

# BI 121 Lecture 9

**I. Announcements** Lab notebook due today! Lab 4 HR & BP.

Thursday, Lab 5 Blood Chemistry. Read pp 5-1 thru 5-6 x2. Q?

**II. Overview of Labs** HR & BP. Blood chem lab review

**III. Cardiovascular Connections** LS 2012 ch 9

- A. Cardiac cycle? Contract-relax!
- B. ♥'s electrical highway + Pacemaker activity  
LS fig 9-7 p 235, tab 9-1 p 236, fig 9-8 p 237
- C. NHLBI & AHA websites



**IV. CV Physiology in the News** NHLBI & AHA websites  
Exercise & Nic? Exercise guidelines: ACSM, AHA, CDC

**V. CV Pathophysiology & Risk Reduction** LS ch 9, 10 +...

- A. AMI, CVA, CVD, PVD, TIA, HTN? + surgical treatments
- B. Atherosclerosis? LS fig 9-27, 9-25, 9-26 pp 266-8
- C. How to minimize risk of CVDs? Treatment triad:  
Exercise, Diet, Drugs + Surgery
- D. Food choices make a difference?  
What's HAPOC?

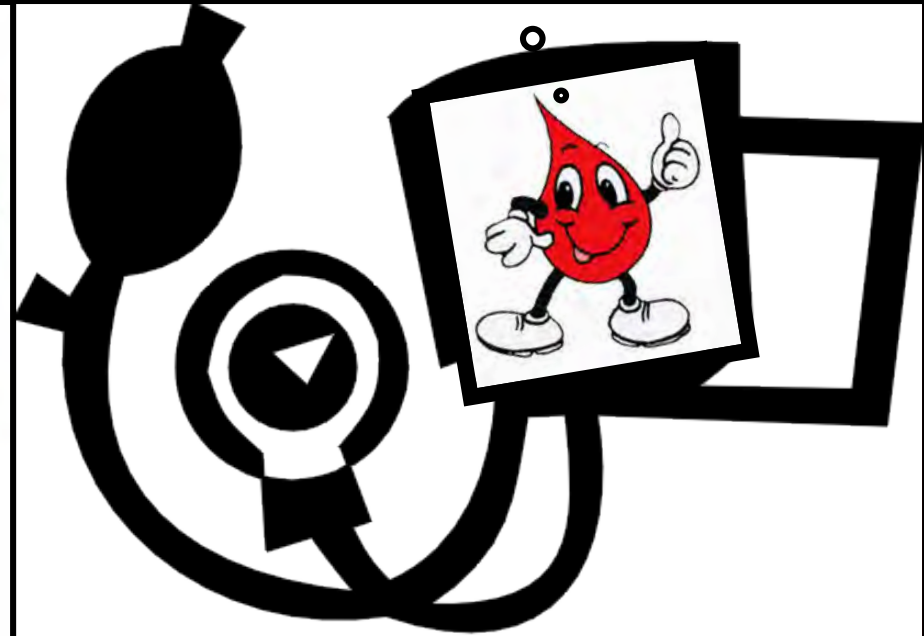


# *Heart-Blood Pressure Lab Today!*

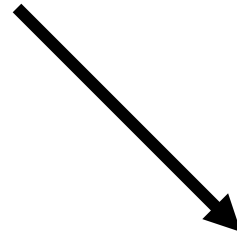
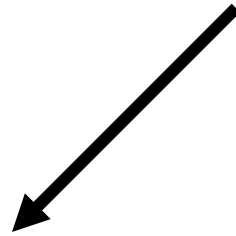
Lub-dup!



I'm cool!



# Cardiac Cycle

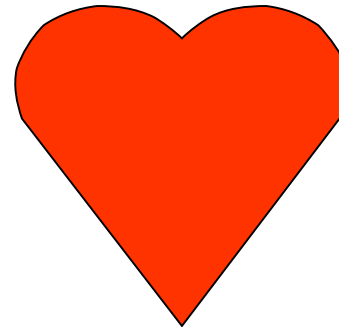
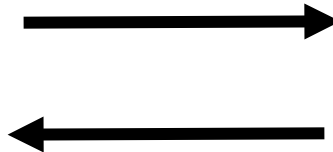
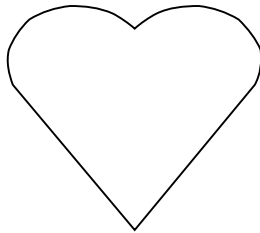


***Systole***

Contract  
& Empty

***Diastole***

Relax  
& Fill



# ***Blood Chemistry on Thursday! No food, drink or gum in lab!***



***Thanks sincerely!***

# PREPARATION



WASH & DRY



ALCOHOL



# SAMPLE+TESTS



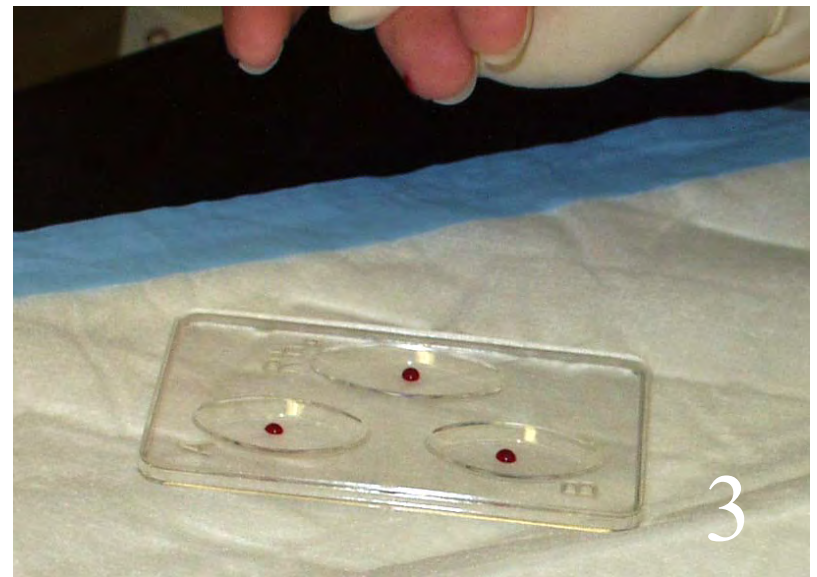
1

OBTAIN  $\mu$ SAMPLE



2

BLOOD GLUCOSE



3

BLOOD TYPING

# BLOOD GLUCOSE

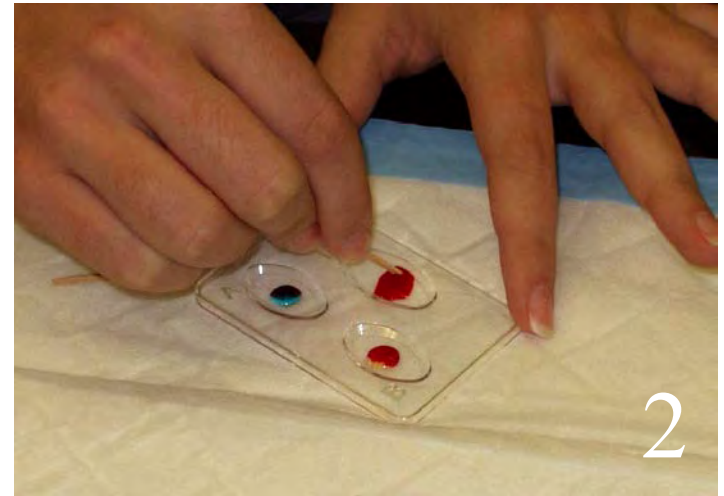


**READ & RECORD!!**

# BLOOD TYPING



ADD ANTISERA



MIX W/TOOTHPICKS



READ & RECORD!!



# CLEAN-UP!



FOLD DIAPER



BLOOD PRODUCTS



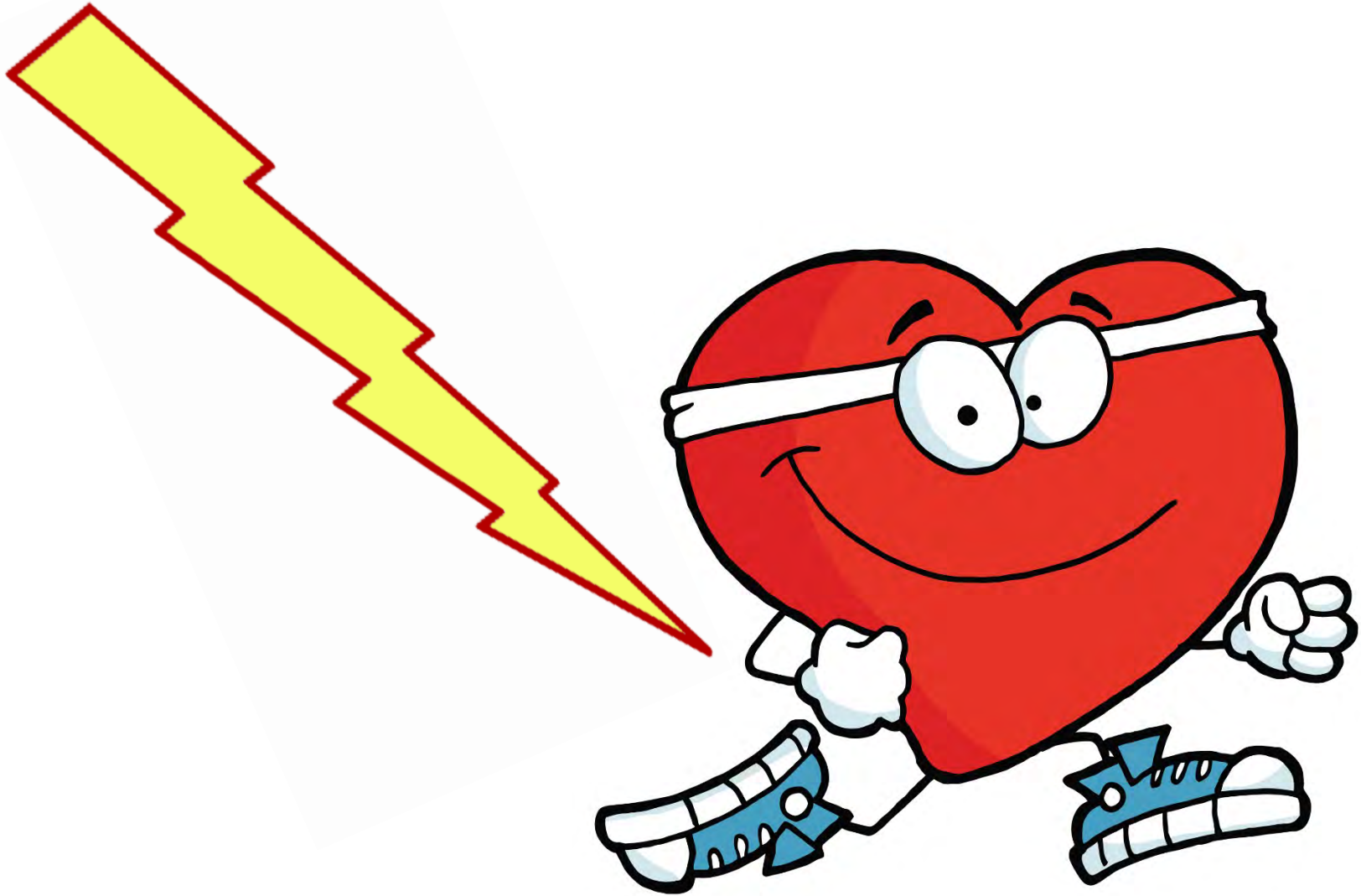
REWASH!!

