

FACT SHEET

The effect of shockwave on Patella tendinopathy

INTRODUCTION

Definition(1)

- Includes tendinopathy anywhere along the extensor mechanism of the knee from the quadriceps tendon to the attachment of the patellar tendon on the tuberositas tibiae, but is most commonly localized to the distal patella part
- Also referred to as jumper's knee
- The patellar tendon becomes irritated after repeated jumps

Occurrence(1)

- No unusual condition
- Particularly common among athletes
 - In volleyball, prevalence is stated at 40 %
 - At the elite level in football, the prevalence is also high

METHOD

We searched PubMed with the following search string:

extracorporeal AND shock AND wave OR ESWT OR shockwave AND patella AND tendinopathy OR jumpers AND knee Filters: Meta-Analysis, Review, Systematic Review, in the last 5 years, Humans, English

7 articles were found. 6 articles are excluded, as they do not deal with the subject but describe biomechanics, injections, surgical interventions, psychological aspects regarding jumper's knee, prophylaxis and winter sports injuries among the female elite.

Then only one left from 2018, and we therefore chose to investigate "similar articles":

Andriolo et al. Nonsurgical Treatments of Patellar Tendinopathy: Multiple Injections of Platelet-Rich Plasma Are a Suitable Option: A Systematic Review and Meta-analysis (2)

In this search, we found 2 newer meta-analyses, and they were retrieved for review.

Challoumas et al. Management of patellar tendinopathy: a systematic review and network meta- analysis of randomised studies (3)

Stania et al. Treatment of Jumper's Knee with Extracorporeal Shockwave Therapy: A Systematic Review and Meta-Analysis (4)

After having closely read these 2 studies, Stania et al. were chosen as they specifically deal with the effect of ESWT.

RESULTS

Below is an overview of the methods and effects of the included studies.

Stania et al. (4)				
7 studies included out of 192 possible studies	The treatment effect has been measured: Baseline 12 weeks Baseline, 16 weeks	6 studies with fESWT 1 studies with rESWT		Assessment:
155 included in intervention groups	Baseline, 1, 12, and after 22 weeks Baseline, 6, 12, and 24 weeks Baseline 2.6 and 12 months	1 bar = 0.1 mJ/mm ²		<ul style="list-style-type: none"> • Visual Analogue Scale (VAS) • VISA-P • Vertical jump test • Ultralydsscanning • Modified Blazina scale (functional assessment related to pain during specific sports activity) • Likert score (participant satisfaction) • Isokinetic Strength Measure • Dynamometer target (strength)
155 included in control groups	Baseline, 1,3,6 and 12 months	1MPa = 10 bar		

STUDY	DOSE	CONTROL GROUP	EFFECT	METHOD
Taunton et al. (fESWT)(5) 10 included	2000 pulses; 0.17 mJ/mm ² ; 3 to 5 treatments 1 week apart, (treatment 4 and 5 if no effect after 3)	A: ESWT B: sham ESWT	Significant differences in favour of the ESWT group in VISA-P: question 3 (non-weight-bearing extension - VAS) Question 6 (VAS one-legged jump x 10) Greatest improvement 3-4 weeks after the last treatment	Starting position not stated
Wang et al. (fESWT)(6) 50 included	1500 pulses; 0.18 mJ/mm ² ; 1 Treatment	A: ESWT B Conservative treatment. (heat/cold gaskets, cross-frictions, phonophoresis (the use of e.g. NSAID gel with ultrasonic beh), stretching exercises, eccentric exercises, strengthening exercises) (number of treatments or duration not stated)	Significant improvement in VISA-P., VAS, and knee mobility in group A after treatment.	Light activity for 4-6 weeks after. Back to sports / heavy activity after Starting position not stated

