Scoping Review of Dance for Adults With Fibromyalgia: What Do We Know About It?

Julia Bidonde¹,²*, MSc, PhD; Catherine Boden³*, MLIS, PhD; Soo Kim²*, PhD; Angela J Busch²*, PhD; Suelen M Goes²*, PhD; Emily Knight⁴*, PhD

¹Division for Health Services, Norwegian Institute of Public Health, Oslo, Norway
²School of Rehabilitation Science, College of Medicine, University of Saskatchewan, Saskatoon, SK, Canada
³Leslie and Irene Dubé Health Sciences Library, University of Saskatchewan, Saskatoon, SK, Canada
⁴School of Health Science, Western University, London, ON, Canada

*all authors contributed equally

Abstract

Background: Fibromyalgia is a chronic disorder characterized by widespread muscular tenderness, pain, fatigue, and cognitive difficulties. Nonpharmacological treatment options, such as physical activity, are important for people with fibromyalgia. There are strong recommendations to support engagement in physical activity for symptom management among adults with fibromyalgia. Dance is a mode of physical activity that may allow individuals with fibromyalgia to improve their physical function, health, and well-being. Dance has the potential to promote improved pain processing while simultaneously providing the health and social benefits of engaging in physical activity that contributes to symptom management and overall function rehabilitation. However, we are unaware of current evidence on dance as a nonpharmacological/physical activity intervention for adults with fibromyalgia.

Objective: The aims of this study were to understand how dance is used therapeutically by individuals with fibromyalgia; to examine the extent, range and nature of research activity in the area; and to determine the value of undertaking a systematic review of interventions.

Methods: We used and adapted the Arksey and O’Malley scoping framework. The search strategy involved a comprehensive search of main health and electronic social databases, trial registries and grey literature without language limits. Pairs of reviewers independently screened and extracted data and evaluated the methodological quality of randomized control trials.

Results: Twenty-one unique records for 13 studies met inclusion criteria; the studies included mostly middle-aged women. Types of dance included were aerobic dance, belly dance, dance movement therapy, biodanza and Zumba. Intervention parameters were different among studies. Frequency varied between one to three times a week; all were done in small group settings. Studies evaluated a variety of outcomes in the symptoms, wellness, psychosocial, physical functioning, balance and fitness categories; no studies evaluated the safety or adverse events systematically which is a major weakness of the literature.

Conclusions: There are few studies in the field of dance and fibromyalgia, suggesting research is in its infancy but slowly growing. They are of European and South American origin, focusing on female participants and a limited number of dance modes. Because the body of literature is small, of low quality and highly heterogeneous, we concluded that a systematic review of interventions on dance is not warranted at this time.

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KEYWORDS
fibromyalgia; exercise; dancing; scoping review; adult
Introduction

Background

Fibromyalgia is a chronic disorder characterized by widespread muscular tenderness, pain, fatigue and cognitive difficulties [1,2]. The diagnosis is often complex, requiring a history of typical symptoms over time and the exclusion of a somatic disease by medical examination [1]. In addition to pain, fatigue, and cognitive difficulties, individuals with fibromyalgia may experience sleep and mood disturbances, anxiety, depression, difficulty with attention and concentration, as well as a range of gastrointestinal (eg, irritable bowel syndrome) and somatosensory (eg, hyperalgesia, allodynia, paraesthesia) symptoms [1]. Symptoms of fibromyalgia can affect an individual’s quality of life, often negatively impacting family dynamics, productivity at work, and independence [2].

Fibromyalgia is common worldwide with the prevalence reported to be 2%-4% of the general population, and diagnosis in females outnumbering diagnosis in males [1,3]. Insights gained from research in the past several decades implicate numerous factors in its pathophysiology including changes in brain and neural structure and function, muscular physiology, hormonal factors, inflammatory markers, and genetic influences [4,5]. Individuals with fibromyalgia often experience comorbid illnesses, including musculoskeletal conditions, cardiovascular or endocrinological disorders, spondylitis/intervertebral disc disorders, interstitial cystitis bladder syndrome, chronic pelvic pain, temporomandibular joint disorder, and psychiatric disorders [6].

Physical Activity and Dance

A substantial evidence base supports the value of physical activity for individuals with fibromyalgia. The latest European League Against Rheumatism guideline stated there is a strong recommendation to support both aerobic and resistance training in symptom management for individuals with fibromyalgia [7]. Physical activity is defined as any bodily movement produced by skeletal muscles resulting in energy expenditure [8]. Dance, a genre of physical activity, can be a social experience, an artistic expression, and a leisure activity, as well as a rigorous stimulus for physical fitness. We operationalize dance as a purposeful, deliberate, and expressive motion of the body caused by contraction of the skeletal muscles [9]. Dance may include music; and although dance movements could be called “functional” (eg, bending, walking, and reaching), the goal of dance is the deliberate and purposeful expression of the body itself through movement [10].

