Bridging Science and Therapy: From Neurobiology to Rehabilitation

Key Scientific Contributions by Our Team

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Rest or load?

Fatigue

LIMITATION OF LOAD

Subjective symptom – it is not possible to quantify

Chronic - can bring some relevant information?

Inactivity has negative impact

- Physiological fatigue
- Neuromuscular fatigue

x

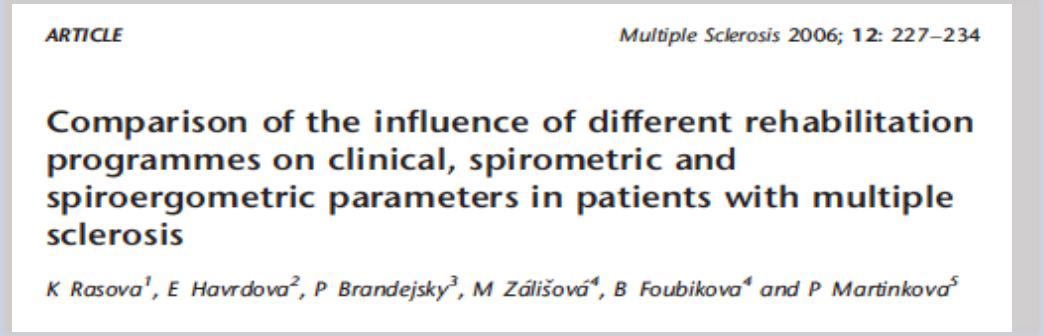
- Fatigue accompany depression
- Tiredness

An effect of therapy

Physiotherapy is effective

Tiredness is possible to treat

Aerobic training is safety



ARTICLE Multiple Sclerosis 2006; 12: 227–234

Comparison of the influence of different rehabilitation programmes on clinical, spirometric and spiroergometric parameters in patients with multiple sclerosis

K Rasova[1], E Havrdova[2], P Brandejsky[3], M Zálišová[4], B Foubikova[4] and P Martinkova[5]

The best poster ECTRIMS 2001

1 x D1
4 x Q1
2 x Q2

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People with newly diagnosed multiple sclerosis benefit from a complex preventative intervention—a single group prospective study with follow up

Natália Hrušková[1], Kateřina Berchová Bímová[2], Angela Davies Smith[3], Tereza Škodová[4], Marie Bičíková[4], Lucie Kolátorová[4], Ivana Štětkářová[5], Ľuba Brožek[6], Alena Javůrková[1], Gabriela Angelová[1] and Kamila Řasová[1]*

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TABLE 2 Changes at post intervention and at follow-up.

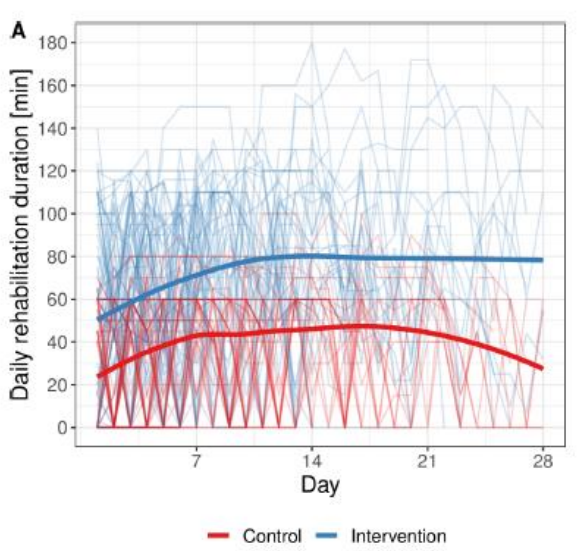
Questionnaires	M1	M1 → M2	Wilcoxon test	M1 → M3	Wilcoxon test
	Mean	Mean change	*p* value	Mean change	*p* value
SWLS	24 (35)	1	ns	2	0.007
BDI	7 (0)	0	ns	-1	ns
MSAQ	96 (140)	1	ns	-2	ns
MFIS	26 (0)	2	ns	−6	0.035
FSMC	65 (20)	−8	0.035	−9	0.007
Spirometric and spiroergometric parameters	M1	M1 → M2	Wilcoxon test	M1 → M3	Wilcoxon test
	Median (the best value)	Median change	*p* value	Median change	*p* value
VC	4.18 (102%)	−0.05	ns	−0.16	ns
R max	1.04 (93%)	−0.02	ns	0	ns
VO_2 max/kg	29.4 (100%)	−1.3	ns	−2.2	ns
VO_2 max/TF	13.3 (123%)	−0.1	ns	−1.6	ns
VE max/Kg	0.99 (86%)	0.14	ns	0.22	ns
Wmax	127.5 (67%)	−2.5	ns	−7.5	ns
Steroids and neuroactive steroids	M1	M1 → M2	Wilcoxon test	M1 → M3	Wilcoxon test
	Median	Median change	*p* value	Median change	*p* value
Cortisol (nmol/L)	499.16	18.12	ns	−38.09	ns
Cortisone (nmol/L)	98.15	14.32	ns	14.84	ns
DHEA (nmol/L)	15.51	0.31	ns	2.64	ns
7β-OH-DHEA (nmol/L)	0.44	0.02	ns	0.09	ns
7-oxo-DHEA (nmol/L)	0.08	0.05	0.0638	0.08	ns

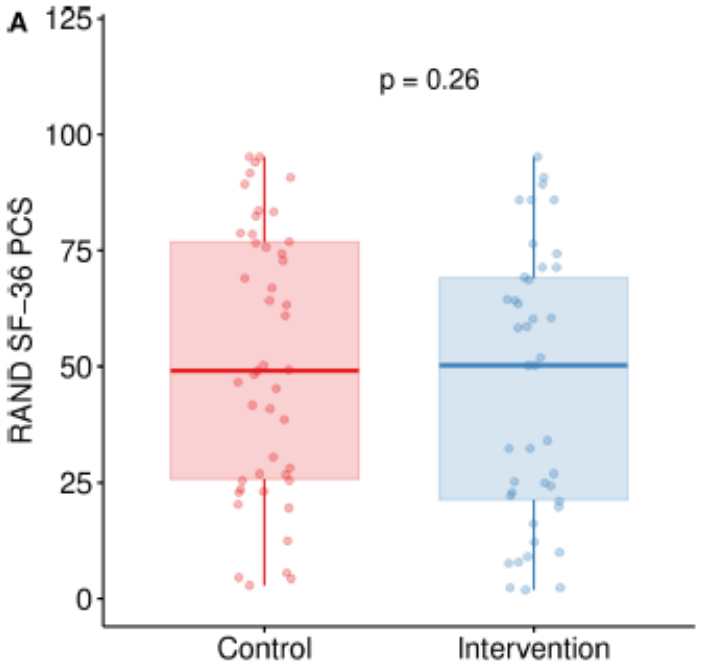
M, Measure; SWLS, Satisfaction with life scale; BDI, Beck depression inventory; MSAQ, Multiple sclerosis acceptance questionnaire; MFIS, Modified fatigue impact scale; FSMC, Fatigue scale for motor and cognitive functions; VC, Vital capacity; Rmax, Maximal respiratory exchange ratio; VO_2max/kg, Maximal oxygen uptake; VO_2max/TF, Maximal oxygen pulse; VEmax/kg, Maximal pulmonary ventilation; Wmax, Maximal muscle performance; DHEA, Dehydroepiandrosterone; 7β-OH-DHEA, 7β-hydroxy-dehydroepiandrosterone; and 7-oxo-DHEA, 7-keto-dehydroepiandrosterone.

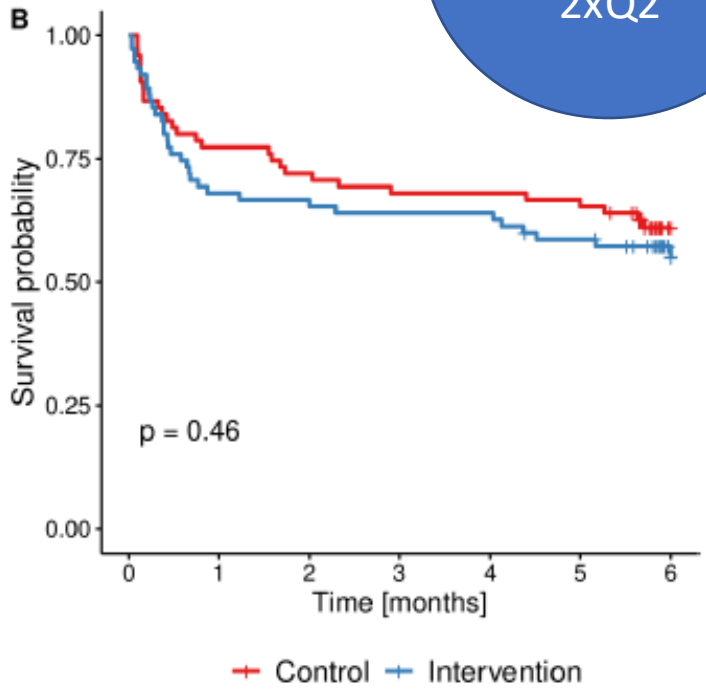
Original research

Functional electrical stimulation-assisted cycle ergometry-based progressive mobility programme for mechanically ventilated patients: randomised controlled trial with 6 months follow-up

Petr Waldauf,[1] Natália Hrušková,[2] Barbora Blahutova ,[1] Jan Gojda,[3] Tomáš Urban,[1] Adéla Krajčová,[1] Michal Fric,[1] Kateřina Jiroutková,[1] Kamila Řasová,[2] František Duška [1]

