



What impact does a 6-12 year-old child's pencil grasp have on their handwriting performance?

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Relevant Discipline	Occupational Therapy (OT)
Sources searched	<ul style="list-style-type: none"> Embase, PubMed, Emcare, Cochrane, Health Collection and OT Seeker on 23 August 2020. For non-peer reviewed literature Google Scholar and Google searched on 1 September 2020.
Quality appraisal of the body of Evidence	<p>Strength of Evidence: Evidence was all low level (cross sectional studies and non-peer reviewed sources)</p> <p>Quality of Evidence: Consistent message across studies that types of mature grasp does not affect handwriting performance. However, samples for several studies were based on:</p> <ul style="list-style-type: none"> Convenience samples, not representative of the broader population, and Other countries where teaching, script and language may not reflect our local population. <p>There was no participant/assessor blinding in any of the studies found. Of the peer reviewed studies, one cited clear issues with their methodology for handwriting assessment and one provided very limited detail on how they determined grasp had little effect on handwriting. Overall the quality of evidence was weak.</p> <p>Statistical significance: Four peer reviewed studies found there was no statistically significant difference in handwriting for children using different grasps.</p> <p>Clinical significance: The impact would differ depending on the distribution of grasps used at specific schools and OT practices and their use of interventions to adjust grasp. Atypical grasps were used by 60-77% of children (Schwellnus et al. 2012; Koziatsek & Powell 2003).</p> <p>External Validity/Applicability: Teachers (Graham et al. 2008) and occupational therapists (Ziviani & Elkins 2006) predominantly consider dynamic tripod grasp to be the "correct" grasp. Recognition of multiple functional grasps could represent a significant change in the focus of interventions for children with handwriting difficulties and affect confidence and performance.</p>
Summary of Evidence findings	Five peer reviewed studies found in this review found that differences in a child's pencil grasp had no statistically significant effect on handwriting legibility and/or speed (Schwellnus et al. 2012; Ziviani & Elkins 2006; Koziatsek & Powell 2003; Dennis & Swinith 2001; Chang & Yu 2005).
Conclusions	Differences in 6-12 year old children's pencil grasps is unlikely to affect their handwriting, provided they are using a mature grasp. However, these results should be approached with caution due to the limited and relatively low level of evidence available. Further research is recommended using samples representative of the population and a higher level study design.
Implications for clinical practice	Children using mature grasps are unlikely to require clinical interventions that change their grasp to improve their handwriting.

- Schwellnus, H., Carnahan, H., Kushki, A., Polatajko, H., Missiuna, C. & Chau, T. (2012). Effect of pencil grasp on the speed and legibility of handwriting in children, *American Journal of Occupational Therapy*, 66(6), pp. 718–726.
- Ziviani, J. & Elkins, J. (1986). Effect of pencil grip on handwriting speed and legibility, *Educational Review*, 38(3), 247-257.
- Dennis, J.L. & Swinith, Y. (2001). Pencil grasp and children's handwriting legibility during different-length writing tasks, *American Journal of Occupational Therapy*, 55(2), 175–183.
- Koziatsek, S.M., & Powell, N.J. (2003). Pencil grips, legibility, and speed of fourth-graders' writing in cursive, *American Journal of Occupational Therapy*, 57(3), 284-288.
- Graham, S., Harris, K., Mason, R., Fink-Chorzempa, L., Moran, B. & Saddler, S. (2008). How do primary grade teachers teach handwriting? A national survey, *Reading and Writing*, 21(1), 49–69.
- Chang, S.H., & Yu, N.Y. (2005). Evaluation and classification of types of Chinese handwriting deficits in elementary schoolchildren, *Perceptual and Motor Skills*, 101(2), 631-647.

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