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Tuina for spasticity of poststroke: protocol of a systematic review and meta-analysis

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Keywords:	STROKE MEDICINE, REHABILITATION MEDICINE, Limb reconstruction < ORTHOPAEDIC & TRAUMA SURGERY

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Tuina for spasticity of poststroke: protocol of a systematic review and meta-analysis

Qiongshuai Zhang¹, Gangcheng Ji², Fang Cao³, Yihan Sun⁴, Guanyu Hu¹, Shaoqian Sun⁵, Yanze Liu¹, Jiazhen Cao¹, Deyu Cong⁶, Yufeng Wang⁶, Bailin Song¹

Correspondence to Prof Bailin Song; jlsongbl@126.com and Dr Yufeng Wang; wangchn@126.com

ABSTRACT

Introduction spasticity is a common complication of post-stroke, tuina is a widely used rehabilitation treatment, although there is a lack of supportive evidence on efficiency and safety for post-stroke spasticity patients. The aim of this systematic review is to assess and synthesis efficacy and safety of tuina for spasticity of post-stroke.

Methods and analysis. A comprehensive electronic search of PubMed, EMBASE, MEDLINE, Cochrane library, Web of Science(WOS), Wiley, Springer, Chinese Science Citation Database(CSCD), China National Knowledge Infrastructure (CNKI), Chinese Biomedical literature Database (CBM), Chinese Scientific and Journal Database (VIP), Wan Fang database(Wanfang), Japanese medical database (CiNii), Korean Robotics Institute Summer Scholars (RISS), and Thailand Thai-Journal Citation Index Centre (TCI) will be conducted to search literatures of randomized controlled trials of tuina for spasticity of post-stroke survivors. There is no language, publication status or date limitations. Cochrane Handbook for Systematic Reviews of Interventions will be used to assess the risk of bias, and the protocol will be conducted according to approach and Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P).

Ethics and dissemination ethical approval will not be required, for no primary data of individual patients was collected, We will publish the findings in a peer-reviewed journal.

Strengths and limitations of this study

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3 ▶To our knowledge this is the first comprehensive systematic review
4 focused on efficiency and safety of tuina for spasticity of post-
5 stroke.
6

7 ▶Only randomized controlled trials (RCTs) will be included in this
8 study.
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10 ▶The reliability of this systematic review may be limited by the
11 quality of the primary studies included. To solve this problem,
12 authors will assess the quality of the trials included with the
13 Cochrane risk of bias tool.
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17
18 Stroke has been the first risk factor of death in China¹. It is also
19 one of the diseases with high mortality and disability rate in the
20 world². Limb spasm is a common complication of post-stroke patients³
21 ⁴. Recent study show that about 17% - 43% of stroke patients had limb
22 spasticity⁵⁻⁷, and the medical cost of post-stroke limb spasm patients
23 is about four times as much as post-stroke patients without
24 spasticity⁸⁻⁹. Limb spasm not only severely restricts the activity
25 ability of patients, reduces the quality of life, but also causes
26 psychological impact on patients' rehabilitation, and brings great
27 burden to families and society¹⁰⁻¹⁴.

28 Physical therapy, oral or injection drug therapy, and operation
29 therapy are commonly used in western medicine to treat post-stroke
30 spasticity at present. Oral drugs such as baclofen, eperisone,
31 hydrochloride and diazepam have large side effects which hinder the
32 recovery of motor function with long time taking¹⁵. Botulinum toxin
33 treatment is difficult to achieve long-term results, and it is often
34 injected for moderate or severe cases of post-stroke spasticity¹⁶
35 ¹⁷. At present, much more of the patients with spasticity after
36 stroke choose external treatment. In China, many external treatment
37 methods of traditional Chinese Medicine (TCM) are applied to the
38 treat this disease.
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45 Tuina, as an external treatment of TCM¹⁸⁻¹⁹, has been widely used in
46 China for hundreds of years and increasingly practiced in western
47 countries in recent years. Systematic evaluation²⁰ shows that
48 acupuncture is efficiency and safety in the treatment of limb spasm
49 after stroke. Acupuncture and massage belong to the external
50 treatment of traditional Chinese medicine, and both are based on the
51 same theory of meridians and acupoints. However, it is still unclear
52 whether the effectiveness of acupuncture is also applicable to
53 massage in the treatment of post-stroke spasticity. At present, there
54 is no systematic review of massage in the treatment of post-stroke
55 limb spasticity, so this study will evaluate the efficiency and
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3 safety of massage in the treatment of post-stroke limb spasticity,
4 and provide evidence for clinical decision-making of massage.
5

6 **Methods**

7 The systematic review will be performed following the guideline of
8 preferred reporting items of systematic reviews a meta-analysis
9 protocol (PRISMA-P) 2015²¹.

10 **Inclusion Criteria**

11 **Types of studies**

12 We will include randomized controlled trials (RCTs) of tuina for
13 post-stroke spasticity in the treatment groups. RCTs' language of
14 English, Chinese, Japanese, Korean and Thai will be included, there
15 will be no restriction on language.
16

17 **Types of participants**

18 We will include patients suffering post-stroke spasticity (>18
19 years old) with no restriction of onset time. Stroke (Cerebral
20 infarction or cerebral hemorrhage) is diagnosed according to WHO
21 criteria ²², participants have the symptoms of limb muscle tension
22 increase, and the modified Ashworth Scale (MAS) score is grade 1-2.
23 Participants of any age, sex, ethnicity will be enrolled (在临床研究中
24 也标明) .
25

26 **Types of interventions**

27 The treatment group using tuina, while the control group receives
28 treatment of oral medication, acupuncture, Chinese herbal medication,
29 physical therapy, surgery, botox injections and so on or even with no
30 treatment will be included.
31

32 **Types of outcome measures**

33 **Primary outcome**

34 The primary outcome measures

35 Muscle tone will be evaluated by the Modified Ashworth Scale (MAS)

36 **Secondary outcome**

37 Functional rehabilitation was assessed with Fugl-Meyer Assessment
38 scale (FMA) or Simplified Fugl-Meyer Assessment scale

39 Muscle strength will be defined by surface electromyogram root mean
40 square value (RMS),

41 Activities of daily living (ADL) will be assessed by the modified
42 Bathel index (MBI),

43 Quality of life will be measured by stroke specific quality of life
44 scale (SS-QOL) or quality of life 36 item short-form health survey
45 (SF-36)

46 Limb pain will be assessed by Visual Analogue Scale (VAS)
47

48 **Search strategy**

49 **Electronic searches**

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3 The published electronic literature will be searched in PubMed,
4 EMBASE, MEDLINE, Cochrane library, Web of Science(WOS), Wiley,
5 Springer, Chinese Science Citation Database, China National Knowledge
6 Infrastructure (CNKI), Chinese Biomedical literature Database (CBM),
7 Chinese Scientific and Journal Database (VIP), Wan Fang database,
8 Japanese medical database (CiNii), Korean Robotics Institute Summer
9 Scholars (RISS), and Thailand Thai-Journal Citation Index Centre
10 (TCI) . We will also check reference lists, and the literature will
11 be searched range from the establishment to January 1, 2020.

12 The search strategy is developed according to published reviews ²³
13 ²⁴. The detail search strategy of MEDLINE (PubMed) is listed in
14 appendix 1, while the search strategy will be modified according to
15 other different databases.

16 **Data collection and analysis**

17 **Selection of literature**

18 Two authors (YZL, JZC) will identify studies according to the
19 inclusion criteria independently. Firstly, they will eliminate
20 duplicate researches by using endnote software (V. x9.0). secondly,
21 screening the title and abstract, if necessary, reading the full
22 article to confirm if it should be included. They also use endnote
23 software to manage the included studies. The screening operation is
24 performed as Figure 1. If there is disagreement during the screening
25 process, discuss with the third experts (GCJ) to make decision.

26 **Data extraction and management**

27 Two authors (SQS and YFW) will extract data from the included
28 studies independently. The general Information, which consists of
29 title, publication year, authors, country, language, journal source;
30 information of participants: gender, age , stroke type, duration of
31 onset, sample size; information of intervention characteristics:
32 type, session, duration, follow-up time; outcome information about
33 primary outcome, second outcome, observation time points, blinding of
34 evaluators and adverse effects.

35 **Assessment of risk of bias in included studies**

36 Two independent authors (QSZ and FC) will evaluate the risk of bias
37 by using the Cochran Collaboration Network Bias Risk Assessment Tool
38 to assess the risk bias of the literature included in the systematic
39 review. The two authors will assess the risk of bias of sequence
40 generation, allocation concealment, blinding of participants
41 personnel and outcome assessment, incomplete outcome data, selective
42 outcome reporting and other bias. The evaluation grades are low, high
43 and unclear risk of bias.

44 **Measures of treatment effect**

45 Two independent authors (YHS and QSZ) will use risk rate (RR) with
46 95% confidence interval (CI) to analysis the dichotomous data. While,
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we will use mean difference (MD) or standard mean difference (SMD) with 95% (CI) for continuous data, the Other binary data will be changed into RR form.

Dealing with missing data

If some information of the included studies missed, we will try to contact the correspondence author through e-mail, phone or other contacts. If failure, we will turn to the following strategies to evaluate the potential influence of missing data ²⁵.

