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Review Article (Meta-Analysis)

Impact of Manual Therapy on Instrumentalist Musicians With Playing-Related Musculoskeletal Disorders: A Systematic Review

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KEYWORDS
Complementary therapy;
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Abstract *Objective:* To investigate the effects of manual therapy on playing-related musculoskeletal disorders (PRMDs) in instrumentalist musicians.
Data Sources: PubMed, MEDLINE, CINAHL, Scopus, Web of Science, and EMBASE were searched from inception until December 17, 2024.
Study Selection: Randomized controlled trials (RCTs), noncontrolled trials, case reports evaluating the effects of any manual therapy on PRMDs of instrumentalists were selected.
Data Extraction: Two independent authors extracted data and assessed quality using different risk of bias assessment tools, depending on study design.
Data Synthesis: Of the 529 retrieved titles, 9 were included: 3 articles on 2 RCTs (one with 69 string/wind/percussion players and the other with 30 wind players, aged 18-30y), 1 case series (689 instrumentalists), 1 pre-post trial (32 string/wind/keyboard/percussion/other instrumentalists, aged 18-30y), and 4 case reports (4 string/wind/keyboard players, aged 25-64y). The first RCT showed significantly reduced pain and disability after soft tissue and mobilization techniques along with postural exercises versus postural exercises alone in temporomandibular dysfunction of wind instrument students. The other RCT reported immediate and medium-term significant pain reduction after Tuina versus sham Tuina in PRMDs in professional musicians. The case series, pre-post study, and 1 case report

List of abbreviations: PRMD, playing-related musculoskeletal disorder; RCT, randomized controlled trial.
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were of low-very low quality, while 3 case reports were of good quality. However, it should be noted that support for treatment was very limited; both RCTs were underpowered and had a high risk of bias, whereas the evidence from the other studies was limited by low quality and/or design. Heterogeneity did not allow for meta-analysis.
Conclusions: The evidence supporting manual therapy for PMRDs in instrumentalists is scarce and of low quality. High-quality RCTs are needed to investigate the risks and benefits of these interventions.

Musicians' activity-related musculoskeletal disorders, referred to as playing-related musculoskeletal disorders (PRMDs), have a relevant effect on musicians' quality of life, artistic performance, and sometimes professional career. PRMDs are highly prevalent among instrumentalist musicians (instrumentalists).[1,2] The life-long prevalence of musculoskeletal disorders in this population ranges from 46% to 90% and the point prevalence from 9% to 36%. The neck and the shoulders are the most affected body regions, although different instruments (woodwind, string, or keyboard) and different body features imply specific risks of biomechanical overloads.[3] PMRDs can affect music students from the very beginning of their career, most often in childhood,[4] as well as professional musicians, who face constant demands for practice and performance.[5]

Education, postural correction, targeted exercise programs, rest, and a gradual return to activity are recommend for PMRDs.[1,6] Manual therapy can be divided into conventional (eg, orthopedic manual physical therapy, manual medicine[7]) and nonconventional, also defined as complementary and alternative medicine[8] (eg, osteopathy, Tuina, a traditional chinese medicine manual therapy approach). Chiropractic is also included in complementary and alternative medicine by the World Health Organization, although this attribution is controversial.

Manual therapy is one of the most ancient and widespread therapeutic interventions worldwide. A Norwegian study including a population of 1600 individuals reported that musicians resorted to manual therapy more frequently than other workers,[9] but no comprehensive review on the effects of such treatments on PRMDs has been published. Thus, we aimed to perform a systematic review of the existing evidence of the effects of manual therapy, both conventional and nonconventional, on any PRMD outcome in instrumentalists.

Methods

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines and recommendations[10] guided the conduct and reporting of this systematic review. The protocol was prospectively registered in the International Prospective Register of Systematic Reviews as CRD42024628044. No deviations from the protocol occurred.

Data sources and search strategy

The search was conducted by 2 expert reviewers in PubMed, MEDLINE, CINAHL, Scopus, Web of Science, and EMBASE for studies published from inception to December 17, 2024 evaluating the effects of specific manual therapy approaches either conventional or nonconventional (including osteopathy, chiropractic, Tuina, others) in the treatment of musculoskeletal disorders of instrumentalist musicians; no language restrictions were applied. The full search strategy for each database (supplemental appendix S1, available online only at http://www.archives-pmr.org/) was planned by experts in manual therapy, PMRDs, and the methodology of systematic reviews. In addition, the reference lists of all included articles and previous reviews on the topic were manually screened to retrieve potentially eligible papers.

Study selection

Studies meeting the following Participants Intervention Comparator Outcomes Study type criteria were included: (1) participants: instrumentalists with musculoskeletal disorders, excluding those with specific non playing-related conditions (eg traumatic or rheumatic); (2) intervention: any type of conventional or nonconventional manual therapy for which the used approach is stated (eg, mobilizations with movement, high velocity low amplitude techniques, Tuina-based techniques, osteopathic techniques); (3) comparator: any possible comparator as well as no comparator; (4) outcomes: any PRMD-related outcomes were included; and (5) study type: randomized controlled trials (RCTs), controlled trials, pre-post trials, case series, and case reports exploring conventional or nonconventional manual therapy effects. Two reviewers independently screened search records and evaluated full texts for eligibility. Any disagreement was resolved by consensus with the contribution of a third reviewer.

