



A Study on the Effectiveness of Controlled Decline Eccentric Squat Protocol in Pain And Knee Function Among Basketball Players with Patellar Tendinopathy

KEYWORDS

Patellar tendinopathy, pain, knee function, controlled decline eccentric squat.

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ABSTRACT

Background: Patellar tendinopathy is commonly referred to as "Jumper's knee." It is seen in as many as 31.9% of elite basketball players. Eccentric exercises involve the lengthening of a muscle-tendon unit as a load is applied to it. The present study aims to find out the effect of controlled decline eccentric squat protocol in pain and sports function among basketball players with patellar tendinopathy.

Methods: Twenty patellar tendinopathy subjects were selected for the study and underwent controlled decline eccentric squat protocol training. The Pain and knee function was assessed by visual analog scale (VAS) and victoria institute of sports assessment for patella (VISA-P) respectively at the baseline and at 4 weeks.

Conclusion: There is significant reduction of pain and improvement in knee function with four week controlled decline eccentric squat protocol among basket ball players with Patellar tendinopathy.

Introduction

The high level of participation has placed the injury rate to its extreme in basketball game (Michaud et al, 2001) with more than twice as many injuries as baseball and 40% more injuries than football in one series (Cohen et al, 2003). These include injuries to the ankle (15.8%–39.3%), knee (5%–20%), hand (8.8%–43%), head and neck (8%–36.4%) and lumbar spine (0%–11.7%) (Henry et al, 1982). Basketball injuries are most common of all sports injuries occurring between 3.8% and 23.1%. (Burt et al, 2001).

As many as 28% of basketball players eventually experience some form of injury, with an injury rate of 18.3 per 1000 participants. Sprains and strains are the most common types of basketball injuries, accounting for 55.1% of injuries (Prebble et al, 1999). Knee injuries are the second most common type of injury following ankle injuries. Patellar tendinopathy commonly referred to as "Jumper's knee," is seen in as many as 31.9% of elite basketball players.

Patellar tendinopathy is one of the common and significant syndromes encountered in sports Physiotherapy. Patellar tendinopathy is an increasing common overuse and degenerative clinical condition commonly affecting the elite professionals and recreational sports persons (Khan et al, 2002).

Eccentric exercises involve the lengthening of a muscle-tendon unit thereby applying load to a muscle. (Wang et al, 2006). An eccentric action is an activation of the muscle at the same time it elongates the musculo-tendinous complex (Faulkner, 2003). Eccentric exercises have emerged as a popular treatment method for tendinopathy (Banes et al, 1995).

Methods

Study Design: Pre and post test experimental study.

Sample : 20 basketball players (n=20) who fulfilled the inclusion and exclusion criteria were selected by simple ran-

dom sampling method.

Inclusion Criteria

- Patient diagnosed through clinical examination and by diagnostic ultrasound scanning for patellar tendinopathy.
- Tenderness at the patellar tendon and / or at the inferior pole of patella on palpation.
- Pain in the patellar tendon on jumping, climbing and / or descending stairs.
- Basketball players with age between 18 and 22 years.
- Both male and female players.
- Professional players with minimum of one year of continuous performance.
- Unilateral involvement.

Exclusion Criteria

- Patella femoral pain syndrome
- Chondromalacia patella / mal tracking of patella
- Patella alta / Patella baja
- Subluxation or dislocation of patella
- Individuals diagnosed with degenerative conditions of knee, hip and ankle joints
- Recent fracture or surgery at knee, hip and ankle.
- Recent ligament with / or Meniscus injury
- Players with severe knee in-stability
- Muscle power of quadriceps and hamstrings less than three.
- Not a regular player.
- Bilateral involvement

Independent Variable

- Controlled Decline Eccentric Squat Protocol

Dependent Variable

- Pain
- Knee Function

Procedure:

20 basket players with unilateral anterior knee pain diagnosed with patellar tendinopathy who were confirmed by

clinical examination and diagnostic ultrasonography were included in this study. All the subjects who satisfied the inclusion criteria were selected after taking acceptance through the consent form for the participation in this study. They were treated with the exercise regimen by the controlled decline eccentric protocol on a 25° decline board for a period of four weeks. The pain and knee function were assessed by visual analog scale (VAS) and victoria institute of sports assessment for patella (VISA-P) respectively at the baseline and at 4 weeks.

Measurement procedure

- Visual Analog Scale
- The Victorian Institute of Sport Assessment Score for Patella

Visual Analog Scale

It is a psychometric response scale in which the subjects were asked to mark the pain level on a 100 mm line marked from 0 to 10, subject is explained that 0 (zero) denotes no pain and 10 (ten) refers to excruciating pain and 5 (five) moderate. The VAS is used as a pre test at baseline and post test. These values are then recorded for the tabulation.

The Victorian Institute of Sport Assessment- Patella

The questionnaire consists of eight questions. Six out of eight questions rate pain during activities of daily living and simple functional tests on an inverse visual analogue scale from 0 to 10 points, with 10 representing optimal health. Two questions concern the ability to participate in sporting activities. The maximum score for an asymptomatic athlete is 100 points. The subject is requested to fill in the form as a pre test and post test questionnaire.