- Worst-case scenario analysis: All participants with missing data counted as failures.

- Extreme worst-case/best-case scenario analysis: Participants with missing outcome data in the exercise arm counted as failures and in the control arm as successes and vice versa.

Assessment of heterogeneity

We will use Q -test and I^2 statistic to assess the heterogeneity of the included studies, as the criteria: $I^2 < 50\%$ indicates low heterogeneity, while $I^2 > 50\%$ indicates high heterogeneity,

Assessment of reporting bias

We will construct a funnel plots to assess asymmetry, only if at least 10 RCTs are included.

Data synthesis

The meta-analysis of intervention and outcome measures methods will be conducted by RevMan 5.3.5 software (the Cochrane Collaboration, Oxford, England). If the statistical heterogeneity is low ($P > 0.1$, or $I^2 < 50\%$), we will use the fixed-effect model to combine the data, while, if the statistical heterogeneity is high ($P < 0.1$, or $I^2 > 50\%$), we will use the random-effect model. However, if the heterogeneity level much significant, a descriptive analysis will be performed.

Subgroup analysis and investigation of heterogeneity

We will perform subgroup analysis to assess heterogeneity of the study according to the following factors from the available sufficient data:

- Age

- Sex

- Different types of stroke (Cerebral hemorrhage or cerebral infarction)

- Different types of tuina

- Different time/course of treatment

- Different parts of affected limbs (upper limb or lower limb)

- Different types of control group (acupuncture, placebo, oral/Injection drug or no treatment)

Sensitivity analysis

We will perform sensitivity analysis to evaluate the robustness and reliability of the pooled results. If the results are not stable, we

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3 may turn to removing studies of high risk of bias, or check up
4 processing method of missing data (Worst-case scenario analysis: All
5 participants with missing data counted as failures; Extreme worst-
6 case/best-case scenario analysis: Participants with missing outcome
7 data)
8
9

10 **Grading of evidence quality**

11 We will use the Grading of Recommendations Assessment, Development
12 and Evaluation (GRADE)²⁶ to assess the confidence in cumulative
13 evidence. risk of bias, heterogeneity, indirectness, imprecision and
14 Publication bias will be assessed, and the results will be divided
15 into three levels: high, moderate, low and very low.
16
17

18 **Amendments**

19 We will show all of the amendments with detail description and
20 rationale in the amendments of this study.
21

22 **Ethics and dissemination**

23 This study needs no ethical approval, because there is nothing of
24 the data, which has relationship with individual patient. We will
25 complete this systematic review according to PRISMA guidelines, the
26 review will provide assessment of effect and safety of tuina for
27 spasticity of post-stroke. We will publish the findings in a peer-
28 reviewed journal.
29
30

31 **Discussion**

32 This systematic review will focus on the efficiency and safety of
33 tuina for spasticity of post-stroke. Tuina is a traditional Chinese
34 physical therapy, which is effective for 516 diseases in China²⁷, of
35 which spasticity is included. clinical reports show tuina is well in
36 treatment of spasticity of post-stroke, however, high quality study
37 still did' t appear. We conduct this review, aim to provide better
38 evidence and guide for clinical decision making. We plan to publish
39 this review within 1 year since the protocol published, then we will
40 update it every 3 years.
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46 **Author affiliations**

47 1 Acupuncture and Tuina Department, Changchun University of Chinese
48 Medicine, Changchun, 130117, China.

49 2 Rehabilitation Medicine Department, Changchun University of Chinese
50 Medicine, Changchun 130117, China;

51 3 Acupuncture Department, Henan University of Traditional Chinese
52 Medicine, Zhengzhou 45000, China

53 4 TCM Department, Changchun university of Chinese Medicine, Changchun
54 130117, China.

55 5 Rehabilitation Medicine Department, Jilin University Third
56 Affiliated Hospital, Jilin University, Changchun, 130117, China.
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6. Tuina Department, Traditional Chinese Medicine Hospital of Jilin Province, Changchun 130021, China;

Contributors QSZ and BLS conceived and designed the protocol, QSZ and YHS registered the protocol review in the Prospero database and drafted the manuscript. YZL and JZC designed the search strategy. QSZ and FC draft the protocol, QSZ, GCJ, FC, YHS, SQS, GYH, YZL, JZC, NYC, YFW and BLS contribute to and approved the final manuscript of the protocol review.

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Competing interests Non declared

Patient consent Not required

Provenance and peer review not commissioned; externally peer reviewed

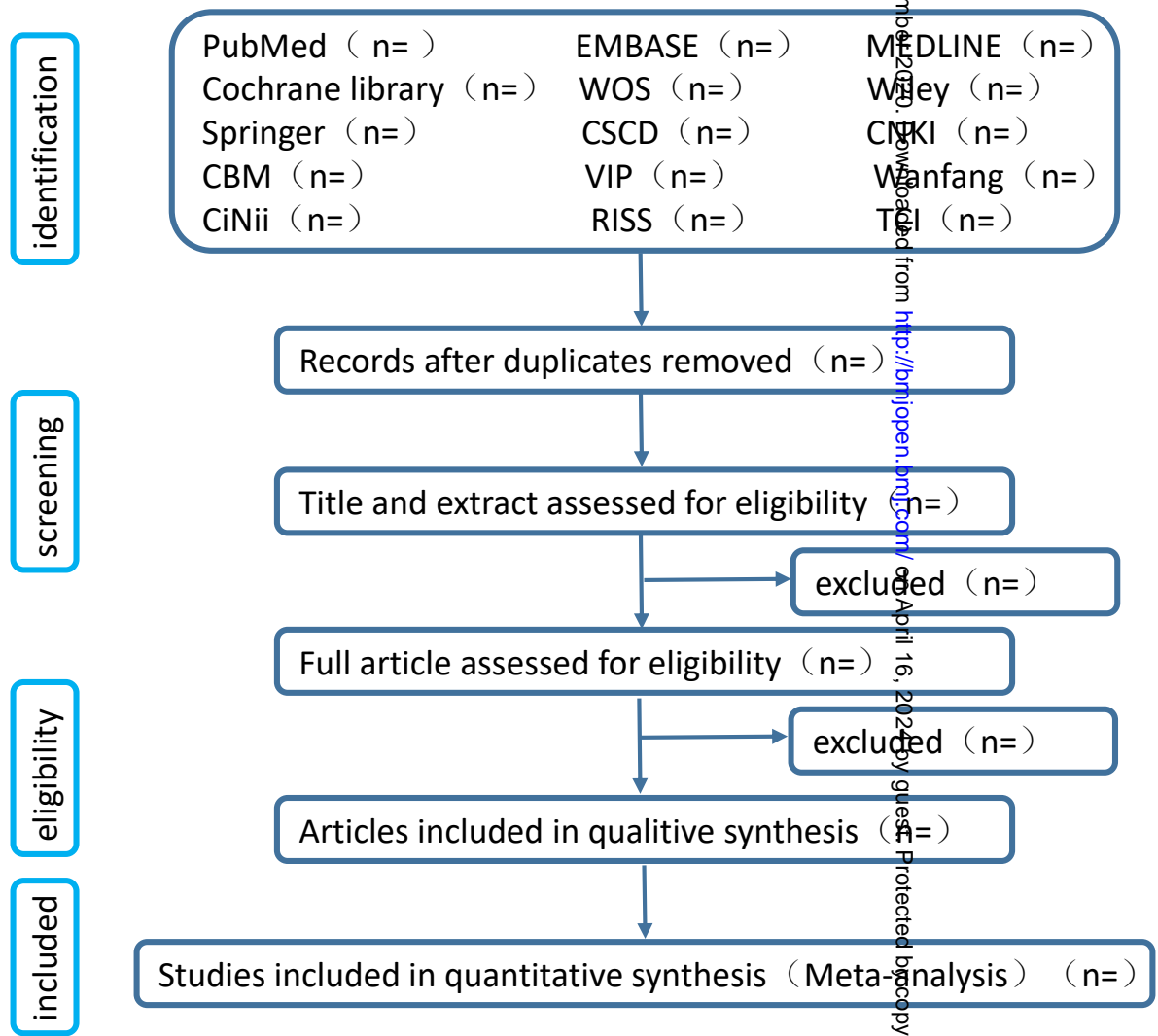
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7 Table1 PubMed search strategy

8 Spasticity of post-stroke	9 #1. Stroke[MeSH] OR Apoplexy [Tiab] OR post-stroke[tiab] OR poststroke[tiab]OR Apoplectic [Tiab] OR 10 Apoplexia [Tiab] OR Cerebral hemorrhage [Tiab] OR Ich [Tiab] OR Cerebrovascular accident [Tiab] OR 11 Cerebrovascular disorders [Tiab] OR Cerebral embolism [Tiab] OR Brain embolism [Tiab] OR Embolic 12 stroke [Tiab] OR Cerebral infarct OR cva*[tiab] 13 #2. spasm[Mesh] OR dystonia[tiab] OR paraparesis, spastic[tiab] OR muscle spasticity*[tiab] OR muscle 14 hypertonia [tiab] OR muscle rigidity*[tiab] OR muscle tonus[tiab] OR spas*[tiab] OR high tone[tiab] 15 #3. #1 AND #2
18 Tuina	19 #4. Tuina[tiab] or Massage[tiab] or Acupressure[tiab] or Rub[tiab] or Massageing[tiab] or 20 Massotherapy[tiab] or manipulation[tiab]
21 Randomised controlled trial	22 #5. Randomised controlled trial [pt] OR controlled clinical trial [pt] OR randomized [tiab] OR 23 placebo [tiab] OR drug therapy [sh] OR randomly [tiab] OR trial[tiab] OR groups [tiab]
25 Final search strategy	26 6. #3 AND #4 AND #5

Reporting checklist for protocol of a systematic review.

