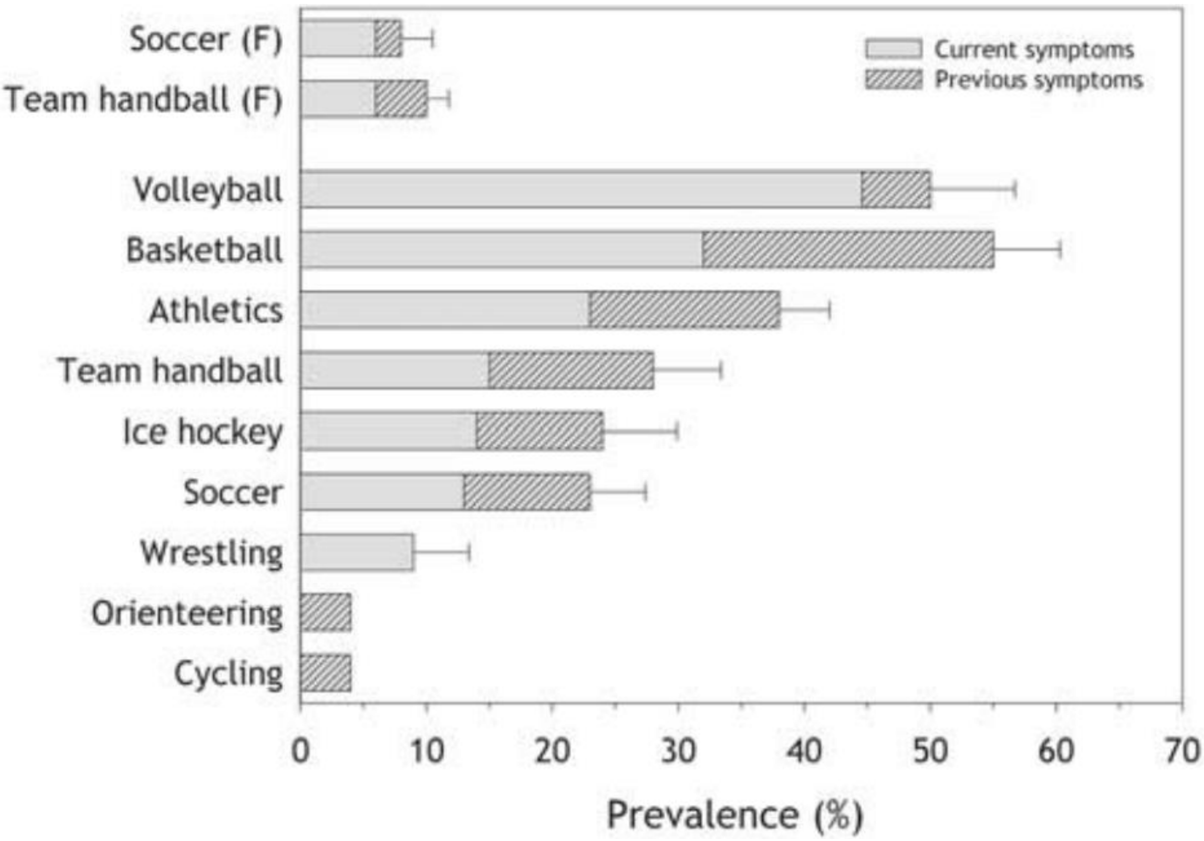
Prevalence

A study by Lian et al (2005) examined the prevalence of patellar tendinopathy (PT) in different sports among female and male athletes. Approximately fifty athletes from each of nine sports including athletics, basketball, ice hockey, volleyball, orienteering, road cycling, soccer, team handball, and wrestling competing at a national elite level in Norway acted as the participants in the study. There were a total of 613 participants. The diagnostic criteria used to assess for PT were a history of pain localized to the lower patellar pole or insertion of the quadriceps tendon in connection with athletic activity as well as distinct palpation tenderness corresponding to the painful area. To assess the severity of the condition, the athletes also self-recorded their VISA scores. Previous PT was diagnosed based on history alone.

The overall prevalence of current PT was 14.2% (6% bilateral; 4.9% right knee; 3.3% left knee). In addition, 8.3% reported previous symptoms of PT affecting one or both legs, resulting in a prevalence of current or previous symptoms of 22.5%. Only 1 athlete with a diagnosis of current PT localized the pain to the quadriceps tendon insertion at the upper patellar pole, and the rest localized the pain to the patellar tendon. Figure 1 below demonstrates the prevalence of current and previous symptoms of PT across the nine sports. The results for female athletes are shown in the two upper bars with the remaining bars representing male athletes. Standard error is shown by the error bars.

As demonstrated by Figure 1 there is a high prevalence of PT in sports characterized by high-impact ballistic loading of the knee extensors (i.e. volleyball and basketball) and low prevalence in sports with low loads (i.e. cycling and orienteering) suggesting that there is a link between the prevalence of PT and total tendon load.

