Physiotherapy protocol for patient with symptoms of joint hypermobility – case study

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Abstract

Background: Hypermobility can affect one or more joints and can be a result of injury or deliberate stretching training. It can also be congenial and linked to a range of symptoms affecting musculoskeletal and other internal organs and systems. The main symptom of hypermobility is pain which is often accompanied by posture defects. Well-conducted physiotherapy can help reduce or completely eliminate pain ailments for patients.

Aims: The aim of this paper was to present a physiotherapy protocol of a patient with symptomatic joint hypermobility. Hypermobility is described as an increased range of motion in joints and ligaments, in relation to the accepted physiological norms. The root cause of hypermobility is a disruption in the proportions of collagen I and collagen III. The effects of disrupted collagen production are visible both in the musculoskeletal system, as well as other internal organ systems.

Case report: This work presents a physiotherapy protocol of a 34-year-old female patient with symptoms of joint hypermobility (Beighton scale score 7/9). Patient reported pain symptoms in the lumbar spine.

Procedure: Physiotherapy protocol was based on Pilates-sourced exercises. Each workout comprised of 7 exercises focusing on individual muscle groups.

Results: Patient returned to the clinic after 10 days. No changes were observed in the range of motion in affected joints and Beighton scale score remained unchanged. Lumbar spine pain symptoms subsided. Patient reported significant improvement in her ability to complete daily tasks.

Summary: Physiotherapy for patients with joint hypermobility ought to focus on eliminating pain symptoms, improving joint stability, and improvement in proprioception. Short-term therapy (10 days) resulted in positive outcomes in the above-mentioned patient.

Key words

joint hypermobility syndrome, musculoskeletal pain syndrome, Beighton scale.

Introduction

Joint hypermobility is a phenomenon related to increased movement in joints and ligaments. Each joint has a physiologically limited range of motion. Joint hypermobility occurs when the physiological barrier of a joint is crossed without breaching the anatomical integrity of a joint, which would result in damage to the joint [1]. Hypermobility can affect one or more joints and can be a result of injury or deliberate stretching training. It can also be congenial and linked to a range of symptoms affecting musculoskeletal and other internal organs and systems – in these cases we can suspect Hypermobility Spectrum Disorders (HSD). Hypermobility is related to disruption in proportions of collagen types I and III, which results in laxity of joint structures made of connective tissue [2]. Hypermobility Spectrum Disorders (HSD) affect between 0,6% and 31,5% of the population, depending on the inclusion criteria of research sample selection, such as age, gender, or ethnicity. Hypermobility affects women more frequently than men, and it reduces with age [3].

The main symptom of hypermobility is pain. The type and frequency of pain symptoms are changeable and depend on the individual – pain can be sporadic, periodic, or chronic. Pain symptoms result in reduced tolerance to static load, e.g., during prolonged periods of standing or sitting by the desk. Pain is most frequently localised around knee joints, spine, shoulder, feet, or hips [2].

People experiencing joint hypermobility are more prone to injury. This is a result of excessive joint mobility, disrupted proprioception, and reduced muscle strength – these factors can lead to sprains, injury to muscle, tendon, ligament, or synovial cartilage. Recurrent injuries lead to more frequently occurring pain and reduction in functionality and can predispose to early onset joint degeneration [4]. Hypermobility is often accompanied by posture defects, e.g., flat feet (rigid and transverse), hallux valgus, deep thoracic kyphosis and lumbar lordosis or scoliosis [4, 5].

Aside from symptoms related to the locomotor system, HSD cause a range of other symptoms, i.e., increased stretch of skin, stretch marks, large scars, difficulty in wound healing, temporomandibular joint dysfunction, pelvic organ prolapse, rectal prolapse, urinary incontinence, hernias, varicose veins, vascular fragility, or mitral valve prolapse. Significant dysfunction is also related to symptoms of depression, anxiety, or panic – patients are fatigued with chronic pain, which then results in difficulties in day-to-day functioning [3, 4].

Recent years have brought advancements in research on hypermobility. Due to discrepancies in literature resulting from heterogenous nomenclature, the following clinical classification has been proposed in the **Figure 1** [4]:

- Patients with 'asymptomatic' hypermobility, confirmed by a positive Beighton score, but reporting no pain ailments from the musculoskeletal system;
- Patients with hypermobility, who pass diagnostic criteria for hypermobile Ehlers-Danlos Syndrome (hEDS);
- Patients with hypermobility and pain ailments, who do not pass diagnostic criteria for hEDS, are classified as having Hypermobility Spectrum Disorders (HSD).