Benefits of dance for chronic conditions can be found in the literature; for example, increased functional and cardiovascular gains, motivation for participation [11], and quality of life [12], as well as a reduction in cardiovascular mortality [13], when compared to traditional exercise training. Emotional benefits were seen after dance-based exercise participation among older individuals [14]. One specific dance-based approach common in the literature is dance movement therapy (DMT), which has been defined as the psychotherapeutic use of movement that furthers the emotional, social, cognitive, and physical integration of the individual [15]. This form of dance may include a variety of movement methods that have a systematic treatment approach and are goal-oriented [16]. DMT has been used for conditions including cancer [16], schizophrenia [17], depression [18], dementia [19,20], and Parkinson’s disease [21]. At the start of this scoping review, we were aware of two publications that include adults with fibromyalgia [22-24].

Dance contributes to the physical training of balance, coordination, strength, flexibility, aerobic capacity, bone health, and proprioception. Additionally, dance promotes increased motivation to exercise [25], attention and cognitive capacity [26], vitality [27], and positive effects on mood [28], everyday competencies, and social life [29]. Dance can also offer auditory, visual and sensory stimulation, motor learning, emotional perception, expression, and interaction. All these features make dance an “enriched environment” which stimulates the brain’s plasticity [29] and suggest that dance may be worth evaluating as a component of fibromyalgia management.

Pain Processing and Social Bonding

Widespread pain and fatigue are hallmark symptoms of fibromyalgia and are known factors limiting an individual’s participation in treatment [30]. During physical activity, the muscular and physiological stress on the body stimulates the release of endorphins, which contributes to the sensation of an “activity high” and, potentially, a “social high” [31]. Evidence supports that both physical pain (the unpleasant experience that is associated with actual or potential damage to tissue) and social pain (the unpleasant experience that is associated with actual or potential damage to one’s sense of social connection or value) are processed with shared neural circuitry [32]. This supports the hypothesis that experiences in social and physical pain may be similar for the individual, such that individuals experiencing chronic physical pain are more likely to avoid activities for fear of inducing both social and physical pain [32,33]. Therefore, a social activity intervention may lead to improved treatment outcomes for adults with fibromyalgia by improving pain processing.

Dance is an engaging and enjoyable form of physical activity. Group or social dance facilitates social bonds, through working in synchrony (performing the same movements at the same time) [31,34]. Synchronization and physical exertion, such as through dance, independently elevate the pain threshold [31]. Moreover, dance can increase self-control, which impacts psychological health and therefore the experience of chronic pain [35]. Therefore, dance has the potential to promote improved pain processing while simultaneously providing the health and social benefits of engaging in physical activity that may contribute to symptom management for adults with fibromyalgia.

This scoping review aimed to: comprehensively examine and map the evidence related to dance in adults (ie, 18 years or older) with diagnosed fibromyalgia; to examine the extent, range and nature of research activity in the area; and to determine the value of undertaking a systematic review of interventions. Definitions used in this review are found in the glossary (Multimedia Appendix 1).
Methods

Scoping review methodology is particularly useful for examining the breadth of the research in a specific topic area. We used and adapted the Arksey and O’Malley scoping framework [36]; adaptations (including a seventh step, knowledge dissemination, not reported in this manuscript) were driven by an intention to develop a feasible approach for reviewing the body of literature. The steps included identifying the research questions and relevant studies; selecting the studies and charting the data; collating, summarising and reporting the results; and ongoing consultation. A detailed description of these steps is outlined in our protocol [37].

The population, intervention, comparator, and outcome (PICO) criteria and the search strategy are presented in the Multimedia Appendices 2 and 3 and also in our protocol [37]. Pairs of reviewers independently screened citations for inclusion, extracted data and evaluated the methodological quality of randomized control trials (RCTs) using the Cochrane Collaboration Risk of Bias Tool [38]. Conflicts were resolved by consensus and with the aid of a third reviewer if needed. Criteria used for screening, extracting and methods for quality evaluation are provided in our protocol [37].

We used frequencies and percentages to describe nominal data. We shared the findings with the researchers and patients engaged with the Cochrane Fibromyalgia and Physical Activity team led by one of the authors (JB), and we integrated all responses into this review.

Results

Identifying and Selecting Relevant Studies

The search of the databases, clinical trials registries, and citation tracking yielded 171 citations after duplicates were removed. Figure 1 presents results of the literature search and flow of articles. Search of fibromyalgia association websites did not yield research reports. In total, we screened 171 publications at the title and abstract phase and excluded 133 not meeting the inclusion criteria. The full-text of 34 articles and four trial registry records were screened, and 21 records (ie, unique, companion, and trial registry records) for 13 studies were included [22-24,39-56]. Of the four trial registry records, three were protocols for full-text publications [40,47,54] and one was for a study currently recruiting [48]. Five studies each published two articles for the same study, and the second publication is considered a companion article for the same study: those are Assunçao Júnior [39,53] Bohner Horowitz [24,43], Carbonell-Baëza [46,56], Collado-Mateo [49,50], and Lopez Rodriguez [22,23]. Studies by Lopez Rodriguez were a pilot trial and follow up conducted consecutively; we believe these two publications have substantial overlap in their samples, and with a trial registry record [54]. A publication summary is presented in Table 1.

