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Comparison between Effectiveness of Convenient Physiotherapy with Therapeutic Ultrasound V/S Convenient Physiotherapy with Taping in the Management of Jumper's Knee in the Athletes: A Randomize Control Trial

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## Abstract

**Title**: Comparison between effectiveness of Convenient physiotherapy with therapeutic ultrasound Vs convenient physiotherapy with taping in the management of jumper's knee in the athletes: A randomize control trial.

**Background**: Jumper's knee is overused injury most commonly occurs in athletes. This is occurs due to a ling activities like jumping, running weight lifting may also leads to this condition. There are many treatments available for the jumper's knee. In this study there is comparison between two different protocol treatments. This study will provide specific effective treatment protocol. In this study there is comparison between convenient physiotherapy with therapeutic ultrasound and convenient physiotherapy with taping.

**Objective**: To find the effectiveness of convenient physiotherapy treatment with therapeutic ultrasound and convenient physiotherapy treatment with taping. To find out significant effective therapeutic intervention from given treatment.

**Methods**: All participants are divided into two groups Group A and Group B. Group A get convenient physiotherapy with therapeutic ultrasound and Group B will get convenient physiotherapy with taping. This treatment is given for the 4 weeks and after that using outcome measures the analysis will done. Total numbers of participants are 60.

**Conclusion**: Comparison between convenient physiotherapy with ultrasound and convenient physiotherapy with taping in the management of jumper's knee shows that convenient physiotherapy with taping is more effective than the convenient physiotherapy with ultrasound.

**Key words:** Jumper's knee, Therapeutic ultrasound, Taping, Convenient physiotherapy

# Introduction

Tendinopathy is a common musculoskeletal disorder affecting both recreational and elite athletes potentially leading to disability lasting several months [1]. Numerous athletes who run and jump as in volleyball (44%) and basketball (32%). Similar activity occurs in soccer and dancers, who also participate in repetitive kicking, jumping, and landing. A higher prevalence is noted in sports with high impact ballistic loading of the knee extensors [2]. Patellar tendon overuse is also seen in military recruits, accounting for 15% of all of their soft tissue injuries 5 and up to 22% incidence in the overall athletic population [3]. Many factors, both intrinsic and extrinsic, contribute to patellar Tendinopathy. Intrinsic factors such as strength imbalance, postural alignment, foot structure, reduced ankle dorsiflexion, and lack of muscle strength or flexibility may play a role. However the primary cause appears to relate to the extrinsic factor of overuse [4]. Microtrauma or "overuse" injury develops from repetitive mechanical loading of the tendon through excessive jumping and landing activity [5]. A study of 760 adolescent athletes across 16 different sports revealed a prevalence of 5.8% of athletes with patellar tendon pain. 22.8% incidence of patellar tendon pain in a sample of 407 elite volleyball players, and Taunton et al found that 4. 8% of 2000 runners had patellar tendon pain [6]. However, multiple histopathologic studies have indicated that the primary pathologic process in most painful tendons is degenerative rather than inflammatory [7]. Based on histopathology, several Authors have suggested that the term "tendinitis" be abandoned in favor of the term "tendinosis", which describes a degenerative tendon condition [8]. Other tissue research has shown the presence of pro-inflammatory chemical agents such as cyclooxygenase, growth factors, and prostaglandin in painful patellar tendons as well as macrophages and lymphocytes in chronic tendinopathy, 24 suggesting that there may be an inflammatory component in patellar tendon pain [8]. The intervention plan for patellar tendon pain should be based on an evidence-based approach which incorporates the clinical judgment of the clinician, the patient's values, and the best available evidence [9].

# What is jumper's knee?

The term jumper's knee was first used in 1973 to describe an inspectional Tendinopathy. Jumper's knee is often caused by over use or strain on the patellar ligament. The patellar ligament joints the patella to the shin bone, or tibia. It is very strong and facilitates straightening the leg by the quadriceps muscles. The quadriceps muscles straighten the knee in jumping, running and other movements in which the individual needs to be propelledfromthegroundthesemusclesalsofunctiontostabilizethebody during landing. The patellar ligament endues a great deal of stress during these movements this is especially true when the individual frequently changes direction performs jumping movements, or uses the ligament repeatedly for long periods of time as in running. With repeated over use constant inflammation micro-tears as well as collagen degeneration may occur.

# Evaluation

The purpose of the evaluation is to differently diagnose between conditions affecting the patella. A comprehensive evaluation includes detailed examination of both intrinsic and extrinsic factors. A detailed history of a patient's workout schedule and duration of symptoms is paramount to making a correct diagnosis. If symptoms have lasted longer than 6 weeks, Tendinopathy should be suspected. Evaluation of chronic patellar Tendinopathy should include the utilization of Blazina's knee scale 22 or Kennedy's scale [10]. Pain in the patellar tendon may be reproduced with resisted knee extension [11].

