Evidensbaseret neurorehabilitering for motorisk funktion – muligheder og udfordringer

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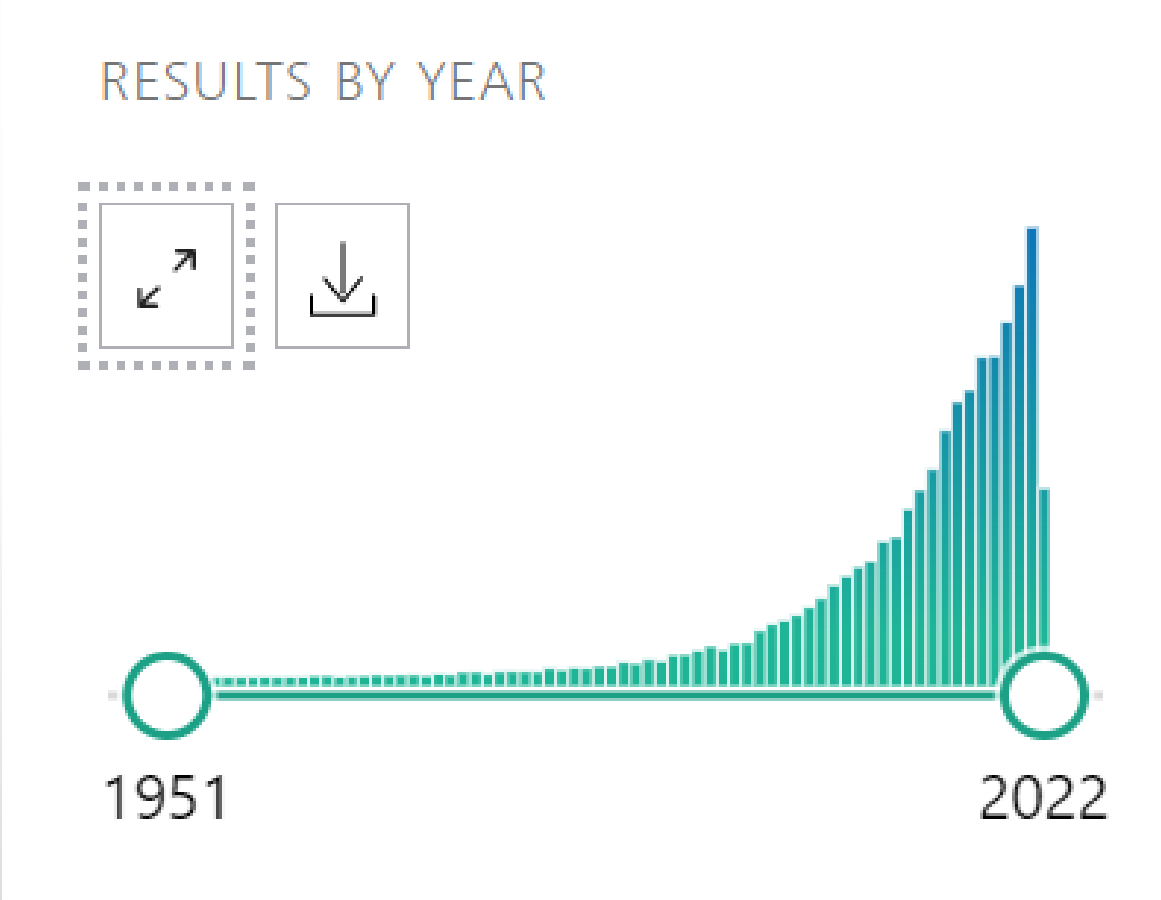
Forskning i neurorehabilitering



Stroke AND rehabilitation 45.000 hits

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Muligheder – EBP for motorisk function

- Tilbyde bedst mulig rehabilitering
- Opnå bedst mulig funktion
- Udnytte patientens / borgerens rehabiliteringspotential
- Brug af begrænsete resourcer
- Forpliktelse til livslang læring
- Bedst behandling for den individuelle patient på det rigtige tidspunkt

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Udfordringer med EBP – hvorfor er det vanskeligt?

