Aqua Fitness in the Elderly

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What is Fitness?

Fitness is exercise mainly for non sports people.

Fitness is characterized by the absence of competition.

What are fitness goals?

Because of the absence of competition, fitness goals are not related to jumping the highest, swimming the fastest or having the strongest throw.

Fitness goals are not solving a disease or pathology either.

What are fitness goals?

Improve physical fitness

Set of attributes that people possess or achieve that relates to the ability to perform physical activity.

Multidimensional concept

Skill-related components
Physiological fitness components
Health-related components

Physical fitness concept

Skill-related components: agility, balance, coordination, speed, power, and reaction time (mostly associated with sports and motor skills performance)

Physiological fitness components:

Metabolic fitness – status of metabolic systems and variables predictive of the risk for diabetes and cardiovascular disease; Morphologic fitness - status of body composition factors, as body circumference, fat distribution,…; Bone integrity - status of bone mineral density (mostly associated with nonperformance components that relate to biological systems influenced by habitual activity)

Physical fitness concept

Health-related components: cardio-vascular endurance, muscular strength and endurance, flexibility, and body composition.

(mostly associated with the ability to perform daily activities and with a level of conditioning with a low association with the development of diseases related to reduced movement.)

What is the main purpose of fitness?

Improving conditioning in order to get healthy and to have a good quality of life (no disease and no functional limitations)

What is aquatic fitness?

Aquatic fitness is usually related to exercises that we can do in the swimming pool that are not exactly related to formal swimming.

The initial idea of aqua fitness, namely hydrogymnastics, was to provide the option of aquatic exercise for all people, particularly people who cannot swim, keeping the head out of the water.

How we do it?

- Classes (groups)

Problems:

  - Different conditioning
  - Usually no previous testing

and

  - Clients with different goals??*

- Personal Training

Problems:

  - Boring
  - Attendance
  - Programs "controlled" by clients

*I'm going to do some exercise with Susana because I want:

How we do it?

Aquatic fitness purposes:

cardio-vascular endurance, muscular strength and endurance, flexibility, and body composition
(Health related component)

- Classes (groups)

Problems:

- Different conditioning
- Usually no previous testing

Programming…?

Programming for groups

Trying to do our best

Programming for groups
What about the units?

Aquatic fitness purposes:

cardio-vascular endurance, muscular strength and endurance, flexibility, and body composition
(Health related component)

Ex:

5 min Warm-up

20 min cardio-vascular

15 min muscular strength and endurance

10 min flexibility and relax

Programming for groups

-Changing intensity or adapt exercise according to personal limitations through:

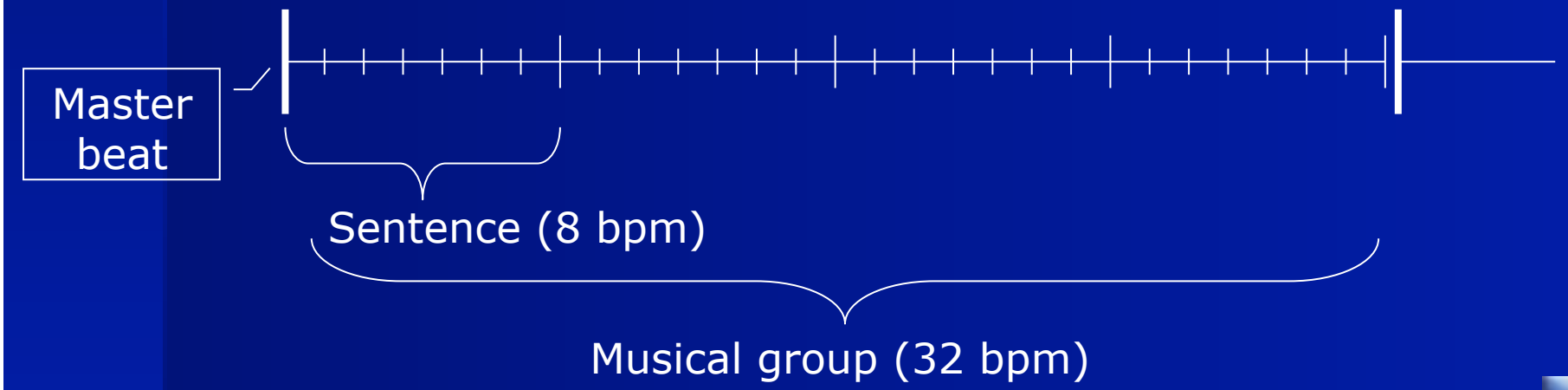
- -Surface
- -Speed
- -working position
- -Enlarge
- -Around
- -travel

SWEAT formula, *Speedo*

(Mary Sanders)

Music in aquafitness

- Music has rythem - bpm
- Each 8 bpm: sentence
- 4x 8 (32) bpm: musical group



Music and exercise link

Land rythem

Water rythem

Half-water rythem

Questions about aquatic fitness

I don’t move forward
without a question!!