Based on the PRISMA-P guidelines.

Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

Upload your completed checklist as an extra file when you submit to a journal.

In your methods section, say that you used the PRISMA-Reporting guidelines, and cite them as:

Moher D, Shamseer L, Clarke M, Ghersi D, Liberati A, Petticrew M, Shekelle P, Stewart LA. Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) 2015 statement. Syst Rev. 2015;4(1):1.

		Reporting Item	Page Number
Title			
Identification	#1a	Identify the report as a protocol of a systematic review	1
Update	#1b	If the protocol is for an update of a previous systematic review, identify as such	n/a This is a new systematic review

Registration

[#2](#) If registered, provide the name of the registry (such as PROSPERO) and registration number

n/a Registration is in progress

Authors

[#3a](#) Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author

1,6,7

[#3b](#) Describe contributions of protocol authors and identify the guarantor of the review

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Amendments

[#4](#) If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments

n/a This is a new systematic review

Support

[#5a](#) Indicate sources of financial or other support for the review

7

[#5b](#) Provide name for the review funder and / or sponsor

7

[#5c](#) Describe roles of funder(s), sponsor(s), and / or institution(s), if any, in developing the protocol

7

Introduction

1	Rationale	#6	Describe the rationale for the review in the context	2
2			of what is already known	
3				
4				
5				
6	Objectives	#7	Provide an explicit statement of the question(s) the	1
7			review will address with reference to participants,	
8			interventions, comparators, and outcomes (PICO)	
9				
10				
11				
12				
13				
14	Methods			
15				
16				
17	Eligibility criteria	#8	Specify the study characteristics (such as PICO,	3
18			study design, setting, time frame) and report	
19			characteristics (such as years considered, language,	
20			publication status) to be used as criteria for eligibility	
21			for the review	
22				
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24				
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27				
28				
29	Information	#9	Describe all intended information sources (such as	3,4
30	sources		electronic databases, contact with study authors,	
31			trial registers or other grey literature sources) with	
32			planned dates of coverage	
33				
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39	Search strategy	#10	Present draft of search strategy to be used for at	3,4, appendix 1
40			least one electronic database, including planned	
41			limits, such that it could be repeated	
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47	Study records -	#11a	Describe the mechanism(s) that will be used to	4,5
48	data		manage records and data throughout the review	
49				
50				
51	management			
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54	Study records -	#11b	State the process that will be used for selecting	4
55	selection process		studies (such as two independent reviewers)	
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1		through each phase of the review (that is, screening,	
2		eligibility and inclusion in meta-analysis)	
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6	Study records -	#11c Describe planned method of extracting data from	4
7			
8	data collection	reports (such as piloting forms, done independently,	
9			
10	process	in duplicate), any processes for obtaining and	
11		confirming data from investigators	
12			
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14			
15	Data items	#12 List and define all variables for which data will be	4
16		sought (such as PICO items, funding sources), any	
17		pre-planned data assumptions and simplifications	
18			
19			
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23	Outcomes and	#13 List and define all outcomes for which data will be	3
24			
25	prioritization	sought, including prioritization of main and additional	
26		outcomes, with rationale	
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31	Risk of bias in	#14 Describe anticipated methods for assessing risk of	4
32			
33	individual studies	bias of individual studies, including whether this will	
34		be done at the outcome or study level, or both; state	
35		how this information will be used in data synthesis	
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41	Data synthesis	#15a Describe criteria under which study data will be	3
42		quantitatively synthesised	
43			
44			
45			
46	Data synthesis	#15b If data are appropriate for quantitative synthesis,	5
47		describe planned summary measures, methods of	
48		handling data and methods of combining data from	
49		studies, including any planned exploration of	
50		consistency (such as I ² , Kendall's τ)	
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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	Data synthesis Data synthesis Meta-bias(es) Confidence in cumulative evidence	#15c #15d #16 #17	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression) If quantitative synthesis is not appropriate, describe the type of summary planned Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies) Describe how the strength of the body of evidence will be assessed (such as GRADE)	5 n/a all the data will be quantitative synthesised 2,5 6
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Notes:

- 1b: n/a This is a new systematic review
- 2: n/a Registration in progress
- 4: n/a This is a new systematic review
- 15d: n/a all the data will be quantitative synthesised The PRISMA-P checklist is distributed under the terms of the Creative Commons Attribution License CC-BY 4.0. This checklist was completed on 20. March 2020 using <https://www.goodreports.org/>, a tool made by the [EQUATOR Network](#) in collaboration with [Penelope.ai](#)

BMJ Open

Tuina for spasticity of poststroke: protocol of a systematic review and meta-analysis

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Tuina for spasticity of post stroke: protocol of a systematic review and meta-analysis

Qiongshuai Zhang¹, Gangcheng Ji², Fang Cao³, Yihan Sun⁴, Guanyu Hu¹, Shaoqian Sun⁵, Yanze Liu¹, Jiazhen Cao¹, Yufeng Wang⁶, Xiaohong Xu⁷ Bailin Song¹

Correspondence to Prof Bailin Song; jlsongbl@126.com and Dr Xiaohong Xu;740761229@qq.com

ABSTRACT

Introduction spasticity is a common complication of post-stroke, tuina is a widely used rehabilitation treatment, although there is a lack of supportive evidence on efficiency and safety for post-stroke spasticity patients. The aim of this systematic review is to assess and synthesis evidence of efficacy and safety of tuina for spasticity of post-stroke.

Methods and analysis. A comprehensive electronic search of EMBASE, MEDLINE (by Pubmed), Cochrane library, Web of Science (WOS), Wiley, Springer, PEDro, Chinese Science Citation Database (CSCD), China National Knowledge Infrastructure (CNKI), Chinese Biomedical literature Database (CBM), Chinese Scientific and Journal Database (VIP), Wan Fang database (Wanfang), Japanese medical database (CiNii), Korean Robotics Institute Summer Scholars (RISS), and Thailand Thai-Journal Citation Index Centre (TCI) will be conducted to search literatures of randomized controlled trials of tuina for spasticity of post-stroke survivors range from the establishment to January 1, 2020

. There is no time of publicaiton limitations. The primary outcome will be measured with the Modified Ashworth Scale (MAS), and the second outcome will included Fugl-Meyer Assessment scale (FMA), surface electromyogram root mean square value (RMS), the modified Bathel index (MBI), stroke specific quality of life scale (SS-QOL), quality of life 36 item short-form health survey (SF-36), and Visual Analogue Scale (VAS). Cochrane Handbook for Systematic Reviews of Interventions will be used to assess the risk of bias, GRADE will be used to access the confidence in cumulative evidence. The protocol will be conducted according to approach and Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015.

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3 **Ethics and dissemination** ethical approval will not be required, for
4 no primary data of individual patients was collected, We will publish
5 the findings in a peer-reviewed journal.
6

7 **PROSPERO registration number** CRD42020163384
8
9

10 **Strengths and limitations of this study**

- 11 ▶This is the first comprehensive systematic review focused on
- 12 efficiency and safety of tuina for spasticity of post-stroke.
- 13 ▶Only randomized controlled trials (not included quasi-RCTs) will be
- 14 included in this study.
- 15
- 16 ▶We searched databases of English, Chinese, Japanese, Korean and
- 17 Thailand, while other languages may be ignored.
- 18
- 19

20
21 Stroke has been the first risk factor of death in China¹. It is also
22 one of the diseases with high mortality and disability rate in the
23 world². Limb spasticity is a common complication of post-stroke
24 patients^{3 4}. Recent study show that about 17% - 43% of stroke patients
25 had limb spasticity⁵⁻⁷, and the medical cost of post-stroke limb
26 spasticity patients is about four times as much as post-stroke
27 patients without spasticity^{8 9}. Limb spasticity not only severely
28 restricts the ability of patients, reduces the quality of life, but
29 also causes psychological impact on patients' rehabilitation, and
30 brings a great burden to families and society^{10 11 12 13 14}.

31 Physical therapy, oral or injection drug therapy, and operation
32 therapy are commonly used in western medicine to treat post-stroke
33 spasticity at present. Oral drugs such as baclofen, eperisone,
34 hydrochloride and diazepam have large side effects which hinder the
35 recovery of motor function with long time taking¹⁵. Botulinum toxin
36 treatment is difficult to achieve long-term results, and it is often
37 injected for moderate or severe cases of post-stroke spasticity^{16 17}.
38 Physical therapy often requires active exercise coordination of
39 patients, however, patients with severe conditions are often unable
40 to cooperate. Surgical treatment is traumatic and a large number of
41 patients often find it difficult to accept. At present, much more of
42 the patients with spasticity after stroke choose external treatment.
43 In China, many external treatment methods of traditional Chinese
44 Medicine (TCM) are applied to the treat this disease.

