לשכת המסחר והתעשיה ישראל-איטליה
Camera di Commercio e Industria Israel-Italia

Embassy of Italy
Tel Aviv

Healthy Life and Longevity
Centenarians in Italy and Israeli Lifestyle, Nutrition, Clinical, and Genetics

Monday 2nd December
The Steinhardt Museum of Natural History
Klausner St 12, Tel Aviv-Yafo

European Group for Research into Elderly and Physical Activity

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European Review of Aging and Physical Activity

Yael Netz

לשכת המסחר והתעשיה ישראל-איטליה
CAMERA DI COMMERCIO E INDUSTRIA ISRAEL-ITALIA

Healthy Life And Longevity

Physical Exercise and Longevity

Yael Netz

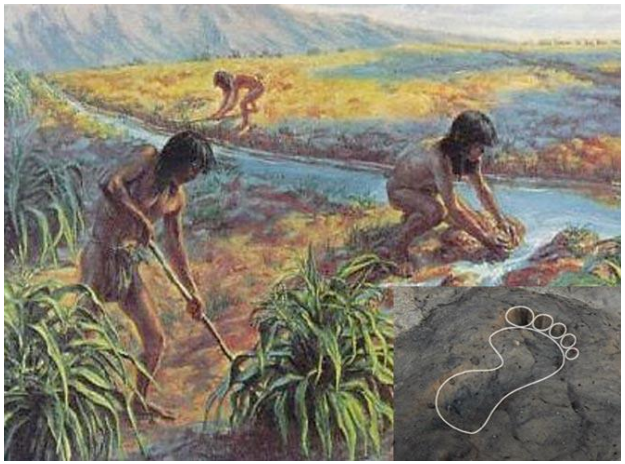
EDITORIAL Open Access

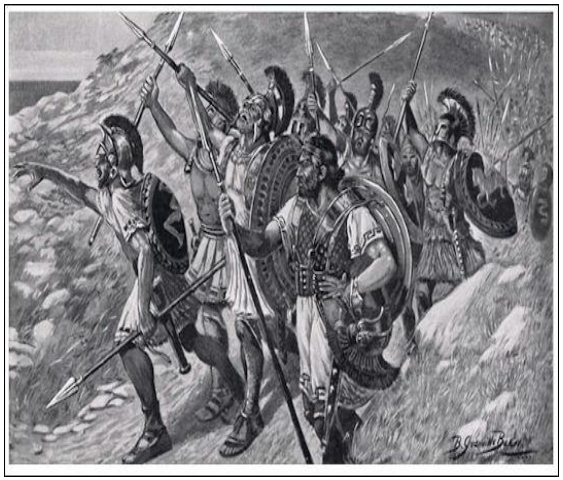
EURAPA moves to open access: Research trends and challenges in physical activity in old age

Yael Netz[1*] and Wiebren Zijlstra[2]

2015

The evolution of sedentarism followed by the evolution of purposeful exercise



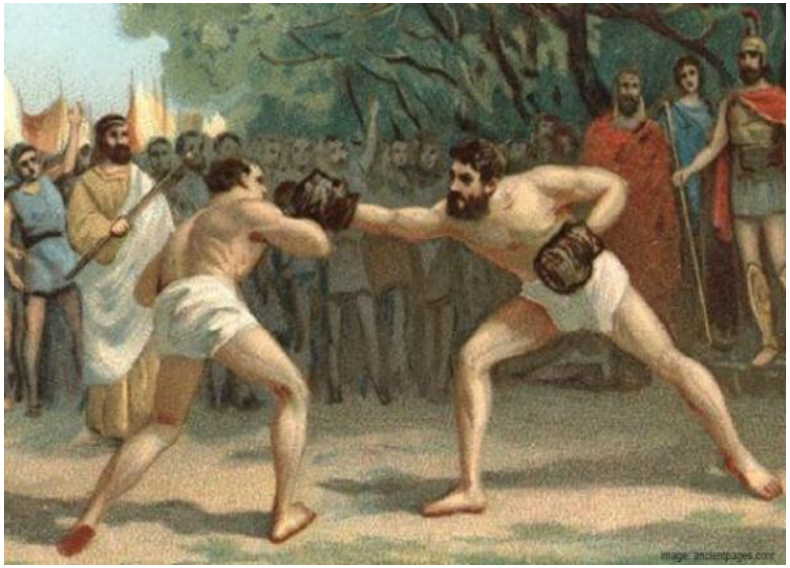


In the past, no need for purposeful exercise.

