

Appendix

Search Strategy: MEDLINE (PubMed)

01. osteopath* AND medicine
02. osteopath* AND treatment
03. osteopath* AND manipulat*
04. Manipulation, Osteopathic [Mesh]
05. Osteopathic Medicine [Mesh]

06. 01 OR 02 OR 03 OR 04 OR 05

07. meta-analysis
08. meta-analysis
09. metaanalysis
10. systematic review
11. review
12. Review Literature as Topic [Mesh]
13. Review" [Publication Type]
14. Meta-Analysis [Publication Type]
15. Meta-Analysis as Topic"[Mesh]

16. 07 OR 08 OR 09 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15

17. 06 AND 16

Supplemental Table 1. Excluded systematic reviews.

First author, year	Title	Reason for exclusion
Schwerla, 1999 ¹	[Evaluation and critical review published in the European literature on osteopathic studies in the clinical field and in the area of fundamental research].	The SR included any type of study design.
Spiegel, 2003 ²	Osteopathic manipulative medicine in the treatment of hypertension: An alternative, conventional approach.	Narrative review.
Gamber, 2005 ³	Cost-effective osteopathic manipulative medicine: a literature review of cost-effectiveness analyses for osteopathic manipulative treatment.	Evaluation of OMT cost-effectiveness.
Licciardone, 2005 ⁴	Osteopathic manipulative treatment for low back pain: a systematic review and meta-analysis of randomized controlled trials.	The SR included primary studies in which the intervention was not performed by osteopathic physicians or osteopaths.
Jäkel, 2011 ⁵	Therapeutic effects of cranial osteopathic manipulative medicine: a systematic review.	The SR included primary studies in healthy volunteers.
Posadzki, 2011 ⁶	Osteopathy for musculoskeletal pain patients: A systematic review of randomized controlled trials.	The SR included primary studies in healthy volunteers and intervention was not performed by osteopathic physicians or osteopaths.
Orrock, 2013 ⁷	Osteopathic intervention in chronic non-specific low back pain: a systematic review.	Overlap: 2 out of 2 studies. This SR was update by Franke 2014 ²⁵ .
Cerritelli, 2015 ⁸	Osteopathic manipulative treatment in neurological diseases: systematic review of the literature.	The SR included any type of study design.
Cicchitti, 2015 ⁹	Chronic inflammatory disease and osteopathy: a systematic review.	The SR included study with an animal model and any type of study designs.
Majchrzycki, 2015 ¹⁰	Application of osteopathic manipulative technique in the treatment of back pain during pregnancy.	The SR included primary studies in which the intervention was not performed by osteopathic physicians or osteopaths.
Vasconcelos, 2015 ¹¹	Effect of osteopathic maneuvers in the treatment of asthma: review of literature.	The SR included any type of study design, and the intervention was not performed by osteopathic physicians or osteopaths.
Guillard, 2016 ¹²	Reliability of diagnosis and clinical efficacy of cranial osteopathy: a systematic review.	The SR included primary study in which the intervention was not performed by osteopathic physicians or osteopaths.
Kruger, 2016 ¹³	Osteopathic treatment of irritable bowel syndrome - A review.	Overlap: 4 out 4 studies. Most rigorous criteria were used in Muller' s SR ³² .
Ruffini, 2016 ¹⁴	Osteopathic manipulative treatment in gynecology and obstetrics: A systematic review.	The SR included any type of study designs.
Veloso, 2016 ¹⁵	Osteopathic Manipulation Treatment on postural balance: a systematic review.	The SR included any type of study designs.
Raguckas, 2016 ¹⁶	Osteopathic considerations in obstructive pulmonary disease: A systematic review of the evidence.	The SR included any type of study designs.
Ahmad, 2017 ¹⁷	Current Clinical Status of Osteopathy: Study Based on Retrospective Evidences of Six Years, A Systemic Review.	The SR included any type of study design, and the intervention was not performed by osteopathic physicians or osteopaths.
Do Vale, 2017 ¹⁸	Effectiveness of the osteopathic treatment in intestinal constipation: A systematic review.	Clinical outcomes are not reported.
Steel, 2017 ¹⁹	Osteopathic manipulative treatment: A systematic review and critical appraisal of comparative effectiveness and health economics research.	The SR included any study designs.
Lanaro, 2017 ²⁰	Osteopathic manipulative treatment showed reduction of length of stay and costs in preterm infants.	The SR included RCTs and controlled clinical trials.
Guillaud, 2018 ²¹	Reliability of diagnosis and clinical efficacy of visceral osteopathy: A systematic review.	The SR included primary study in which the intervention was not performed by osteopathic physicians or osteopaths.
Potekhina, 2018 ²²	Osteopathy is a new medical specialty. Assessment of clinical effectiveness of osteopathic manipulative therapy in various diseases.	The SR included any type of study design, and the intervention was not performed by osteopathic physicians or osteopaths.
Saracutu, 2018 ²³	The effects of osteopathic treatment on psychosocial factors in people with persistent pain: A systematic review.	The SR included primary studies in which the intervention was not performed by osteopathic physicians or osteopaths.
Sposato, 2018 ²⁴	Osteopathic manipulative treatment in surgical care: short review of research publication in osteopathic Journals during the period 1990 to 2017.	The SR included any study designs.
Verhaeghe, 2018 ²⁵	Osteopathic care for spinal complaints: A systematic literature review.	The SR included primary studies in which the intervention was not performed by osteopathic physicians or osteopaths.
Verhaeghe, 2018 ²⁶	Osteopathic care for low back pain and neck pain. A cost-utility analysis.	Health economic evaluation of osteopathic care in low back pain and neck pain. Data about clinical outcomes were not completely reported.