- Det tager lang tid at skaffe evidens
- Traditionel mange små studier, dårlig kvalitet af studierne, forskellige effektmål
- **Er bedre nu!**

- Det tager lang tid at overføre ny viden til klinisk praksis

  - circa 10 år
- Individuelt og på gruppeniveau:
  Holdninger, traditioner, travlhed
- Strukturer som ikke fremmer læring og videreuddannelse

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ARMFUNKTION

Tabel 1. Terapeutiske optioner for rehabilitering af armfunktion

			Anbefaling	
Grad af parese	**Basis valg vs. option**	**Type træning**	**akut / subakut**	**kronisk**
Svær parese	Basis	Arm basis training	B+	0
		Arm robot therapy	B+	0
		Spejlbehandling (add-on)	B+	B+
		Bilateral training	0	0
		cNMES, EMG-NMES	0	0
		VR med vægtaflastning	0	
	Option	Somatosensory stimulation	0	0
		Akupunktur	0	
Mild til moderat parese	Basis	Arm ability training	B+	0
		Repetitive task training	0	0
		Strengthening exercises	0	0
		Therapy with VR	0	0
		Spejlterapi (add-on)	B+	B+
		mCIMT/CIMT (leart ikke-brug)	B+	B+
	Option	Trunk restraint (reaching)	0	0
		Mental practice	0	0
		rTMS	0	0
Mild til svær parese	Frarådes	tDCS	B-	B-

Anbefalingerne er baseret på GRADE skala, "skal" = A, "bør" = B, "kan" = 0.
Forkortelser: cNMES cyclical neuromuscular electrical stimulation; EMG electromyographically triggered; CIMT constraint-induced movement therapy; rTMS repetitive transcranial magnetic stimulation; tDCS transcranial direct current stimulation; VR virtual reality.

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Clinical pathways Thomas Platz ed. - GANGFUNKTION

Grad af anbefaling	Subakut fase efter stroke – ingen anbefaling for kronisk fase
A (skal)	
B (bør)	• Intensiv og progressiv gangtræning, konventionel fysioterapi og gangtræning kombineret med elektromekaniske gangtræningssystemer som exoskeleton og gangrobot, hvis tilgængelig og egnet
0 (kan)	• Intensiv gangtræning kombineret med motor imagery • Intensiv gangtræning med trædemølle hvis tilgængelig og egne • Cykliske multchannel stimulering for at genere bevægelser der ligner en gangmønster • Specific neglekttræning for personer med neglekt

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De rigtige spørgsmål

- Hvad virker for hvem på hvilket tidspunkt efter skade?
- Subgrupper
- Individer
- **Personaliseret neurorehabilitering**
- Baseret på evidens, objektive parametre (prognose) og personens ønsker og preferencer

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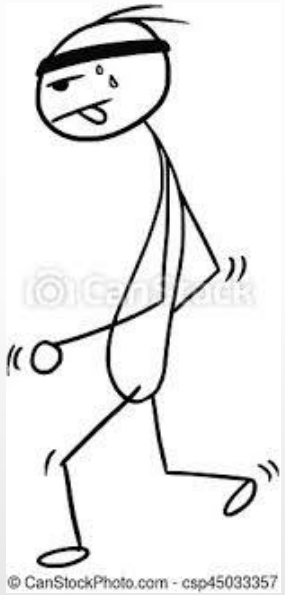
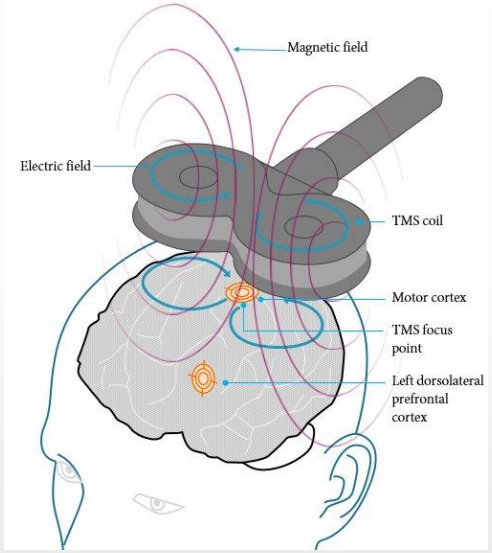
3 eksempler fra praksis