We included studies regardless of the language. All authors were native speakers in Italian and highly proficient in English. For other languages, we used an automatic translator (Deepl) and identified a bilingual health professional/researcher to review the translation.

Data extraction

Two authors independently extracted the following information from the included articles: study characteristics (authors, year of publication, design), participants (inclusion/exclusion criteria, number of individuals per group, and musculoskeletal complaint/diagnosis), intervention/control features (type and duration), considered outcomes and relative measures (at any timepoints), and results. Disagreements were resolved by consensus with the contribution of a third author. If relevant information was missing,

we contacted the corresponding author via e-mail to request it.

Quality assessment

Two authors independently assessed the risk of bias for each study and every domain, using different tools depending on the study design; disagreements were resolved by a third author. Version 2 of the Cochrane Risk of Bias tool for randomized trials[11] was used for RCTs, the methodological index for nonrandomized studies[12] for noncontrolled studies, and the Johanna Briggs Institute quality appraisal tool[13] for case reports.

Data synthesis

We performed a quantitative synthesis of the included RCTs if they were sufficiently homogeneous regarding the participants' musculoskeletal condition(s), the intervention provided, the type of control, the outcomes measures, and the timing of follow-up assessments. For each outcome, we computed the standardized mean difference (SMD) and obtained pooled estimates from ≥2 studies based on random-effects models to account for heterogeneity of outcomes,[14] assessing heterogeneity and inconsistency using the Q and I^2 statistics, respectively.[15] For other study designs, a qualitative summary of the data was made.

Results

Selected studies

After removal of duplicates, 529 articles were identified, of which 9 met the inclusion criteria: 3 reports of RCTs, 2 of which reported the results of the same trial measured at different times (thus, 3 articles for 2 RCTs),[16-18] 1 pre-post trial,[19] 1 case series,[20] and 3 case reports.[21-23] An additional case report[24] was identified by cross-referencing and included. Figure 1 shows the flow chart of the selection process.[25]

Features of the included studies

Of the 3 papers on RCTs,[16-18] 2 reported data of the same study by Sousa et al[17,18] on a sample of 69 wind, string, or percussion musicians (their age range was not reported or retrieved upon request) with PRMDs. The other RCT, by López Requena et al,[16] evaluated a sample of 30 adult (age range, 18-30y) music students who played wind instruments with temporomandibular dysfunction. A case series by Janiszewski and Cieślik[20] included data from 689 instrumentalists whose age and instruments played were not reported, and the authors did not provide this information upon our request. The pre-post trial by Assel et al[19] included data from 32 individuals (age range, 18-30y, playing stringed, wind, keyboard, percussion, or other/unknown instruments). Finally, the 4 case reports[21-24] included data from 4 individuals (age range, 25-64y, playing stringed, wind, or keyboard instruments).

Two articles were published in German[23,24] and 1 in Polish[20]; we performed an automated translation (Deepl) and identified a German physical therapist and a Polish nurse, both highly proficient in Italian, to review and approve the translations. All other included articles were published in English. One included article[22] reported 3 cases: the one of an organist was considered for this review, whereas the other 2, of a guitarist and a bassoonist, were excluded from the review, one because of the traumatic etiology of the disorder and the other because the intervention did not involve any manual therapy. Table 1 summarizes the characteristics of the selected studies.

Quality assessment

All RCTs had high risk of bias (fig 2): for the trial reported by Sousa et al,[17,18] this was primarily because of the randomization process, which was conducted prior to enrollment and thus made the allocation unconcealed. For the article reporting the long-term effects of the intervention,[18] the high risk also resulted from uncertainty about the balancing of nonprotocol intervention across groups and the adherence to assigned interventions. Such uncertainty also existed for López Requena et al,[16] in which an additional problem stemmed from the lack of blindness of the assessor who measured the range of motion of mouth opening.

The methodological quality of the 2 noncontrolled studies included in the review was also low-very low (fig 3). A large case series reported by Janiszewski and Cieślik[20] did not provide any relevant information other than the aim of the study, so it scored very low (total score: 2/16). For the pre-post trial by Assel et al,[19] concerns arose from the selection of participants, the lack of assessor blinding, the time of follow-up, and the exclusion of >5% of participants from the follow-up assessment (total score: 8/16).

Conversely, the methodological quality of 3 of 4 case reports included in this review was high, with a clear description of history, demographic features, preintervention clinical condition, assessment, intervention delivered, and results at the postintervention assessment (fig 4), with the notable exception of Ridder et al,[24] who reported only the applied intervention and the follow-up assessment.