Zwerver et al. (fESWT)(7) 62 included	2000 pulses; 4 Hz; 0.1–0.58 mJ/mm ² ; 3 treatments, 1x per week for 3 weeks	A: ESWT B: sham ESWT	No difference between the groups. ESWT group improvement in pain 1 week after	Treatment within the season. (basketball, handball, volleyball) Lying back, slight flexion of the knee, most painful spot on the tendon is treated, treatment is focused anteriorly but also dorsally on the tendon by tilting the probe
Veltrano et al. (8) (fESWT) 46 included	2400 pulses; 0.17–0.25 mJ/mm ² ; 3 sessions with an interval between 48 and 72 hours	A: PRP injection B: ESWT	PRP showed significantly better results at 6 and 12 months of control (VISA-P, VAS and also in the Blazina scale after 12 months.	Starting position not described 2 weeks after treatment, training with progression begins
Thijs et al. (9) (fESWT) 52 included	1000 pulses; 4 Hz; 0.2 mJ/mm ² ; 3 sessions, once a week	A: ESWT+ eccentric training B: sham ESWT + eccentric training	No significant differences between the groups.	Most painful area is treated. Starting position not stated
Cheng et al. (rESWT) 51 included	2000 pulses; 9-12 Hz; 1.5 – 3 bars; (equivalent to 0.09-0.27 mJ/mm ²); 16 treatments 1 x a week	A: ESWT B: acupuncture, ultrasound therapy, microwave therapy (treatment with high-frequency electromagnetic waves)		
Lee et al. (5)(fESWT) 30 included	1500 pulses; 4 Hz; Beginning at 0.08 mJ/mm ² until the individual's maximum pain threshold; 6 treatments 1x a week	A: eccentric exercises + sham ESWT B: eccentric exercises + ESWT	Late mechanical properties are improved by eccentric training, and the inclusion of ESWT in the treatment does not promote this improvement	Treating most painful area of tendon found by palpation and participant feedback Lying on your back Knees in 30 degree flexion

The authors' own conclusion when comparing all the results found in the included studies:

“Extracorporeal shockwave therapy is a safe and non-invasive treatment for patellar tendinopathy. Contrary to surgical intervention, this form of therapy is not related to major complications or side effects; also, the patients do not need to take time off work.

However, our meta-analysis did not reveal significant differences between ESWT and control groups with respect to the VAS and VISA-P scores for long-term outcomes.

Hence, no definite conclusions on extracorporeal shockwave therapy efficacy for jumper's knee can be drawn.

There is a need for high-methodological-quality randomized clinical trials that may facilitate clear-cut recommendations regarding the methodology of ESWT “

CONCLUSION

Based on the meta-analysis and close reading of the individual studies, we cannot clearly state whether there is an indication for the use of ESWT in connection with the use of ESWT.

This is due to the low number of studies.

The methodology in the individual studies varies considerably.

They include participants ranging from recreational exercisers to elite participants

On the available material, therefore, there is so far no conclusive documentation for the use of ESWT, which is also the conclusion of a new Danish study by Krogh et al.(10) concluded that it is clinically still unclear whether ESWT can have an effect.

A pilot study by Williams et al. (11) researchers who have studied ESWT treatment on the patellar tendon, and looked at which patients have not had an effect of shockwave treatment, indicate that if the pathology is only found in the tendon, there is a greater chance of an effect of ESWT, compared to the tendons where the fat pad is involved. If the fat pad is involved, it suggests that arthroscopy could be better suited as treatment. It might therefore be relevant to scan the tendon with US to evaluate the pathology, as an MRI of all jumper's knees is probably unrealistic.

RECOMMENDATION

Dose fESWT: Lying on your back, knees flexed at 30 degrees, between 2000 and 2500 pulses, between 4 – 8 Hz, 0.08 – the patient's maximum pain threshold. 3 treatments 1 week apart

Dose rEWST: Lying on your back, knees flexed at 30 degrees, between 1500 and 2500 pulses, 9-12 Hz, 1.5 -3.0 bar, 3-5 treatments at 1 week intervals.

REFERENCES

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Search	Actions	Details	Query	Results	Time
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