



FAST BREAK

Publication for team medical personnel

Tendinopathy

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ISSUE 15

WELCOME to FAST BREAK!

Welcome to Fast Break, the official quarterly news bulletin of the FIBA Medical Commission. Our goal is to introduce our FIBA sports medicine and sports science community to newsworthy research topics and develop a community of practice among physicians and clinicians involved with basketball at every level of play across the globe.

We hope this publication will foster friendly communication and discussions within the world of basketball. We welcome and encourage your questions, comments, suggestions, and contributions to this publication.

MESSAGE FROM THE EDITOR

In medical school, the concept of evidence-based practice is heralded as the scientific manner to guide your practice of medicine. However, when you start to practice, you quickly learn that 'whatever is clinically true is not experimentally false' - meaning, we see time and again many things that work when evidence says it should not. The art of medicine is learning to let evidence guide you, but also to consider the patient's particulars, as well as your own experience.

In the early part of the 21 century, medical research outlined positive benefits from the use of topical nitroglycerine for improving chronic tendon pain and function. I must admit that I have used this as part of - I think - a successful treatment program for many years, gaining pain relief and return to sport activities for innumerable patients with chronic tendon pain. However, one of the selected publications of interest has published more recent (but possibly limited) data suggesting that topical nitroglycerine is not a more effective treatment option than placebo. Perhaps a better concept to be teaching our young medical colleagues is the concept of 'evidence guided medicine' that considers both the science – and art – of the practice of medicine. What do you think?

In this edition we are introducing a new segment entitled Edification from the Medical Commission and we will feature a commentary or editorial from a member of the medical commission each quarter. Instead of a message from the chair of the medical commission, we will be featuring Guest Editorials from an array of basketball and health care experts. This month, Jill Cook, PhD, will provide the inaugural guest editorial. Dr. Cook is a physical therapist from Australia who has done extensive research in the area of patellar tendinopathy, which was the theme of her doctoral work, and this edition of the Fast Break. Dr. Cook is an author in the first two selected publication of interest this month.

If you have any ideas for future topics to feature in this newsletter, or sections to add that will help you in your role in health care provision to basketball athletes, please email me.

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GUEST EDITORIAL

Jill Cook, PhD, is a physical therapist from Australia who has done extensive research in the area of patellar tendinopathy.

Patellar tendinopathy, defined as pain and dysfunction in the tendon, is a common injury in basketball due to the high levels of change of direction and jumping. It would be easy to think that we understand this condition, but despite much research there are a lot of unanswered questions about patellar tendon pain and unclear directions for treatment. Tendon pathology is complex and once degenerative pathology is present there is no capacity for the tendon to repair or normalise. Tendon pathology is a load accumulation condition, which is the more load you expose your tendon to the more likely you are to have pathology. The association with older age is through exposure to load rather than age being a cause of pathology. This is true for all tendons in the body, but it seems the patellar tendon is different.

There is recent evidence from longitudinal studies and young dancers and athletes have demonstrated that patellar tendon pathology can start in adolescence when the tendon is maturing (Rudavsky et al, Harris et al). The implications of this are profound, as load management in this critical period may prevent deterioration in tendon structure. Much more complex research is needed to offer a clear direction to those involved in management of tendinopathy in basketball players.

It would seem simple to diagnose patellar tendinopathy, usually tendon imaging and palpation tenderness are considered to confirm the diagnosis. However, these can both be positive in other anterior knee conditions such as patellofemoral pain. It is important that the assessment includes pain behaviour with increasing loads as well as localised pain with load. Treatment options for tendinopathy are often simplistic, directing treatments at the pathology with injection and adjunct therapies. This seems logical but tendon pathology can exist without ever being symptomatic and

treatments directed at the pathology cannot restore the tendon to normal structure or repair the tendon. As pain is not coming from the tendon pathology, then pain can persist after these treatments. Also, the need to have time off after treatments directed at the pathology result in a less load tolerant tendon. The outcomes after treatment to the pathology are poor and exercise based treatments have better efficacy.

Exercise treatments need to improve the mechanical stiffness of the tendon, the strength and endurance of the muscle attached to the tendon, the strength and endurance of the kinetic chain (i.e. the ankle and hip as well as the knee) and in more elite athletes use strategies to improve motor drive of the knee muscles. Research shows that a four-stage exercise program that incorporates heavy slow resistance training improves outcomes more than a standard eccentric exercise program (Breda et al).

In terms of managing an athlete with patellar tendinopathy, reducing high tendon loads such as decelerating and jumping during training can make the player more capable in games. Addressing the muscle strength is always the key intervention both in-season and in the off-season.

We have come a long way since the 1990's in our understanding of patellar tendinopathy, but it is clear that much more research is needed. Clinicians and those working with basketball players should be clear on the limited role of pathology in diagnosing and managing the condition and that a functional approach improves outcomes.