Data synthesis

Regarding the RCTs, because of the limited number of trials (N=2), which enrolled different populations and studied the effects of different interventions, meta-analysis was not possible. The effects of Tuina-based techniques were investigated by Sousa et al[17,18] in 69 musicians with PRMDs, randomly distributed into the experimental (n=39) and the control (n=30) groups, who received Tuina treatment on real acupoints or on nonspecific skin points, respectively. Tuina is a traditional chinese medicine manual technique to massage the recipient's muscles; similar to acupuncture, the practitioner stimulates pressure points in the recipient's body.[26] The authors studied the immediate effect of 1 session of real Tuina or sham Tuina administered by a health professional[17] and the long-term effects of the same intervention self-administered by participants daily.[18] The authors found that a single session of Tuina was more effective than sham

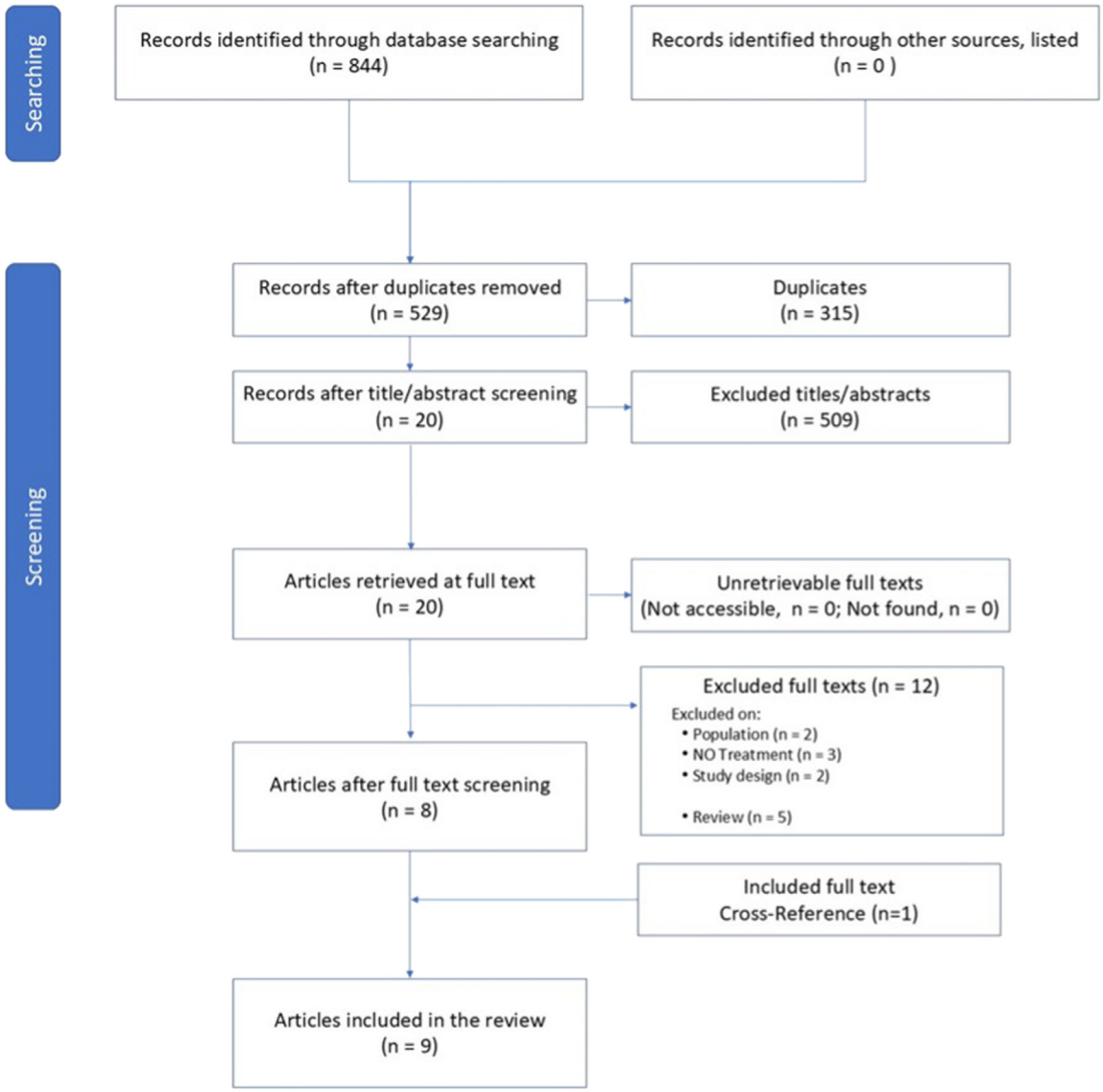

Fig 1 Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram.

intervention in terms of pain measured immediately after the first session (Hedges' g, −2.175; 95% confidence interval [CI], −2.799 to −1.591),[17] and that 20 days of self-administered Tuina treatment was more effective on pain than self-administered sham intervention (SMD, −0.741; 95% CI, −1.239 to −0.254).[18] López Requena et al[16] evaluated a sample of 30 adult music students who played wind instruments experiencing pain in the cranio-cervical-mandibular region and/or in the masticatory muscle and temporomandibular disfunctions, randomized to a combined treatment with a well-described manual therapy (suboccipital inhibition, posterior fascia stretching, and cervical mobilization) and active postural exercises, compared with postural exercises alone, for a duration of 4 weeks. Results showed that participants in the experimental group had lower Craniofacial Pain and Disability Inventory score (Hedges' g, −0.632; 95% CI, −1.379 to 0.091) and higher mouth opening range of motion (Hedges' g, 1.070; 95% CI, 0.320-1.862) after the treatment period. We always rated the level of evidence as very low, because of severe risk of bias and imprecision.