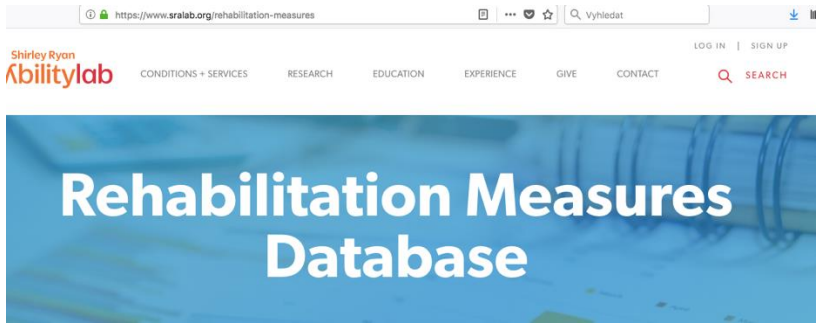


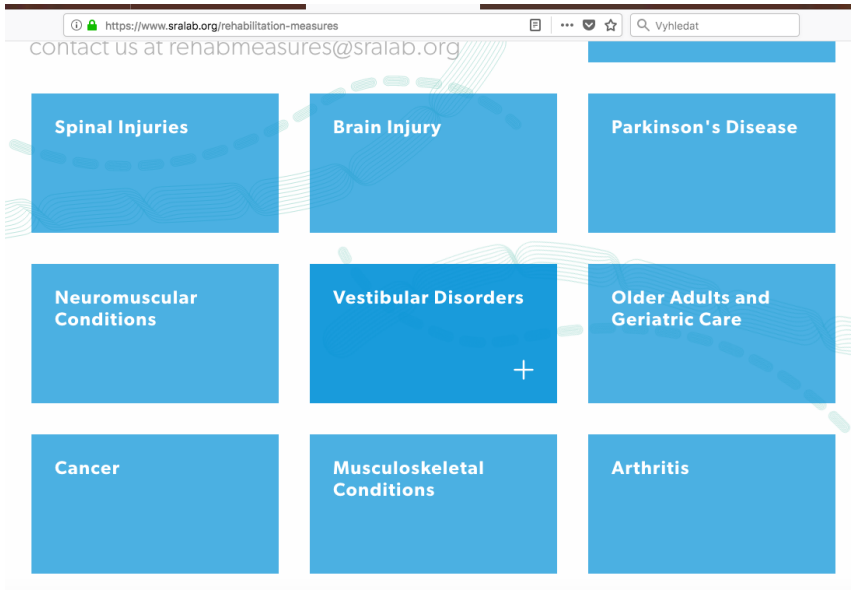




1xQ1, IF: 9.139/2020
2xQ2

Selection of the appropriate assessment





https://www.sralab.org/rehabilitation-measures

https://www.healthmeasures.net/search-view-measures

Psychometric properties of clinical tests

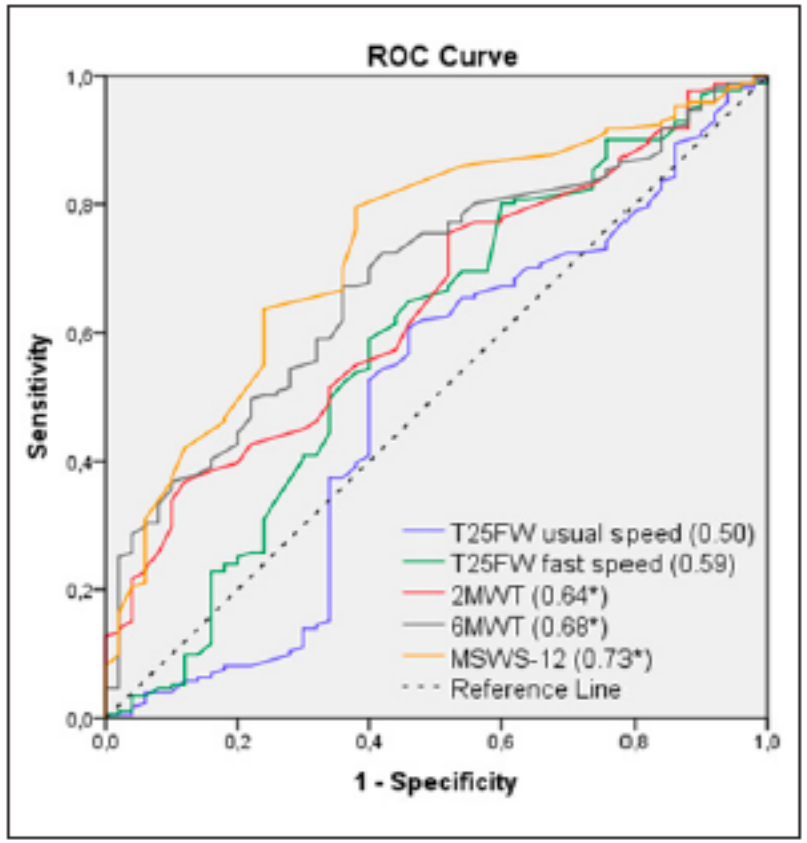


Figure 1. Receiver operating characteristic curves (ROCs) and the areas under the ROC (AUCs) of walking measures from the patients' perspective for the "whole" group.
Abbreviations: T25FW, Timed 25-Foot Walk; 2MWT, 2-Minute Walk Test; 6MWT, 6-Minute Walk Test; MSWS-12, Multiple Sclerosis Walking Scale–12.
*P < .05 for AUC values.

D1
IF:
8.689/2018

120 citations

3 x D1
1 x Q1
2 x Q2

ARTICLE

Responsiveness and meaningful improvement of mobility measures following MS rehabilitation

Ilse Baert, PT, PhD, Tori Smedal, PT, PhD, Alon Kalron, PT, PhD, Kamila Rasova, PT, PhD, Adnan Heric-Mansrud, PT, MSc, Rainer Ehling, MD, Iratxe Elorriaga Minguez, PT, Una Nedeljkovic, MD, Andrea Tacchino, PhD, Peter Hellinckx, PT, Greet Adriaenssens, PT, Gosia Stachowiak, PT, Klaus Gusowski, PT, Davide Cattaneo, PT, PhD, Sophie Borgers, PT, Jeffrey Hebert, PT, PhD, Ulrik Dalgas, MSc, PhD, and Peter Feys, PT, PhD

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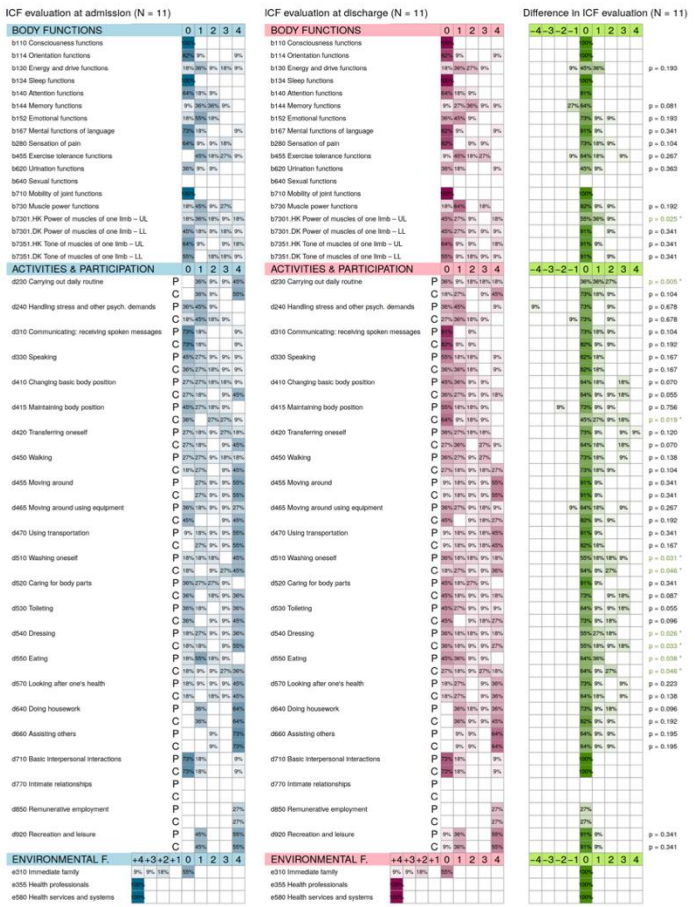
Table 3 Distribution of global rating of change scale from patient's and therapist's perspective on functional mobility

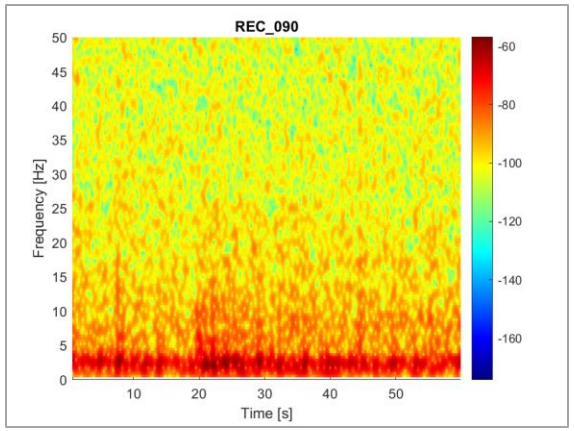
	Perspective from patient, n (%)	Perspective from therapist, n (%)
Very much worse	0 (0)	0 (0)
Much worse	3 (1.6)	2 (1.1)
Minimally worse	4 (2.1)	3 (1.6)
No change	33 (17.3)	29 (15.2)
Minimally improved	70 (36.7)	102 (53.4)
Much improved	66 (34.6)	45 (23.6)
Very much improved	8 (4.2)	8 (4.2)

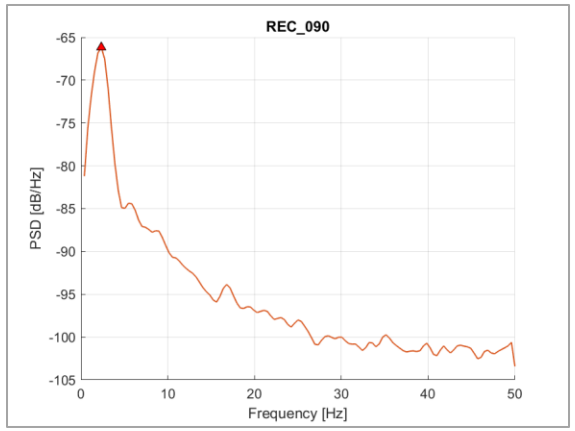
Markéta Pavlíková, MSc., Ph.D.: The **ICF categorical profile** has been highly useful in multiple ways

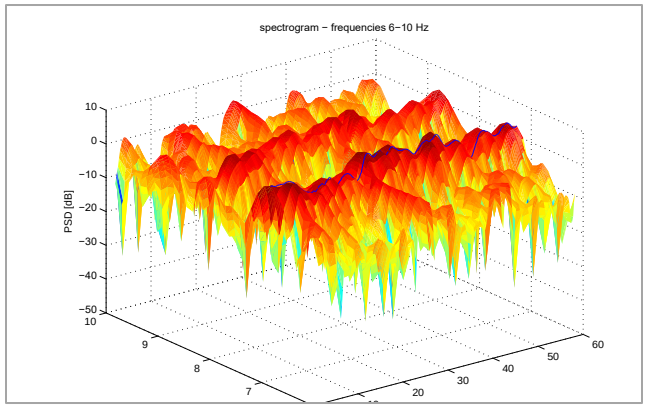
- It provides **good coverage** of the various **impacts of Multiple Sclerosis (MS)**.
- It aids in **validating assessment tools**.
- It contributes to a **deeper understanding** of the **situation and needs of people with MS**



Objective measurement of tremor







FAKULTA
ELEKTROTECHNICKÁ
ČVUT V PRAZE

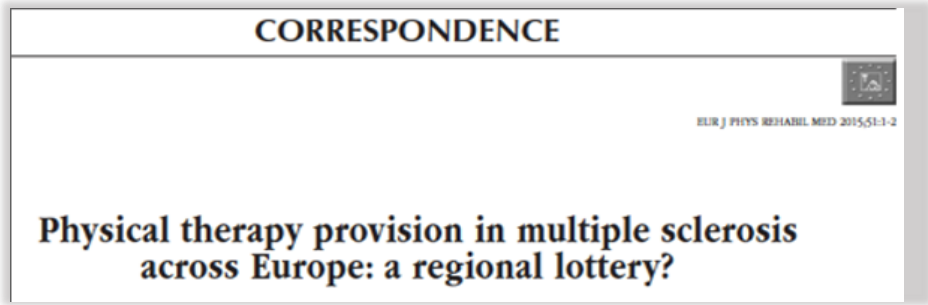
Content and organisation of physiotherapy

1 x D1
2 x Q1
2 x Q2

2003 EMSP, European Parliament

2 workshops
Grant RIMS, VF a NF

1. Physical activity (fitness/endurance/resistance) training (7 PT interventions, mostly in cluster PTI-C)
2. Neuroproprioceptive "facilitation, inhibition" (14 PT interventions, mostly in cluster PTI-A, and PTI-B) - interventions that were developed in the 1950s (for example PNF, Vojta reflex locomotion, Rood's Approach, Bobath, Brunnstrom approach)
3. Motor/skill acquisitions (individualized therapy led intervention) when the patient is increasingly active in the motor retraining process (15 PT interventions, mostly in cluster PTI-D, PTI-F and PTI-G)
4. Technology based (6 PT interventions cluster PTI-E).



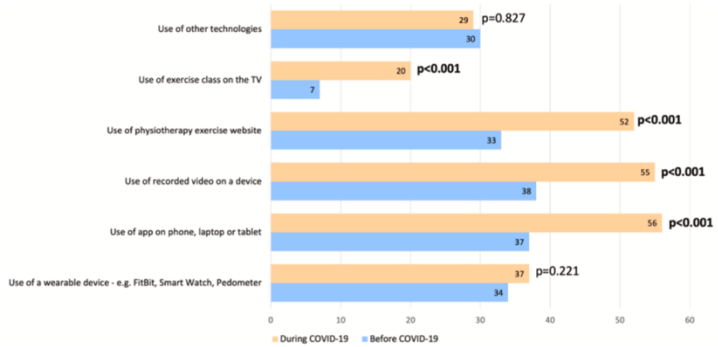


Fig. 1. Use of technologies for physiotherapy prior to and during the COVID-19 pandemic. Values are presented as percentages

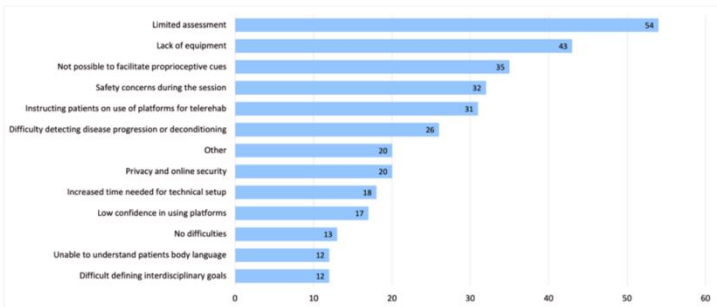


Fig. 2. Challenges reported by physiotherapists in the use of telerehabilitation during the COVID-19 pandemic. Values are presented as percentages of physiotherapists expressing the item as a challenge.