References:

Quantifying proximal patellar tendon changes during adolescence in elite ballet dancers, a 2-year study A Rudavsky, J. Cook, S. Docking SJMSS [Volume28_Issue11](#) 2018 2369-2374

Male and female adolescent athletes develop patellar tendon abnormalities at different maturity stages: a longitudinal study of 173 athletes. M. Harris, S. Edwards, E. Rio, M. Hannington, C. Bonello, S. Docking et al. JSMS S32, 2022

Effectiveness of progressive tendon-loading exercise therapy in patients with patellar tendinopathy. S J Breda, E H G Oei, J Zwerver, E Visser, E Waarsing, G Krestin, R de Vos. BJSM Volume 55, 9

SELECTED PUBLICATIONS OF INTEREST

Self-reported Jumpers' Knee is Common in Elite Basketball Athletes – But Is It All Patellar Tendonopathy?

Hannington M, Docking S, Cook J, Rio E, Edwards S. Physical Therapy in Sport, May 2020, 43:58-64.

OBJECTIVE: To describe the prevalence and pain location of self-reported tendinopathy and patellar tendon abnormality in a male elite basketball population. **DESIGN:** Cross-sectional. **SETTING:** Pre-season tournament. **PARTICIPANTS:** Sixty male athletes from the Australian National Basketball League. **MAIN OUTCOME MEASURES:** Self-reported patellar tendinopathy (PT) using the Oslo Sports Trauma Research Center Overuse Questionnaire (**OSTRC**). Pain location using pain mapping (dichotomised: focal/diffuse) and severity during the single leg decline squat. Ultrasound tissue characterisation scans of both patellar tendons. **RESULTS:** Thirteen participants (22.7%) self-reported PT. Only 3 who reported PT had localised inferior pole pain. Thirty athletes reported pain during the decline squat, 15 described focal pain: 10 diffuse pain (5 missing data). Those with diffuse pain had greater years played [Md = 21 (13-24), n=10 than focal pain (Md=12 (7-26), n=15), p= 0.0042, r=0.3]. Bilateral tendon abnormality was found in 45% of athletes and 15% had unilateral tendon abnormality.

Epidemiology of Patellar Tendinopathy in Athletes and the General Population: A Systematic Review and Meta-analysis.

Natarelli S, Lodi CMT, Cook, J, Deabate, L, Filardo G. Orthopaedic Journal of Sports Medicine, Jun2023; 11(6): 1-11.

BACKGROUND: Patellar tendinopathy (PT) mainly affects athletes who use the tendon for repeated energy storage and release activities. It can have a striking impact on athletes' careers, although data on its real prevalence and incidence are sparse. Research efforts should start from the results of reliable and updated epidemiological research to help better understand the impact of PT and underpin preventative measures. **PURPOSE:** To determine the prevalence and incidence of PT in athletes and the general population. **DESIGN:** Systematic review; Level of evidence, 3. **METHODS:** A systematic review of the literature was performed on January 17, 2022, and conducted according to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. The PubMed, Web of Science, and Wiley Cochrane Library databases were searched for epidemiological reports of any evidence level and clinical studies reporting data on the incidence or prevalence of PT for the 11,488 retrieved records. The primary endpoint was the prevalence and incidence of PT in sport-active patients. The secondary endpoints were PT prevalence and incidence in subgroups of athletes based on sex, age, sport type, and sport level played, as well as the same epidemiological measures in the general population. **RESULTS:** A total of 28 studies, with 28,171 participants, were selected and used for the qualitative and quantitative analysis. The general and athletes' populations reported an overall PT prevalence of 0.1% and 18.3%, respectively. In athletes, the prevalence of PT was 11.2% in women and 17% in men ($P = .070$). The prevalence of PT in athletes <18 years was 10.1%, while it was 21.3% in athletes ≥ 18 years ($P = .004$). The prevalence of PT was 6.1% in soccer players, 20.8% in basketball players, and 24.8% in volleyball players. Heterogeneous PT diagnostic approaches were observed. Higher prevalence values were found when PT diagnoses were made using patient-reported outcomes versus clinical evaluations ($P = .004$). **Conclusion:** This review demonstrated that PT is a common problem in the male and female sport-active

populations. There are twice as many athletes aged ≥ 18 years than there are < 18 years. Volleyball and basketball players are most affected by PT.

Effectiveness of topical glyceryl trinitrate in treatment of tendinopathy – systematic review and meta-analysis.

Saltychev M, Johansson J, Kemppi V, Juhola J. Disability & Rehabilitation. Oct2022, Vol. 44 Issue 20, p5804-5810.

The objective of this meta-analysis was to evaluate the evidence on the effectiveness of glycerin trinitrate (NTG) measured by pain severity. CENTRAL, MEDLINE, EMBASE, SCOPUS, and WEB of SCIENCE databases were searched in November 2020. The study selection was performed by two independent reviewers. The risk of systematic bias was assessed according to the Cochrane Collaboration's domain-based evaluation framework. Of 87 identified records, the meta-analysis was conducted on eight RCTs. When grouping by the type of tendinopathy and combining the estimates obtained from all available time points, the pooled standardized difference in means (SMD) was -0.80 (95% CI -1.34 to -0.26), and the number needed to treat 3.53 (95% upper confidence limit 12.4). When combining all the available data (all types of tendinopathy and all time points), the pooled SMD was -1.57 (95% CI -2.47 to -0.67). Overall heterogeneity was high. The risk of systematic bias was low in most of the selected studies. There is no evidence that NTG is more effective to reduce pain in tendinopathy than placebo. The effects of NTG were insignificant or borderline significant (probably insignificant clinically) concerning rotator cuff tendinopathy, Achilles tendinopathy, patellar tendinopathy, and lateral epicondylitis. A meta-analysis conducted on eight RCTs found no evidence that topical glycerin trinitrate is more effective to reduce pain in tendinitis than placebo. The effects were insignificant or borderline significant concerning rotator cuff tendinitis, Achilles tendinitis, patellar tendinitis, and lateral epicondylitis. The effects were independent of the dosage used.