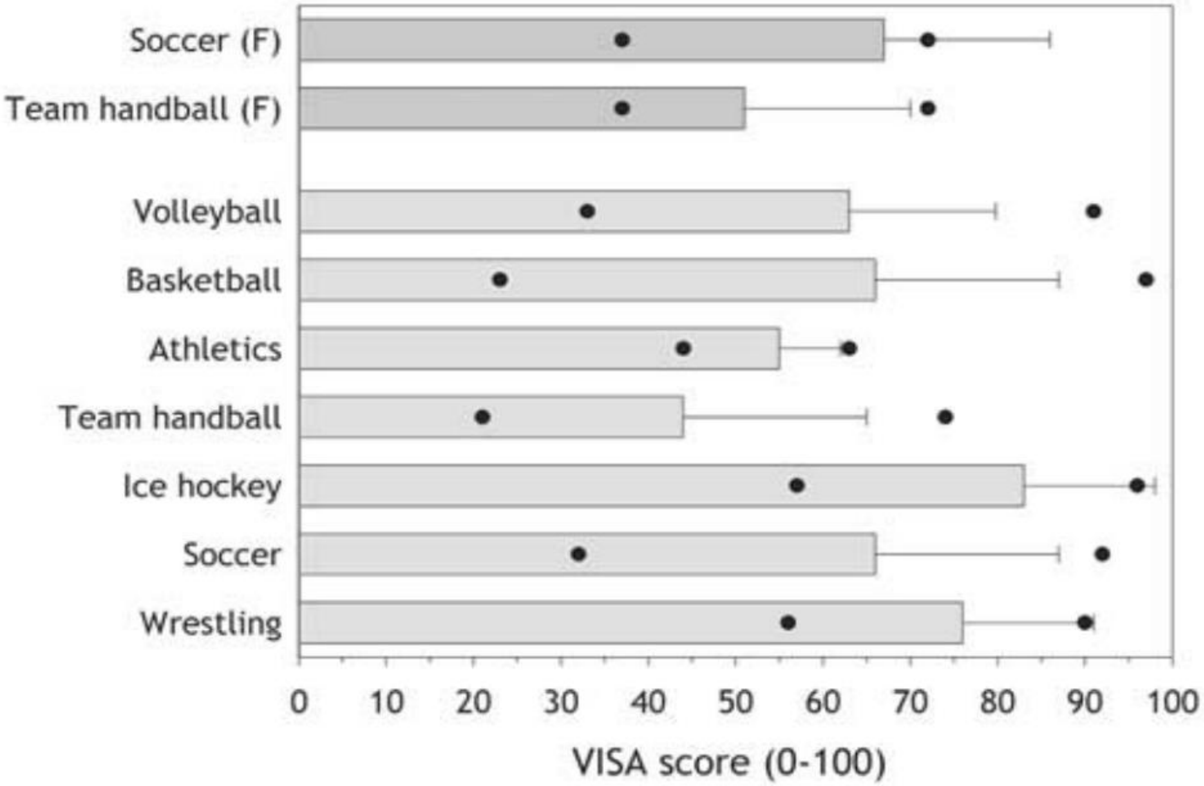
Figure 1 – Prevalence of current and previous symptoms of PT across the nine sports as outlined by Lian et al (2005)



The authors acknowledge that the total prevalence figure of 22.5% probably represents a minimum estimate due to a number of factors. Firstly, the athletes with the most serious problems who could not participate in training or competition were not included in the study and the number of athletes who were too disabled to is unknown. Also, an unknown number of athletes may have retired early because of PT, and some may have settled for a career at a lower level of performance because they could not tolerate the heavy training and competition load at the elite level. Thus, the elite samples we were able to study represent the survivors, and the true career prevalence is higher than the 22% reported here as an overall result across the sports included.

The mean duration of the symptoms was 32 months, with a mean VISA score of 64. Figure 2 shows the VISA scores for players with current symptoms of PT in the various sports groups. For players with bilateral symptoms, the lowest value was used. Again, the results for female athletes are shown in the two upper bars with the remaining bars representing male athletes No results are given for orienteering and cycling because there were no athletes with current symptoms in these groups. The mean and standard deviation are represented by the bars and error bars respectively. In addition, the black dots show the lowest and highest values in each group.

Figure 2 - VISA scores for players with current symptoms of PT in the various sports groups



Prevention Strategies

A cross-sectional study by Mendonca et al (2014) investigated the association of lower limb biomechanical factors to patellar tendon morphological abnormalities on ultrasound. 35 basketball and volleyball athletes acted as the participants in the study. The measurements taken included ankle dorsiflexion range, shank-forefoot alignment, iliotibial band flexibility, hip lateral rotators and abductors isometric strength, hip passive medial rotation range, patellar rotation and knee alignment in the frontal plane. Ultra-sonographic evaluation was also performed in both patellar tendons in longitudinal and transverse planes with patellar tendon hypo-echoic areas and thickness used as the main outcome measures.