Behandling



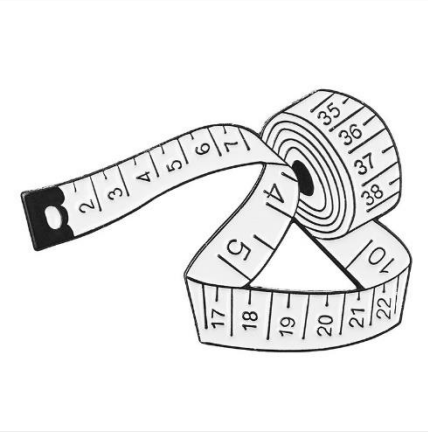
Højintensiv gangtræning

Prognose



Transkraniel Magnetisk Stimulering

Evaluering



Standardiserede måleredskaber

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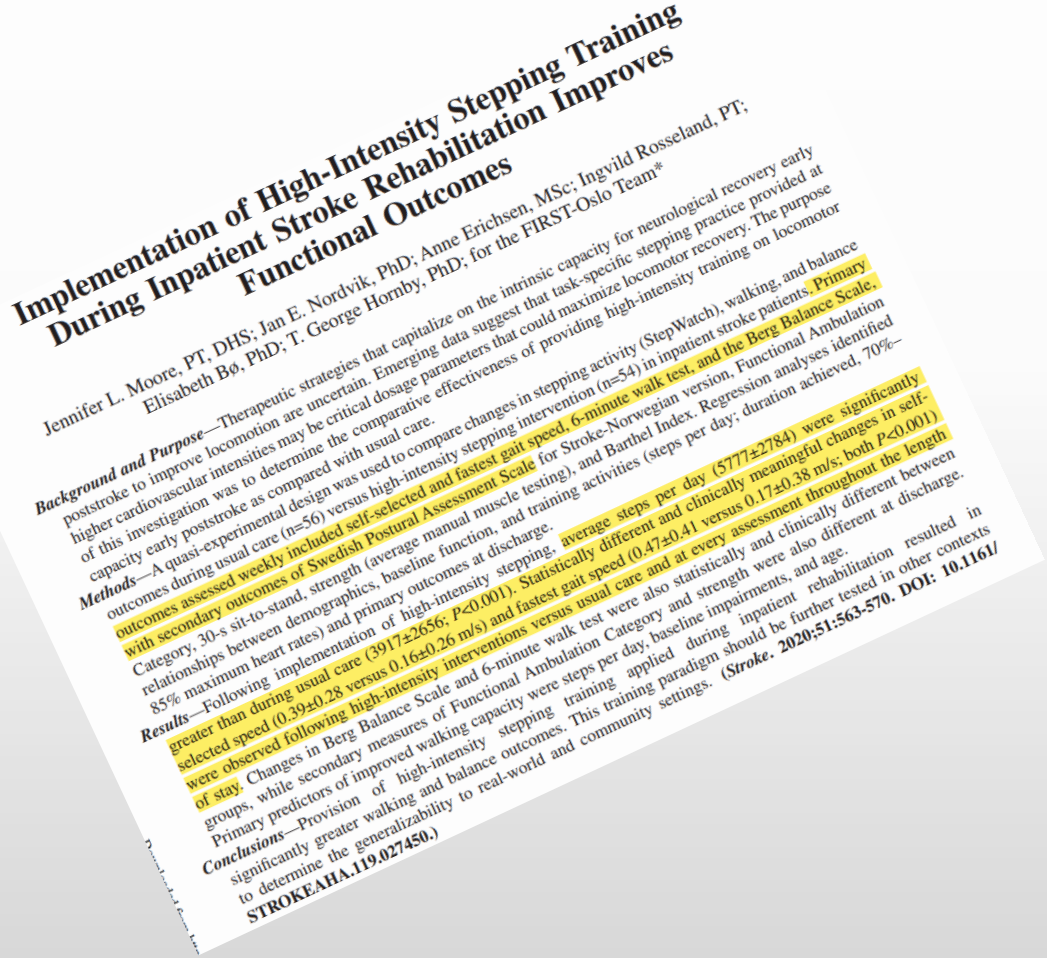
Højintensiv gangtræning