Regarding noncontrolled studies, participants of the case series described by Janiszewski and Cieślik[20] suffered from work-related overload and were treated with different approaches according to medical assessment. The authors found that in the group of patients with nonspecific pain conditions associated with musculoskeletal dysfunction, an improvement in musculoskeletal measures was obtained after manual therapy, whereas in the group with specific disorders, such as tenosynovitis or pain syndromes of spinal/thoracic outlet origin, a greater improvement was obtained after kinesiotherapy or physical activity. However, the authors did not describe in detail the enrolled population or the treatment, nor did they provide any numerical data on the results. Assel et al[19] presented a pre-post trial involving 32 adult music students with PRMDs, examined before and after receiving 12 physical therapy treatments over 6 weeks. The treatment included postural stabilization followed by individual treatments in which manual therapy (eg, mobilization, myofascial techniques) was mentioned without any specific description, together with other interventions

Table 1 Features of the included studies.

Study	Design	Participants	N	Pathology	Intervention	Duration	Outcome	Results
Janiszewski and Cieślik,[20] 2004	Case series	Musicians and music students	689	Funct. and organ. dis., pain	MT, PT, PM	NS	Muscle tension at rest, muscle strength and fatigue, chronaxie, PROM	-MT: improved funct. dis. (all outcome) -PT: improved organ. dis. (muscle tension at rest) -PM: improved organ. dis. (ROM, chronaxie, tension at rest)
Ridder,[24] 2008	Case report	Bassoonist	1	Wrist pain (spine, hip)	Dental bite, Osteopathy, MT	3 mo	NS	Complete resolution of symptoms
Dommerholt,[22] 2009	Case report	Organist	1	Wrist and thumb pain	MT	4 mo	NRS 0-10	Pain almost disappeared (NRS=1); effects maintained 2-y follow-up
Schalow,[23] 2020	Case report	Violinist	1	Neck/wrist/arm/hip pain	Chiropractic+TM	9 wk	Pain, PROM	Increased ROM and disappearance of hip and arm pain, marked reduction (90%) in neck; effects maintained at 9-mo follow-up
Sousa et al,[17] 2015a	RCT	Wind, string or percussion musicians	Experimental: 39 Control: 30	PRMD	Tuina vs Tuina sham	1 session	NRS 0-10	In the experimental group, significant reduction in pain after treatment
Sousa et al,[18] 2015b	RCT	Wind, string or percussion musicians	Experimental: 39 Control: 30	PRMD	Tuina vs Tuina sham	20 d	NRS 0-10	Lower NRS in the experimental group on days 1, 3, 5, 10, 15, and 20
Popescu et al,[21] 2021	Case report	Violist	1	Neck/shoulder pain	MT (Mulligan)	20 wk	VAS pain, AROM, PROM, SPADI, NDI	Improvement in all outcomes
Assel et al,[19] 2023	Pre-post	Music students	32	PRMD	PT+MT	6 wk	PP (H, SCM, S, T, LS, R, P, PV, QL), VAS pain, WSP	VAS reduction final week and after instrument use ($P<.001$); PP reduction right in H, LS, R, PV cervical ($P<.05$) WSP reduction ($P<.001$)
López Requena et al,[16] 2024	RCT	Students playing wind instruments	Experimental: 15 Control: 15	TMD	MT+PE vs PE	4 wk	VAS pain, AROM mouth opening, CF-PDI	At final evaluation, significant differences in favor of the TM+PE group in AROM and CF-PDI ($P=.002$)

Abbreviations: AROM, active range of motion; CF-PDI, Craniofacial Pain and Disability Inventory; funct dis, functional disorders; H, hyoid muscles; LS, levator scapulae; MT, manual therapy; NDI, Neck Disability Index; NRS, numeric rating scale; NS, not specified; organ dis, organic disorders; P, pectoralis; PE, postural exercises; PM, physical modalities; PP, pressure pain; PROM, passive range of motion; PT, physical therapy; PV, paravertebral; QL, quadratus lumborum; R, rhomboideus; RCT, randomized controlled trial; ROM, range of motion; S, scalene; SCM, sterno-cleidomastoideus; SPADI, Shoulder Pain and Disability Index; T, trapezius; TMD, temporomandibular dysfunctions; VAS, visual analog scale; WSP, widespread pain (pain on palpation of tender points).

