Aquatic Therapy in Multiple Sclerosis

Urs N. Gamper, PT

September 21th, 2013

Preceptorship on rehabilitation in multiple sclerosis 2013

urs.gamper@kliniken-valens.ch

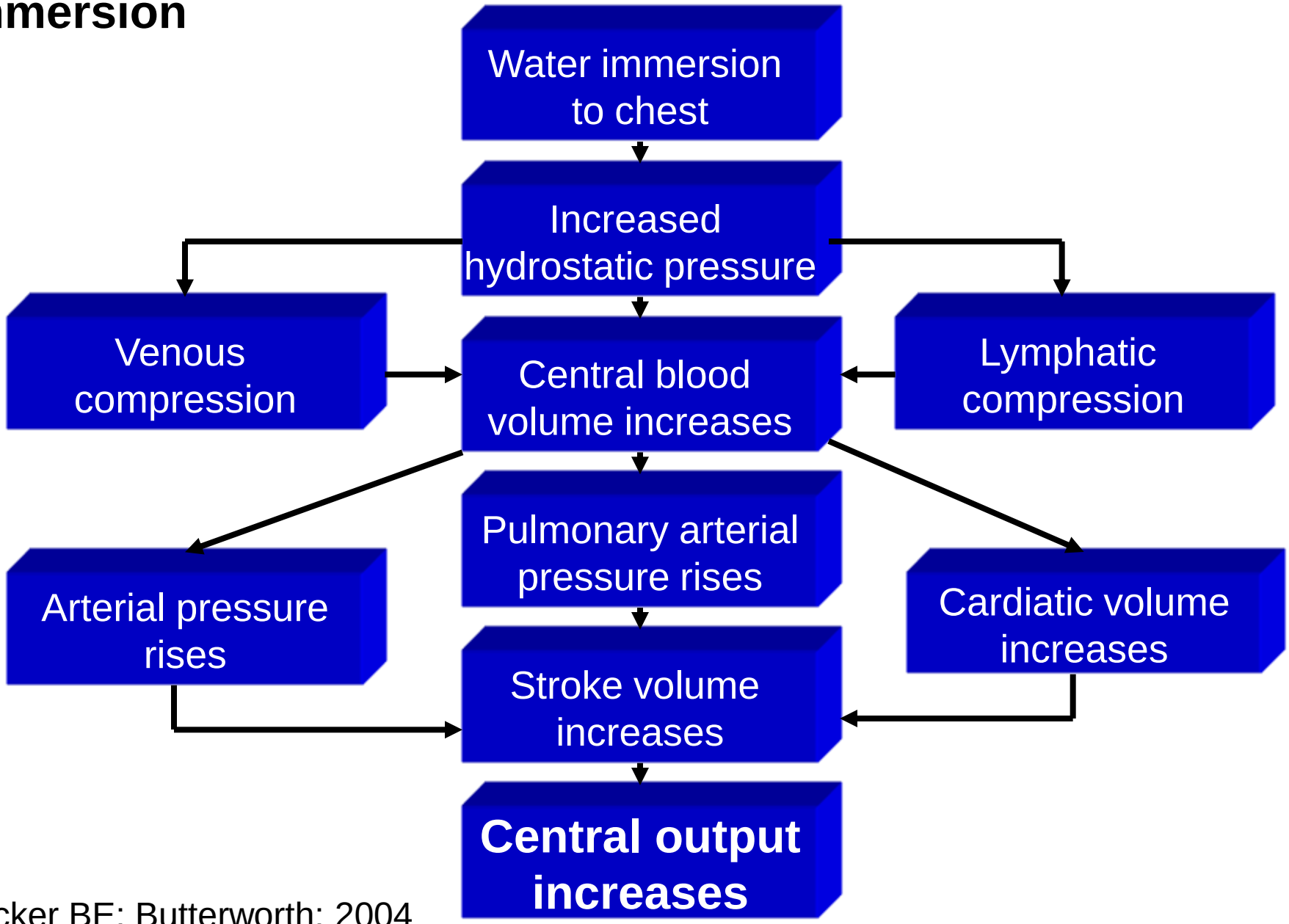
Contents

KLINIKEN VALENS

- Effects of immersion
  - Cardiatic system
  - Pulmonal system
  - Renal system
  - Nervous system
  - Muscle system
- Legitimation of aquatic therapy
- Aquatic physical therapy concepts
- Evidence based practice
- Conclusion