45 Tuina is an ancient form of external treatment method, which was
46 based on the meridian and acupoint theory of traditional Chinese
47 medicine, and uses specific operation skill acting on the surface
48 or acupoints of the patient's body to treat diseases.^{18 19} Tuina has
49 been widely used in China for hundreds of years and increasingly
50 practiced in western countries in recent years. Systematic evaluation
51 ²⁰ shows that acupuncture is efficiency and safety in the treatment
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of limb spasticity after stroke. Acupuncture and Tuina belong to the external treatment of traditional Chinese medicine, and both are based on the same theory of meridians and acupoints. However, it is still unclear whether the effectiveness of acupuncture is also applicable to Tuina in the treatment of post-stroke spasticity. If tuina therapy for post stroke spasticity is proven to be effective, which has the characteristics of simple operation and low cost. At present, there is no systematic review of Tuina in the treatment of post-stroke limb spasticity, so this study will evaluate the efficiency and safety of Tuina in the treatment of post-stroke limb spasticity, and provide evidence for clinical decision-making of massage.

Methods

The systematic review will be performed following the guideline of Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015²¹.

Inclusion Criteria

Types of studies

We will include randomized controlled trials (not included quasi-RCTs) of tuina for post-stroke spasticity in the treatment groups. If multi-arm RCTs comes, we will select the group which used tuina and another without tuina for analysis. We will select the first stage of cross over RCTs, which tuina was firstly used in one group. RCTs' language of English, Chinese, Japanese, Korean and Thai will be included.

Types of participants

We will include patients suffering post-acute phase of post-stroke spasticity (18 years old). Stroke (Cerebral infarction or cerebral hemorrhage) is diagnosed according to WHO criteria²², participants have the symptoms of limb muscle tension increase, and the modified Ashworth Scale (MAS) score is grade 1-2. Participants of any age, sex, ethnicity will be enrolled.

Types of interventions

The treatment group using tuina, while the control group receives treatment of oral medication, acupuncture, Chinese herbal medication, physical therapy, surgery, botox injections and so on or even with no treatment will be included.

Types of outcome measures

Primary outcome

The primary outcome measures

Muscle tone will be evaluated by the Modified Ashworth Scale (MAS). MAS is a clinical instrument which is commonly used for measuring spasticity, and some studies have proofed its reliability²³⁻²⁵.

Secondary outcome

Motor function was assessed with Fugl-Meyer Assessment scale (FMA) or Simplified Fugl-Meyer Assessment scale

Muscle strength will be defined by surface electromyogram root mean square value (RMS),

Activities of daily living (ADL) will be assessed by the modified Bathel index (MBI),

Quality of life will be measured by stroke specific quality of life scale (SS-QOL) or quality of life 36 item short-form health survey (SF-36)

Limb pain will be assessed by Visual Analogue Scale (VAS)

Safety outcome

Aggravation of spasm

Skin abrasions

Exclusion criteria:

- Repeatedly published studies;
- Experiences, letters, systematic reviews, animal experiments;
- Tuina was not only in the experimental group but also in the control group;
- Articles without full text or with data which is missed nor can't be used.

Search strategy

Electronic searches

The published electronic literature will be searched in EMBASE, MEDLINE (by Pubmed), Cochrane library, Web of Science (WOS), Wiley, Springer, PEDro, Chinese Science Citation Database, China National Knowledge Infrastructure (CNKI), Chinese Biomedical literature Database (CBM), Chinese Scientific and Journal Database (VIP), Wan Fang database, Japanese medical database (CiNii), Korean Robotics Institute Summer Scholars (RISS), and Thailand Thai-Journal Citation Index Centre (TCI). We will also check reference lists, and the literature will be searched range from the establishment to January 1, 2020.

The search strategy is developed according to published reviews²⁶²⁷. The detail search strategy of MEDLINE (by Pubmed) is listed in Table 1, while the search strategy will be modified according to other different databases.

Table 1 MEDLINE (by Pubmed) search strategy

Spasticity of post-stroke	#1. Stroke[MeSH] OR Apoplexy [Tiab] OR post-stroke[tiab] OR poststroke[tiab] OR Apoplectic [Tiab] OR Apoplexia [Tiab] OR Cerebral hemorrhage [Tiab] OR Ich [Tiab] OR Cerebrovascular accident [Tiab] OR Cerebrovascular disorders [Tiab] OR Cerebral embolism [Tiab] OR Brain
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	embolism [Tiab] OR Embolic stroke [Tiab] OR Cerebral infarct OR cva*[tiab] #2. spasm[Mesh] OR dystonia[tiab] OR paraparesis, spastic[tiab] OR muscle spasticity*[tiab] OR muscle hypertonia [tiab] OR muscle rigidity*[tiab] OR muscle tonus[tiab] OR spas*[tiab] OR high tone[tiab] #3. #1 AND #2
Tuina	#4. Tuina[tiab] or Massage[tiab] or Acupressure[tiab] or Rub[tiab] or Massageing[tiab] or Massotherapy[tiab] or manipulation[tiab]
Randomised controlled trial	#5. Randomised controlled trial [pt] OR controlled clinical trial [pt] OR randomized [tiab] OR placebo [tiab] OR drug therapy [sh] OR randomly [tiab] OR trial [tiab] OR groups [tiab]
Final search strategy	6. #3 AND #4 AND #5

Data collection and analysis

Selection of literature

Two authors (YZL, JZC) will identify studies according to the inclusion criteria independently. Firstly, they will eliminate duplicate researches by using EndNote software (V. x9.0). Secondly, screening the title and abstract, if necessary, reading the full article to confirm if it should be included. They also use EndNote software to manage the included studies. The screening operation is performed as Figure 1. If there is disagreement during the screening process, discuss with the third experts (GCJ) to make a decision.

Data extraction and management

Two authors (SQS and YFW) will extract data from the included studies independently. The general Information, which consists of title, publication year, authors, country, language, journal source; information of participants: gender, age, stroke type, duration of onset, sample size; information of intervention characteristics: type, session, duration, follow-up time; outcome information about primary outcome, second outcome, observation time points, blinding of evaluators and adverse effects.

Assessment of risk of bias in included studies

Two independent authors (QSZ and FC) will evaluate the risk of bias by using the Cochrane Collaboration bias risk assessment tool to assess the risk bias of the literature included in the systematic review. The two authors will assess the risk of bias of sequence generation, allocation concealment, blinding of participants personnel and outcome assessment, incomplete outcome data, selective outcome reporting and other bias. The evaluation grades are low, high and unclear risk of bias.

Measures of treatment effect

Two independent authors (YHS and QSZ) will use the mean difference (MD) or standard mean difference (SMD) with 95% (CI) for continuous data, the Other binary data will be changed into RR form.

Dealing with missing data

If some information of the included studies missed, we will try to contact the correspondence author through e-mail, phone or other contacts. If failure, we will turn to the following strategies to evaluate the potential influence of missing data ²⁸.

- Worst-case scenario analysis: All participants with missing data counted as failures.
- Extreme worst-case/best-case scenario analysis: Participants with missing outcome data in the exercise arm counted as failures and in the control arm as success and vice versa.

Assessment of heterogeneity

We will use Q -test and I^2 statistic to assess the heterogeneity of the included studies, as the criteria: $I^2 < 50\%$ indicates low heterogeneity, while $I^2 > 50\%$ indicates high heterogeneity,

Assessment of reporting bias

We will construct a funnel plots to assess asymmetry, only if at least 10 RCTs are included.

Data synthesis

The meta-analysis of intervention and outcome measures methods will be conducted by RevMan 5.3.5 software (the Cochrane Collaboration, Oxford, England). If the statistical heterogeneity is low ($P > 0.1$, or $I^2 < 50\%$), we will use the fixed-effect model to combine the data, while, if the statistical heterogeneity is high ($P < 0.1$, or $I^2 > 50\%$), we will use the random-effect model. However, if the heterogeneity level much significant, a descriptive analysis will be performed.

Subgroup analysis and investigation of heterogeneity

We will perform subgroup analysis to assess heterogeneity of the study according to the following potential factors from the available sufficient data:

- Age
- Sex
- Different types of stroke (Cerebral hemorrhage or cerebral infarction)
- Different types of tuina
- Different time/course of treatment
- Different parts of affected limbs (upper limb or lower limb)
- Different types of control group (acupuncture, placebo, oral/Injection drug or no treatment)

We may make meta-regressions according to age and and the different time/course of treatment if heterogeneity is obvious.

Sensitivity analysis

We will perform the sensitivity analysis to evaluate the robustness and reliability of the pooled results. If the results are not stable, we may turn to removing studies of high risk of bias, or check up processing method of missing data (Worst-case scenario analysis: All participants with missing data counted as failures; Extreme worst-case/best-case scenario analysis: Participants with missing outcome data)

Grading of evidence quality

We will use the Grading of Recommendations Assessment, Development and Evaluation (GRADE)²⁹ to assess the confidence in cumulative evidence. Risk of bias, heterogeneity, indirectness, imprecision and Publication bias will be assessed, and the results will be divided into three levels: high, moderate, low and very low.

Amendments

We will show all of the amendments with detail description and rationale in the amendments of this study.

