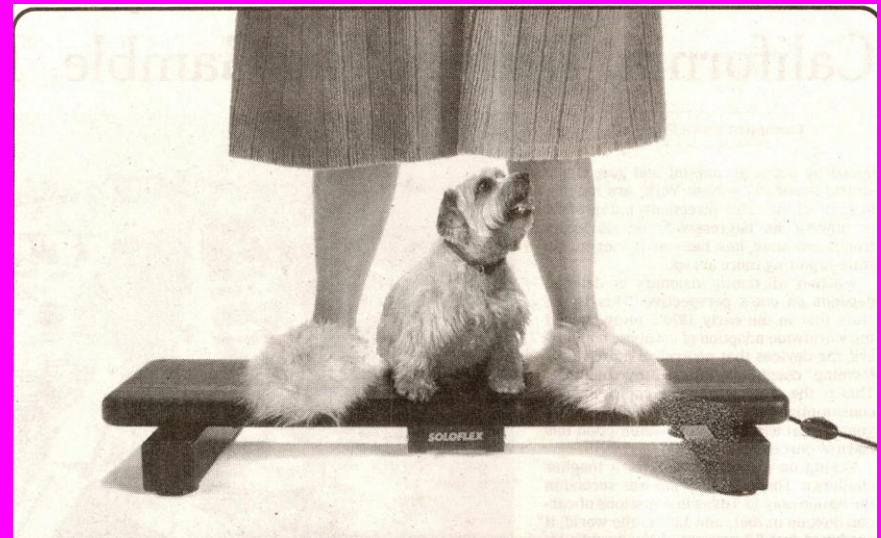


3 large "Stretching Studies" underway
United States, Australia, Norway

Soloflex: whole body vibration therapy platforms



**Our new contraption
beats you into shape!**



It works for doggies, too.

What do you think?

- Claims: Increases bone density in turkeys, sheep, rats.
- “Like moderate weightlifting.”
- **10** minutes/day: improves circulation, strength, flexibility, balance, mood, vitality.
- Relieves: joint & muscle pain.
- **? Application: frail elderly, people with disabilities.**

IS DANCING EXERCISE?

Middle schools- combat obesity

Adopt Dance Dance Revolution (DDR)

Floor mats/Japanese video/electronic

music: strenuous, use brain

New P.E.- less competitive

vs. team sports



“You don’t have to be good at it to get good work out” (Times 4/30/07)

EXERCISE: Do you need it?

