

Lifestyle for prevention and management of Alzheimer's Disease

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Largest Epidemic Ever

- 60% of all deaths world wide are due to chronic disease
- More than one billion adults worldwide are overweight; at least 300 million of them are clinically obese – will surpass 1.5 billion by 2015.
- 22 million children under five years old are overweight

World Health Organization, 2006

Where is the culprit?

“Chronic, non-communicable diseases are currently responsible for around 70% of the total burden of illness and injury experienced by the Australian population. The proportion is expected to increase to close to 80% by 2020”

Preventing Chronic Disease: A Strategic Framework – Background Paper, October 2001

Chronic Disease

- slow progress, long continuance
- individual crosses threshold - “clinical horizon” to manifest
- mechanisms underlying are active long before outwardly affected



Examples of Major Chronic Diseases

- cardiovascular disease (atherosclerosis, heart failure, hypertension, and stroke)
- obesity
- type 2 diabetes
- some cancers
- osteoporosis
- sarcopenia
- Alzheimer's disease



Risk Factors and Lifestyle

- If the major risk factors for chronic disease were eliminated, at least 80% of heart disease, stroke and type 2 diabetes would be prevented; and 40% of cancer would be prevented
- Major risk factors for chronic disease are an unhealthy diet, physical inactivity, and tobacco use
- Requires a new approach
- Prevention and treatment through lifestyle modification

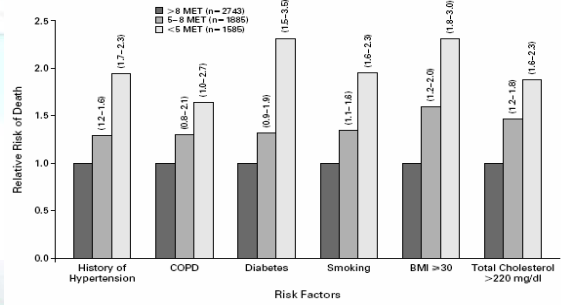
World Health Organization, 2006

“Indeed, with the possible exception of diet modification, we know of no single intervention with greater promise than physical exercise to reduce the risk of virtually all chronic diseases simultaneously”

Booth et al, JAP 2000

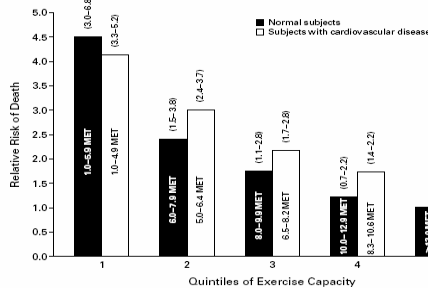


Protective Effect of Exercise in Different Chronic Conditions



Myers et al. N Engl J Med 346:793-801. 2002

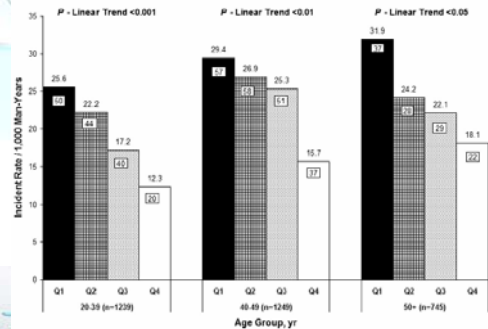
Protective Effect of Exercise Cardiovascular Disease



Myers et al. N Engl J Med 346:793-801. 2002

Muscle Strength Incidence Metabolic Syndrome

[Q1=lowest muscle strength - Q4=highest muscle strength]



