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MindMotionPRO

Virtual Reality based Upper Limb Neurorehabilitation

Early Rehab. Made Simple.

www.mindmaze.com

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The rehabilitation dose is central to functional recovery

The problem:
The neurorehabilitation dose is typically too low and often delivered too late to allow maximum recovery potential and desired hospital discharge timing.

EXCITE[1], GRASP[2] and Han[3] randomized controlled studies demonstrate that the rehabilitation dose is central to recovery:

EXCITE Trial: RCT demonstrates that intensive therapy provided by CIMT (Constraint-Induced Movement Therapy) produces clinically relevant benefits in arm function that persist for at least 1 year (Steven Wolf, JAMA, 2006).

→ **The appropriate rehabilitation dose produces lasting clinically relevant arm functional improvements.**

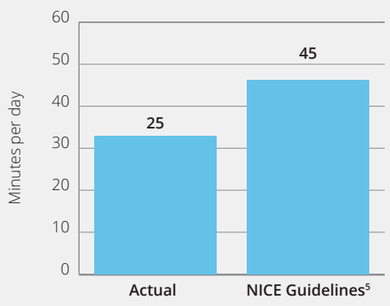
GRASP Trial: RCT shows that repetitive arm programme improves upper limb function at the end of the 4-week intervention (approximately 7 weeks post stroke).

→ **Repetitive arm movements improve upper limb recovery in the sub-acute phase of stroke.**

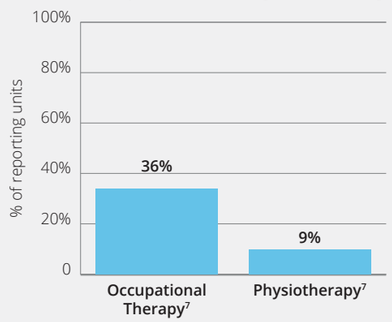
Han study: RCT 1 – 2 months post stroke demonstrates that 2 – 3 hours of arm training per day improve FMA and ARAT scores (Han et al, Clin Rehabil, 2013).

→ **2 – 3 hours of arm training per day for 6 weeks started early improve FMA and ARAT.**

Are we hitting guideline targets?



Median number of minutes per day on which physiotherapy is received from UK Sentinel Stroke National Audit Programme (SSNAP), July – Sept 2015 report[1]



Data from 207 reporting units in the UK Sentinel Stroke National Audit Programme (SSNAP), July – Sept 2015 report[2]

It is hard to meet rehabilitation targets

Hospital resources do not always allow patients to meet rehabilitation targets.

"The dose of Upper Limb treatment after stroke is unacceptably low…"

(Nick Ward, UCL, London)[4]

NICE Guidelines call for 45 minutes of upper limb rehab per day.

(NICE Guidance – Stroke (QS2), 2010)[5]

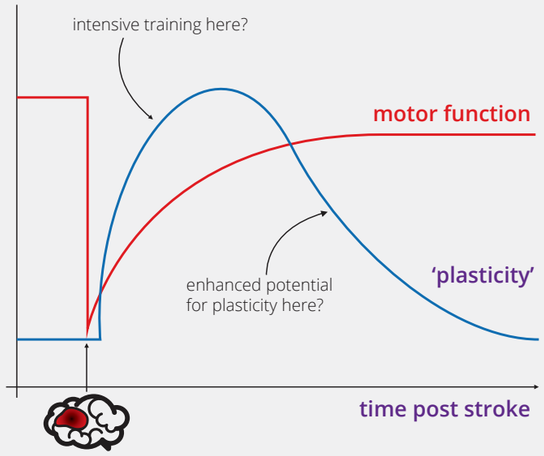
In the acute phase, average patient spends less than 13% of time in therapeutic activity.