Functional tests of ascending or descending stairs, performing single leg declining squats, jumping or hopping will most likely reproduce patellar pain symptoms [12]. The evaluation should include history, age and any recent growth spurts, location of pain, and special tests. The rehab professional should be able to differentiate between patellar Tendinopathy and additional diagnoses of:

- 1. patellofemoral dysfunction
- 2. Sinding-Larsen-Johansson Syndrome
- 3. Ssss Osgood Schlatter's disease

# General management of jumper's knee

Typical non invasive treatment includes resting, icing, and eccentric strengthening of the quadriceps muscles. The KT tape application for jumper's knee is excellent for providing pain relief as well as taking strain off of the ligament. Promoting blood flow to the area, and providing proprioceptive (body awareness) confidence.

Rehabilitationincorporates three stages ranging from limited partial weight bearing loaded exercise to a sports specific return to play protocol. Overuse is a primary contributor to patellar tendinopathy, it is important to avoid rapid progression in frequency, intensity, and duration in rehabilitation and functional progression [13]. Most athletes with patellar tendinopathy are treated non-operatively, it is imperative to understand rehabilitation protocols and implement them wisely. Eccentric exercise has been promoted as an important conservative treatment choice for patellar Tendinopathy [14-18]. Prior to initiating exercise, a warm-up and stretching period is recommended. Cycling on a stationary bicycle for 5-10 minutes with minimal resistance is suggested as an active warm-up. Next, stretching should be incorporated into the program before and after the exercise routine in order to address any flexibility imbalances. Hip flexor, quadricep, hamstring, and gastrocnemius and soleus tightness may contribute to tend on over load during jump in gand landing activities. Lower extremity stretching of 15, 30, 45, or 60 seconds or 2 minutes produces significant gains inflexibility in healthy young or middle age adults[19,20]. Static stretching of 30 seconds atleast three to four times per day is recommended by various authors. [16,19,20]. Soft tissue mobilization (STM) is used to reduce pain and fibrotic limitations in tissue found in patellar tendinopathies[20]. Deep trans versefriction massage for 5-10 minutes twice daily is recommended to help promote normalized collagen alignment [21,22].

# **Statement of Problem**

There is no significant research on the effect of ultrasound and taping in the management of Jumper's knee.

# Significance of research

This study will find the effectiveness of taping and therapeutic ultrasound with convenient physiotherapy treatment in the management of the Jumper's knee.

## Literature reviews

Marsha Rutland, Dennis O'Connell et all (2010) has done study on "clinical commentary evidence–supported rehabilitation of patellar tendinopathy" conclude that A variety of rehabilitation techniques are necessary to assist an individual in returning to recreational activities following patellar tendinopathy. A combination of active rest, education, eccentric exercise, progressing the training regime by 10% weekly, and modifying activity have all been found to be effective in tendinopathy treatment [23]

Mark F. Reinking (2016) has done study on "clinical commentary current concepts in the treatment of patellar Tendinopathy "conclude that Patellar tendinopathy is a common overuse condition seen among athletes, particularly those who participate in jumping sports. Effective conservative intervention includes relative rest, addressing biomechanical issues, eccentric exercise, stretching, and movement retraining. Counterforce bracing are commonly employed, but have weak or little evidence to support their use [24].

Astrid j de vries, inge van den akker-scheek(2013) has done study on "effect of patellar strap and sports tape on jumper's knee symptoms: protocol of a randomised controlled trial" Conclude that patellar tendon straps or taping can deliver short-term pain relief for athletes who continue to compete in jumping sports [25].

Dimitrios Stasinopoulos and Ioannis Stasinopoulos(2003) has done study on "comparison of effects of exercise programme, pulsed ultrasound and transverse friction in the treatment of chronic patellar tendinopathy" conclude that Pain from patellar Tendinopathy can be reduced by an exercise programme. Transverse friction and pulsed ultrasound seem to be ineffective treatments for patellar tendinopathy [26].

David F gerrard (1998) has done study on "external knee supports in ruby union. Effectiveness of bracing and taping." Concluded that there is no significant prophylactic effectof knee taping and it will not provide any significant stability to knee joint to the players [27].

De Vries A, ZwerverJ,Diercks R, Tak I, et all (2016) done study on "Effect of patellar strap and sports tape on pain in patellar Tendinopathy: A randomized controlled trial" They have concluded that patellar strapping and sports taping provide support the knee joint during the playing and it has significant reduction in pain [28].

De vriesA,Van den Akker-scheek et al (2013) done study on " Effect of patellar strap & sports tape on jumper's knee symptoms: Protocol randomized controlled trial. "And they have concluded that the participation in there sporting activity is increased after the intervention treatment. And there is reduction in to the pain. Patellar strapping and sports taping provides support to the knee joint and relives the symptoms [29].