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Original article

Changes in physiotherapy services and use of technology for people with multiple sclerosis during the COVID-19 pandemic

Johanna Jonsdottir [a,1], Carme Santoyo-Medina [b,c,1], Turhan Kahraman [d], Alon Kalron [e,f,1], Kamila Rasova [g,1], Lousin Moumdjian [h,i,j,1], Susan Coote [k,l,1], Andrea Tacchino [m,1], Erica Grange [n], Tori Smedal [o,p,1], Ellen Christin Arntzen [q,1], Yvonne Learmonth [r,s,t,1], Ludovico Pedulla [u,1], Gillian Quinn [v,1], Daphne Kos [w,x,1,*]

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The impact of the COVID-19 pandemic on physical therapy practice for people with multiple sclerosis: A multicenter survey study of the RIMS network

Turhan Kahraman [a], Kamila Rasova [b], Johanna Jonsdottir [c], Carme Santoyo Medina [d,e], Daphne Kos [f,g], Susan Coote [h,i], Andrea Tacchino [j], Tori Smedal [k,l], Ellen Christin Arntzen [m,n], Gillian Quinn [o], Yvonne Learmonth [p,q,r], Ludovico Pedulla [s,t], Lousin Moumdjian [u,v,w], Alon Kalron [x,y,*]

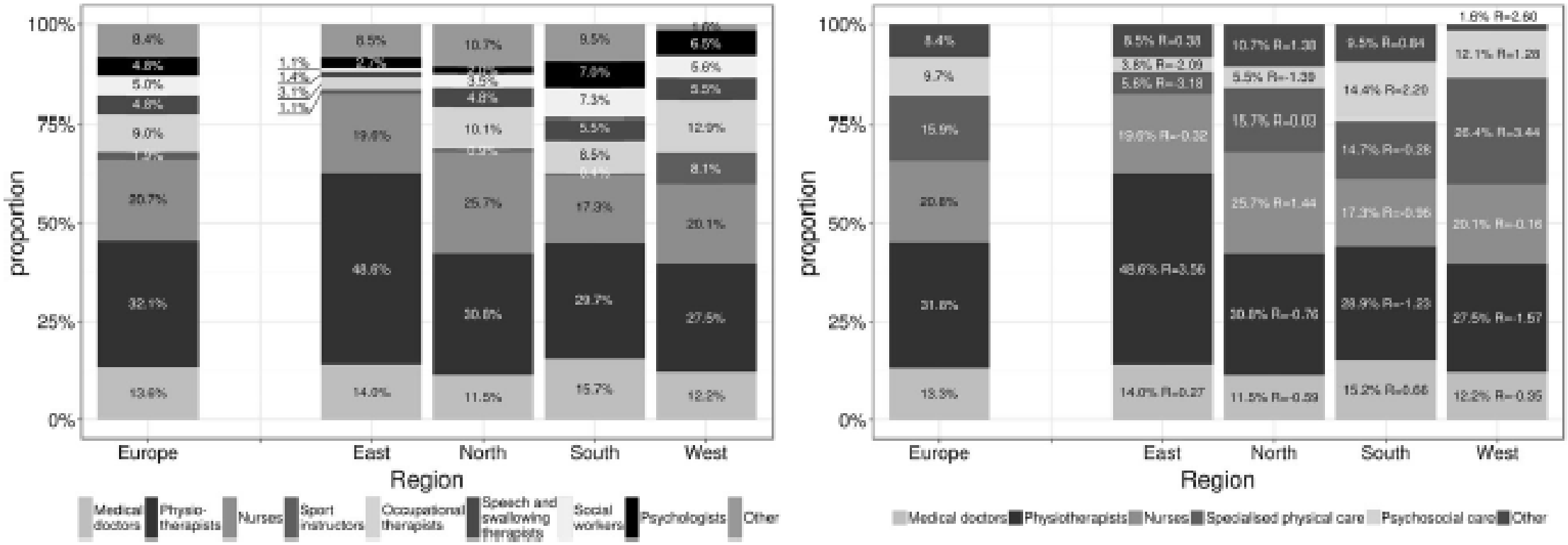
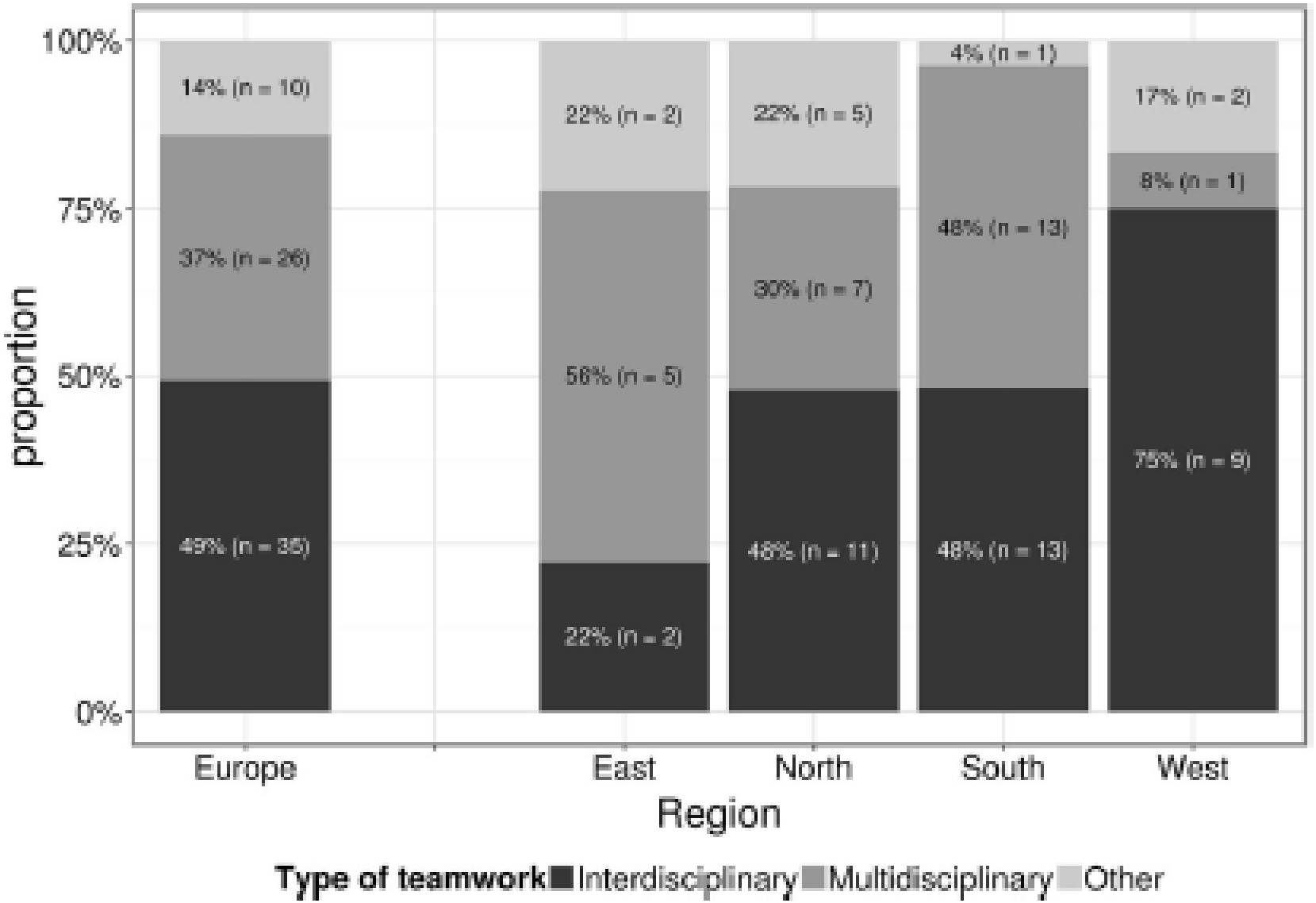


Fig. 2 Distribution of professionals and groups of professionals in the team, for different European regions. Mean proportion of various professions in the team across regions and Europe in given in the graphs. For the χ^2-test the professions were pooled as follows: sport instructors, occupational therapists and speech/swallowing therapists into "specialised physical care" category, social workers and psychologists into "psychosocial care". There was a statistically significant difference between regions in the distribution of professionals in teams ($p < 0.001$). Standardised residuals between observed and expected proportions are given in the second graph. Sensitivity analysis with joining "other" category to either "physical" or "psychosocial" category was performed and confirmed the statistically significant difference between regions ($p = 0.015$ and $p = 0.002$ respectively)



of teamwork across Europeans regions. Graph shows proportion of answers by 72 respondents together with counts in parentheses. nary team was defined as "specialists work in parallel towards addressing problems related to their profession". Interdisciplinary team as "specialists working as a group to achieve a common goal that is explicitly agreed upon". Type of teamwork differs across the her exact test; $p = 0.046$)

Complex rehabilitation after stroke

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COMIRESTROKE—A clinical study protocol for monitoring clinical effect and molecular biological readouts of *COM*prehensive *I*ntensive *RE*habilitation program after *STROKE*: A four-arm parallel-group randomized double blinded controlled trial with a longitudinal design

Kamila Řasová[1]*, Patricia Martinková[2]*, Michaela Vařejková[2], Barbora Miznerová[1], Markéta Pavliková[1], Jana Hlinovská[1], David Hlinovský[1], Štěpánka Philippová[1], Michal Novotný[4], Karolína Pospíšilová[5], Paula Biedková[1], Romana Vojíková[1], Jan Havlík[4], Valerie Brid O'Leary[6], Marie Černá[6], Aleš Bartoš[7,8] and Tom Philipp[1]*

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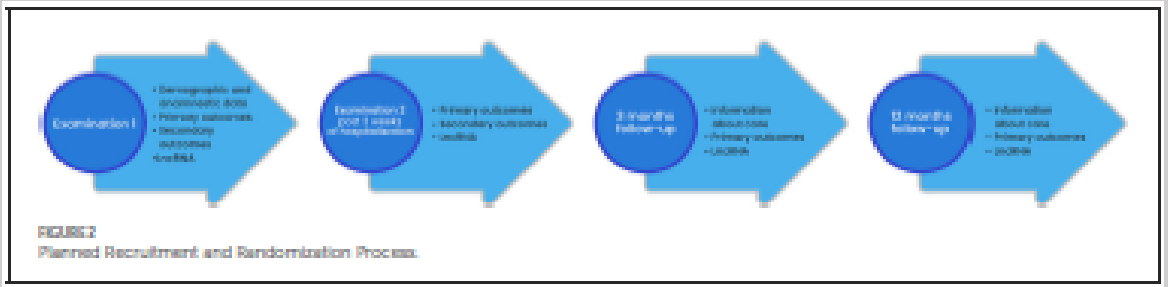

FIGURE 2
Planned Recruitment and Randomization Process.

	STUDY PERIOD					
	Enrolment	Allocation	Post-allocation			
TIMEPOINT**	0	0	t_1 Day 1–2	t_2 Day 19–20	t_3 Month 3	t_4 Month 12
ENROLMENT						
Eligibility screen	X					
Informed consent	X					
Allocation		X				
INTERVENTIONS						
COMIRESTROKE—ICF			⟵	⟶		
COMIRESTROKE—NIFI			⟵	⟶		
COMIRESTROKE—TECH			⟵	⟶		
COMIRESTROKE—CONTROL			⟵	⟶		
ASSESSMENTS						
Basic characteristics	X					
Primary outcomes			X	X	X	X
Secondary outcomes			X	X		
Molecular biological readouts			X	X	X	X

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Improvements in upper extremity isometric muscle strength, dexterity, and self-care independence during the sub-acute phase of stroke recovery: an observational study on the effects of intensive comprehensive rehabilitation

Řasová K.[1,3]*, Martinková P.[2], Vařejková M.[2], Miznerova B.[3,4], Hlinovská J.[3], Hlinovský D.[5], Iskendri D.[3], Lebdušková L.[3], Vojíková R.[3], Zakouřilová J.[3], Běhounek J.[3], Musil V.[6] and Philipp T.[3]*

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TABLE 5 Pre-test post-test differences in individuals with stroke on the impaired upper extremity.