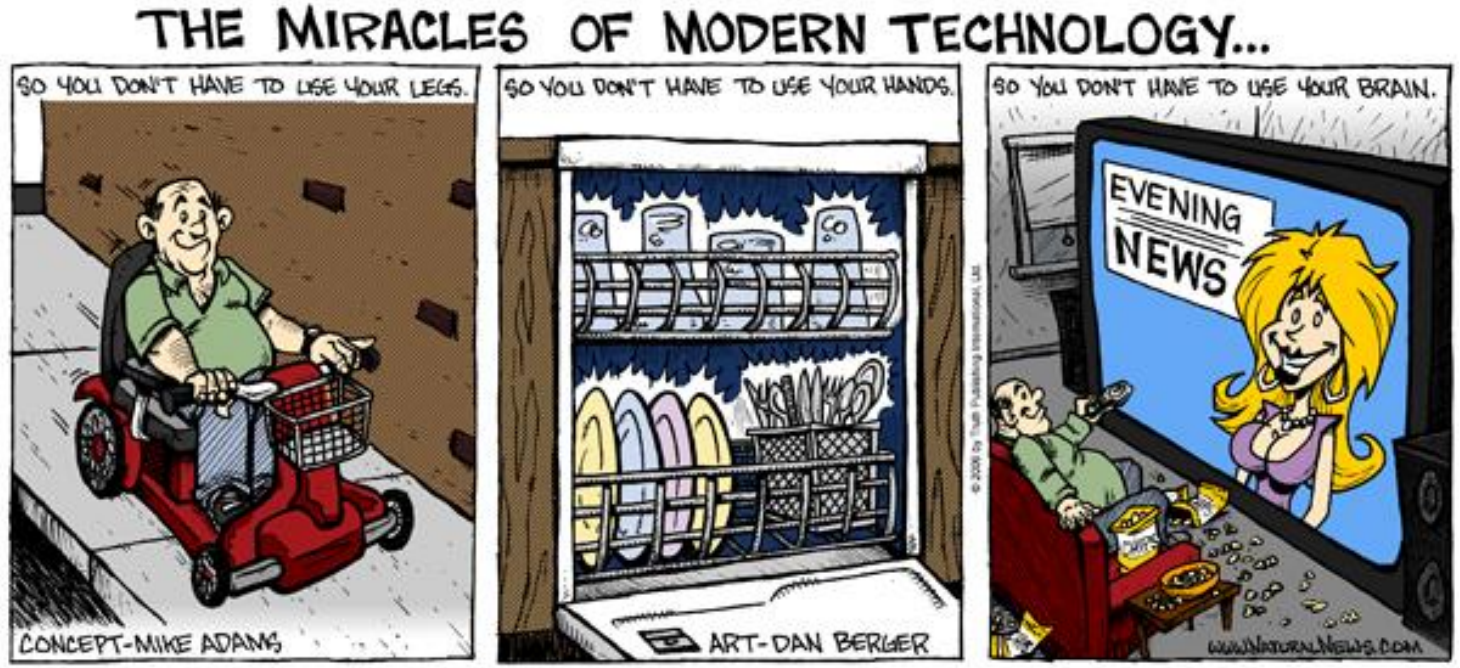
Survival required movement

Dancing

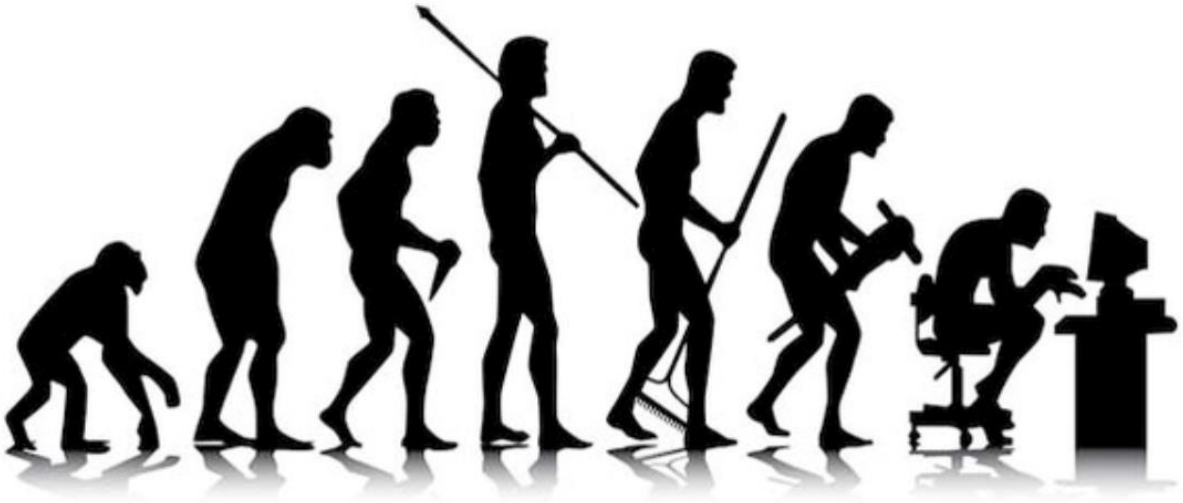
Sports

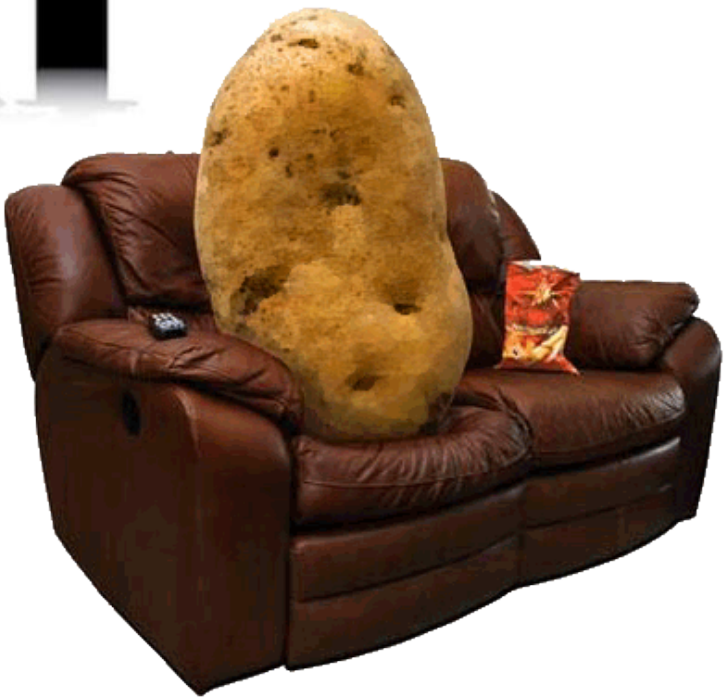


The Principle of Movement Economy – has been a stimuli for technology development



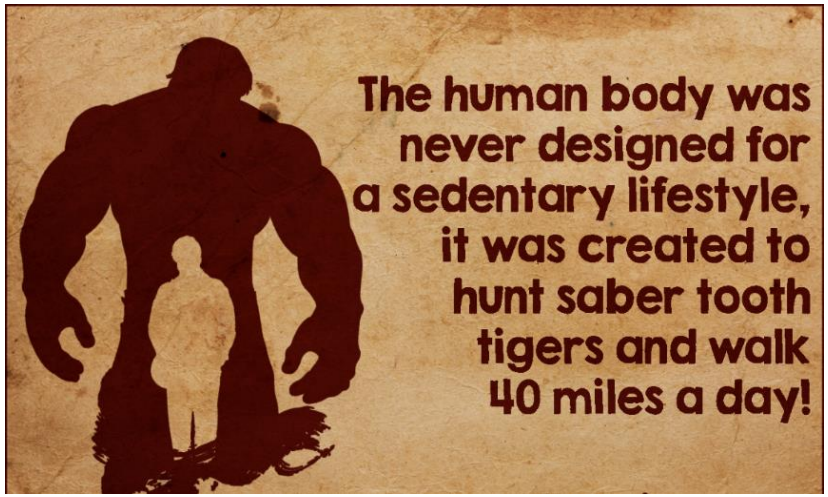
The evolution of sedentarism





Two elemental human phenomena – a crisis relationship.

Movement economy vs movement necessity



The basic need to reduce movement vs the natural dependence on movement – use it or loose it!!!

Purposeful exercise to complement the natural movement

Movement economy especially in old age

There is a biological basis for the age-related decline in physical activity among both nonhuman subjects and humans.

The dopaminergic neurotransmitter system appears to be a possible neurobiological mechanism that can explain this decline.

Purposeful exercise – perceived as energy expenditure, thus it is predominantly aerobic exercise

the overwhelming reduction in daily energy expenditure in the twentieth-century, along with an increase in cardiovascular diseases, brought about the promotion of aerobic exercise as the main mode of exercise for fitness and health promotion

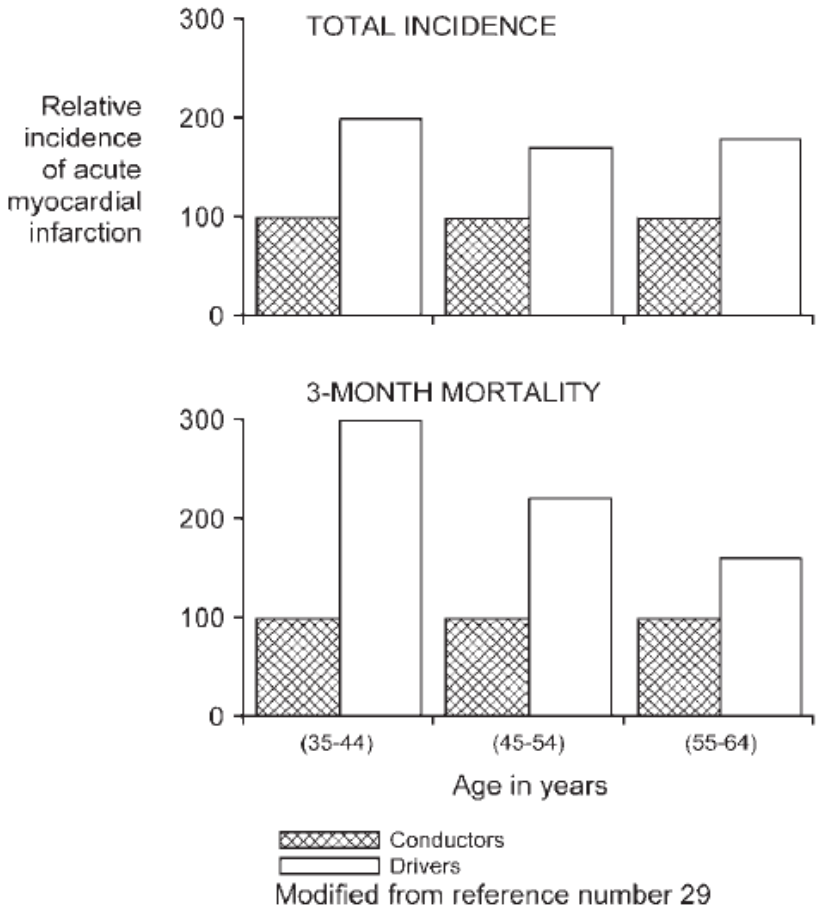


Figure 1 Age-adjusted relative incidence of acute myocardial infarction in London busmen, 1949–1958