Ethics and dissemination

This study needs no ethical approval, because there is nothing of the data, which have a relationship with an individual patient. We will complete this systematic review according to PRISMA guidelines. The review will provide an assessment of effect and safety of tuina for spasticity of post-stroke. We will publish the findings in a peer-reviewed, open access journal and the finished systematic review and meta-analysis will be disseminated online, which would be obtained freely for anyone. The results may contribute to improving the therapeutic strategy of patients with post stroke spasticity. This protocol registered on PROSPERO (CRD42020163384).

Patient and public involvement

No patient or public will be involved in our study directly. We only use data that existed in studies published.

Discussion

This systematic review will focus on the efficiency and safety of tuina for spasticity of post-stroke. Tuina is a traditional Chinese physical therapy, which is effective for 516 diseases in China³⁰, of which spasticity is included. Clinical reports show tuina is well in treatment of spasticity of post-stroke, however, high quality study still did' t appear. We conduct this review, aim to provide better evidence and guide for clinical decision making. We plan to publish this review within 1 year since the protocol published, then we will update it every 3 years.

Author affiliations

- 1 Acupuncture and Tuina Department, Changchun University of Chinese Medicine, Changchun, 130117, China.
- 2 Rehabilitation Medicine Department, Changchun University of Chinese Medicine, Changchun 130117, China;
- 3 Acupuncture Department, Henan University of Traditional Chinese Medicine, Zhengzhou 45000, China
- 4 TCM Department, Changchun university of Chinese Medicine, Changchun 130117, China.
- 5 Rehabilitation Medicine Department, Jilin University Third Affiliated Hospital, Jilin University, Changchun, 130117, China.
6. Tuina Department, Traditional Chinese Medicine Hospital of Jilin Province, Changchun 130021, China;
7. Graduate school, Changchun University of Chinese Medicine, Changchun, 130117, China.

Contributors QSZ and BLS conceived and designed the protocol. QSZ and YHS registered the protocol review in the Prospero database and drafted the manuscript. YZL and JZC designed the search strategy. QSZ and FC draft the protocol, QSZ, GCJ, FC, YHS, SQS, GYH, YZL, JZC, XHX, YFW, XHX and BLS contribute to and approved the final manuscript of the protocol review.

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Patient consent Not required

Provenance and peer review not commissioned; externally peer reviewed

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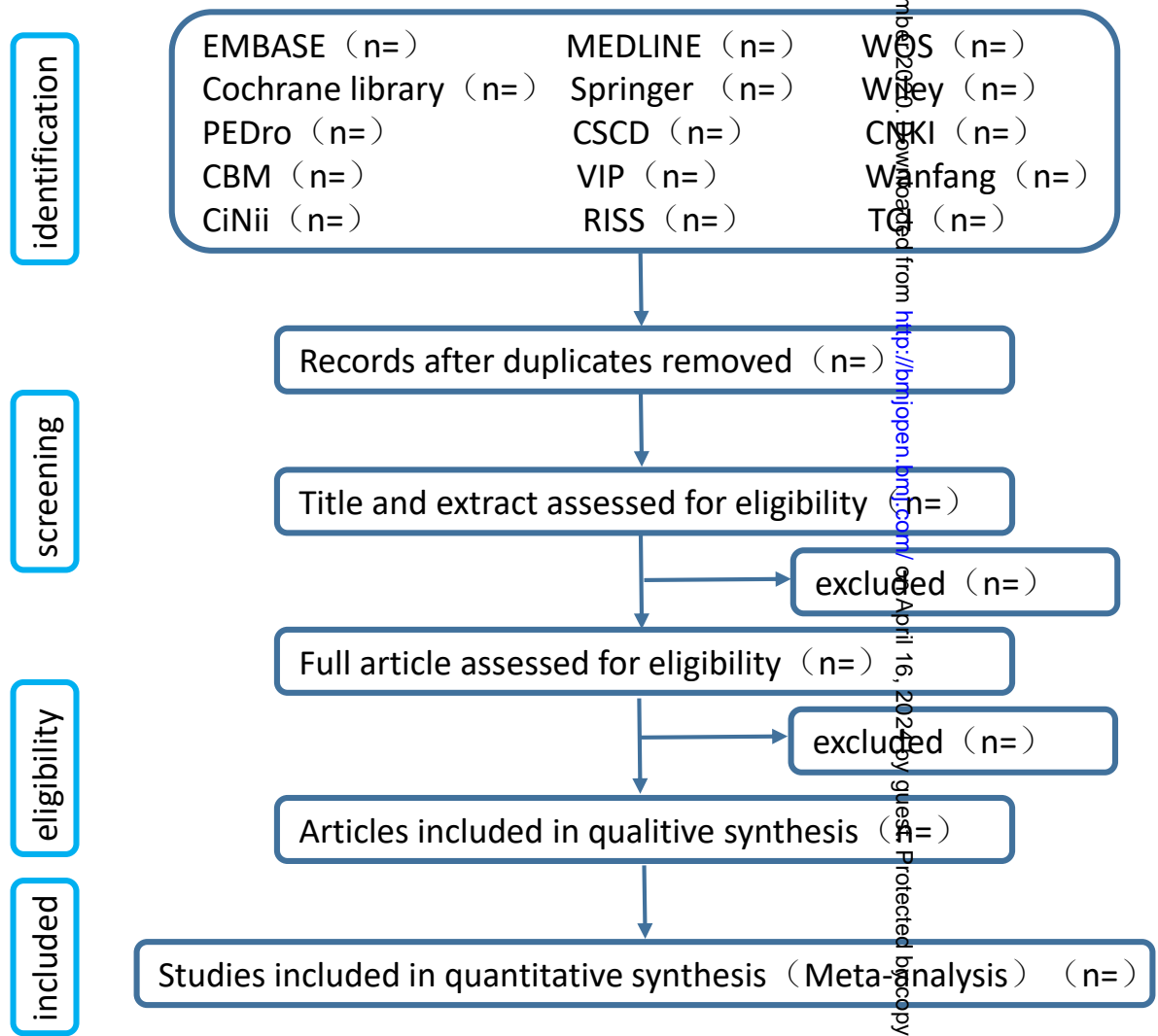
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Caption of figure 1: The screening process.

For peer review only

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Reporting checklist for protocol of a systematic review.

Based on the PRISMA-P guidelines.

Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

Upload your completed checklist as an extra file when you submit to a journal.

In your methods section, say that you used the PRISMA-Reporting guidelines, and cite them as:

Moher D, Shamseer L, Clarke M, Ghersi D, Liberati A, Petticrew M, Shekelle P, Stewart LA. Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) 2015 statement.

Syst Rev. 2015;4(1):1.

	Reporting Item	Page Number
Title		
Identification	#1a Identify the report as a protocol of a systematic review	1
Update	#1b If the protocol is for an update of a previous systematic review, identify as such	n/a This is a new systematic review

1 **Registration**

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4 [#2](#) If registered, provide the name of the registry (such as PROSPERO) and registration number

5 n/a Registration

6 is in progress

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10 **Authors**

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13 **Contact** [#3a](#) Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author

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13 **Contribution** [#3b](#) Describe contributions of protocol authors and identify the guarantor of the review

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26 **Amendments**

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29 [#4](#) If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments

30 n/a This is a new

31 systematic review

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39 **Support**

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42 **Sources** [#5a](#) Indicate sources of financial or other support for the review

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47 **Sponsor** [#5b](#) Provide name for the review funder and / or sponsor

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50 **Role of sponsor or funder** [#5c](#) Describe roles of funder(s), sponsor(s), and / or institution(s), if any, in developing the protocol

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56 **Introduction**

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1	Rationale	#6	Describe the rationale for the review in the context	2
2			of what is already known	
3				
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5				
6	Objectives	#7	Provide an explicit statement of the question(s) the	1
7			review will address with reference to participants,	
8			interventions, comparators, and outcomes (PICO)	
9				
10				
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14	Methods			
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17	Eligibility criteria	#8	Specify the study characteristics (such as PICO,	3
18			study design, setting, time frame) and report	
19			characteristics (such as years considered, language,	
20			publication status) to be used as criteria for eligibility	
21			for the review	
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29	Information	#9	Describe all intended information sources (such as	3,4
30	sources		electronic databases, contact with study authors,	
31			trial registers or other grey literature sources) with	
32			planned dates of coverage	
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39	Search strategy	#10	Present draft of search strategy to be used for at	3,4, appendix 1
40			least one electronic database, including planned	
41			limits, such that it could be repeated	
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47	Study records -	#11a	Describe the mechanism(s) that will be used to	4,5
48	data		manage records and data throughout the review	
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51	management			
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54	Study records -	#11b	State the process that will be used for selecting	4
55	selection process		studies (such as two independent reviewers)	
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1		through each phase of the review (that is, screening,	
2		eligibility and inclusion in meta-analysis)	
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6	Study records -	#11c Describe planned method of extracting data from	4
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8	data collection	reports (such as piloting forms, done independently,	
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10	process	in duplicate), any processes for obtaining and	
11		confirming data from investigators	
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15	Data items	#12 List and define all variables for which data will be	4
16		sought (such as PICO items, funding sources), any	
17		pre-planned data assumptions and simplifications	
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23	Outcomes and	#13 List and define all outcomes for which data will be	3
24			
25	prioritization	sought, including prioritization of main and additional	
26		outcomes, with rationale	
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31	Risk of bias in	#14 Describe anticipated methods for assessing risk of	4
32			
33	individual studies	bias of individual studies, including whether this will	
34		be done at the outcome or study level, or both; state	
35		how this information will be used in data synthesis	
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41	Data synthesis	#15a Describe criteria under which study data will be	3
42		quantitatively synthesised	
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46	Data synthesis	#15b If data are appropriate for quantitative synthesis,	5
47		describe planned summary measures, methods of	
48		handling data and methods of combining data from	
49		studies, including any planned exploration of	
50		consistency (such as I ² , Kendall's τ)	
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1	Data synthesis	#15c	Describe any proposed additional analyses (such as	5
2			sensitivity or subgroup analyses, meta-regression)	
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6	Data synthesis	#15d	If quantitative synthesis is not appropriate, describe	n/a all the data
7			the type of summary planned	will be
8				quantitative
9				synthesised
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16	Meta-bias(es)	#16	Specify any planned assessment of meta-bias(es)	2,5
17			(such as publication bias across studies, selective	
18			reporting within studies)	
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24	Confidence in	#17	Describe how the strength of the body of evidence	6
25	cumulative		will be assessed (such as GRADE)	
26	evidence			
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Notes:

- 35 • 1b: n/a This is a new systematic review
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- 38 • 2: n/a Registration in progress
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- 41 • 4: n/a This is a new systematic review
- 42
- 43
- 44 • 15d: n/a all the data will be quantitative synthesised The PRISMA-P checklist is distributed under
- 45 the terms of the Creative Commons Attribution License CC-BY 4.0. This checklist was completed
- 46 on 20. March 2020 using <https://www.goodreports.org/>, a tool made by the [EQUATOR Network](#)
- 47 in collaboration with [Penelope.ai](#)
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BMJ Open

Tuina for spasticity of poststroke: protocol of a systematic review and meta-analysis

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Manuscript ID	bmjopen-2020-038705.R2
Article Type:	Protocol
Date Submitted by the Author:	23-Sep-2020
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Primary Subject Heading:	Complementary medicine
Secondary Subject Heading:	Complementary medicine, Rehabilitation medicine
Keywords:	STROKE MEDICINE, Limb reconstruction < ORTHOPAEDIC & TRAUMA SURGERY, REHABILITATION MEDICINE

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Tuina for spasticity of post stroke: protocol of a systematic review and meta-analysis

Qiongshuai Zhang¹, Gangcheng Ji², Fang Cao³, Yihan Sun⁴, Guanyu Hu¹, Shaoqian Sun⁵, Yanze Liu¹, Jiazhen Cao¹, Yufeng Wang⁶, Xiaohong Xu⁷ Bailin Song¹

Correspondence to Prof Bailin Song; jlsongbl@126.com and Dr Xiaohong Xu;740761229@qq.com

ABSTRACT

Introduction spasticity is a common complication of post-stroke, tuina is a widely used rehabilitation treatment, although there is a lack of supportive evidence on Efficacy and safety for post-stroke spasticity patients. The aim of this systematic review is to assess and synthesis evidence of efficacy and safety of tuina for spasticity of post-stroke.

Methods and analysis. A comprehensive electronic search of EMBASE, MEDLINE, Cochrane library, Web of Science(WOS), Wiley, Springer, PEDro, Chinese Science Citation Database(CSCD), China National Knowledge Infrastructure (CNKI), Chinese Biomedical literature Database (CBM), Chinese Scientific and Journal Database (VIP), Wan Fang database(Wanfang), Japanese medical database (CiNii), Korean Robotics Institute Summer Scholars (RISS), and Thailand Thai-Journal Citation Index Centre (TCI) will be conducted to search literatures of randomized controlled trials of tuina for spasticity of post-stroke survivors range from the establishment to January 1, 2020

There is no time of publication limitations. The primary outcome will be measured with the Modified Ashworth Scale, and the second outcome will included Fugl-Meyer Assessment scale, surface electromyogram root mean square value, the modified Bathel index, stroke specific quality of life scale, quality of life 36 item short-form health survey, and Visual Analogue Scale. Cochrane Handbook for Systematic Reviews of Interventions will be used to assess the risk of bias, GRADE will be used to access the confidence in cumulative evidence. The protocol will be conducted according to approach and Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015.

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3 **Ethics and dissemination** ethical approval will not be required, for
4 no primary data of individual patients was collected, We will publish
5 the findings in a peer-reviewed journal.

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7 **PROSPERO registration number** CRD42020163384
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10 **Strengths and limitations of this study**

- 11 ▶This is the first comprehensive systematic review focused on
- 12 Efficacy and safety of tuina for spasticity of post-stroke.
- 13 ▶Only randomized controlled trials (not included quasi-RCTs) will be
- 14 included in this study.
- 15 ▶We searched databases of English, Chinese, Japanese, Korean and
- 16 Thailand, while other languages may be ignored.
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20
21 Stroke has been the first risk factor of death in China¹. It is also
22 one of the diseases with high mortality and disability rate in the
23 world². Limb spasticity is a common complication of post-stroke
24 patients^{3 4}. Recent study show that about 17% - 43% of stroke patients
25 had limb spasticity⁵⁻⁷, and the medical cost of post-stroke limb
26 spasticity patients is about four times as much as post-stroke
27 patients without spasticity^{8 9}. Limb spasticity not only severely
28 restricts the ability of patients, reduces the quality of life, but
29 also causes psychological impact on patients' rehabilitation, and
30 brings a great burden to families and society^{10 11 12 13 14}.

31
32 Physical therapy, oral or injection drug therapy, and operation
33 therapy are commonly used in western medicine to treat post-stroke
34 spasticity at present. Oral drugs such as baclofen, eperisone,
35 hydrochloride and diazepam have large side effects which hinder the
36 recovery of motor function with long time taking¹⁵. Botulinum toxin
37 treatment is difficult to achieve long-term results, and it is often
38 injected for moderate or severe cases of post-stroke spasticity^{16 17}.
39 Physical therapy often requires active exercise coordination of
40 patients, however, patients with severe conditions are often unable
41 to cooperate. Surgical treatment is traumatic and a large number of
42 patients often find it difficult to accept. At present, much more of
43 the patients with spasticity after stroke choose external treatment.
44 In China, many external treatment methods of traditional Chinese
45 Medicine (TCM) are applied to the treat this disease.

46
47 Tuina is an ancient form of external treatment method, which was
48 based on the meridian and acupoint theory of traditional Chinese
49 medicine, and uses specific operation skill acting on the surface or
50 acupoints of the patient's body to treat diseases.^{18 19}. Tuina has
51 been widely used in China for hundreds of years and increasingly
52 practiced in western countries in recent years. Systematic evaluation
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20 shows that acupuncture is Efficacy and safety in the treatment of

limb spasticity after stroke. Acupuncture and Tuina belong to the external treatment of traditional Chinese medicine, and both are based on the same theory of meridians and acupoints. However, it is still unclear whether the effectiveness of acupuncture is also applicable to Tuina in the treatment of post-stroke spasticity. If tuina therapy for post stroke spasticity is proven to be effective, which has the characteristics of intervention and low cost. At present, there is no systematic review of Tuina in the treatment of post-stroke limb spasticity, so this study will evaluate the Efficacy and safety of Tuina in the treatment of post-stroke limb spasticity, and provide evidence for clinical decision-making of massage.

Methods

The systematic review will be performed following the guideline of Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015²¹.

Inclusion Criteria

Types of studies

We will include randomized controlled trials (not included quasi-RCTs) of tuina for post-stroke spasticity in the treatment groups. If multi-arm RCTs comes, we will select the group which used tuina and another without tuina for analysis. We will select the first stage of cross over RCTs, which tuina was firstly used in one group. RCTs' language of English, Chinese, Japanese, Korean and Thai will be included.

Types of participants

We will include patients suffering post-acute phase of post-stroke spasticity (18 >years old). Stroke (Cerebral infarction or cerebral hemorrhage) is diagnosed according to WHO criteria ²², participants have the symptoms of limb muscle tension increase, and the modified Ashworth Scale (MAS) score is grade 1-2. Participants of any sex, ethnicity will be enrolled.

Types of interventions

The treatment group using tuina, while the control group receives treatment of oral medication, acupuncture, Chinese herbal medication, physical therapy, surgery, botox injections and so on or even with no treatment will be included.

Types of outcome measures

Primary outcome

The primary outcome measures

Muscle tone will be evaluated by the Modified Ashworth Scale (MAS). MAS is a clinical instrument which is commonly used for measuring spasticity, and studies have proofed its reliability²³⁻²⁵.

Secondary outcome

Motor function was assessed with Fugl-Meyer Assessment scale (FMA) or Simplified Fugl-Meyer Assessment scale

Muscle strength will be defined by surface electromyogram root mean square value (RMS),

Activities of daily living (ADL) will be assessed by the modified Bathel index (MBI),

Quality of life will be measured by stroke specific quality of life scale (SS-QOL) or quality of life 36 item short-form health survey (SF-36)

Limb pain will be assessed by Visual Analogue Scale (VAS)

Safety outcome

Skin abrasions

Exclusion criteria:

- Repeatedly published studies;
- Experiences, letters, systematic reviews, animal experiments;
- Tuina was not only in the experimental group but also in the control group;
- Articles without full text or with data which is missed nor can' t be used.

