



An internet-based at home training protocol enhances muscle strength and lung function in multiple sclerosis patients

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Multiple sclerosis & exercise

background

Materials &
methods
ms-intakt

Results:
preliminary
analysis

conclusions

- There is evidence for the effect of exercise but:
 - only few high quality randomized controlled trials
 - Small and heterogeneous study samples
 - Few long-term interventions (more than 3 months)
- Underlying problems:
 - Diversity of disease symptoms
 - Dependency of the intervention to one clinic/study center

Advantages of an internet intervention

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- Distribution
 - Not tied to a certain area => large-scale usage
 - Economic => long-term usage
- Training
 - Individual exercise prescription
 - Standardizable training progression
 - Comprehensive and automatic documentation of exercise intensity, duration, frequency
- long-term commitment and motivation
 - Continuous communication (Email, phone, social media)
 - Regular provision of information and motivational boosters
- Internetbased interventions to increase physical activity levels have shown good results in MS patients (Motl, Dlugonski et al. 2010)

Study goals

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To assess the feasibility and effectiveness of an internet-based at home physical training protocol (e-Training) in fully ambulatory MS patients.

Outcomes:

1. Quality of life

HAQUAMS

(Gold et al. 2001)

2. Fatigue

WEIMuS

(Flachenecker 2006)

3. Muscle strength

isometr. max.

(Schnell M3 Diagnos)

4. Aerobic capacity

VO₂^{peak}

(bicycle spiroergometry)