Implementation of High-Intensity Stepping Training During Inpatient Stroke Rehabilitation Improves Functional Outcomes

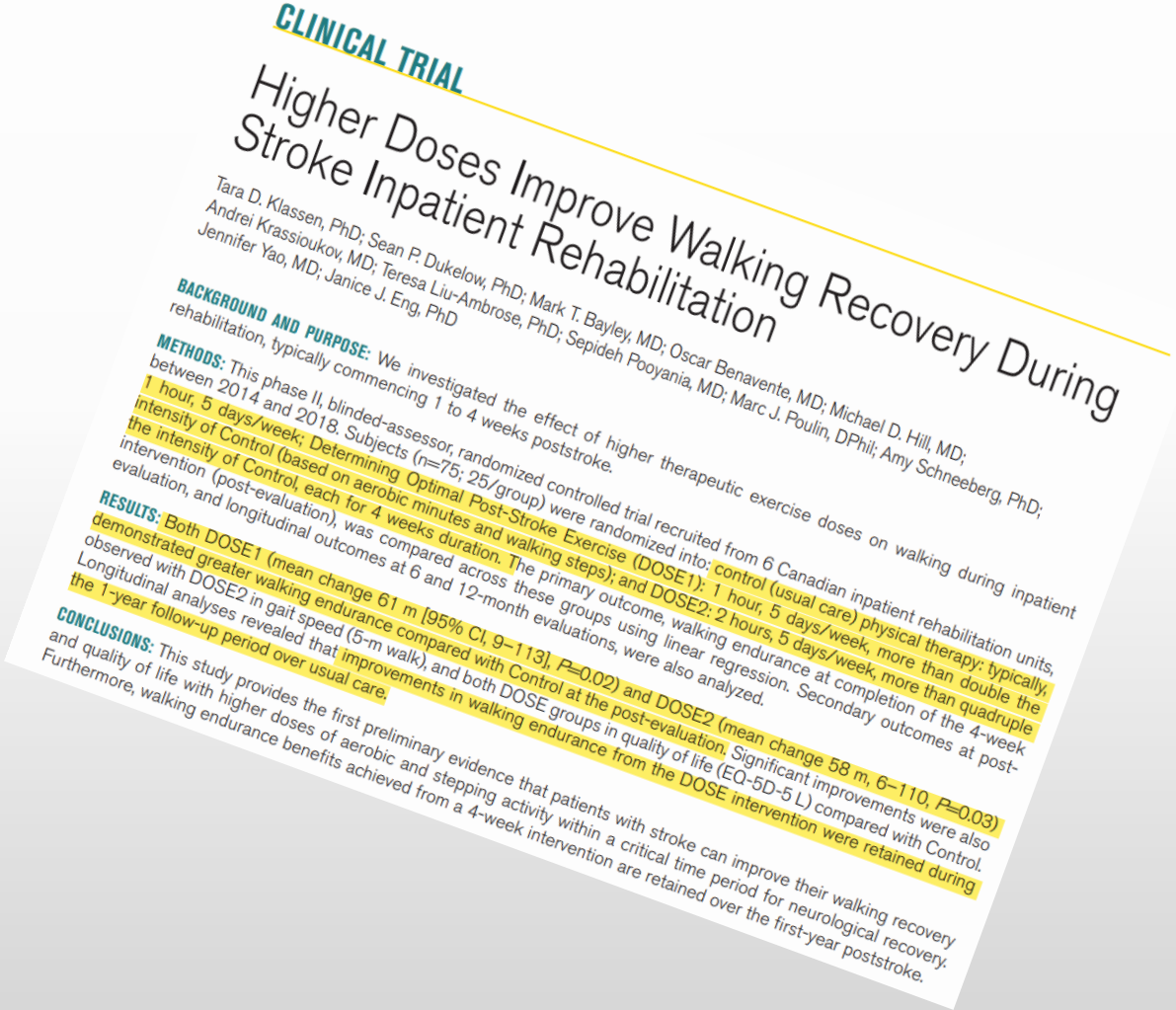
Jennifer L. Moore, PT, DHS; Jan E. Nordvik, PhD; Anne Erichsen, MSc; Ingvild Rosseland, PT; Elisabeth Bø, PhD; T. George Hornby, PhD; for the FIRST-Oslo Team*