(Bernhardt et al. 2004)[6]

1. *EXCITE Trial – Steven L. Wolf et al "Effect of Constraint-Induced Movement Therapy on Upper Extremity Function 3 to 9 Months After Stroke. The EXCITE Randomized Clinical Trial" , JAMA November 1, 2006, Vol 296, No. 17*
2. *GRASP STUDY – Stroke. 2009 Jun;40(6):2123-8. doi: 10.1161/STROKEAHA.108.544585. Epub 2009 Apr 9. A self-administered Graded Repetitive Arm Supplementary Program (GRASP) improves arm function during inpatient stroke rehabilitation: a multi-site randomized controlled trial. Harris JE1, Eng JJ, Miller WC, Dawson AS.*
3. *HAN STUDY – Han C et al "Effects of intensity of arm training on hemiplegic upper extremity motor recovery in stroke patients: a randomized controlled trial" Clin Rehabil. 2013 Jan;27(1):75-81.*
4. *Nick Ward, "Managing the upper-limb after stroke" 2014; www.ucl.ac.uk/cnr/docs/upperlimb/ward*
5. *NICE Guidance – Stroke (QS2), 2010 – Quality statement 7: Ongoing inpatient rehabilitation: https://www.nice.org.uk/guidance/qs2/chapter/Quality-statement-7-Ongoing-rehabilitation*
6. *Bernhardt, J., Dewey, H., Thrift, A., & Donnan, G. (2004). Inactive and alone physical activity within the first 14 days of acute stroke unit care. Stroke, 35(4), 1005-1009.*
7. *UK Sentinel Stroke National Audit Programme (SSNAP), July-Sept 2015 report, accessed on https://www.strokeaudit.org/results/Clinical-audit/National-Results.aspx*

Early rehabilitation increases recovery potential

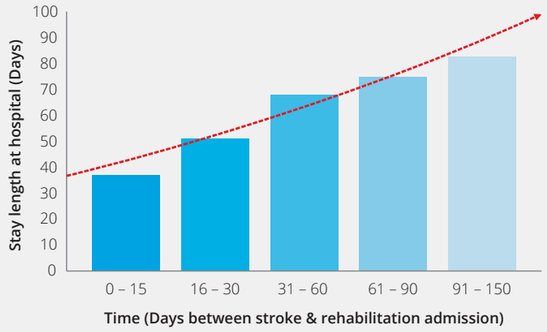
What is the best time to initiate neurorehabilitation? As early as 1 – 6 weeks post stroke.



"Accumulating evidence suggests … [there is] … a compelling reason to deliver the highest dose and intensity of neurorehabilitation in the first few weeks and months after stoke in order to effect the biggest improvement in the widest range of functional tasks"

(Nick Ward, UCL Institute of Neurology, Queen Square, London, UK)[8]

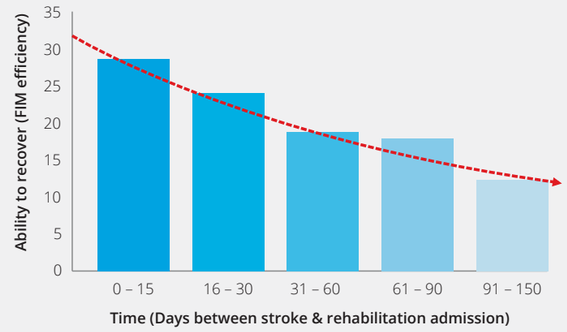
Delaying admission to rehabilitation lengthens hospital stay



The later you start rehab, the longer the hospital stay.

Reproduced from Salter et al., J Rehabil Med 2006[9]

Delaying admission to rehabilitation reduces patient's ability to recover on FIM (Functional Independence Measure)



The sooner patients can start rehabilitation, the greater the recovery potential.

8. *Nick Ward, ECNR 2015 www.acnr.co.uk/2015/09/the-future-of-stroke-rehabilitation-upper-limb-recovery*
9. *Katherine Salter, B. A., Mark Hartley, B. A., & Norine Foley, B. (2006) « Impact of early vs delayed admission to rehabilitation on functional outcomes in persons with stroke » J Rehabil Med, 38(113/117).*

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Increase upper limb neurorehabilitation as early as 1 – 6 weeks post stroke

MindMotionPRO

A CE Marked hospital-based solution for early motor rehabilitation that lets you increase the rehabilitation dose cost effectively. Simple set-up decouples therapist time from desired rehabilitation time.