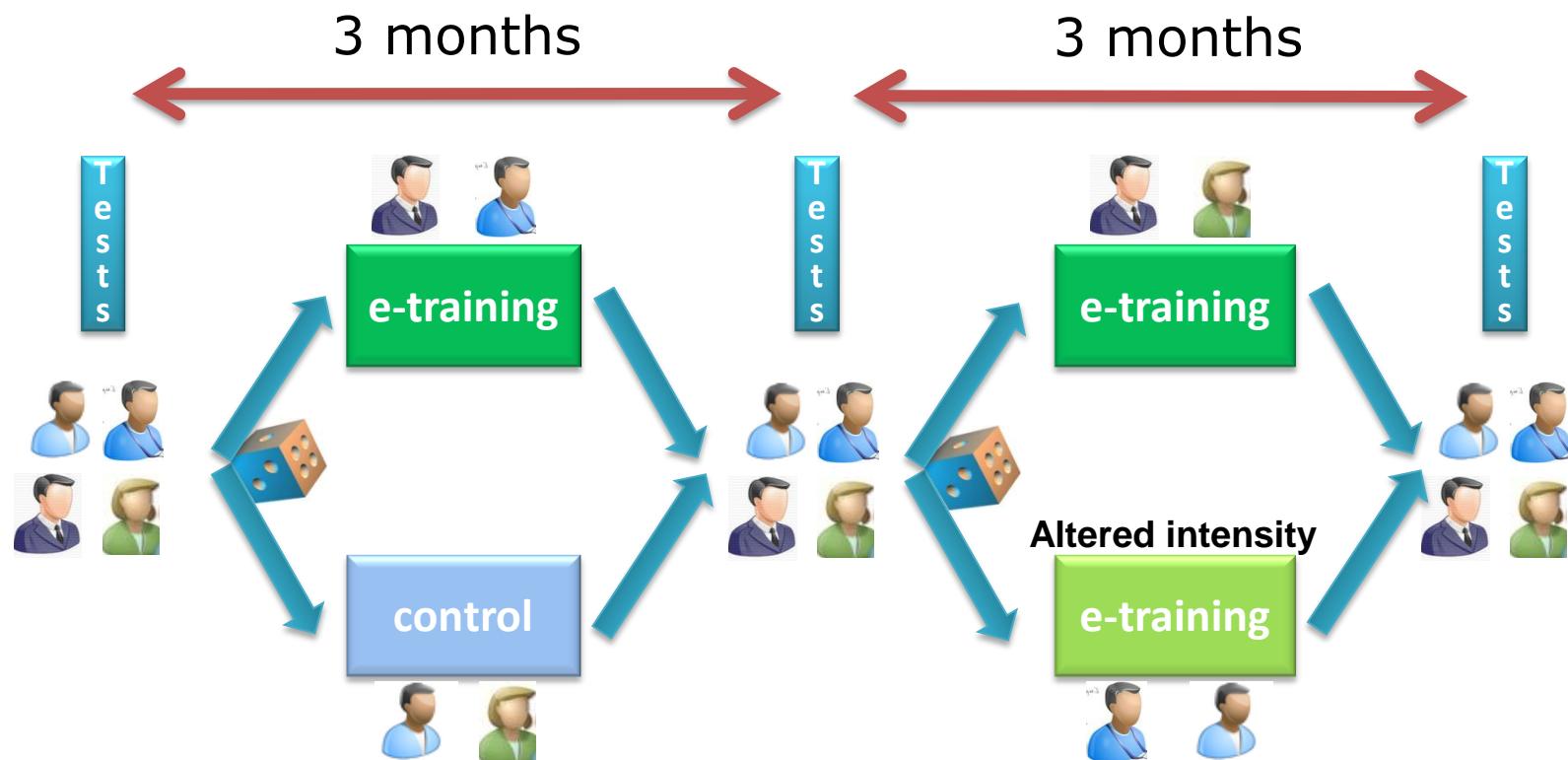
5. Lung function

PEF, FVC

(Spirometry)

Study design

- Randomised, controlled, waiting group design
- Study duration: 9/2009 until 3/2012
- 2 study centres: Erlangen, Bad Mergentheim





Intervention: home-based exercise

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- Introductory group session
 - Basic & disease-specific exercise information
- Strength exercises
 - 2 sessions per week, home-based, 5-8 exercises
 - Equipment: elastic bands, Gymball
- Aerobic exercise
 - 1x per week, type of activity selectable
- Physical activity diary
 - Scheduling and documentation of all exercise sessions and activities



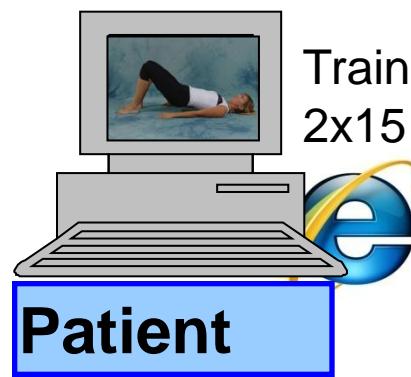
Internet administration of strength training

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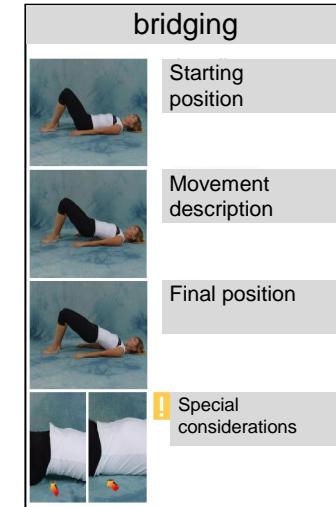
results

conclusions



Training
2x15 reps

Documentation



Rate of perceived exertion



Training supervision

Intensity

Easier/more demanding exercise



Results

- Intervention finished June 2011
- Sample size: 126 pwMS
(m:32, f:94)
- age: $40,8 \pm 9,9$
- disease duration:
 $9,5 \pm 8,2$
- Statistics: 3 months data,
intervention vs. control

