10 principles of neuroplasticity

How to harness the ability of the brain to heal itself after injury

NEUROPLASTICITY is the amazing ability of our brains to change throughout our lives. It's how we re-learn lost skills after a brain injury like TBI or stroke. These 10 principles are incorporated into your **brain rehabilitation therapy.** When doing your therapy homework, apply these principles to take a more active role in your recovery.

1

USE IT OR LOSE IT

Your brain is a network of neural connections. Every thought or action or skill you practice has a specific set of connections that fire in the brain – but these connections only stay strong if they're used. If you don't use them, they fade and weaken over time.

2

USE IT AND IMPROVE IT

The flip side of "use it or lose it" tells us to practice a skill often (which means you're firing those brain connections more often) to strengthen neural connections over time.

3

SPECIFICITY

The cells in our brains are called neurons and each is responsible for actions or skills. In order to promote neuroplastic changes, your therapy exercises need to target parts of your brain in a specific way; you can't just do any old exercise. In rehab, your evidence-based exercises are rooted in research and will improve a specific skill or area of the brain.

4

SALIENCE

A fancy way of saying that your exercises should be meaningful to you. Research shows that motivation helps facilitate neuroplastic changes. Because what's meaningful varies from person to person, and your therapy program isn't set in stone, if you're not inspired by an exercise, try something different.

5

TRANSFERENCE

Learning a skill in one situation can transfer to another situation – and this is a good thing. Clinicians may talk about "generalizing" (or using) the skills you practice in therapy to daily life activities outside therapy. This is transference.

6

INTERFERENCE

When you practice and improve skills in one area, it can interfere with your ability to improve skills in another area. Don't worry; your clinician knows how to work around this.

7

TIME

As your brain re-learns skills after an injury, there are times during recovery when you'll see a faster rate of improvement and times when it will seem slower. This is normal neuroplastic healing.

8

AGE

Our brains are more plastic when we are young, which is why kids pick up skills so rapidly. However, neuroplasticity absolutely occurs in adulthood too! In fact, at any age, we have the potential to learn new skills or re-learn lost skills.

9

REPETITION

Practicing rehab therapy frequently and consistently is key. Just like if you're strength-training by lifting weights and you go to the gym once a month, you won't see much improvement. If you go more frequently, you will. Our brains work the same way.

10

INTENSITY

Intensity works hand-in-hand with repetition. In the gym example, if you use light weights that don't challenge you, you won't see the same results as if you push yourself with heavier weights. Intensity can be the number of times you do an exercise, how long you do it, or how difficult the exercise is. Play around with different intensity parameters to keep your homework interesting!

Source: Kleim JA, Jones TA. Principles of experience-dependent neural plasticity: implications for rehabilitation after brain damage. Journal Speech Lang Hear Res. 2008 Feb;51(1): S225-39. doi: 10.1044/1092-4388(2008/018).

constanttherapy.com **T** 1-888-233-1399 **E** support@constanttherapy.com

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