Background and Purpose—Therapeutic strategies that capitalize on the intrinsic capacity for neurological recovery early poststroke to improve locomotion are uncertain. Emerging data suggest that task-specific stepping practice provided at higher cardiovascular intensities may be critical dosage parameters that could maximize locomotor recovery. The purpose of this investigation was to determine the comparative effectiveness of providing high-intensity training on locomotor capacity early poststroke as compared with usual care.

Methods—A quasi-experimental design was used to compare changes in stepping activity (StepWatch), walking, and balance outcomes during usual care (n=56) versus high-intensity stepping intervention (n=54) in inpatient stroke patients. Primary outcomes assessed weekly included self-selected and fastest gait speed, 6-minute walk test, and the Berg Balance Scale. Secondary outcomes of Swedish Postural Assessment Scale for Stroke-Norwegian version, Functional Ambulation Category, 30-s sit-to-stand, strength (average manual muscle testing), and Barthel Index. Regression analyses identified relationships between demographics, baseline function, and training activities (steps per day; duration achieved, 70%–85% maximum heart rates) and primary outcomes at discharge.

Results—Following implementation of high-intensity stepping, average steps per day (5777±2784) were significantly greater than during usual care (3917±2656; $P<0.001$). Statistically different and clinically meaningful changes in self-selected speed (0.39±0.28 versus 0.16±0.26 m/s) and fastest gait speed (0.47±0.41 versus 0.17±0.38 m/s; both $P<0.001$) were observed following high-intensity interventions versus usual care and at every assessment throughout the length of stay. Changes in Berg Balance Scale and 6-minute walk test were also statistically and clinically different between groups, while secondary measures of Functional Ambulation Category and strength were also different at discharge. Primary predictors of improved walking capacity were steps per day, baseline impairments, and age.

Conclusions—Provision of high-intensity stepping training applied during inpatient rehabilitation resulted in significantly greater walking and balance outcomes. This training paradigm should be further tested in other contexts to determine the generalizability to real-world and community settings. (***Stroke***. **2020;51:563-570. DOI: 10.1161/STROKEAHA.119.027450.**)



CLINICAL TRIAL

Higher Doses Improve Walking Recovery During Stroke Inpatient Rehabilitation

Tara D. Klassen, PhD; Sean P. Dukelow, PhD; Mark T. Bayley, MD; Oscar Benavente, MD; Michael D. Hill, MD; Andrei Krassioukov, MD; Teresa Liu-Ambrose, PhD; Sepideh Pooyania, MD; Marc J. Poulin, DPhil; Amy Schneeberg, PhD; Jennifer Yao, MD; Janice J. Eng, PhD

BACKGROUND AND PURPOSE: We investigated the effect of higher therapeutic exercise doses on walking during inpatient rehabilitation, typically commencing 1 to 4 weeks poststroke.

