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What is the evidence for the effectiveness of constraint-induced movement therapy (CIMT) when compared to mirror box therapy (MBT) for adults who have experienced hemiplegia following a stroke?

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Relevant Discipline	Occupational therapy, Physiotherapy
Sources searched	A search was conducted using multiple databases (Cochrane, PubMed and Medlab) on August 28th 2020.
Highest level of Evidence found	The evidence review is based on 3 systematic reviews and 5 randomised controlled trials (RCT's), Each of these designs are ranked highest on the hierarchy of evidence due to their rigorous methodology and generally low levels of bias.
Quality appraisal of the body of Evidence	**Strength of Evidence:** The evidence review is based on 3 systematic reviews and 5 randomised controlled trials (RCT's)
	Quality of Evidence: The quality of CIMT studies may be considered moderate-high, compared to the moderate quality of MBT studies, which had some inconsistent evidence to support its effectiveness. Furthermore, while the systematic reviews integrate numerous studies, some RCT's would have benefited from a larger sample size to increase the strength of their findings.
	Statistical significance: The majority of studies present statistically significant evidence to support CIMT and MBT, identified in obtaining p values <0.05.
	Clinical significance: The review produced recommendations relevant in clinical settings.
	External Validity/Applicability: Severity of impairment and time since stroke are two factors impacting the external validity of these results; a result of the evidence being based on a wide demographic. Nevertheless, most studies also had a confidence interval of 95%, suggesting there is a very high chance results reflect the general population.
Summary of Evidence findings	The studies compared CIMT and MBT to conventional rehabilitation for treating hemiplegia post-stroke. Various outcome measures were used to evaluate changes in upper limb motor function, including the Fugl-Meyer Assessment (FMA), Functional Independence Measure (FMA) and Wolf Motor Function Test (WMFT). Three out of the four studies indicate that MBT, when paired with conventional therapy, improves motor function after stroke. Contrastingly, all four of the CIMT studies prove that this specific therapy is effective in improving motor function.
Conclusions	CIMT proved to have a larger treatment effect when compared with conventional therapy, for adults post-stroke. MBT had moderate quality evidence to support its use with adults who have experienced stroke. However, comparing CIMT and MBT alongside each other, CIMT had higher-quality and consistency of support when used with clients post-stroke.
Implications for clinical practice	Based on the findings, there is stronger evidence to suggest that CIMT is a more effective form of therapy than MBT. Despite this, conventional therapy paired with a specialised therapy, whether it be CIMT or MBT, remains effective in restoring upper limb motor function. We would recommend that allied health professionals identify which form/s of therapy are best for their client determined by their medical history, the time passed since the stroke, and the severity of the injury.

1. Antoniotti, P., Veronelli, L., Caronni, A., Monti, A., Aristidou, E., Montesano, M. & Corbo, M. (2019). No evidence of effectiveness of mirror therapy early after stroke: an assessor-blinded randomized controlled trial, *Clinical Rehabilitation*, *33*(5), 885–893.
2. Chinnavan, E., Priya, Y., Ragupathy, R. & Wah, Y. (2020). Effectiveness of mirror therapy on upper limb motor functions among hemiplegic patients, *Bangladesh Journal of Medical Science*, *19*(2), 208–213.
3. Pervane, V.S., Nakipoglu Yuzer, G.F., Sezgin O.D., Demir, O.S. & Ozgirgin, N. (2016). Effects of mirror therapy in stroke patients with complex regional pain syndrome type 1: A randomized controlled study, *Archives of Physical Medicine and Rehabilitation*, *97*(4), 575–581.
4. Peurala, S.H., Kantanen, M.P., Sjögren, T., Paltamaa, J., Karhula, M. & Heinonen, A. (2012). Effectiveness of constraint-induced movement therapy on activity and participation after stroke: a systematic review and meta-analysis of randomized controlled trials, *Clinical Rehabilitation*, *26*(3), 209–223.
5. Thieme, H., Morkisch, N., Mehrholz, J., Pohl, M., Behrens, J., Borgetto, B. & Dohle, C. (2019). 'Mirror therapy for improving motor function after stroke: Update of a Cochrane Review, *Stroke*, *50*(2), 26–27.
6. Wang, Q., Zhao, J., Zhu, Q., Li, J. & Meng, P. (2011). Comparison of conventional therapy, intensive therapy and modified constraint-induced movement therapy to improve upper extremity function after stroke, *Journal of Rehabilitation Medicine*, *43*(7), 619–625.
7. Wolf, S.L., Winstein, C.J., Miller, J.P., Taub, E., Uswatte, G. & Morris, D. (2006). Effect of constraint-induced movement therapy on upper extremity function 3 to 9 months after stroke: The EXCITE randomized clinical trial, *Journal of the American Medical Association*, *296*(17), 2095–2104.
8. McIntyre, A., Viana, R., Janzen, S., Mehta, S., Pereira, S. & Teasell, R. (2014). Systematic review and meta-analysis of constraint-induced movement therapy in the hemiparetic upper extremity more than six months post stroke, *Topics in Stroke Rehabilitation*, *19*(6), 499–513.

This evidence summary has been prepared by undergraduate students as part of the HLTH 3057 Advanced Evidence Based Practice course. Due to limitations of assignment requirements reviews are limited to a maximum of 8 evidence sources. Conclusions and implications for clinical practice reported are provisional based on the evidence identified in this review and should be contextualized to local practice, clinical expertise and patient values. For further information on the review process please contact steve.milanese@unisa.edu.au