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Joint Hypermobility in Dancers: Assessment, Performance-Related Aspects and Musculoskeletal Consequences – A Narrative Review

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Abstract

Background: Large ranges of movement are important in dance, especially in demanding choreography. Joint hypermobility is common among dancers, but its interpretation is complex, as increased mobility may relate to both performance demands and health concerns.

Aim: This narrative review summarizes current evidence on joint hypermobility in dancers, focusing on assessment methods, prevalence, performance-related aspects, musculoskeletal and functional consequences, and management considerations.

Material and methods: A targeted literature search used terms related to joint hypermobility, generalized joint hypermobility, Beighton Score, dance, ballet, contemporary dance, injuries, pain, fatigue, balance, and physical fitness. Original quantitative and qualitative studies, prospective cohorts, randomized controlled trials, reviews, and relevant background papers were included.

Results: Prevalence of joint hypermobility in dancers varies substantially depending on population, assessment tool, and cut-off used, but appears common and possibly more frequent than in non-dancers. Hypermobility may offer aesthetic and choreographic value, yet is also linked to arthralgia, instability-related injuries, fatigue, reduced physical fitness, and psychological distress. Direct evidence on management in hypermobile dancers is limited, though broader rehabilitation literature suggests exercise-based interventions may improve pain, proprioception, quality of life, and function in symptomatic cases.

Conclusions: Joint hypermobility in dancers is neither purely beneficial nor purely harmful, but a performance-related trait with variable consequences. Management is mainly relevant when hypermobility is symptomatic. Future research should use consistent definitions and cut-offs, distinguish

asymptomatic from symptomatic hypermobility, and evaluate dance-specific management strategies.

Key words: joint hypermobility; generalized joint hypermobility; Beighton Score; dancers; ballet; injuries; flexibility; performance; rehabilitation

1. Introduction

Large ranges of movement are an important physical requirement in dance. Dancers are required to have extensive joint range of movement in order to execute demanding choreography, and active range of movement has been described as particularly relevant to dance performance, especially in classical ballet and contemporary dance [1].

Joint hypermobility (JH) refers to increased mobility of one or more joints beyond normal physiological limits. When increased mobility is present in several body regions, it is commonly described as generalized joint hypermobility (GJH). JH may occur without symptoms, but symptomatic or syndromic forms of hypermobility have also been described in the literature [2].

In dancers, increased joint mobility may have different origins, including long-term training, traumatic or repetitive injuries, and genetically inherited hypermobility [3]. Therefore, large ranges of motion in dancers should not automatically be interpreted as generalized joint hypermobility, particularly because they may reflect both inherent joint laxity and training-related adaptations [4,5].

This narrative review aims to summarize current evidence on joint hypermobility in dancers, with particular attention to assessment methods, prevalence, performance-related aspects, musculoskeletal and functional consequences, and selected management considerations.

2. Material and methods

This article is a narrative review of the literature on joint hypermobility in dancers, with particular focus on assessment methods, prevalence, performance-related aspects, musculoskeletal and functional consequences, and selected management considerations.

A targeted literature search was conducted using PubMed, Google Scholar and ResearchGate. Additional sources were identified through manual screening of reference lists from relevant articles and reviews. Search terms included combinations of keywords related to joint hypermobility, such as “joint hypermobility”, “generalized joint hypermobility”, “Beighton Score”, “joint laxity”, “hypermobility syndrome”, “benign joint hypermobility syndrome” and “Ehlers-Danlos syndrome”, combined with dance-related terms such as “dance”, “dancers”, “ballet”, “classical ballet”, “contemporary dance” and “jazz dance”. Additional searches were performed using terms related to musculoskeletal and functional outcomes and management, including “injury”, “pain”, “arthralgia”, “fatigue”, “balance”, “proprioception”, “physical fitness”, “range of motion”, “rehabilitation”, “physical therapy”, “exercise therapy”, “strengthening”, “stabilization” and “management”.