Charting and Collating the Data

Publications were original peer-reviewed journal articles; designs were uncontrolled before and after (n=4), controlled before and after (n=2), qualitative (n=2), and RCTs (n=6). All but one study [55], were published after 2003 (range 1997-2017; see Figure 2). Two publications were from South America and the remaining from Europe. Eleven articles were written in English, and one in Spanish. Dance interventions modes included aerobic dance, belly dance, biodanza, DMT, and Zumba. Most of these interventions included dance and another component (eg, DMT+theatre+cultural events).

Outcomes measured fell within seven domains: symptoms (ie, pain), wellness (eg, overall health), psychosocial (ie, self-image), physical function, balance, and fitness (ie, muscle strength), and other (ie, body composition). We have summarized outcomes and outcome measures in Multimedia Appendix 4. No studies assessed adverse events systematically, and narrative reports were included in few instances [41,46,50,52], generally relating to an acute increase in pain (see Multimedia Appendix 5). The number of withdrawals was reported in nine studies [22,39,41,44-46,50,51,55].

We evaluated the methodological quality of five published RCTs [22,24,41,50,55] (Figures 3 and 4) to determine the value of undertaking a systematic review of interventions. Results demonstrated problems of selection, performance, detection and reporting biases. Other factors affecting study quality are assessment of a large number of outcomes, diversity on the psychometric and other outcome measures, and clinical heterogeneity.

Participants

Participants were mainly middle-aged females with a fibromyalgia diagnosis (ACR 1990, n=11; ACR 2011, n=1; unclear criteria, n=1); one study recruited males but its final sample composition was unclear [55]. The total number of participants across studies was 488 (median 36). Participant age ranged between 30 and 68 years. Duration of fibromyalgia (years since diagnosis) varied from 2 to 35 years (not reported in three studies). Participants who were taken medications needed to be on a stable course of pharmacological treatment before starting the intervention, and have no contraindications for physical activity (eg, uncontrolled hypertension). The inclusion criteria of one study specified that participants needed to meet the criteria for depression [51]; two studies specified inclusion criteria for pain levels to be between 3-8 on a visual analog scale [23,51].

Intervention and Music

Interventions were performed once (n=5), twice (n=4) or three times a week (n=2). Intensity was not specified in five studies, set as a low intensity (n=2), worded as listening to their bodies or not exceeding pain thresholds (n=2) or set at 40%-50% of oxygen consumption (VO₂: n=1). Intervention duration ranged between 50 to 120 minutes and length between 8 to 24 weeks; only two studies reported long-term follow up times (see Table 2). There was limited information about the qualifications of the instructor or the setting (group or individual). Five studies lack information on the instructor’s qualifications [22,24,43,46,48,55], two mentioned a physiotherapist with experience in dance [41,45], one a student with training in dancing [39,53], one professional kinesiologist and dance teacher [49,50] and the rest made reference to “study leader.”
Figure 1. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram.
We found limited information on how music was used (see Multimedia Appendix 6), such as to inspire spontaneous movement, creativity and emotional expression [22,23,44-46]. In some studies, music also involved a receptive listening experience with the aim of facilitating dialogue, where the participants engaged in a relational process with peers during the sessions [22,23,45,46].

In Hallberg [52] the women described dance as an enjoyable and desirable activity “…I’ll pretty much dance to every song during a dance evening…it was so much fun.” Although dance continued to be a valued activity in participants’ lives, their narratives closely interlaced the physical effort it represented, the persistence of pain, and limitations it caused. However, the sense of joy and perseverance prevailed: “But it’s worth it, you have to live.” Madeiros [53] followed up after a 3-month Zumba intervention, and the women reported benefits on sleep quality, pain, self-esteem, and physical functioning.

**Gaps in the Literature**

We were unable to conduct comparative analyses of key concepts across studies due to lack of consistency in conceptual definitions of dance. Participants’ medications were not described in all studies, thus could not be summarized. In addition to lack of systematically measuring adverse events, no studies addressed concepts of communication (eg, isolation), challenges or barriers to participation or implementation, acceptability, feasibility or applicability for clinical practice. There was no information available on cost or equipment.