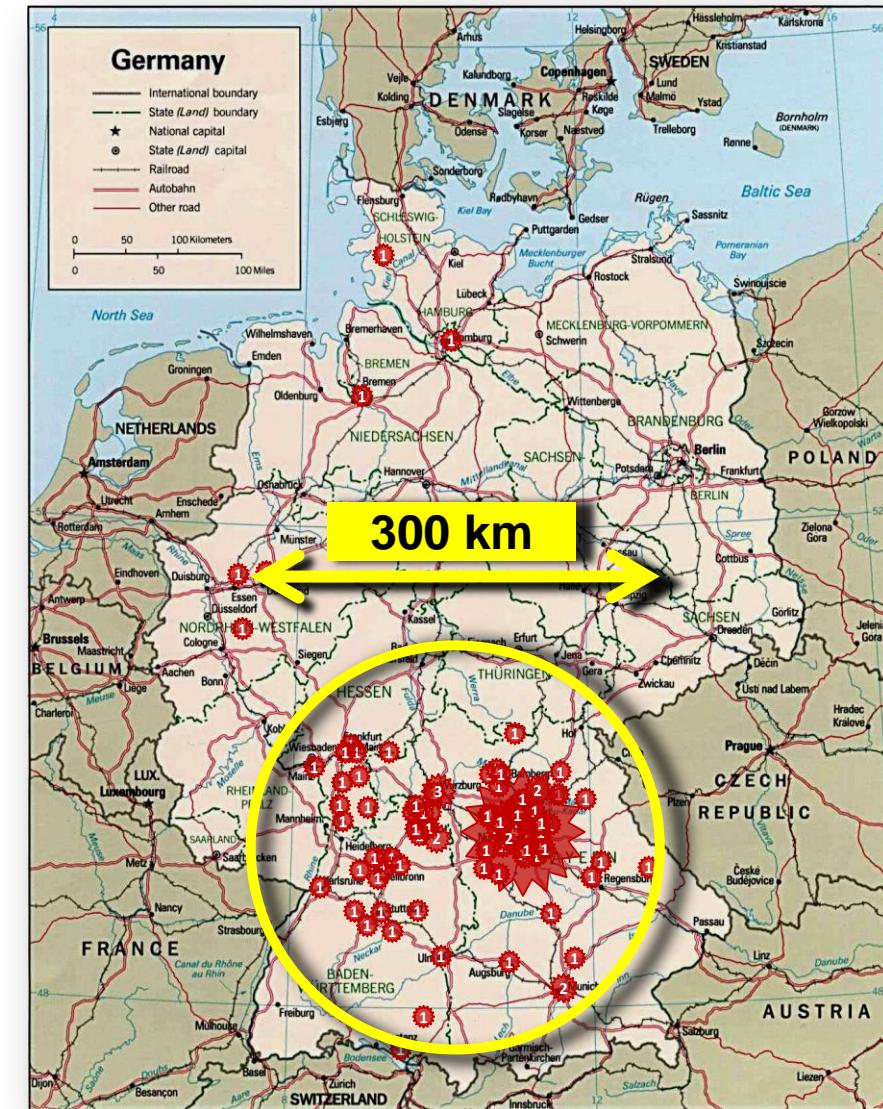
MANOVA: time*group,
post-hoc (Bonferroni)

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Compliance and dropout

- Compliance

- 3529 training sessions ($\approx 1,8$ per part. per week)
- 20885 documented exercises ($\approx 5,9$ per session)
- 8387 physical activity diary entries ($\approx 3,8$ per week)

- Dropouts

- After 3 months: 19 (15%);
after 6 months: 48 (38%)
- 23 in intervention,
25 in control group

Reasons for dropout	n
illness / injury (not related to intervention)	12
Disease activity / relapse	10
Lack of motivation / compliance	10
Familiar reasons, stressful live events	8
Cognitive / psychological reasons	3
Appointment for assessment not feasible	4
pregnancy	1