Cardio-vascular changes during immersion

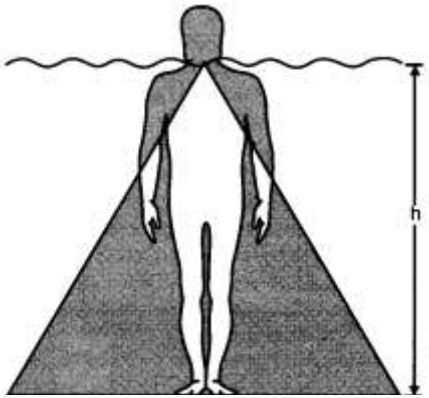
KLINIKEN VALENS



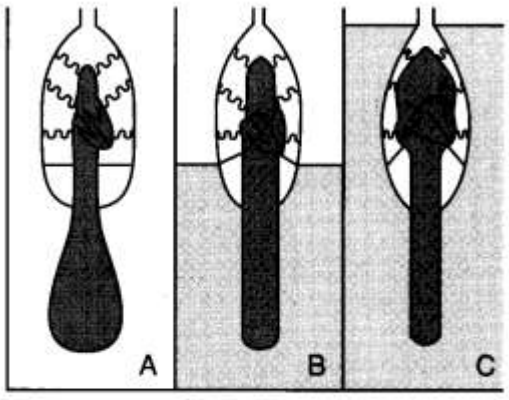
Becker BE; Butterworth: 2004

Cardio-vascular work on immersion

KLINIKEN VALENS



Hydrostatic pressure



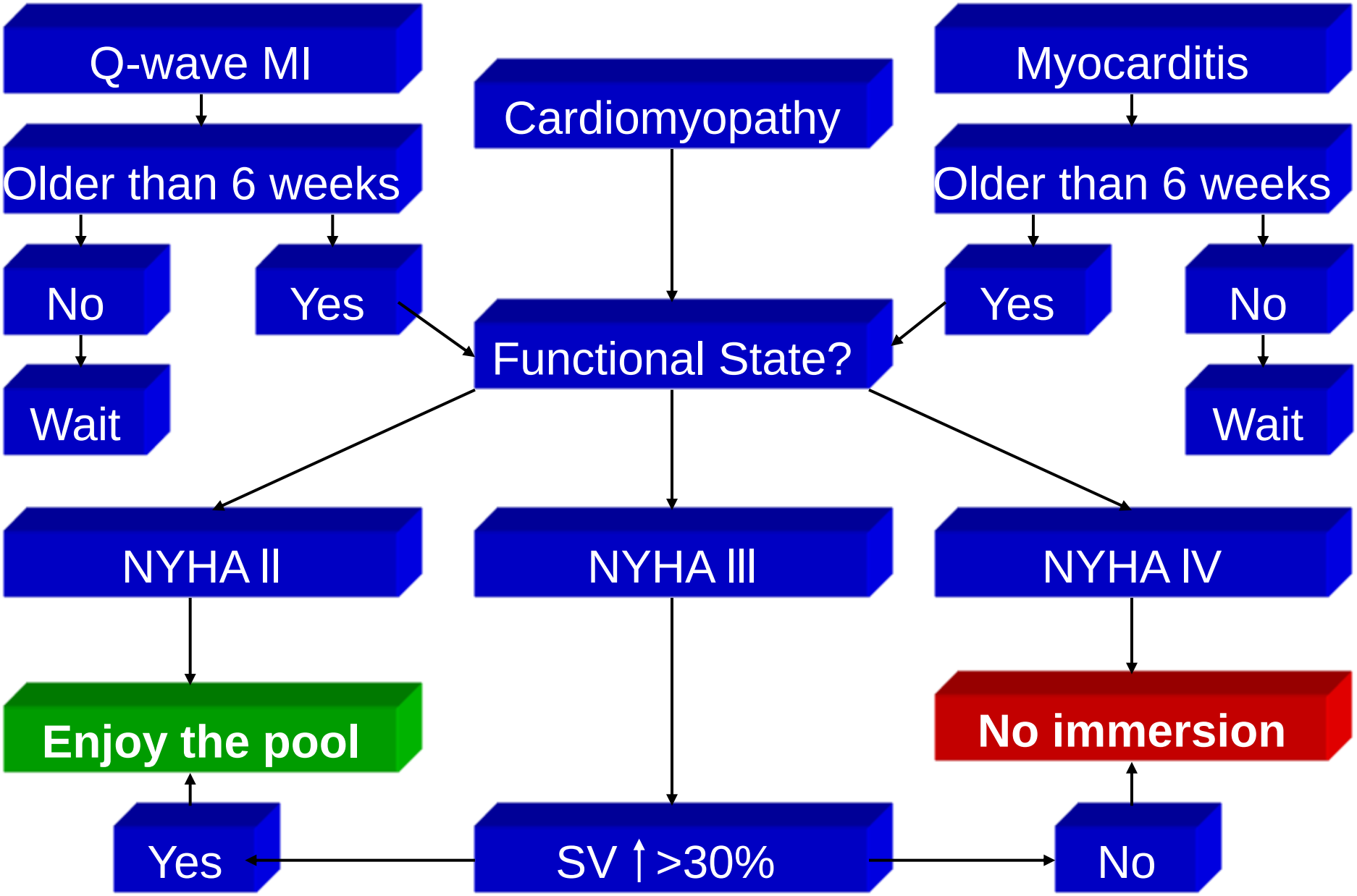
