
Exercise and the heart

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Outline

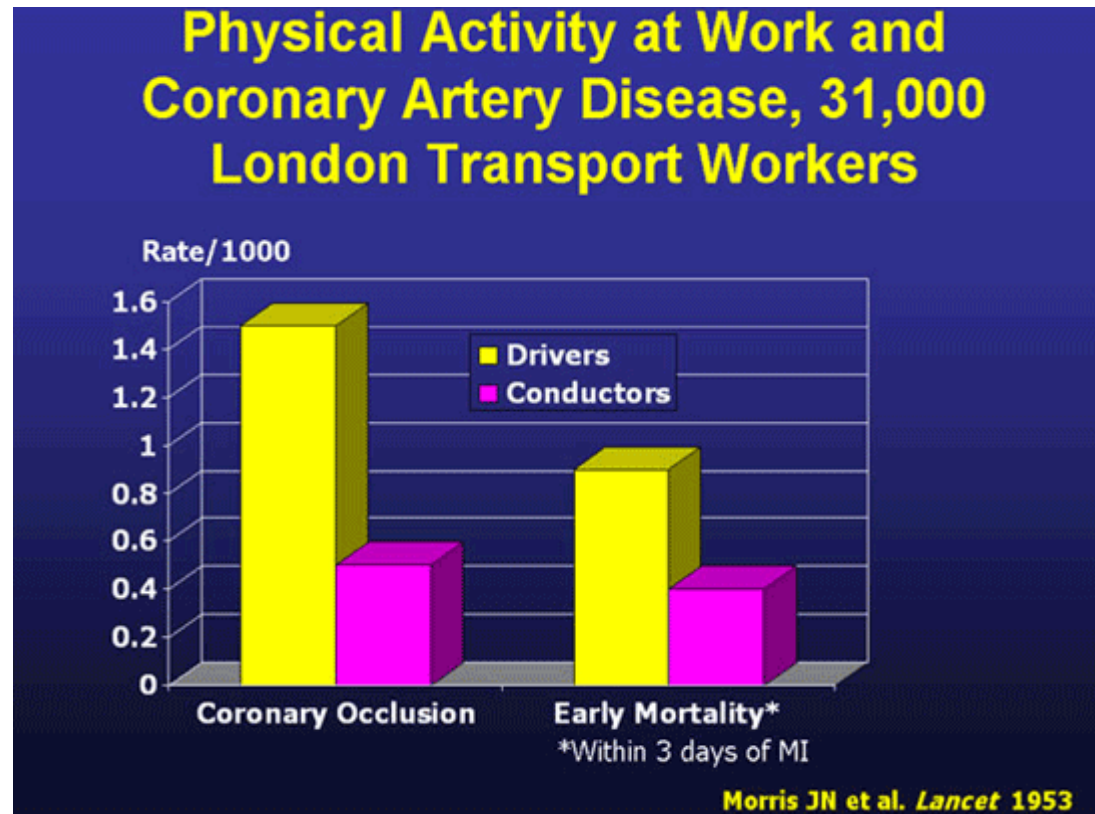
- Review specific benefits of exercise
 - Discuss the risks associated with exercise
 - Know the cardiovascular risk assessments
 - List the current recommendations on exercise
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*“All parts of the body if used in **moderation** and exercised in labors to which each is **accustomed**, become thereby **healthy** and well developed, and **age slowly**; but if **unused** and **left idle**, they become liable to **disease**, defective in growth, and **age quickly**.”*