The literature search was performed between June and July 2026. Recent literature was prioritised where available; however, older foundational studies were also included when they remained directly relevant to the topic. Eligible sources included original quantitative studies, qualitative studies, prospective cohort studies, cross-sectional studies, randomized controlled trials and narrative or systematic reviews. Sources were included if they addressed joint hypermobility, generalized joint hypermobility, joint laxity, symptomatic hypermobility, assessment methods, prevalence, performance-related aspects, musculoskeletal and functional outcomes, or management considerations relevant to dancers. Background articles were also included when they clarified terminology, classification, assessment methods, general prevalence of joint hypermobility or the physical requirements of dance.

3. Review of available literature

3.1. Diagnostic assessment and prevalence of joint hypermobility in dancers

The prevalence of joint hypermobility varies across populations and depends on age, sex, assessment method and cut-off value. In a systematic review and meta-analysis of children and adolescents, the overall prevalence of joint hypermobility was estimated at 34.1%, with higher prevalence in girls than in boys [6].

The Beighton Score is the most widely used screening tool for generalized joint hypermobility. It is a nine-point scale based on selected movements of the fifth fingers, thumbs, elbows, knees and trunk. However, it assesses only a limited number of joints, is weighted toward upper-limb items and omits several joints that may be functionally relevant in dancers [7]. Therefore, Beighton-based results should be interpreted with caution, particularly in populations where mobility may be influenced by training.

The prevalence of joint hypermobility in dancers has been reported using different assessment methods and diagnostic frameworks. These include the Beighton Score, the Lower Limb Assessment Scale (LLAS), the Brighton criteria, the Villefranche criteria, the Grahame and Hakim questionnaire and Sachse/Kapandji criteria. These methods do not assess identical constructs. The Beighton Score is primarily used to assess GJH, LLAS focuses on lower-limb hypermobility, whereas the Brighton and Villefranche criteria have been used to identify symptomatic or syndromic hypermobility. Terminology in this field has also changed over time, particularly after the 2017 reclassification of Ehlers-Danlos syndromes and hypermobility-related conditions.

Foley and Bird also emphasized that commonly used hypermobility criteria were not developed specifically for dancers and may not fully reflect the dynamic movement capabilities of this population. They noted that dancer-specific assessment should consider

factors such as active and passive range of motion, warm-up and the specific demands of different dance styles [8].

Table 1. Assessment methods and prevalence estimates of joint hypermobility in dancers

Study	Population	Assessment method	Main findings
McCormack et al. 2004	Student and professional ballet dancers	Beighton Score; Brighton criteria for benign joint hypermobility syndrome (BJHS)	Hypermobility and BJHS were more common in ballet dancers than in controls. BJHS appeared to decline from students to professionals and was less frequent in higher professional ranks.
Sanches et al. 2015	Brazilian ballet students and teachers	Beighton Score; Brighton criteria for joint hypermobility syndrome (JHS)	JH was present in 58% of the whole sample. JHS was more frequent in teachers than students, 36% vs 16%.
Siev-Ner et al. 2016	Female dancers aged 8–16 years and non-dancers of similar age	Beighton Score; joint range of motion assessment	JH was significantly more frequent in dancers than in non-dancers. Dancers with JH also showed greater ROM than dancers without JH.
Chan et al. 2018	Elite Australian dancers	Beighton Score; LLAS; Brighton criteria; Villefranche criteria	Beighton $\geq 4/9$: 84%; Beighton $\geq 5/9$: 72%; Beighton $\geq 6/9$: 52%; LLAS $\geq 7/12$: 38% left and 42% right; Brighton criteria: 31%; Villefranche criteria: 84%.
Skwiot et al. 2019	Jazz dancers	Beighton Score; Grahame and Hakim questionnaire; Sachse/Kapandji criteria	JHS prevalence varied by method: 64.9% using Beighton Score, 74% using the Grahame and Hakim questionnaire and 59.7% using Sachse/Kapandji criteria.
van Rijn and	Pre-professional	Beighton Score with	GJH was present in 29.1%

Study	Population	Assessment method	Main findings
Stubbe 2021	contemporary dancers	different cut-off values	using Beighton $\geq 4/9$ and 15.4% using Beighton $\geq 6/9$.