	Post-stroke patients with impaired upper extremity							
		PRE		POST		PRE-POST		
	N	Mean	SD	Mean	SD	Mean	SD	p-value$_{adj}$
NHPT D	10	57.96	27.93	46.06	21.76	−11.90	21.75	0.157
NHPT ND	10	60.39	31.66	40.27	12.47	−20.11	28.12	0.086
grip D	12	14.96	9.82	14.38	10.95	−0.58	3.16	0.537
grip ND	15	12.07	6.77	13.64	7.45	1.58	3.02	0.094
key pinch D	11	3.36	2.62	4.02	2.78	0.65	0.84	0.068
key pinch ND	15	2.87	1.76	3.46	1.90	0.59	0.66	0.034
tripod pinch D	11	2.12	1.95	2.35	1.60	0.23	1.08	0.537
tripod pinch ND	13	1.72	1.44	2.14	1.55	0.42	0.69	0.086
tip-tip pinch D	11	2.53	2.01	2.73	2.08	0.20	0.67	0.423
tip-tip pinch ND	13	2.01	1.52	2.63	1.75	0.62	0.81	0.053
ARAT D	15	27.33	23.60	34.87	25.68	7.53	10.78	0.053
ARAT ND	21	28.76	24.40	34.24	22.89	5.48	8.11	0.034

SD, standard deviation; adj, adjusted; D, dominant; ND, non-dominant; NHPT, Nine Hole Peg Test; ARAT, Action Research Arm Test.

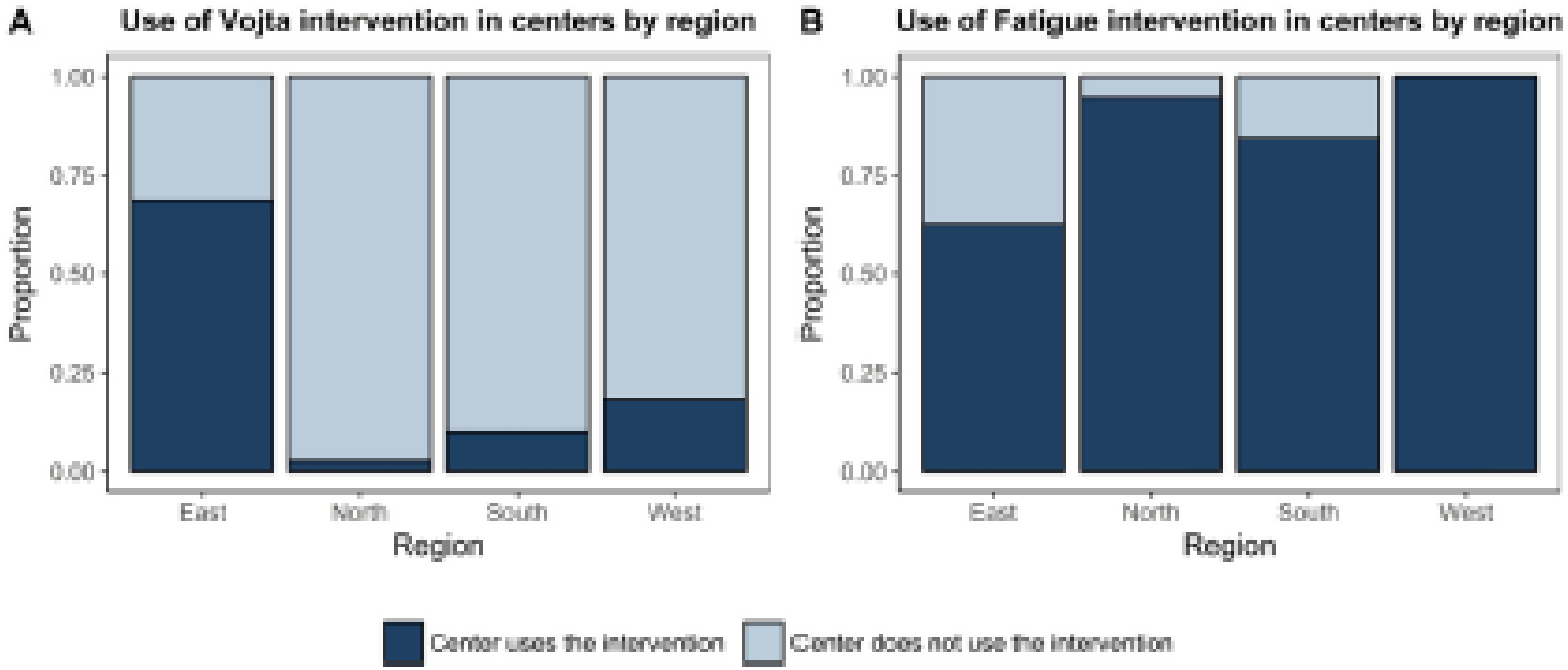
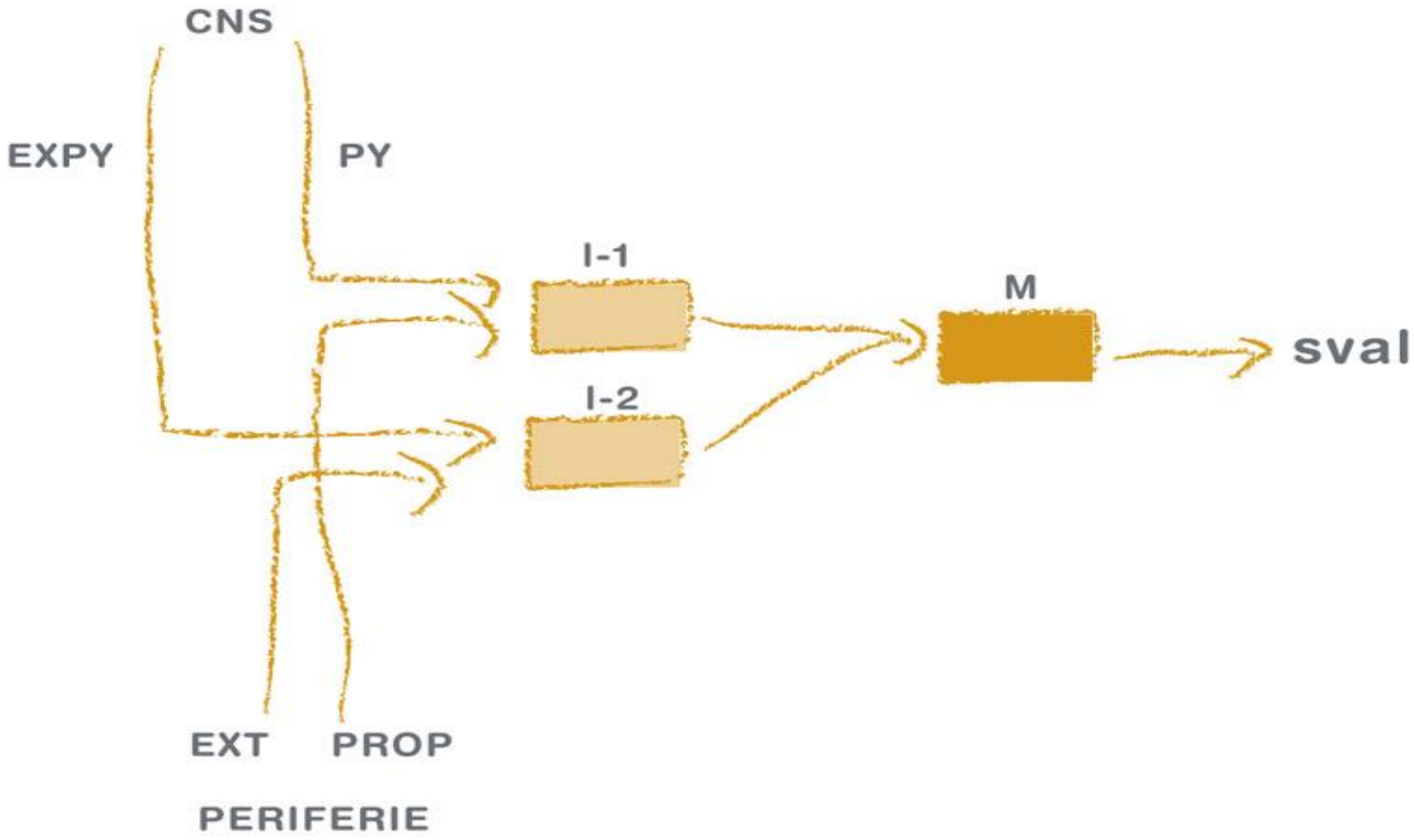


Fig. 1. Proportion of interventions used in regions. A. Vojta intervention, B. Fatigue intervention.

Vojta reflex locomotion

https://www.youtube.com/watch?v=wYYoJVifvjQ&feature=youtu.be

Neuroproprioceptive „facilitation, inhibition“



PT enhances the effectiveness of the synaptic connections among neurons forming functional networks, which leads to the evocation of movement by some otherwise weak and insufficient stimuli.

Véle F. Kineziologie pro klinickou praxi, 1997

Motor program activating therapy

Principls of neuroproprioceptive "facilitation, inhibition"

Combination of afferent stimuli

Postural positions based on ontogenesis

Activation of motor programs at subcortical level

Activation of motor patterns

Principles of sensomotor learning

Repetition

Different conditions and environment

Motor programme activating therapy influences adaptive brain functions in multiple sclerosis: clinical and MRI study

Kamila Rasova[a], Marie Prochazkova[a], Jaroslav Tintera[b], Ibrahim Ibrahim[b], Denisa Zimova[c] and Ivana Stetkarova[c]

Video documenting an effect of MPAT

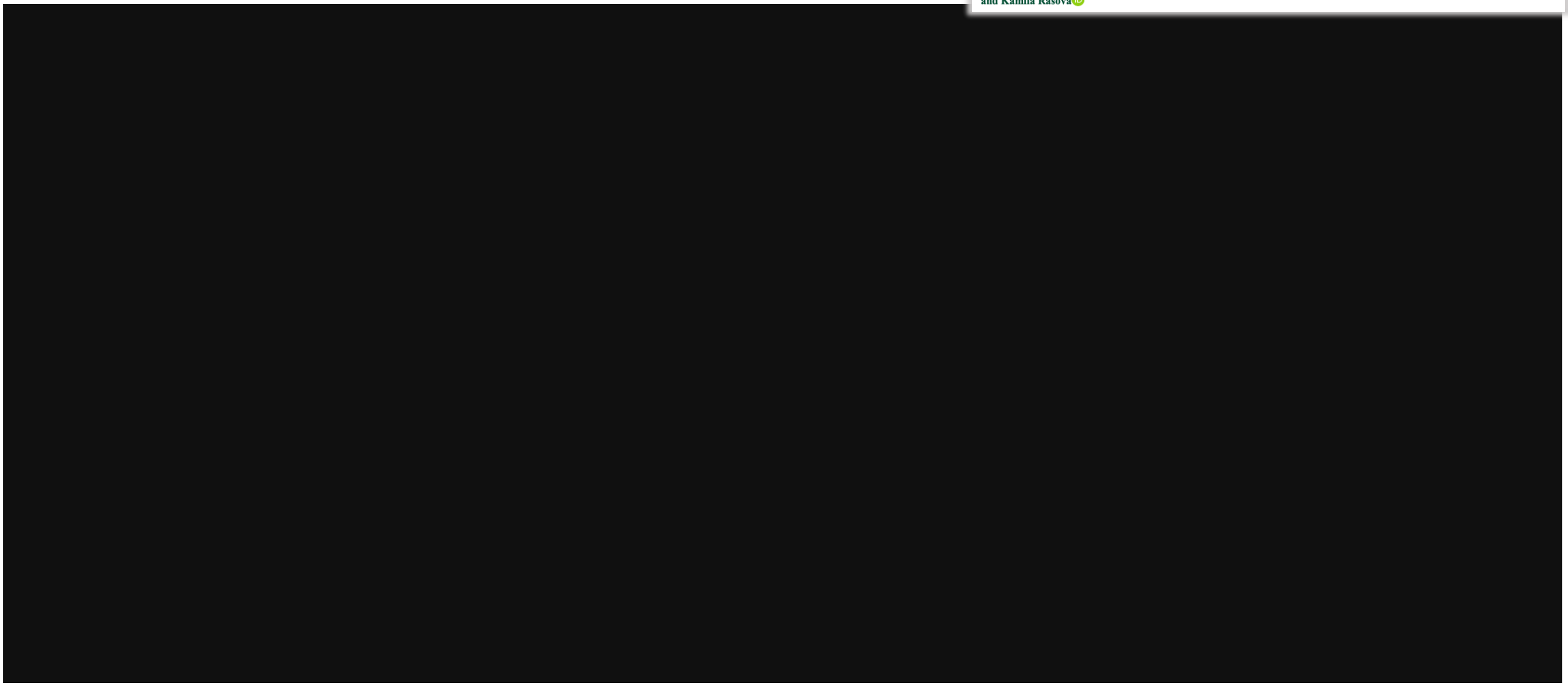
MULTIPLE SCLEROSIS JOURNAL | MSJ

Topical Review

Functional electrical stimulation for foot drop in people with multiple sclerosis: The relevance and importance of addressing quality of movement

