



Correlation between patellofemoral pain syndrome and dynamic balance in young female kathak dancers

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Abstract

Topic: Correlation between Patellofemoral Pain syndrome and dynamic balance in young female Kathak dancers.

Background: Patellofemoral pain syndrome (PFPS) is characterized by pain in the retro patellar region aggravated by climbing stairs, squatting, prolonged sitting with knees flexed. Multifactorial causes of PFPS include lower limb mal alignment, greater Q angles, repetitive movements. Dancers have a high predisposition of PFPS due to the complex foot work and foot postures. PFPS patients have shown to exhibit reduced dynamic balance than normal individuals. Correlation between pain intensity due to PFPS and dynamic balance in Kathak dancers can help in prevention of PFPS at an early stage of dance training

Objective: To find a correlation between pain intensity arising due to PFPS and dynamic balance in female Kathak dancers.

Methodology: Ethical clearance was obtained from the institution. Informed consent was taken from the participants. Participants were screened according to inclusion and exclusion criteria. Purpose of study and procedure was explained to participants. The subjects were assessed for severity of Patellofemoral pain syndrome using Anterior knee pain rating scale (Kujala scale) and dynamic balance was assessed using Star Excursion Balance Test (SEBT). Correlation between above two variables will be analyzed using Pearson's correlation constant.

Results: 111 Kathak dancers were assessed for PFPS out of which 64 dancers had anterior knee pain and 47 dancers were having no pain. A medium negative correlation was found between intensity of pain and average balance in Kathak dancers having PFPS. As intensity of pain increases, dynamic balance shows reduced scores on SEBT. No correlation was found between years of dance training and dynamic balance and also intensity of pain.

Conclusion: A medium negative correlation was found between intensity of pain and average balance in Kathak dancers having PFPS. As intensity of pain increases, dynamic balance shows reduced scores on SEBT. Current study concluded that dynamic balance is reduced in Kathak dancers having PFPS and hence prevention strategies can be incorporated in early years of dance training to prevent occurrence of PFPS.

Keywords: kathak dancers, patellofemoral pain syndrome, anterior knee pain, dynamic balance, star excursion balance test

Introduction

Kathak is an Indian classical dance form which is one of the eight major forms of Indian classical dance. Kathak is characterized by intricate footwork, fast spins, attaining complex body and foot postures [1]. Kathak dance form emphasizes on footwork and hence high demands are posed on dancer's lower extremity specially knee and ankle which leaves them at a risk of injury [1].

This dance form places the ankle in extremes of plantarflexion and dorsiflexion with inversion and eversion. There's high prevalence of pronated foot [49%] in Kathak dancers which predisposes them to lower extremity injuries [1]. During pronation, the tibia rotates inward and pressure on lateral part of patellofemoral complex increases [2] This causes overloading of the patellofemoral complex. Repetitive movements with this mal alignment contributes to be one of the causative factors for PFPS hence predisposing Kathak dancers to PFPS.

Lower extremity is an inter related structure because of which alteration at one aspect can affect adjacent areas like knee [2] Along with excessive pronated feet, Q angle has also been associated with predisposition of PFPS. A greater lateralization angle is exerted on the patella with a greater Q angle, which increases the load on the lateral facet of the patella and the lateral femoral condyle thus PFPS being prevalent in females than males [3].

Patellofemoral pain syndrome is characterized by anterior knee pain during squatting, climbing and descending stairs, prolonged sitting with knees flexed, running or jumping^[4].

A combination of factors such as lower extremity mal-alignment (pronated feet, wider Q angles), overuse, overloading, muscular imbalances are causative factors for PFPS^[4].

Balance is a complex function. It involves integration of vestibular, somatosensory and visual inputs. Balance is an important aspect of every dance form. Balance helps Kathak dancers attain complex postures and helps fulfil aesthetic demands. Effective control of balance relies on sensory inputs along with proper muscle activation^[4].

Dancers and athletes have been found to have better control of dynamic balance due to years of dance training^[6].

^{7]} If pain intensity will reduce dancer's ability to maintain balance and complex postures still remains unclear. Patients with PFPS have been found to have reduced static and dynamic balance. Reduced proprioception, muscle imbalances, intensity of pain, lower extremity mal alignment are contributing factors for reduced balance in PFPS patients^[4, 5].

Nili Steinberg reported reduced proprioception ability in young dancers having patellofemoral pain which resulted in reduced SEBT score due to increased nociceptive stimulation.

Hence, after reviewing the available literature, the purpose of this study is to find a correlation between pain intensity due to PFPS and dynamic postural balance in female dancers.