***Discussion***

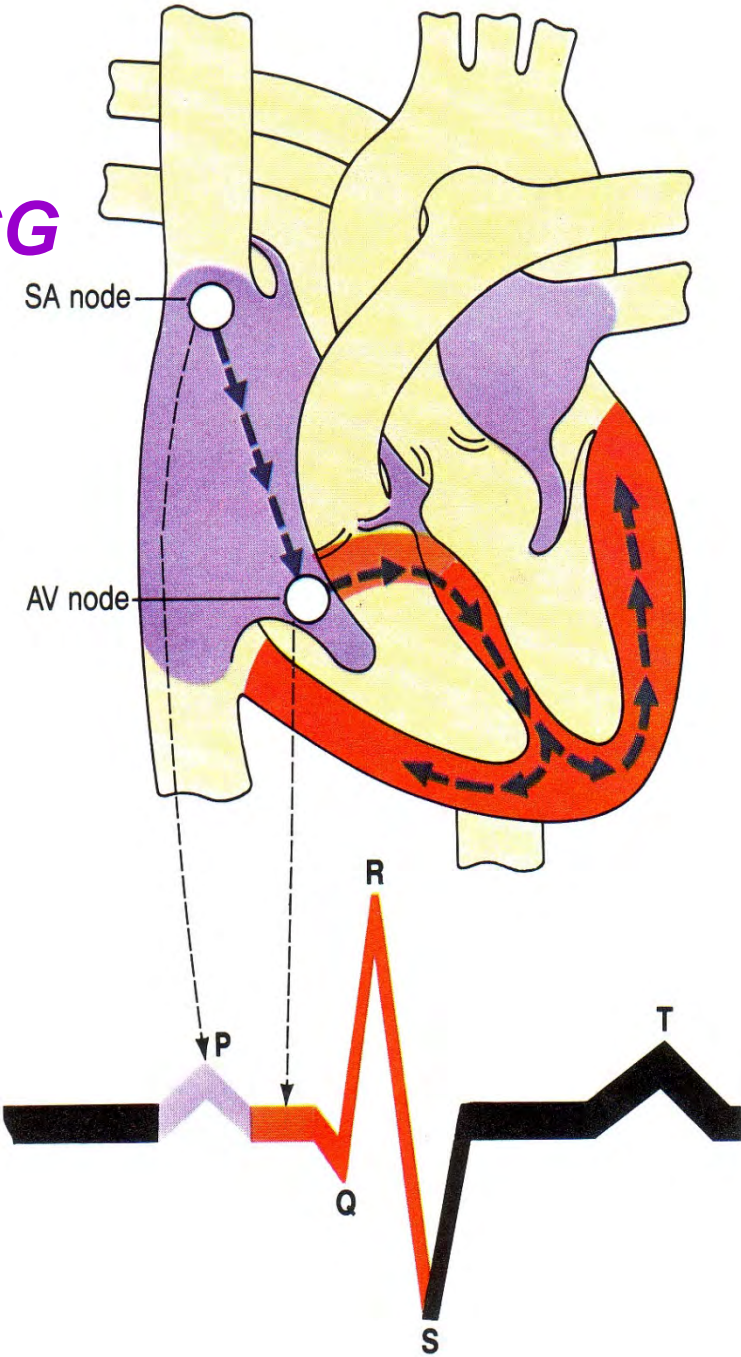
**+**

***Brief Break***

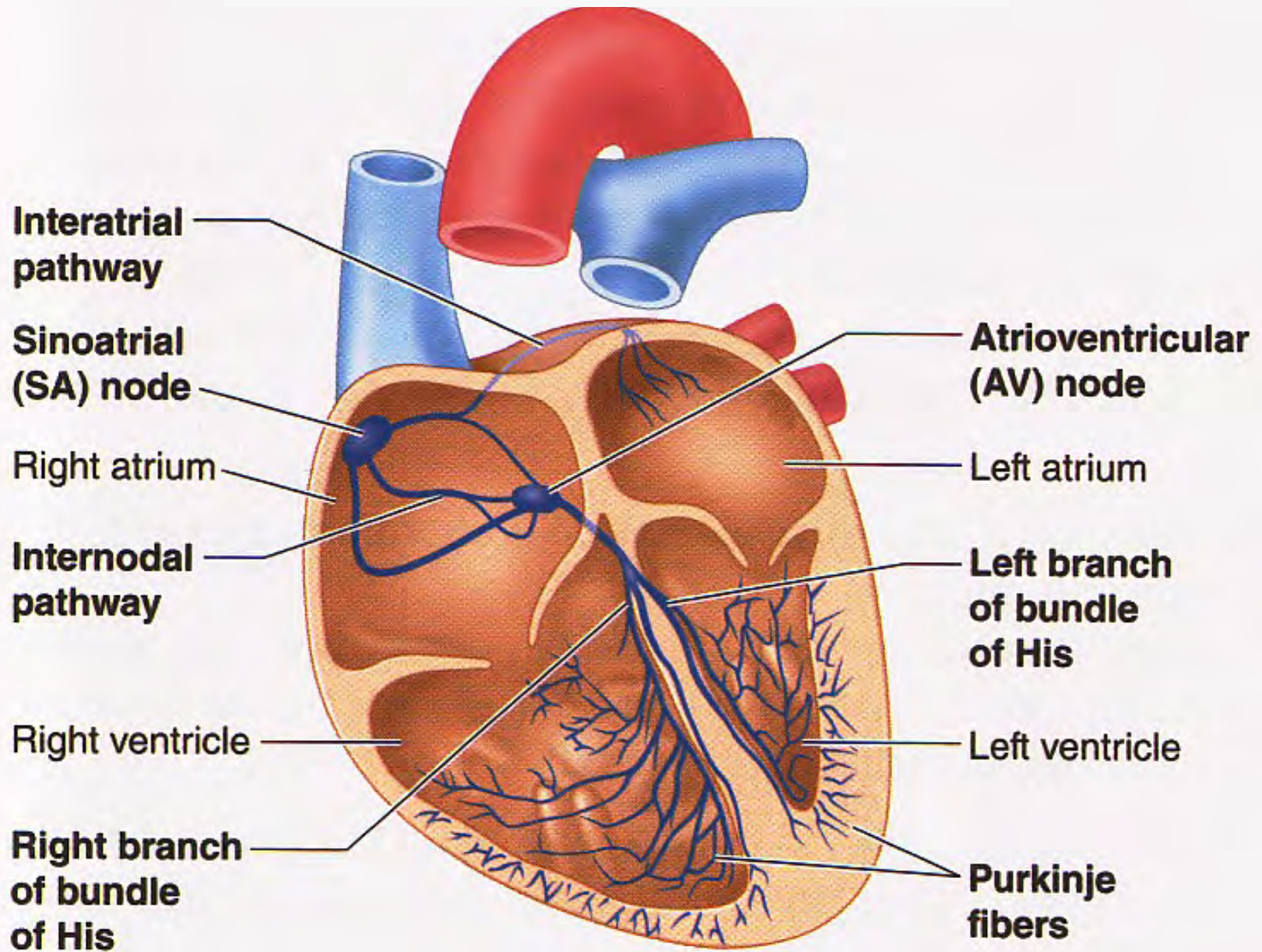
***(Automatically) Shock the Heart then it Contracts!***

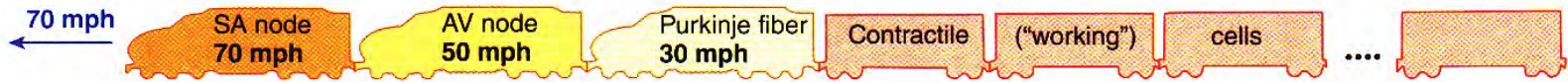


**EKG/ECG  
Origin**

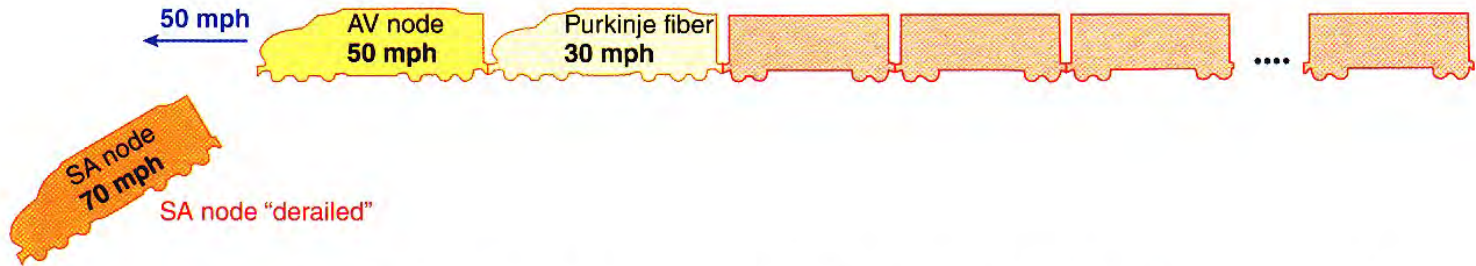


# Heart's Electrical Highway!

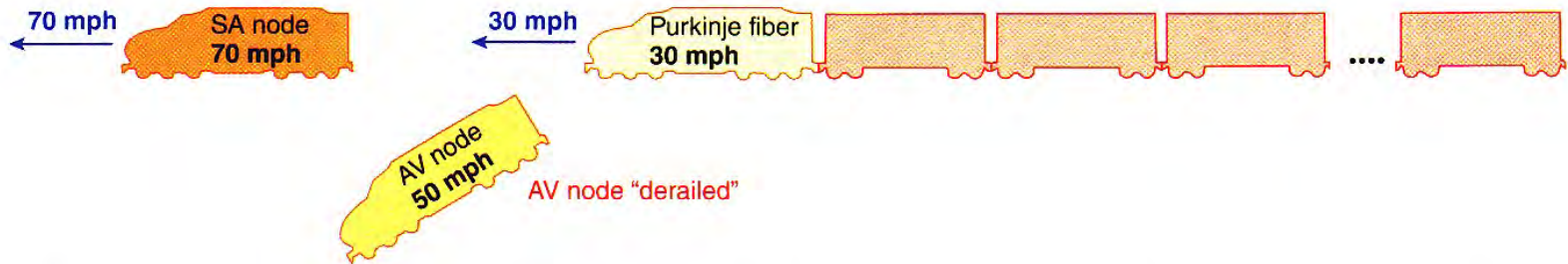




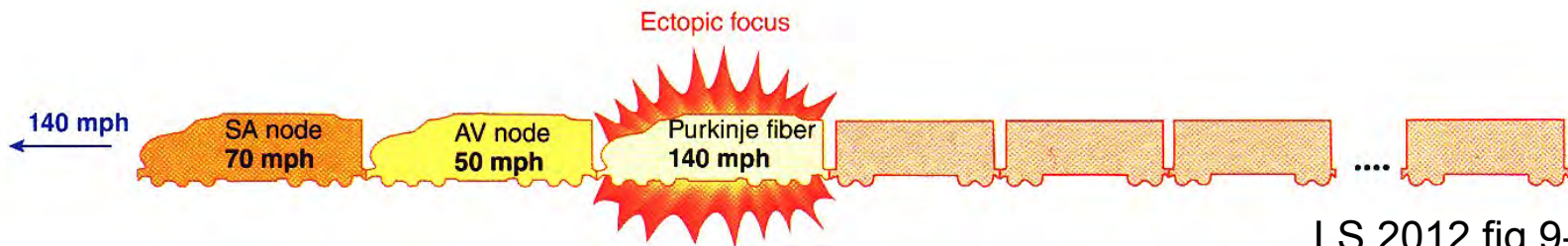
(a) Normal pacemaker activity: Whole train will go **70 mph** (heart rate set by SA node, the fastest autorhythmic tissue).



(b) Takeover of pacemaker activity by AV node when the SA node is nonfunctional: Train will go **50 mph** (the next fastest autorhythmic tissue, the AV node, will set the heart rate).



(c) Takeover of ventricular rate by the slower ventricular autorhythmic tissue in complete heart block: First part of train will go **70 mph**; last part will go **30 mph** (atria will be driven by SA node; ventricles will assume own, much slower rhythm).



# ***American Heart Association (AHA) & National Heart, Lung & Blood Institute***

**<http://www.my.americanheart.org>**



**<http://www.nhlbi.nih.gov/>**

Department of Health and Human Services · National Institutes of Health

**National Heart Lung and Blood Institute**

People Science Health





**We all have multimillion-dollar bodies!!**

**Can you believe that's Nicole?**

Hollywood glamour queen Nicole Kidman likes to swim to keep that multimillion-dollar body in shape. But the down-to-earth superstar doesn't need a fancy spa — she does her laps at the local YMCA! Nice goggles, Nic!







**Continuous exercise**  
**≥ 50% muscle mass**  
**≥ Conversational pace**  
**20-60 min/session**  
**3-5 days/wk**

<http://www.acsm.org/about-acsm/media-room/news-releases/2011/08/01/acsm-issues-new-recommendations-on-quantity-and-quality-of-exercise>



**AMERICAN COLLEGE**  
of **SPORTS MEDICINE**

## **Guidelines: Healthy Adults < 65 yr**



**Do moderately intense aerobic exercise  
30 min/d, 5 d/wk**

**OR**

**Do vigorously intense aerobic exercise  
20 min/d, 3 d/wk**

**AND**

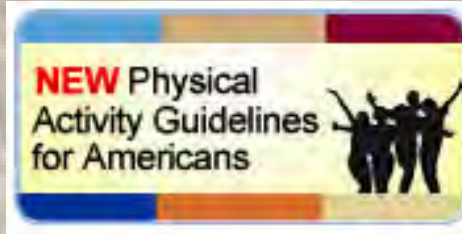
**Do 8-10 strength-training exercises  
8-12 repetitions/each exercise, 2 d/wk**



S

yr)

Federal exercise guidelines include strength training for all  
<http://www.health.gov/paguidelines/guidelines/default.aspx>



**Adults: Moderate to Vigorous Exercise  $\geq$  30 min, 5 d/wk**

**Children: Moderate to Vigorous Exercise  $\geq$  60 min, 5 d/wk**

# CVDs

AMI

CVA



TIA

HTN

PVD

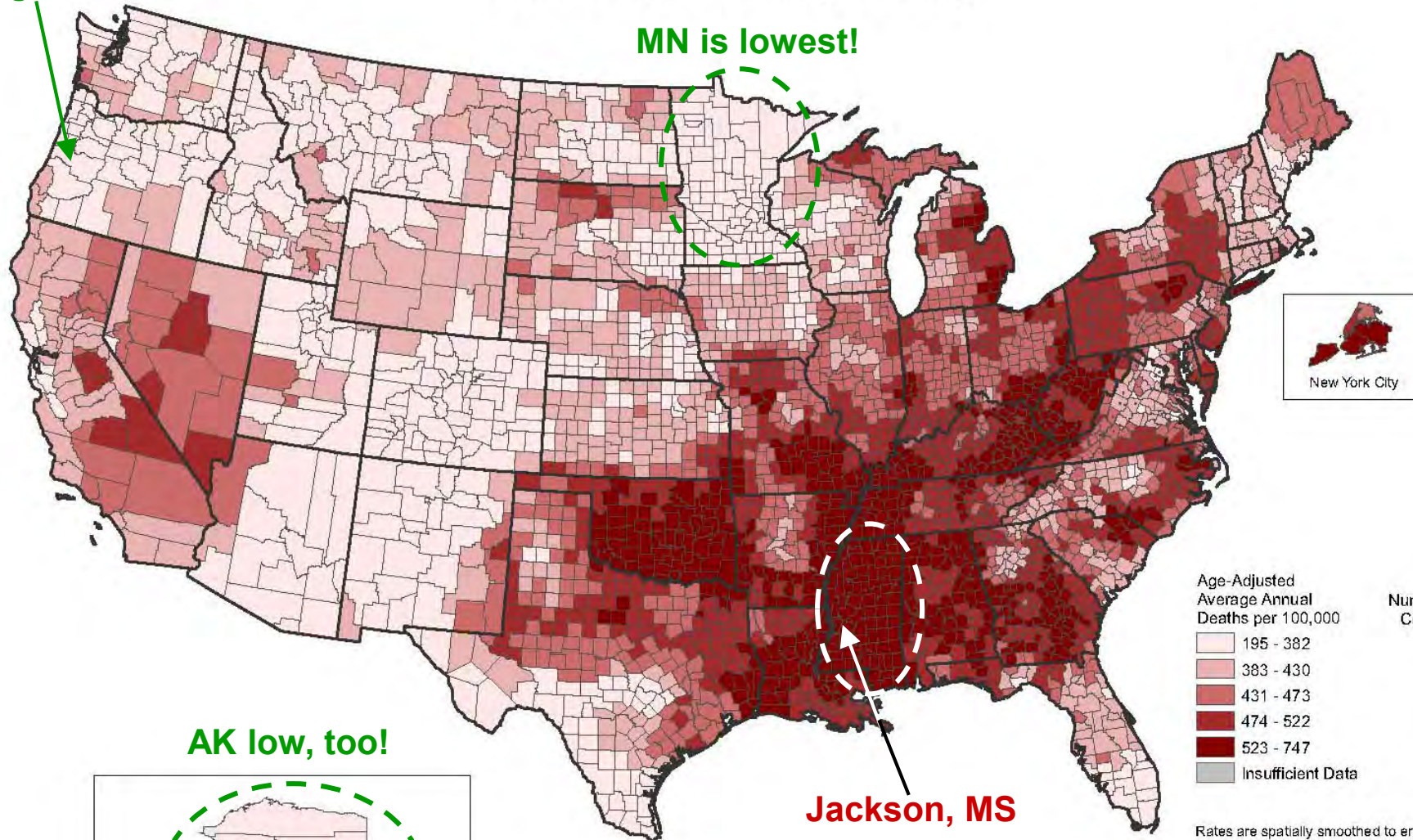
# Did you know?

- **Every year ~785,000 Americans have a first heart attack. Another 470,000 who've had  $\geq 1$  have another attack.**
- **In 2008, > 616,000 people died of heart disease. Heart disease caused almost 25% of deaths in the US.**
- **In 2010, coronary heart disease US costs ~\$108.9 billion including health care, medications & lost productivity.**

# Heart Disease Death Rates, 2000-2006 Adults Ages 35+, by County

Eugene, OR

MN is lowest!