Multiple Sclerosis Journal
1–8
DOI: 10.1177/1352458520923958

Angela Davies Smith, Terezie Prokopiusova, Rosemary Jones, Tania Burge and Kamila Rasova



Funtional electrical stimulation

MULTIPLE SCLEROSIS JOURNAL | MSJ

Topical Review

Functional electrical stimulation for foot drop in people with multiple sclerosis: The relevance and importance of addressing quality of movement

Angela Davies Smith, Terezie Prokopiusova, Rosemary Jones, Tania Burge and Kamila Rasova

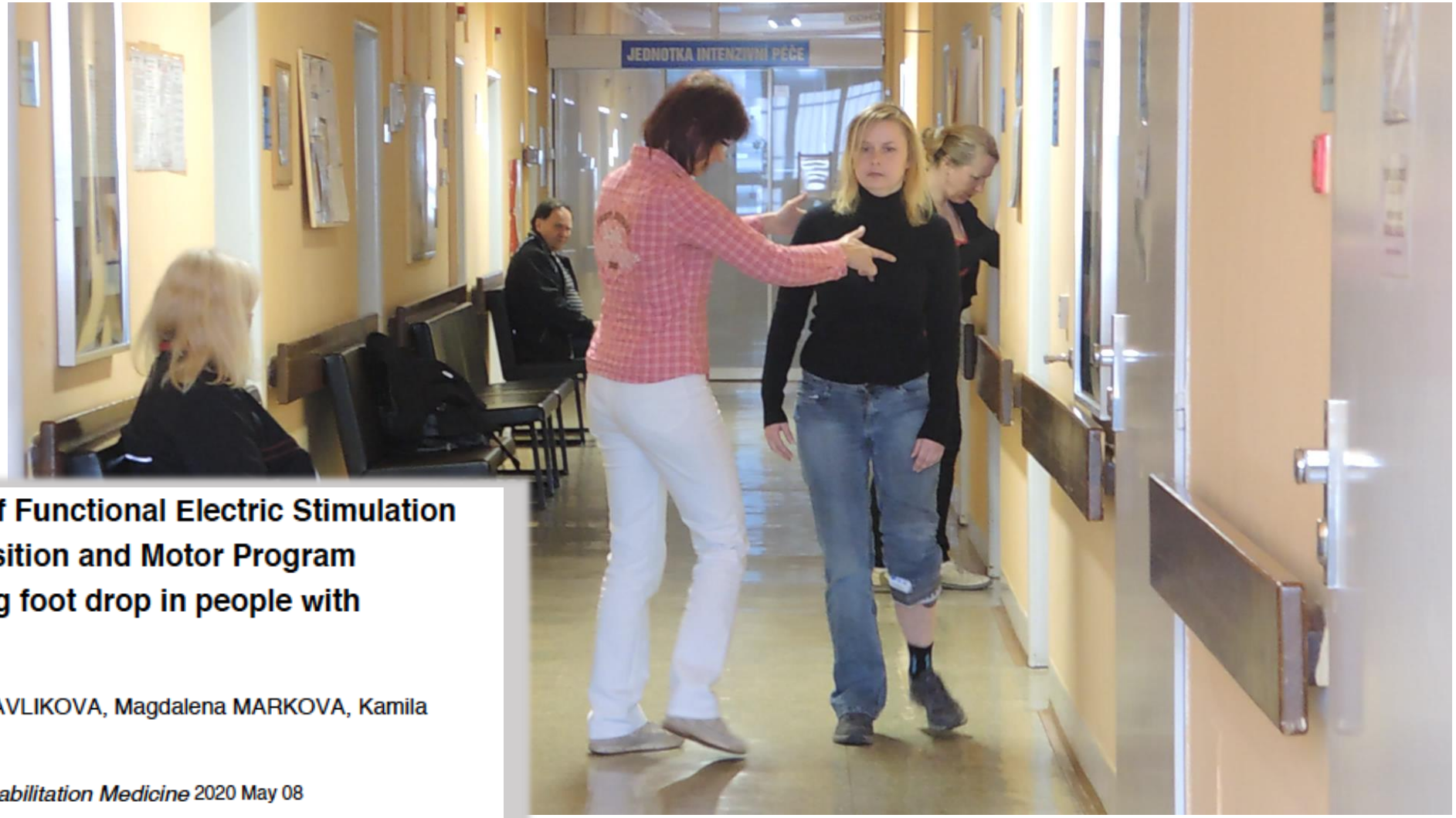
Multiple Sclerosis Journal

1–8

DOI: 10.1177/1352458520923958

GAUK

Funtional electrical stimulation in Posturally Corrected Position



Randomized comparison of Functional Electric Stimulation in Posturally Corrected Position and Motor Program Activating Therapy: treating foot drop in people with Multiple Sclerosis

Terezie PROKOPIUSOVA, Marketa PAVLIKOVA, Magdalena MARKOVA, Kamila RASOVA

European Journal of Physical and Rehabilitation Medicine 2020 May 08
DOI: 10.23736/S1973-9087.20.06104-3

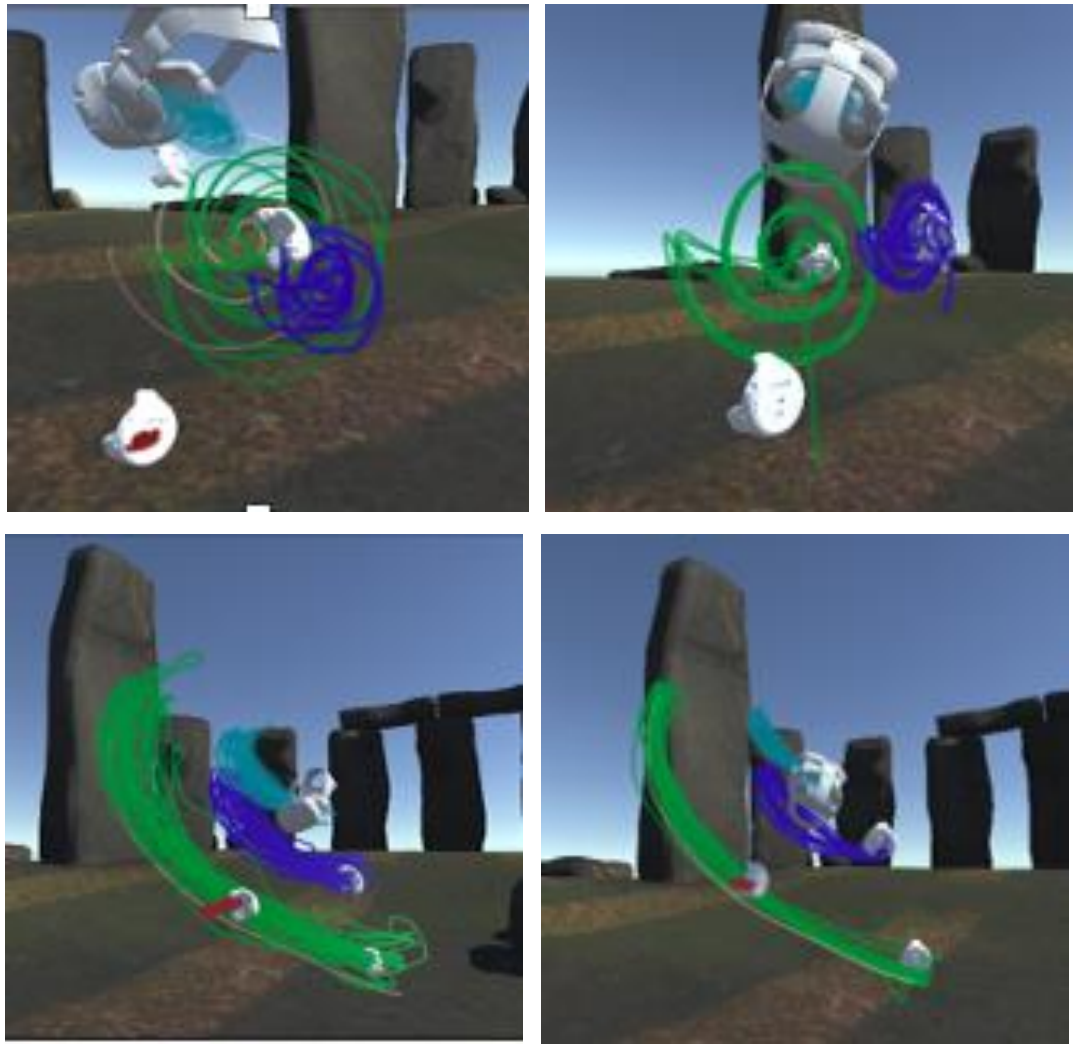
Article type: Original Article

Combination of neuroproprioceptive 'facilitation, inhibition' and virtual reality

GAUK

- multifactorial sense stimulation
- influences dopamine centres in the brain
- influences mirror neurons

Combination of neuroproprioceptive 'facilitation, inhibition' and virtual reality



FAKULTA APLIKOVANÝCH VĚD
ZÁPADOČESKÉ UNIVERZITY
V PLZNI

KATEDRA INFORMATIKY
A VÝPOČETNÍ TECHNIKY

Herynková A., FBMI, ČVUT, Praha, 2021

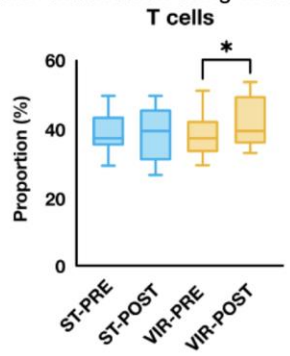
BMJ Open

Virtual reality-based neuroproprioceptive physiotherapy in multiple sclerosis: a protocol for a double-arm randomised assessor-blinded controlled trial on upper extremity function, postural function and quality of life, with molecular and functional MRI assessment

Barbora Miznerova ,[1,2] Jindra Reissigova,[3] Libor Vasa,[4] Jakub Frank,[4] Michael Hudec,[5] Lubomir Rodina,[6,7] Anna Herynkova,[2] Jan Havlik,[8] Jaroslav Tintera,[9] Jan Rydlo,[9] Ibrahim Ibrahim,[9] Valerie B O'Leary,[5] Marie Cerna,[5] Iva Jurickova,[5] Marketa Pokorna,[5] Tom Philipp,[2] Jana Hlinovska,[2] Ivana Stetkarova,[10] Kamila Rasova [2,6]