Search strategy

Electronic searches

The published electronic literature will be searched in EMBASE, MEDLINE(by Pubmed), Cochrane library, Web of Science(WOS), Wiley, Springer, PEDro, Chinese Science Citation Database, China National Knowledge Infrastructure (CNKI), Chinese Biomedical literature Database (CBM), Chinese Scientific and Journal Database (VIP), Wan Fang database, Japanese medical database (CiNii), Korean Robotics Institute Summer Scholars (RISS), and Thailand Thai-Journal Citation Index Centre (TCI) . We will also check reference lists, and the literature will be searched range from the establishment to January 1, 2020.

The search strategy is developed according to published reviews ²⁶ 27. The detail search strategy of MEDLINE(by Pubmed) is listed in Table 1, while the search strategy will be modified according to other different databases.

Table1 MEDLINE(by Pubmed) search strategy

Spasticity of post-stroke	#1.Stroke[MeSH] OR Apoplexy [Tiab] OR post-stroke[tiab] OR poststroke[tiab]OR Apoplectic [Tiab] OR Apoplexia [Tiab] OR Cerebral hemorrhage [Tiab] OR Ich [Tiab] OR Cerebrovascular accident [Tiab] OR Cerebrovascular disorders [Tiab] OR Cerebral embolism [Tiab] OR Brain embolism [Tiab] OR Embolic stroke [Tiab] OR Cerebral infarct OR cva*[tiab]
---------------------------	--

	#2. spasm[Mesh] OR dystonia[tiab] OR paraparesis, spastic[tiab] OR muscle spasticity*[tiab] OR muscle hypertonia [tiab] OR muscle rigidity*[tiab] OR muscle tonus[tiab] OR spas*[tiab] OR high tone[tiab] #3. #1 AND #2
Tuina	#4. Tuina[tiab] or Massage[tiab] or Acupressure[tiab] or Rub[tiab] or Massageing[tiab] or Massotherapy[tiab] or manipulation[tiab]
Randomised controlled trial	#5. Randomised controlled trial [pt] OR controlled clinical trial [pt] OR randomized [tiab] OR placebo [tiab] OR drug therapy [sh] OR randomly [tiab] OR trial [tiab] OR groups [tiab]
Final search strategy	6. #3 AND #4 AND #5

Data collection and analysis

Selection of literature

Two authors (YZL, JZC) will identify studies according to the inclusion criteria independently. Firstly, they will eliminate duplicate researches by using EndNote software (V. x9.0). Secondly, screening the title and abstract, if necessary, reading the full article to confirm if it should be included. They also use EndNote software to manage the included studies. The screening operation is performed as Figure 1. If there is disagreement during the screening process, discuss with the third experts (GCJ) to make a decision.

Data extraction and management

Two authors (SQS and YFW) will extract data from the included studies independently. In multi-arm RCTs, we will extract data from RCTs of two arms, while we will select one group which contain the treatment of tuina as the treatment group, we will also choose another group the treatment of which without tuina as the control group. The general Information, which consists of title, publication year, authors, country, language, journal source; information of participants: gender, age, stroke type (cerebral infarction or cerebral hemorrhage), duration of onset, sample size; information of intervention characteristics: type, session, duration, follow-up time; outcome information about primary outcome, second outcome, observation time points, and adverse effects.

Assessment of risk of bias in included studies

Two independent authors (QSZ and FC) will evaluate the risk of bias by using the Cochrane Collaboration bias risk assessment tool to assess the risk bias of the literature included in the systematic review. The two authors will assess the risk of bias of sequence generation, allocation concealment, blinding of participants personnel and outcome assessment, incomplete outcome data, selective

1
2
3 outcome reporting and other bias. The evaluation grades are low, high
4 and unclear risk of bias.

5 6 **Measures of treatment effect**

7 Two independent authors (YHS and QSZ) will use the mean
8 difference (MD) or standard mean difference (SMD) with 95% (CI) for
9 continuous data of final measurements, the Other binary data will be
10 changed into RR form.

11 12 **Dealing with missing data**

13 If some information of the included studies missed, we will try to
14 contact the correspondence author through e-mail, phone or other
15 contacts. If failure, we will turn to the following strategies to
16 evaluate the potential influence of missing data²⁸.

17
18
19 • Worst-case scenario analysis: All participants with missing data
20 counted as failures.

21 • Extreme worst-case/best-case scenario analysis: Participants with
22 missing outcome data in the exercise arm counted as failures and in
23 the control arm as success and vice versa.

24 25 **Assessment of heterogeneity**

26 We will use Q -test and I^2 statistic to assess the heterogeneity of
27 the included studies, as the criteria: $I^2 < 50\%$ indicates low
28 heterogeneity, while $I^2 > 50\%$ indicates high heterogeneity,

29 30 **Assessment of reporting bias**

31 We will construct a funnel plots to assess asymmetry, only if at
32 least 10 RCTs are included.

33 34 **Data synthesis**

35 The meta-analysis of intervention and outcome measures methods will
36 be conducted by RevMan 5.3.5 software (the Cochrane Collaboration,
37 Oxford, England). If the statistical heterogeneity is low ($P > 0.1$, or
38 $I^2 < 50\%$), we will use the fixed-effect model to combine the data,
39 while, if the statistical heterogeneity is high ($P < 0.1$, or $I^2 > 50\%$),
40 we will use the random-effect model. However, if the heterogeneity
41 level much significant, a descriptive analysis will be performed.

42 43 **Subgroup analysis and investigation of heterogeneity**

44 We will perform subgroup analysis to assess heterogeneity of the
45 study according to the following potential factors from the available
46 sufficient data:

47 Age

48 Sex

49 Different types of stroke (Cerebral hemorrhage or cerebral
50 infarction)

51 Different types of tuina

52 Different time/course of treatment

53 Different parts of affected limbs (upper limb or lower limb)

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3 Different types of control group (acupuncture, placebo,
4 oral/Injection drug or no treatment)

5
6 We may make meta-regressions according to age and and the different
7 time/course of treatment if heterogeneity is obvious.

8 **Sensitivity analysis**

9
10 We will perform the sensitivity analysis to evaluate the robustness
11 and reliability of the pooled results. If the results are not stable,
12 we may turn to removing studies of high risk of bias, or check up
13 processing method of missing data (Worst-case scenario analysis: All
14 participants with missing data counted as failures; Extreme worst-
15 case/best-case scenario analysis: Participants with missing outcome
16 data)

17 **Grading of evidence quality**

18
19 We will use the Grading of Recommendations Assessment, Development
20 and Evaluation(GRADE)²⁹ to assess the confidence in cumulative
21 evidence. Risk of bias, heterogeneity, indirectness, imprecision and
22 Publication bias will be assessed, and the results will be divided
23 into three levels: high, moderate, low and very low.

24 **Amendments**

25
26 We will show all of the amendments with detail description and
27 rationale in the amendments of this study.

28 **Ethics and dissemination**

29
30 This study needs no ethical approval, because there is nothing of
31 the data, which have a relationship with an individual patient. We
32 will complete this systematic review according to PRISMA guidelines.
33 The review will provide an assessment of effect and safety of tuina
34 for spasticity of post-stroke. We will publish the findings in a
35 peer-reviewed, open access journal and the finished systematic review
36 and meta-analysis will be disseminated online, which would be
37 obtained freely for anyone. The results may contribute to improving
38 the therapeutic strategy of patients with post stroke spasticity.
39 This protocol registered on PROSPERO(CRD42020163384).

40 **Patient and public involvement**

41
42 No patient or public will be involved in our study directly. We
43 only use data that existed in studies published.

44 **Discussion**

45
46 This systematic review will focus on the Efficacy and safety of
47 tuina for spasticity of post-stroke. Tuina is a traditional Chinese
48 physical therapy, which is effective for 516 diseases in China ³⁰, of
49 which spasticity is included. Clinical reports show tuina is well in
50 treatment of spasticity of post-stroke, however, high quality study
51 still did' t appear. We conduct this review, aim to provide better
52 evidence and guide for clinical decision making. We plan to publish
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2
3 this review within 1 year since the protocol published, then we will
4 update it every 3 years.
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8 **Author affiliations**

9
10 1 Acupuncture and Tuina Department, Changchun University of Chinese
11 Medicine, Changchun, 130117, China.

12 2 Rehabilitation Medicine Department, Changchun University of Chinese
13 Medicine, Changchun 130117, China;

14 3 Acupuncture Department, Henan University of Traditional Chinese
15 Medicine, Zhengzhou 45000, China

16 4 TCM Department, Changchun university of Chinese Medicine, Changchun
17 130117, China.

18 5 Rehabilitation Medicine Department, Jilin University Third
19 Affiliated Hospital, Jilin University, Changchun, 130117, China.

20 6. Tuina Department, Traditional Chinese Medicine Hospital of Jilin
21 Province, Changchun 130021, China;

22 7. Graduate school, Changchun University of Chinese Medicine,
23 Changchun, 130117, China.