A history of physical activity, cardiovascular health and longevity: the scientific contributions of Jeremy N Morris, DSc, DPH, FRCP

Ralph S Paffenbarger Jr,[a,b] Steven N Blair[c] and I-Min Lee[b,d]

Recommended Guidelines of Physical Activity for Older Adults (per week)

American Heart Association (AHA)

American College of Sports Medicine (ACSM)

U.S. Department of Health and Human Services (DHHS)

World Health Organization (WHO)

WHO (2011) Global Recommendations of Physical Activity for Health.
ACSM (2009). Exercise and physical activity for older adults. M*edicine and Science in Sports and Exercise, 41*, 1510-1530.
Nelson et al. (2007). Physical activity and public health in older adults: Recommendation from the American College of Sports Medicine and the American Heart Association. *Medicine and Science in Sports and Exercise, 39*, 1435-1445.

Aerobic Exercise

- walking
- cycling
- running
- swimming

Body's large muscles move in a rhythmic manner for sustained periods

strength training (muscles work against force)

flexibility training (activities to preserve range of motion)

Balance training

Increase lower body strength and reduce likelihood of falling

Intensity

10
9
8
7
6
5
4
3
2
1
0

Moderate-intensity* - noticeable *increases in heart rate and breathing.

Intensity

10
9
8
7
6
5
4
3
2
1
0

Vigorous-intensity - **large** *increases in heart rate and breathing.*

***Moderate-intensity* - noticeable increases in heart rate and breathing.**

In a week:

at least:

moderate-intensity: 150 min.

At least 30 min. a day in bouts of at least 10 min.

Or

vigorous-intensity: 75 min.

At least 20 min. a day

Aerobic Exercise

- **walking**
- **cycling**
- **running**
- **swimming**

Any modality that does not impose excessive orthopedic stress

Strength training (muscles work against force)

at least:

Twice a week (preferable in nonconsecutive days) Between moderate (5-6) and vigorous (7-8) intensity

Progressive weight training or weight bearing exercise (8-10 exercises involving the major muscle groups of 8-12 repetitions each)

flexibility training (activities to preserve range of motion)

at least:

Twice a week (preferable in nonconsecutive days), for at least 10 min. in moderate (5-6) intensity

Sustained stretches for each major muscle group and static rather than ballistic movements

Balance training

Increase lower body strength and reduce likelihood of falling

Progressively difficult postures that gradually reduce the base of support

Dynamic movements that perturb the center of gravity (e.g. circle turns)

Reducing sensory input (e.g. standing with eyes closed)

Cut Down On

- T.V. watching
- Video and Computer Games
- Sitting Still for long periods of time

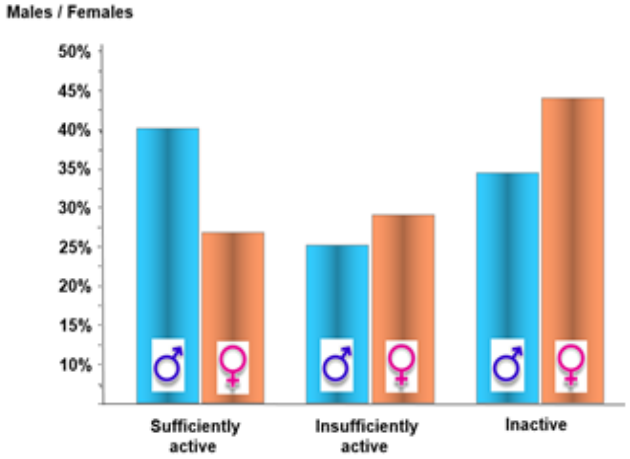
Sitting is the new smoking…

Journal of Aging and Physical Activity, 2011, 19, 30-47

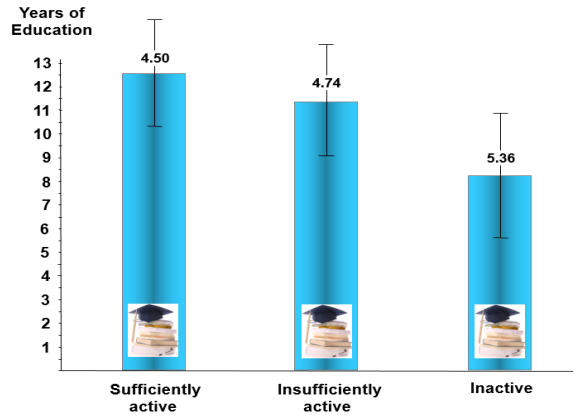
Adherence to Physical Activity Recommendations in Older Adults: An Israeli National Survey

Yael Netz, Rebecca Goldsmith, Tal Shimony, Yosefa Ben-Moshe, and Aviva Zeev

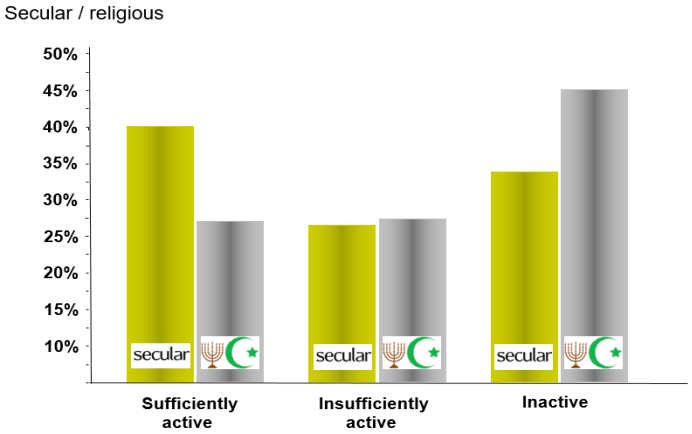
Level of Activity and Gender (N=1663)



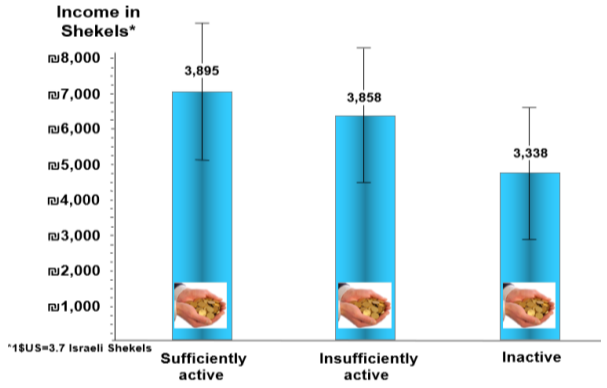
Level of Activity and Education (N=1663)



Level of Activity and Religious vs Secular (N=1663)