Central blood volume↑

Stroke volume increase
(Starlings‘s law)

Head-out water immersion increase stroke volume from 71 to 100 ml/beat
Aborelius M Jr et al: Aerpsp Med, 1972

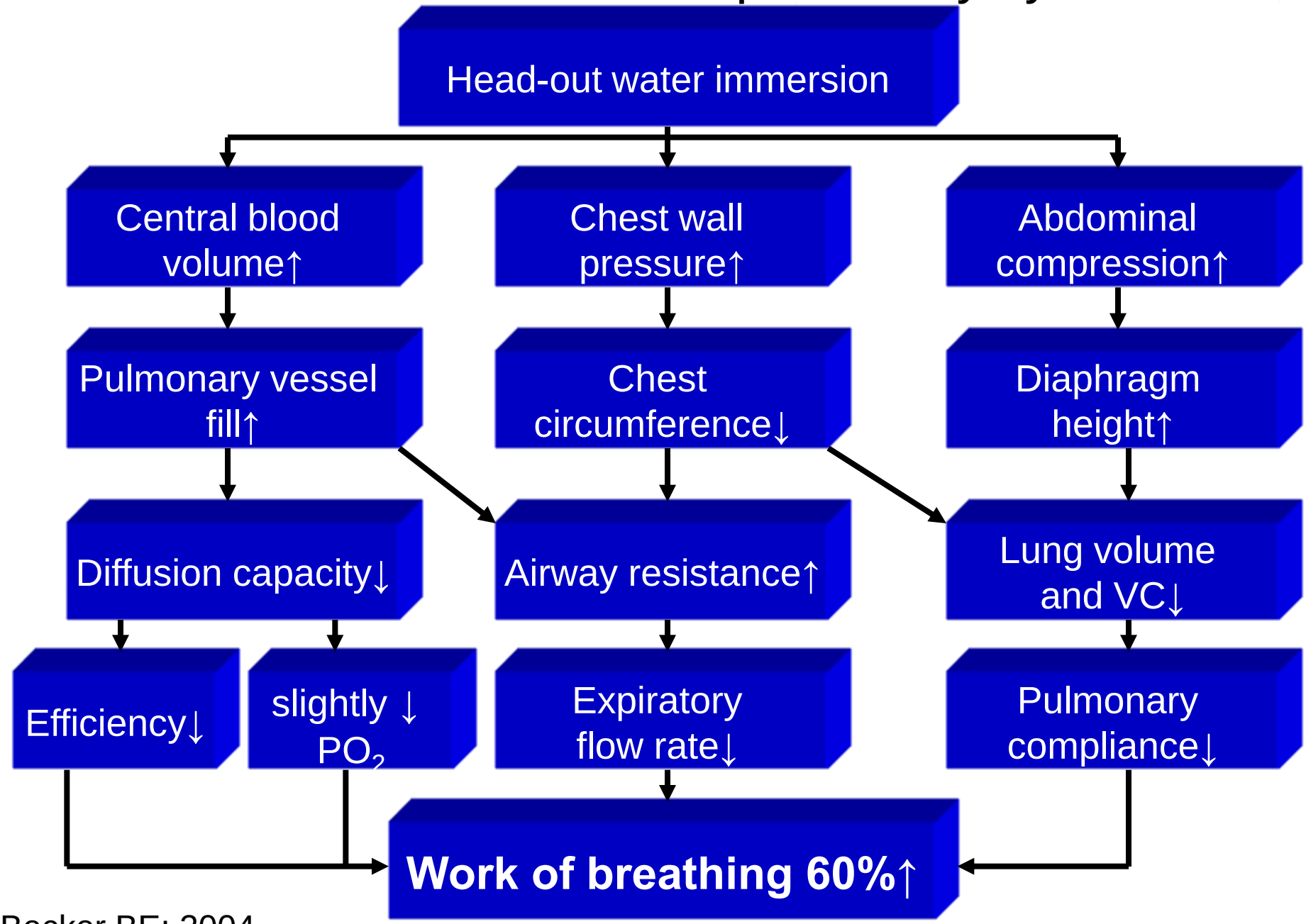
Exercise maximum for sedentary individuals
Schlant RC in The Heart, 1986