AK low, too!

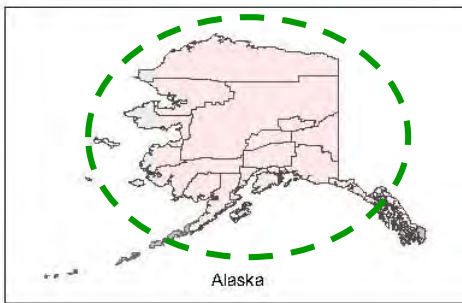
Jackson, MS

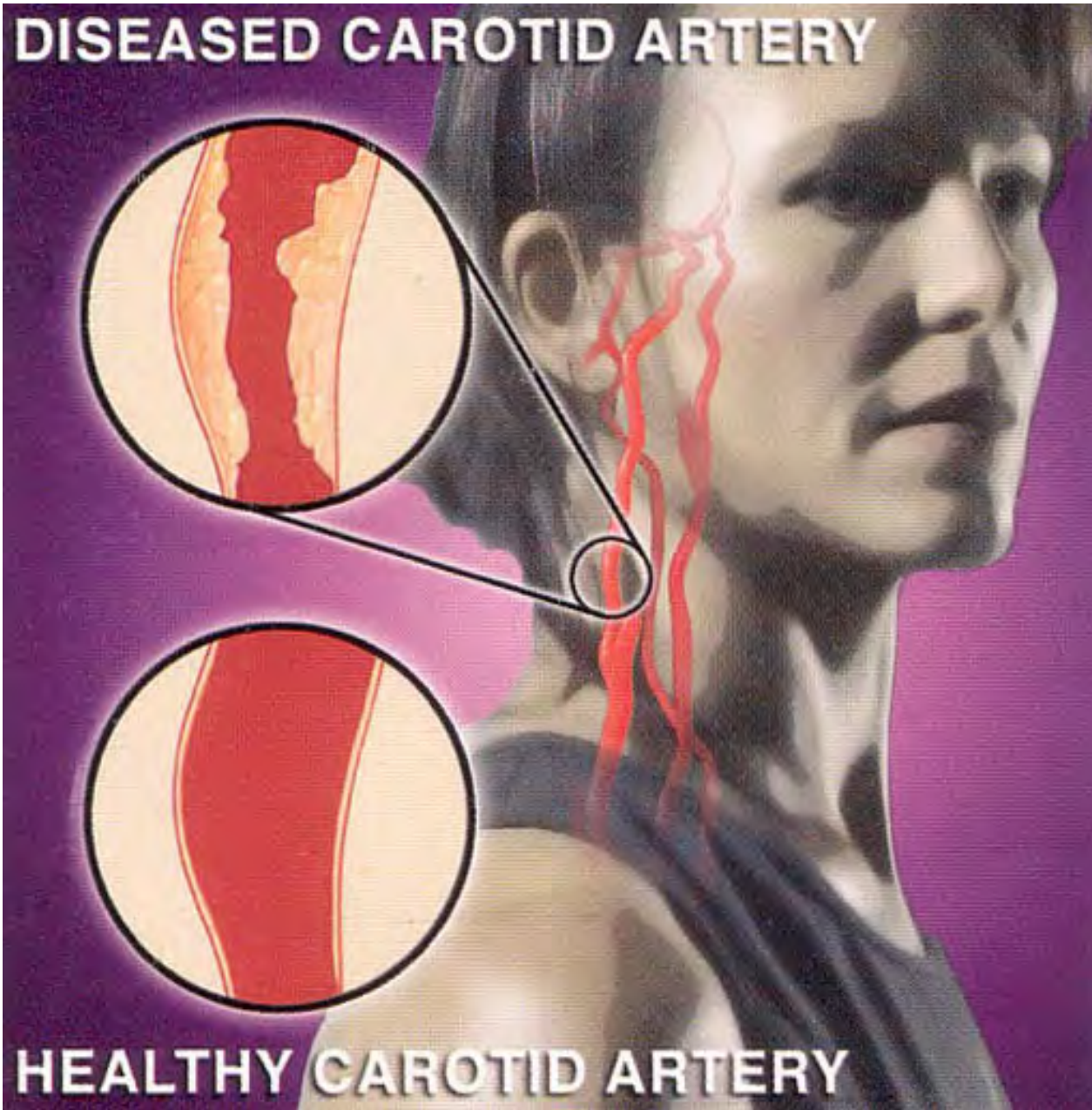
Age-Adjusted Average Annual Deaths per 100,000	Number of Counties
195 - 382	632
383 - 430	648
431 - 473	629
474 - 522	624
523 - 747	606
Insufficient Data	2

Rates are spatially smoothed to enhance the stability of rates in counties with small populations.

ICD-10 codes for heart disease: I00-I09, I11, I13, I20-I51

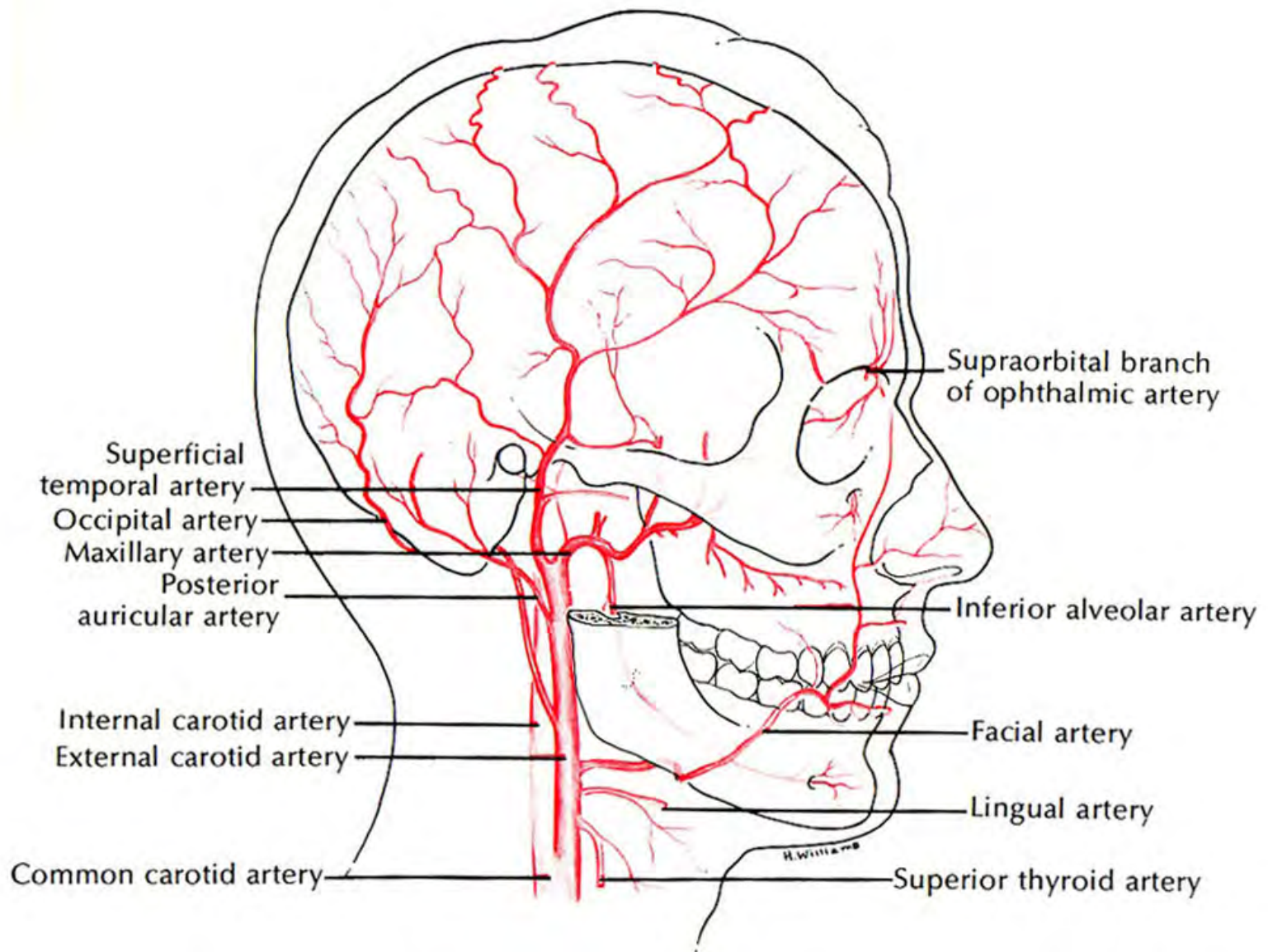
Data Source: National Vital Statistics System and the U.S. Census Bureau