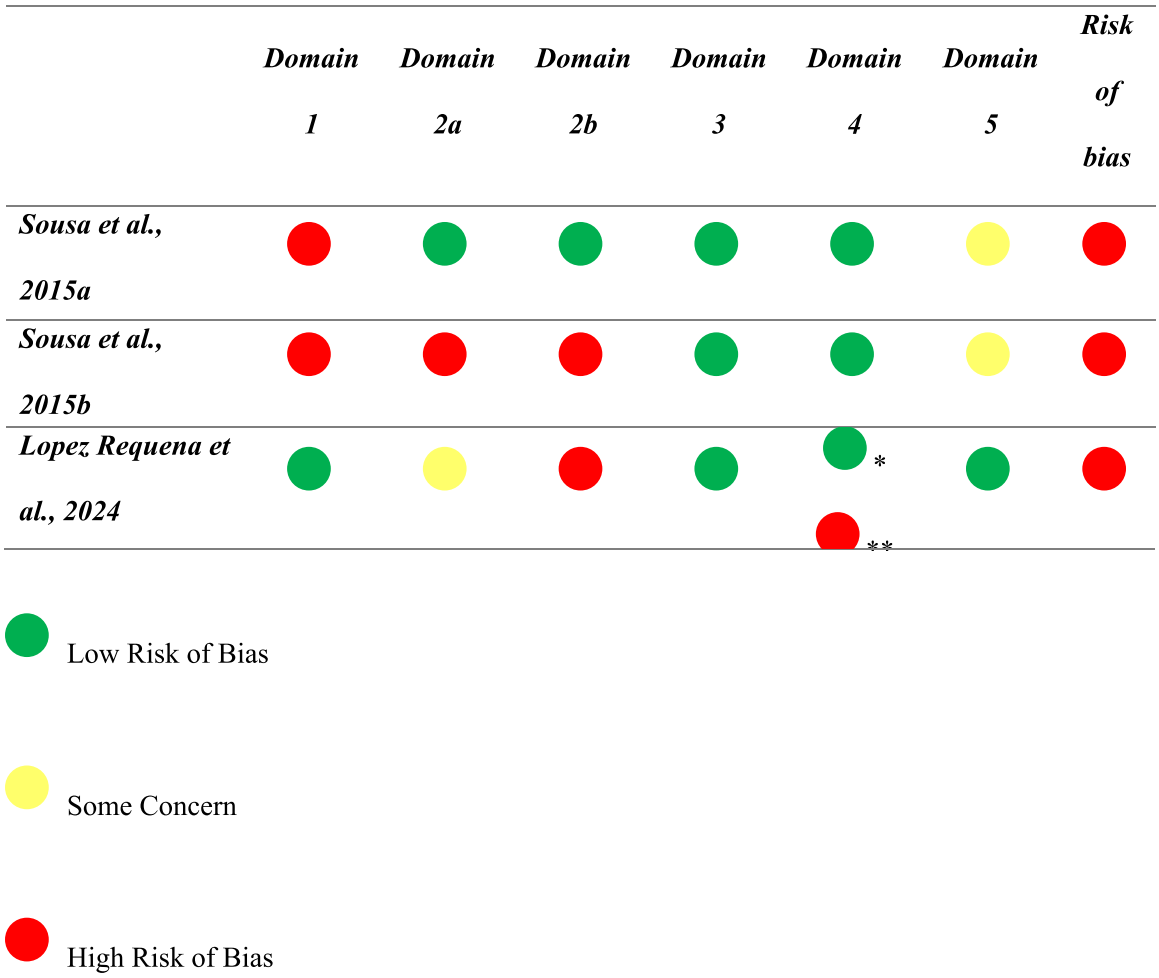

Fig 2 Risk of bias of included RCTs assessed by version 2 of the Cochrane Risk of Bias tool for randomized trials (RoB 2). Domain 1: Risk of bias arising from the randomization process; Domain 2a: Risk of bias because of deviations from the intended interventions (effect of assignment to intervention); Domain 2b: Risk of bias because of deviations from the intended interventions (effect of adhering to intervention); Domain 3: Missing outcome data; Domain 4: Risk of bias in measurement of the outcome; Domain 5: Risk of bias in selection of the reported result. *Outcome: pain; **Outcome: range of motion of mouth opening.

including core stabilization, therapeutic exercises such as movement sequences and stretches, muscle relaxation and stretches, and muscle relaxation and awareness techniques for patients to perform at home. Postural workload also was assessed by examining their musical instrument. After treatment, a significant reduction in the average pain level measured with the visual analog scale was found (change in average pain in the previous week: 1.9; Cohen's d=1.42; change in average pain after playing the instrument: 2.7; Cohen's d=1.19), as well as in pain elicited by the pressure on some cervical/shoulder muscles.