Clinical Algorithm for Aquatic Activity by Heart failure



Becker BE: 2010 adapted from Meyer K et al: 2008

Effects of immersion on pulmonary system

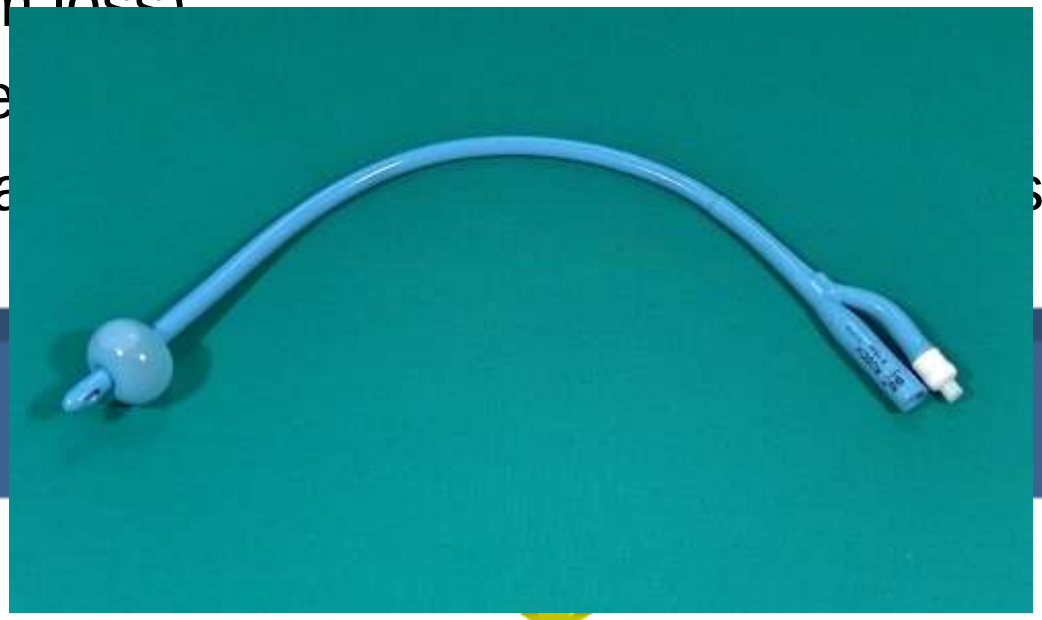


Becker BE; 2004

Renal function during immersion

KLINIKEN VALENS

- Suppression of aldosterone by 35% after 3 hours (sodium loss)
- ADH re
- Renin a



