Introduction to CIMT

TIDE Group

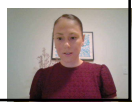
Sound on

1

Objectives

By the end of this module you will be able to:

- **Identify** patients/clients that are suitable for a CIMT program
- **Name and describe** the key components of CIMT
- Have an **awareness** of the evidence underpinning CIMT



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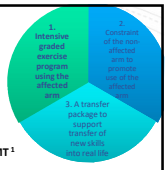
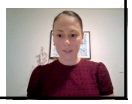
What is Constraint Induced Movement Therapy (CIMT) and how is it used in practice?



- **Three key components of CIMT** [1]
- 1. Intensive, graded practice using the affected upper limb to enhance task specific use
- 2. Constraint or forced use of the affected upper limb by placing the non affected upper limb in a mitt or restraint
- 3. A transfer package designed to transfer the gains made in the clinical setting to the patient's real-world environment



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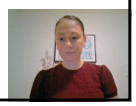
CIMT and learned non-use

- Taub et al. circa 1970's: Studies with primates with unilateral sectioning of the dorsal cervical and upper thoracic spine nerve roots.
- Applied a physical restraint to unaffected arm- primates able to resume bimanual selfcare and routine daily activities
- Only once restraint worn for at least 3 days
- Using the limb purposefully could also be induced when training was used, particularly when tasks were made increasingly difficult to achieve a reward – "**shaping**" [2].



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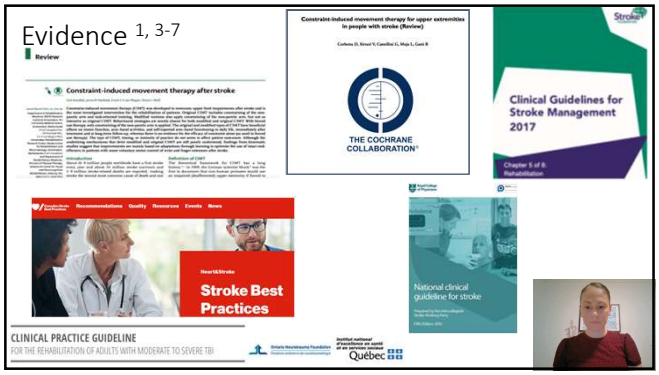
Evidence [1, 3-7]



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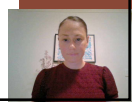
CIMT versus dose matched interventions [8]

- Stevenson et al., 2012: Systematic review with meta-analysis of CIMT compared to dose-matched interventions for upper limb dysfunction in adult stroke survivors
- 22 trials identified – mean PEDro score 6.4 (1.2)
- CIMT superior to dose matched interventions based on indicators of:

1. Upper limb motor capacity (e.g. Fughl Meyer Assessment)
2. Upper limb ability (e.g. ARAT, Wolf Motor Function Test)
3. Functional Independence Measure (FIM) scores
4. Motor Activity Log (MAL) scores in terms of Amount of Use and Quality of Movement in the arm



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Changes to the brain!

- The size of cortical representation of a body part in the brain depends on the amount of use of that body part e.g. Increased cortical representation of left hand for string musicians [9]
- Pre and post measures of cortical motor output of a hand muscle taken (abducens pollicus brevis) [10]
- Significant enlargement of cortical area size post CIMT
- Similar results seen in study by Ro et al., (2006)[11] with 8 stroke survivors in the subacute phase (2 weeks post stroke)

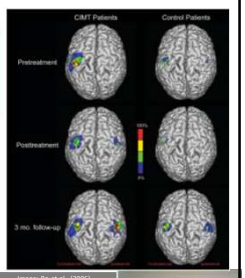
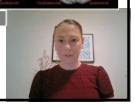


Image: Ro et al., (2006)



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How CIMT works

8

CIMT aims to reverse learned non-use of the weaker arm

9

Development of learned non-use [15]

Neurological injury or disease leading to a weak arm → Unsuccessful and frustrating attempts to use the weaker arm → Preference of the stronger arm as a normal compensation → Long term preference of the stronger arm even when physical recovery of the weaker arm is seen

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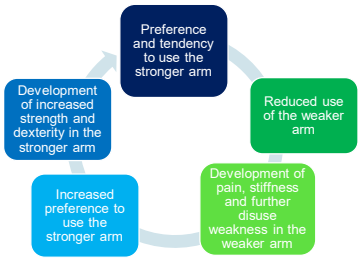
The Vicious Cycle of Learned Non-Use [12]



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STROKE RECOVERY: HE CAN BUT DOES HE? [13]

KEITH ANDREWS, JEAN STEWARD
Author Notes
Rheumatology, Volume 18, Issue 1, February 1979, Pages 43–48,

Abstract
SUMMARY
On assessing 29 consecutive stroke patients attending the Day Hospital of the Geriatric Unit it was found that there was a difference in what the patient could do in the unit and did do at home. Each activity of daily living was less well performed in the home situation in 25-45% of cases.
In 52% of cases the chief carer claimed that the patient did not do two or more activities at home which the patient was capable of in the Day Hospital. This was not related to the features of the stroke but more to the attitude of the patient and his chief carer. Patients starting therapy late also did less well at home than in the rehabilitation unit. **These findings emphasize the need to train the chief carer as well as the patient and also suggest the possible need for more home-orientated rehabilitation.**

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CIMT overcomes learned non-use by

Putting the stronger arm 'on a holiday'

AND

Putting the weaker arm 'on a boot camp'

13

CIMT overcomes learned non-use by

Putting the stronger arm 'on a holiday'

AND

Putting the weaker arm 'on a boot camp'

Creating the necessity required to strengthen and drive new synaptic connections

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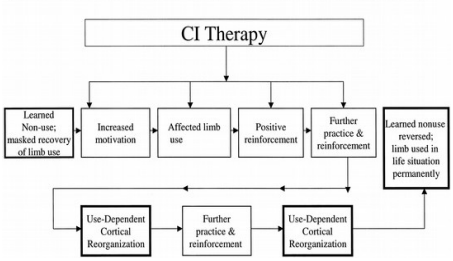
Overcoming Learned Nonuse



(Sunderland 2005) [14]

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Principles behind CIMT Training [15]

Structured training should be fun, motivating and achievable!

Negative self-belief

Task too challenging → Frustration/ 'Can't do it' → Likelihood of reduced/non-use of weaker arm

Positive self-belief

Task achievable and motivating → Excitement/ 'Can do it' → Likelihood of increased weaker arm use

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10 Principles to Optimise Neuroplasticity [16]

- Use it or lose it
- Use it and improve it
- Be specific in your choice of task to practice
- Repetition matters
- Intensity matters
- Time matters
- Salience matters
- Age matters
- Aim for transference
- Be careful of interference

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CIMT is suitable for people with……

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What's needed to make CIMT work? [17-19]

- CIMT works for people who have a minimum amount of movement present in the wrist and hand
- This demonstrates the presence of an intact cortico-spinal system, the foundation on which CIMT builds dextrous movement

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