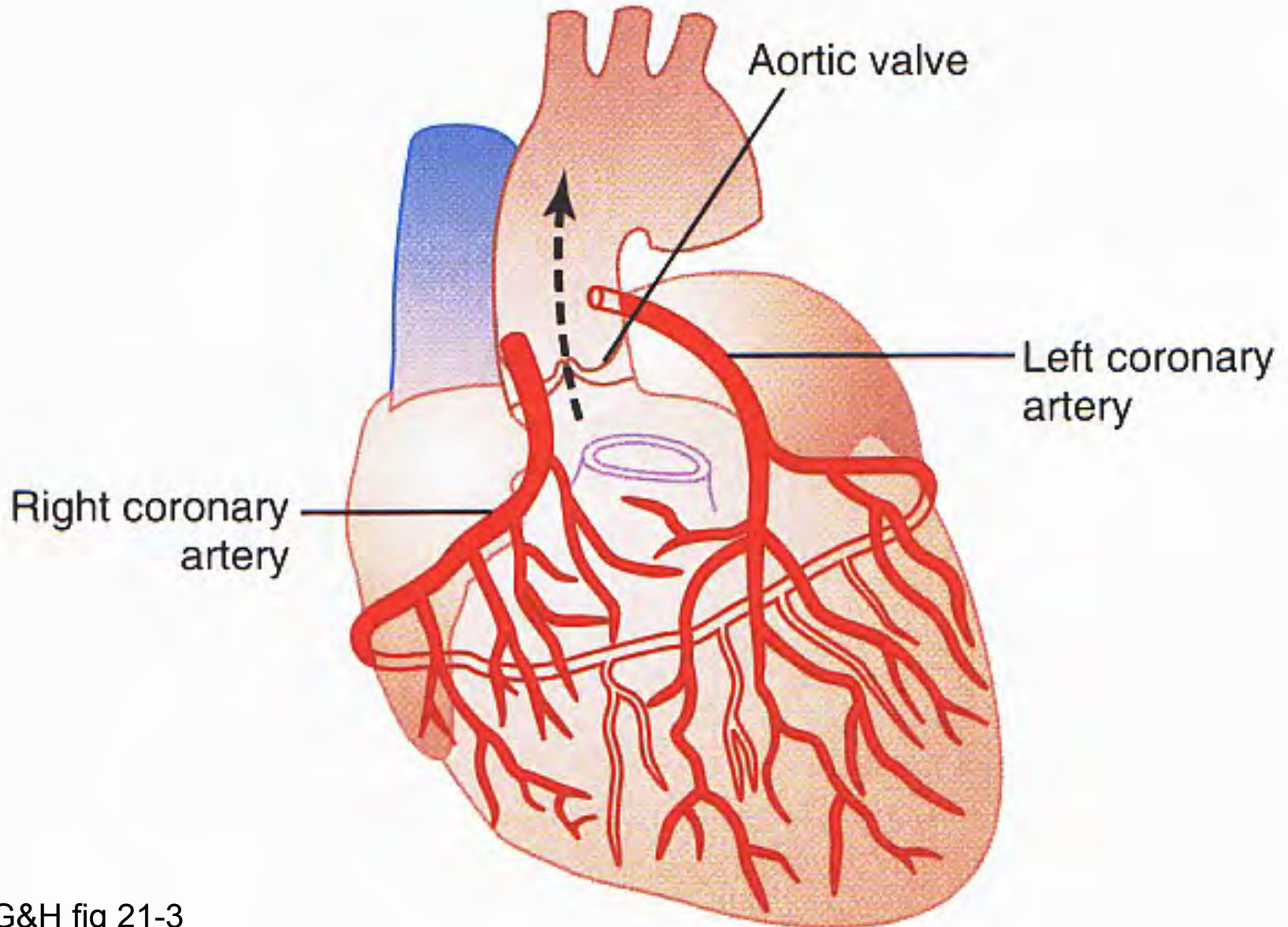


Source: Lifeline Screening, 2007

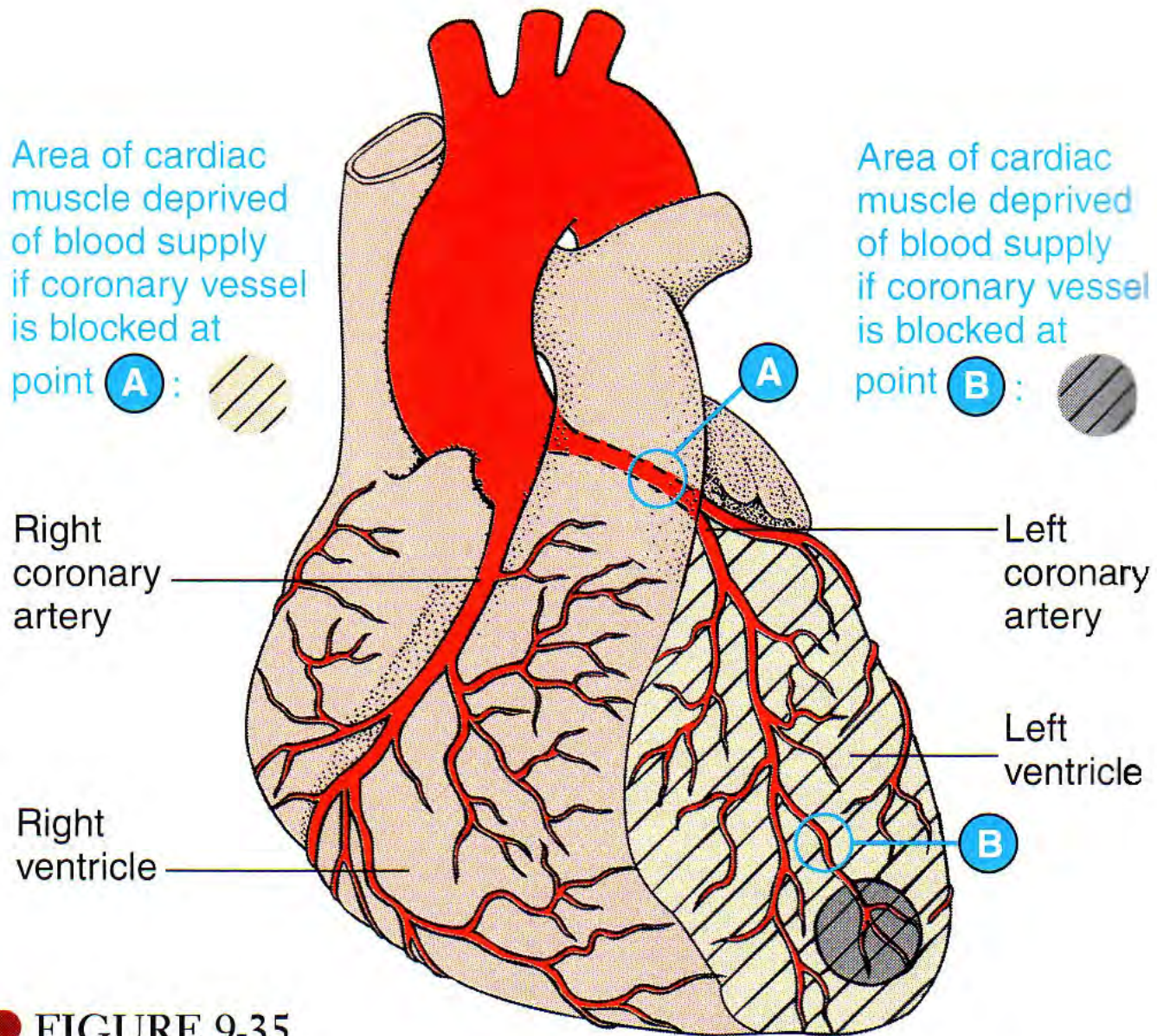




# ***Coronary Circulation ≡ Crowns the Heart!***

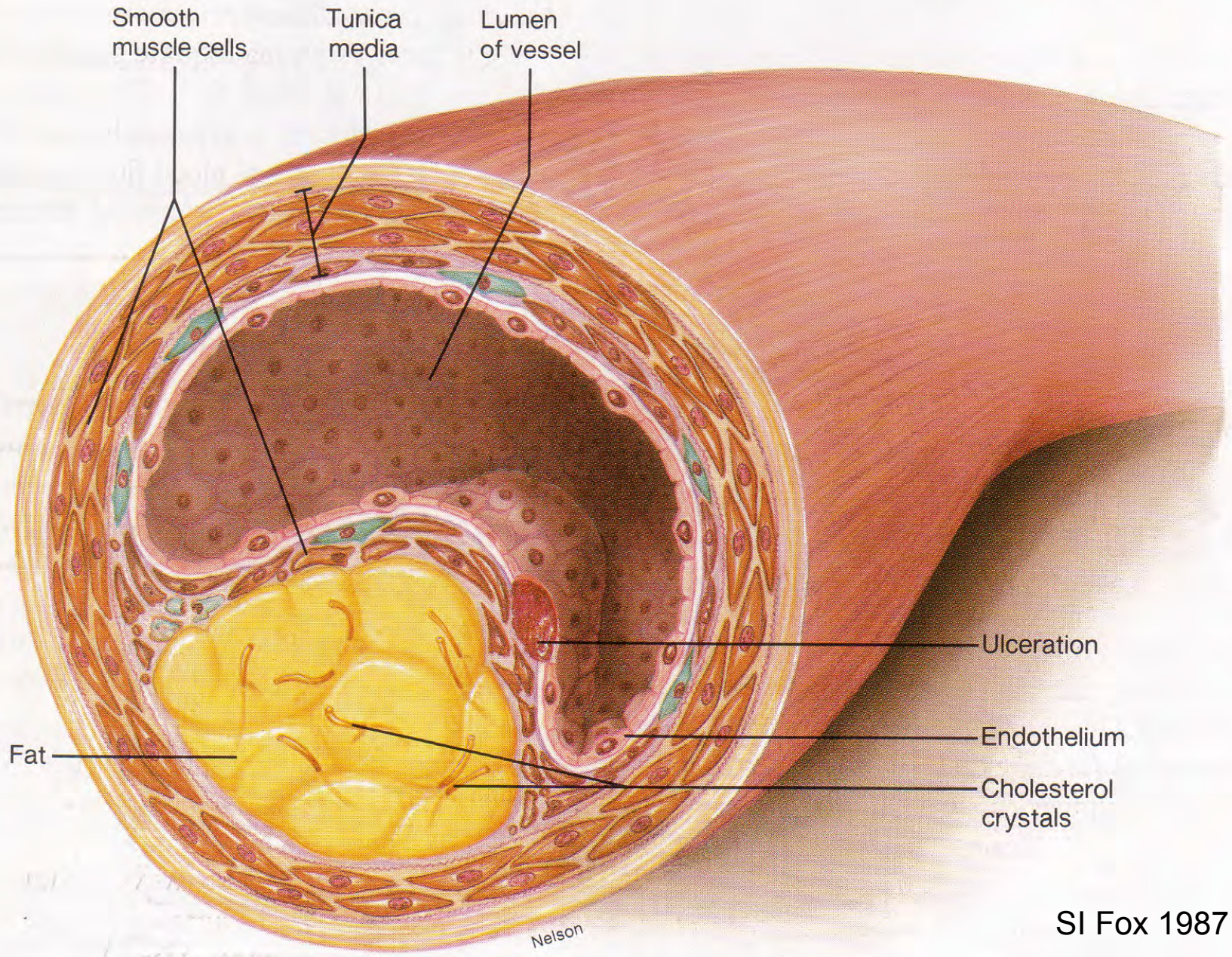






● **FIGURE 9-35**

Extent of myocardial damage as a function of the size of the occluded vessel



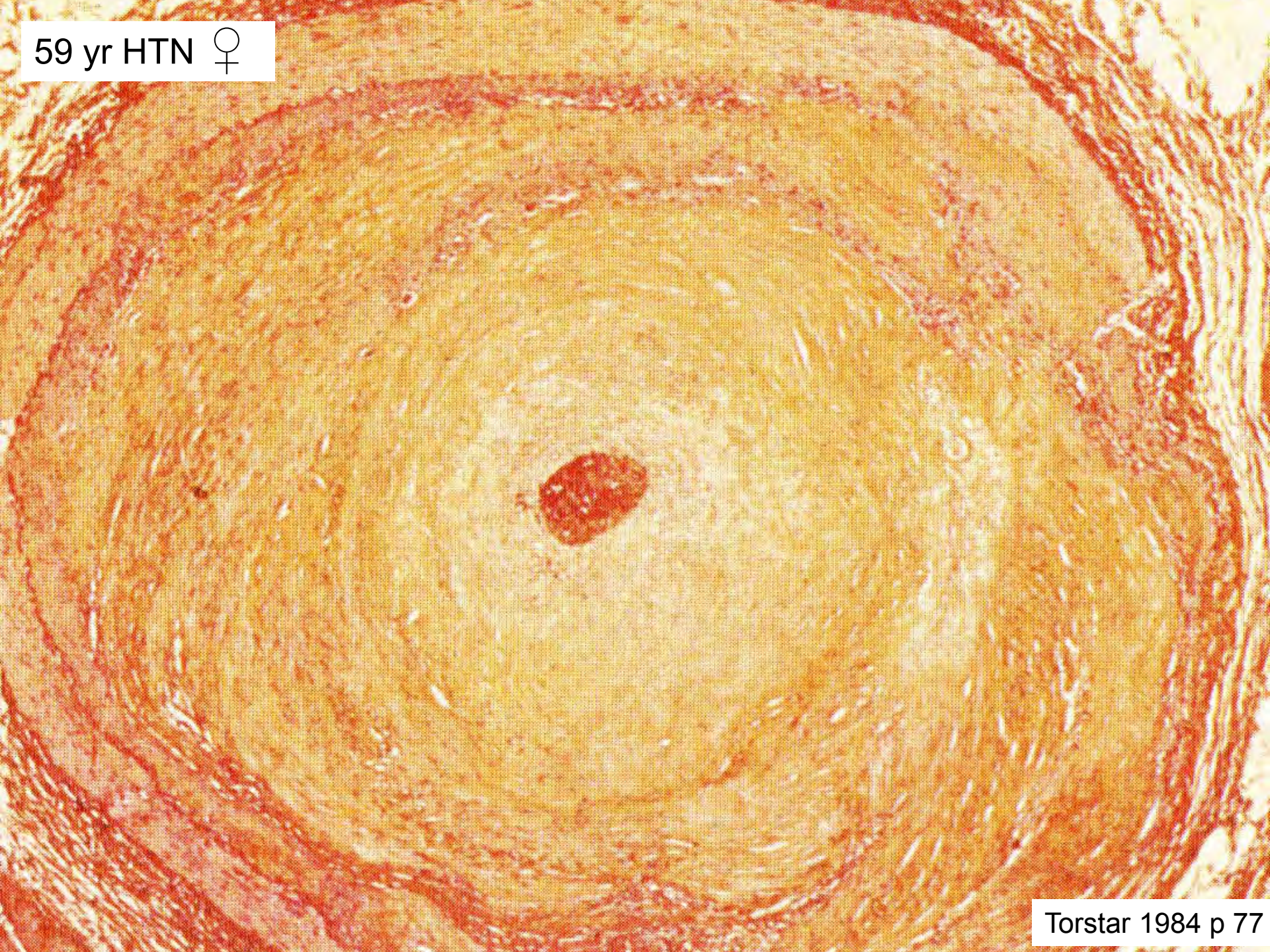
Nelson

100 yr ♀





59 yr HTN ♀



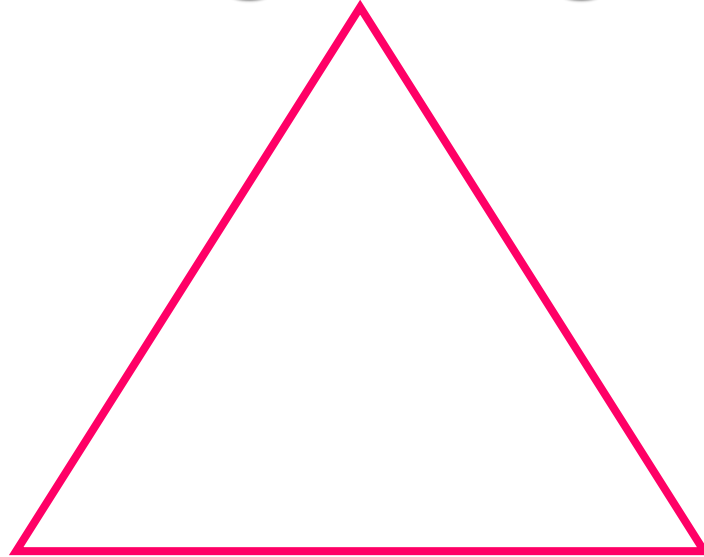


# *Treatment Triad*

NB: Last blasted resort!!