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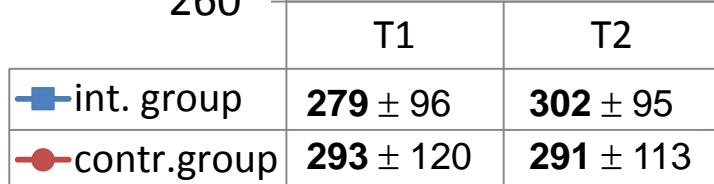
Results:
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conclusions

Results – muscle force

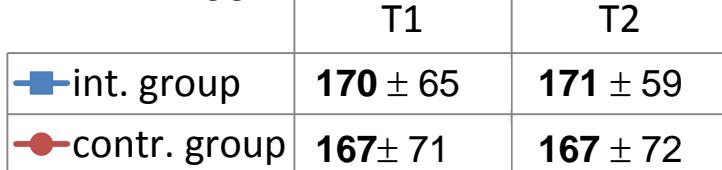
Maximum
isometric force
(Nm)

knee extension



p=.012

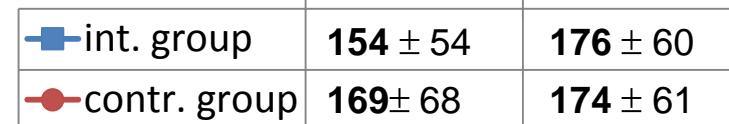
Maximum
isometric force
(Nm)
trunk
extension



p=.894

Maximum
isometric force
(Nm)

knee flexion



p=.007

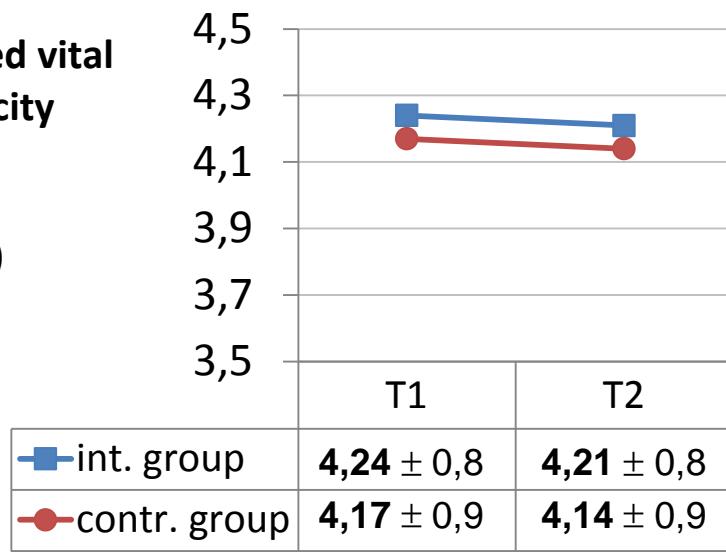
p=.512

Maximum
isometric force
(Nm)
Trunk
flexion



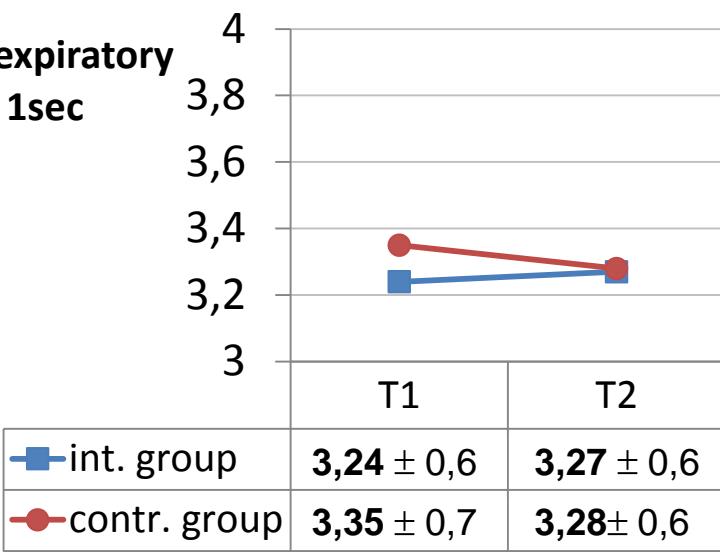
Results – lung function, aerobic capacity