For those affected by hypermobility spectrum disorders (HSD), 4 types have been identified, as described below (**Table 1**) [4].

There is no doubt that, as physiotherapists, we must be aware of hypermobility spectrum disorders. Well-conducted physiotherapy can help reduce or completely eliminate pain ailments for patients. Main aims of rehabilitation are improving proprioception, coordination, balance, muscle strength and endurance. Physiotherapy for hypermobility should involve the following elements: treatment of pain symptoms, postural re-education, selected exercises to strengthen and stretch the muscles stabilizing peripheral joints prone to injury, individually tailored to the patient's level of dysfunction, proprioception, coordination and balance exercises, close kinetic chain exercises, general body development exercises.

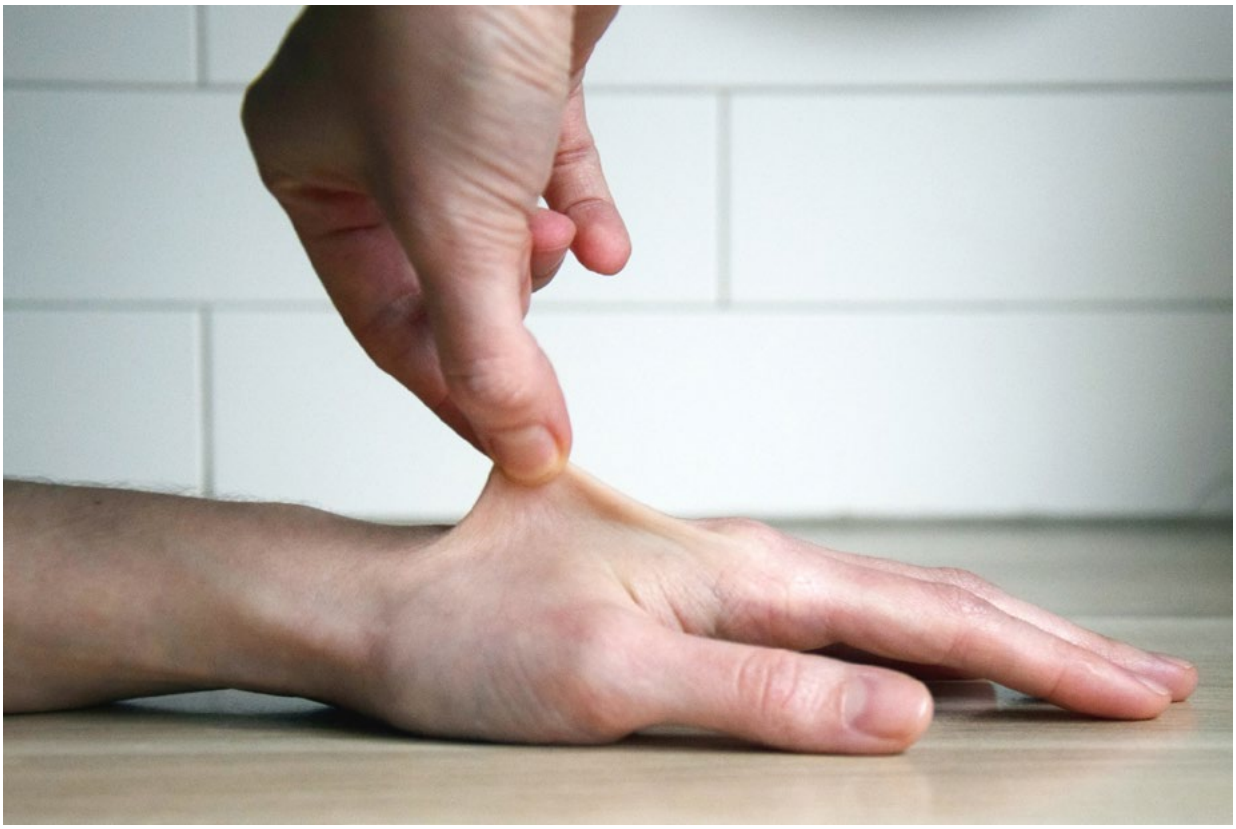

Figure 1. Increased skin extensibility.

Table 1. Classification of hypermobility spectrum disorders.

Name	Description
G-HSD	Generalized form of joint hypermobility syndrome, confirmed by a positive Beighton's test. Additionally, musculoskeletal symptoms (one or more) are present.
P-HSD	Peripheral joint hypermobility that involves only the joints of the hands and/or feet and one or more musculoskeletal symptoms, Beighton's test result is usually negative.
L-HSD	Hypermobility limited to only one joint with musculoskeletal symptoms, but only at that location, Beighton's test result is negative.
H-HSD	Hypermobility presented in the past, Begihton test result is negative, but musculoskeletal symptoms (one or more) may be present.