To cite: Miznerova B, Reissigova J, Vasa L,

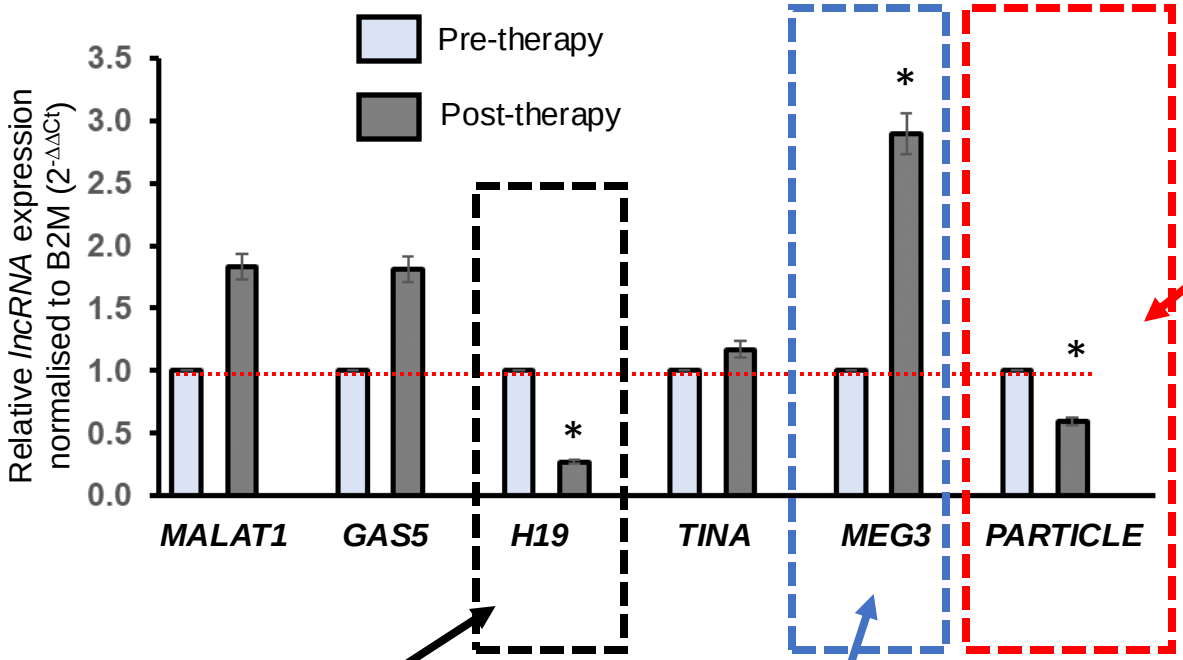
Figure 4: A significant difference in the change in T lymphocyte count between standard rehabilitation and rehabilitation using virtual reality



Legend: Virtual Reality Application Innovatively Implementing the Principles of Proprioceptive "Facilitation and Inhibition" (VIREFYMS) leads to a statistically significant increase in T lymphocyte count ($p = 0.03$). In standard therapy (ST), there is a tendency for an increase in T lymphocytes; however, this increase is not statistically significant ($p = 0.83$).

Imprinted long non-coding RNA MEG3 was significantly upregulated: MALAT1 and GAS5 were borderline significantly upregulated (both had p = 0.07). MEG3 usually has very low expression or is not expressed when analysed.

Differential expression of long non-coding RNA in peripheral blood sample of MS patient after therapeutic intervention



First preliminary evidence *PARTICLE* is altered by MS therapy.

First preliminary evidence that *H19* is decreased after therapy

First preliminary evidence that *MEG3* is increased after therapy

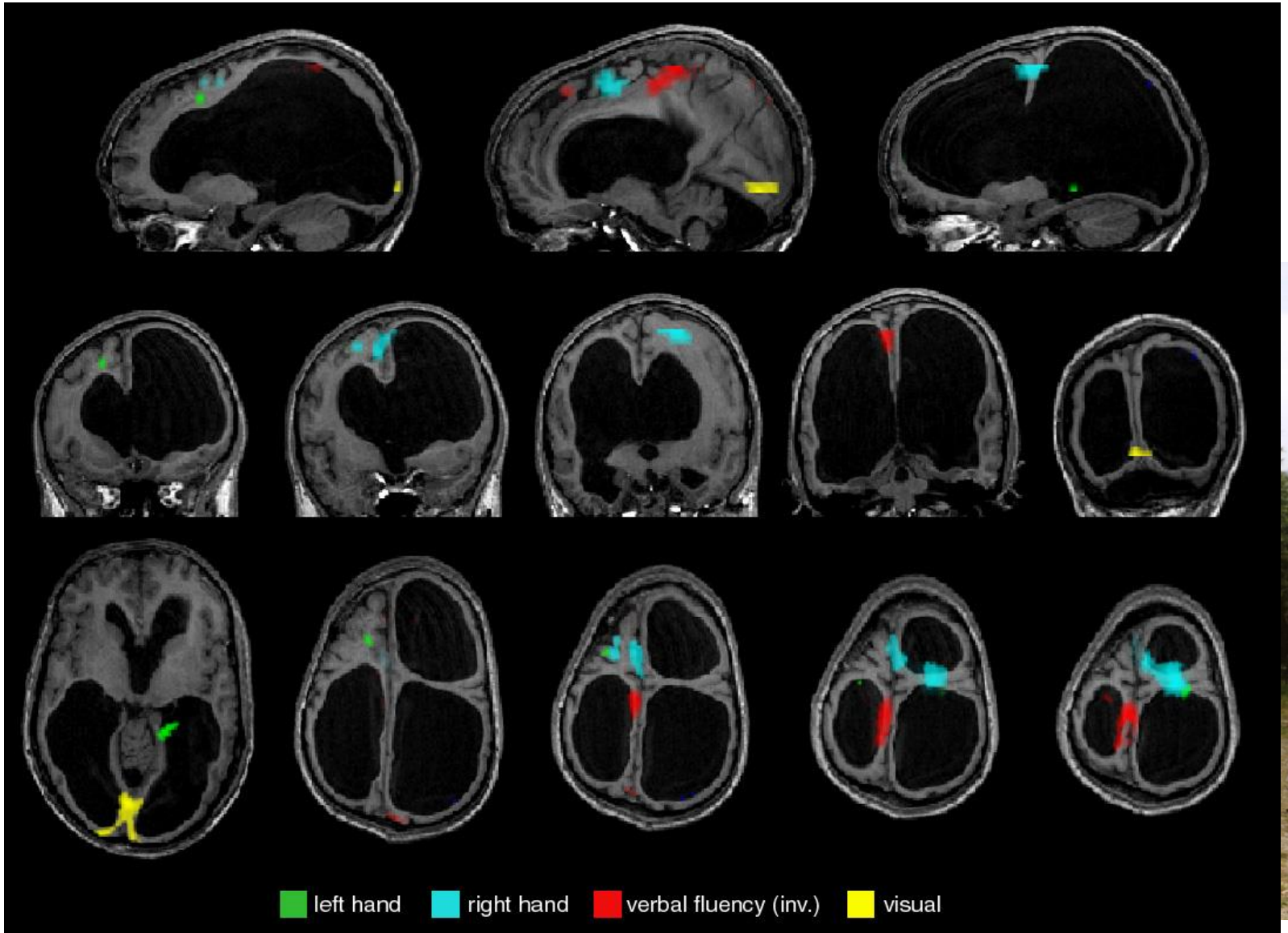
Neuroproprioceptive "facilitation, inhibition" physical therapy in specially programmed virtual environment has a potential to activate plastic and adaptive processes of the CNS in MS documented also by upregulation of long non-coding RNA.

Doc. Valerie B. O'Leary, Mgr. Iva Juříčková – Department of Medical Genetics, Third Faculty of Medicine, Charles University

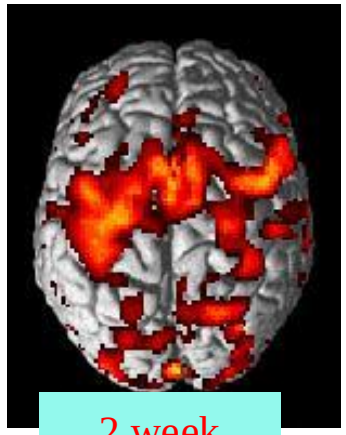
Plasticity and adaptability of the CNS

- The **central nervous system (CNS) is plastic** and capable of adapting to changing internal and external conditions.
- This adaptability enables **adaptive changes**, such as the **relocation of inflammatory mediators, remyelination, redistribution of sodium channels, local cortical reorganization**—manifesting as an **increase in presynaptic proteins and dendritic sprouting**—which contribute to **functional recovery**.

Congenital hydrocefalus

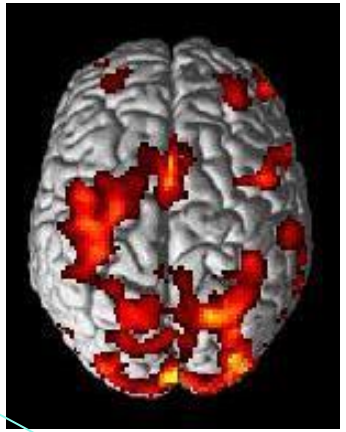


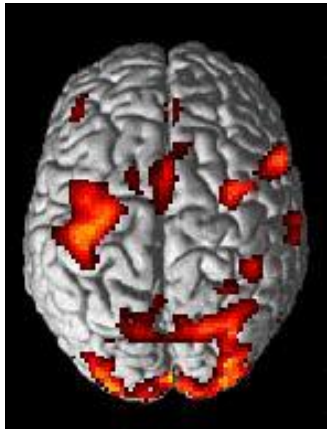
Stroke



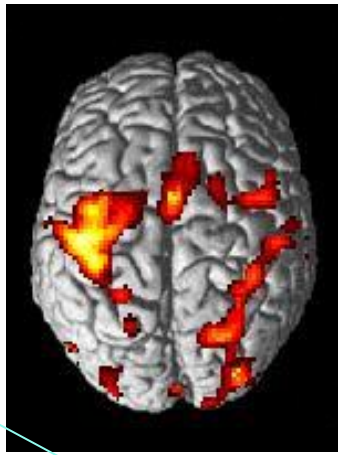
2 week

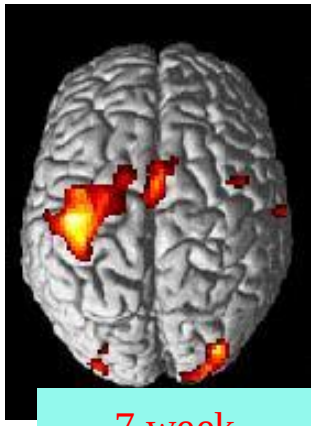
grasp 3%





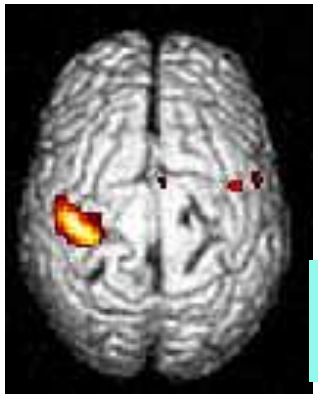
leasion





7 week

grasp: 89%



Healthy control

Ward N. The use of functional recovery in neurorehabilitation of MS people, 2003

European Journal of Physical and Rehabilitation Medicine 2021 December;57(6):889-99
DOI: 10.23736/S1973-9087.21.06701-0

ORIGINAL ARTICLE

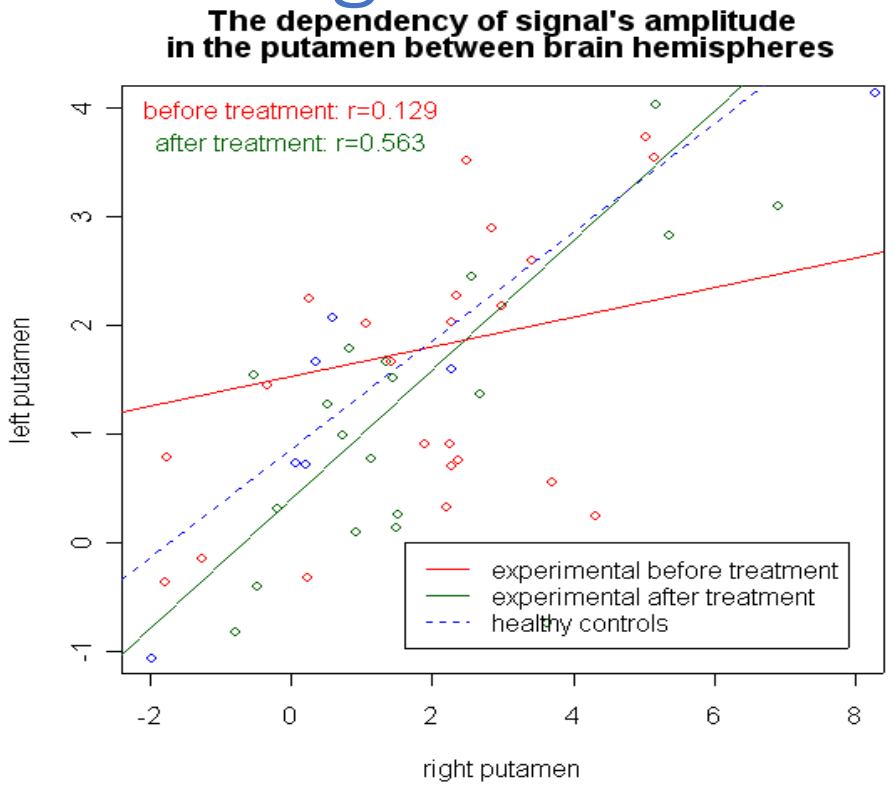
A Three-Arm Parallel-group Exploratory Trial documents balance improvement without much evidence of white matter integrity changes in people with multiple sclerosis following two months ambulatory neuroproprioceptive "facilitation and inhibition" physical therapy