Finally, regarding case reports, Ridder et al[24] presented a 25-year-old bassoonist who developed pain in her right wrist 2 months before her visit to the practice, diagnosed as tenosynovitis and treated with wrist splinting. The patient presented with increasing pain in the entire arm including the shoulder and the entire right scapula. The patient underwent extensive orthodontic treatment with loose braces and was wearing a dental splint because of night grinding. The osteopath identified a bite dysfunction with deviation of the jaw to the right and a segmental vertebral and costal dysfunction. The first treatment technique was craniosacral manual therapy. Subsequently, the left temporal bone and maxillary suture were treated manually with further cranial techniques. Individual segmental dysfunctions of the spine and ribs were treated using muscle energy osteopathic techniques. Trigger point treatments and myofascial techniques were also used. Ear acupuncture was performed to support the jaw joint. After this therapy, a bite registration was performed immediately, after which a bite splint was made for the lower jaw. Parallel to the use of this splint, a manual therapy/physical therapy treatment was carried out. At the final osteopathic check-up, after 6 months, the cranial examination was negative. The patient no longer presented any health problems; in particular, the patient no longer complained of headaches or of muscular or tendon pain. Schalow[23] reported the case of a professional violist who experienced severe pain in her spine and upper extremity without any history of trauma, which prevented the patient from any musical activity. The chiropractic assessment noted postural distortions, hypertonic muscles, joint pain, arthritis, and ponticulus posticus. Radiography identified the excursion of the cervical spine from the vertical axis and C0-C1-C2 misalignments. After performing a low-speed, low-force manual correction at the cranio-cervical junction, the patient experienced immediate relief of wrist pain.

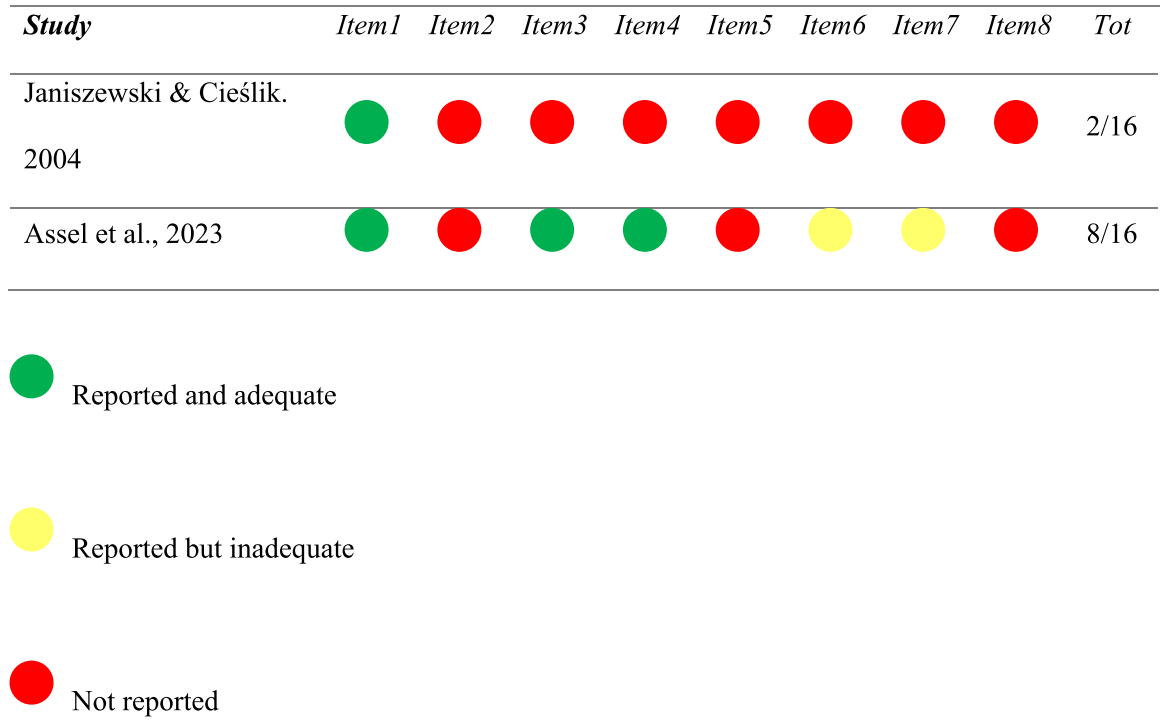

Fig 3 Risk of bias of included noncontrolled studies (case series, pre-post trials) assessed by the methodological index for non-randomized studies (MINORS). Item1: Clearly stated aim; Item2: Inclusion of consecutive patients; Item3: Prospective data collection; Item4: Appropriate endpoints; Item5: Unbiased assessment; Item6: Appropriate follow-up; Item7: Loss to follow-up <5%; Item8: Prospective calculation of the study size.