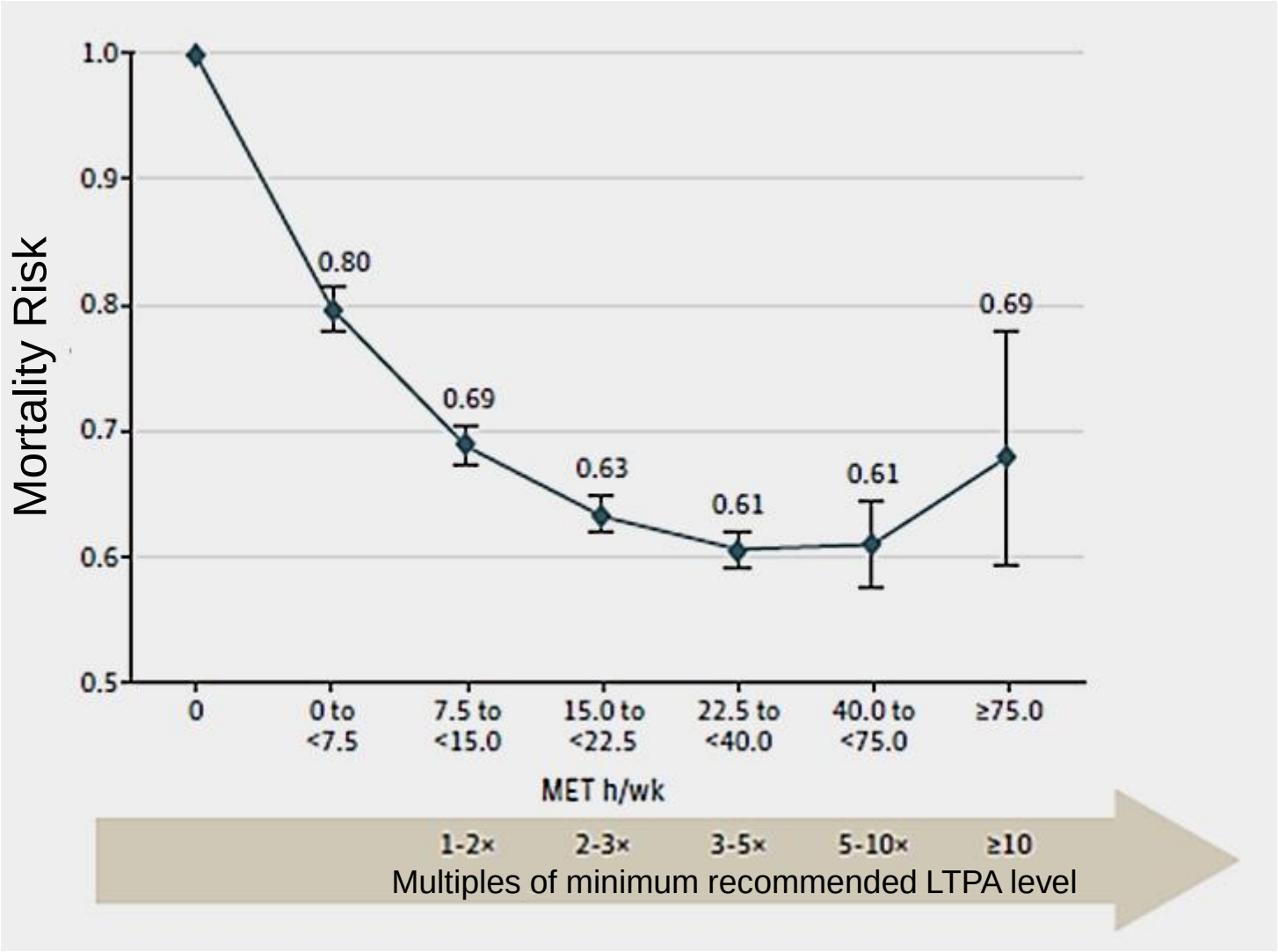
Level of Activity and Income (N=1663)



Original Investigation

Leisure Time Physical Activity and Mortality

A Detailed Pooled Analysis of the Dose-Response Relationship



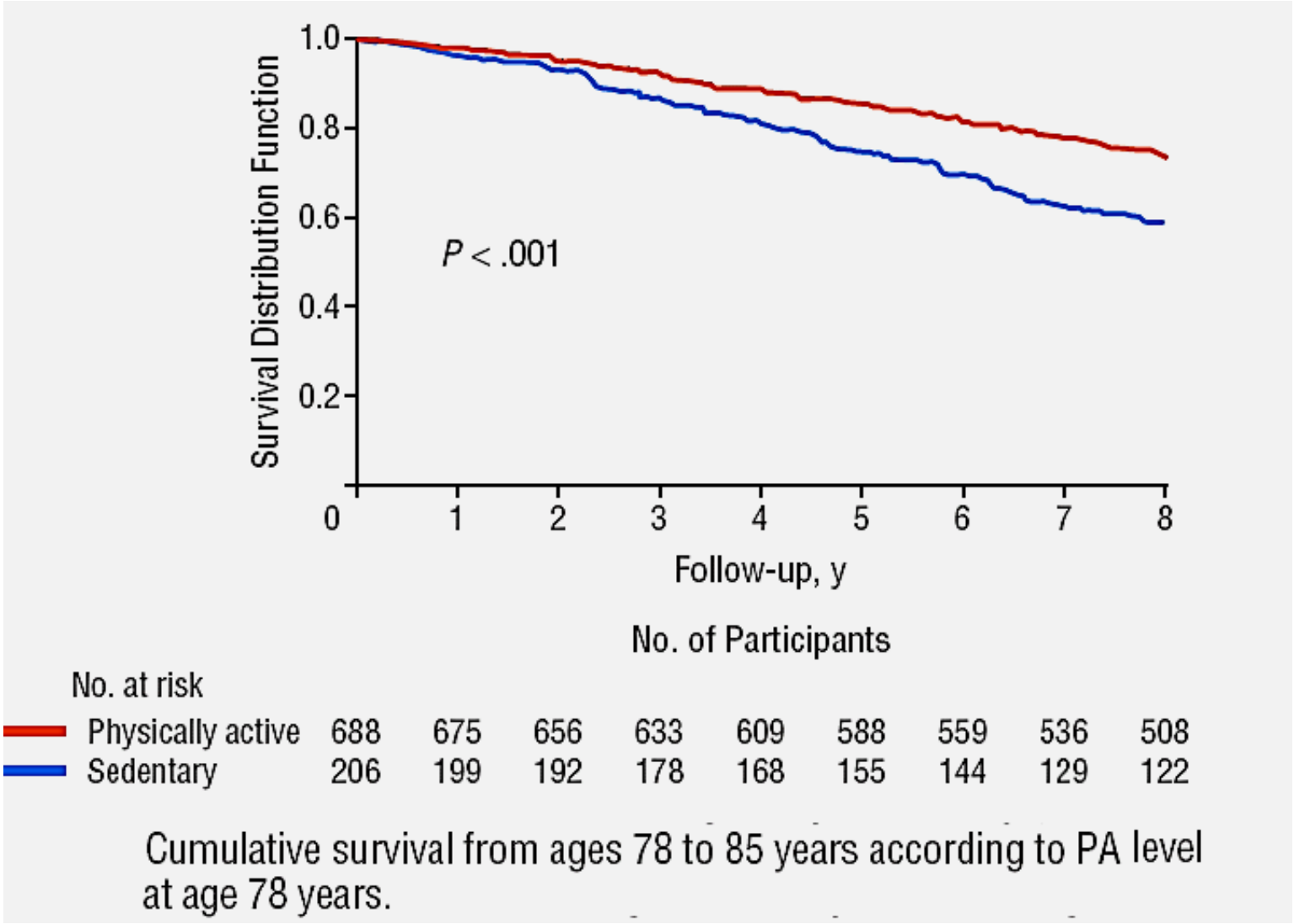
A total of 661,137 men and women (median age, 62 years; range, 21-98 years)

Arem et al JAMA Intern Med, 2015

Physical Activity, Function, and Longevity Among the Very Old

Jochanan Stessman, MD; Robert Hammerman-Rozenberg, MD; Aaron Cohen, MD; Eliana Ein-Mor, MA; Jeremy M. Jacobs, MBBS

Arch Intern Med. 2009



Cumulative survival from ages 78 to 85 years according to PA level at age 78 years.