The results indicated that high shank-forefoot varus alignment, ankle dorsiflexion restriction and iliotibial band flexible were associated with PT and therefore these biomechanical factors could be contribute to patellar tendon mechanical overload in athletes. With this in mind it is clear that assessing these biomechanical factors and correcting them when indicated is a key component in preventing this type of injury from occurring.

Findings from this study suggest that athletes who present with a VISA-P of less than 80 points are 5.4 times more likely to demonstrate patella tendon morphologic abnormalities on ultrasound (Mendonca et al 2014). Frequent screening of athletes may be a means of preventing PT however, aside from the aforementioned study, there is currently a lack of evidence in this area.

Given the effect of surface and training volume on PT, controlling the volume of jump training on hard playing surfaces is an important factor to consider for prevention of PT. This is because overloading the knee extensor mechanism beyond the capacity of the patellar tendon to regenerate will precipitate PT. Adequate progression of load in sports. Increase in physical load, repetition, intensity, frequency or duration greater than 10% per week has been demonstrated to contribute to PT (Rutland et al 2010). However, more research is needed to quantify how often and by what percentage the volume of jump training can be safely increased over a given time period (Reeser et al 2006).

Risk Factors

A systematic review by Worp et al (2011) set out to identify the risk factors associated with PT. Table 1 demonstrates the results of the systematic review. The “high score studies” and “low score studies” columns represent the number of studies for each risk factor that were of high quality and low quality respectively according to a methodological quality assessment list developed by Bongers et al. (2002) An average score of 41% was calculated across all of the studies assessed.

The “low positive effect” and “high positive effect” columns represent the number of studies that indicated a significant positive effect and non-significant effect respectively according to a method used by Ariëns et al for assessing strength of evidence. This method also provided the justification for the categories indicated in the level of evidence column.

None of the demographic variables were a risk factor for PT. Regarding anthropometrics, there was some evidence that weight, body mass index, waist-to-hip ratio, leg-length difference and arch height of the foot are risk factors for PT. None of the sports-related factors were identified as risk factors for PT. Of the strength/flexibility variables, there was some evidence quadriceps flexibility, hamstring flexibility, quadriceps strength and vertical jump performance were risk factors for PT.

Table 1 – Results of a systematic review by Worp et al (2011) investigating the risk factors associated with PT

Risk Factor	High Score Studies	Low Score Studies	High Positive Effect	Low Positive Effect	Level of Evidence
Demographics					
Age	1	4	0	0	Inconclusive
Gender	0	2	0	0	Inconclusive
Anthropometrics					
Height	2	4	0	0	Inconclusive
Weight	2	6	1	2	Some
BMI/Weight Height Ratio	1	2	1	1	Some
Waist and Hip Girth	1	1	1	0	Inconclusive
Waist-to-Hip Ratio	1	1	1	1	Some
Leg-Length Difference	1	2	0	2	Some
Longer Tibial Length to Stature	0	1	0	1	Inconclusive
Arch Height of Foot	0	1	0	1	Some
Sports Related Factors					
Playing Years	0	2	0	0	Inconclusive
Account of Training/Competition	0	6	0	3	Inconclusive
Strength Training	0	3	0	1	Inconclusive

Jump Training	0	2	0	0	Inconclusive
Playing Surface Volleyball	0	1	0	1	Inconclusive
Strength /Flexibility					
Quadriceps Flexibility	1	0	1	0	Some
Hamstring Flexibility	1	1	1	0	Some
Sit and Reach Scores	0	4	0	1	Inconclusive
Angle Dorsiflexion Range	0	2	0	1	Inconclusive
Quadriceps Strength	1	4	0	1	Some
Hamstrings Strength	1	1	0	0	Inconclusive
Vertical Jump Performance	0	5	0	3	Some

Clinical Presentation

The presentation of PT varies between individuals and there is no checklist available to specify when a diagnosis of PT is accurate. Thus clinicians must avail of knowledge of symptoms which may present along with their own clinical reasoning when assessing for a presentation of PT.

Subjective – Outlined below are certain subjective complaints which may suggest PT:

- Well localised knee pain related to activity levels
- Insidious and gradual onset of pain (Often precipitated by an increase in frequency or intensity of ballistic knee movements
- Initially pain may present as dull ache at the beginning or end of strenuous activity.
- Pain can progress to being present during the activity and progress to impairing performance.
- May be a constant ache at rest/during the night.
- Pain with sustained sitting and when ascending/descending stairs (Warden and Bruckner 2003)

Objective – Outlined below are certain objective findings which may suggest PT

- Tenderness of patellar tendon on palpation.
- Thickening of tendon
- Reduced muscle bulk and strength (Quadriceps and Gastrocs)
- Decline (30 degree) squat for symptom reproduction
- Positive “Passive Flexion-Extension sign” and “Standing Active Quadriceps Sign” (Rath et al 2010)
- Knee pain at least one of jumping/landing, running or changing direction (Crossley et al 2007)
- A VISA score, less than 80 (Warden et al 2007)

Diagnosis

While there is no definitive test to diagnose PT, clinicians must base their diagnosis on the Subjective and Objective findings on assessment, the use of validated outcome measures (e.g. VISA) and the use of imaging. Of the imaging tools available, ultrasound (US) and magnetic resonance imaging (MRI) are two of the most commonly utilized. A study carried out by Warden et al (2007) compared the accuracy of Grey Scale US, Colour Doppler US and MRI in diagnosing PT. The accuracy of these tools was found to be 83%, 83% and 70% respectively. Both the GS US and CD US demonstrated greater levels of sensitivity (confirming presence of symptoms) and specificity (ability to confirm when PT was not clinically diagnosed) when compared against MRI. Therefore the use of GS US and CD US is recommended when used in conjunction with other clinical signs and symptoms of PT.