Overall, the available studies suggest that joint hypermobility is common in dancers, but they do not support a single universal prevalence estimate for all dance populations. Studies comparing dancers with controls suggest that hypermobility is more frequent in dancers than in non-dancers [4,5]. However, studies using different assessment methods or cut-off values show that the same group of dancers may be classified differently depending on the tool or threshold used [3,9,10].

Beighton-based classification in dancers may also be influenced by individual score components. Armstrong reported that female dancers had the highest prevalence of hypermobile lumbar flexion, with 93% demonstrating this Beighton item. Removing lumbar flexion from the total Beighton Score changed hypermobility classification in females, suggesting that Beighton results in dancers should be interpreted not only as a total score, but also with attention to the contribution of individual items, particularly lumbar flexion [11].

3.2. Joint hypermobility as a performance-related trait in dance

Joint hypermobility may be interpreted as a performance-related trait in dance because hypermobility has often been promoted in this profession for aesthetic reasons [12]. In dance, increased mobility in selected joints may be desired because it allows dancers to achieve aesthetically appealing ranges of movement [3].

The aesthetic relevance of GJH has also been described in qualitative research involving professional dance artists and ballet masters. Dancers with characteristics of GJH were perceived as fitting the desired aesthetic of contemporary dance companies and choreographers. The “hypermobility aesthetic” emerged as one of the main themes in interviews with dance professionals, and increased joint mobility was described as being used for choreographic gains in the professional dance environment [13].

The possible performance-related value of joint laxity has also been discussed in relation to selection into ballet training. Female students from the Royal Ballet School showed greater inherent joint laxity than student nurses, including in joints such as the wrist and elbow, which were not normally encouraged to become hypermobile through training. This observation led to the inference that inherent joint laxity was positively favoured in the selection process of the ballet school [4].

3.3. Musculoskeletal and functional consequences in hypermobile dancers

The musculoskeletal and functional consequences of joint hypermobility in dancers have been described mainly in relation to arthralgia, injuries, balance, physical fitness, fatigue and psychological distress.

In ballet dancers, symptomatic hypermobility has been discussed mainly in relation to benign joint hypermobility syndrome (BJHS). McCormack et al. suggested that dancers with BJHS may be more vulnerable to injury and overuse because of factors such as delayed tissue healing and poor proprioception. In their study, arthralgia was common, but its relationship with BJHS was not the same in female and male dancers. Among female dancers, pain was reported most often in those who had BJHS-related features, especially stretchy skin. This suggested that, in young female ballet dancers, arthralgia may be more clinically relevant when it occurs together with other features of BJHS. Among male dancers, this pattern was not observed, so pain and injury may have been influenced by other factors rather than BJHS alone [4].

Among ballet students in Brazil, musculoskeletal injuries occurred more frequently in hypermobile dancers than in non-hypermobile dancers. Injuries related to instability were most commonly described, including sprains, tendinitis and fractures. These three categories accounted for 56% of all injuries, and 88.5% of instability-related injuries occurred in hypermobile dancers. In the same study, pain was more frequent in non-hypermobile dancers, whereas muscle fatigue was similar between hypermobile and non-hypermobile groups [14].

Further prospective data suggest that the relationship between Beighton-based hypermobility and injury in dancers is not straightforward. Armstrong assessed 82 university dancers using the Beighton Score with lumbar flexion included and removed, and followed them prospectively for injuries over one academic year. Sixty-one dancers were classified as

hypermobile using Beighton ≥ 4 , but this number decreased to 50 when lumbar flexion was removed from the score. Hypermobile dancers had significantly more total days injured than non-hypermobile dancers in both classifications. However, the total Beighton Score alone was only a weak predictor of total days injured [15]. These findings suggest that Beighton-based classification may be relevant to injury burden in dancers, but the total score should not be interpreted as a simple linear measure of injury risk.

In a prospective cohort study of pre-professional contemporary dancers, GJH was not associated with all complaint injuries, substantial injuries or time-loss injuries. Previous long-lasting injury, rather than GJH itself, was associated with increased injury risk [10].

Not all functional findings were adverse. In female collegiate dancers, lower-extremity hypermobility was positively correlated with balance measured by the Star Excursion Balance Test. Lower-extremity hypermobility status predicted 36.9% of the variance in balance scores, while core endurance was not correlated with balance. However, the effect of lower-extremity hypermobility on longitudinal injury risk requires further study [16].