Clinical Management of Patellar Tendinopathy.

Rosen AB, Wellsandt E, Nicola M, Tao MA. Journal of Athletic Training, July 2022, 57(7):621-631.

Patellar tendinopathy is a common yet misunderstood condition that afflicts a variety of patient populations. This lack of understanding affects the ability of clinicians to provide effective treatment interventions. Patients with tendinopathy often report long-term and low to moderate levels of pain, diminished flexibility, and reduced strength, as well as decreased physical function. Load-management strategies combined with exercise regimens focused on progressive tendon loading are the most effective treatment options for patients with patellar tendinopathy. This review will provide an evidence-based approach to patellar tendinopathy, including its pathoetiology, evaluation, and treatment strategies.

Impact of Patellar Tendinopathy on Isokinetic Knee Strength and Jumps in Professional Basketball Players.

Dauty M, Menu P. *Sensors* (14248220). Jul2021, Vol. 21 Issue 13, p4259-4259.

Patellar tendinopathy is characterized by tendon pain which may reduce the level of performance. This study's main aim was to compare isokinetic knee strength and jump performances at the start of the sport season between players with patellar tendinopathy and those without. Secondary aims were to assess the relationship between knee strength and jump function. Sixty-two professional basketball players were enrolled (mean age: 25.0 ± 4.0). All players performed knee isokinetic measurements, single leg countermovement jumps, and one leg hop tests. Correlations between knee strength and jump performances were examined. Twenty-four players declared a patellar tendinopathy and were compared to the 38 players without tendinopathy. The isokinetic quadriceps strength was lower in cases of patellar tendinopathy, and a camel's back curve was observed in 58% of the cases of patellar tendinopathy. However, jump performances were preserved. No link was found between quadriceps and hamstring limb symmetry indexes at 60 and 180°/s with jumps. This preseason screening enabled us to identify the absence of consequences of patellar tendinopathy in professional basketball players. Jump performances were not altered, possibly due to compensatory strategies.

Knee Movement Characteristics of Basketball Players in Landing Tasks Before Onset of Patellar Tendinopathy: A Prospective Study.

Feng R, Best TM, Wang L, Gao W, Liu H, Yu, B. *Frontiers in Sports and Active Living*, Open Access, Volume 47, July 2022, Article number 847945

BACKGROUND: Patellar tendinopathy is one of the most common injuries for basketball players. Jumping and landing movement patterns are potential risk factors for patellar tendinopathy. **HYPOTHESIS:** Male college basketball players who developed patellar tendinopathy would demonstrate greater peak vertical ground reaction force and knee flexion angular velocity, and smaller knee flexion range of motion and knee flexion angles at initial contact compared to players who did not develop the injury when performing a stop-jump task within a year prior to the onset of the injury. **STUDY DESIGN:** Prospective study. **METHODS:** Freshmen college basketball male players ($n = 181$) were recruited for three consecutive years and followed to the end of the third year of the study. Three-dimensional kinematic and kinetic data during a stop-jump task were collected for all participants at the beginning of each school year. Peak vertical ground reaction force, knee flexion angle at initial foot contact with the ground, range of motion for knee flexion and maximal knee flexion angular velocity during the landing phases of the stop-jump task were collected and calculated. Development of patellar tendinopathy was monitored in follow-up. Independent t-tests and Cohen's d effect sizes (ES) were used to compare movement patterns between injury and no injury groups for each school year. **RESULTS:** A total of 60 knees developed patellar tendinopathy. The injury groups had a significantly greater peak vertical ground reaction force in freshmen and junior years ($P = 0.020$, $ES = 0.13$; $P = 0.046$, $ES = 0.17$), smaller knee flexion ROM in freshmen year ($P = 0.002$, $ES = 0.10$), and greater maximum knee flexion angular velocity in freshmen and junior year ($P = 0.012$, $ES = 0.10$; $P = 0.001$, $ES = 0.35$) during the horizontal landing phase before the takeoff of the jump compared to the no injury groups. The injury groups also had a significantly smaller knee flexion angle at initial contact during vertical landing phase after the takeoff of the jump in freshmen and junior years ($P = 0.001$, $ES = 0.36$; $P = 0.001$; $ES = 0.37$) during vertical landing phase. **CONCLUSION:** Peak vertical

ground reaction force, knee flexion angle at initial foot contact, knee flexion range of motion, and maximum knee flexion angular velocity are associated with patellar tendinopathy among male college basketball players in different school years

Impact of Patellar Tendinopathy on Isokinetic Knee Strength and Jumps in Professional Basketball Players.