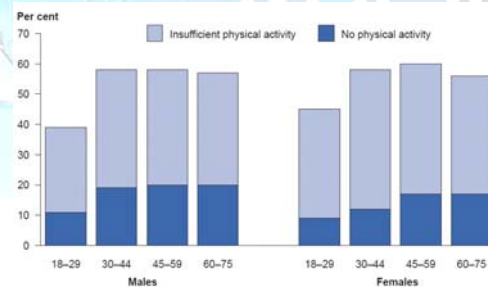
Jurca et al. MSSE 11:1849-1855.2005

Physical Activity Guidelines

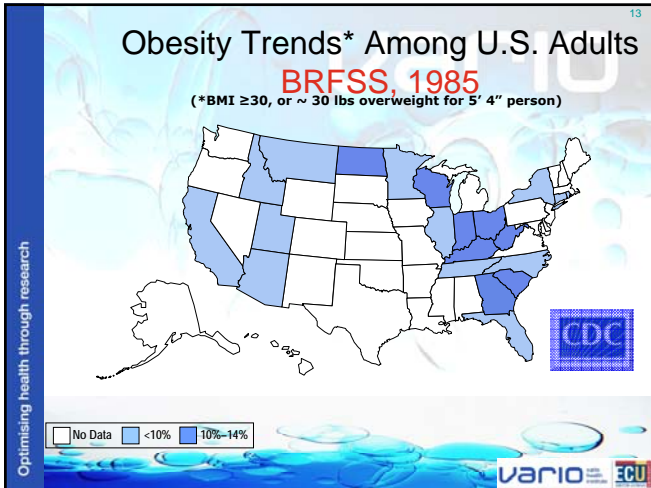
Australia's Health 2006, AIHW

- National Physical Activity Guidelines for Australians
- at least 30 minutes of moderate-intensity physical activity on most, preferably all, days of the week to obtain health benefits.
- interpreted as 30 minutes on at least five days of the week, a total of at least 150 minutes of moderate activity per week.
- children and adolescents recommended at least 60 minutes of moderate to vigorous physical activity every day.

Rates of Physical Inactivity



Notes:
 1. Age-standardised to the Australian population as at 30 June 2001.
 2. People aged 18-75 years.
 3. Insufficient physical activity is less than 150 minutes and/or less than five sessions in the previous week.
 Source: AIHW analysis of the 2000 National Physical Activity Survey.



Exercise and Alzheimer's Disease

- Application across spectrum of problem:
 - Reducing risk in general population – prophylactic
 - Reversing or slowing progression in early stage
 - Maintaining QOL, structure and function in later stage
 - Enhancing care and carers

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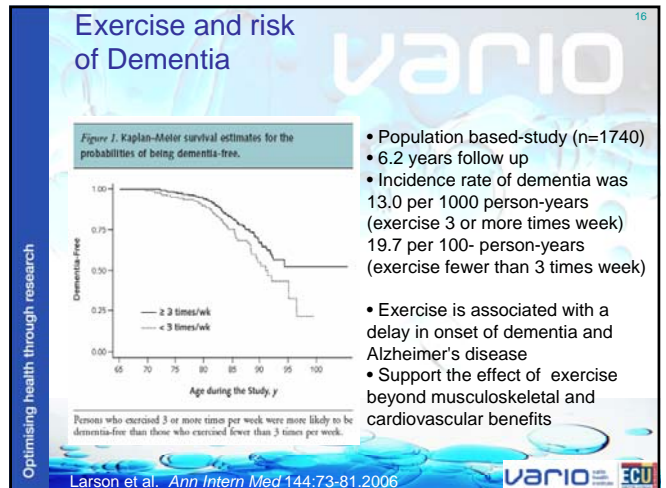
Epidemiology

- Epidemiological studies into Alzheimer disease indicates physical activity appears beneficial, as does a diet with high levels of vitamins B6, B12 and folate, while red wine in moderate quantities also appears protective

McDowell, I. Alzheimer's disease: insights from epidemiology. *Aging-Clinical & Experimental Research*. 13:143-162, 2001.

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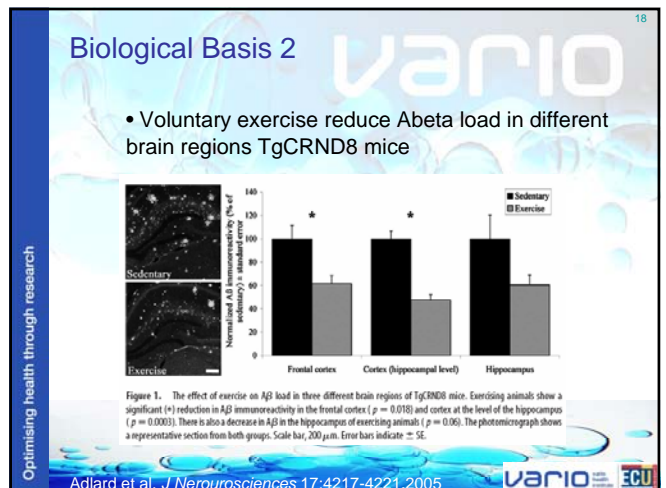
Biological Basis 1

- Physical exercise may preserve brain function by improving cerebral blood flow and oxygen delivery¹
- Inducing fibroblast growth factor in the hippocampus²
- Reduced loss of hippocampus brain tissue in the aging brain is related to physical conditioning³

¹Rogers et al. *J Am Geriatr Soc* 38:123-128.1990
²Pinilla et al. *Neuroscience* 1:53-61.1998
³Colcombe et al. *J Gerontol Med Sci* 58A:176-180.2003

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Risk Factors for Alzheimer's Disease



Cholesterol

•Exercise and nutrition demonstrated effects on:

- Lowered TC
- Lowered LDL-C
- Increased HDL-C
- Lowered triglycerides

Scranton, R., et al. Predictors of 14-year changes in the total cholesterol to high-density lipoprotein cholesterol ratio in men. American Heart Journal. 147(6):1033-1038, 2004

Homocysteine

- Amino acid produced by the body
- Elevated levels associated with AD
- Modifiable through exercise and nutrition
- For example:
 - 6 months exercise in elderly serum homocysteine decreased 5.34%
 - increased 6.1% for control group
- Folate, dietary fiber, caffeine and alcohol also factors

Vincent, K. R., et al. Homocysteine and lipoprotein levels following resistance training in older adults. Preventive Cardiology. 6:197-203, 2003.

