

THE COMPREHENSIVE STUDY ON HANDWRITING OF INDIVIDUALS WITH DOWN SYNDROME

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DOI : <https://www.doi.org/10.56726/IRJMETS53013>

ABSTRACT

This extensive review paper explores the complexities associated with handwriting skills and difficulties in individuals with neurodevelopmental disorders, with a specific emphasis on Down Syndrome (Ds) By consolidating significant discoveries from multiple studies, this review offers a comprehensive comprehension of the factors that impact handwriting, potential interventions, and the educational consequences for these particular populations.

Keywords: Down Syndrome, Handwriting, Motor Skills, Cognitive Abilities

I. INTRODUCTION

Down's syndrome is the most not unusual chromosomal reason of highbrow disabilities. It takes place in about 1 in 600 stay births, prevalence growing with maternal age. reminiscence, language and communicate impairment are core functions of Down's syndrome (legal guidelines, Byrne, & Buckley, 2000), and neuromotor and sensory disabilities are greater commonplace than inside the non-disabled populace. The purpose of the existing examine became to analyze handwriting in adults with Down syndrome (DS). while there is a protracted records and way of life of behavioral studies on fundamental motor capabilities in DS, handwriting capability has been as a substitute neglected, although it is an essential mode of conversation. **(Raphael Tsao, 2011)**.

Handwriting is a unique aspect of an individual's personality and can vary greatly from person to person. In the case of individuals with Down syndrome, handwriting may present with distinct characteristics that differentiate it from individuals without the condition.

Handwriting is a crucial purposeful lifestyles skill and relevant to a child's ability to participate at school. the purchase of handwriting gives challenges for youngsters with Down Syndrome (DS) because of its complicated nature related to motor manage and the combination of kinesthetic and visual facts collectively with quite a number of cognitive abilities. Occupational therapists play a vital role helping in the development of handwriting amongst youngsters with unique instructional popularity. As numbers of youngsters with Down Syndrome attending mainstream colleges is increasing greater know-how about interventions used robotically via occupational therapists to promote the improvement of handwriting is essential to tell occupational remedy exercise. Handwriting without Tears (HWT) is an intervention used extensively via occupational therapists to sell the improvement of handwriting (Olsen, 2003). There may be little studies that has focused at the software of the HWT technique implemented to children with Down Syndrome. As an occupational therapist working with a populace of children with Down syndrome in the Republic of Ireland, the primary creator explored whether or not the program, with its emphasis on a multisensory method, turned into especially proper for teaching prewriting/handwriting abilities to children with Down syndrome. **(Sandra Patton, 2017)**

People with Down syndrome often face challenges with fine motor skills, which can affect their ability to write neatly and consistently. Some common features of handwriting in individuals with Down syndrome may include: 1. *Irregular letter sizes*: Difficulty controlling hand movements can lead to variations in the sizes of letters within words. 2. *Inconsistent spacing*: Uneven spacing between letters and words may be evident due to challenges in motor coordination. 3. *Imprecise letter formation*: Letters may be poorly formed or not clearly distinguishable from one another. 4. *Slower writing speed*: Individuals with Down syndrome may write more slowly compared to their peers without the condition due to limited motor coordination. 5. *Difficulty with letter alignment*: Aligning letters along a straight line or within ruled margins can be a challenge for individuals with Down syndrome.

The complexity of handwriting is a in particular vital component to take into account whilst analyzing populations with motor co- ordination problems including DCD, as there are many underlying cognitive factors, that can influence their handwriting performance (Van Galen, 1991).as an instance, earlier than executing the motor issue of handwriting, there are methods that have to precede it consisting of activating the goal to put in writing, producing thoughts, retrieving semantics, spelling and deciding on the ideal allographs (Van Galen, 1991).Handwriting is a totally critical part of the overall writing technique and is consequently regarded as a lower-stage aspect in models of writing (Berninger & Swanson, 1994; Berninger & Amtmann, 2003).whilst limitations in lower stage transcription capabilities (handwriting & spelling) occur, they could have an effect on the general writing system in terms of the quantity of text produced and the pleasant of written composition .in step with Berninger (1999) children's ability to compose textual content is constrained by means of important elements; transcription skills and operating memory assets. The more automatic a toddler's handwriting is, the more working memory is made available to awareness at the content of the writing (Berninger & Amtmann, 2003; Kellogg, 2008). however, if an infant's handwriting is labored and no longer but computerized, the attentional resources available to cognizance on higher-degree approaches which include planning may be restrained. It turns into even more complex while a child is asked to balance all the above methods as fast as possible during an exam. Handwriting speed will become vital in an examination environment, as the kid desires in order to switch their thoughts to the web page at the same time as seeking to preserve up with their thoughts. Having to write down quickly also adds the additional dimension of producing legible text, as there's an essential change-off relationship among handwriting velocity and legibility (Weintraub & Graham, 1998).for instance, whilst a child writes of their best handwriting, legibility will increase at the same time as the velocity at which it's miles produced decrease. **(Mellisa M .Prunty, 2013)**

Functional Asymmetries In The Quality Of Handwriting Movements; Writing hand choice is a distinguished useful asymmetry, but biomechanical factors may also make contributions to any kinematic variations inside the quality of handwriting actions completed via either hand. Eighteen dextral participants used an inking pen with their right or left hand to put in writing cursive letter Is, inverted Is, and their mirror photographs (to manipulate for biomechanical variations) on a images tablet. Kinematic evaluation of the scaling, consistency, performance, and shape of writing stroke trajectories revealed functional asymmetries among hands. The right hand became faster and produced more efficient strokes, which were of greater constant period, duration, and peak velocity. variations among palms do no longer clearly mirror biomechanical elements; consequently, the documentation of any practical asymmetries might also allow their subsequent use as markers of underlying pathology in situations along with schizophrenia. **(James G. Philips, 1999)**

Individuals with Down syndrome may exhibit unique handwriting characteristics that can vary from person to person. These characteristics can include differences in letter formation, sizing, spacing, and overall legibility. Factors such as muscle tone, fine motor skills, and cognitive processing abilities can influence their handwriting.

II. CONCLUSION

This comprehensive review paper provides valuable insights into the complexities of handwriting abilities and challenges in individuals with neurodevelopmental disorders, particularly DS. It emphasizes the multifaceted factors influencing handwriting, educational implications, and the need for further research. Understanding the functional and biomechanical aspects of hand preference and kinematic differences, as well as the impact of age and IQ on academic progress, is crucial for tailored interventions and educational planning tools for these populations. The findings also question the traditional understanding of "slowness" in handwriting, highlighting the significance of pausing and proposing innovative approaches to address handwriting challenges in individuals with DCD. Additionally, the review underscores the importance of normative data in guiding educational planning and intervention.

III. REFERENCES

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