METHODS: This phase II, blinded-assessor, randomized controlled trial recruited from 6 Canadian inpatient rehabilitation units, between 2014 and 2018. Subjects (n=75; 25/group) were randomized into: control (usual care) physical therapy: typically, 1 hour, 5 days/week; Determining Optimal Post-Stroke Exercise (DOSE1): 1 hour, 5 days/week, more than double the intensity of Control (based on aerobic minutes and walking steps); and DOSE2: 2 hours, 5 days/week, more than quadruple the intensity of Control, each for 4 weeks duration. The primary outcome, walking endurance at completion of the 4-week intervention (post-evaluation), was compared across these groups using linear regression. Secondary outcomes at post-evaluation, and longitudinal outcomes at 6 and 12-month evaluations, were also analyzed.

RESULTS: Both DOSE1 (mean change 61 m [95% CI, 9–113], $P=0.02$) and DOSE2 (mean change 58 m, 6–110, $P=0.03$) demonstrated greater walking endurance compared with Control at the post-evaluation. Significant improvements were also observed with DOSE2 in gait speed (5-m walk), and both DOSE groups in quality of life (EQ-5D-5 L) compared with Control. Longitudinal analyses revealed that improvements in walking endurance from the DOSE intervention were retained during the 1-year follow-up period over usual care.

CONCLUSIONS: This study provides the first preliminary evidence that patients with stroke can improve their walking recovery and quality of life with higher doses of aerobic and stepping activity within a critical time period for neurological recovery. Furthermore, walking endurance benefits achieved from a 4-week intervention are retained over the first-year poststroke.

Same same, but different.....

- Flere skridt med højere puls (70-80% af makspuls)
- Samme resourcer (Klassen et al. for DOSE1 only)
- Forbedring vedvarer 6 and 12 mdr. efter (Klassen et al.)
- Anden forskning støtter også høj kardiovaskulær intensitet, men ikke altid langtidseffekt påvist
- Implementering
- Stor engagement fra terapeuterne