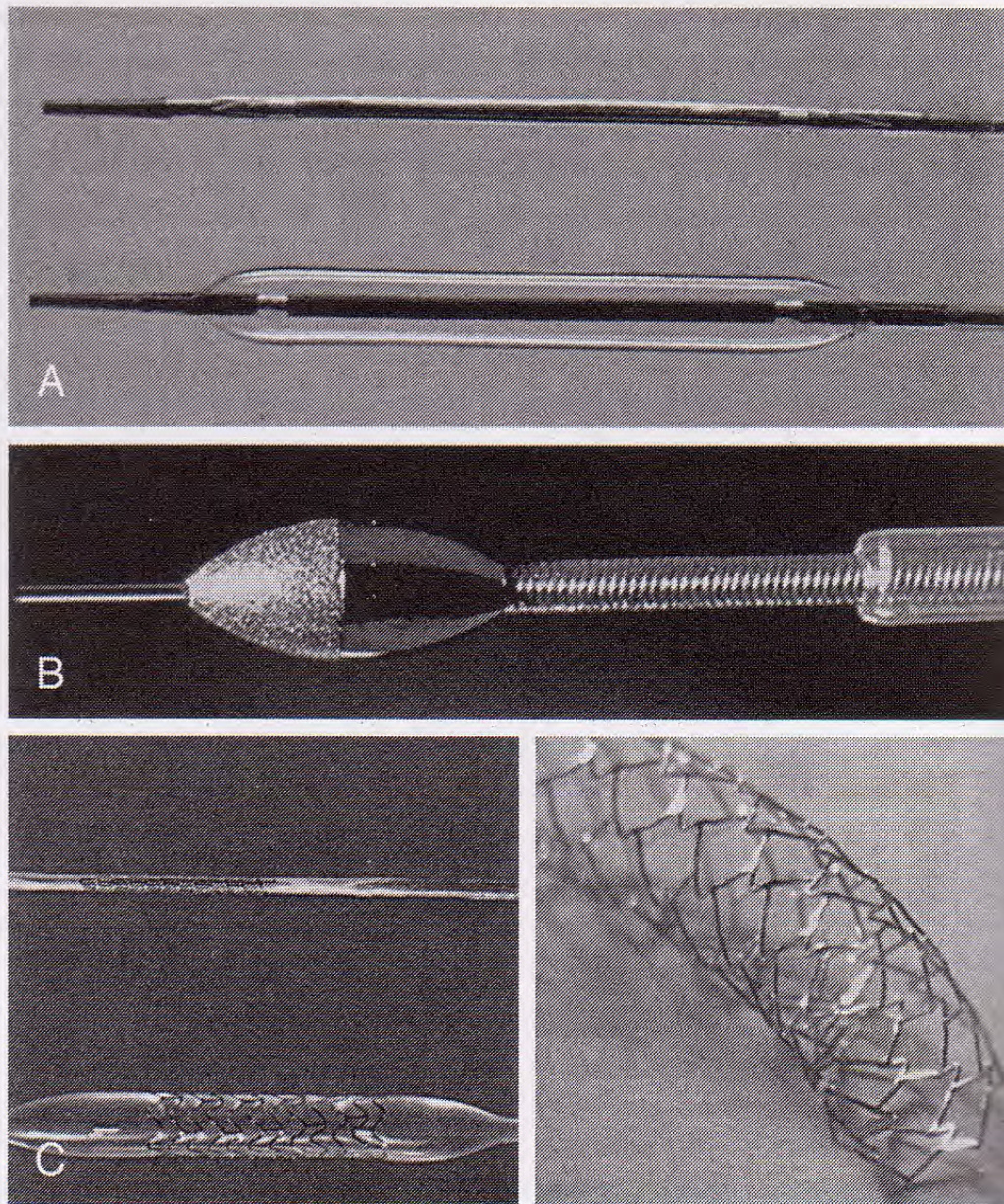


*Drugs/Surgery*



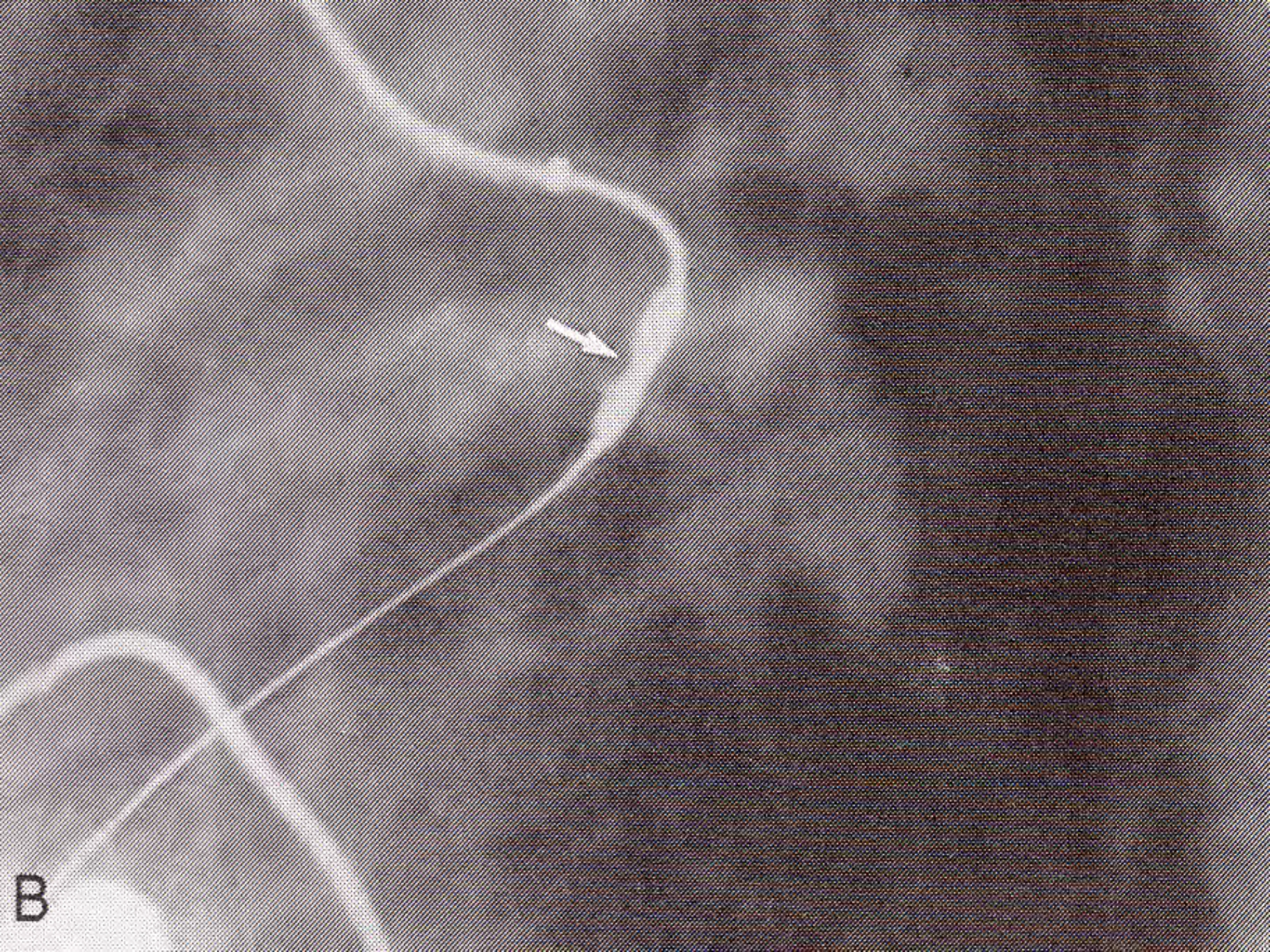
*Exercise*

*Dietary  
Modification*

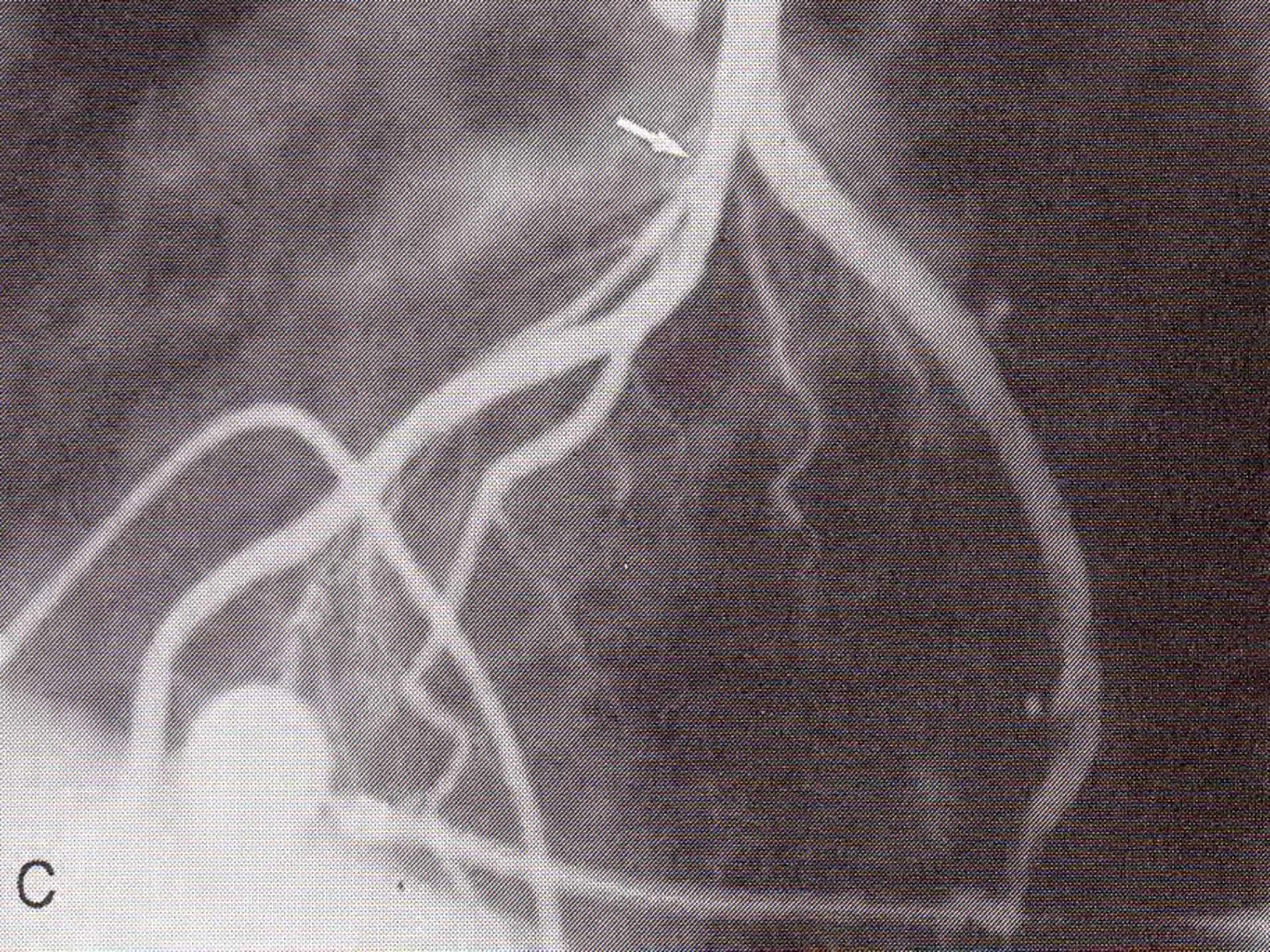


**FIGURE 37-1** Devices for percutaneous transluminal coronary interventions. **A**, Coronary balloon. **B**, Rotational atherectomy burr (Rotablator). **C**, Coronary stent.