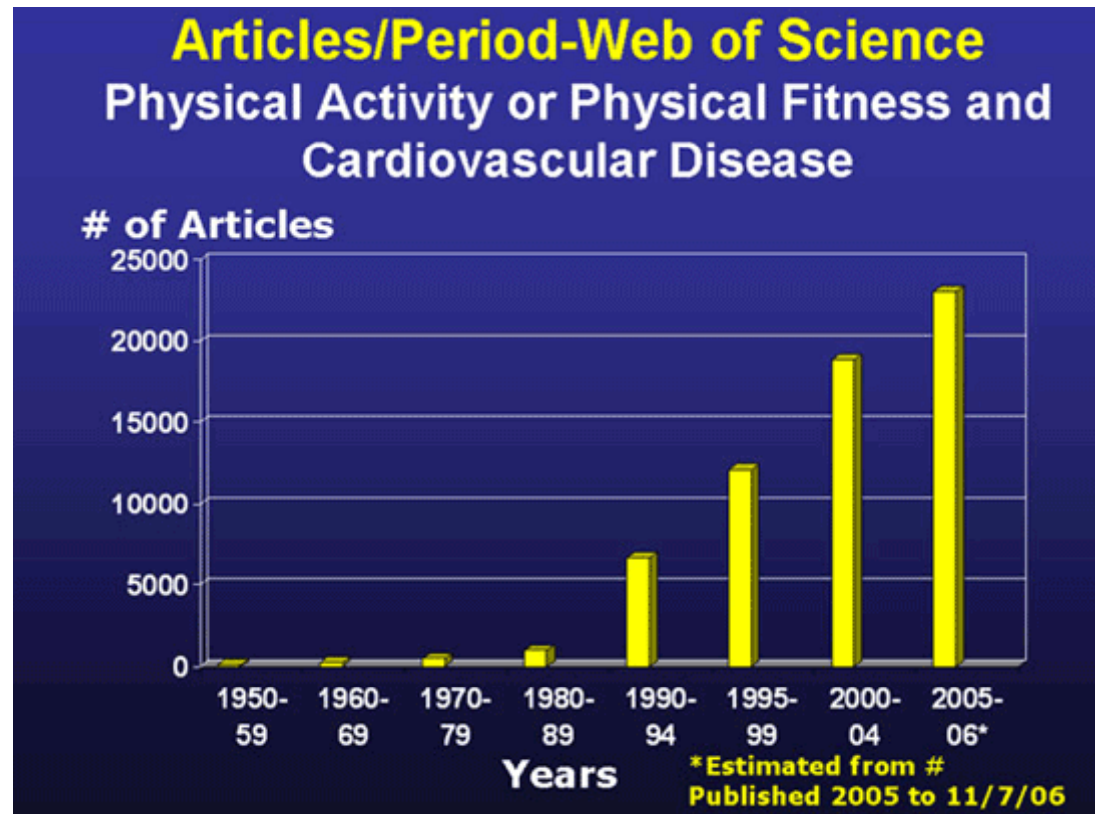
Hippocrates



Professor Jeremy Morris London 1950



Increase in the peer evidence literature



Benefits of Exercise on the Heart

- **Reduces the incidence of CAD**

- Most physically Active have CAD rates half those of the most sedentary
- Graded relationship of decreasing CAD rate with increasing physical activity

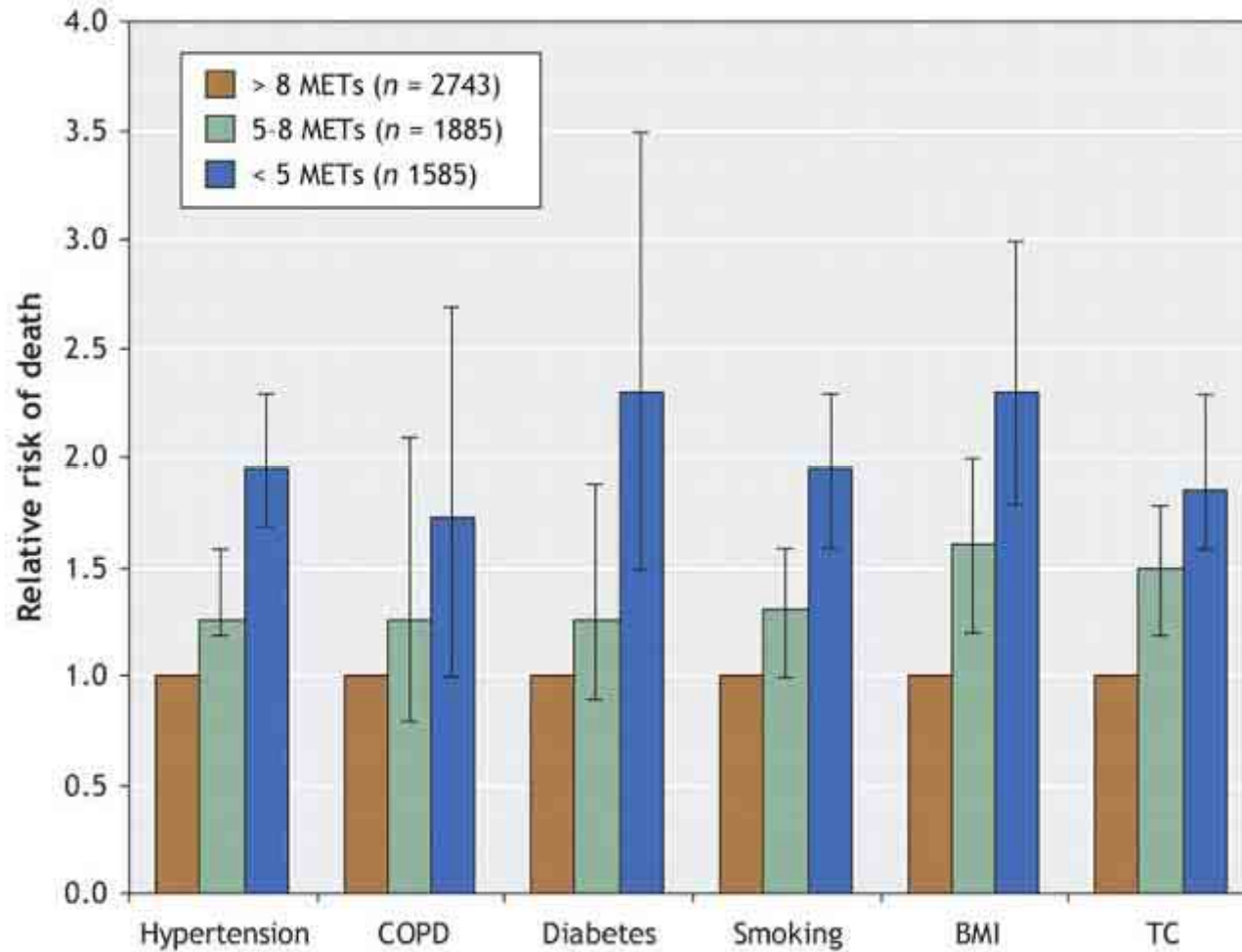
- **Manage some CAD risk factors:** lipids; hypertension; glucose intolerance; obesity