Easily adapted to the patient's performance
- Number of repetitions
- Speed of game
- Difficulty level
- Hand side
- Mirror vs. direct mode

MindMotionPRO exercises developed based on standardized neurorehabilitation principles: upper limb rehabilitation & cognitive paradigms

Training games engage patient's shoulder, elbow, forearm, and wrist movement

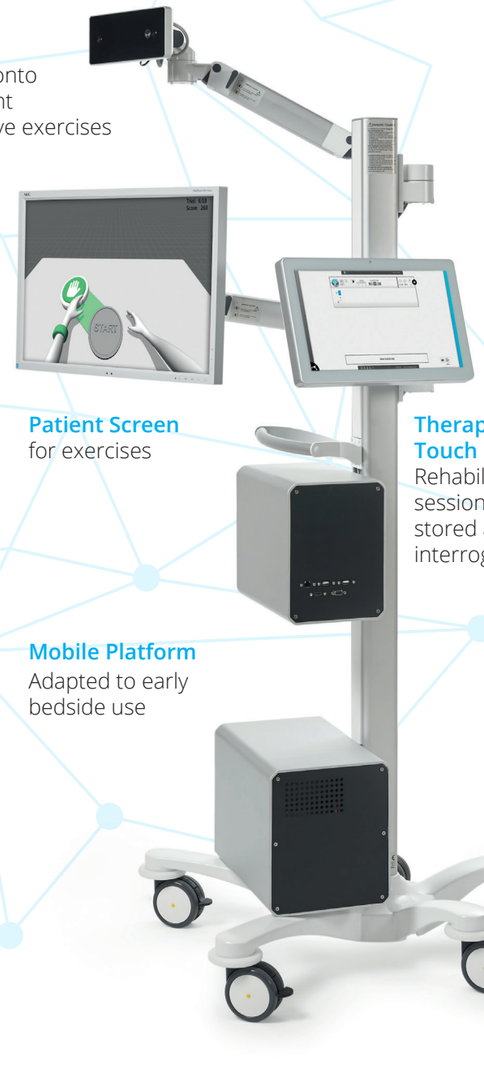
Integrated therapy
- Constraint-induced therapy
- Mirror therapy
- Action observation therapy
- Motor imagery

Suitable for bed use allowing early intervention

Independent practice allows increased therapy dosage

Interactive and immersive exercises provide increased motivation

3D Motion Tracking Camera Captures and maps patient movements onto 3D avatars in different customized interactive exercises



Patient Screen for exercises

Therapist Touch Screen Rehabilitation sessions assigned, stored and interrogated

Mobile Platform Adapted to early bedside use

MindMotionPRO lets you increase the rehabilitation dose

Acute Stroke Patients:

Clinical study shows patients are comfortable with 20 – 30 minutes per session as early as 4 days post hospitalization without continuous supervision[1]

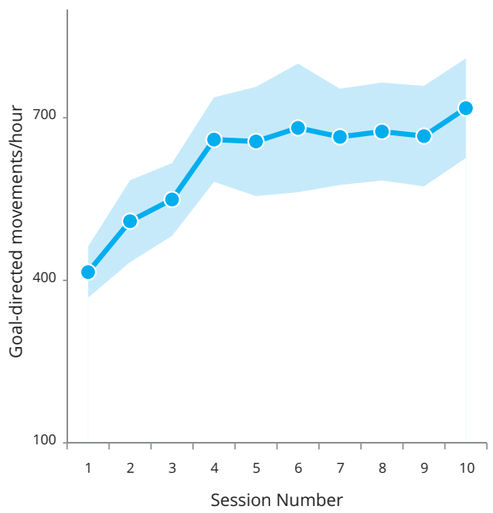
- Treatment possible as early as 4 days post hospitalization
- ~22 min VR therapy of active reach movements
- Concentration and enjoyment to a great extent
- Motivated to continue training

Chronic Stroke Patients:

Study demonstrates training intensity nearly doubles from session 1 to 10[2]

Goal-directed movements/hour[2]

Evolution of virtual reality exercise intensity across sessions for each patient.