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### Table 1. Publication summary.

| Characteristics                  | Value |
|----------------------------------|-------|
| **Year of Publication, n (%)**   |       |
| 1997                             | 1 (8) |
| 2003-10                          | 4 (31) |
| 2011-17                          | 7 (54) |
| Ongoing                          | 1 (8) |
| ** Continent, n (%)**            |       |
| South America                    | 2 (15) |
| Europe                           | 11 (85) |
| **Language, n (%)**              |       |
| English                          | 12 (92) |
| Spanish                          | 1 (8)  |
| **Design, n (%)**                |       |
| Randomized control trial         | 6 (46) |
| Controlled before and after      | 2 (15) |
| Uncontrolled before and after    | 4 (31) |
| Grounded theory                  | 1 (8)  |
| **Mode, n (%)**                  |       |
| Aerobic dance                    | 1 (8)  |
| Belly dance                      | 1 (8)  |
| Biodanza                         | 3 (23) |
| Dance movement therapy           | 5 (38) |
| Zumba                            | 2 (15) |
| Activity, recovery and balance   | 1 (8)  |
| **Type of publication, n**       |       |
| Primary article                  | 12     |
| Companion article (published protocol or additional publication) | 5 |
| Ongoing (ie, trial registry record status recruiting) | 1 |
Figure 2. Dance and fibromyalgia publication's timeline.

Figure 3. Methodological quality of randomized controlled trials.
Figure 4. Methodological quality of randomized controlled trials.

| Study              | Random sequence generation (selection bias) | Allocation concealment (selection bias) | Blinding of participants and personnel (performance bias) | Objective outcome assessment (detection bias) | Subjective outcome assessment (detection bias) | Incomplete outcome data (attrition bias) | Selective reporting (reporting bias) |
|--------------------|---------------------------------------------|-----------------------------------------|----------------------------------------------------------|---------------------------------------------|---------------------------------------------|----------------------------------------|-------------------------------------|
| Baptista 2012      | +                                           | -                                       | +                                                        | -                                           | +                                           | -                                      | +                                   |
| Bojner Horowitz 2003-06 | +                                           | ?                                       | -                                                        | -                                           | ?                                           | ?                                      | ?                                   |
| Collado-Mateo 2017 | +                                           | -                                       | +                                                        | -                                           | ?                                           | +                                      | +                                   |
| Lopez Rodriguez 2012-13 | +                                           | -                                       | +                                                        | -                                           | +                                           | -                                      | +                                   |
| Nørregard 1997     | +                                           | ?                                       | +                                                        | -                                           | +                                           | -                                      | -                                   |
Table 2. Intervention characteristics.

| Characteristics | Value, n (%) |
|-----------------|-------------|
| Times per week  |             |
| 1x/week         | 5 (45)      |
| 2x/week         | 4 (36)      |
| 3x/week         | 2 (18)      |
| Intensity       |             |
| Respect their body rhythm and limits | 1 (9) |
| Ability to change intensity difficulty | 1 (9) |
| 40%–50% VO2 max | 1 (9) |
| Low             | 2 (18)      |
| Not exceeding pain | 1 (9) |
| No reported     | 5 (45)      |
| Duration        |             |
| 50 to 60 minutes | 7 (64) |
| 61 to 120 minutes | 3 (27) |
| Not reported    | 1 (9)       |
| Length of intervention |     |
| 8 to 11 weeks   | 3 (27)      |
| 12 to 16 weeks  | 7 (64)      |
| >16 weeks       | 1 (9)       |
| Follow up (ie, after end of intervention) | 2 (18) |
| Delivery mode   |             |
| Individual      | 1 (95)      |
| Small group or group | 4 (36) |
| Individual, pair and group | 2 (18) |
| Not reported    | 4 (36)      |

*a Qualitative study and ongoing not included.

b VO2: maximal oxygen uptake.

Discussion

Principal Findings

There has been some interest in dance as a potential nonpharmacological intervention in fibromyalgia, yet the body of knowledge remains small. Most studies were published after 2003, included middle-aged women, and used a small number of dance modes (belly dance, DMT, aerobic dance, biodanza, Zumba). Currently, there is a broad variation across studies (ie, design, mode, delivery mode, intervention parameters); the creation and agreement of consistent terminology, starting with the definition of dance, would be beneficial.

Dance was used in the studies as a form of exercise training (eg, aquatic biodanza), or performed because of its artistic or creative nature (eg, DMT). Dance was one of a multi-component (or mixed) intervention; this is an important consideration for practitioners and individuals wishing to engage in dance. Interaction with others was important; dance was conducted in groups or small groups to help socialization. This is not surprising as socialization holds potential to affect pain processing [32] thereby potentially improving treatment outcomes for individuals with fibromyalgia [37]. Music was used as a tool for creativity and expression, as well as socialization but its use was not well defined. Researchers need to provide better descriptions concerning parameters of the intervention, such as exercise frequency, intensity, time (duration), type (and mode), use of music, and instructor qualifications.