Maia fiho AL, Villaverde AB et all (2010) done study on "cooperative study of the topical application of aloe vera gel, the rapeutic ultrasound

&phonophoresis on the tissue repair in collagenase include rat tendinitis. " And they have conclude that therapeutic ultrasound is more effective in tissue repair in collagenase. other than that topical application of aloevera gel gives no significant effect in tissue repair [30].

Best TM, Moore B, Jarit P. et al (2015) done study on "Sustained acoustic medicine: Wearable long duration ultrasonic therapy for the treatment of tendinopathy." And they have concluded that therapeutic ultrasound is effective in the management of the nidiopathy. Long duration ultrasonic therapy will relieve symptoms significantly [31].

Byung-Hyun Park, Jeong-Hwan Seo et all (2013) done study on "Reliability and Validity of the Korean Version VISA-P Questionnaire for Patellar Tendinopathy in Adolescent Elite Volleyball Athletes" And they have concluded that the Korean version VISA-P questionnaire was found to have satisfactory reliability and validity. Thus, it may be useful in assessing the treatment of patellar tendinopathy in Korean athletes in the future [32].

Pollye. Bijur, wendysilver, e. JohnGallagher (2001) donestudyon "Reliability of the Visual Analog Scale for Measurement of Acute Pain." And they have concluded that Reliability of the VAS for acute pain measurement as assessed by the ICC appears to be high. Ninety percent of the pain ratings were reproducible within 9 mm. These data suggest that the VAS is significantly reliable to be used to assess acute pain [33].

# Objective

- 1. To find the effectiveness of convenient physiotherapy treatment with therapeutic ultrasound and convenient physiotherapy treatment with taping.
- 2. To find out significant effective therapeutic intervention from given treatment.

# Method

**Design:** Randomize control trial

Setting: Ahmadabad

Sampling method: Convenient sampling

Sample size: 60

# **Inclusion criteria:**

- Patient diagnosed with the jumper's knee.
- Age between 20 30.
- Athletes

# **Exclusion criteria:**

- Unstable knee joint.
- Allergy to the taping material.
- Patient with the cardiopulmonary disease.
- Recent knee joint injury

# **Procedure:**

Patients who fulfill the Inclusion criteria will included in to the study. After singing inform consult forms Patients are allocated in to two groups. That is Group: A and Group: B

Group allocation will be done randomly and patients are blind about the allocation.

After the allocation of the group:

- Group A will get Convenient physiotherapy & THERAPUTIC ULTRASOUND
- Group B will get Convenient physiotherapy & Taping (McConnell tapping )
- Convenient physiotherapy is given as given in table [1]

This intervention is given for the 4 weeks.

- 1. Each candidate should fill the VISA scale before starting the intervention and it will be reassessed at the end of the 4 weeks.
- 2. VAS scale is taken before and after the sporting activities

After collecting all the data. Data analysis will done.

Data collection tool: Microsoft office Excel sheet

Week	Convenient physiotherapy	Stretching	Ultrasound
1	-Around the world eccentric Lowing legrice(4 ways)	-Hip flexors -Quadriceps	1 MHZ Continuous
	- Eccentrics quatsontotal gym/shuttle on decline board	- Calfstretching before and after intervention	10 minutes
2	Same as above with progression	As Above	As Above
3	Same as above with progression	As Above	As Above
4	Same as above with progression	As Above	As Above

Table: 1: Convenient physiotherapy management

# Data analysis

Data analysis will be done by using SPSS 14.

#### Result

	VAS before	VAS after	VISA before	VISA after
	intervention	intervention	intervention	intervention
SD	1. 119	0. 6497	14. 16	8. 770

Table: 2: Score in convenient physiotherapy with ultrasound

### (CONVENIENTPHYSIOTHERAPY+ULTRASOUND)



(CONVENIENTPHYSIOTHERAPY+ULTRASOUND)



VASbeforeintervention VASafterintervention

	VAS before	VAS after	VISA before	VISA after
	intervention	intervention	intervention	intervention
SD	1. 094	0. 5826	10. 85	9. 489

Table: 3:Score in convenient physiotherapy with taping

(CONVENIENTPHYSIOTHERAPY+TAPPING)



VASbeforeintervention VASafterintervention



	VAS after	VISA after	VAS after	VISA after
	Intervention in	Intervention in	intervention	Intervention in
	convenient	convenient	in convenient	convenient
	physiotherapy	physiotherapy	physiotherapy	physiotherapy
	with ultrasound	with	with taping	with taping
		ultrasound		
SD	0. 8683	8. 770	10. 17	9. 489

Table:4: Comparison between convenient physiotherapy with ultrasound vs.Convenient physiotherapy with taping.