Abbreviations: *G-HSD, Generalized Hypermobility Spectrum Disorders; P-HSD, Peripheral Hypermobility Spectrum Disorders; L-HSD, Localized Hypermobility Spectrum Disorders); H-HSD, Historical Hypermobility Spectrum Disorders).*

Positive effects of strength and endurance training have been proven. These exercises can involve resistance bands; however, the level of resistance must be tailored so that a patient does not experience pain. It is worth involving general body development exercises and not focus solely on joints where pain ailments occur [2, 5, 6, 7, 8]. It is also worth reminding patients to be mindful of daily functions: avoiding static overload, such as sitting in one position for a prolonged time; controlling body weight to avoid overloading joints and spine; and avoiding excessive muscle strain – overloaded muscles do not act as a protective barrier to the joints, which additionally stresses the ligamentous-capsular apparatus.

Aims

The aim of this paper was to present a physiotherapy protocol of a patient with symptomatic joint hypermobility and evaluating the impact of short-term therapy on pain symptoms of the lumbar spine in the presented case.

Case report

34-year-old patient presented with symptoms of joint hypermobility and pain in the lumbar spine. During an assessment, information on her lifestyle had been collected. Between ages 4 and 29 patient had trained in ballet and was currently dancing in a folk band. She spent her free time actively and cared for two children ages 3 and 5. During the assessment, patient reported symptoms indicative of hypermobility spectrum disorder, such as: increased stretch of skin, difficulty in wound healing, tendency to form stretch marks, a reproductive organ prolapses following second birth, habitual ankle dislocation and joint pain lasting for a number of weeks at a time.

The patient experienced pain in the lumbar spine, pain intensity rated 3 out of 10-point VAS scale. Pain symptoms occurred regularly, every few days, without any tangible trigger. Acute pain episodes were noted in patient's symptom history (intensity 10 out of 10), most recent one occurred 9 months ago.

A physical examination was conducted. The examination, conducted based on the modified Beighton scale, involved evaluation of patient's ability to complete a set manoeuvre. For every positive result, one point was granted (**Table 2**). A score of 4 or more points can suggest hEDS is present [9]. The patient scored 7 out of 9 points. The mobility of the lumbar spine was also assessed – flexion, extension, rotation, and lateral bend. The range of individual movements was within physiological norm. The patient reported a slight increase in pain levels (maximum 5 out of 10) during flexion and extension, which passed after returning to the starting position.

Table 2. Beighton scale scores.

Beighton scale	Left upper/lower limb	Right upper/lower limb
Passive dorsiflexion of V finger above 90 degrees	–	–
Passive opposition of thumb to palm of forearm	+	+
Elbow joint hyperflexion more than 10 degrees	+	+
Knee joint hyperflexion more than 10 degrees	+	+
Bending the trunk with the knee joint straightened, palms touch the floor	+	
Total score	7/9	

Procedures

Physiotherapy protocol was based on Pilates exercises, accounting for its modern modifications. Each workout comprised of 7 exercises, from 10 to 15 repetitions per set, focusing on individual muscle groups. Before attempting the exercises, it had been checked if the patient had experienced dehiscence of the white line of the rectus abdominis (via palpation and ultrasound, at rest and tension). The correct tension of the stabilizing muscles (transverse abdominal muscle, diaphragm, pelvic floor muscles) was taught in various starting positions. Example exercises are presented in **Figures 2 and 3**.

Exercises lasted approximately 15 minutes, and were conducted at a slow pace, with particular attention paid to proper movement of individual muscle groups and precision of movement. The patient exercised with a physiotherapist and alone at home for the 10 following days. The exercises were primarily aimed at: improving muscle strength, improving proprioception, and improving motor coordination.

Exercises were selected in terms of their impact on individual muscle groups and their aim was strengthening the gluteal muscles (gluteus maximus, gluteus medius, and gluteus minimus), abdominal muscles (transverse abdominal muscle, internal and external oblique muscle, rectus abdominis muscle), and upper back muscles (i.e., latissimus dorsi). The structures listed have a direct influence on the mobility of the lumbar spine, and their weakening can affect joint stability and occurrence of pain in this area.

Aside from proposed exercises no further therapeutic methods were used to reduce pain, including pharmacological treatment. In addition, elements of health education were included in relation to factors influencing back pain, such as: the need to supplement dance training with other forms of movement, an appropriate way to lift a child or correction of posture during everyday activities.

Figure 2a. Shoulder Bridge exercise – starting position.