Differential Diagnosis

A study by Jonsson (2009) identified a number of differential diagnoses with regard to PT. There are a number of other anatomical structures which are located near the patellar tendon and because of this incorrect diagnoses can sometimes occur. While pain is usually well localised to the tendon in tendinopathy, if diffuse pain symptoms are present other diagnoses should be suspected. It is essential to firstly exclude patella-femoral pain before proceeding to consider other possible differential diagnoses:

- It is difficult on clinical examination to tell the difference between chrondopathology of the inferior pole of the patella and tendon pain (Cook et al 2001) (Alfredson et al 2005).
- Dupont et al (1997) state that plica formations can cause symptoms of pain as well as snapping or popping of the patellofemoral joint.
- A more rare condition that can be a differential diagnosis with regard to PT is impingement of the infrapatellar fat pad (Kumar et al 2007).
- Patellofemoral pain syndrome usually presents as pain in the posteromedial aspect of the patella (Dixit et al 2007). Patients may also report feeling of giving way or patellar instability which is an uncommon complaint of those presenting with PT (Dixit et al 2007).
- It can be difficult to differentiate a partial patellar tendon rupture from PT. However they can often be identified as they usually occur in relation to high impact activities in athletes or after a sudden blow to the tendon.
- Osgood-Schlatter syndrome is an inflammation of the bone and cartilage where the patellar tendon attaches to the tibia. This condition usually occurs in adolescents during a growth spurt and often with the added factor of high level activity participation (Whitmore 2013)

Outcome Measures

A wide variety of outcome measures are utilised within the research pertaining to PT. Perhaps among the most noteworthy are the VISA-P, VAS and jump height.

VISA–P (Appendix)

The Victorian Institute of Sports (Australia) developed the VISA-P scale (Visentini et al 1998) which consists of eight items and is a self-administered outcome measure. It has been established as a valid and reliable outcome measure used to establish the severity of PT (Khan et al 1998, Khan et al 1999) and has become the most widely used patient reported outcome measure to assess changes in athletes with PT (Kountouris and Cook 2007). The self-administered questionnaire comprises of 8 questions with a non-symptomatic individual scoring a maximum of 100.

A score below 80 indicates the potential presence of PT (Warden et al 2007). Commonly athletes with PT would record a score of 50-80 (Young et al 2005). Six items rate pain level during daily activities and functional tests on a numeric pain-rating scale (0–10) and two items provide information on sporting participation. A study by Hernandez-Sanchez et al (2014) estimated that the minimal clinical important difference for the VISA-P scale among athletes with chronic PT is a change greater than 13 points or an improvement of 15.4–27% of inverted baseline scores.

VAS

This is a simple and frequently used measure for assessing intensity of pain. This valid and reliable measure (Joyce et al 1975, Huskisson 1974, Beery and Iiusskinson 1972) in which the patient is asked to mark the intensity of pain on a 10cm straight line. The further right the patient marks, the greater intensity of pain felt.

Vertical Counter Movement Jump Height (CMJ Jump)

This is a functional assessment commonly used in the literature to assess pre and post intervention performance. Participants are asked to stand in a stationary postion with both hands on the iliac crests; from this position the participant bends their knee(s) to 90 and performs a maximal jump, the height of which is recorded. Some studies performed this assessment on a contact mat which measured flight time and calculated vertical displacement of centre of gravity from this (Visnes et al 2005). Others analysed the displacement of reflective markers placed on the participants to determine jump height (Romero Rodriguez et al 2011).

Treatment

The majority of the literature pertaining to PT focuses on the area of treatment and establishing the most effective intervention when combating PT. Exercise therapy (ET), extra-corporeal shockwave therapy (ECST), Platelet-rich Plasma injection (PRP) and surgical intervention are the dominant treatments in the literature at present, with ET and surgery being the best supported.

Exercise Therapy

Under the open ended title of exercise therapy (ET) lies a vast number of potential treatments. Eccentric, concentric-eccentric, isometric and heavy slow resistance (HSR) are all methods of ET currently being explored.

Eccentric

Currently eccentric exercise is the most popular treatment option for PT, with the Alfredson model for Achilles tendinopathy commonly being adjusted to fit PT. The Alfredson model consists of 3 sets of 15 repetitions of eccentric exercise being performed every day (Young et al 2005). An exercise which is key to this model is the decline squat which enables eccentric load being placed on the patellar tendon.