Rest room for incontinent patients before pool treatment

Tajima F et al:1988, Eppstein M: 1992

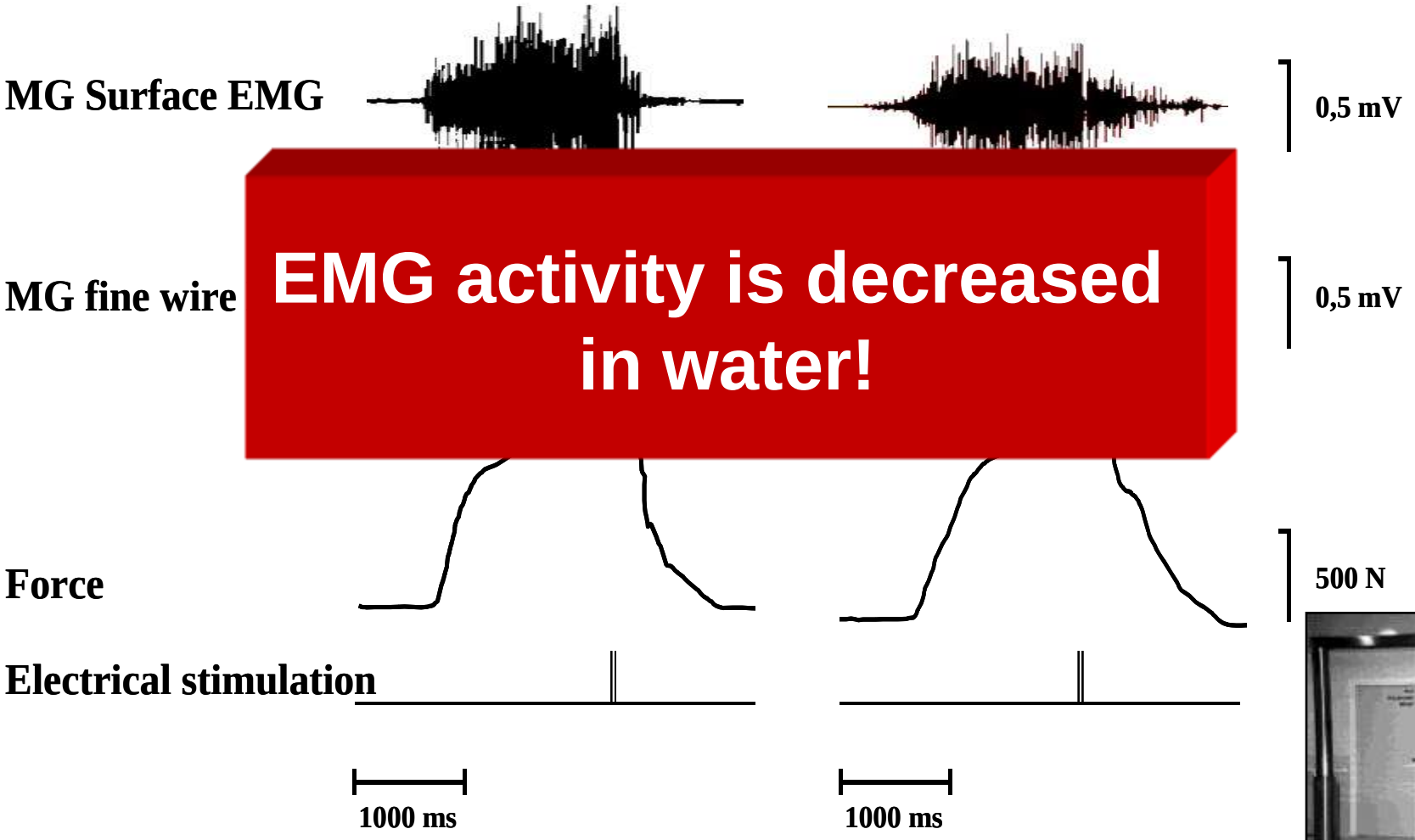
KLINIKEN VALENS

Effect on nervous system

- Immersion, temperature and turbulence increases pain threshold (Juve Meeker: 1998)
- Immersion suppresses sympathetic nervous system activity (Hildenbrand et al: 2010)
- Immersion increases plasma dopamin and has positive effects on mood (Krishna et al: 1983)