Dauty M, Menu P, Mesland O, Louguet B, Fouasson-Chailloux A. *Sensors*, Vol 21, Iss 13, p 4259 (2021)

Patellar tendinopathy is characterized by tendon pain which may reduce the level of performance. This study's main aim was to compare isokinetic knee strength and jump performances at the start of the sport season between players with patellar tendinopathy and those without. Secondary aims were to assess the relationship between knee strength and jump function. Sixty-two professional basketball players were enrolled (mean age: 25.0 ± 4.0). All players performed knee isokinetic measurements, single leg countermovement jumps, and one leg hop tests. Correlations between knee strength and jump performances were examined. Twenty-four players declared a patellar tendinopathy and were compared to the 38 players without tendinopathy. The isokinetic quadriceps strength was lower in cases of patellar tendinopathy, and a camel's back curve was observed in 58% of the cases of patellar tendinopathy. However, jump performances were preserved. No link was found between quadriceps and hamstring limb symmetry indexes at 60 and 180°/s with jumps. This preseason screening enabled us to identify the absence of consequences of patellar tendinopathy in professional basketball players. Jump performances were not altered, possibly due to compensatory strategies.

Jump-landing mechanics in patellar tendinopathy in elite youth basketballers.

Harris M, Schultz A, Drew MK, Rio E, Charlton P, Edwards S. *Scandinavian Journal of Medicine & Science in Sports*. Mar2020, Vol. 30 Issue 3, p540-548.

Patellar tendinopathy (PT) is a leading cause of morbidity in jump-landing athletes. Landing mechanics are identified as a factor associated with PT and/or patellar tendon abnormality. This study aimed to identify key jump-landing variables associated with PT. Thirty-six junior elite basketball players (men $n = 18$, women $n = 18$) were recruited from a Basketball Australia development camp. Three-dimensional (3D) kinematic and ground reaction force (GRF) data during a stop-jump task were collected as well as ultrasound scans of the patellar tendons and recall history of training load data. Mixed-model factorial analyses of variance were used to determine any significant between-group differences. Of the 23 participants included for statistical analyses, 11 had normal bilateral patellar tendons (controls) and eight reported PT (currently symptomatic); however, the four participants categorized as asymptomatic with patellar tendon abnormality on diagnostic imaging were excluded from statistical analyses due to their small sample size. Athletes with PT displayed a similar knee flexion angle at initial foot-ground contact (IC) and hip extension strategy during a stop-jump horizontal landing. Despite a similar kinematic technique, athletes with PT utilized a strategy of a longer stance duration phase from IC to peak force. This strategy did not lead to those athletes with PT decreasing their peak vertical GRF nor patellar tendon force during landing but enabled these athletes to land with a lower rate of loading (control 59.2 ± 39.3 vs. PT 29.4 ± 33.7 BW.s⁻¹). Athletes with PT still reported

significantly reduced training volume (control 4.9 ± 1.8 vs PT 1.8 ± 1.1 sessions/wk; total training time/wk control 2.4 ± 1.0 vs PT 1.4 ± 1.1 h/wk).

Multiparametric MRI of Knees in Collegiate Basketball Players: Associations With Morphological Abnormalities and Functional Deficits.

Nosrat C, Gao KT, Bhattacharjee R, Pedoia V, Koff MF, Gold GE, PotterHG, Majumdar S. Orthopaedic Journal of Sports Medicine, Dec2023; 11(12): 1-9.

Background: Rates of cartilage degeneration in asymptomatic elite basketball players are significantly higher compared with the general population due to excessive loads on the knee. Compositional quantitative magnetic resonance imaging (qMRI) techniques can identify local biochemical changes of macromolecules observed in cartilage degeneration. **Purpose/Hypothesis:** The purpose of this study was to utilize multiparametric qMRI to (1) quantify how T1 ρ and T2 relaxation times differ based on the presence of anatomic abnormalities and (2) correlate T1 ρ and T2 with self-reported functional deficits. It was hypothesized that prolonged relaxation times will be associated with knees with MRI-graded abnormalities and knees belonging to basketball players with greater self-reported functional deficits. **Study Design:** Cross-sectional study; Level of evidence, 3. **Methods:** A total of 75 knees from National Collegiate Athletic Association Division I basketball players (40 female, 35 male) were included in this multicenter study. All players completed the Knee injury and Osteoarthritis Outcome Score (KOOS) and had bilateral knee MRI scans taken. T1 ρ and T2 were calculated on a voxel-by-voxel basis. The cartilage surfaces were segmented into 6 compartments: lateral femoral condyle, lateral tibia, medial femoral condyle, medial tibia (MT), patella (PAT), and trochlea (TRO). Lesions from the MRI scans were graded for imaging abnormalities, and statistical parametric mapping was performed to study cross-sectional differences based on MRI scan grading of anatomic knee abnormalities. Pearson partial correlations between relaxation times and KOOS subscore values were computed, obtaining r value statistical parametric mappings and P value clusters. **Results:** Knees without patellar tendinosis displayed significantly higher T1 ρ in the PAT compared with those with patellar tendinosis (average percentage difference, 10.4%; $P = .02$). Significant prolongation of T1 ρ was observed in the MT, TRO, and PAT of knees without compared with those with quadriceps tendinosis (average percentage difference, 12.7%, 13.3%, and 13.4%, respectively; $P \leq .05$). A weak correlation was found between the KOOS-Symptoms subscale values and T1 ρ /T2. **Conclusion:** Certain tissues that bear the brunt of impact developed tendinosis but spared cartilage degeneration. Whereas participants reported minimal functional deficits, their high-impact activities resulted in structural damage that may lead to osteoarthritis after their collegiate careers.