Whalen, 2018 ²⁷	A Short Review of the Treatment of Headaches Using Osteopathic Manipulative Treatment.	The SR included any type of study design, and the intervention was not performed by osteopathic physicians or osteopaths.
Rechberger, 2019 ²⁸	Effectiveness of an osteopathic treatment on the autonomic nervous system: a systematic review of the literature.	The SR included any type of study design, primary studies in healthy participants and intervention was not performed by osteopathic physicians or osteopaths.
Switters, 2019 ²⁹	Is visceral manipulation beneficial for patients with low back pain? A systematic review of the literature.	The SR included primary studies in which the intervention was not performed by osteopathic physicians or osteopaths.
Buscemi, 2020 ³⁰	Endocannabinoids release after osteopathic manipulative treatment. A brief review.	The SR included any type of study designs.
Santiago, 2020 ³¹	Instrumentation used to assess pain in osteopathic interventions: A critical literature review.	Clinical outcomes are not reported.
Kiepe, 2020 ³²	Effects of osteopathic manipulative treatment on musicians: A systematic review.	The SR included any type of study designs.
Baroni, 2021 ³³	Osteopathic manipulative treatment and the Spanish flu: a historical literature review.	Historical review evaluating which OMT technique were administered in patients during the 1918 Spanish flu pandemic.
Tramontano, 2021 ³⁴	Vertigo and balance disorders- The role of osteopathic manipulative treatment: A systematic review.	The SR included any type of study designs and primary study in healthy participants.
De Marsh, 2021 ³⁵	Pediatric osteopathic manipulative medicine: A scoping review.	The SR included any type of study designs.

OMT: osteopathic manipulative treatment, RCTs: randomized controlled trials, SR: systematic review.

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Supplemental Table 2. Summary of identified systematic reviews with overlapping.

Total SRs (n=9)	Total	overlapping	Total
Total trials	71	14	57
Total participants	5577	1837	3740
Musculoskeletal conditions (6 SRs)²⁴⁻²⁹			
Total trials	44	14	30
Total participants	4251	1837	2414
Trials low back pain	34	12	22
Participants low back pain	3369	1316	2053
Trials neck pain	3	0	3
Participants neck pain	123	0	123
Trials chronic non-cancer pain	7	2	5
Participants chronic non-cancer pain	759	521	238
Paediatric conditions (1 SR)³⁰			
Trials pediatrics conditions	17	0	17
Participants pediatric conditions	887	0	887
Neurological conditions (1 SR)³¹			
Trials primary headache	5	0	5
Participants primary headache	235	0	235
Visceral conditions (1 SR)³²			
Trials irritable bowel syndrome	5	0	5
Participants irritable bowel syndrome	204	0	204

SR: systematic review.

Supplemental Table 3. Identified SRs with studies overlapping.

Primary studies	Participants	Primary studies	Participants	Primary studies	Participants	Primary studies	Participants	Primary studies	Participants
Chown 2008	71			Chown 2008	131*	Albers 2018	48	Rohrich 2014	35
Gibson 1985	97					Cuccia 2010	50	Beltz 2014	54
Licciardone 2003	71	Licciardone 2003	71	Licciardone 2003	98**	Licciardone 2003	66	Schwerla 2015	80
Licciardone 2010	144	Licciardone 2010	144					Licciardone 2010	144
Licciardone 2013	455	Cleary 1994	12	Licciardone 2013	455	Licciardone 2013	455	Hensel 2015	400
Mandara 2008	94	Burton 2000	30	Mandara 2008	94	Papa 2012	72		
Peters 2006	57					Schwerla 2008	37	Peters 2006	57
Grundemann 2013	41					Stepnik 2018	31	Gundemann 2013	41
Recknagle 2007	39			De Oliveira 2019	38			Recknagle 2007	39
Vismara 2012	21	Vismara 2012	21	Vismara 2012	21				
Anderson 1999	155								
Adorján - Schaumann 1999	57								
Heinze 2006	60								
Cruser 2012	60								
Schwerla 2012	80								
Trials 15	TP 1502	Trials 5	TP 278	Trials 6	TP 739	Trials 7	TP 759	Trials 8	TP 850
TP, Total participants. *OMT group counted twice and considered exercise group even if drop-out are >40%, **participants at 6 months, OMT counted twice.									