A study by Young et al (2005) compared the Alfredson model of eccentric exercise against the Stanish and Curwin model in two groups of elite volleyball athletes. The Stanish and Curwin model of exercise emphasises squatting exercise on flat surface however the muscle activation is eccentric and concentric and focuses on increasing speed and rapid deceleration during the eccentric portion of the squat. With this model 3 sets of 10 reps are completed daily. Results found that both groups improved significantly from baseline at 12 weeks and 12 months with no between group differences detected (VISA, VAS). The groups did differ however in terms of the likelihood of attaining a clinically improvement in VISA scores (20 points) with the decline group demonstrating 97% likelihood versus 47% in the step squat group.

A review paper by Visnes et al (2007) also looked at eccentric exercise, while exploring different eccentric protocols along with comparisons against concentric exercise, surgical intervention and ultrasound. Eccentric exercise alone demonstrated similar significant improvements when compared against surgical intervention and eccentric exercise based rehab. One of the studies in this review by Jonsson et al (2005) compared concentric exercise and eccentric exercise on a decline board and reported significant improvements in VISA, VAS and patient satisfaction. The randomised study aimed to compare these treatment options in a group of athletes who were taken out of their athletic activity for the first 6 weeks of treatment.

Nineteen patellar tendons from fifteen patients with a long duration (mean 17.4 months) of pain from the proximal patellar tendon were included in the study. The inclusion criteria were pain in the proximal patellar tendon during or after patellar tendon loading activity, tenderness in the proximal patellar tendon during palpation, and structural tendon changes together with neovascularisation in the proximal patellar tendon on ultrasound. The starting position for the eccentric quadriceps training was standing on the 25° decline board with the entire body weight on the injured leg. From that position the knee was slowly flexed to 70°. To return to the starting position, the other leg, or, if there were bilateral problems, the arms, were used. Concentric quadriceps activity was avoided as much as possible. The procedure was the same for the concentric group other than the mode of contraction. Benefits were maintained in the eccentric group while the concentric group all needed further intervention (schlerosing injections/surgery).

A study by Dimitrios et al (2012) investigated the effectiveness of eccentric training and eccentric training with static stretching exercises in isolation for the management of PT. The eccentric training was the same for both groups. The subjects carried out three sets of 15 repetitions of unilateral squat on a 25° decline board. The squat was performed at a slow speed at every treatment session with the patients counting to 30 during each squat. The results demonstrated that eccentric training combined with static stretching exercises produced a larger effect both immediately after treatment and six months after the end of the treatment compared with eccentric training in isolation. Table 2 demonstrates the results for both groups at baseline, end of treatment (week 4) and follow up (week 24). The values represent the mean VISA-P scores of the subjects at each time point. The authors carried out a one-way ANOVA on the change in VISA-P from baseline and found that the results for both week 4 and week 24 reached statistical significance.

Table 2 – Table representing of results of study by Dimitrios et al (2012). Mean values for VISA-P scores are given along with 95% confidence intervals in brackets.

Intervention	Baseline	Week 4 (Change from Baseline)	Week 24 (Change from Baseline)
Eccentric training + static stretching	44 (31-58)	86 (70-94)	94 (75-100)
Eccentric training alone	46 (33-60)	74 (58-82)	77 (68-84)

These results demonstrate that eccentric training of the patellar tendon combined with static stretching exercises of the quadriceps and hamstrings is superior to eccentric training alone in non-athletes with PT aged between 18 and 30 years in terms of reducing pain and improving function.

A study by Frohm et al 2007 set out to compare the efficacy and safety of two eccentric rehabilitation protocols for patients with symptomatic PT. A new eccentric overload training device was compared with the present standard eccentric rehabilitation programme on a decline board. The eccentric overload training group used the Bromsman eccentric overload training device while the standard eccentric group used the one-legged eccentric training according to Curwin. All 20 subjects completed the 12-week intervention with there being no significant differences between the baseline characteristics of the groups. The main outcome measures used included the VISA-P and isokinetic strength training.

Regarding the VISA-P both groups improved significantly during the treatment period of 12 weeks ($p<0.001$ for each group). The eccentric overload training group increased from a median of 49 to 86 points, whereas the standard eccentric rehabilitation increased from a median of 36 to 75 points. There were no significant differences between the study groups at any time during the treatment. As for Isokinetic strength testing, at baseline the symptomatic leg in both groups was weaker than the asymptomatic one but there was a significant increase in extensor torque after treatment either leg in either group. After a 3-month rehabilitation period, most patients could be regarded as improved enough to be able to return to training and sports and there were no serious side effects were detected in either group. The results demonstrated that in patients with PT pain, two-legged eccentric overload training twice per week, using the Bromsman device was as efficient and safe as the present standard daily eccentric one-legged rehabilitation-training regimen using a decline board.