Dance mode, outcomes, and outcome measures were heterogeneous, which poses challenges for synthesizing evidence. Additionally, the risk of bias assessment of RCTs showed a high risk of selection bias related to subject allocation, performance and detection bias related to blinding and reporting biases. None of the included studies evaluated safety or adverse events systematically, which is a major weakness of these studies, and consistent with the fibromyalgia and exercise
literature more generally [57]. The lack of data on acceptability, feasibility, applicability, and cost-effectiveness represent drawbacks to informing clinical practice.

Future research may wish to consider the individual effects of socialization, music, and physical effects of dance itself to better understand the role of dance in enhancing treatment outcomes among individuals with fibromyalgia.

Some limitations to this scoping review exist. First, we have focused on providing the breadth rather than depth of information on this topic, so questions remain regarding the effectiveness of this intervention. Second, no electronic database contains all the information needed for a research project; the search is limited to what was available to researchers. Finally, we are aware others might define dance in a more or less inclusive way than we have done, consequently capturing somewhat different literature for review.

Acknowledging that these studies represent initial steps in the field, prudence is necessary when recommending dance to individuals with fibromyalgia as we do not yet have a proper understanding of its benefits and harms. This lack of evidence will negatively impact knowledge translation efforts, such as safely integrating dance into clinical management approaches.

Conclusion
This scoping review is, to our knowledge, the first systematic and rigorous synthesis conducted of studies reporting on dance as a nonpharmacological intervention for adults with fibromyalgia. The study demonstrates there is a small body of evidence using interventions such as belly dance, DMT, aerobic dance, biodanza, and Zumba mostly conducted in middle-aged women. Safety issues were not assessed systematically or reported, representing a major gap in the current literature. Lack of common intervention approaches and outcome measures as well as standardization in reporting outcomes presents a barrier to pooling data. To date, adults with fibromyalgia interested in engaging in dance programs for control of symptoms have little evidence to aid in their decision-making. As this body of research grows, our understanding of dance in adults with fibromyalgia will improve and provide meaningful information about the potential role of dance in symptom management, physical and mental health of adults with fibromyalgia and for health practitioners working with these individuals.

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Authors' Contributions
All authors contributed equally to the completion of this manuscript.

Conflicts of Interest
None declared.

Multimedia Appendix 1
Glossary of terms.

[PDF File (Adobe PDF File), 28KB-Multimedia Appendix 1]

Multimedia Appendix 2
PICO criteria.

[PNG File, 88KB-Multimedia Appendix 2]

Multimedia Appendix 3
Search strategy.

[PDF File (Adobe PDF File), 30KB-Multimedia Appendix 3]

Multimedia Appendix 4
Outcome and outcome measures (ie, scale or technique).

[PDF File (Adobe PDF File), 31KB-Multimedia Appendix 4]

Multimedia Appendix 5
Adverse events.

[PDF File (Adobe PDF File), 25KB-Multimedia Appendix 5]
Multimedia Appendix 6
Dance intervention classification and use of music.

[PDF File (Adobe PDF), 30KB-Multimedia Appendix 6]