Aquatic fitness in elderly

Aquatic fitness is very popular among older persons in Portugal and in Spain and probably in many more countries.

Why?

Aquatic fitness in elderly

Why?

- protective effect of water

- don't feel sweaty

- because water hides fat

- because water is good for everything and hydro is even good for sexual performance (Suelly, from Brazil!!)

Bla, bla, bla, bla…

-Because teachers choose poor exercises and the classes have a non controlled intensity that usually is very light or light.

Aquatic fitness in elderly

Intensity

Intensity	Maximal HR (%)
Very Light	<50
Light	50-63
Moderate	64-76
Hard (vigorous)	77-93
Very Hard	≥94
Maximal	100

ACSM (2006)

220-40=180	220-60=160
90	80
90-113	80-89
115-137	102.4
139-167	121-149
169	150
180	160

Aquatic fitness in elderly

Mistakes with exercises

. Using non adapted land movements

. Using hands out of the water

. Hands are in the water but they not produce force or body support

. Jumping too much without resistance

. Increasing the velocity of the movement leading to reduced amplitude of the movement often leading to reduced power

. Movement is not adapted for the population, namely elderly and so on…

Specifically for the elderly…

Gerontology:

Interdisciplinary Science that studies old people in general and the processes of aging (Lloret, 1995).

Degenerative process and reduction of some biological, psychological and social functions (Villa e Calvo, 1998).

Geriatrics

Temporal delimitation

Not important!

Chronological age vs. Functional age

Aging

WHAT CHANGES?

Aging

Changes in

- General physical characteristics
- Several biological systems
- Psycho-social behavior
- Physical capacity

Aging

General physical characteristics

Height

Weight (< fat free mass and > fat mass, affecting physical capacity and health)

Reduced function

Higher risk for a cardiac event

Higher risk for bone pathology

Higher morbidity and mortality

Aging
Biological systems

Locomotor system

- ✓ ↗ of articular lesions
- ✓ ↘ velocity and muscular power
- ✓ ↘ force and muscular volume
- ✓ ↘ bone density
- ✓ ↘ articular mobility and flexibility

Aging
Biological systems

Locomotor system

Reduced gait velocity

Reduced step length (15% M, 20% Woman)

Reduced cadence

Reduced hip range of movement

Unilateral support (force and balance)

No motivation

Movement economy

Feet on the ground for more time

Insecure gait pattern

Aging
Biological systems

Cardiovascular system

✓Reduction in cardiac elasticity and contractibility

✓Irregular heart beat

✓ ⇲ of stroke volume and accumulation of lipids in cardiac valves

✓ ⇲ of maximal HR with similar rest HR

✓ stiffness and enlargement of arterial walls and increase in blood pressure

Aging
Biological systems

Cardiovascular System (cont.)

- ✓ slower venous return
- ✓ ↘ of cardiac output
- ✓ ↘ of the efficiency of valves in veins (fluid retention and varicose veins)

Aging
Biological systems

Respiratory system

- ✓ ↘ ventilation amplitude and frequency
- ✓ ↘ vital capacity
- ✓ stiffness of thorax spine and articulations
- ✓ ↘ lungs and bronchial tissue elasticity

Aging

Biological systems

Vision, hearing, touch, smell, taste

- ✓ ↘ depth perception
- ✓ ↘ visual accuracy and visual field
- ✓ ↘ tactile sensitivity
- ✓ lower capacity to adapt to changes in light intensity
- ✓ ↘ accuracy of taste and smell
- ✓ ↑ difficulty in distinguishing between significant sound and noise

Aging

Biological systems

Neuromotor system

- ✓ ↘ number of neurons
- ✓ ↘ information velocity and processing
- ✓ ↘ velocity of stimulus answer
- ✓ ↘ ability to retain information
- ✓ ↘ attention and concentration
- ✓ ↘ speed of learning
- ✓ difficulty in maintaining balance
- ✓ poor posture