A single-blind randomized controlled trial by Kongsgaard et al (2009) investigated the clinical, structural and functional effects of peri-tendinous corticosteroid injections (CORT), eccentric decline squat training (ECC) and heavy slow resistance training (HSR) in PT. The study was conducted to compare the three management options in addition to investigating some of the associated underlying mechanisms of the three different management approaches.

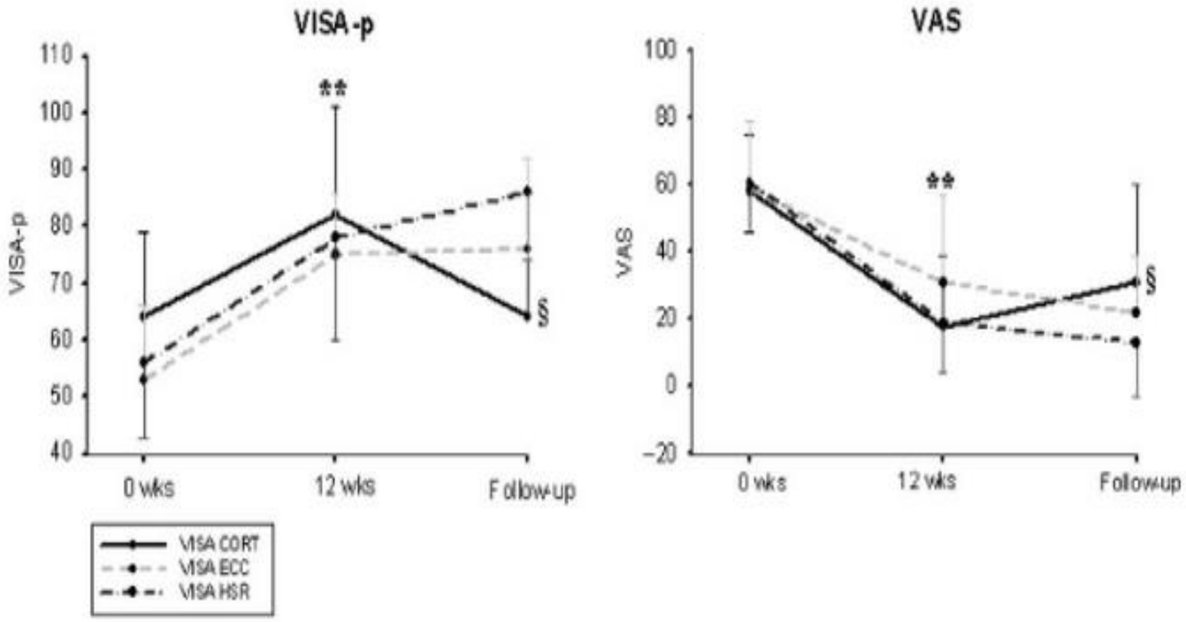
The participants were 52 recreational male athletes diagnosed with chronic PT. An experienced physician confirmed the diagnosis based on defined clinical findings including a pain duration of 43 months, local anterior–posterior thickening of the tendon of at least 1 mm compared with the mid-tendon level on ultrasound, and a hypo-echoic area and presence of a colour Doppler signal within the hypo-echoic area. The main outcome measures used were the VISA-P and VAS.

The results demonstrated that VISA-P and VAS scores improved significantly and similarly in all groups from baseline to 12 weeks. The VISA-P and VAS scores decreased in CORT and were unchanged in ECC and HSR from week 12 to the half-year follow-up. The relative VISA-P improvement from baseline to the half-year follow-up was higher in HSR and ECC than CORT. The relative improvement in VAS from baseline to the half-year follow-up was significantly greater in HSR compared with CORT. At 12 weeks, nine CORT (75%), five ECC (42%) and nine HSR subjects (70%) were satisfied with their clinical outcome. Four CORT (36% of responders), two ECC (22% of responders) and eight HSR subjects (73% of responders) were satisfied at the half-year follow-up. This distribution differed between groups, with HSR being the most satisfied.

Figure 3 shows the VISA-P and VAS scores at baseline (0 weeks), after the treatment intervention (12 weeks) and at the half-year follow-up (follow-up) for the three intervention groups. The values shown are means with the error bars representing standard deviation. The

"**" symbol indicates scores that were significantly different from baseline (p<0.01), while the "§" symbol indicates scores that were significantly different from 12 weeks (p<0.05).

Figure 3 – Graph representing results of study by Kongsgaard et al (2009)



The authors concluded that while CORT has good short-term effects the long-term clinical effects are poor in the treatment of PT. HSR has good short-term and long-term clinical effects accompanied by pathology improvement and increased collagen turnover.

Decline eccentric squat appears to be the most beneficial eccentric exercise reported in the literature. When compared against flat eccentric squats a significantly greater improvement was reported on VAS and return to sports rates in the decline group. The final paper in the review compared eccentric exercise versus pulsed ultrasound and versus transverse frictions with "significantly" positive improvements in eccentric group versus the other two groups. However no validated outcome measure was used, thereby limiting the validity of the results.