Physical Activity, Function, and Longevity Among the Very Old

Jochanan Stessman, MD; Robert Hammerman-Rozenberg, MD; Aaron Cohen, MD; Eliana Ein-Mor, MA; Jeremy M. Jacobs, MBBS

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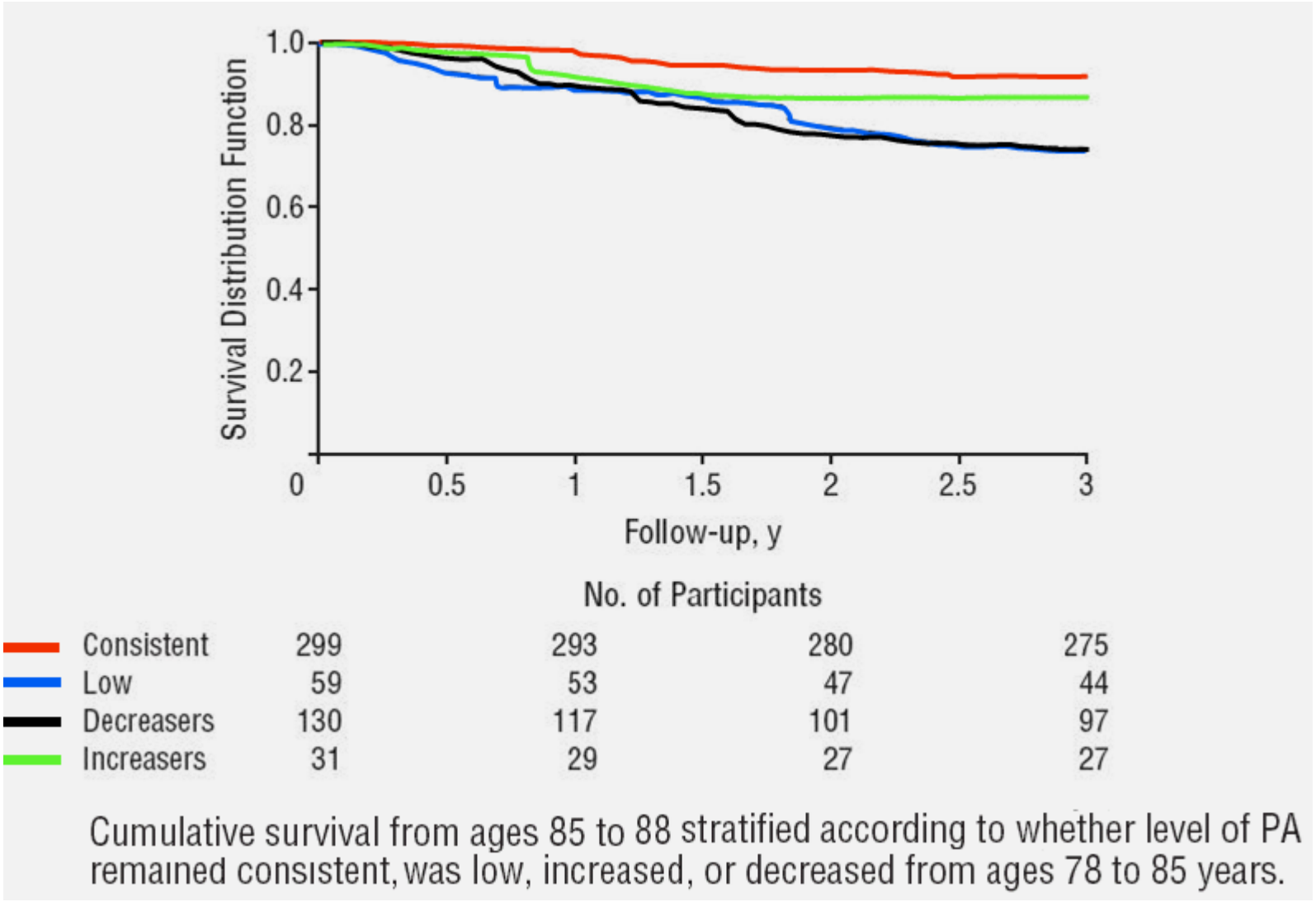


Cumulative survival from ages 85 to 88 stratified according to whether level of PA remained consistent, was low, increased, or decreased from ages 78 to 85 years.

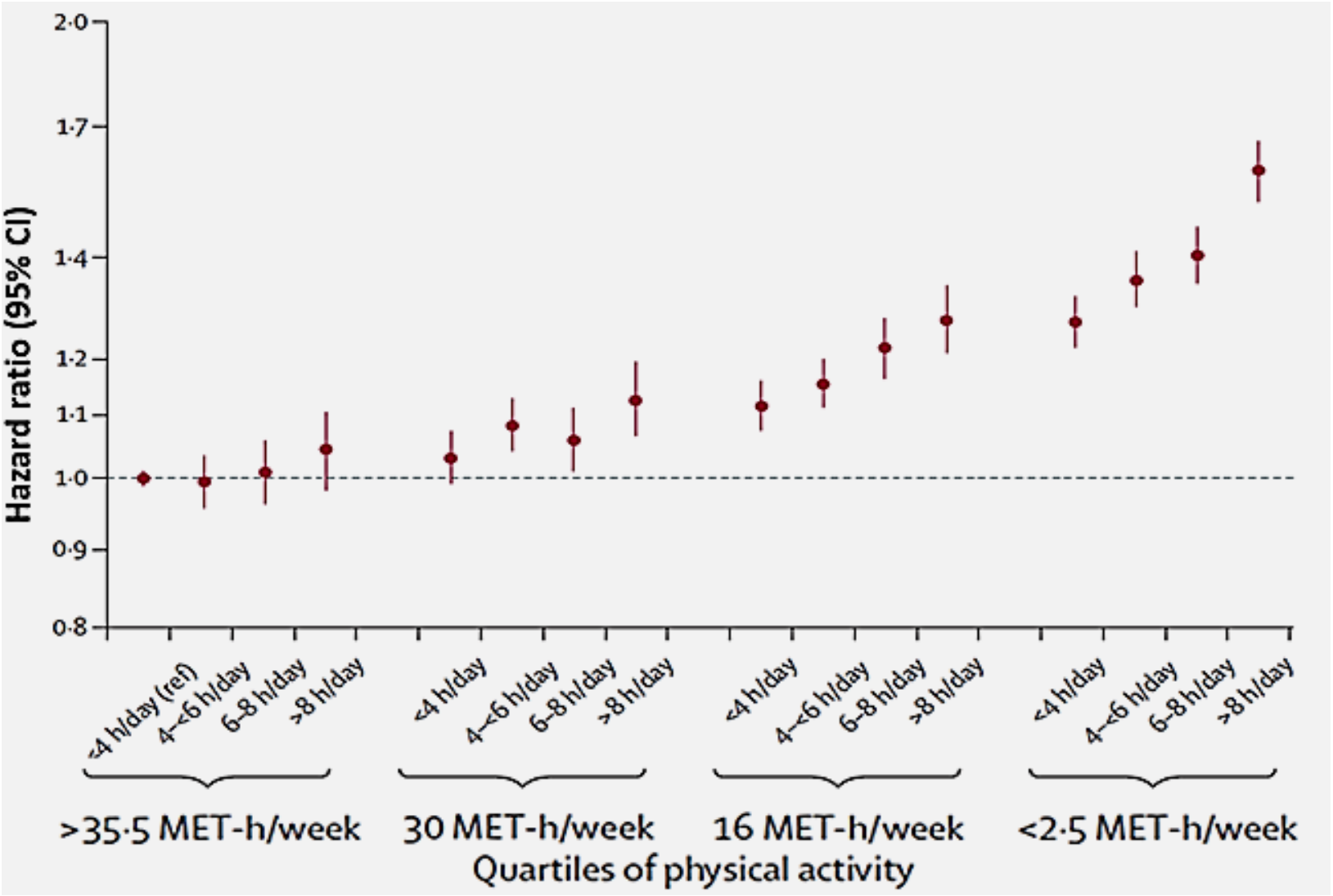
Does physical activity attenuate, or even eliminate, the detrimental association of sitting time with mortality? A harmonised meta-analysis of data from more than 1 million men and women