Aging
Psycho-social behavior

Financial problems

Isolation

Solitude

Not working

RETIREMENT

Anxiety

Depression

Lower self-esteem and self suficiency

Inactivity

Lower physical and mental health

Aging
Physical capacity

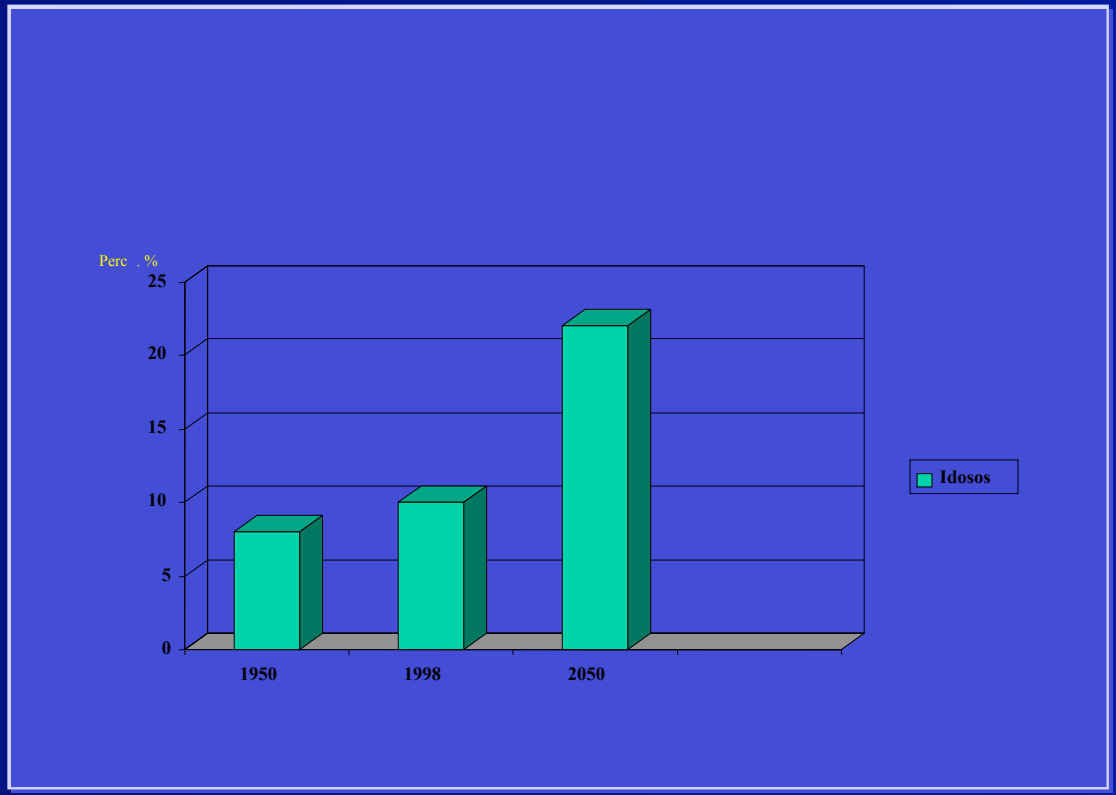
Lower:

- Flexibility
- Aerobic Function
- Anaerobic Function
- Muscular Force
- Coordination
- Balance

Aging

What is the proportion of elderly people in our community?

Estimated increase of elderly people



Increase in the proportion of elderly people

WHY?

Increase… WHY?

- Reduced birth rates
  - Social changes
  - Family planning

- Increase in average life expectancy
  - Medical care
  - Better therapy
  - Improved and earlier diagnostics
  - Prevention

Aging

Long Life
VS
Quality of Life

?

Why physical activity during elderly?

Quality of life
Autonomy

Function
Health

So, ...

What are the benefits of physical activity for the elderly?

Benefits:

Physiological
Psychological
Social

Main physiological benefits of physical activity in elderly

Reduction in risk factors for pathology

cardiovascular

metabolic

osteoarticular

Lower systolic and diastolic pressure
Better lipoprotein profile

Increased bone density
Stronger muscles, ligaments and tendons
Reduced joint degeneration

Weight control
Improved glucose tolerance and lower insulin resistance

Main psychological benefits for physical activity in the elderly

Promotes well-being

Better self-image

Better self confidence and self-esteem

Increased independence

Increased positive mood

Better cognitive function

Main social benefits for physical activity in the elderly

Occupation of free time – work substitute, new interest

Social integration
Better human relationships
Stimulates friendship and socialization
Reduces isolation

