

Football Medicine

MEETS THE UNIVERSE OF SPORT

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The *Speaker* at the conference will be **Prof. Dr. Karsten Knobloch, FACS**

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COMBINED EXTRACORPOREAL SHOCKWAVE THERAPY (ESWT) FOR PATELLA TENDINOPATHY IN GERMAN BUNDESLIGA

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Introduction

Soccer players suffer mainly from tendinopathies of the Achilles and the patella tendon as has been demonstrated in the UEFA Champions league study as the major overuse injury. Running exposure in a usual German Bundesliga match of 10-12 km, potential further games in the Champions league and/or the German cup, turf and shoes as external factors as well as for example genetic factors in Col5A1 and Col1A1 genes might predispose a given soccer player to these aforementioned tendinopathies. Treatment options like Platelet-Rich-Plasma (PRP) injections, polidocanol sclerosing or minimal-invasive scraping techniques often necessitate soccer players to rest and be out of competition for at least some weeks.

Extracorporeal Shockwave Therapy (ESWT) uses acoustic waves to elicit a protein response. The translation of the acoustic wave signal in a protein response is mediated by a mechanism called mechano-transduction. Beyond others, stem cell activation has been shown by focused ESWT recently. I sought to evaluate and report the clinical results of non-invasive combined ESWT on pain levels, ultrasound imaging and return to play for player availability in professional German Bundesliga soccer. Combined ESWT covers physically a broader energy spectrum (low to medium energy flux densities 0.03-0.25 mJ/mm²) as well as more frequencies (5-15 Hz) than a single radial or focused ESWT approach and thus exert additional effects than a single radial or focused ESWT approach.

Methods

Seventeen German Bundesliga soccer players from five different clubs (27.3±2.1years; 4 striker, 10 midfielder, 3 defenders, 184±9cm, BMI 22.1±1.8kg/m²) suffering from patella tendinopathy >4 weeks were included. All players were out of competition due to patella tendon pain (>5/10) during running exercises. Load modification, local cryotherapy, kinesiotaping and/or manual therapy as well as eccentric training were

without sustained beneficial effects beforehand. All players underwent both, conventional and Power Doppler ultrasound determining the size of tendon diameter as well as the amount and location of neovascularisation by PowerDoppler ultrasound (according to the Öhberg classification 0°-4°) to assess the extent of the patella tendon disease.

Combined ESWT was applied combining both ESWT technologies (STORZ Medical Ultra device, Tägerwilen, Switzerland), starting with focused ESWT at the point of tendon pain (2,000 impulses with 0.12-0.25 mJ/mm²) followed by regional radial ESWT around the tendon and at the quadriceps muscle for muscle detonation with different radial ESWT applicators (STORZ C15 and Di15, 10Hz, 3,000 impulses). These combined radial and focused ESWT sessions were performed on a weekly base with at mean four combined ESWT sessions (4.0±1.4 sessions). In between the ESWT sessions, players were in rehabilitation training in their clubs with running exposure pain-limited <5/10 on a visual analogue scale (VAS) and further conventional eccentric training.

Results

Patella tendon pain at exercise was reduced by 45% from VAS 6.2±2.1 to 3.4±1.0 at two weeks, by 73% from VAS 6.2±2.1 to 2.3±0.5 at four weeks and by 81% from VAS 6.2±2.1 to 1.3±0.3 after 12 weeks of treatment. No adverse effects were noted. Patella tendon diameter was reduced from 8.2±2.0 mm to 5.9±1.2 mm (by 28%) at 12 weeks as was the increased PowerDoppler blood flow (from Öhberg class 3.1±0.4 to 0.6±0.2 at 12 weeks). Return to play was achieved at 16±7 days. Within a three months follow-up period, no player had a recurrent time-loss injury of the patella tendon.

Conclusion

Combined radial and focused ESWT can reduce patella tendon pain, improve tendon ultrasound and allow early return to play within on average 16 days in patella tendinopathy in German Bundesliga soccer players when conventional treatment failed. No adverse effects of combined radial and focused shockwave therapy were noted.