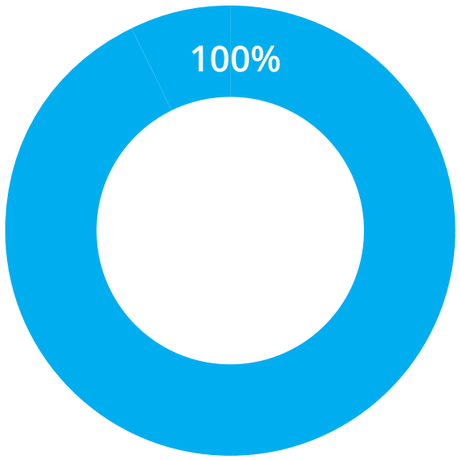
1. Garipelli G. et al, CHUV Lausanne University Hospital 2015, in publication

2. Thomas Schmidlin, Clinique Romande de Réadaptation/EPFL, Sion, Switzerland; European Congress of Neurorehabilitation (ECNR) Oral Presentation December 1, 2015

Positive patient feedback on MindMotionPRO training games

Patients enjoy MindMotionPRO rehabilitation training games

100% of patients greatly enjoy rehabilitation with MindMotionPRO [1]

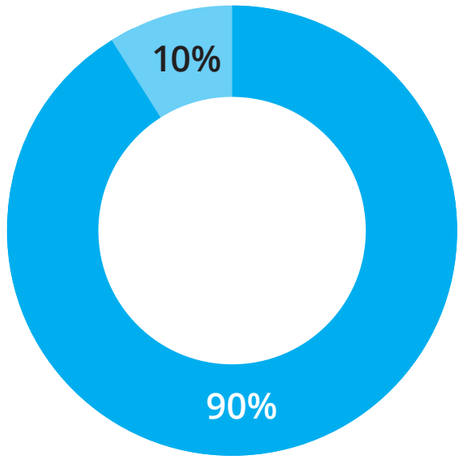


Question: Have you enjoyed your training experience?

- Greatly enjoyed MindMotionPRO
- Quite enjoyed MindMotionPRO
- Just OK

MindMotionPRO gives patients added motivation

90% of patients report improvement in their movement capacity [2]

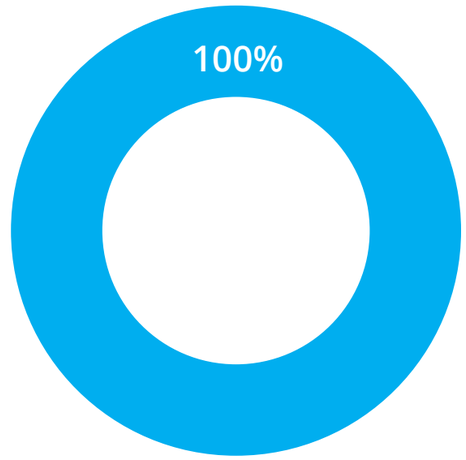


Question: After your training session, do you feel any improvement of your movements?

- Yes
- No

MindMotionPRO helps patients forget they are in the hospital

While performing rehabilitation exercises, 100% of patients forget they are in the hospital [1]



Question: During the exercises, did you have the feeling of being in the hospital room?

- Never
- Seldom
- About half the time
- Usually
- Always

Patients' Testimonials

"I really enjoyed it. I would be happy to come back to do more playing. The point game is fun as it looks like Star Wars."

"The time spent during these exercises makes me forget that I am in a hospital."

"The mirror game is difficult to play, but I won't give up!"

"I think that was easier than other therapies, not tiring and also it was like a tasty dessert."

1. Garipelli G. et al, CHUV Lausanne University Hospital 2015, in publication

2. Thomas Schmidlin, Clinique Romande de Réadaptation/EPFL, Sion, Switzerland; European Congress of Neurorehabilitation (ECNR) Oral Presentation December 1, 2015

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Early Rehab. Made Simple.

MindMotionPRO is a means to increase the rehabilitation dose cost effectively. Simple set-up lets you decouple therapist time from desired rehabilitation time.

3D Motion Tracking Camera

Patient Screen

Therapist Touch Screen

Suitable for bed use

Mobile Platform

CE

Product certification

CE marked according to European Medical Device Directive 93/42/EEC

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