References
1. Häuser W, Ablin J, Fitzcharles MA, Littlejohn G, Luciano JV, Usui C, et al. Fibromyalgia. Nat Rev Dis Primers 2015 Dec 13;1:15022. [doi: 10.1038/nrdp.2015.22] [Medline: 27189527]
2. Wolfe F, Clauw DJ, Fitzcharles M, Goldenberg DL, Katz RS, Mease P, et al. The American College of Rheumatology preliminary diagnostic criteria for fibromyalgia and measurement of symptom severity. Arthritis Care Res (Hoboken) 2010 May;62(5):600-610 [FREE Full text] [doi: 10.1002/acr.20140] [Medline: 20461783]
3. Queiroz LP. Worldwide epidemiology of fibromyalgia. Curr Pain Headache Rep 2013 Aug;17(8):356. [doi: 10.1007/s11916-013-0356-5] [Medline: 23801009]
4. Abeles AM, Pillinger MH, Solitar BM, Abeles M. Narrative review: the pathophysiology of fibromyalgia. Ann Intern Med 2007 May 15;146(10):726-734. [Medline: 17502633]
5. Marcus D, Dedhar A. Introduction. In: Fibromyalgia. New York: Springer Science and Business Media; 2011.
6. Ghavidel-Parsa B, Bidari A, Amir MA, Ghalebaghi B. The Iceberg Nature of Fibromyalgia Burden: The Clinical and Economic Aspects. Korean J Pain 2015 Jul;28(3):169-176 [FREE Full text] [doi: 10.3344/kjp.2015.28.3.169] [Medline: 26175876]
7. Macfarlane GJ, Kronisch C, Dean LE, Atzeni F, Häuser W, Flüü E, et al. EULAR revised recommendations for the management of fibromyalgia. Ann Rheum Dis 2017 Feb;76(2):318-328. [doi: 10.1136/annrheumdis-2016-209724] [Medline: 27377815]
8. Caspersen CJ, Powell KE, Christenson GM. Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. Public Health Rep 1985 Apr;100(2):126-131 [FREE Full text] [Medline: 3920711]
9. Beardsley MC. What Is Going on in a Dance? Dance Research Journal 1982 Sep 23;15(1):31. [doi: 10.2307/1477692]
10. Stevens C, McKechnie S. Thinking in action: thought made visible in contemporary dance. Cogn Process 2005 Dec;6(4):243-252. [doi: 10.1007/s10339-005-0014-x] [Medline: 18239953]
11. Kaltsatou AH, Kouidi EI, Anifanti MA, Douka SI, Deligiannis AP. Functional and psychosocial effects of either a traditional dancing or a formal exercising training program in patients with chronic heart failure: a comparative randomized controlled study. Clin Rehabil 2014 Feb;28(2):128-138. [doi: 10.1177/0269215513492988] [Medline: 23864515]
12. Gomes NM, Menezes MA, Oliveira CV. Dance therapy in patients with chronic heart failure: a systematic review and a meta-analysis. Clin Rehabil 2014 Dec;28(12):1172-1179. [doi: 10.1177/0269215514534089] [Medline: 24849796]
13. Merom D, Ding D, Stamatakis E. Dancing Participation and Cardiovascular Disease Mortality: A Pooled Analysis of 11 Population-Based British Cohorts. Am J Prev Med 2016 Jun;50(6):756-760. [doi: 10.1016/j.amepre.2016.01.004] [Medline: 26944521]
14. Marks R. Narrative Review of Dance-Based Exercise and Its Specific Impact on Depressive Symptoms in Older Adults. AIMS Med Sci 2016;3(1):61-76 [FREE Full text] [doi: 10.3934/mdsci.2016.1.61]
15. American Dance Therapy Association. 2016. What is dance movement therapy? URL: https://adta.org/2014/11/08/what-is-dancemovement-therapy/ [accessed 2018-04-23] [WebCite ID 6tvzVKilJ7]
16. Bradt J, Shim M, Goodill SW. Dance/movement therapy for improving psychological and physical outcomes in cancer patients. Cochrane Database Syst Rev 2015 Jan 07;1:CD007103. [doi: 10.1002/14651858.CD007103.pub3] [Medline: 25565627]
17. Ren J, Xia J. Dance therapy for schizophrenia. Cochrane Database Syst Rev 2013 Oct 04(10):CD006868. [doi: 10.1002/14651858.CD006868.pub3] [Medline: 24092546]
18. Meekums B, Karkou V, Nelson EA. Dance movement therapy for depression. Cochrane Database Syst Rev 2015 Feb 19(2):CD009895. [doi: 10.1002/14651858.CD009895.pub2] [Medline: 25695871]
19. Hokkanen L, Rantalä L, Remes AM, Härkönen B, Viramo P, Winblad I. Dance and movement therapeutic methods in management of dementia: a randomized, controlled study. J Am Geriatr Soc 2008 Apr;56(4):771-772. [doi: 10.1111/j.1532-5415.2008.01611.x] [Medline: 18380687]
20. Lapum JL, Bar RJ. Dance for Individuals With Dementia. J Psychosoc Nurs Ment Health Serv 2016 Mar;54(3):31-34. [doi: 10.3928/07963942-20151219-05] [Medline: 26935188]
21. Sharp K, Hewitt J. Dance as an intervention for people with Parkinson's disease: a systematic review and meta-analysis. Neurosci Biobehav Rev 2014 Nov;47:445-456. [doi: 10.1016/j.neubiorev.2014.09.009] [Medline: 25268548]
22. López-Rodríguez MDM, Castro-Sánchez AM, Fernández-Martínez M, Matarrán-Peñarroya GA, Rodríguez-Ferrer ME. [Comparison between aquatic-biodanza and stretching for improving quality of life and pain in patients with fibromyalgia]. Aten Primaria 2012 Nov;44(11):641-649 [FREE Full text] [doi: 10.1016/j.aprim.2012.03.002] [Medline: 22591551]
23. López-Rodríguez MM, Fernández-Martínez M, Matarrán-Peñarroya GA, Rodríguez-Ferrer ME, Granados GG, Aguilar FE. [Effectiveness of aquatic biodanza on sleep quality, anxiety and other symptoms in patients with fibromyalgia]. Med Clin (Barc) 2013 Dec 07;141(11):471-478. [doi: 10.1016/j.medcli.2012.09.036] [Medline: 23246170]
Bojner-Horwitz E, Theorell T, Maria Anderberg U. Dance/movement therapy and changes in stress-related hormones: a study of fibromyalgia patients with video-interpretation. The Arts in Psychotherapy 2003 Jan;30(5):255-264. [doi: 10.1016/j.artspr.2003.07.001]