Injection Therapy

A comprehensive review study undertaken by Van Ark et al (2011) explored a number of injection therapies currently used in the treatment of PT.

- Steroid Injections

The three studies which explored this form of injection therapy were of the greatest quality of the papers included in the review. All studies reported significant improvements in the short term in outcomes such as pressure pain, VAS and VISA-P, however very poor long term benefits reported.

One study found that, when compared against Aprotinin injection (Prevents breakdown of clots), steroid injections were reported subjectively by patients to have poorer symptom reduction and poorer return to sport rate. Another study, mentioned earlier in our booklet by Kongsgaard et al (2009), reported that steroid injections only provided short term relief when compared against eccentric and HSR exercise. While the exercise groups demonstrated long term benefits in treating PT.

- Sclerosis Injection

This intervention aims to target and destroy neovessals and accompanying neural ingrowth which may result in pain in PT. In a cross-sectional study carried out without a control group, this method of intervention reported a significant decrease in pain during activity (Alfredson and Ohberg 2005). Another study, this time using a placebo injection control group, reported significant improvements in VISA-P, knee function and pain at 12 months (Hoksrud et al 2006). While this appears to be a promising treatment intervention, there is a relative paucity of literature in the area. Therefore more research is needed before this treatment can be advocated.

- Plasma-Rich Platelet Injection (PRP)

This injection is prepared from autologous blood and contains a number of growth factors. Growth factor has previously shown application in tissue healing, hence its attempted application in PT. All three studies concluded that PRP was safe and demonstrated promising result; however, these studies are among the poorest quality in the review. Lack of a control group and use of an inappropriate control group are some of the areas lacking in these studies. The review concluded that more research is needed in this area.

With this in mind, in a more recent study by Charousset et al (2014) it was set out to evaluate clinical and radiological outcomes of three consecutive ultrasound guided platelet rich plasma (PRP) injections for the treatment of chronic PT in athletes. Patients were included if they had clinical symptoms including anterior chronic knee pain, tenderness at the inferior pole of the patella and morphological signs of chronic PT. Twenty-eight patients were included in the study. Regarding outcome measures, the VISA-P score, VAS for pain, and Lysholm knee scale were used for clinical evaluation after return to practice sports. To evaluate tendon healing, magnetic resonance imaging was performed at one and three months after the procedure.

Table 3 shows the results of the three outcome measures in question prior to the injections and at the two year follow up with the statistical analysis indicating the significance of the results. The results demonstrated that three ultrasound guided injections of PRP significantly improved function. In fact, of all athletes that had failed previous non-operative treatment for at least four months (mean of 18 months), 75% were able to return to their pre-symptom sporting level after a mean period of three months, and this sporting level was maintained until the two year follow-up. A complete repair of the tendon was confirmed by the three month MRI in 57% of patients.

Table 3 – Table demonstrating results of study by Charousset et al (2014)

Comparison of Clinical Outcomes Before the Procedure and at the 2-Year Follow-up

Outcome Measure	Preprocedure	2-Year Follow-up	*P* Value
Lysholm score	60 (40-70)	96 (70-100)	<.001
VISA-P score	39 (28-60)	94 (60-100)	<.001
VAS	7 (4-8)	0.8 (0-3)	<.0001

The authors concluded that this conservative procedure is an alternative treatment to surgery, which has allowed only 50% to 70% of the treated patients to return to a pre-symptom sporting level.

Electrotherapy

- Extracorporeal Shockwave Therapy (ESWT)

ESWT is a non-invasive and safe intervention, originally used in urology to treat kidney stones. Recently ESWT has begun to be applied in PT with both analgesic and stimulating effect on tissue being suggested mechanisms of intervention.

A review paper carried out by van Leeuwen et al (2009) looked at 7 different studies exploring ESWT. ESWT was compared against placebo, conservative treatment and surgery. Of the three studies comparing against placebo, one study did not use blinding of the participants. While this study found good results in VAS and functional ability, the validity of these results is poor secondary to the placebo groups awareness of receiving a sham treatment. The remaining two placebo studies found that ESWT had a positive impact on pain and VISA-P, however no long term follow up was included and very small population sizes were used.

When compared against surgery, no significant improvements in VISA-P or VAS was noted in either group at baseline or at the 2 year follow-up. However the surgical group did have a significantly longer lay-off from work. When compared against conservative treatment however, a single study demonstrated significantly greater in ESWT group in terms of VAS, VISA-P and subjective knee function. While the literature is quite varied in this area, the overall picture created is that ESWT is a mostly minimally effective treatment.

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7. Are you currently undertaking all aspects of normal training or activity?

0	☐	No. Not at all.
4	☐	Modified training or activity.
7	☐	Full training / competition but not at same level as when symptoms began.
10	☐	Competing at the same level as symptoms began.

8. This question has 3 parts - please answer one part only

- If you have no pain while being active or playing sport → answer **Q8a only**.
- If you have pain while active or playing sport but it doesn't stop you from training → answer **Q8b only**.
- If you have pain that stops you from being active or playing sport → answer **Q8c only**.