Treatment procedure

Controlled Decline Eccentric Squat Protocol

Volume of Training:

- No of repetitions per set : 10 repetitions
- No of sets per session : 3 sets
- Treatment session per day : 2 sessions
- No of days per week : 5 days
- Total Treatment Duration : 4 weeks

The Position of the subject: The Starting position for the control decline eccentric squat training for patellar tendon was on the 25° decline board with entire weight of the body on the affected leg. They were instructed to avoid bending forward but keep the back as vertical as possible with maintaining the normal curvature at spine with the hands supported at the hip.

Procedure: The main programme started with the squatting movements on the affected leg. The players performed the eccentric training programme from the starting position on a 25° decline board slowly by controlled flexion at the knee up to 60°. As the knee is flexed to 60° the subject was asked to come to normal with the asymptomatic leg. If the normal leg was injured, the subjects were instructed to use their arms to assist during the concentric phase. They were instructed to take two seconds for each eccentric component of each exercise and were instructed to exercise despite of pain during exercise, but to stop if the pain became disabling. If the pain was severe or if the pain was 8 on scale patients were said to discontinue the exercise.

After one set the subject were asked to rest for 15 sec. The whole exercise programme was restricted to total of

three sets.

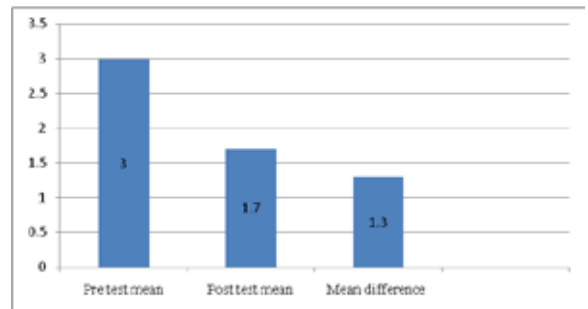
The programme ended with a cool down exercise of free exercises for duration of 5 minutes.

Data analysis and Results

Table: I Computation of Statistical value and significance of controlled decline eccentric Squat protocol for pain by VAS

Values	Mean	Mean difference	SD	t value
PRE – TEST	3.00	1.30	0.65	t = 7.26*
POST-TEST	1.70			

The table I displays the pre and post test mean values of pain, standard deviation and calculated paired 't' values. Since the calculated 't' value is 7.26 which is more than the 't' table value 2.861 at 0.005 level. The above study shows that there is significant difference in pain following controlled decline eccentric squat protocol among basketball players with patellar tendinopathy.

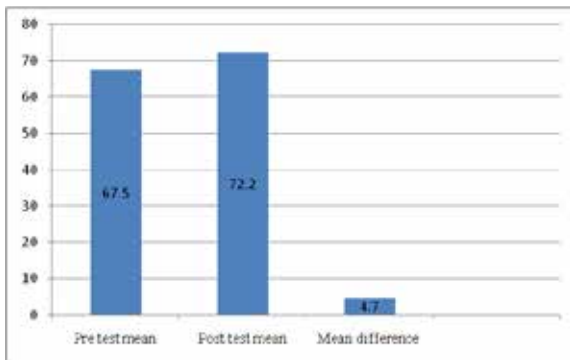


Graph: 1 Shows pre test post test mean and mean difference values of pain

Table: II Computation of Statistical value and significance of Controlled Decline Eccentric Squat protocol for knee function by VISA-P

Values	Mean	Mean difference	SD	t value
PRE – TEST	67.50	4.70	2.29	t = 6.15
POST-TEST	72.20			

The table II displays the pre and post test mean values of knee function, standard deviation and calculated paired 't' value of knee function. Since the calculated 't' value is 6.15 which is more than the 't' table value 2.861 at 0.005 level. The above study shows that there is significant difference in knee function following controlled decline eccentric squat protocol among basketball players with patellar tendinopathy.



Graph:2 Shows pre test post test mean and mean difference values of knee function

Discussion

The reduction in pain after the controlled decline eccentric protocol it may be due to reduced calf muscle tension, permitting better mechanical loading and isolation at the knee extensor mechanism. And the patho physiological changes brought by the decline eccentric squat. The return to normal functional may be due to normalization of the tendon by facilitated remodeling. This was supported by Visnes and Bahr (2007) they did a critical review of the evolution of eccentric training as treatment for patellar tendinopathy (jumper's knee) was done by the authors by computerized search of the MEDLINE database to identify prospective and randomized clinical trials with a focus on clinical outcome of eccentric training for patellar tendinopathy. Seven articles with a total of 162 patients and in which eccentric training was one of the interventions, all published after the year 2000. The results were positive with of potentially significant differences identified in the eccentric programmes with different phases or types of loading. The study suggests that eccentric training may have a positive effect, but the ability to recommend a specific protocol is limited.

Conclusion

It is concluded that there is significant reduction of pain and improvement in knee function with four week training by controlled decline eccentric squat protocol among basketball players with patellar tendinopathy.

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