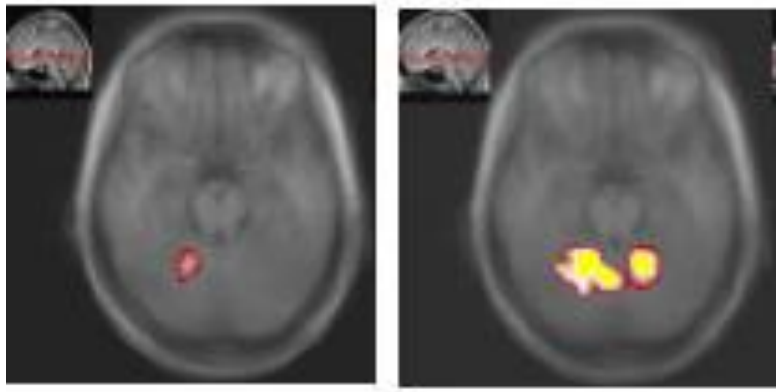
Kamila ŘASOVÁ [1] *, Barbora BUČKOVÁ [2, 3], Terezie PROKOPIUSOVÁ [1], Marie PROCHÁZKOVÁ [1], Gabriela ANGEL [1], Magdaléna MARKOVÁ [1], Natália HRUŠKOVÁ [1], Ivana ŠTĚTKÁŘOVÁ [4], Šárka ŠPAŇHELOVÁ [5], Jan MAREŠ [6], Jaroslav TINTĚRA [7], Petr ZACH [8], Vladimír MUSIL [9], Jaroslav HLINKA [2, 6]

Neuroplasticity

- Physical activity (fitness/endurance/resistance) training influences the CNS non-specifically – it induces new angiogenesis and increases cerebral blood flow without cortical reorganization and it exerts a prophylactic influence on the cerebral atrophy observed earlier while preserving neuronal integrity.
- Motor/skill acquisitions and Technology based PTs - systematically train damaged function. The repetition of new and complex movements induces a substantial cortical network reorganization topographically closely related to the trained movement that leads to a synaptogenesis process.
- Neuroproprioceptive ”facilitation, inhibition” PT suitable combines afferent stimuli, modulates interneuronal systems, repeatedly activates motor programs at the subcortical level, and as such induces adaptive and plastic processes of the CNS.

Plasticity and adaptability of the CNS – functional changes





Grant ESF

2004 Award at ECTRIMS

Clinical Rehabilitation 2005; **19**: 170–181

Is it possible to actively and purposely make use of plasticity and adaptability in the neurorehabilitation treatment of multiple sclerosis patients? A pilot project

K Rasova MS Centrum, Department of Neurology, **J Krasensky** Department of Magnetic Resonance and Radiology, **E Havrdova** MS Centrum, Department of Neurology, **J Obenberger** Department of Magnetic Resonance and Radiology, **Z Seidel** Department of Magnetic Resonance and Radiology, **O Dolezal** MS Centrum, Department of Neurology, Charles University in Prague and General Faculty Hospital, **P Rexova** EuroMISE Centre of Charles University and Academy of Sciences of the Czech Republic and **M Zalisova** MS Centrum, Department of Neurology, Charles University in Prague and General Faculty Hospital, Prague, Czech Republic

Plasticity and adaptability of the CNS – functional changes

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Online version at http://www.minervamedica.it

European Journal of Physical and Rehabilitation Medicine 2021 June;57(3):356-65
DOI: 10.23736/S1973-9087.20.06336-4

ORIGINAL ARTICLE

Brain activity changes following neuroproprioceptive "facilitation, inhibition" physiotherapy in multiple sclerosis: a parallel group randomized comparison of two approaches

Marie PROCHAZKOVA [1], Jaroslav TINTERA [2], Sarka SPANHELOVA [3], Terezie PROKOPIUSOVA [1], Jan RYDLO [2], Marketa PAVLIKOVA [1], Antonin PROCHAZKA [4], Kamila RASOVA [1] *

[1]Department of Rehabilitation Medicine, Third Faculty of Medicine, Charles University, Prague, Czech Republic; [2]MR Unit, Department of Diagnostic and Interventional Radiology, Institute for Clinical and Experimental Medicine, Prague, Czech Republic; [3]Department of Rehabilitation, Motol Faculty Hospital, Prague, Czech Republic; [4]Institute of Biophysics and Informatics, First Faculty of Medicine, Charles University, Prague, Czech Republic

D1
IF=5.313
2021

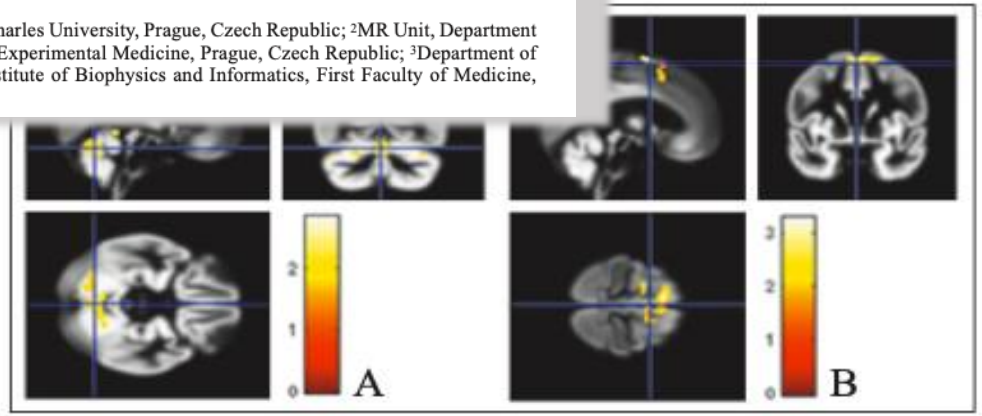


Figure 5.—Increase in cerebellar (A) and supplementary motor and pre-motor areas (B) activation (P=0.05) after physiotherapy in conjunction with a positive change in clinical index.
In sagittal section: top left; frontal section: top right; and transversal section: bottom left.

Plasticity and adaptability of the CNS – structural changes

Neuroradiology
DOI 10.1007/s00234-011-0879-6

FUNCTIONAL NEURORADIOLOGY

Fractional anisotropy and mean diffusivity in the corpus callosum of patients with multiple sclerosis: the effect of physiotherapy

Ibrahim Ibrahim · Jaroslav Tintera · Antonin Skoch · Filip Jirů · Petr Hlustik · Patricia Martinkova · Karel Zvara · Kamila Rasova

Received: 27 October 2010 / Accepted: 20 April 2011

Online version at http://www.minervamedica.it

European Journal of Physical and Rehabilitation Medicine 2021 December;57(6):889-99
DOI: 10.23736/S1973-9087.21.06701-0

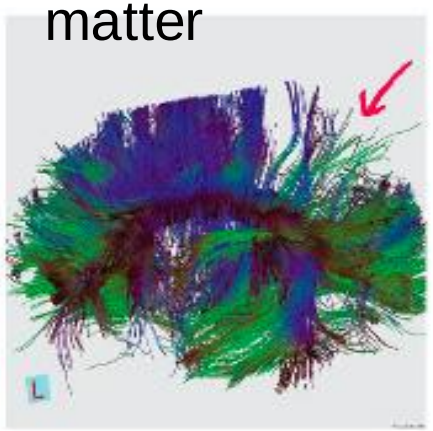
ORIGINAL ARTICLE

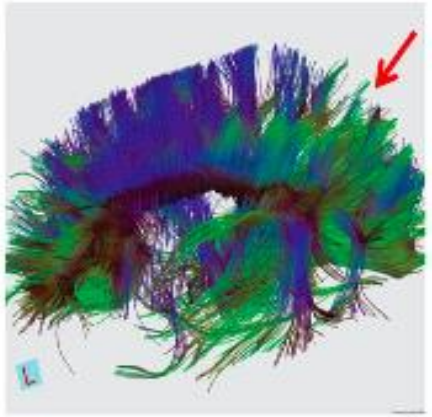
A Three-Arm Parallel-group Exploratory Trial documents balance improvement without much evidence of white matter integrity changes in people with multiple sclerosis following two months ambulatory neuroproprioceptive "facilitation and inhibition" physical therapy

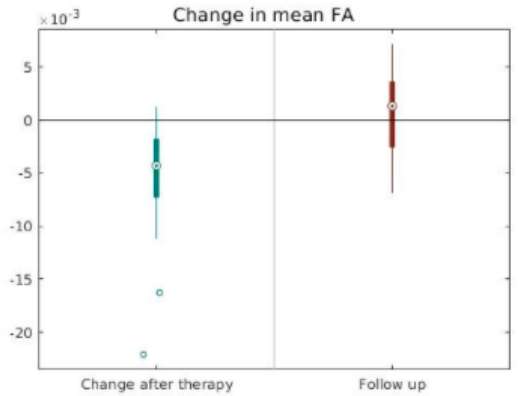
Kamila ŘASOVÁ [1] *, Barbora BUČKOVÁ [2, 3], Terezie PROKOPIUSOVÁ [1], Marie PROCHÁZKOVÁ [1], Gabriela ANGEL [1], Magdaléna MARKOVÁ [1], Natália HRUŠKOVÁ [1], Ivana ŠTĚTKÁŘOVÁ [4], Šárka ŠPAŇHELOVÁ [5], Jan MAREŠ [6], Jaroslav TINTĚRA [7], Petr ZACH [8], Vladimír MUSIL [9], Jaroslav HLINKA [2, 6]

D1
IF=5.313
2021

- **Lower radial diffusivity** – remyelinization
- **Higher fractional anisotrophy** – better integrity of white matter