24 **Contributors** QSZ and BLS conceived and designed the protocol. QSZ and
25 YHS registered the protocol review in the Prospero database and
26 drafted the manuscript. YZL and JZC designed the search strategy. QSZ
27 and FC draft the protocol, QSZ, GCJ, FC, YHS, SQS, GYH, YZL, JZC,
28 XHX, YFW, XHX and BLS contribute to and approved the final manuscript
29 of the protocol review.
30

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36 **Patient consent** Not required

37 **Provenance and peer review** not commissioned; externally peer reviewed
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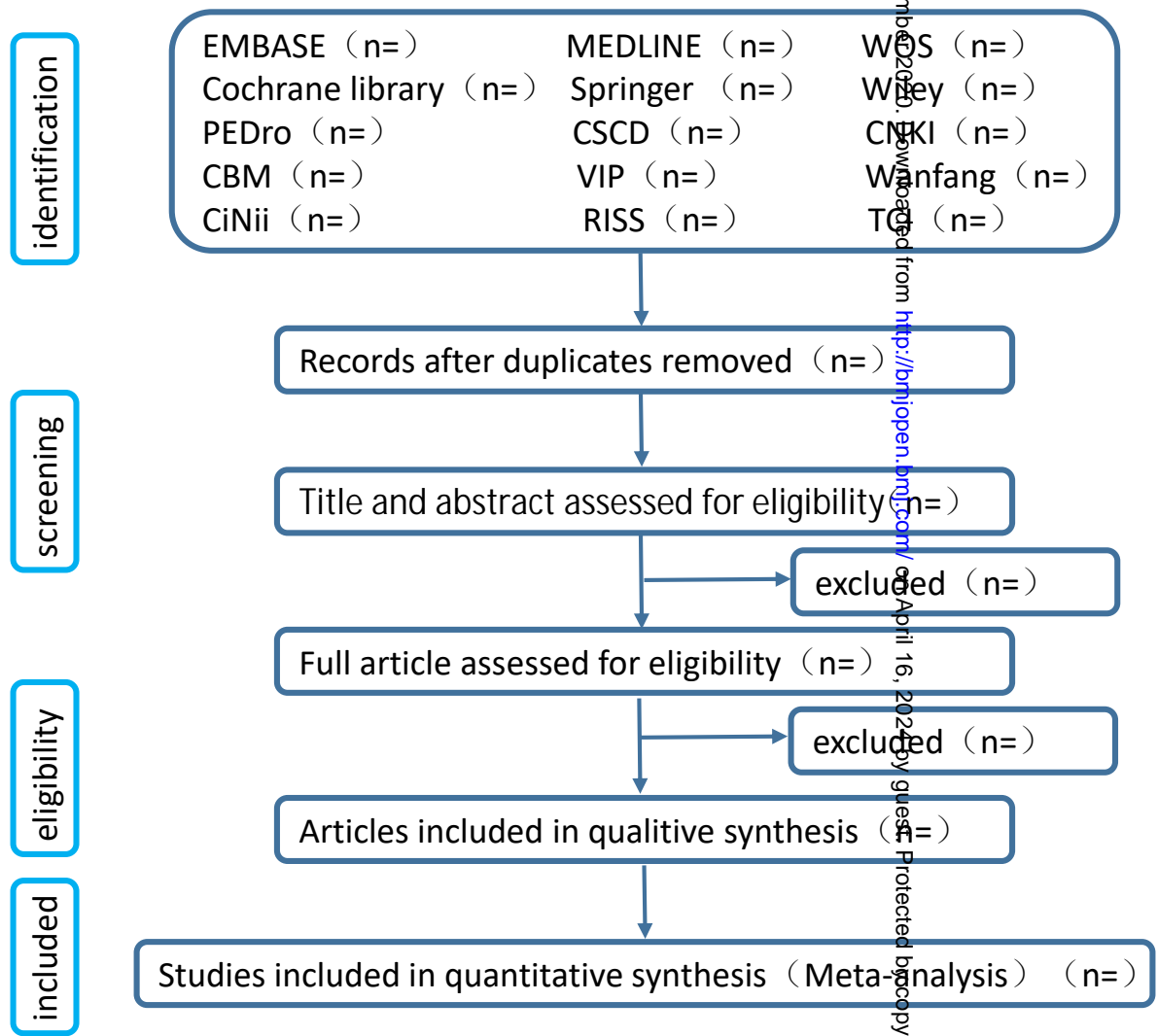
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14 Caption of **figure 1**: The screening process.
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For peer review only

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Reporting checklist for protocol of a systematic review.

Based on the PRISMA-P guidelines.

Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

Upload your completed checklist as an extra file when you submit to a journal.

In your methods section, say that you used the PRISMA-Reporting guidelines, and cite them as:

Moher D, Shamseer L, Clarke M, Ghersi D, Liberati A, Petticrew M, Shekelle P, Stewart LA. Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) 2015 statement.

Syst Rev. 2015;4(1):1.

	Reporting Item	Page Number
Title		
Identification	#1a Identify the report as a protocol of a systematic review	1
Update	#1b If the protocol is for an update of a previous systematic review, identify as such	n/a This is a new systematic review

1 **Registration**

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4 [#2](#) If registered, provide the name of the registry (such as PROSPERO) and registration number n/a Registration is in progress

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10 **Authors**

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13 **Contact** [#3a](#) Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author 1,6,7

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20 **Contribution** [#3b](#) Describe contributions of protocol authors and identify the guarantor of the review 7

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26 **Amendments**

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29 [#4](#) If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments n/a This is a new systematic review

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39 **Support**

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42 **Sources** [#5a](#) Indicate sources of financial or other support for the review 7

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47 **Sponsor** [#5b](#) Provide name for the review funder and / or sponsor 7

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50 **Role of sponsor** [#5c](#) Describe roles of funder(s), sponsor(s), and / or institution(s), if any, in developing the protocol 7

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55 **Introduction**

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1	Rationale	#6	Describe the rationale for the review in the context	2
2			of what is already known	
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6	Objectives	#7	Provide an explicit statement of the question(s) the	1
7			review will address with reference to participants,	
8			interventions, comparators, and outcomes (PICO)	
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14	Methods			
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17	Eligibility criteria	#8	Specify the study characteristics (such as PICO,	3
18			study design, setting, time frame) and report	
19			characteristics (such as years considered, language,	
20			publication status) to be used as criteria for eligibility	
21			for the review	
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29	Information	#9	Describe all intended information sources (such as	3,4
30	sources		electronic databases, contact with study authors,	
31			trial registers or other grey literature sources) with	
32			planned dates of coverage	
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39	Search strategy	#10	Present draft of search strategy to be used for at	3,4, appendix 1
40			least one electronic database, including planned	
41			limits, such that it could be repeated	
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47	Study records -	#11a	Describe the mechanism(s) that will be used to	4,5
48	data		manage records and data throughout the review	
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51	management			
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55	Study records -	#11b	State the process that will be used for selecting	4
56	selection process		studies (such as two independent reviewers)	
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1		through each phase of the review (that is, screening,	
2		eligibility and inclusion in meta-analysis)	
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6	Study records -	#11c Describe planned method of extracting data from	4
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8	data collection	reports (such as piloting forms, done independently,	
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10	process	in duplicate), any processes for obtaining and	
11		confirming data from investigators	
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15	Data items	#12 List and define all variables for which data will be	4
16		sought (such as PICO items, funding sources), any	
17		pre-planned data assumptions and simplifications	
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23	Outcomes and	#13 List and define all outcomes for which data will be	3
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25	prioritization	sought, including prioritization of main and additional	
26		outcomes, with rationale	
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31	Risk of bias in	#14 Describe anticipated methods for assessing risk of	4
32			
33	individual studies	bias of individual studies, including whether this will	
34		be done at the outcome or study level, or both; state	
35		how this information will be used in data synthesis	
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41	Data synthesis	#15a Describe criteria under which study data will be	3
42		quantitatively synthesised	
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46	Data synthesis	#15b If data are appropriate for quantitative synthesis,	5
47		describe planned summary measures, methods of	
48		handling data and methods of combining data from	
49		studies, including any planned exploration of	
50		consistency (such as I ² , Kendall's τ)	
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1	Data synthesis	#15c	Describe any proposed additional analyses (such as	5
2			sensitivity or subgroup analyses, meta-regression)	
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6	Data synthesis	#15d	If quantitative synthesis is not appropriate, describe	n/a all the data
7			the type of summary planned	will be
8				quantitative
9				synthesised
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16	Meta-bias(es)	#16	Specify any planned assessment of meta-bias(es)	2,5
17			(such as publication bias across studies, selective	
18			reporting within studies)	
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24	Confidence in	#17	Describe how the strength of the body of evidence	6
25	cumulative		will be assessed (such as GRADE)	
26	evidence			
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Notes:

- 35 • 1b: n/a This is a new systematic review
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- 38 • 2: n/a Registration in progress
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- 41 • 4: n/a This is a new systematic review
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- 44 • 15d: n/a all the data will be quantitative synthesised The PRISMA-P checklist is distributed under
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- 46 on 20. March 2020 using <https://www.goodreports.org/>, a tool made by the [EQUATOR Network](#)
- 47 in collaboration with [Penelope.ai](#)
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