Comparison between the effectiveness of decline squat exercise and forward lunges in athletes with patellar tendinopathy.

Kumar PGM, hara Subramanyan, PVH. Drug Invention Today. Jun2020, Vol. 14 Issue 6, p997-1000.

Background and Objective: Jumper's knee or patellar tendinopathy is one of the common overuse or repeated stress injury in sports. It implies functional stress overload while jumping, most commonly affecting the inferior pole of patella. The prevalence of jumper's knee is about 40-50%

among the elite basketball players. In basketball players, the patellar tendon is exposed to landing forces of 8 kN (equaling 6-8 times the body weight), compared with 0.5 kN during walking. Aim: The aim of the study was to evaluate the comparative effectiveness in patellar tendinopathy athletes who were receiving decline squat and forward lunges in the rehabilitation program. Materials and Methodology: It is a randomized clinical trial consisting of 30 basketball players with clinically diagnosed and imaging confirmed with patellar tendinopathy. They were randomly assigned into two groups consisting of 15 in each group. Group A received single-leg decline squat exercise at a decline board of 25° and progressing with load along with conventional physiotherapy and Group B received forward lunges on the flat floor and progressing with load along with conventional physiotherapy for three sets of 15 repetitions daily for 4 weeks. The outcome measurement tools used in this study is Victorian Institute of Sport Assessment (VISA) score and visual analog scale (VAS) for tendon pain with activity. Measures were taken throughout the intervention period of 4 weeks. Results: The result suggests that both the groups had a significant higher score at VISA and reduction in VAS score, but there will be more significant improvement seen in Group A. Conclusion: Both exercise protocols were alleviate pain and sporting functions in basketball players over 4 weeks. This study shows that the decline squat exercise protocol shows higher clinical gains during the rehabilitation of patellar tendinopathy in athletes.

Platelet-rich plasma for jumper's knee: a comprehensive review of efficacy, protocols, and future directions.

Bosco F, Gai V, Giustra F, Ghiri A, Cacciola G, Masse A. European Journal of Orthopaedic Surgery & Traumatology. 34(1):91-96, 2024.

Purpose: This comprehensive review evaluates the current state of platelet-rich plasma (PRP) treatment for jumper's knee, also known as patellar tendinopathy. The aim is to assess the efficacy of PRP as a therapeutic option compared to other available procedures, investigate the benefits and potential drawbacks of PRP infiltration, and provide insights into the optimal protocols for PRP preparation and administration.

Methods: A comprehensive literature search of English articles published up to June 2023 was conducted using PubMed and Scopus databases. Studies evaluating PRP for treating jumper's knee or patellar tendinopathy were analyzed to assess the current state of research in this field. Results: PRP has demonstrated promising results in promoting cellular remodeling and accelerating the healing process in the jumper's knee. It shows potential benefits in pain reduction, improved function, and accelerated recovery. However, the efficacy of PRP varies depending on patient characteristics, disease severity, and the specific administration methodology. Establishing standardized PRP preparation and administration protocols are necessary to optimize its effectiveness. Further research is needed to define appropriate patient selection criteria and refine the application of PRP therapy in patellar tendinopathy management. Conclusion: Jumper's knee is commonly managed conservatively, but there is a lack of consensus on further treatment options. PRP treatment holds promise in promoting tissue healing and repair. However, standardized protocols for PRP preparation and administration, as well as optimal dosage and number of injections, require further investigation to enhance its efficacy. Continued research efforts are necessary to ascertain the precise role of PRP and its refinement in the management of patellar tendinopathy.

Radial Extracorporeal Shockwave Therapy (rESWT) is Non-Superior to Minimal-Dose rESWT for Patients with Chronic Patella Tendinopathy: A Double-Blinded Randomized Controlled Trial.

Wheeler PC, Dudson C, Calver R. Muscles Ligaments Tendons Journal, Oct-Dec2023; 13(4): 531-540.

OBJECTIVE: Investigating outcomes for patients with chronic patella tendinopathy following radial extra-corporeal shockwave therapy (rESWT). **METHODS:** 22 patients with chronic patella tendinopathy were recruited for this DB-RCT from a single NHS Sports Medicine clinic. Participants were randomized equally to either 3 sessions of herapeutic-dose or minimal-dose rESWT respectively, alongside a structured and progressive home exercise program. **PARTICIPANTS:** 86% male, mean age 36.1 ± 12.5 years, symptom duration: 30.4 ± 32.7 months. Maximum 6-month follow-up, with interim data at 6-weeks, and 3-months. **RESULTS:** Improvements were seen in both groups, with an improvement of pain by about 35% across all time periods; these within-group improvements were seen at the interim (6-week, 3-month) and final (6-month) study period. However, no differences were seen between-groups at any time period, suggesting non-superiority of therapeutic over minimal-dose ESWT. There were no changes seen in markers of general health or levels of recorded physical activity. **CONCLUSIONS:** Small sample sizes limit firm conclusions, but this study has failed to show any superiority of rESWT compared to minimal-dose rESWT in patients with chronic patella tendinopathy, when performed alongside a structured home exercise program (progressive loading, flexibility, and balance components). The findings from this study do not support the current recommendations, that of three sessions of radial-ESWT performed at weekly intervals at the maximally comfortably tolerated dose. **STUDY REGISTRATION:**The study was registered prospectively on a publicly accessible database.