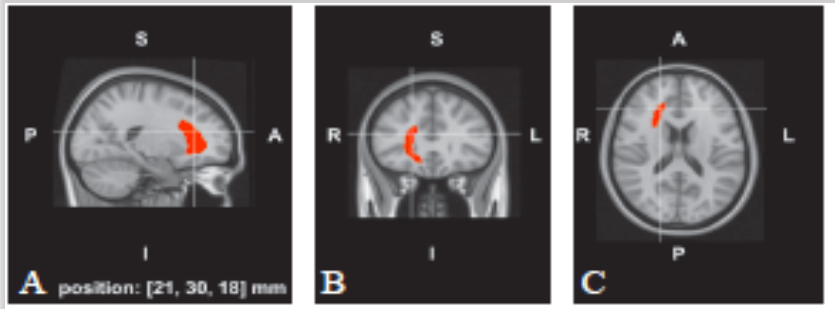
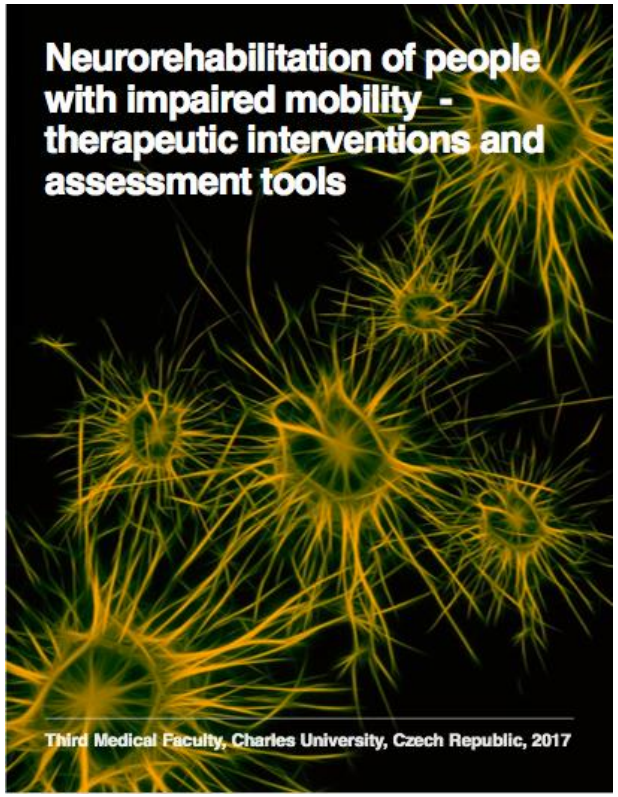
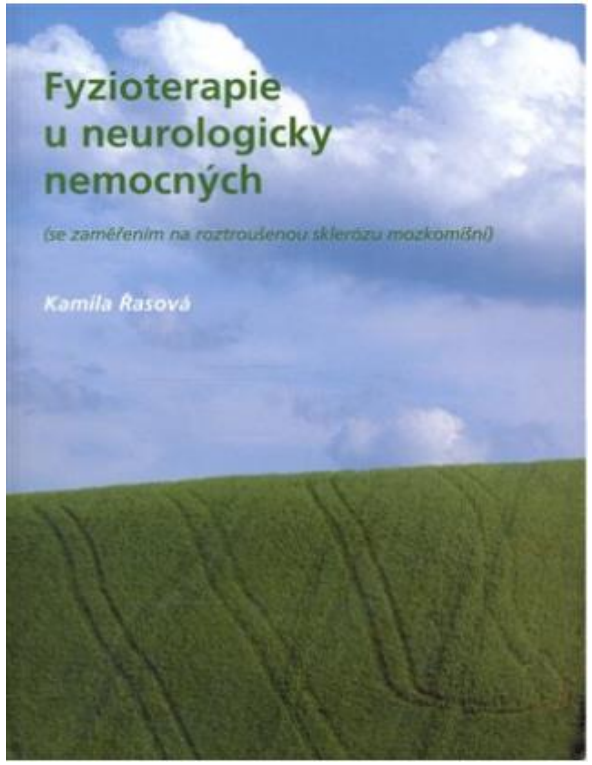
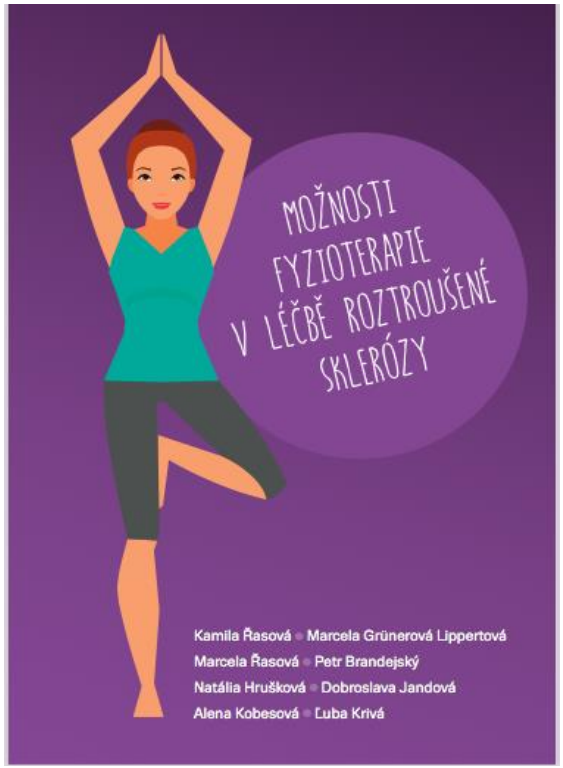
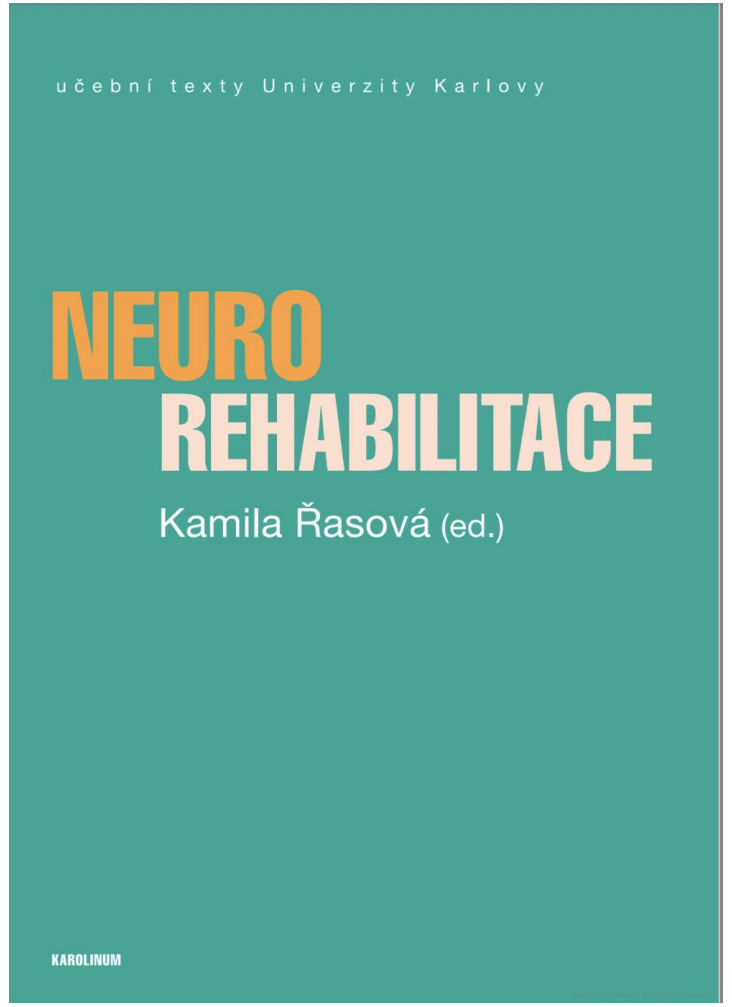


Figure 2.—Right anterior corona radiata, region where FA significantly decreased immediately after neuroproprioceptive "facilitation and inhibition" rehabilitation.
Right anterior corona radiata (as defined by the JHU white matter atlas) is highlighted in dark gray (red in the online version): in this region, the FA significantly decreased after the neuroproprioceptive "facilitation and inhibition" physical therapy. The MNI coordinates of the crosshair and of the visualized: A) sagittal; B) coronal; and C) axial sections are 21,30,18 mm.









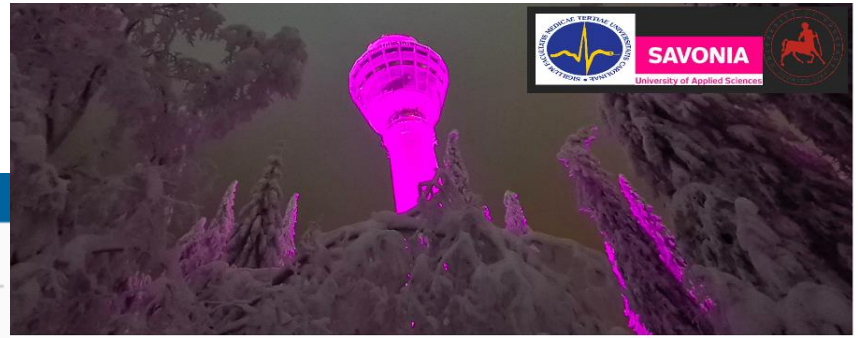
iBook: https://itunes.apple.com/cz/book/neurorehabilitation-people-impaired-mobility-therapeutic/id1207772832?mt=13

Online: https://www.bookport.cz/kniha/neurorehabilitace-14188/

Interdisciplinary co-operation

Worskhop in neurorehabilitation - CVOL0295

Anglický název:	Worskhop in neurorehabilitation	Garant:	doc. PhDr. Kamila Řasová, Ph.D.
Zajišťuje:	Klinika rehabilitačního lékařství 3. LF UK a FNKV (12-REHA)	Patří mezi:	BF-VP-3 (ZÁPIS)
Fakulta:	3. lékařská fakulta		
Platnost:	od 2022		
Semestr:	letní		



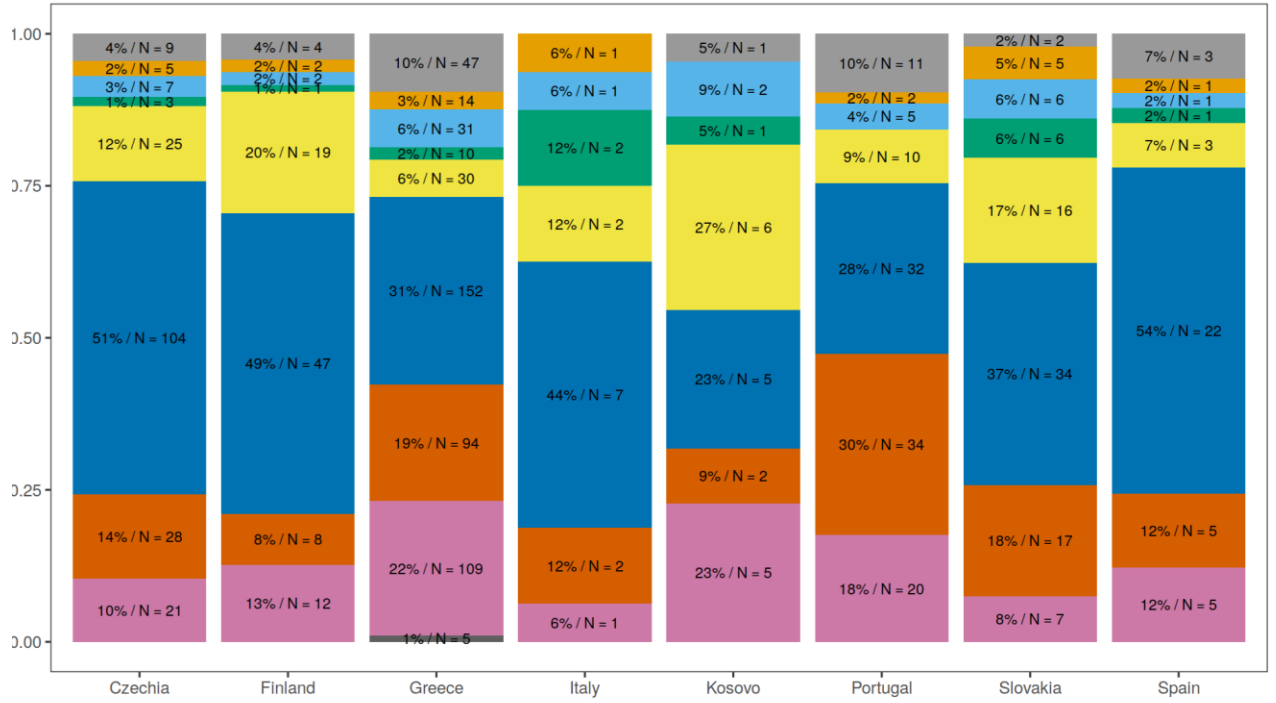
NEURO REHABILITATION

Erasmus+ blended intensive courses (BIP) programme, 20-24.2.2023, Kuopio, Finland

tiers

Quality of Life and Quality of Education among Physiotherapy Students in Europe

Michaela Schramlová[1*], Kamila Řasová[1*], Johanna Jonsdottir[2], Markéta Pavlíková[1], Jolana Rambousková[3], Marja Äijö[4], Martina Šlachtová[5], Alena Kobesová[6], Elena Žiaková[7], Turhan Kahraman[8], Dagmar Pavlů[9], Beatriz María Bermejo-Gil[10], Dap[illegible][11], Eydokia Billis[12], Papagiannis Georgios[13], José Alves-Guerreiro[14], Nikolaos St[illegible], Marika Kiviluoma-Ylitalo[18], Marja-Leena Lähteenmäki[19], Jan[illegible], Magdalena Hagovská[22], Anna L. Arca[23], Sara Cortés[24]



I believe this year's BIP meeting will be successful once again, not only from a professional but also a social perspective.
I’m really looking forward to it.