Figure 2b. Shoulder Bridge exercise – adequate movement.

Figure 3a. Roll Down exercise – starting position.

Figure 3b. Roll Down exercise – adequate movement.

Results

Patient returned to the clinic after 10 days of completing the exercise routine. No changes were observed in the range of motion in affected joints and Beighton scale score remained unchanged: 7 out of 9 points. Lumbar spine pain symptoms subsided, and the patient reported significant improvement in her ability to complete daily tasks. Additionally, it became easier to control correct body posture – patient reported that she started correcting her posture spontaneously during sitting or walking. She has also noticed an improvement in her mood – reduction in pain symptoms encouraged her to continue exercising.

Discussion

Nowadays, spinal pain is a common social issue. It is estimated that between 60% and 80% of the population of highly developed countries experiences lower back pain [10]. Causes for this vary – we often blame sedentary lifestyle, lack of physical activity or bad body posture. According to the newest definition by the International Association for the Study of Pain (IASP), pain is an 'unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage' [11]. If pain experienced is not directly related to mechanical tissue damage, we need to consider other factors that could cause or exacerbate pain ailments. The biopsychosocial model explains pain by focusing on biological, psychological, and social factors, which correlate with experiences of chronic pain [12].

In the case of hypermobile individuals, relationships between these factors are present – many patients avoid physical activity due to fear of pain or injury [6]. This impacts not only the levels of fitness but can also negatively impact the

patient's self-perception. Frequently, the following scenario occurs; patients experience pain, so they try exercising. Poorly selected or incorrectly conducted exercise do not decrease, but rather increase patient's pain levels, which causes demotivation and feelings of anxiety – 'it's better not to work out, because it only makes things worse'.

In a study conducted in the United Kingdom, 25 people with hypermobility spectrum disorders were asked about their experience with daily activities. Common among answers were statements on chronic fatigue, pain, and fear of injury. This resulted in a need to modify or limit levels of physical activity. Commonly experienced were also feelings of anxiety and catastrophising minor injuries. Participants also pointed towards an important issue, where an appropriate diagnosis did not guarantee beneficial treatment, and that the knowledge base of the medical professionals around hypermobility is still unsatisfactory [13].

Appropriate therapy can successfully help patients. Research has observed positive effects o f muscle strength and endurance training [6]. Research by Celenay and Kay is worth particular attention. 38 participants (20 of those with hypermobility confirmed by Beighton Scale score and 18 participants in the control group) were subjected to 8-week exercise regime aiming to stabilise the lumbar spine. The measured outcomes were impact on pain levels, endurance of torso muscles, and stability of posture. Each training session lasted approximately 40-45 minutes and included 25 minutes of stability exercises. Initially, patients were taught the correct tension levels of the abdominal transverse muscle and multifidus muscle. Much attention was devoted to teaching of stabilising the lumbar spine in various starting positions (from lying face-down, through kneeling, to sitting and standing), as well as neutral position of the spine. After finishing the exercise programme improvement was noted in the results of the test group: pain symptoms had reduced and there was improvement in strength of the torso muscles and dynamic stabilisation in comparison to the control group [7].

Existing literature concerning physiotherapy protocol for hypermobile individuals show that an accurate diagnosis of the condition is difficult, and that Beighton Scale, which is used as a screening tool, does not include many important aspects of the hypermobility spectrum disorders. Other problematic factors include a lack of awareness around the existence of hypermobility, difficulties in accurate diagnosis of hypermobility spectrum disorders and the effect of misdiagnosis [4]. Patients with increased joint mobility often report chronic pain symptoms, recurrent injuries, or difficulties with coordination, which are symptoms often associated with various other orthopaedic or neurological disorders. Detailed diagnostics for hypermobility and accurately selected exercises and other forms of therapy can bring relief and help patients in their daily functioning.

There is no doubt that further research on the use of physiotherapy for people with hypermobility spectrum disorder. It is key to remember that therapy must be individualised and best matched to each patient's needs. Just as hypermobility and its symptoms can present differently in each affected individual, so should therapy be adjusted to each patient's ailments, needs, abilities, and expectations.

Summary

Physiotherapy for patients with joint hypermobility ought to focus on eliminating pain symptoms, improving joint stability, and enhancing proprioception. Short-term therapy (10 days) resulted in positive improvement for the patient discussed in this study, however, to further establish the effectiveness of the described form of physiotherapy further research is needed, involving a larger sample size. Physiotherapy procedures must be tailored to the individual ability and dysfunction of the patient. More research is needed to broaden the knowledge base of physiotherapy procedures for those with hypermobility spectrum disorder.

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