How we utilize Neuroplasticity in Rehabilitation

Taking Advantage of the Plastic Brain

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Defining Neuroplasticity

* NEURO- : relating to nerves or the nervous system

![Diagram of a neuron with labels for various parts such as cell body, axon, dendrite, synapse, and others.](image)
Defining Neuroplasticity

* PLASTICITY: the adaptability of an organism to changes in its environment
For your brain...

Neuroplasticity = Learning
Motor Learning

* Principles to Enhance Motor Learning
  * Intensity
  * Repetition
  * Task Specificity
  * Problem Solving
Who Benefits?
Problem Solving

* How to do YOU enhance problem solving in your “student”

* FEEDBACK:
  * Attention (Internal vs External)
  * Motivational Property
  * Self-Control

* TIME:
  * The teacher needs to be patient and be QUIET

* SALIENCE:
  * The student needs to care about the task
Figure 2 Accuracy scores (higher scores indicate greater accuracy) produced by novice golfers (Experiment 1, Wulf and Su 2007). Participants in the external focus group were instructed to focus on the swing of the club, whereas internal focus participants were instructed to focus on the swing of their arms. The control group was not given attentional focus instructions. During 2 days of practice (with focus instructions and reminders) and on a retention test (without instructions) on day 3, the external focus group outperformed the two other groups.


Figure 3 Platform deviations (root mean square error [RMSE]) from the horizontal position for the Better and Worse groups during 2 days of practice, and on the dual-task transfer tests on day 3 in Wulf and Lewthwaite (2009). The ‘Better’ group showed more effective balance performance on the transfer test. (Note: smaller RMSEs indicate more effective performance)
Feedback...who decides?

* Self-controlled

VS

* Yoked
Who learns better?

Figure 4 Movement form scores (higher scores indicate more effective form) for basketball jump shots (Wulf et al. 2005). Self-control group participants, who had control over the presentation of an expert video model, outperformed yoked group participants—despite an initial disadvantage—on the retention test.

Neuroplasticity = Learning

Learning enhances brain health
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