Efficacy of ultrasound guided dry needling as an adjunct to conventional physical therapy for patients with jumper's knee: A randomized controlled trial.

Sharif F, Ahmad A, Gilani SA, Bacha R, Hanif A, Arif MA. Frontiers in Surgery, Vol 9 (2022)

BackgroundJumper's knee is a degenerative condition among athletes, and it has been treated with conventional physical therapy (CPT). Ultrasound guided dry needling (USG-DN) is a relatively new technique to explore clinical outcomes in patients with tendinopathy.**Methods**This parallel group, single-blinded randomized controlled trial was carried out involving 94 athletes with clinically diagnosed jumper's knee, divided into an intervention group (USG-DN + CPT, n = 47) and a control group (CPT, n = 47). Participants received a 4-week programme; the intervention group received ultrasound guided patellar tendon dry needling (DN) in conjunction with CPT. The control group received only CPT. The visual analog scale (VAS), Victorian institute of sports assessment-Patellar tendinopathy (VISA-P) questionnaire, Lysholm scale, Knee injury and osteoarthritis outcome score (KOOS) and ultrasonographic features of patellar tendinopathy were evaluated at baseline, 1 week, 2 weeks, and 4 weeks. The data were analyzed through SPSS-26.**Results**The study found statistically significant differences.

Patellar Tendon Load Progression during Rehabilitation Exercises: Implications for the Treatment of Patellar Tendon Injuries.

Silva RS, Silbernagel KG, Song K, Hullfish TJ, Baxter JR, Sprague A. *Medicine and Science in Sports and Exercise*, 1 March 2024, 56(3):545-552.

PURPOSE: This study aimed to evaluate patellar tendon loading profiles (loading index, based on loading peak, loading impulse, and loading rate) of rehabilitation exercises to develop clinical guidelines to incrementally increase the rate and magnitude of patellar tendon loading during rehabilitation. **METHODS:** Twenty healthy adults (10 females/10 males, 25.9 ± 5.7 yr) performed 35 rehabilitation exercises, including different variations of squats, lunge, jumps, hops, landings, running, and sports specific tasks. Kinematic and kinetic data were collected, and a patellar tendon loading index was determined for each exercise using a weighted sum of loading peak, loading rate, and cumulative loading impulse. Then the exercises were ranked, according to the loading index, into tier 1 (loading index ≤ 0.33), tier 2 ($0.33 < \text{loading index} < 0.66$), and tier 3 (loading index ≥ 0.66). **RESULTS:** The single-leg decline squat showed the highest loading index (0.747). Other tier 3 exercises included single-leg forward hop (0.666), single-leg countermovement jump (0.711), and running cut (0.725). The Spanish squat was categorized as a tier 2 exercise (0.563), as was running (0.612), double-leg countermovement jump (0.610), single-leg drop vertical jump (0.599), single-leg full squat (0.580), double-leg drop vertical jump (0.563), lunge (0.471), double-leg full squat (0.428), single-leg 60° squat (0.411), and Bulgarian squat (0.406). Tier 1 exercises included 20 cm step up (0.187), 20 cm step down (0.288), 30 cm step up (0.321), and double-leg 60° squat (0.224). **CONCLUSIONS:** Three patellar tendon loading tiers were established based on a combination of loading peak, loading impulse, and loading rate. Clinicians may use these loading tiers as a guide to progressively increase patellar tendon loading during the rehabilitation of patients with patellar tendon disorders and after anterior cruciate ligament reconstruction using the bone–patellar tendon–bone graft.

Management of Patellar Tendinopathy Through Monitoring, Load Control, and Therapeutic Exercise: A Systematic Review.

Núñez-Martínez P, Hernández-Guillen D. *Journal of Sport Rehabilitation*. Mar2022, Vol. 31 Issue 3, p337-350

CONTEXT: Patellar tendinopathy presents with persistent tendon pain located in the lower pole of the patella and loss of function related to mechanical load. Although its pathogenesis is not completely clear, conservative treatment including exercise is the main intervention of patellar tendinopathy treatment. **OBJECTIVE:** To describe the efficacy of patellar tendinopathy management through therapeutic exercise, and control and monitoring of loads. Evidence acquisition: MEDLINE, WoS, Cochrane Plus, PEDro, and the gray literature were searched from inception to July 2021. Based on the PICO strategy, the inclusion criteria were clinical trials published in English or Spanish; outcomes of function, pain, and strength; patients with patellar tendinopathy with no age or gender limitations; using an active intervention; and at least a methodological quality equal to or greater than 3 points on the Jadad scale. All data were analyzed by 2 independent reviewers (P.N.-M. and D.H.-G.). Studies were qualitatively synthesized using a descriptive synthesis. The methodological quality and risk of bias assessment were performed with the PEDro and Jadad scale, respectively. Evidence synthesis: A total of 136 articles were identified, of which 12 met the eligibility criteria. All of them were

regarded as presenting a moderate risk of bias and their methodological quality was considered acceptable to good. Recovering patellar tendinopathy with therapeutic exercise seems to significantly improve function, pain, and strength after intervention and even lasted over time. **CONCLUSION:** A treatment based on load monitoring and physical exercise has proven to be effective in rehabilitating patellar tendinopathy, with positive results in the short and medium term.