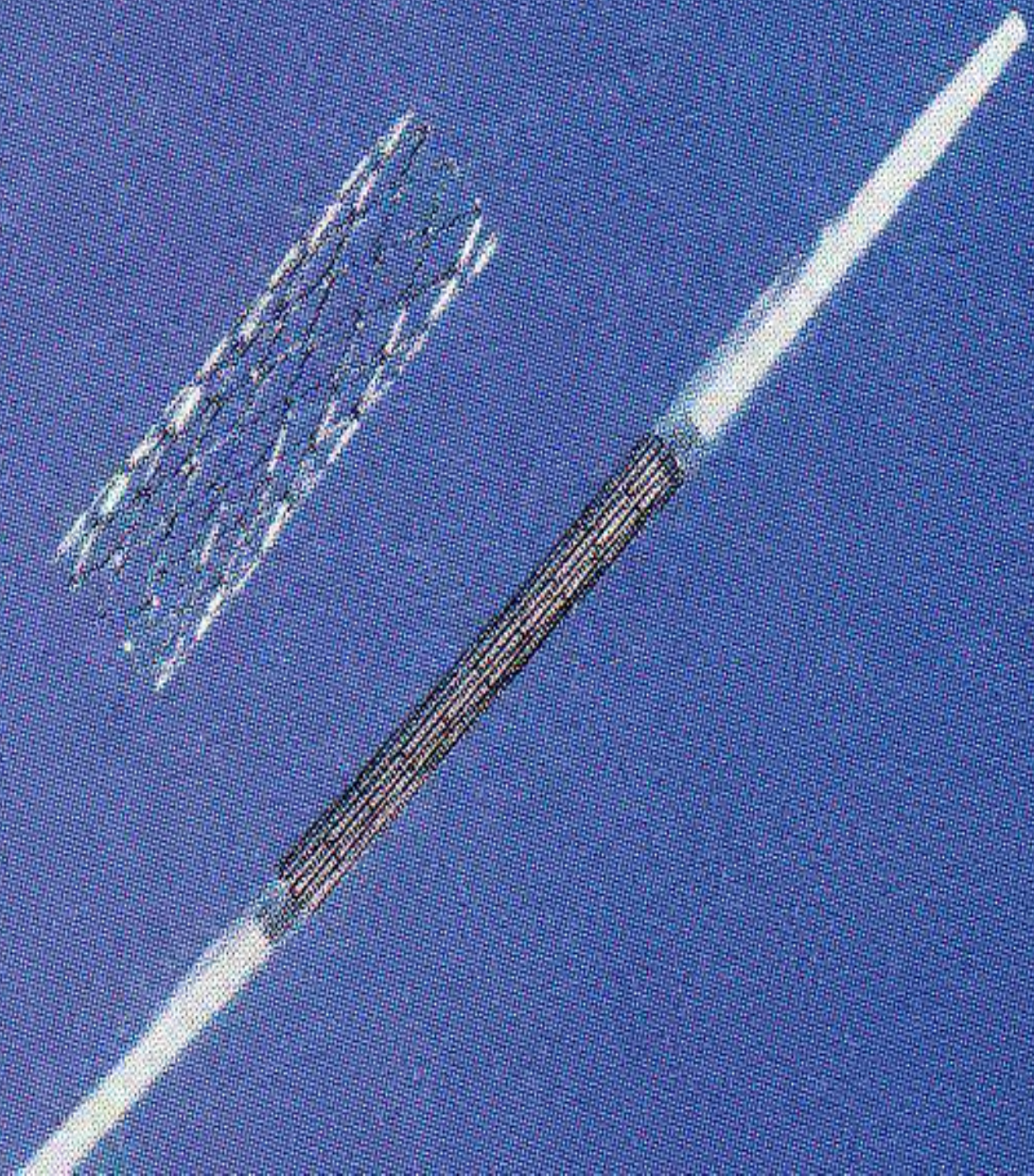




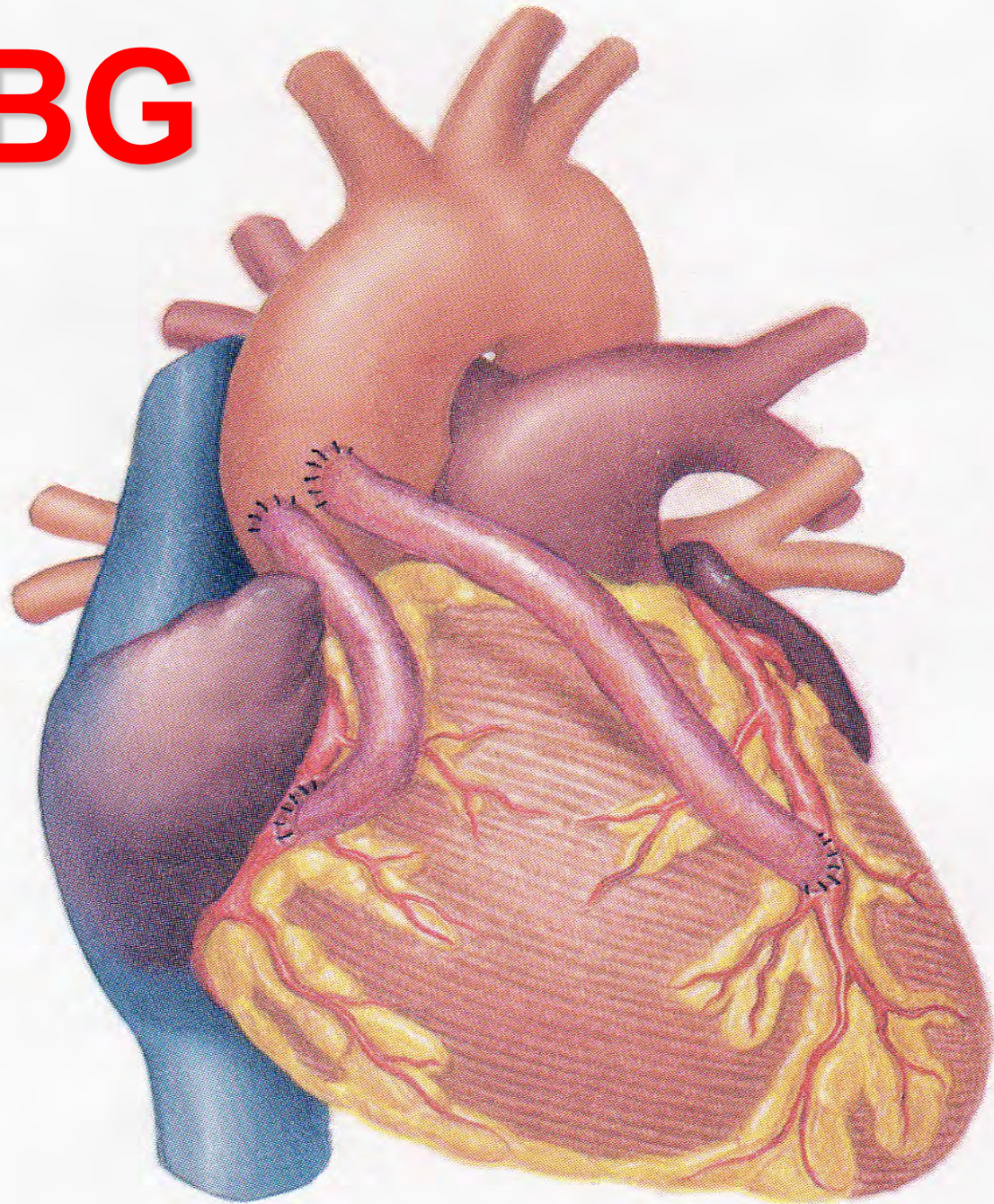
B

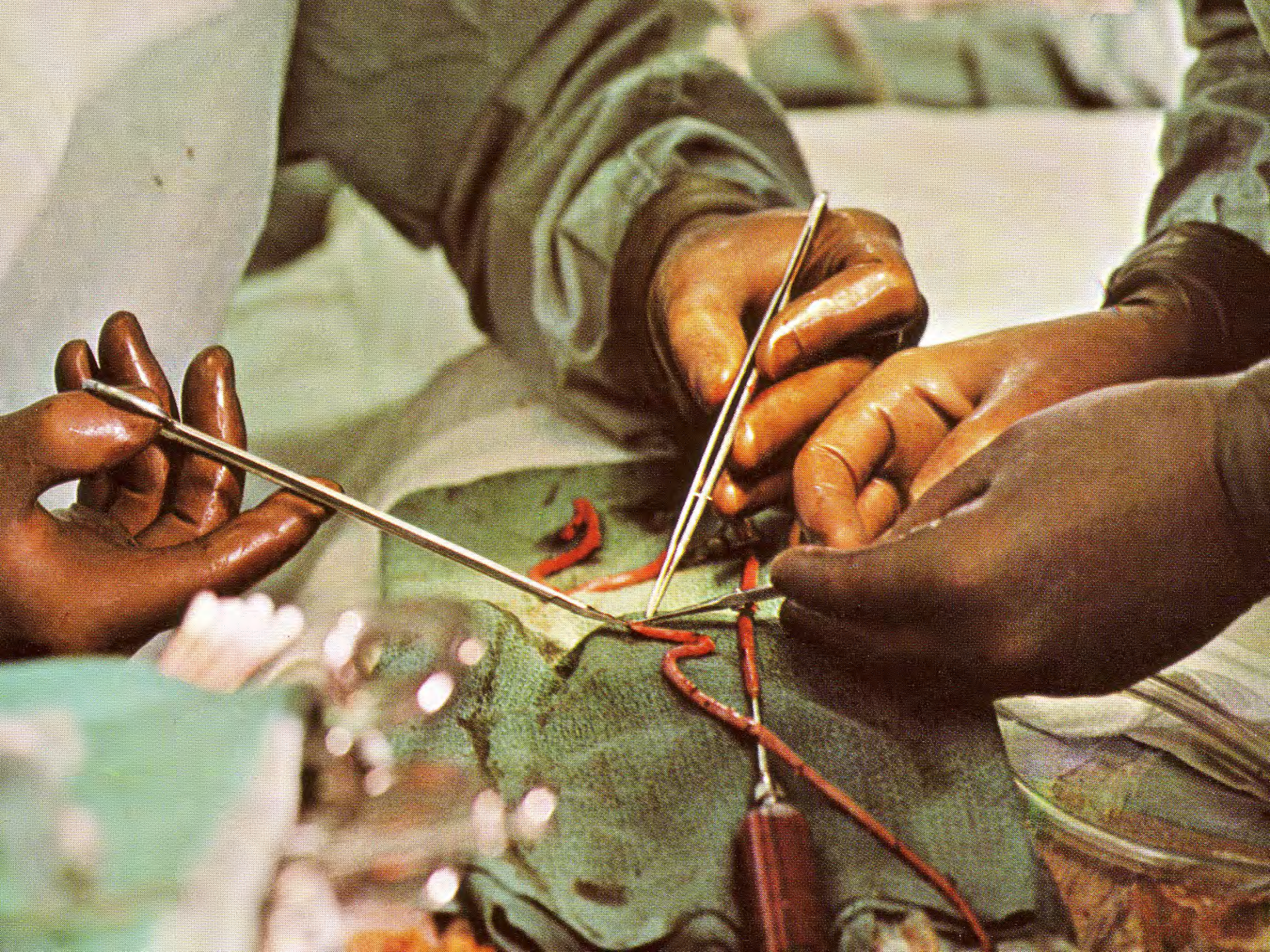


C



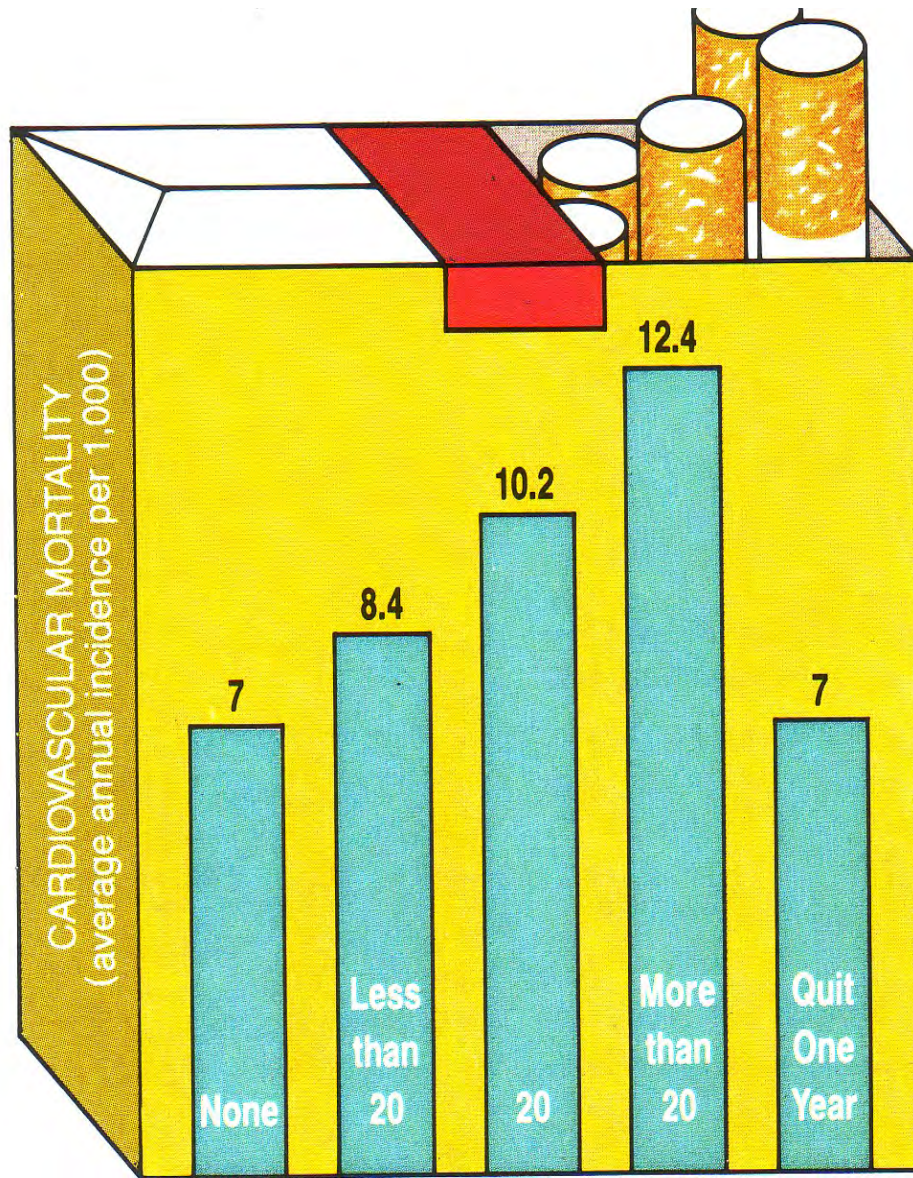
# CABG











CIGARETTES SMOKED PER DAY

# Tobacco-free Campus

For better health,  
smoking and use of  
tobacco products are  
prohibited everywhere  
on our property.



UO's Josh Buehler

U.S. Surgeon General  
Regina Benjamin

# SMOKE AND TOBACCO-FREE UNIVERSITY



**September 1, 2012**

For a healthier community and cleaner  
environment, the University of Oregon  
will be smoke and tobacco free.



**Ready to Quit Tobacco?**

[tobaccofree.uoregon.edu](http://tobaccofree.uoregon.edu)

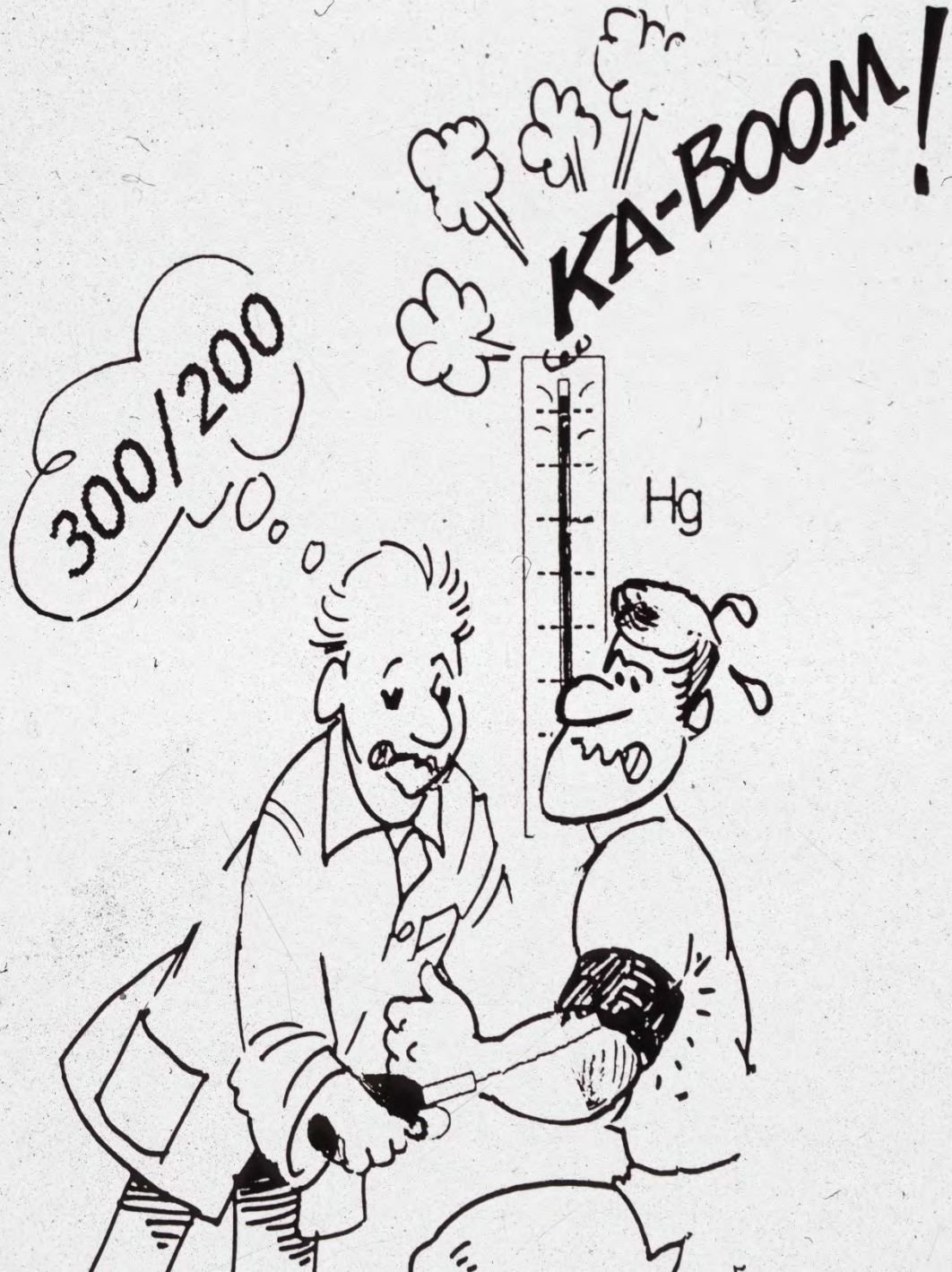


UNIVERSITY OF OREGON

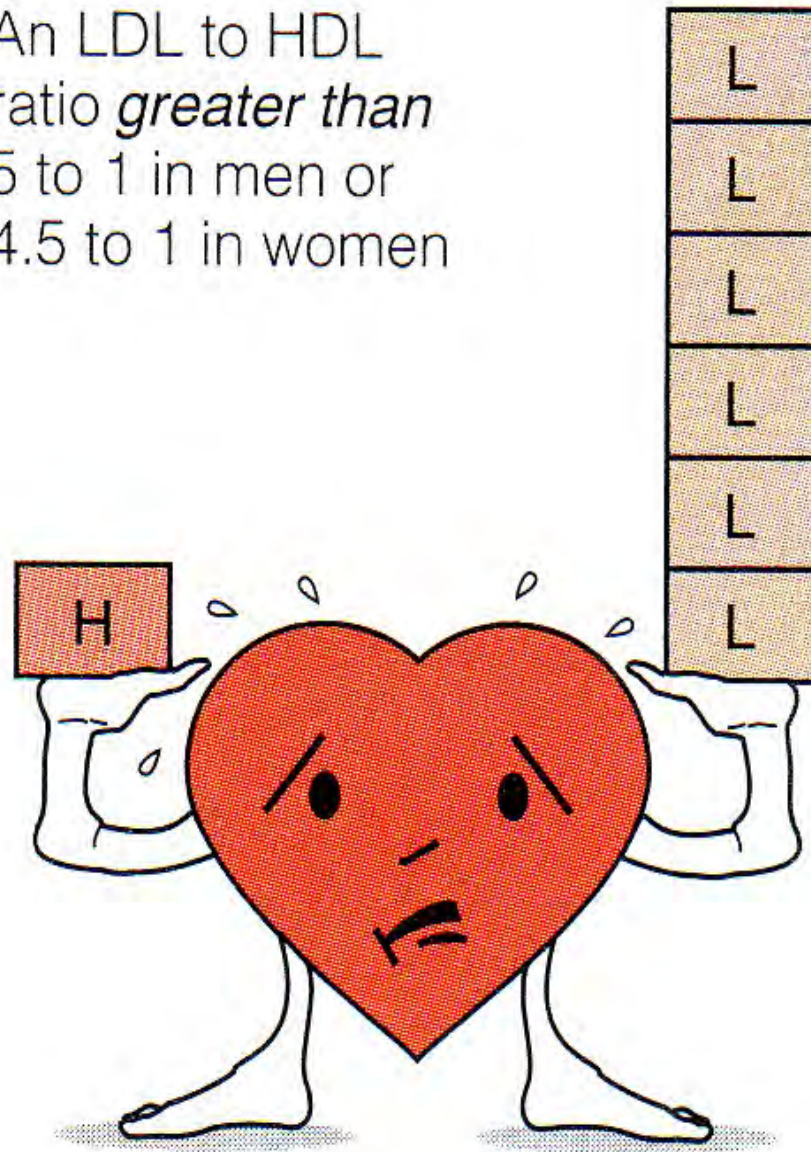
[tobaccofree.uoregon.edu](http://tobaccofree.uoregon.edu)



For a healthier community and cleaner  
environment, the University of Oregon  
is smoke and tobacco-free.