8a. If you have no pain while playing sport, for how long do you train?

0 – 20 mins	20 – 40 mins	40 – 60 mins	60 – 90 mins	> 90 mins
☐	☐	☐	☐	☐
6	12	18	24	30

8b. If you have some pain while playing sport, but it does not stop you from completing your training, for how long can you train?

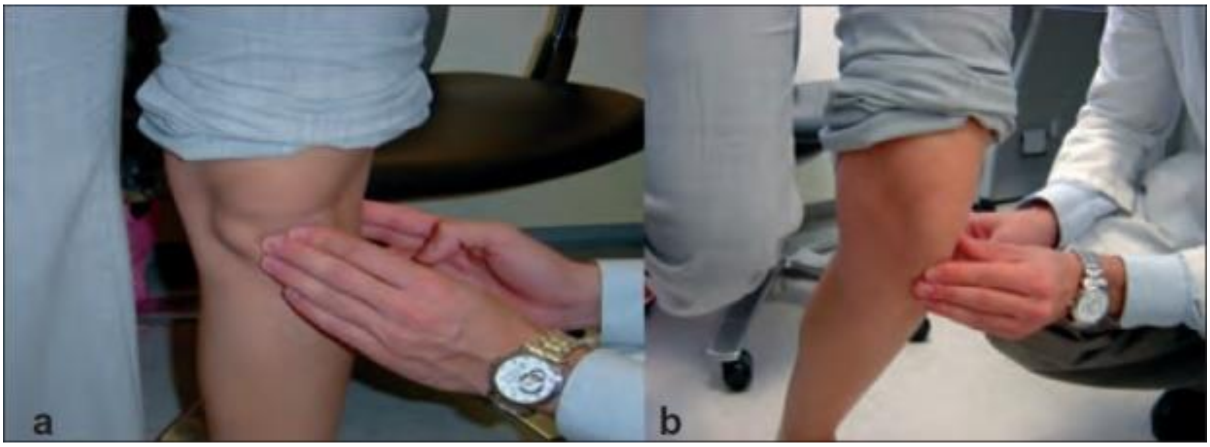
0 – 15 mins	15 – 30 mins	30 – 45 mins	45 – 60 mins	> 60 mins
☐	☐	☐	☐	☐
0	5	10	15	20

8c. If you have pain that stops you from playing sport, for how long can you train?

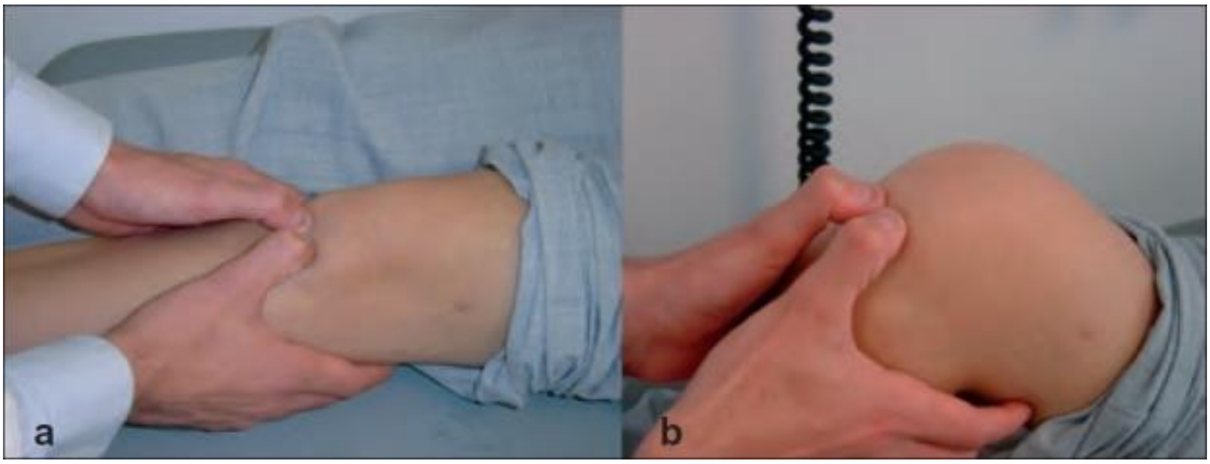
Nil	0 – 10 mins	10 – 20 mins	20 – 30 mins	> 30 mins
☐	☐	☐	☐	☐
0	2	5	7	10

TOTAL VISA SCORE ☐

1. Passive Flexion Extension Sign - a) Palpation of the patellar tendon in passive extension (b) Palpation of the patellar tendon in 90° flexion



2. Standing Active Quadriceps Sign - (a) Standing active quadriceps test, weight bearing in full extension (b) Standing active quadriceps test, weight bearing in 30° of flexion



In both tests the maximum point of tenderness is palpated in A and B. A positive test is if tenderness on palpation is reduced in B when compared against A. (Rath et al 2010).