Højintensiv gangtræning

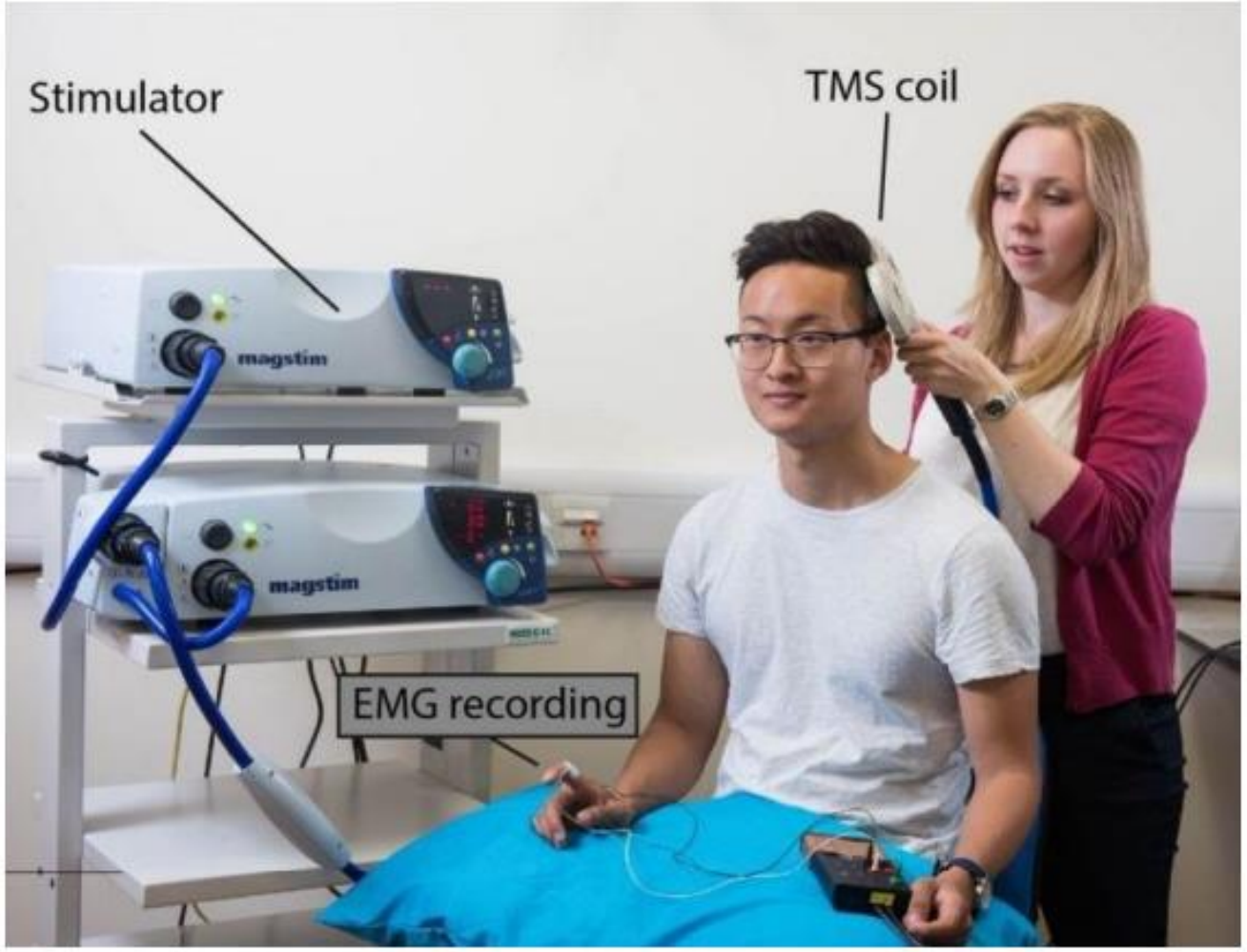
Muligheder

- Individualiseret rehabilitering
- Præcis dosering af intensitet
- Bedre udnyttelse af tiden under rehabilitering

Udfordringer

- Kræver ændring af praksis og traditioner
- Går på bekostning af andre elementer i behandlingen
- Implementering skal evalueres og fastholdes

TMS undersøgelse for prognose af armfunktion



Hvorfor skal vi kunne prædikere armfunktion? (eller prædikere funktion generelt?)

Muligheder

- Individualiseret rehabilitering
- Bedre udnyttelse af tiden under rehabilitering
- Realistiske forventninger hos patient / pårørende
- Styrker motivation hos dem med god prognose
- Muliges bedre resultater ved træning af andre områder

Udfordringer

- Tydelig indikator, men ikke perfekt (80% korrekt dårlig prognose)
- Der findes altid en undtagelse
- Etisk dilemma at meddele en dårlig prognose

Standardiserede måleredskaber for motorisk funktion efter hjerneskade

- Functional Ambulation Categories (FAC)
- Timed-up-and-go
- 10m gang test

Anbefalinger til nationale redskaber til vurdering af funktionsevne
- hos voksne med erhvervet hjerneskade

- Fugl-Meyer Motor Assessment OE

Standardiserede tests på definerede tidspunkt efter skade

Muligheder

- Dokumentation af ændring
- Klinisk relevant information på tværs af afsnit og sektorer
- Forskning – udvikling
- Motiverende for patienten
- +++++

Udfordringer

- Tager tid
- Passer ikke for alle patienter
- Kræver et system som gør det nemt at huske tidspunkt for test
- Kræver opbakning fra ledere og organisation

Tak!

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