An LDL to HDL  
ratio *greater than*  
5 to 1 in men or  
4.5 to 1 in women



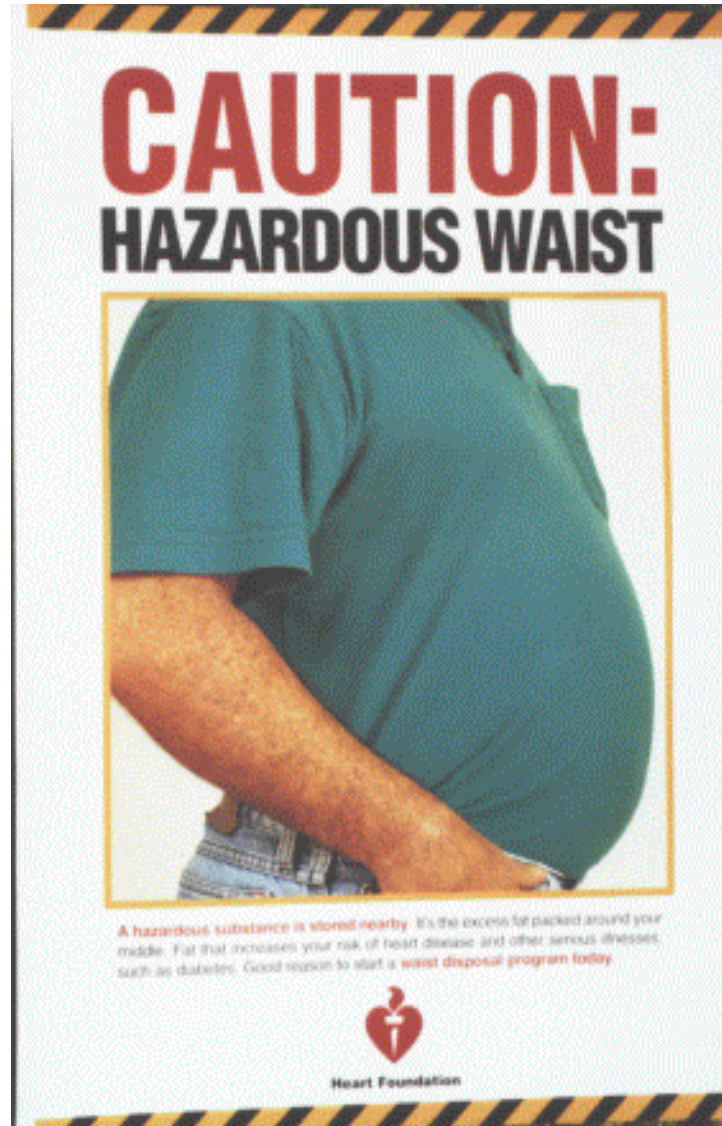
Increased risk of  
heart disease

# Apple type of obesity predisposed to CVD!

Pear type of fat pattern...



implies lower disease risk!



Eat more apples...



to help prevent the apple type of obesity!



**Cardiorespiratory  
Endurance**



**Muscular  
Strength/Endurance**



**HEALTH-RELATED  
FITNESS**

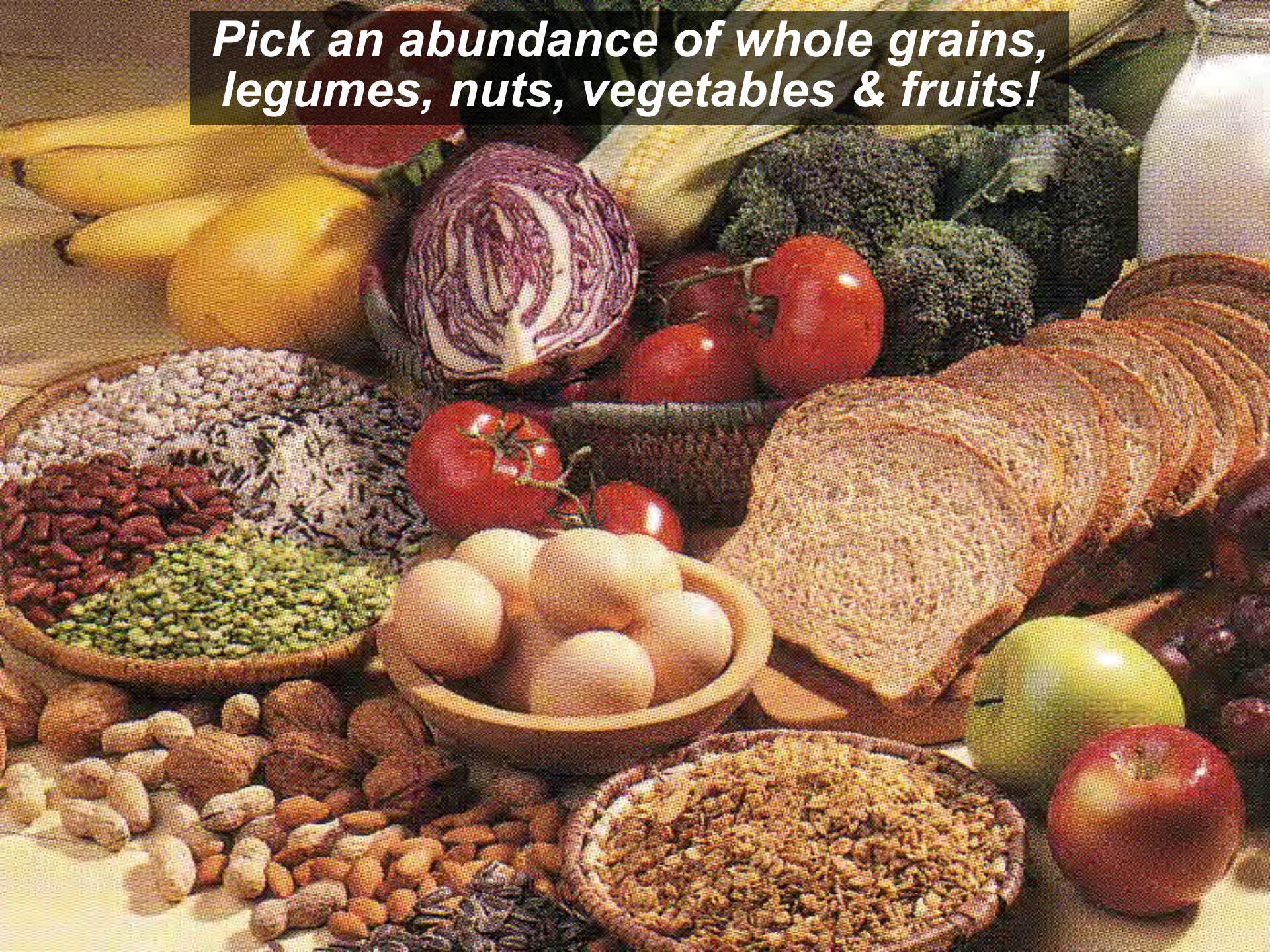


**Flexibility**



**Neuromuscular Relaxation**

***Pick an abundance of whole grains, legumes, nuts, vegetables & fruits!***







# Healthy Oils to Minimize Atherosclerosis HAPOC?

# H

# A

# P

# O

# C

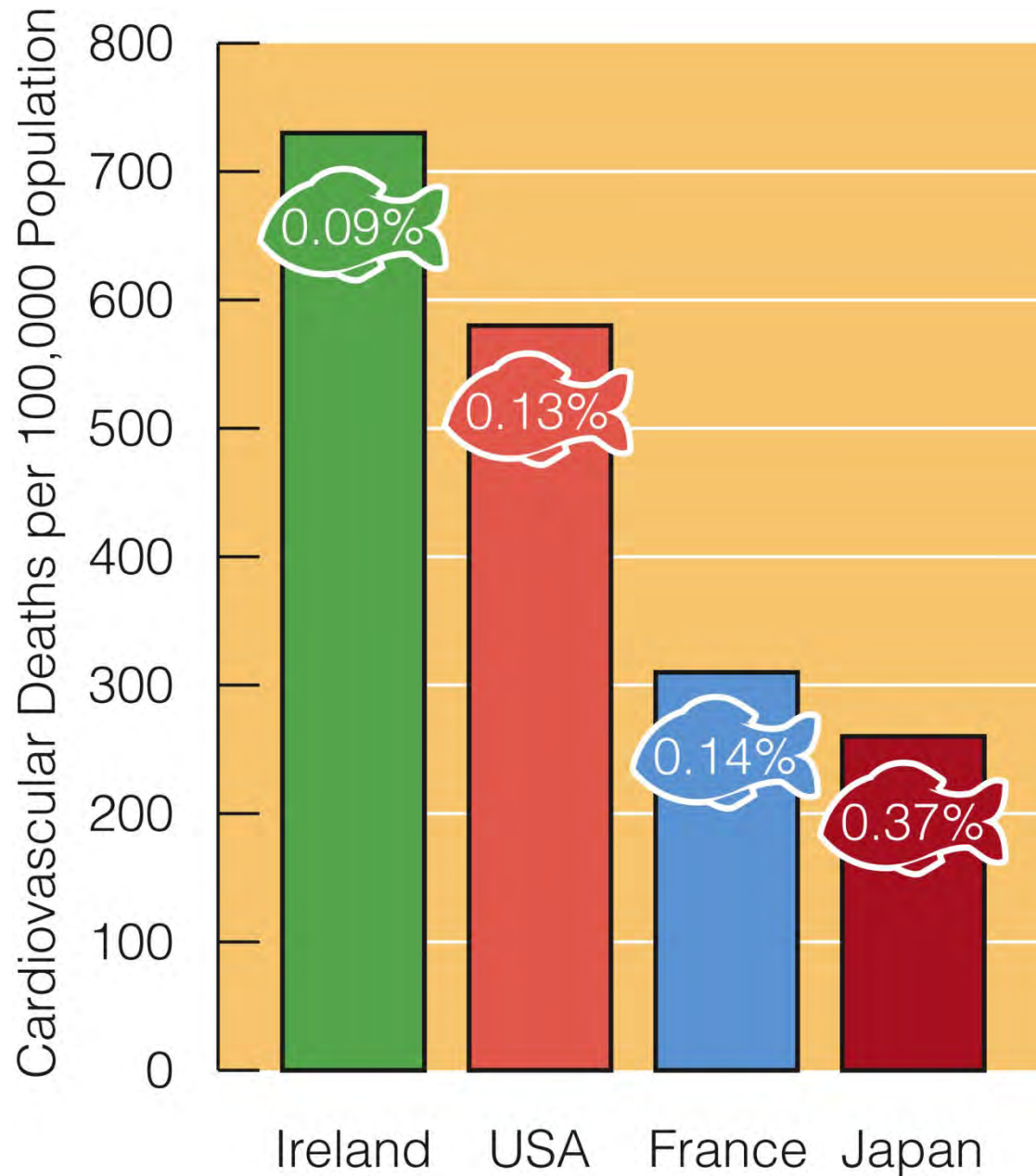


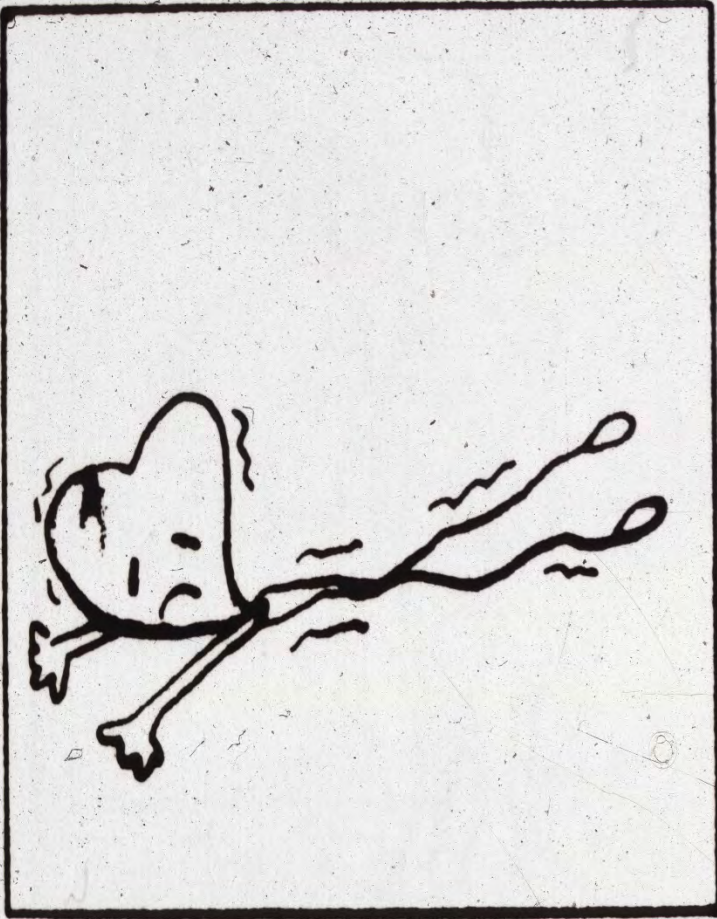


Yes for the  
spinach! — but get  
rid of the pipe!!