### **BOTHVISASCORE(AFTERINTERVENTION)**



- VISAScoreafterintervention VISAScoreafterintervention

#### **BOTHVASSCORE(AFTERINTERVENTION)**



# Discussion

The aim of the study was to find the effectiveness between convenient physiotherapy with ultrasound and convenient physiotherapy with taping in the management of jumper's knee (patellar tendinopathy). There is no study done on effectiveness between convenient physiotherapy with ultrasound and convenient physiotherapy with taping. Marsha Rutland, Dennis O'Connell et all in 2010 proposed evidence based physiotherapy management in patellar tendinopathy. They have found that a variety of rehabilitation techniques are necessary to assist an individual in returning to recreational activities following patellar tendinopathy. A combination of active rest, education, eccentric exercise, progressing the training regime by 10% weekly, and modifying activity have all been found to be effective in tendinopathy treatment.

Mark F. Reinking in 2016 proposed clinical commentary current concepts in the treatment of patellar tendinopathy. They have found that effective conservative intervention includes relative rest, addressing biomechanical issues, eccentric exercise, stretching, and movement retraining. Other interventions including TFM and counterforce bracing are commonly employed, but have weak or little evidence to support their use.

Astrid jde vries,ingevandenakker-scheekin2013proposedeffectof patellar strap and sports tape on jumper's knee symptoms. They have found that patellar strapping is not give any significant effect on symptoms. Patellar strap and sports tape provides support to the knee joint during sporting activities. Dimitrios Stasinopoulos and Ioannis Stasinopoulos in 2004 proposed effects of exercise programmer and pulsed ultrasound and transverse friction in the treatment of chronic patellar tendinopathy. They have found that exercise program is significantly effective in the management of patellar tendinopathy . But pulse ultrasound is more effective than the transverse friction in the management chronic patellar tendinopathy.

This study shows that convenient physiotherapy with ultrasound and convenient physiotherapy with taping is significantly effective in the management of jumper's knee. Comparison between convenient physiotherapy with ultrasound and convenient physiotherapy with taping in the management of jumper's knee shows that convenient physiotherapy with taping is more effective than the convenient physiotherapy with ultrasound.

# Conclusion

This study shows that convenient physiotherapy with ultrasound and convenient physiotherapy with taping is significantly effective in the management of jumper's knee. Comparison between convenient physiotherapy with ultrasound and convenient physiotherapy with taping in the management of jumper's knee shows that convenient physiotherapy with taping is more effective than the convenient physiotherapy with ultrasound.

# Limitations

We need to relay on the patient response in the effect of treatment in symptoms management. We cannot apply the result in all population.

# **Future recommendation**

This study done with more sample size. Further study is done on the specific effect of ultrasound in the management of patellar tendinopathy. Further study should be done on the specific effect of Taping in the management of patellar tendinopathy.

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# Appendix

### A. VISA score

B. VAS scale

# **VICTORIANINSTITUTEOFSPORT**

1. For how many minutes can you sit pain free?

0 mins100 mins Points

012345678910

2. Do you have pain walking downstairs with a normal gait cycle?

strong severe pain No pain

#### 012345678910

3. Do you have pain at the knee with full active non-weight bearing knee extension?

strong severe pain No pain

#### 012345678910

4. Do you have pain when doing a full weight bearing lunge?

strong severe pain no pain

#### 012345678910

5. Do you have problems squatting?

Unable no problems Points

#### 012345678910

6. Do you have pain during or immediately after doing10 single leghops?

Strong severe no pain Points pain/unable 012345678910

7. Are you currently undertaking sport or other physical activity? 0 □ Not at all

4  $\square$  Modified training  $\pm$  modified competition

7 **D** Fulltraining±competition but not at same level as when symptos began

10 Competing at the same or higher level as when symptoms began **8.** Please complete **EITHER A, B or C** in this question.

•If you have **no pain** while undertakingsport please complete **Q8a only**.

• If you have **pain while under taking sport but it does not stopy ou** from completing the activity, please complete **Q8 bonly**.

• If you have **pain that stop syou from completing sporting activities**, please complete **Q8c only**.

8a. If you have no pain while undertaking sport, for how long can you train/practise?

NIL1-5 mins6-10 mins7-15 mins>15 mins

**D D D D Points** 

07142130

OR

**8b**. If you havesome pain while under taking sport, but it does not stopy ou from completing your training/practice for how long can you train/practise?

NIL1-5 mins6-10 mins7-15 mins>15 mins

04101420Points

#### OR

**8c.** If you have **painwhichstops you** from completing your training/practice for how long canyou train/practise?

NIL	1-5 mins	6-10 mins	7-15 mins	>15 mins
0	2	5	7	10Points



