Supplementary Material

Paratonia in Dementia: A Systematic Review

Supplementary Table 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement.

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	

Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

Supplementary Table 2. Critical Appraisal of the included studies

Author/year	Design	Checklist / Total items	Remarks	Score*
Bautmans et al., 2008	RCT	Randomized Controlled Trials / 13	→ items 1,2; unclear → item 4; participants blind for treatment assignment scored yes based on the severity of dementia although this was not addressed by the authors → item 5; therapists were not blind for treatment assignment	10/13
Benassi et al., 1990	Cross-sectional	Analytical Cross-Sectional Studies / 8	→ item 3; exposure measured in a valid way was not applicable → item 5; no confounding factors identified → item 6; no strategies for dealing with confounding factors stated → item 7; unclear if outcomes were measured in a valid and reliable way → item 8; unclear if appropriate statistical analysis is used	3/7
Bennet et al., 2002	Cohort	Cohort studies / 11	→ item 6; unclear if the participants were free of the outcome at the start of the study	8/9
Beversdorf and Heilman, 1998	Cross-sectional	Analytical Cross-Sectional Studies / 8	→ item 3; exposure measured in a valid way was not applicable → item 4; no objective, standard criteria used for assessing the condition → item 5; no confounding factors identified → item 6; no strategies for dealing with confounding factors stated → item 7; unclear if outcomes were measured in a valid and reliable way	3/7
	Measurement	Diagnostic Test Accuracy Studies / 10	→ item 2; case control design was not avoided → item 5; usage of a threshold was not applicable → item 6; unclear if the reference standard used correctly classified the target condition (used reference standard was not validated)	7/9
Critchley, 1956	Narrative review/ Viewpoint	Text and Opinion / 6	→ item 6; incongruence with the literature/sources not logically defended	5/6
Damasceno et al., 2005	Cross-sectional	Analytical Cross-Sectional Studies / 8	→ item 3; exposure measured in a valid way was not applicable → item 5; unclear if confounding factors were identified → item 6; unclear about the strategies to deal with confounding	5/7
Drenth et al., 2017	Prospective study, 6 months on psychometric properties test	Diagnostic Test Accuracy Studies / 10	→ item 6; PAI used as reference standard	10/10
Drenth et al., 2017	Cohort	Cohort studies / 11	→ item 2; similarity of exposure in groups not applicable	9/9

			→ item 6; participants were not free of the outcome at the start so not applicable	
Duret et al., 1989	RCT	Randomized Controlled Trials / 13	→ item 2; concealment allocation unclear → item 3; similarity treatment groups at baseline unclear	11/13
Franssen et al., 1991	Cross-sectional	Analytical Cross-Sectional Studies / 8	→ item 3; exposure measured in a valid way was not applicable → item 7; unclear if outcomes were measured in a valid and reliable way	6/7
Franssen et al., 1993	Case series	Case series / 10	→ item 6; only age and gender were reported on demographics → item 8; Outcomes on intervention or treatment was not applicable	8/9
Hobbelen et al., 2003	Pilot RCT	Randomized Controlled Trials / 13	→ item 4; participants blind for treatment assignment scored yes based on the severity of dementia although this was not addressed by the authors → item 5; therapists were not blind for treatment assignment → item 13; unclear because the trial design seams not appropriate for the intervention group 'good stabilizing cushions'.	11/13
Hobbelen et al., 2006	Delphi procedure for consensus definition	Text and Opinion / 6		6/6
Hobbelen et al., 2008	Cross-sectional on psychometric properties test	Diagnostic Test Accuracy Studies / 10	→ item 6; reference standard used not applicable → item 7; reference standard vs index test not applicable → item 8; appropriate interval between reference test and index test not applicable → item 9; did all patients received same reference standard not applicable	6/6
Hobbelen et al., 2011	Cohort	Cohort studies / 11	→ item 2; similarity of exposure in groups not applicable	10/10
Hobbelen et al., 2012	RCT	Randomized Controlled Trials / 13	→ item 5; blinding treatment assignment therapists unclear	12/13
Jenkyn et al., 1977	Cross-sectional	Analytical Cross-Sectional Studies / 8	→ item 3; exposure measured in a valid way was not applicable	7/7
Kleiner-Fisman et al., 2014	RCT	Randomized Controlled Trials / 13	→ item 11; reliability outcome measurements unclear	12/13
Kurlan et al., 2000	Narrative review/ Viewpoint	Text and Opinion / 6		6/6
Marinelli et al., 2017	Cross-sectional on psychometric properties test	Diagnostic Test Accuracy Studies / 10	→ item 2; case control design was not avoided → item 6; unclear if the used reference standard (not validated) correctly classified the target condition	8/10
O'Keeffe et al., 1996	Cross-sectional	Analytical Cross-	→ item 3; exposure measured in a valid way was not applicable	6/7