Houston S, McGill A. A mixed-methods study into ballet for people living with Parkinson's. Arts Health 2013 Jun;5(2):103-119 [FREE Full text] [doi: 10.1080/17533015.2012.745580] [Medline: 23805165]

Alpert PT. The Health Benefits of Dance. Home Health Care Management & Practice 2010 Dec 02;23(2):155-157. [doi: 10.1177/1084223110384869]

Koch SC, Morlinghaus K, Fuchs T. The joy. Dance the Arts in Psychotherapy 2007 Jan 01;34(4):340-349. [doi: 10.1016/j.artspr.2007.07.001]

Lee JY, Kim HL, Lim J. The Effect of Korean Dance Program on Climaeteric Symptoms and Blood Lipid in Rural Middle-aged Women. IJBSBT 2013 Dec 31;5(6):81-90. [doi: 10.14257/ijbsbt.2013.5.6.09]

Kattenstroth J, Kalisch T, Holt S, Tegenthoff M, Dinse HR. Six months of dance intervention enhances postural, sensorimotor, and cognitive performance in elderly without affecting cardio-respiratory functions. Front Aging Neurosci 2013;5:5 [FREE Full text] [doi: 10.3389/fnagi.2013.00005] [Medline: 23447455]

Ubago Linares MC, Ruiz-Perez I, Oly de Labry-Lima A, Hernandez-Torres E, Plazaola-Castano J. Analysis of the impact of fibromyalgia on quality of life: associated factors. Clinincal Rheumatology 2008;27(5):613-619. [doi: 10.1007/s10067-007-0756-1] [Medline: 17909799]

Tarr B, Launay J, Cohen E, Dunbar R. Synchrony and exertion during dance independently raise pain threshold and encourage social bonding. Biol Lett 2011;7(1):10. [doi: 10.1098/rsbl.2011.0767] [Medline: 26510676]

Eisenberger NI. The pain of social disconnection: examining the shared neural underpinnings of physical and social pain. Nat Rev Neurosci 2012 May 3;13(6):421-434. [doi: 10.1038/nrn3231] [Medline: 22551663]

Asmundson GJ, Norton GR, Jacobson SJ. Social, blood/injury, and agoraphobic fears in patients with physically unexplained chronic pain: Are they clinically significant? Anxiety. Anxiety 1996;2(1):28-33. [doi: 9160596]

Reddish P, Fischer R, Bulbulia J. Let’s dance together chrony, shared intentionality and cooperation. PLos One 2013;8(8):e71182. [doi: 10.1371/journal.pone.0071182] [Medline: 23951106]

Bojner-Horwitz E, Theorell T, Anderberg UM. Dance/movement therapy and changes in stress-related hormones: a study of fibromyalgia patients with video-interpretation. The Arts in Psychotherapy 2003 Jan;30(5):255-264. [doi: 10.1016/j.artspr.2003.07.001]

Arkshey H, O’Malley L. Scoping studies: towards a methodological framework. International Journal of Social Research Methodology 2005 Feb;8(1):19-32. [doi: 10.1080/1364557032000119616]

Bidonde J, Boden C, Busch AJ, Goes SM, Kim S, Knight E. Dance for Adults With Fibromyalgia—What Do We Know About It? Protocol for a Scoping Review. JMIR Res Protoc 2017 Feb 22;6(2):e25 [FREE Full text] [doi: 10.2196/resprot.6873] [Medline: 28228371]

Higgins JPT, Altman DG, Gotzsche PC, Juni P, Moher D, Oxman AD, et al. The Cochrane Collaboration’s tool for assessing risk of bias in randomised trials. BMJ 2011 Oct 18;343:d5928-d5928. [doi: 10.1136/bmj.d5928]

Cortez Assunção Júnior J, de Almeida Silva HJ, Costa da Silva JF, da Silva Cruz R, de Almeida Lins CA, Cardoso de Souza M. Zumba dancing can improve the pain and functional capacity in women with fibromyalgia. Journal of Bodywork and Movement Therapies 2017 Sep;1-5. [doi: 10.1016/j.jbmt.2017.09.022]

Australian and New Zealand Control Trial Registry Identifier: ACTRN12615000836538. Effects of a virtual Reality-based physical exercise in fibromyalgia patients. A randomized controlled trial 2015 [FREE Full text]

Baptista AS, Villela AL, Jones A, Natour J. Effectiveness of dance in patients with fibromyalgia: a randomized, single-blind, controlled study. Clin Exp Rheumatol. (Suppl 74) 2012;30(s18-s23. [doi: 10.1016/j.cexr.2012.07.001]

Bojner Horwitz E, Kowalski J, Anderberg UM. Theater for, by and with fibromyalgia patients – Evaluation of emotional expression using video interpretation. The Arts in Psychotherapy 2010;37(1):13-19. [doi: 10.1016/j.aip.2009.11.003]