Forced vital capacity
FVC
(liter)



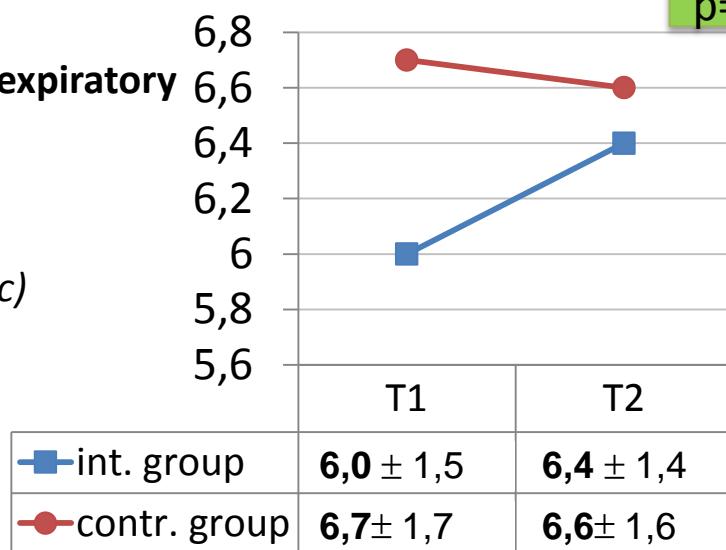
p=.916

Forced expiratory volume 1sec
FEV1
(liter)



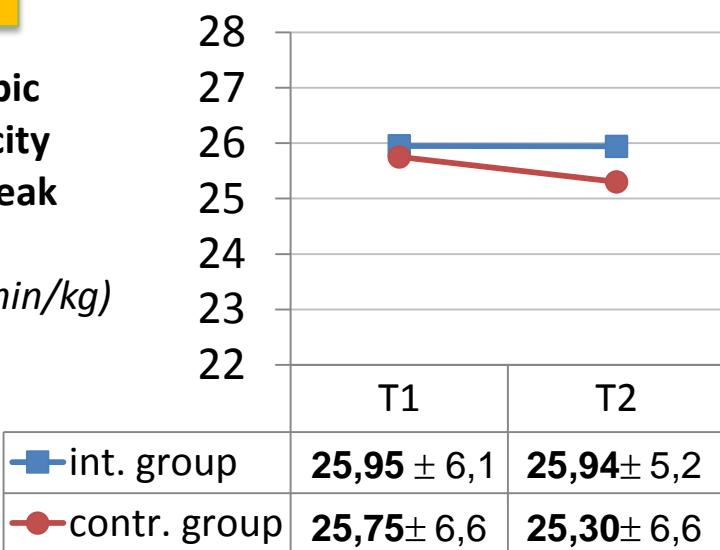
p=.055

Peak expiratory flow
PEF
(l / sec)