Ulf Ekelund, Jostein Steene-Johannessen, Wendy J Brown, Morten Wang Fagerland, Neville Owen, Kenneth E Powell, Adrian Bauman, I-Min Lee, for the Lancet Physical Activity Series 2 Executive Committe* and the Lancet Sedentary Behaviour Working Group*

Lancet 2016

Physical Activity, Sitting Time, and Mortality

Ekelund et al. 2016 Lancet



Physical Exercise is not merely energy expenditure

frontiers in Medicine

REVIEW
published: 29 March 2019
doi: 10.3389/fmed.2019.00057

Is There a Preferred Mode of Exercise for Cognition Enhancement in Older Age?—A Narrative Review

*Yael Netz**

The Academic College at Wingate, Netanya, Israel

The aim of this review is to examine the moderating effect of the mode of exercise on the exercise-cognition relationship. Is one mode of exercise more efficient in enhancing cognition than the other? For example, is aerobic exercise preferable over balance training? Based on official guidelines for old age, exercise modes include aerobic activity, strength (resistance) training, flexibility, balance, and coordination. In relation to cognition, these exercise modes are further divided into two categories: physical training—aerobic and strength, and motor training—balance, coordination, and flexibility. The physical training activities are repetitive and automatic in nature, and require high metabolic energy and relatively low neuromuscular effort. The motor activities involve high neuromuscular demands and relatively low metabolic demands. In addition, there are specific movement skills that require more neuromuscular effort (e.g., Tai Chi), and sometimes also greater metabolic demands (e.g., tennis). Selected studies examining the effect of various modes of exercise on cognition contend that both training categories affect neuroplasticity, and consequently cognitive functioning. However, there are two main differences between them: (1) Physical training affects cognition via improvement

OPEN ACCESS

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University of Arizona, United States

2019

On-going Project

Personalized exercise programs for older adults – a digital user-friendly application

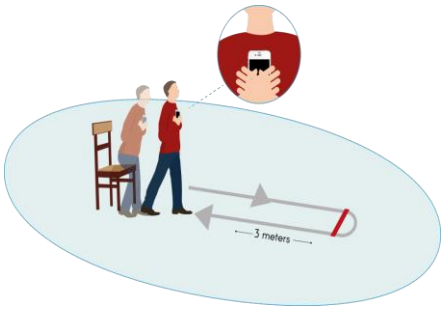
(a grant from the Israeli Ministry of Science Technology and Space)

Israel

Ministry of Science, Technology and Space

Collaboration between **Wingate** and **Hadassah**

Mon4t
Your Personal Checkup

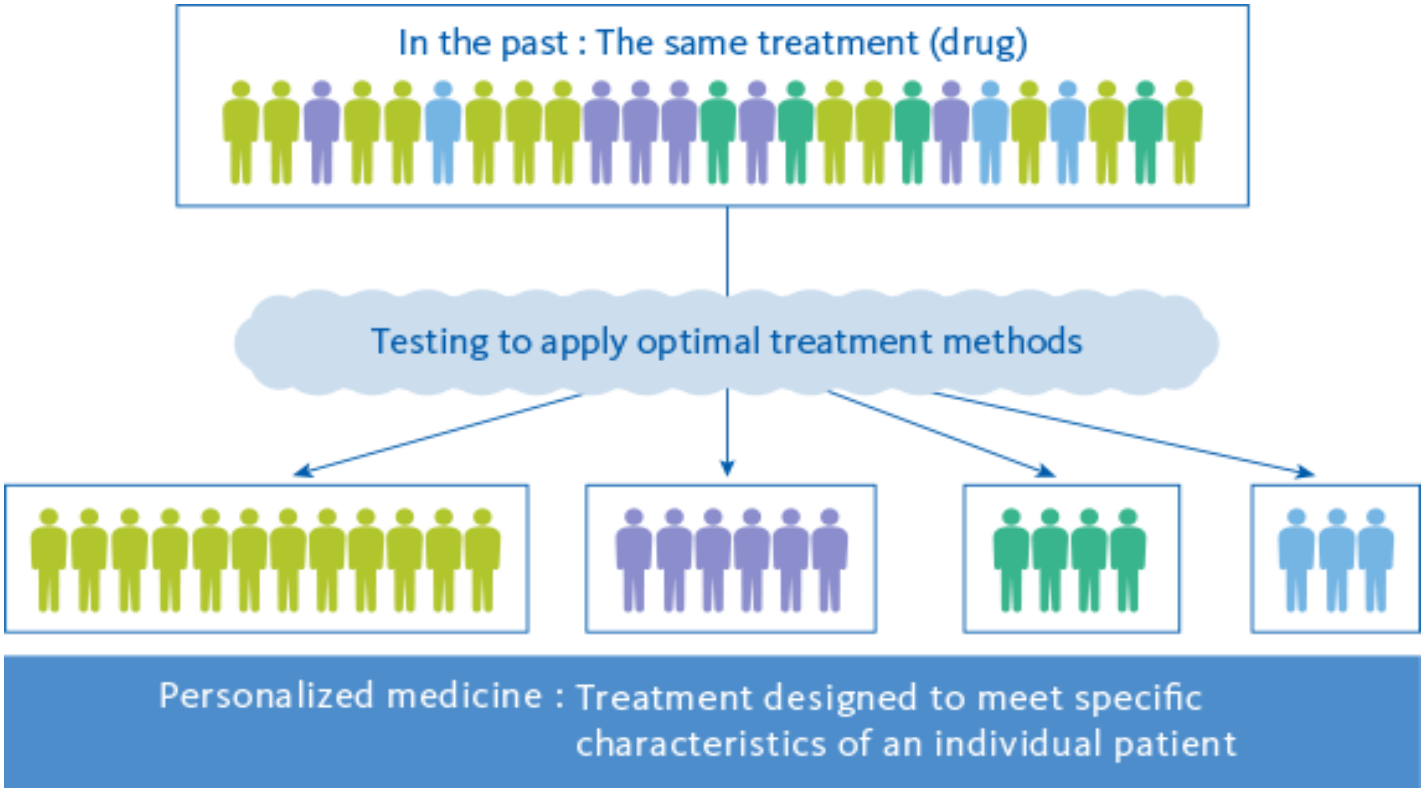


Rationale:

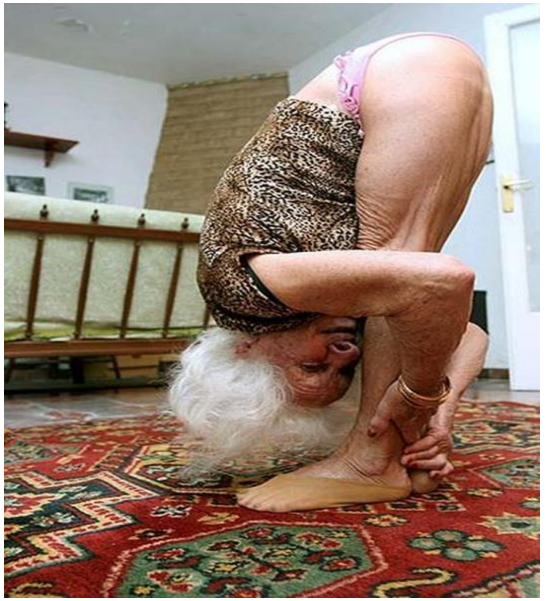
Recommended guidelines too general

Increased variability in old age

Personalized Medicine (including preventative)



Flexibility
(range of motion)



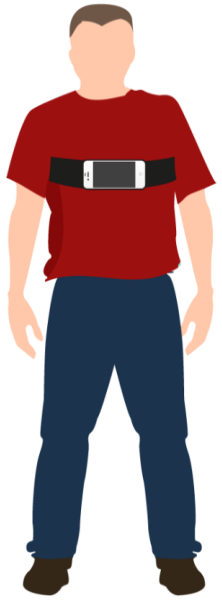
Strength

Balance and coordination

Wingate 1

1/26

Neutral stance

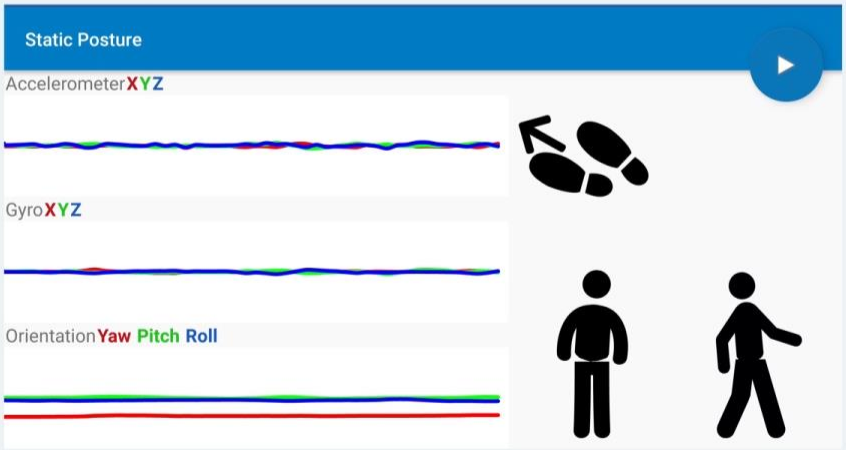


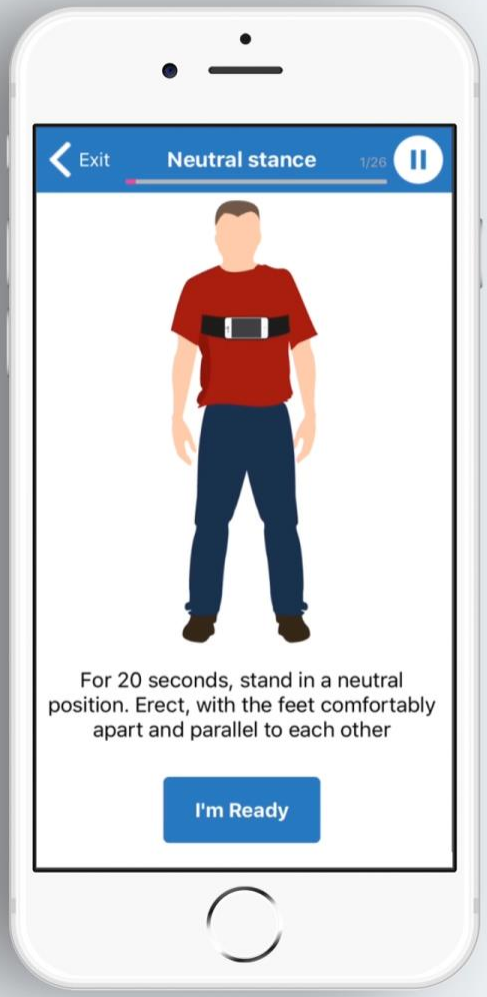
For 20 seconds, stand in a neutral position. Erect, with the feet comfortably apart and parallel to each other

I'M READY

Mon4t
Your Personal Checkup

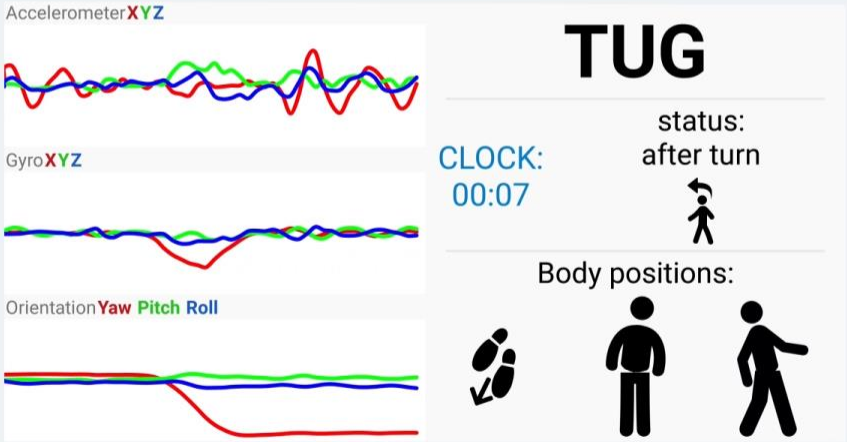
The integral 3D accelerometers and gyroscopes are recording the subject's movements and orientation