EMG activity and force reproduction on quadriceps muscle

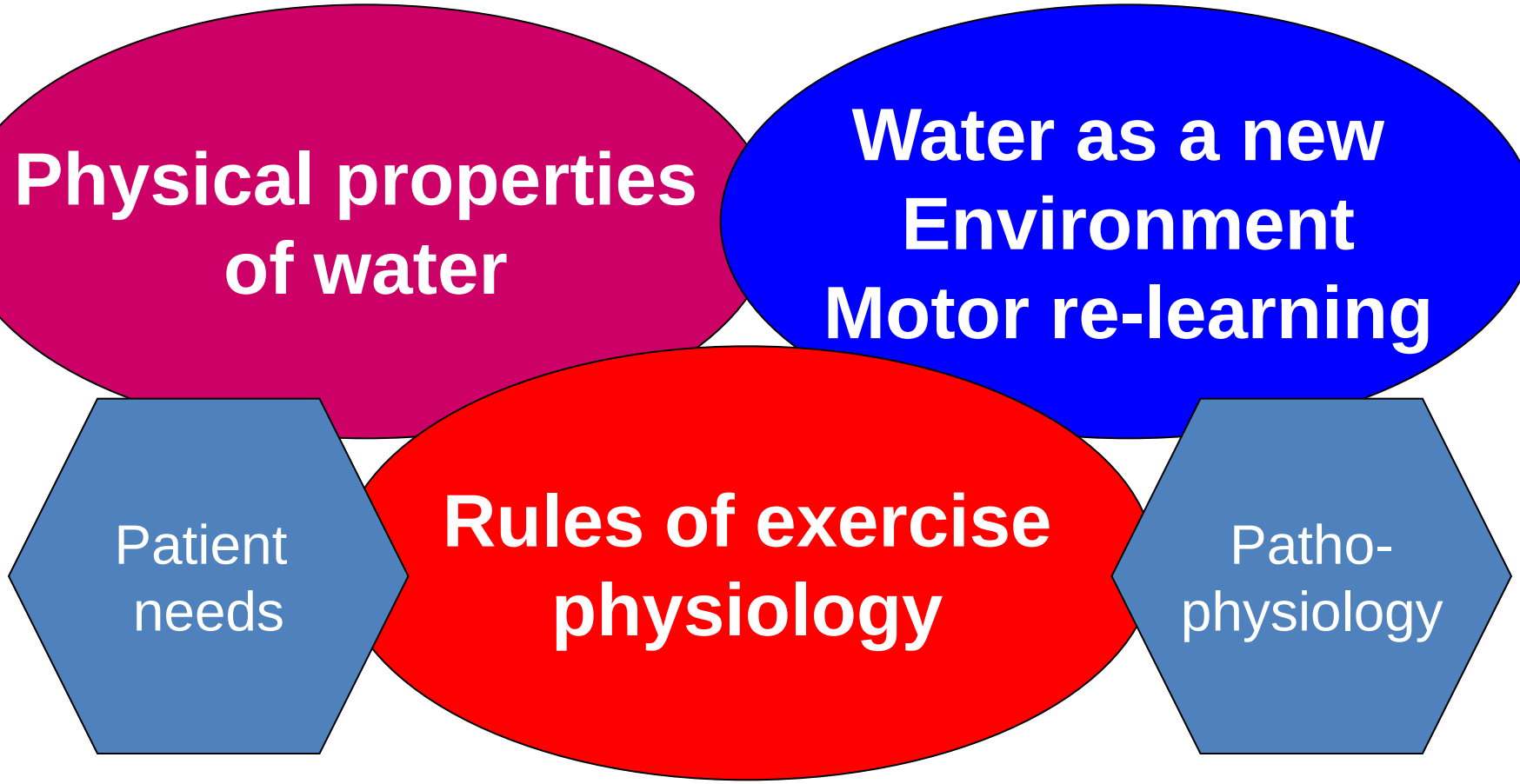
KLINIKEN VALENS



Pöyhönen T: 2008

KLINIKEN VALENS

Hydrotherapy



Physical properties of water

KLINIKEN VALENS

- Buoyancy
- Hydrostatic Pressure
- Viscosity
- Waves
- Turbulences
- Warmth (cold)

Water temperature in thermo sensitive and “normal” patients

KLINIKEN VALENS

Thermo sensitive patients

Treatment in cool water when possible

- 28-30˚ C motor re-learning
- 24-28˚ C aerobic and strengthen exercises

“Normal” patients

- Thermo indifferent water 32-34˚ C motor re-learning
- 28-32˚ C aerobic and strengthening exercises