The initial frequency of visits was twice a week for 4 weeks, then once a week for 5 weeks. Symptoms gradually reduced over time, with minimal pain (90% improvement in neck and low back) or completely resolved at month 9 (arm, wrist, hip) and with a gradual decrease in pain and increase in endurance while performing, until full recovery at month 9. The patient was able to continue her professional career as a teacher and musician, with subsequent follow-up at 7 years. Popescu et al[21] presented the case of a 53-year-old professional violist with chronic disabling neck and shoulder pain. A 20-week multimodal treatment was performed that included mobilization manual therapy techniques with sustained natural apophyseal movements and glides as part of Mulligan's manual concept administered by a physical therapist (this approach requires that the therapist administer manual inputs while the patient is performing an active movement[27]) in addition to neurodynamic exercises, bracing exercises, ergonomic interventions, music-related load modifications, and posture training. Subsequently, an ergonomic intervention with postural correction and replacement with a lighter viola was also carried out. At the end of the treatment, pain was reduced, neck mobility increased, and the patient was able to return to work. The final case report, by Dommerholt,[22] described a 26-year-old professional organ player with pain in the radial aspect of her right wrist and thumb, who had been diagnosed with de Quervain syndrome by 3 different orthopedic surgeons. After evaluation by a physical therapist expert in PMRDs and a clinical re-evaluation, the definitive diagnosis was Wartenberg syndrome, an entrapment of the sensory branch of the radial nerve.[28] Physical therapy consisted of soft tissue mobilizations of the muscles around the elbow, brachioradialis, supinator, and wrist extensor muscles. Myofascial trigger points were treated with a combination of dry needling and manual therapy of trigger points. The patient was instructed on radial nerve sliding exercises within a range of pain.[29] The physical therapy program slowly moved from pain management to conditioning to correct posture, correction of forward head posture, core stabilization, and functional training, with correct practice habits, emphasizing regular and frequent breaks, shadow play, mental practice, relaxation, and music visualizations. At the end of the treatment (4 months), the numeric pain rating scale (0-10) score was 1, and the patient was able to resume playing at a professional level without residual pain or dysfunction (follow-up: 2y).

Discussion

Our systematic review is the first, to our knowledge, to investigate the effects of manual therapy for PMRDs of musicians. Despite an extensive systematic search, the emerging evidence is very limited.

We retrieved only 2 studies with the appropriate design to ascertain treatment effects (RCTs),[30,31] but neither was adequately powered and both had relevant methodological flaws. In particular, Sousa et al[17,18] randomized participants into the experimental and the control group before checking whether they met the inclusion and exclusion criteria. Thus, only 69 of the 112 randomized subjects (just over 60%) were ultimately included in the study. This choice might have produced biases, because the final decision about inclusion came after the random allocation, and the absence of concealed allocation can yield higher estimates of treatment