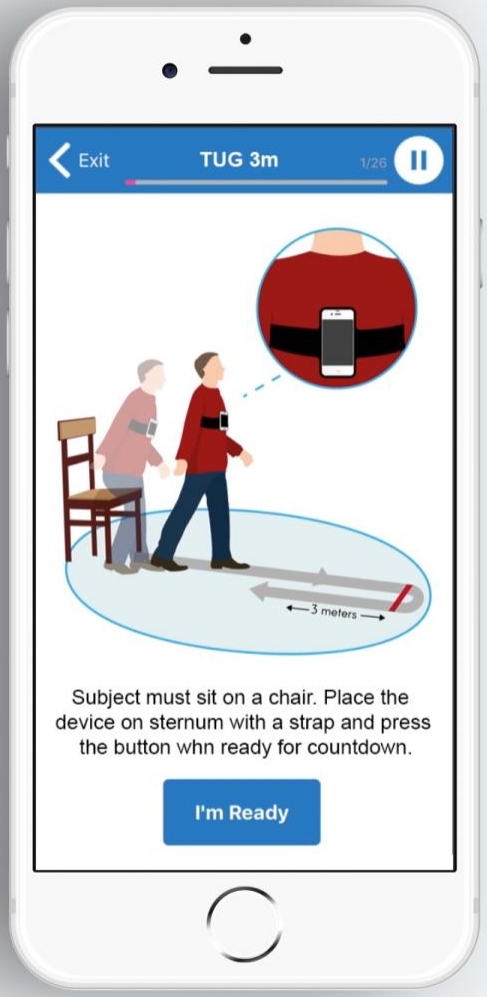


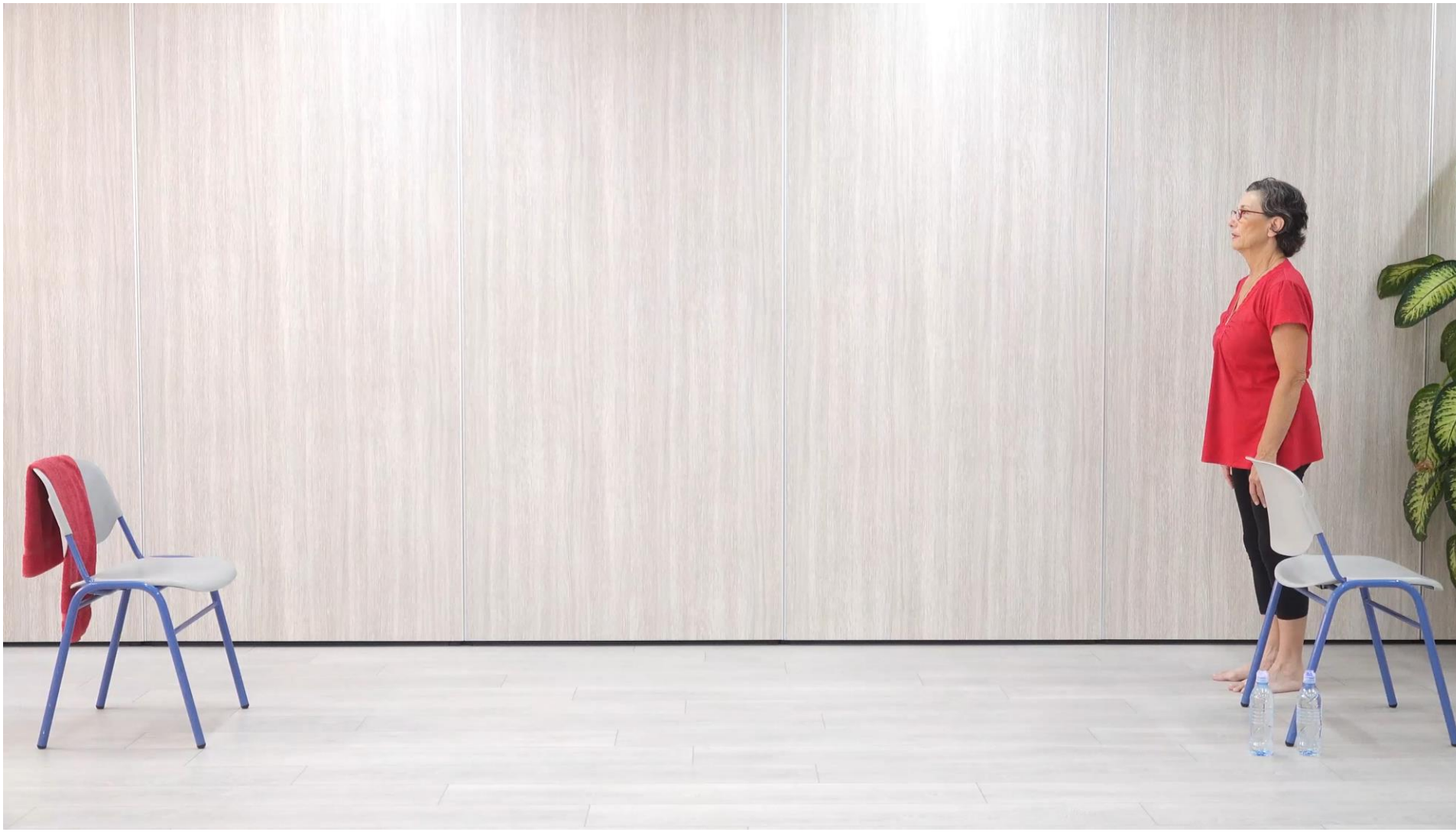


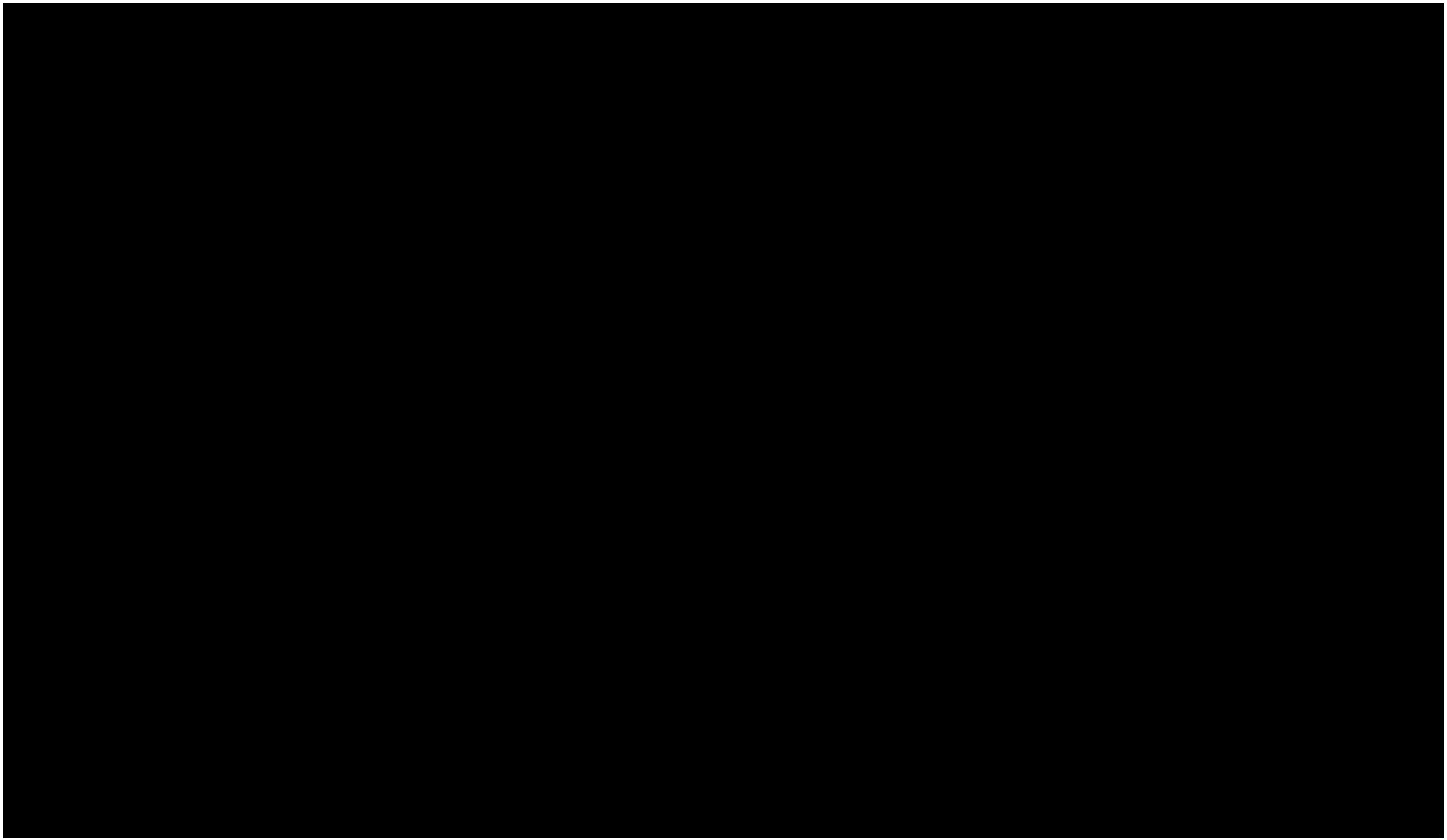
Mon4t
Your Personal Checkup

Timed Up & Go (TUG) is used for Gait Analysis









Yael