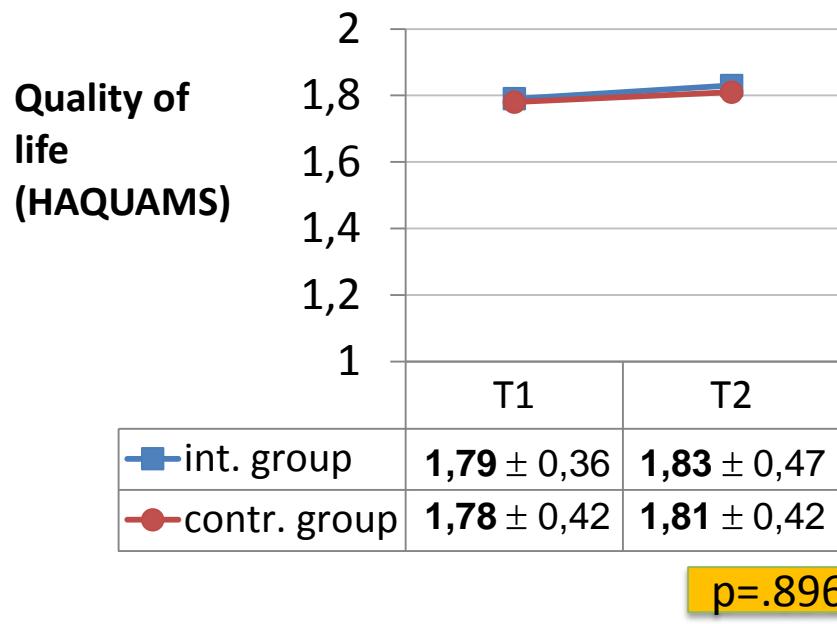


p=.035

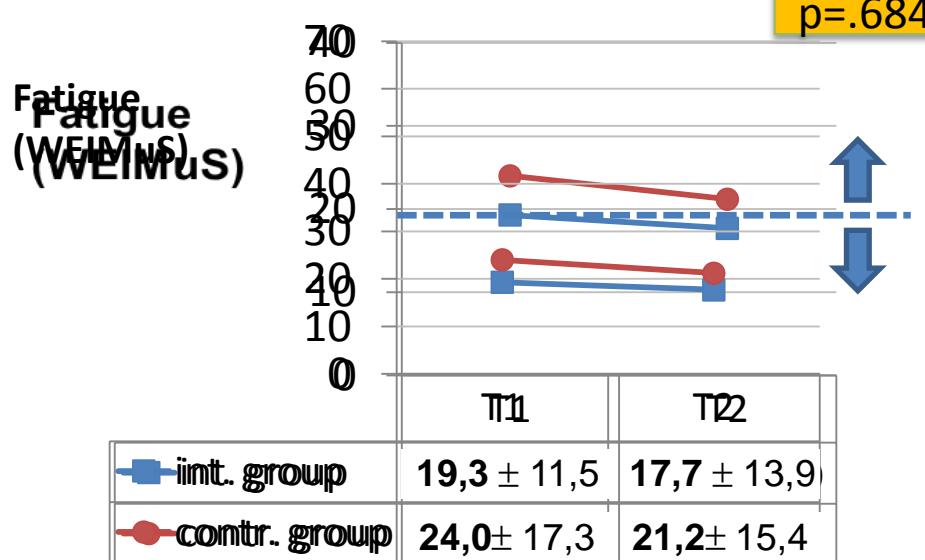
Aerobic capacity
VO₂peak
(ml/min/kg)



Subjective outcomes: quality of life, Fatigue



- Motl 2008: effects on quality of life yielded in...
 - group interventions
 - endurance training interventions=> once a week not enough?



- WEIMuS-Score max. 68;
Cut-off for Fatigue: 32!