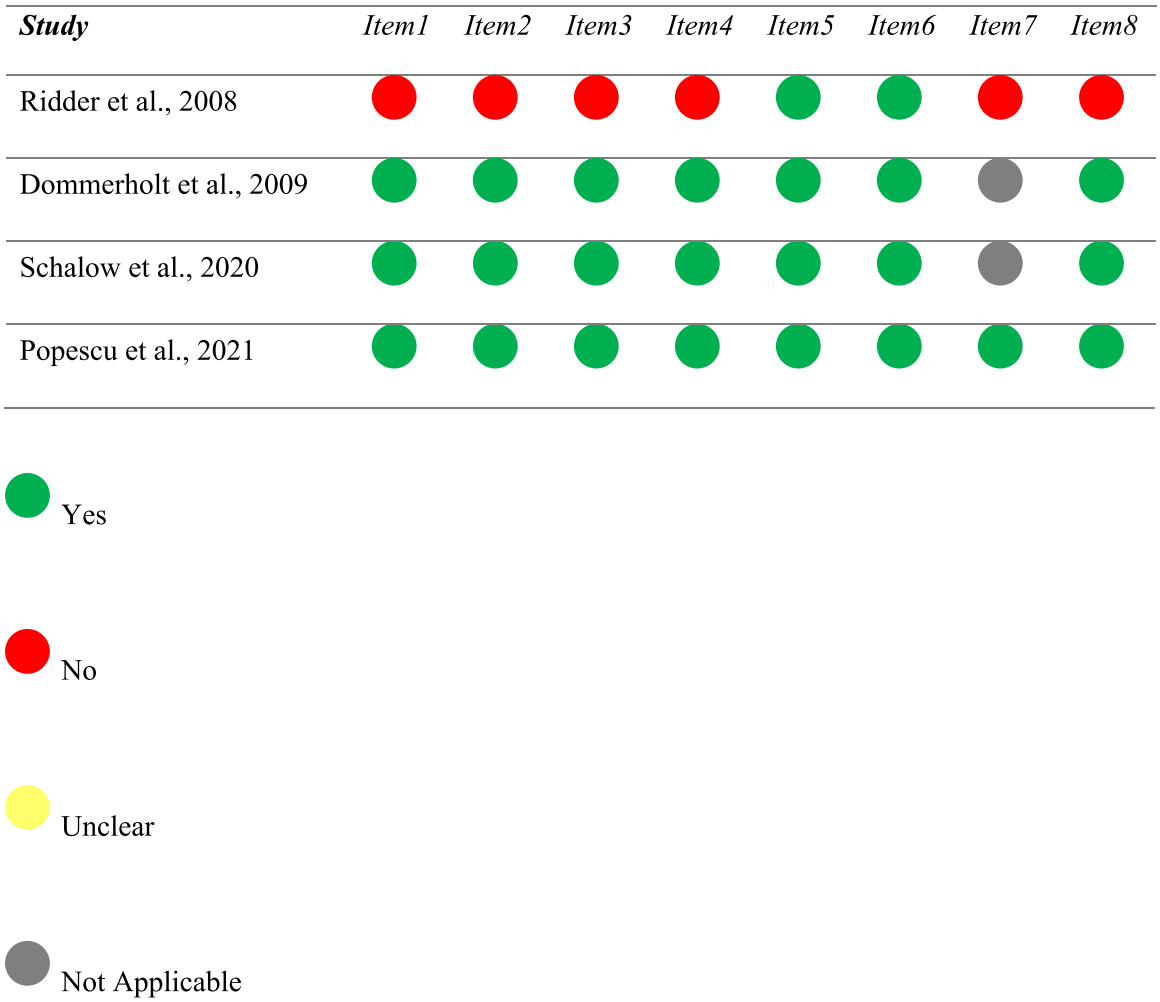

Fig 4 Risk of bias of included case report studies assessed by the Joanna Briggs Institute (JBI) quality appraisal tool for case reports. Item1: Demographic characteristics described; Item2: Patient's history described; Item3: Current clinical condition described; Item4: Diagnostic tests/assessment described; Item5: Intervention described; Item6: Postintervention clinical condition described; Item7: Adverse events identified and described; Item8: Takeaway lessons.

effects.[32,33] The main concerns about the study by López Requena et al[16] regard the clear imbalance between the 2 groups in terms of intervention dosage and placebo effect and the blinding of the evaluators. In fact, both groups were asked to self-perform postural exercises twice a day just before playing their instrument, and only participants in the experimental group received an additional treatment by the physical therapist. The lack of blinding of the assessor likely led to an overestimation of the effect on mouth opening range of motion, which was much greater than the effect found in the questionnaire on pain and disability.

The data presented by the noncontrolled studies suggest positive effects of the interventions delivered, which need to be verified by adequately powered RCTs. Assel et al[19] reported significant pain reduction after the treatment, but the small sample size and the lack of standardization of the intervention are severe limitations of this study. Janiszewski and Cieślik[20] described a very large case series but provided even less detail about the intervention, which was generically defined as physical therapy, manual therapy, or therapy with physical agents. It is not clear whether these different approaches were used alternately or combined or the reasons for choosing one treatment over the others. The authors also omitted any relevant information (selection of participants, prospective data collection, endpoints and outcome measures, unbiased assessment, time of follow-up, dropouts, and statistical analysis), and even the results are provided in a qualitative manner, without providing any central tendency or dispersion values.

The last 4 studies[21-24] are case reports, also considered to be the lowest level evidence, just above experts' opinion.[34,35] Each case report tested a different type of manual therapy on a different PMRD of instrumentalist musicians playing different instruments. In all these cases, treatment was carried out for months (4-9), and manual therapy was associated with many other interventions. In particular, in the case reports by Dommerholt,[22] Schalow,[23] and Popescu et al,[21] all of good quality, the musician's assessment also included observation during the specific activity of playing their instrument, as also reported in the study by Assel et al.[19] The treatment always included an ergonomic intervention on the instrument, suggesting that ergonomics may also have played a relevant role in the reported positive outcomes of each considered treatment.[36]

To our knowledge, this is the first systematic review investigating the effects of manual therapy on instrumentalists' PMRDs. A recent review by Kiepe et al[37] on the effects of osteopathic intervention in musicians included 5 studies, of which only one is a case report by Ridder et al,[24] also included in the present review, which was of very low quality. The other 4 studies were not included in our review because they evaluated the effects of osteopathic manipulation on the quality and extension of the voice and phonation time of healthy singers or singing students and on the range of motion of the cervical spine of healthy violinists. Kiepe et al[37] concluded that the evidence for osteopathy in adult musicians is very limited, and further research is required.

Study limitations

A strength of our work is that is the first systematic review on this topic. We also conducted a thorough search, without time or language limits; we translated the 4 articles published in German and the article published in Polish using an automatic translator (Deepl), without employing an official translator, but all the translations were reviewed by a bilingual health professional. Nevertheless, the very low level of evidence suggests extreme caution in interpreting the results of this review, because of the inherent limitations related to the paucity and, in most cases, the low quality of the current literature on this topic. A limitation of our study is that we only selected studies on instrumentalists, excluding singers and conductors, who may present very different PMRDs. The heterogeneity of treatment approaches and of instruments is a further limitation, as the limited number of cases did not allow separate analysis.

Conclusions

The level of evidence for the effectiveness of manual therapy on PMRDs in instrumentalist musicians is very low. One RCT suggests that conventional manual therapy may have an effect on pain and disability in music students who play wind instruments and have temporomandibular dysfunctions, and another RCT suggests that Tuina may reduce pain in professional musicians with PMRDs, but both studies were underpowered and at high risk of bias. Two noncontrolled studies and 4 case reports suggest an overall positive effect of different manual therapy approaches on PRMDs, but the design of these studies was inadequate to establish the efficacy of any treatment; moreover, the case series, the pre-post trial, and one case report presented serious methodological flaws. In light of the growing demand for manual therapy among musicians, our systematic review reveals an urgent need to fill this research gap with high-quality RCTs investigating the effects of manual therapy interventions on PRMDs.

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Disclosure

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