- 4.6% increase in HDL and decrease LDL by 5%
(meta-analysis; Circulation 2001)

- **Treating patients with CAD; HF; claudication**

- Exercise-based cardiac rehab reduces mortality rate in patients after MI; angioplasty; CABG; angina (Cochrane database 2000)
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Relative risks of death from any cause among participants according to their exercise capacity



Warburton, D. E.R. et al. CMAJ 2006;174:801-809

Risks of Physical Activity

Most studies of
exercise-related cardiovascular events

Are associated with

Sports participation in young athletes
Vigorous exercise in adults

Risks of Physical Activity

Most common risk is musculoskeletal risk

- Cohort of community adults with average activity
 - 25% reported musculoskeletal injury over 1 year
 - 1/3 of injured stopped exercising

 - Risk of injury increases with obesity, vigorous exercise
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Risks of Physical Activity

Vigorous Physical Activity increases the risk of sudden cardiac death; MI among individuals with diagnosed and occult heart disease

- ❑ 1 exertion related death per year for every 15 000 to 18 000 healthy men (Athletes)
 - ❑ 1 death per 82 000 member of fitness facility
(61 male and 10 females out of 3 million member over 2 years)
 - ❑ 5-10% of MIs are associated with vigorous activity
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Risks of Physical Activity

RR of exercise-related MI and sudden death are greatest in those who are least physically active

RR of cardiac arrest during vigorous exercise compared to all other times of the day is

56 times greater among men who exercise infrequently and only 5 times greater among men who exercise frequently

On the other hand

Overall risk of developing cardiovascular disease 25-50%

Pathologic basis for Exertion-related cardiovascular events

- **Young individuals** (<30 years of age)
 - Congenital abnormalities: **HCM**, Coronary artery anomalies; aortic stenosis; arrhythmias

 - **Adults**
 - **Coronary artery disease** is the culprit
 - Among asymptomatic adults, plaque disruption is common
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Pre participation Screening

- Young Athletes
 - AHA recommends cardiovascular screening for high school and college athletes at 3-4 year interval with a questionnaire and physical exam
 - No need for routine EKG

Cardiac History:

	YES	NO
1. Have you ever passed out during or after exercise?.....	<input type="checkbox"/>	<input type="checkbox"/>
2. Have you ever been dizzy during or after exercise?	<input type="checkbox"/>	<input type="checkbox"/>
3. Have you ever had chest pain or chest pressure during or after exercise?	<input type="checkbox"/>	<input type="checkbox"/>
4. Do you tire easily or more quickly than your friends during exercise?	<input type="checkbox"/>	<input type="checkbox"/>
5. Have you ever had racing of your heart or skipped heartbeats?	<input type="checkbox"/>	<input type="checkbox"/>
6. Have you ever been told you had a heart murmur?	<input type="checkbox"/>	<input type="checkbox"/>
7. Have you ever been told you had an enlarged or weak heart?	<input type="checkbox"/>	<input type="checkbox"/>
8. Has any member of your family: -died of heart problems or sudden death before age 50?	<input type="checkbox"/>	<input type="checkbox"/>
-been told they had a serious heart problem before age 50?	<input type="checkbox"/>	<input type="checkbox"/>
-been told they had Marfan's syndrome?.....	<input type="checkbox"/>	<input type="checkbox"/>
9. Has a physician ever denied or restricted your participation in sports?	<input type="checkbox"/>	<input type="checkbox"/>