Bojner-Horwitz E, Kowalski J, Theorell T, Anderberg UM. Dance/movement therapy in fibromyalgia patients: Changes in self-figure drawings and their relation to verbal self-rating scales. The Arts in Psychotherapy 2006;33(1):11-25. [doi: 10.1016/j.artspr.2005.05.004]

Bojner Horwitz E, Theorell T, Anderberg UM. New technique for assessment of self-perception in fibromyalgia patients: a pilot study with video interpretation. Arts Psychother 2004;31(1):153-164. [doi: 10.1016/j.aip.2004.03.004]

Carbonell-Baeza A, Ruiz JR, Aparicio VA, Martins-Pereira CM, Gatto-Cardia MC, Martinez JM, et al. Multidisciplinary and biodanza intervention for the management of fibromyalgia. Acta Reumatol Port 2012;37(3):240-250. [Medline: 23348113]

Carbonell-Baeza A, Aparicio VA, Martins-Pereira CM, Gatto-Cardia CM, Ortega FB, Huertas FJ, et al. Efficacy of Biodanza for treating women with fibromyalgia. J Altern Complement Med 2010 Nov;16(11):1191-1200. [doi: 10.1089/acm.2010.0039] [Medline: 21058885]

ClinicalTrial.gov. Identifier: NCT00961805. Effectiveness of Dance on Patients With Fibromyalgia [FREE Full text]

ClinicalTrials.gov. Identifier: NCT02144116. Dance-movement Therapy Programme in Fibromyalgia 2016 [FREE Full text]
49. Collado-Mateo D, Domínguez-Muñoz FJ, Adsuar JC, Garcia-Gordillo MA, Gusi N. Effects of Exergames on Quality of Life, Pain, and Disease Effect in Women With Fibromyalgia: A Randomized Controlled Trial. Arch Phys Med Rehabil 2017 Dec;98(9):1725-1731. [doi: 10.1016/j.apmr.2017.02.011] [Medline: 28322760]

50. Collado-Mateo D, Domínguez-Muñoz FJ, Adsuar J, Merellano-Navarro E, Gusi N. Exergames for women with fibromyalgia: a randomised controlled trial to evaluate the effects on mobility skills, balance and fear of falling. PeerJ 2017;5:e3211 [FREE Full text] [doi: 10.7717/peerj.3211] [Medline: 28439471]

51. Endrizzi C, Di Pietrantonj C, D’Amico G, Pasetti M, Bartoletti L, Boccalon R. Dance movement psychotherapy for patients with fibromyalgia syndrome. Body, Movement and Dance in Psychotherapy 2017 Feb 20;12(2):111-127. [doi: 10.1080/17432979.2017.1290685]

52. Hallberg LR, Bergman S. Minimizing the dysfunctional interplay between activity and recovery: A grounded theory on living with fibromyalgia. Int J Qual Stud Health Well-being 2011 Jun;6(2) [FREE Full text] [doi: 10.3402/qhw.v6i2.7057] [Medline: 21687553]

53. Madeiros de Araujo JT, Fernandes Rocha C, Costa de Farias GM, da Silva Cruz R, Assunção Junior JC, Almeida Silva HJ. Experience with women with fibromyalgia who practice zumba. Revista Dor 2017;18(3):266-269. [doi: 10.5935/1806-0013.20170113]

54. ClinicalTrial.gov. Efficacy of Electromyographic Biofeedback, Aerobic Exercise and Stretching in Fibromyalgia (Identifier: NCT03182556; updated January 2018; cited 2017 Dec). 2017. URL: https://clinicaltrials.gov/ct2/show/NCT03182556

55. Nørregaard J, Lykkegaard JJ, Mehlsen J, Danneskiold-Samsøe B. Exercise Training In Treatment of Fibromyalgia. Journal of Musculoskeletal Pain 2010 Jan 16;5(1):71-79. [doi: 10.1300/J094v05n01_05]

56. Segura-Jiménez V, Gatto-Cardia CM, Martins-Pereira CM, Delgado-Fernández M, Aparicio VA, Carbonell-Baeza A. Biodanza Reduces Acute Pain Severity in Women with Fibromyalgia. Pain Manag Nurs 2017 Oct;18(5):318-327. [doi: 10.1016/j.pmn.2017.03.007] [Medline: 28606594]

57. Bidonde J, Busch AJ, Bath B, Milosavljevic S. Exercise for adults with fibromyalgia: an umbrella systematic review with synthesis of best evidence. Curr Rheumatol Rev 2014;10(1):45-79 [FREE Full text]

Abbreviations
- **DMT**: dance movement therapy
- **PICO**: population, intervention, comparator, and outcome
- **PRISMA**: Preferred Reporting Items for Systematic Reviews and Meta-Analyses
- **RCT**: randomized control trial
- **VO\(_2\) max**: maximal rate at which an individual can process oxygen

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