Hypertension

- Exercise can lower BP in patients with stage 1 and 2 essential hypertension
- Average reduction in BP is 10.5 mm Hg for systolic and 7.6 mm Hg for diastolic BP

Kokkinos, P. F., P. Narayan, and V. Papademetriou. Exercise as hypertension therapy. Cardiology Clinics. 19:507-516, 2001.

Diabetes

- Diabetes is the world's fastest growing disease
- It's Australia's sixth leading cause of death
- Over one million Australians have it — but 50% are as yet unaware
- Every 10 minutes someone is diagnosed with diabetes

<http://www.diabetesaustralia.com.au/>

Exercise and Diabetes

- Exercise improves insulin resistance
- Beneficial for preventing and treating type 2 diabetes
- Aerobic exercise hindered in older, obese, co-morbid patients
- Resistance exercise in particular is safe and effective

Willey and Singh, Diabetes Care, 2003

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- It is estimated that appropriate levels of physical activity could prevent 30-50% of new cases of Type 2 diabetes
- Benefits for preventing and treating diabetes occur only with regular sustained physical activity patterns

(Manson & Spelsberg, 1994)

Obesity and Overweight

- Combination of exercise and dietary modification is the only effective long-term strategy for controlling body weight



Testosterone and Estrogen

- Sex hormones have a role in maintaining cognitive function
- Age related reduction or intentional deprivation appears to impact AD negatively
- Exercise and body composition changes can alter testosterone and estrogen even in the elderly

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Reversing or slowing progression in early stage

- Psychogeriatric patients illustrate significant short term improvement in cognitive function - physical activity appears to have some arousal effect in these patients
- Several studies have demonstrated improvement with longer term exercise intervention

Maintaining QOL, Structure and Function

- Reducing depression
- weight loss and cachexia - frequent clinical findings in cancer patients
- dietary intake and physical activity to maintain muscle mass
- important clinical strategies requiring further investigation
- Fatigue and declining neuromuscular function can be slowed or even reversed by exercise

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Keeping the Carer healthy

- Exercise, nutrition, relaxation, connectedness, family, social interaction, respite
- Contribute \$billions to Australian Economy
- Delay chronic disease
- Maintain structure and function



What is Anabolic Exercise?

- Repetitive movements performed against resistance
- Resistance limits number completed to generally less than 12 repetitions per set

Exercise recommendations

- Resistance training
 - 2-3 times per week
 - 3 sets of each exercise
 - Intensity of 6-10 RM
 - 60-120 secs rest between sets
 - 6-9 exercises per session
 - Warmup and cool down
 - Total of 45-60 minutes



What is Aerobic Exercise?

- Emphasizes cardiorespiratory system
- Longer duration exercise involving large muscle groups in repetitive actions
- 20 minutes or longer at 60% HRmax or higher
- Jogging, rowing, cycling, swimming, walking

Exercise recommendations

- Aerobic Training
 - 3-4 times per week
 - Continuous exercise using large muscle groups
 - Cycling, jogging, swimming, rowing, walking etc.
 - Heart rate of 60-90% of maximum
 - 220 – age
 - Warmup and cool down
 - Total of 30-60 minutes per day

Exercise recommendations

- Flexibility
 - 10-15 minutes
 - Every day
 - Hold static stretch for 20-60 seconds

“There is no pharmacological intervention that holds a greater promise of improving health and promoting independence in the elderly than does exercise”

Evans & Campbell, Journal of Nutrition, 1993

Medicare Rebate for Exercise Physiology Services

- Medicare Plus and the Enhanced Primary Care Plan
 - Referral from General Practitioner to Exercise Physiologist
1. Exercise Prescription and Management
 2. Prevention and Wellness
 3. Secondary Management of Chronic Disease

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- Referral to appropriate allied health professional is critical
- Exercise Physiologists are minimum 4 year university educated including extensive clinical experience
- Certified by: Australian Association for Exercise and Sport Science (AAESS)

www.aaess.com.au

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Australian Association for Exercise and Sports Science

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Thank You

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