Explain "YES" answers here: _____

Pre participation Screening

■ Adults

ACC/AHA	ACSM	USPSTF
Asymptomatic persons with DM who start vigorous exercise (IIa)	Asymptomatic persons with DM who start vigorous exercise	Against routine exercise testing of low risk adults in general and insufficient evidence for stress test before training
Asymptomatic men >45 and women >55 who start vigorous exercise (IIb)	Asymptomatic men >45 and women >55 and those who has >2 risk factors who start vigorous exercise	

Pre participation Screening and Risk stratification in patients with CAD

- **Class A: Apparently Healthy**

- ❑ Under 40 years with no symptoms or known presence of heart disease or major coronary risk factors
- ❑ Individuals of any age without known heart disease or major risk factors and have normal exercise test

Activity guidelines: no restrictions

ECG and blood pressure monitoring: not required

Supervision required: none

Pre participation Screening and Risk stratification in patients with CAD

- **Class B: Presence of known, stable cardiovascular disease with low risk for vigorous exercise**
 - CAD(MI, CABG, angioplasty, stable angina) whose condition is stable
 - Valvular heart disease
 - Cardiomyopathy**AND the following clinical Symptoms**
 - NYHA class 1 and 2
 - No evidence of heart failure
 - Free of ischemia at rest or on exercise test below 6 METS

Activity guidelines: Individualized

ECG and blood pressure monitoring: During early phase for 6-12 sessions

Supervision required: Initially

Pre participation Screening and Risk stratification in patients with CAD

- **Class C: Moderate to high risk for cardiac complications during exercise**

- CAD(MI, CABG, angioplasty, stable angina, valvular heart disease)
- Cardiomyopathy
- Low EF <30%
- Three vessel disease or left main

AND the following clinical Symptoms

- NYHA class 3 or greater
- 2 or more MIs
- Exercise capacity less than 6 METS

Activity guidelines: Individualized

ECG and blood pressure monitoring: Continuous till safety is established

Supervision required: Medically until safety is established

Pre participation Screening and Risk stratification in patients with CAD

- **Class D: Unstable disease**

- Unstable angina
- Decompensated heart failure
- Uncontrolled arrhythmias
- Severe AS

Activity guidelines: No activity

Treat until back to class C or less

Updated Recommendation for Adults

ACSM and AHA

Circulation 2007

To promote and maintain health

- All healthy adults 18-65 need **moderate intensity** aerobic physical activity for a minimum of **30 minutes on 5 days of the week** or **vigorous exercise** for minimum of **20 minutes on three days of the week** in addition to routine daily living activities
 - Every adult should perform activities that maintain or **increase muscular strength and endurance** a minimum of **two days** each week
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Updated Recommendation for Adults

ACSM and AHA

Circulation 2007

To promote and maintain health

- **Combinations** of moderate-vigorous are beneficial
 - **Bouts** of 10 or more minutes to accumulate towards the target is beneficial
 - To improve fitness or reduce risk of diseases should **exceed the minimum recommendation**
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What is moderate/vigorous exercise

Light

Walking, slowly
Cycling, stationary
Swimming, slow treading
Calisthenics, stretching

Golf, power cart
Bowling

Fishing, sitting
Boating, power
Home care, sweeping/vacuuming
Mowing lawn, riding mower
Home repair, carpentry

Moderate

Walking, briskly
Cycling, pleasure
Swimming, moderate
Calisthenics, general
Racket sports (leisure)
Golf, pulling/carrying clubs

Fishing, standing/casting
Canoeing, leisure
Home care, general cleaning
Mowing, power mower
Home repair, painting

Heavy/Vigorous

Walking, briskly uphill
Cycling, fast
Swimming, fast treading
Calisthenics, aerobic dance
Racket sports (competitive)

Fishing in stream
Canoeing, rapid (> 4 mph)
Moving furniture
Mowing, hand mower

*Data from Ainsworth et al, Leon, and McArdle.⁷¹⁻⁷³

Your health. Your choice.



38 seconds
to the top

38 steps
to better health

Thank you