This is a new segment for the Fast Break. Each quarter we will feature an editorial from a member of the FIBA Medical Commission on topics relevant to basketball.

Soft Tissue Injuries need PEACE and LOVE not POLICE'ing

Marni Wesner, MD, MA, CCFP(SEM), FCFP, Dip Sport Med
FIBA Medical Commission member

For decades, the hallmark of soft tissue injury first aid has recommended Ice, Compression, and Elevation (ICE). That evolved to Rest, Ice, Compression, and Elevation (RICE) and then Protection, Rest, Ice, Compression, and Elevation (PRICE) and finally Protection, Optimal loading, Ice, Compression, Elevation (POLICE). These principles serve well for immediate first aid, but the PRICE-POLICE concept does not consider or provide best practice medical care for the entire spectrum of rehabilitation of an injury. We now know that soft tissue injuries need PEACE and LOVE for best recovery.

I first met Blaise Dubois, BScPHT, in 2005 when we were both on the Team Canada health care team at the FISU games in Ismir, Turkey. As a runner, Blaise is not immune to soft tissue injury, and as a physical therapist, he helps innumerable athletes return to elite levels of sport. His approach to soft tissue injury management is enlightening. In 2019, Blaise and his physical therapy colleague Jean-Francois Esculier described a more comprehensive and wholistic approach to injury management that encompasses the fuller scope of soft tissue injury management, as well as considers the importance of the psychology of injury for the recovery process. Their approach is conceptualized with the anacronym PEACE and LOVE. (<https://doi.org/10.1136/bjsports-2019-101253>)

In the acute phase of injury management, the goal is to limit further harm and we should let PEACE guide soft tissue injury management:

P – Protection from further injury: limit motion for 1-3 days to minimize bleeding and further tissue harm, minimize prolonged rest as this compromises tissue strength. Let pain guide the cessation of protection.

E – Elevation of the injured limb promotes interstitial fluid flow out of injured tissues.

A – Avoid using anti-inflammatory medications; soft tissue injury recovery is dependent on the inflammatory phase of healing to stimulate the proliferative then maturation phases of collagen and tissue healing.

C – Compression helps limit swelling and bleeding into the injured tissue.

E – Education about the nature of injury and the healing/recovery process and expectations, and the benefits of an active approach to recovery. Passive modalities have insignificant effects on pain and function. Set appropriate and realistic goals and expectations for recovery.

After the acute phase of injury recovery has passed, soft tissue injuries need LOVE:

L – Loading the tissue and providing mechanical stress promotes tissue repair and remodeling, and enhances tendon, ligament and muscle capacity

O – Optimism fosters recovery and prognosis. Negative psychological factors can pose a barrier to recovery.

V – Vascularization of tissue is necessary for healing. Aerobic exercise promotes circulation and improves physical function.

E – Exercise helps restore mobility, strength and proprioception after injury.

So, instead of POLICE-ing injury, “give PEACE a chance because perhaps all soft tissue injuries need is LOVE.”

This infographic for your office use is reproduced with permission from Blaise Dubois: (<https://therunningclinic.com/runners/blog/how-is-peace-love-different-from-the-old-acronyms-ice-rice-price-or-police/>)



FROM THE HISTORY BOOK

Basketball was invented in 1891. In 1905, it became a permanent winter sport which means it is played during the winter season. This makes sense since James Naismith invented the game to keep youth active indoors during the long, cold North American winters.

This summer, Paris will host the Olympic Games for the third time (1900, 1924, 2024), but this will be the first time that basketball has been played in the Games in the 'City of Lights'.

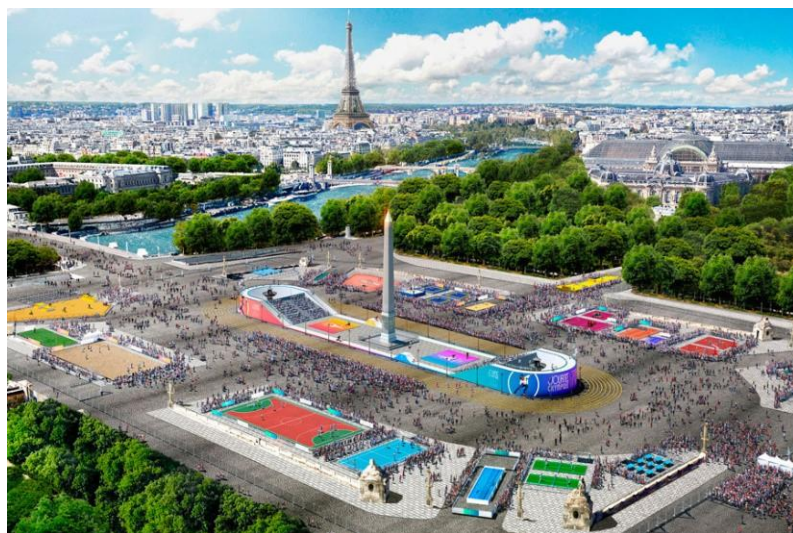
Basketball debuted as summer Olympic sport at the 1936 Games played in Berlin. This event featured 23 nations competing between Aug 7 and 14. The games were played on outdoor lawn and dirt tennis courts which posed a significant problem during inclement weather, making it impossible to dribble the ball.