Materials and Methodology

1. Study design: Co relational study
2. Sample size: 111
3. Sampling method: Convenience sampling
4. Study population: Female Kathak dancers
5. Study setting: Various Kathak institutes in and around Pune
6. Study duration: 6 months
7. Tools and Materials: masking tape, measuring tape, pen.
8. Consent form

Inclusion criteria

1. Kathak dancers between age 18-35 years
2. Dancers who are practicing Kathak for minimum 5 years.
3. Anterior knee pain for at least 4 weeks
4. Unilateral and bilateral PFPS.
5. Dancers willing to participate in the study.

Diagnostic criteria

1. Anterior knee pain on squatting, prolonged sitting, stair climbing.
2. Eccentric step test positive^[8]

Exclusion Criteria

1. Any spinal/lower extremity deformity
2. History of patellofemoral dislocation, subluxation
3. History cruciate, meniscal, collateral ligament injuries
4. History of lower extremity surgery
5. Recent lower extremity trauma/injury
6. Neurological condition
7. Vision deficits
8. Any other patellofemoral disorder

Procedure

1. Ethical clearance was obtained from the institution.
2. Informed consent was taken from the participants.
3. Participants are diagnosed for PFPS according to diagnostic criteria.
4. Participants were screened according to inclusion and exclusion criteria
5. Purpose of study and procedure was explained to participants.

Anterior Knee Pain Rating Scale (AKPS)

The subjects were assessed for severity of Patellofemoral pain syndrome using anterior knee pain rating scale (Kujala scale). AKPS is a 13 item questionnaire to assess intensity of patellofemoral pain^[9]. Total scores range from 0 to 100 where low scores indicate greater pain and inability to function. For the current study the difference out of 100 was taken into consideration.

Star Excursion Balance Test

Star excursion balance test was used to assess dynamic balance of the affected extremity. Subjects were made to stand at the center of 8 directions with the leg to be assessed and asked to reach maximum distance with the

other extremity and come back to the starting position. The distance was manually measured using a measuring tape from the centre of the grid up to the farthest reach point. The trial was not considered valid if the subject couldn't maintain balance. Every dancer was given 3 trials in each direction of SEBT and average distance was calculated. A 30 second break was given after every trial in each direction. Data obtained from Anterior knee pain rating scale (difference out of 100) and average distance in each direction in cm using SEBT (SEBT_{COM}) was correlated [10] Correlation between above two variables will be analyzed using Pearson's correlation coefficient.

Conclusion

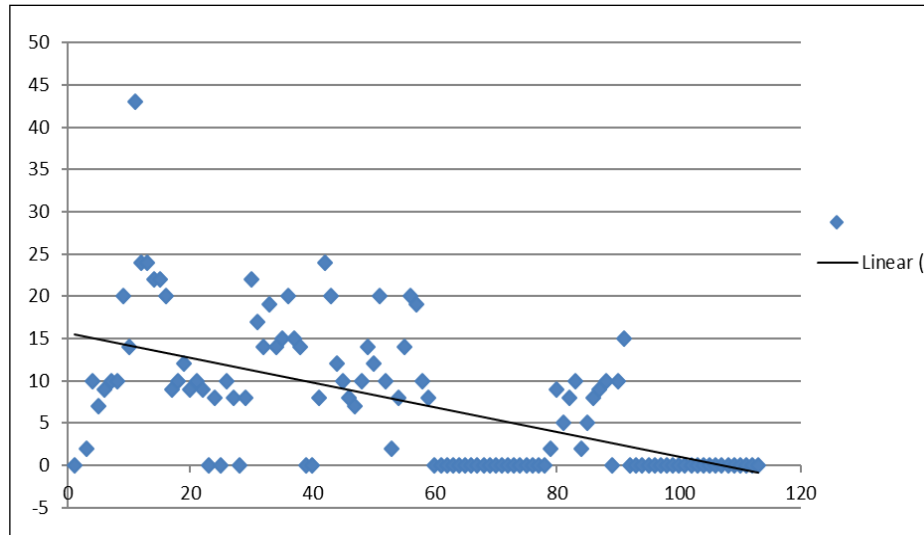


Fig 1

Correlation between AKPS and average balance of 8 directions of SEBT $r = -0.473$ [negative correlation]

A medium negative correlation was found between intensity of pain and average balance in Kathak dancers having PFPS. As intensity of pain increases, dynamic balance shows reduced scores on SEBT. Current study concluded that dynamic balance is reduced in Kathak dancers having PFPS and hence prevention strategies can be incorporated in early years of dance training to prevent occurrence of PFPS.

Years of dancing didn't show any correlation with average SEBT score.

Years of training showed no correlation with pain on AKPS.

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