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The Dynamic Tripod Grasp: A Comparison with Atypical Grasp Patterns for Functional Communication
Research Handout
Fall 2004

Introduction (Purpose of Review):

The development and functional use of the hand is a central focus of occupational therapy practice. In a variety of contexts, occupational therapists evaluate hand function in their client's activities of daily living. For example, school-based occupational therapists may often receive referrals for children with awkward pencil grasp patterns and/or children having difficulty completing their written work in a timely and efficient manner. This review is intended to explore the existing evidence as to whether or not the dynamic tripod is the most functionally appropriate grasp pattern for handwritten communication.

Evidence-Based Practice Question:

Is the dynamic tripod grasp the most functional grip for handwriting?

Criteria for Evidence Questions:

- *Types of Participants:* Participants, of all ages, completing drawing and/or handwritten communication activities with various writing tools.
- *Types of Interventions:* Comparison of handwritten precision, legibility, and timeliness of dynamic tripod grasp versus an atypical grasp.
- *Types of Studies:* Case studies, cohort studies, quantitative studies published in English between 1986-2002.

Table Summarizing the Evidence:

References	Study Design/Data Collection	Level of Evidence	Sample Size	Outcome /Intervention	Conclusions & Implications
Bergman, K.P. (1990)	A cursory sample of the adult public upon observation in varying contexts.	Level III	1) 58-O.T. Students 2). 314 Voters 3). 134 Med. Students *Total 447*	86% of the sample=dynamic tripod 10% of the sample= lateral tripod 2% of sample= other grasps 1% of sample= immature grasps	Many other grasp patterns in addition to the dynamic tripod grasp can be adaptive enough to be functional in everyday life. Authors suggest lateral tripod grasp is equal to dynamic tripod grasp.
Burton, A.W., & Dancisak, M.J. (2000)	Children were given 20 trials of precision drawing tasks, 4 trials each with five implements of various diameters. (1,200 writing samples)	Level III	60 boys & girls within each group 3-,4-, & 5-year-olds.	Grip levels 4 & 5 were used most -within all three age groups. The Less accurate drawings corresponded with a grip score of 2. Pencil grips were evaluated by Schneck & Henderson's (1990) 10-level developmental grip scale.	The lateral tripod grasp was -used 17.4% and the dynamic -tripod grasp was used 35.3% There was no difference -found between these 2 grips. Implement size may/may not Influence writing legibility.
Dennis,	Quasi-experimental, mixed		46- Fourth	Short and long classroom assign-	Legibility mean for atypical

J.L., & Swinth, Y. (2001)	repeated measures design used. *Matched writing samples were used for variability. 2 dependent & independent variables used.	Level III	grade students	ments were scored for legibility using ETCH criteria. *23 students with a dynamic tripod pencil grasp were compared with 23 students using an atypical pencil grasp.	grasp= 95.14%. Legibility mean for dynamic tripod= 92.87%. The type of pencil grasp used did not affect overall legibility.
Koziatek, S.M., & Powell, N.J. (2002)	Completion of the *ETCH-C., Evaluation Tool of Children's Handwriting-Cursive. Pencil grip photographs were taken.	Level III	95 typically developing students + 6 special ed. students.	99 of the students used one of these four pencil grips: 38= dynamic tripod grasp 18= dynamic quadrupod 22= lateral tripod grasp 21= lateral quadrupod grasp	Lateral quadrupod & 4-finger grips were as functional as dynamic tripod, lateral tripod, and dynamic quadrupod pencil grips.
Schneck, C.M. (1991)	Components of grip were observed in a drawing task.	Level III	60 1st grade typically developing children.	Grip posture was assessed using a 5-point rating system (Schneck 1989). Three independent raters were used to score legibility.	Lower grip score was more common with children who displayed poor handwriting+ poor proprioceptive/kines- thetic awareness.
Schneck, C.M., & Henderson, A. (1990)	Observation of pencil grasps during drawing & coloring tasks. Interrater Reliability=.90 (determined in pilot study) Test-retest reliability 85%	Level II	320 typically developing children age 3-11 y/o	Pencil grips were classified as primitive, transitional, and mature based on age and frequency in assigned tasks.	Grip styles in younger children vary according to task. (drawing vs. coloring) Dynamic tripod & lateral tripod grasp patterns are both used maturely.
Ziviani, J., & Elkins, J. (1986)	Studies of photographs taken of children's pencil grasps as they participated in simple writing tasks with pencil & paper	Level III	282 children from Australia btwn 8-14 y/o. typical in development	The study evaluated the effectiveness of different types of dynamic tripod pencil grasps.	Writing speed and legibility were not affected by atypical grasp patterns. Grasp alone may not significantly impact overall handwriting performance.

Summary of Evidence:

- Researchers agree, for the most part, that the dynamic tripod grasp is not the only functional pencil grip utilized in handwriting activities.
- Many other grasp patterns, in addition to the dynamic tripod, can be adaptive enough to be functional in every day life.
- The lateral tripod grasp was considered, in more than one study, to be equal to the dynamic tripod grasp for functional writing capability.
- The lateral/dynamic quadrupod and four-finger pencil grasps were found to be as functional as the dynamic tripod and lateral tripod pencil grasp in one study.
- Grasp alone, may not significantly impact overall handwriting performance.

Implications for Consumers:

- Teachers and parents will require education regarding functional vs. dysfunctional pencil grasps.
- Parents, and other professionals, need to be aware that use of a larger pencil and/or pencil grip to assume a tripod writing grasp may or may not improve overall handwriting legibility.

- Occupational therapists can address these issues in school-based practice through consultation, collaboration, and/or direct intervention if applicable.

Implications for Practitioners:

- Occupational therapists need to explore related factors to the handwriting process (such as proprioceptive-kinesthetic awareness & handedness), not just the grasp pattern alone.
- The use of adaptive pencil grips, or other prosthetic devices, with students should be carefully explored by the occupational therapist.
- Though these devices may assist a student to assume a tripod pencil grasp, they may or may not improve the quality and timeliness of the student's written work.
- Occupational therapists need to remain abreast of classroom written output requirements.
- Technological advancements may decrease the amount of handwritten communication required, allowing other atypical grasp patterns to be functionally appropriate.

Implications for Researchers:

- Further research regarding the developmental progression of fine motor precision grasps requires continued exploration.
- Functional grasp patterns, with various implements, will also require continued research, as written output becomes less of a requirement secondary to technological advancements.

Recommendations for Best Practice:

- In a classroom context, a pencil grasp that allows a student to complete his/her work in a legible and timely manner is functional.
- Though awkward in appearance, an atypical pencil grasp does not constitute occupational therapy intervention.
- Keeping abreast of current research in areas related to functional grasp patterns for handwritten communication will assist occupational therapists to collaborate with educators, parents, and peers on *best practice* methods.

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