Supplemental Table 4. Traffic light and overall traffic light evidence for each condition.						
MUSCULOSCHELETAL CONDITIONS	First author, year	GRADE	Effect size	Traffic light evidence	Downgrade	Overall traffic light evidence §
1. ANSLBP/CNSLBP §						
Pain	Franke, 2014 ²⁵	moderate	medium		Least favourable assessment from new RoB	
	Dal Farra, 2020 ²⁷	low	medium		Low GRADE	
Functional status	Franke, 2014 ²⁵	moderate	small		Least favourable assessment from new RoB	
	Dal Farra, 2020 ²⁷	low	medium		Low GRADE	
2. CNSLBP §						
Pain	Franke, 2014 ²⁵	moderate	small		Least favourable assessment from new RoB	
	Dal Farra, 2020 ²⁷	low	medium		Low GRADE	
Functional status	Franke, 2014 ²⁵	high	small		Least favourable assessment from new RoB	
	Dal Farra, 2020 ²⁷	low	small		Low GRADE	
3. NSLBP in Pregnancy §						
Pain	Franke, 2014 ²⁵	low	medium		Low GRADE	
	Franke, 2017 ²⁶	moderate	medium		Least favourable assessment from new RoB	
Functional status	Franke, 2014 ²⁵	low	medium		Low GRADE	
	Franke, 2017 ²⁶	moderate	small		Least favourable assessment from new RoB	
4. NSLBP in PP						
Pain	Franke, 2014 ²⁵	moderate	large		Least favourable assessment from new RoB	
	Franke, 2017 ²⁶	low	large		Low GRADE	
Functional status	Franke, 2014 ²⁵	moderate	small		Least favourable assessment from new RoB	
	Franke, 2017 ²⁶	low	small		Low GRADE	
5. LBP WITH SCIATICA						
Pain	De Oliveira, 2013 ²⁴	NP	NP		Critically low SR	
6. LBP with MENOPAUSAL SYMPTOMS						
Pain	De Oliveira, 2013 ²⁴	NP	NP		Critically low SR	
7. CNSNP						
Pain	Franke, 2015 ²⁸	moderate	medium		Least favourable assessment from new RoB	
Functional status	Franke, 2015 ²⁸	moderate	small		Least favourable assessment from new RoB	
8. CNCP						
Pain	Rehman, 2020 ²⁹	moderate	small		No judgement for imprecision	
Disability	Rehman, 2020 ²⁹	moderate	small		No judgement for imprecision	
Quality of life	Rehman, 2020 ²⁹	moderate	medium		No judgement for imprecision	
PAEDIATRIC CONDITIONS						
Outcomes for different conditions *	Posadzky, 2013 ³⁰	NP	NP		High risk of bias and critically low quality of SR	
NEUROLOGICAL CONDITIONS						
Outcomes for migraine and tension type headache**	Cerritelli, 2017 ³¹	NP	NP		High risk of bias and low quality of SR	
VISCERAL CONDITION						
Outcomes for IBS***	Muller, 2014 ³²	NP	NP		High risk of bias and low quality of SR	
<p>Traffic light evidence: Green light, MA indicated intervention effectiveness (Effect size any level). Downgrade for GRADE low (or GRADE moderate/high in which judgement for some domains was not performed by the authors or our use of the new RoB version was the least favorable assessment) or for a low/critically low quality of the SRs; Yellow light, MA was not performed, conflicting results from RCTs or only one RCT. Downgrade for high risk of bias (from SR authors or our assessment) or low/critically low quality of SR; Red light, MA indicated that the intervention was ineffective or less effective than comparator. § SR from De Oliveira was not considered as for this condition all RCTs were included in more recent SRs with MAs.</p> <p>Overall traffic light evidence: Green light, high quality evidence from MA indicates intervention effectiveness; Yellow light, promising evidence suggests possible effectiveness, but more research would increase our confidence in the estimate of the effect; Red light, limited or inconclusive evidence.</p> <p>ANSLBP: acute non-specific low back pain, CNCP: chronic non-cancer pain, CNSLBP: chronic non-specific low back pain, CNSNP: chronic non-specific neck pain, IBS: irritable bowel syndrome, LBP: low back pain, MA: meta analysis, NP: not performed, NSLBP: non-specific low back pain, PP: postpartum, RCT: randomized controlled trial, RoB: risk of bias, SR: systematic review.</p> <p>*Different conditions were considered. It's not possible to evaluate the single outcome for each condition, **pain, work disability, headache frequency, quality of life, ***pain, constipation, quality of life.</p>						