Take-away message



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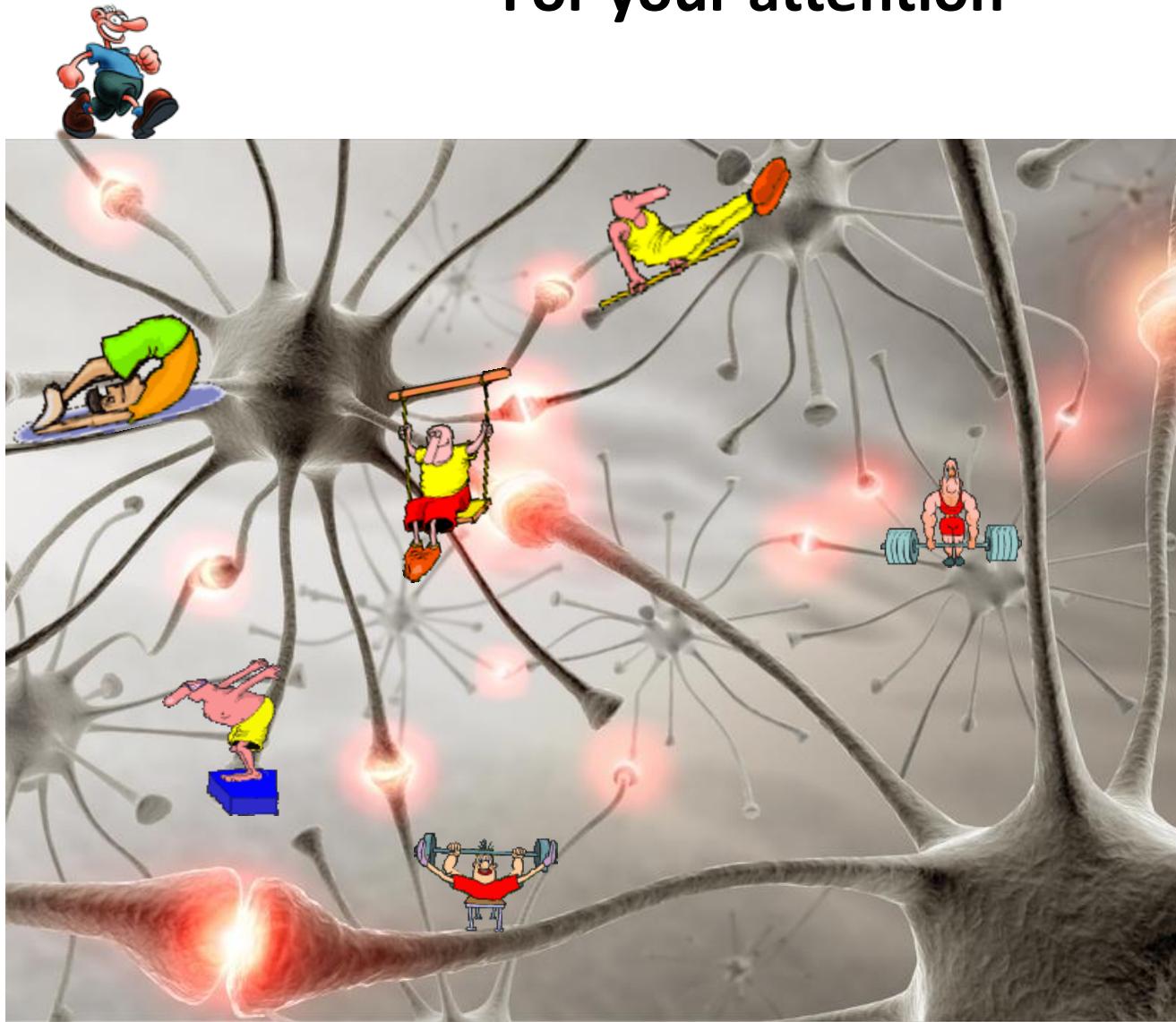
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- Internet-administered training in MS patients
 - is feasible
 - is effective concerning proximal, physiological exercise effects
 - is economical
 - is standardizable
 - is well accepted by patients
- BUT: we need more studies to clarify missing global effects on fatigue and quality of life. We should...
 - ...include more fatigued pwMS
 - ...more severely affected pwMS
 - ...put more emphasis on endurance training
 - ...make use of social media potential of the internet
- **Conclusion:**
Internet-administered training may be suitable for large-scale usage in rehabilitation and aftercare!

Thank you

For your attention



Running projects: e-Training { Strength Endurance Physical activity } vs. Fatigue



PACE Physical activity in

Gilenya treated patients
intervention start: March 2012
at the time: 33 study centres

Recruitment goal: 220 pwMS

⇒ Face-to face introductory seminars



Bayer HealthCare
Bayer Vital

Fatigue-Exercise-Study FatEx

intervention start: May 2012

at the time: 12 study centres

Recruitment goal: 120 pwMS

⇒ online introductory seminars