Physical Activity with elderly people

Limitations and adaptations

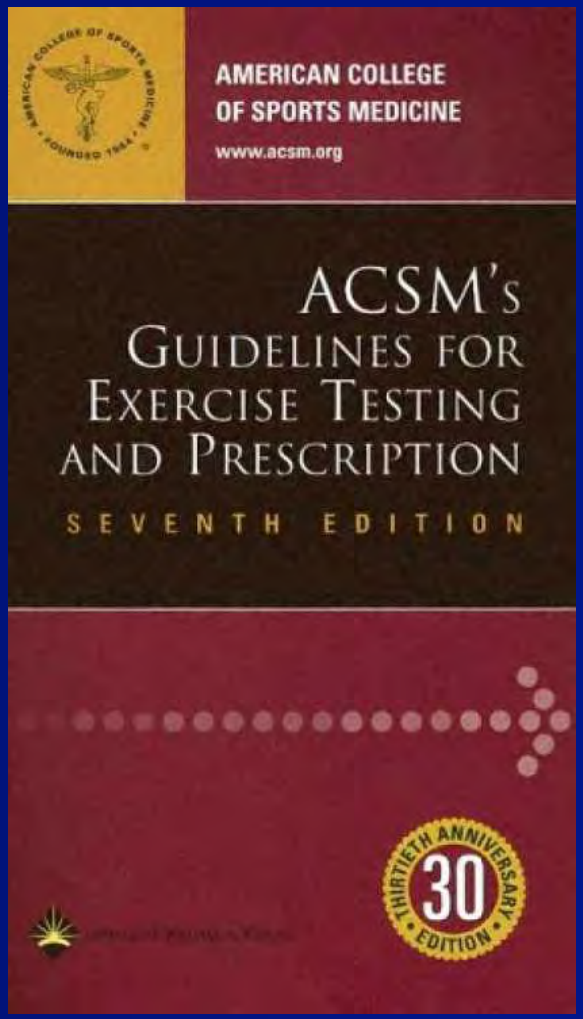
Limitations and adaptations

(Lloret et al., 1995; Sova, 1995)

Pathology		Limitation and or adaptation
Osteoporoses		- Promote exercises with moderate impact and tension (osteogenesis) - In severe cases avoid jumps and choose glide movements - Rising the warm-up time

What about Hydro evidence?

Guidelines



ACSM's Guidelines for Exercise Testing and Prescription (2006)

Reviews and articles

Systematic Review (until 2008)

Author (year)	Subjects	Purpose	Outcomes

59 works (scarce peer revue papers)

2 Reviews:

Reilly et al. (2003) – Deep water running; Tartaruga and Kruel (2006) – Deep water Running applied to sports

Subjects: mainly females; around 50 to 60 years of age

RESEARCH TOPICS

> Analysis of the effects of hydro practice in health-related physical fitness components.

(Hanai et al., 2006; Saavedra et al., 2006;2007;Takeshima et al., 2002)

- muscular strength and endurance (Kruel et al. 2005; Cardoso et al. 2004;Fontes, 2004;Muller et al., 2002; Puhlmann, et al., 2002;Taunton et al., 1996)
- Flexibility (Puhlmann, et al., 2002;Taunton et al., 1996)
- Body composition (Melo, 2004;Gubiani, 2001)
- Cardiovascular endurance (Taunton et al., 1996;Kaneda et al., 2008;Bedford et al.,1996; Pariser et al., 2006; Pereira, 1999; Cassady et al., 1992)

RESEARCH TOPICS

Aerobic performance parameters:

- Oxygen Consumption (VO_2) (Pariser et al., 2006; Cassady et al., 1992;Kosonen et al., 2006; Nagle et al.,2007;Ono et al., 2006; Pinto et al., 2006; 2007; Silvers et al., 2007;Pohl, et al., 2003)
- Maximal Oxygen Consumption (VO_2max) (Saavedra, et al., 2006;2007;Bedford, et al., 1996; Pereira, 1999)
- Breathing frequency (Silvers et al., 2007;Scartoni, 1998)

RESEARCH TOPICS

- Anaerobic performance parameters:

- Blood Lactate (Kosonen et al., 2006; Barbosa et al., 2007;Benelli, et al., 2004;Colado, et al., 2006;Costa, et al., 2008; Nakanishi, et al., 1999; Silvers, et al., 2008;Svedehag, et al., 1992; Gonçalves, 2008a;2008b)

Just one study had as purpose to analyze anaerobic parameters

- Increases in anaerobic capacity appear to have only been described for competitive sports, as swimming and athletics

Although….

- The intensity of aquatic fitness classes that often use continuous or interval training could produce a bigger increase in anaerobic metabolism.

Thanks!

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