Water as a new Environment Motor re-learning

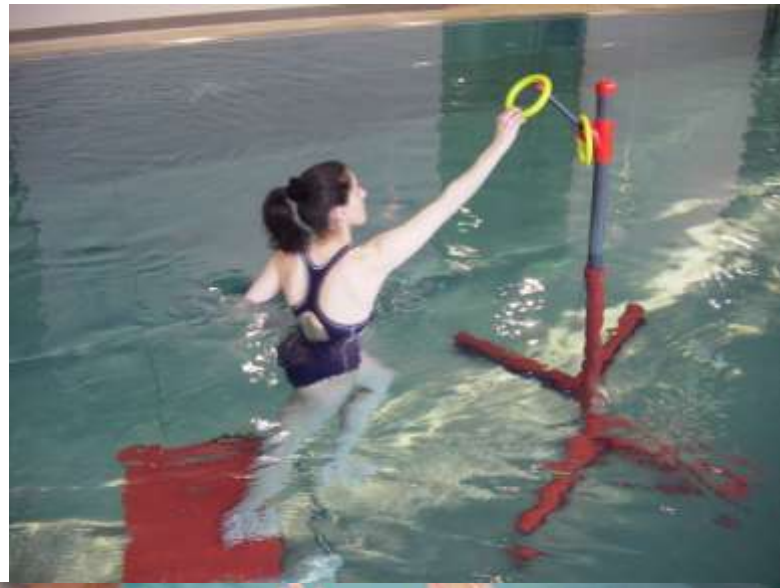
KLINIKEN VALENS

- Problem solving strategy
  - Forced use
  - Trial and error
  - Different compensation strategy in comparison to dry land
- Balance reactions (strategy and time)
- Different sensory input
- No risk to fall

Water as a environment for problem solving

KLINIKEN VALENS

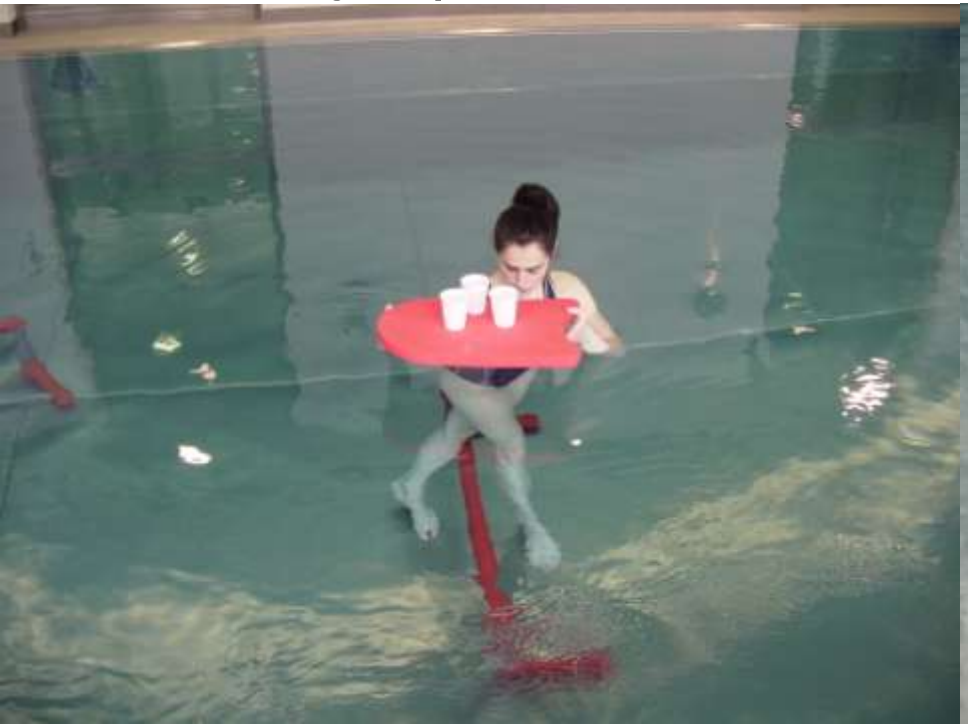
- Water provides “thinking time”
- The body knows how to move
- Water needs new movement strategies
- Single and multiple tasks



Water as an enriched environment for motor re-learning

KLINIKEN VALENS

- Problem solving: balance reactions
- Involuntary / voluntary treatment
- Constraint induced treatment
- Core stability
- Active relaxation
- Sensory input



KLINIKEN VALENS

Rules of exercise physiology

- Load
- Repetition
- Relation between work and break time
- Closed chain to open chain
- Kind of muscle contraction
  - Isometric – isotonic concentric – isotonic eccentric
- Mechanical load-capacity

Take home message

KLINIKEN VALENS

- For sedentary people, immersion has a training effect for the cardiac and pulmonary system.
- Immersion has a positive effect on the mood
- Urinary incontinence is not a contraindication to aquatic therapy.
- Aquatic therapy for PwMS should be done in temperature from 28° to 34° C.
- The advantage of pool balance exercises ➔ no risk to fall.
- The advantage of motor re-learning exercises is “thinking time” and forced use.
- There is some evidence for the effectiveness of aquatic therapy in PwMS.