		Sectional Studies / 8	→ item 7; unclear if outcomes were measured in a valid and reliable way	
Peralta and Cuesta, 2017	Narrative review	Text and Opinion / 6		6/6
Pauc and Young, 2012	Narrative review	Text and Opinion / 6	→ item 2; Unclear, because we are not sure that the authors (chiropractic clinic) have some standing within the field. → item 3 and 4; unclear because reference is made to the Ajugueria (1968) study which allegedly states that Dupré (1910) indicated that paratonia was originally a term used in children and Gegenhalten in dementia. This is not right. Table 1. used on the Delphi consensus by Hobbelen et al. (2006) also contains inaccuracies	3/6
Paulson and Gottlieb, 1968	Narrative review	Text and Opinion / 6	→ item 6; incongruence with the literature/sources not logically defended	5/6
Ries, 2018	Narrative review	Text and Opinion / 6		6/6
Risse et al., 1990	Cohort until death	Cohort studies / 11	→ item 2; similarity of exposure in groups not applicable → item 4; Unclear if confounding factors were identified → Item 5; Unclear if strategies to deal with confounding factors were stated → item 6; Unclear if the participants were free of the outcome at the start → item 7; Unclear if the outcomes were measured in a valid and reliable way → item 11; No appropriate statistical analysis used	4/9
Souren et al., 1997	Narrative review	Text and Opinion / 6		6/6
Tyrell and Rossor, 1988	Cross-sectional	Analytical Cross-Sectional Studies / 8	→ item 2; study subjects and setting unclear described → item 3; exposure measured in a valid way was not applicable → item 6; unclear about the strategies to deal with confounding → item 7; unclear if outcomes were measured in a valid and reliable way → item 8; No appropriate statistical analysis is used	3/7
Tyrell et al., 1990	Cross-sectional	Analytical Cross-Sectional Studies / 8	→ item 3; exposure measured in a valid way was not applicable → item 5; no confounding factors identified → item 6; no strategies for dealing with confounding factors stated → item 8; no appropriate statistical analysis is used	4/7
Van Deun et al., 2017	Cross-sectional on psychometric properties test	Diagnostic Test Accuracy Studies / 10	→ item 5; no threshold was used	9/10

Van Deun et al., 2018	Survey	Qualitative research / 10	→ item 6; no statement is included in the paper of the researcher's cultural and theoretical orientation, although we know the researcher who is a qualified researcher in the field of paratonia. → item 7; no, the potential of the researcher to influence the study is not addressed → item 9; ethical approval not applicable	7/9
Van Deun et al., 2019	Cross-sectional	Analytical Cross-Sectional Studies / 8	→ item 6; unclear about the strategies to deal with confounding	7/8
Van Deun et al., 2019	CT with AB/BA crossover	Quasi-Experimental Studies / 9	→ item 7: unclear if participants received similar treatment/care other than the intervention → item 8; follow-up unclear → item 9; no control group	6/9
Vahia et al., 2007	Prevalence study	Prevalence Studies / 9	→ items 1,2,3; sample size (n=80) 39% of all patients with Alzheimer Disease (AD) seen at that specific center. May not be representative for the total population of people with AD → item 6 and 7; unclear if paratonia was assessed with a validated/reliable method	4/9
Villeneuve et al., 1974	Cross-sectional	Analytical Cross-Sectional Studies / 8	→ item 3; exposure measured in a valid way was not applicable → item 5; no confounding factors identified → item 6; no strategies for dealing with confounding factors stated	5/8

Checklist used available at Joanna Briggs Institute at https://joannabriggs.org/critical-appraisal-tools
*Score: The tools determined whether a criterium was met, whether it was unclear if it was met, or if that criterion was not applicable. One point was awarded when the criterium was met. The number of points were summed and compared to the maximum points possible. If an item was not applicable, the maximum number of points was reduced by one item.

Supplementary Table 3. Minimal Detectable Change (MDC) and Minimal Detectable Important Change (MDIC) of MyotonPro when recording paratonia severity over time.

MyotonPro modality	Mean (SD) value in people with paratonia	MDC_{95}	MDIC (SD)
Tone, Hz	13.18 (1.92)	3.24	0.56 (1.86)
Elasticity, log decrement	1.67 (0.36)	0.50	0.11 (0.45)
Stiffness, N/m	244.70 (36.03)	59.87	1.79 (39.02)
Creep, Deborah number	1.54 (0.29)	0.54	0.12 (0.31)
MSR time, ms	25.05 (4.58)	8.29	1.69 (4.37)