Physical fitness and fatigue in professional dancers were assessed by Scheper et al. Generalized joint hypermobility was associated with lower physical fitness, including lower muscle strength, lower six-minute walk test performance and lower estimated VO₂max. Dancers experienced more fatigue than control subjects, and fatigue was more pronounced when GJH was present [17].

Psychological distress was also assessed in the same study. Dancers experienced more psychological distress than control subjects, and psychological distress was more pronounced when GJH was present. Dancers with GJH therefore seemed more vulnerable to musculoskeletal and psychological complaints and had lower physical fitness despite training [17].

More recent follow-up data also suggest that GJH may be relevant to broader functioning in dance students. Generalized joint hypermobility and anxiety were reported as serious risk factors for dysfunctioning in dance students over a one-year follow-up period [18]. This suggests that hypermobility-related outcomes in dancers may extend beyond injuries alone

and may include fatigue, anxiety-related functioning and broader participation-related consequences [17,18].

3.4. Management considerations in dancers with joint hypermobility

Evidence directly addressing the management of joint hypermobility in dancers is limited. Therefore, this section draws primarily on rehabilitation literature concerning symptomatic hypermobility-related conditions, including joint hypermobility syndrome, hypermobility spectrum disorders and hypermobile Ehlers-Danlos syndrome.

Management of joint hypermobility becomes clinically relevant mainly when increased joint mobility is associated with symptoms or functional consequences. Asymptomatic joint hypermobility should not be equated with a disorder, as it may occur without musculoskeletal involvement. In contrast, hypermobility accompanied by pain, perceived instability, recurrent injuries, fatigue or functional limitation may require conservative management [2,19]. The rehabilitation studies included in the broader hypermobility literature primarily describe symptomatic or functionally relevant populations rather than asymptomatic increased joint mobility.

In broader hypermobility literature, exercise-based rehabilitation has mainly focused on improving strength, proprioception, postural control and functional stability. In a systematic review of physical therapy in hypermobile Ehlers-Danlos syndrome, Reychler et al. included six randomized controlled trials with sample sizes ranging from 20 to 57 patients. The programmes lasted from 4 to 8 weeks and involved 1 to 5 sessions per week. Muscle training and proprioceptive exercises were the most frequent interventions, and most programmes focused on the lower limbs. Across the included studies, pain and proprioception improved in the intervention groups, and quality of life improved when it was assessed [20].

A broader systematic review by Buryk-Iggers et al. included 10 studies with 330 participants with Ehlers-Danlos syndrome or hypermobility spectrum disorders. All included studies reported some improvement in at least one physical or psychological outcome after the intervention period. The interventions included strengthening exercises, proprioceptive training, postural exercises, lumbar stabilization, trunk endurance training, aquatic exercise, endurance training, pain management and multidisciplinary rehabilitation. Pain was assessed in seven studies, four of which reported significant improvements in pain-related outcomes [21].

Several individual studies provide more specific examples of exercise-based management. Daman et al. investigated a 4-week supervised programme performed three times per week in women with hypermobility syndrome. The intervention combined closed kinetic chain exercises with proprioceptive exercises. The programme included progressive tasks such as squats, bridging, plié, lunges, backward walking, heel walking, toe walking, walking with eyes closed, single-leg stance and single-leg bending exercises. After the intervention, knee proprioception improved, knee pain intensity decreased and quality of life increased compared with the control group [22].

Pacey et al. evaluated an 8-week physiotherapist-prescribed, supervised, individualized and progressed exercise programme in children with joint hypermobility syndrome and knee pain. The programme focused on knee strength and control and compared exercises performed into the full hypermobile range with exercises limited to neutral knee extension. It included isometric hamstring and quadriceps exercises, theraband-resisted exercises, standing joint-control exercises, eccentric hamstring strengthening, gluteus medius strengthening and hip abductor strengthening. Children also performed 3–5 home exercises at least five times per week, with each session lasting no more than 30 minutes. The programme reduced knee pain regardless of whether exercises were performed into the hypermobile or neutral range [19].

