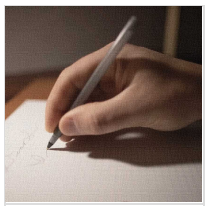

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Rehabilitation interventions for impaired handwriting in people with Parkinson's disease: a protocol for a scoping review

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Handwriting abnormalities in people with Parkinson's disease include several dynamic and kinematic features such as increased writing stroke duration, reduced velocity and altered fluency of the writing strokes. "Dysgraphia" is a term that includes all the possible handwriting alterations and the "micrographia", that defines an impairment of a fine motor skill manifesting mainly as a progressive or stable reduction in amplitude during a writing task, is only one of the characteristics of parkinsonian handwriting. Few studies investigated the effects of a rehabilitative training on handwriting or used measures of handwriting as an outcome in people with PD.

We aim to conduct a scoping review to answer the following question: "*What are the effects of a rehabilitative program on handwriting in people with PD*?"

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Handwriting, Writing, Rehabilitation, Parkinson, Review, Micrographia

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INTRODUCTION
Handwriting abnormalities in people with Parkinson's disease (PD) include several dynamic and kinematic features such as increased writing stroke duration, reduced velocity and altered fluency of the writing strokes [1, 2]. "Dysgraphia" is a term that includes all the possible handwriting alterations and the "micrographia", that defines an impairment of a fine motor skill manifesting mainly as a progressive or stable reduction in amplitude during a writing task, is only one of the characteristics of parkinsonian handwriting [3]. Few studies investigated the effects of a rehabilitative training on handwriting or used measures of handwriting as an outcome in people with PD.
We aim to conduct a scoping review to answer the following question: "*What are the effects of a rehabilitative program on handwriting in people with PD*?"

METHODS
We will conduct a scoping review according to the five-stage methodological framework for scoping studies proposed by Arksey and O'Malley [4] and the relative additional recommendations by Levac and colleagues [5].

Inclusion Criteria
We will consider any published paper reporting the results of a trial in which people with idiopathic PD received a structured rehabilitation program (i.e., more than a single session) of handwriting. We will exclude case reports.

Information sources and search strategy
We will search MEDLINE (PubMed), Embase, the Cochrane Central Register of Controlled Trials (CENTRAL), the Physiotherapy Evidence Database (PEDro) and the Cumulative Index to

Nursing and Allied Health Literature (CINAHL) since their inception. The search strategy for PubMed database is in the Appendix.

Study records management, selection and data collection

We will use EndNote X7 software [6] to manage citation records retrieved through the electronic searches. Two independent reviewers will determine studies eligible for the inclusion; any discrepancies will be resolved by discussion or with the consultation of a third reviewer.

The same two reviewers will extract general characteristics (publication date, study design, description of the intervention and comparator, sample size) and specific information (training characteristics, outcome measures and study results) of included studies on a standardized extraction form.

Risk of bias assessment

Two reviewers will independently assess the risk of bias of included studies. For randomized and non-randomized trials, we will respectively use the version two of the Cochrane Collaboration's tool for assessing risk of bias (RoB-2) [7] and the Risk of bias for non-randomized studies (ROBINS-I) tool [8]. Discrepancies will be resolved by discussion or with the consultation of a third reviewer.

Data synthesis

We will present findings in a narrative summary. We will describe the characteristics of proposed trainings, the outcomes assessed and the efficacy of trainings in included trials.

References

1. Thomas M, Lenka A, Kumar Pal P. Handwriting Analysis in Parkinson's Disease: Current Status and Future Directions. Movement disorders clinical practice. 2017;4:806-18.
2. Tucha O, Mecklinger L, Thome J, Reiter A, Alders GL, Sartor H, et al. Kinematic analysis of dopaminergic effects on skilled handwriting movements in Parkinson's disease. Journal of neural transmission. 2006;113:609-23.
3. Letanneux A, Danna J, Velay JL, Viallet F, Pinto S. From micrographia to Parkinson's disease dysgraphia. Movement disorders : official journal of the Movement Disorder Society. 2014;29:1467-75.
4. Arksey H, O'Malley L. Scoping studies: towards a methodological framework. International Journal of Social Research Methodology. 2005;8:19-32.
5. Levac D, Colquhoun H, O'Brien KK. Scoping studies: advancing the methodology. Implement Sci. 2010;5:69.
6. https://endnote.com/ (last access: April 2022)
7. Sterne JAC, Savovic J, Page MJ, Elbers RG, Blencowe NS, Boutron I, et al. RoB 2: a revised tool for assessing risk of bias in randomised trials. Bmj. 2019;366:l4898.
8. Sterne JAC, Hernan MA, McAleenan A, Reeves BC, Higgins JPT. Assessing risk of bias in a non-randomized study. 2020;Cochrane Handbook for Systematic Reviews of Interventions.

Appendix

Search strategy for PubMed database:

((((("upper extremity"[MeSH Terms] OR ("upper"[All Fields] AND "extremity"[All Fields])) OR "upper extremity"[All Fields]) AND (("dexterities"[All Fields] OR "dexterity"[All Fields]) OR "dexterous"[All Fields])) OR ("hand writing"[All Fields] OR ((("handwriters"[All Fields] OR

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"handwriting"[MeSH Terms]) OR "handwriting"[All Fields]) OR "handwritings"[All Fields]))) AND ((("parkinson*"[Text Word] OR "Parkinson disease"[MeSH Terms]) OR "paralysis agitans"[Text Word])

Search strategy 1w

1 The search strategy was runned in April 2022

Study records management, selection and data collection 1w

2

Risk of bias assessment

3 Requested time will depend on how many studies will be included

Data synthesis

4 Requested time will depend on how many studies will be included

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