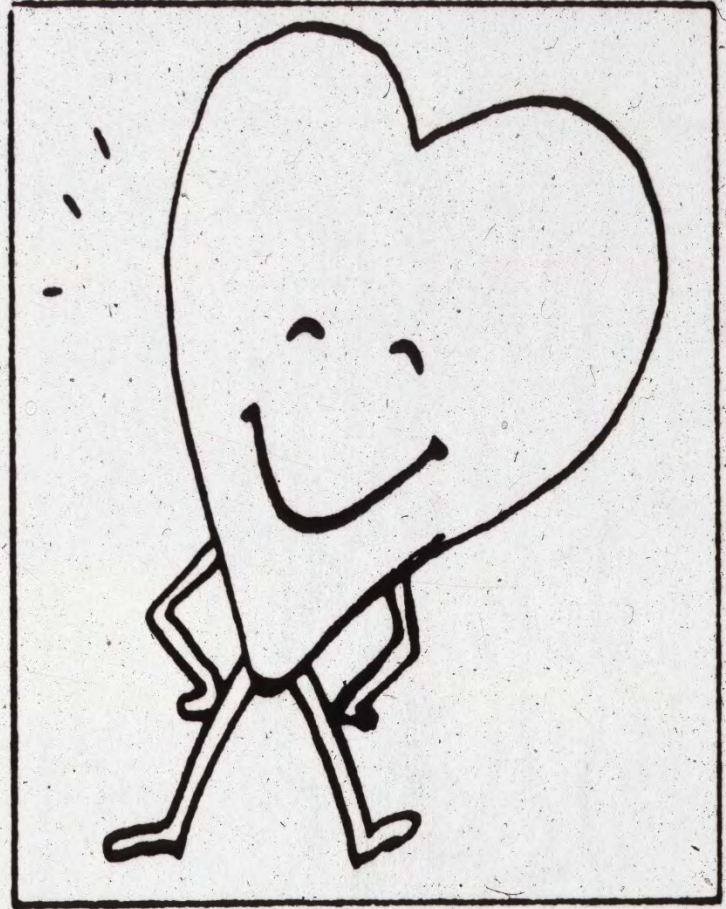


# *Fish Oil Intakes & Cardiovascular Death Rates*



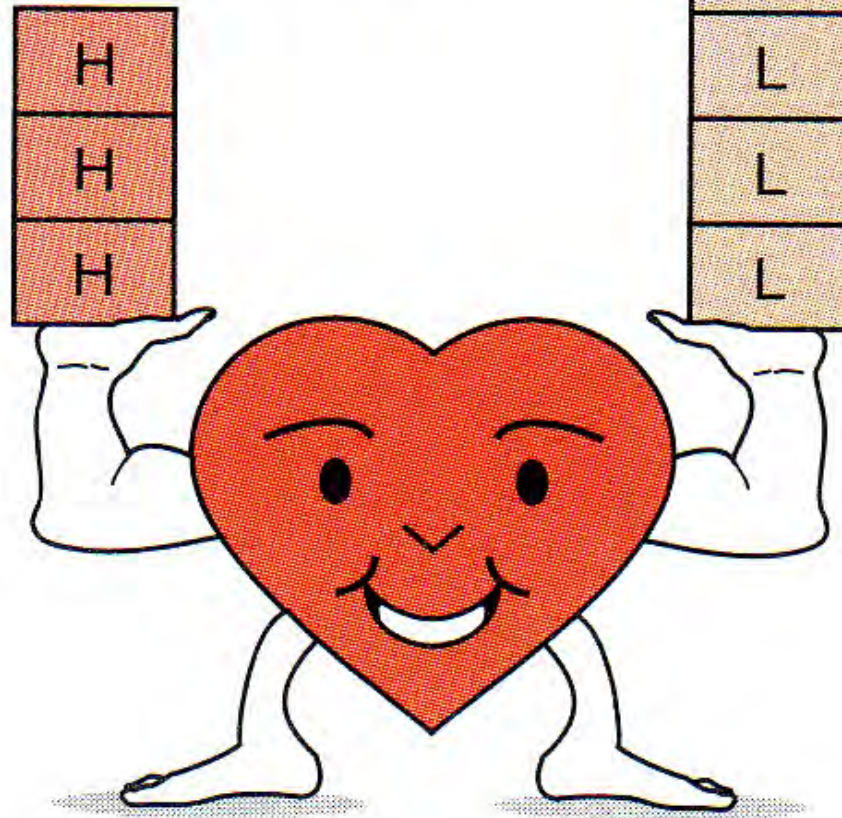


**Before**



**After**

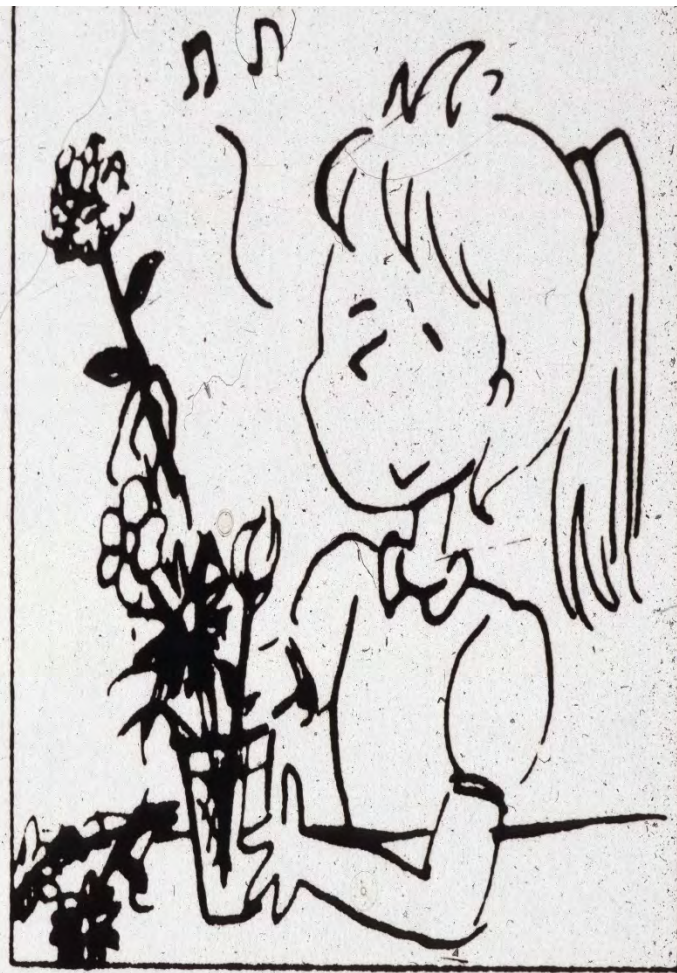
An LDL to HDL  
ratio of *less than*  
5 to 1 in men or  
4.5 to 1 in women



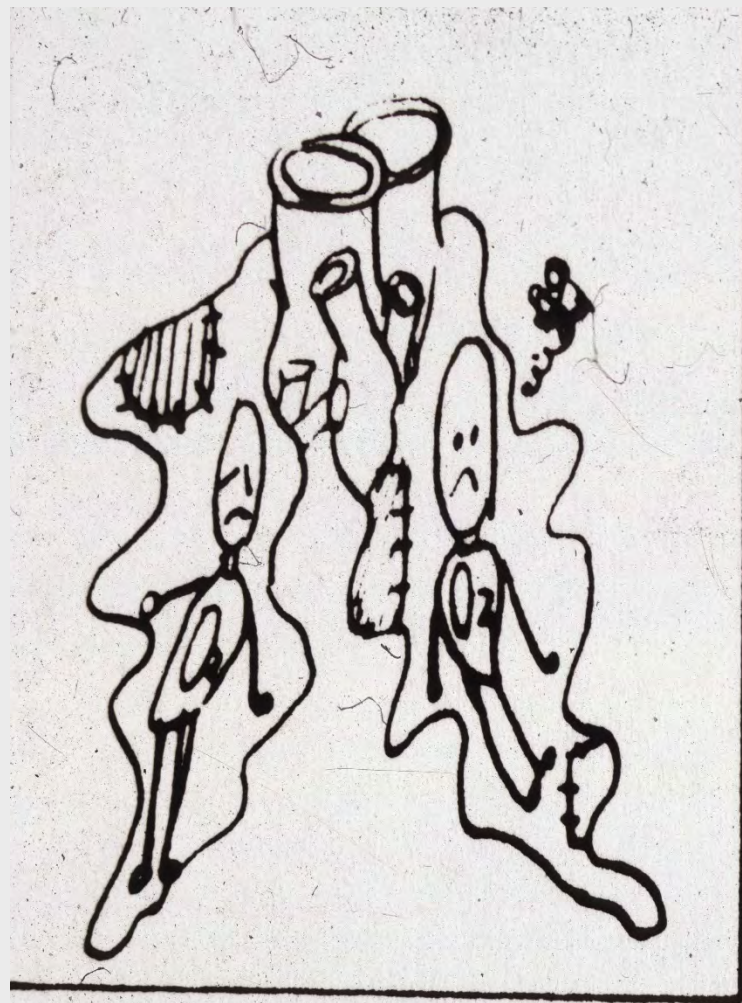
Reduced risk of  
heart disease



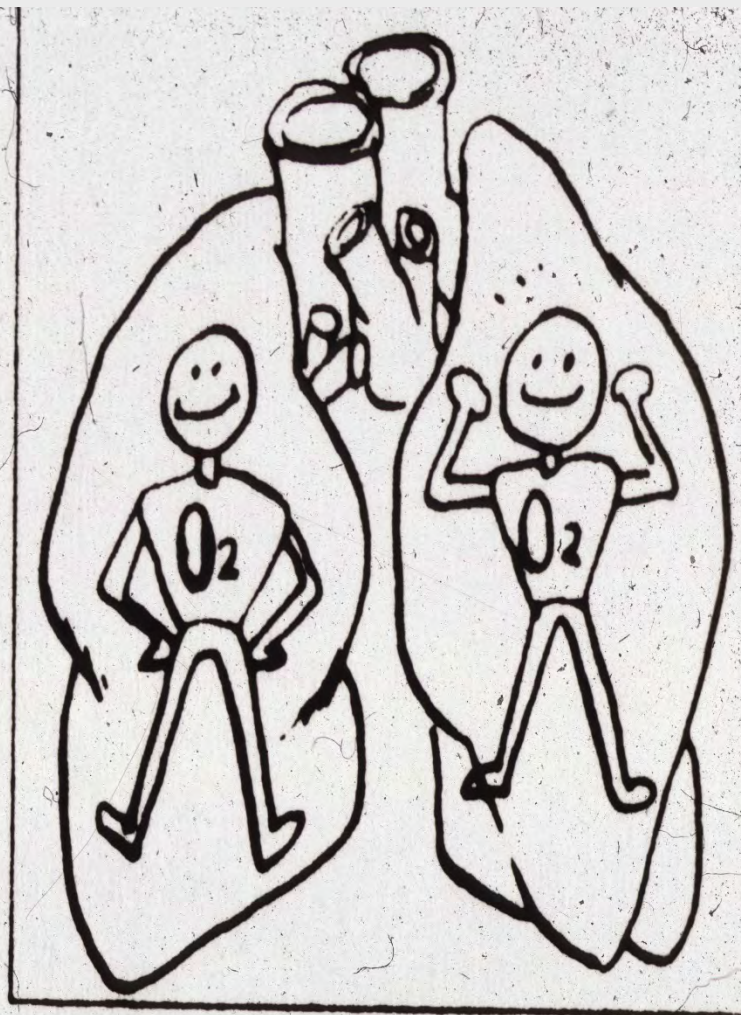
Before



After



**Before**



**After**

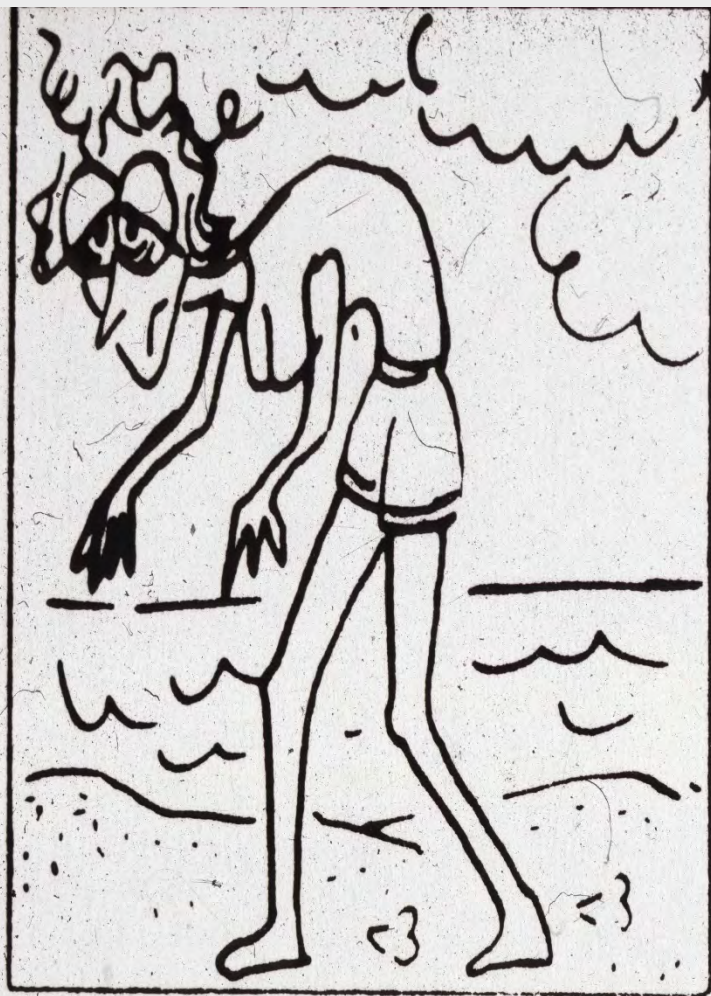




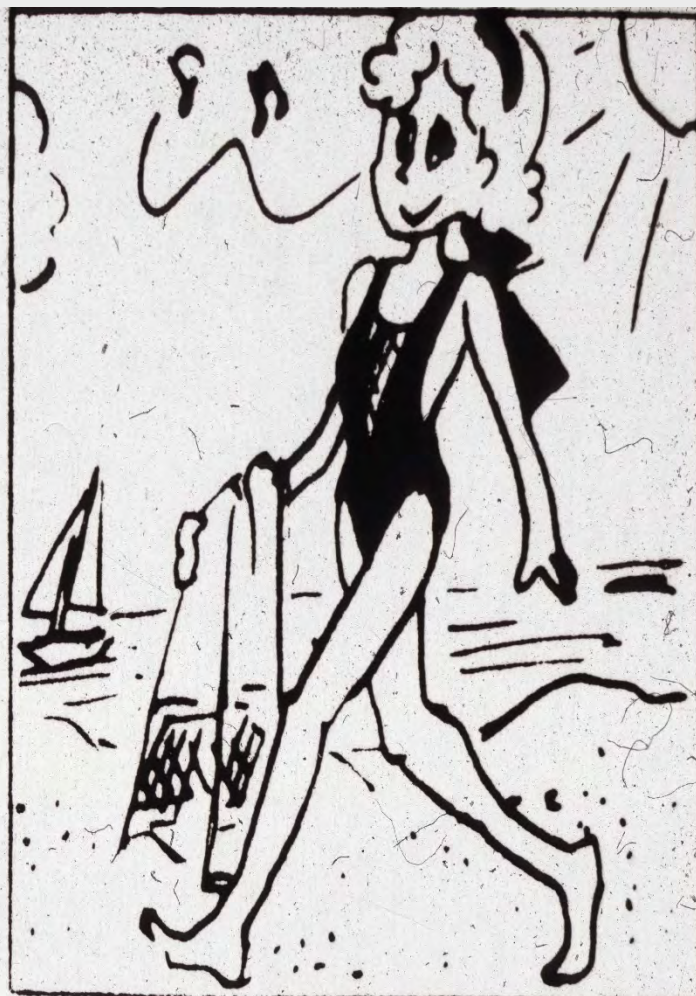
Before



After



**Before**



**After**