The comparison between neutral-range and hypermobile-range exercise in the study by Pacey et al. may be relevant when considering dancers, who are often required to use large ranges of motion. The authors discussed two possible approaches: avoiding exercise into the hypermobile range to reduce repetitive end-range microtrauma, or training strength and motion control within the hypermobile range because this is the range in which hypermobile individuals often function. This may provide a useful conceptual basis for a gradual approach

in which movement control is first developed in safer ranges and then progressively transferred into larger ranges of motion when symptoms and control allow [19].

Overall, the available rehabilitation studies in symptomatic hypermobility-related conditions suggest that exercise-based interventions may be associated with improvements in at least one physical or psychological outcome. Across the included studies, programmes most commonly involved strengthening exercises, proprioceptive training, balance or postural control exercises, lumbar stabilization, trunk endurance training and functional movement control [20,21]. In individual intervention studies, such programmes were associated with reduced pain intensity, improved proprioception, better quality of life or improved functional outcomes [19,22].

4. Conclusions

This narrative review indicates that joint hypermobility is common in dancers, although its reported prevalence varies depending on the dance population, assessment method and cut-off value used. Studies comparing dancers with non-dancers suggest that hypermobility may be more frequent in dancers, but different tools and thresholds make direct comparisons difficult.

Joint hypermobility may have performance-related value in dance because increased joint mobility can contribute to aesthetic and choreographic demands. However, it should not be interpreted as purely beneficial. In some dancers, hypermobility may coexist with arthralgia, instability-related injuries, fatigue, reduced physical fitness or psychological distress.

The relationship between joint hypermobility and injury risk remains inconsistent. Some studies suggest greater injury burden in hypermobile dancers, whereas others do not show a direct association between GJH and injury occurrence. Therefore, hypermobility in dancers should be interpreted in a broader functional and clinical context, including symptoms, previous injury history, strength, balance, fatigue and training load.

Management considerations are mainly relevant when hypermobility is symptomatic or functionally limiting rather than when increased joint mobility is asymptomatic. Broader rehabilitation literature suggests that exercise-based interventions in symptomatic hypermobility-related conditions may be associated with improvements in pain, proprioception, quality of life or functional outcomes. These interventions most commonly

include strengthening exercises, proprioceptive training, balance or postural control exercises, stabilization and functional movement control. However, dance-specific intervention studies are needed before direct management recommendations for hypermobile dancers can be formulated.

Overall, joint hypermobility in dancers is best understood as a performance-related trait with variable consequences. Future studies should use standardized definitions, clearly report assessment tools and cut-off values, distinguish between asymptomatic joint hypermobility, generalized joint hypermobility and symptomatic hypermobility-related conditions, and evaluate management strategies specifically in dance populations.

Declarations

Supplementary Materials: Not applicable. **Author Contributions:** Conceptualization: Ewelina Lachowska, Patrycja Bartkiewicz; Methodology: Ewelina Lachowska, Cyprian Janiszewski; Data acquisition: Ewelina Lachowska, Cyprian Janiszewski, Patrycja Bartkiewicz; Data analysis and interpretation: Patrycja Bartkiewicz, Wojciech Baran; Drafting of the manuscript: Ewelina Lachowska, Cyprian Janiszewski, Patrycja Bartkiewicz, Wojciech Baran; Final approval: Ewelina Lachowska, Cyprian Janiszewski, Patrycja Bartkiewicz, Wojciech Baran. **Funding Statement:** The authors received no specific grant, financial support, or other assistance from any funding agency, commercial entity, or non-profit organization for the preparation of this manuscript. **Institutional Review Board Statement:** Not applicable. **Informed Consent Statement:** Not applicable. **Data Availability Statement:** Not applicable. **Acknowledgements:** Not applicable. **Conflicts of Interest:** The authors declare that no conflicts of interest exist. **Originality:** The submission has not been previously published, nor is it under consideration by another journal. **Use of Artificial Intelligence:** During the preparation of this work, the authors used Anthropic's Claude Opus 4.8 for the purpose of editorial assistance, including language editing, improving clarity and conciseness, and minor stylistic revisions. After using these tools, the authors reviewed and edited the content as needed and take full responsibility for the substantive content of the publication.

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