The first ever Olympic basketball medals were awarded to USA (gold), Canada (silver) and Mexico (bronze).



(Image source: Wikipedia, site of the 1936 Olympic basketball event)

The 2024 Paris Olympics will also feature the 3x3 game, certain to be a spectacular event in the Place de la Concorde.



(Image source: Paris 2024 Organizing Committee)

SHARE YOUR PHOTOS

Please send us your funny, interesting, or remarkable basketball pictures that we can share with the medical and sport science basketball community.

Email: medical@FIBA.basketball



THE STUDENT'S CORNER

This space is intended for sport science and medical students, residents, and fellows to contribute to our knowledge and conversation.

Please encourage your students to contribute to the Fast Break on a topic of their choosing related to basketball injury, rehabilitation or sport science. The work published here is reviewed and approved for submission by the student's preceptor.

Unfortunately, no student submitted a contribution for this edition of the Fast Break.

NEWS AND NOTABLE FROM THE FIBA MEDICAL COMMISSION

Mark your calendar: the next FIBA Medical Commission webinar is entitled Team Stress – the Role of the Team Doctor, on Wednesday, June 26 at 08h00 Central European Time. This will be a case-based session addressing mental health and wellness for teams. This is a timely topic with many pinnacle events approaching such as the Olympic games and the U17 championship.

An invitation will be sent to all who are registered in our FIBA medical/health data base prior to the session. If you are not currently in the FIBA medical community database please forward your email address to medical@fiba.basketball. The meeting will be recorded and available to view on the FIBA website following the session.

Our guest experts for this session are Dr. Samanta McLeod and Dr. Ranjit Menon.

Dr McLeod (Ph.D.) is dually qualified in Sport and Exercise Psychology as well as Clinical Health Psychology; she is the founder and managing director of The SAM Centre. Over a 30-year career, Samantha has successfully combined private practice in multidisciplinary settings, with State and National-level elite and professional teams' consultancy, as well as clinical governance leadership roles and specialist academic positions. Samantha currently consults for AFL Richmond, the Australian Institute of Sport, and the Victorian Institute of Sport. Samantha played

elite-level basketball and was the inaugural Chair of the WNBL Franchise, Melbourne Boomers, Committee. Samantha has researched, published, and lectured in, sport psychology, sports medicine, including athletic injury risk and recovery as well as athlete chronic conditions. Her mission is to shift sports medicine towards a holistic, integrated, collaborative framework for high performance sport, and to enhance the wellbeing and performance of athletes, as well as the practitioners, upskilling them to thrive within, and when transitioning out of, sport.

Dr. Menon is an Australian sport psychiatrist who has worked in sport psychiatry for over a decade. He has treated athletes from a number of sporting codes including cricket, Australian rules football, basketball, rugby, athletics, tennis, golf, and hockey. He is internationally recognized as a leading sport psychiatrist and has published a number of articles in peer reviewed journals on topics related to mental healthcare in high performance environments. He is an external consultant to many domestic sporting bodies including the AFL, Cricket Australia, Tennis Australia, and the Australian Institute of Sport, as well as international organizations such as ICC, ATP, WTA and FIBA. He is the Vice President of the International Society for Sports Psychiatry.

BASKETBALL CME OPPORTUNITIES

A listing of varied sport medicine and basketball meetings and conferences you may be interested in attending:

A listing of all the American Medical Society for Sports Medicine conferences can be found here:

<https://www.amssm.org/Conferences.php>

The South African Sports Medicine Association hosts several events throughout the year:

<https://www.sasma.org.za/events/>

The Society for Sport Exercise and Performance Psychology website lists a number of mental performance educational opportunities:

<https://www.apadivisions.org/division-47/about/resources/conferences>

Conference Locate.com allows you to search globally for conferences on an extensive array of medical topics:

<https://www.clocate.com>

A listing of exercise physiology conferences across the world can be found here:

<https://conferenceindex.org/conferences/exercise-physiology>

And for something a little different:

<https://unconventional.com.au/conferences/south-america/medical-conferences/2024/>

If you prefer self-study to earn CME credits while you are on vacation, have a look at these options:

https://www.americanseminar.com/?gad_source=1&gclid=Cj0KCQjw5cOwBhCiARIsAJ5njuavUXdPzpk4LULqCfKx1tp5tulliGrFPaki0M-Hjk6RjD6Vb4EGtGQaAtMTEALw_wcB

Date	Location	Event website
July 2-5, 2024	Glasgow (Scotland)	European College of Sport Science
Sept 12-15, 2024	Cape Town	World Physical Therapy Africa Region Congress

	(South Africa)	
Sept 30-Oct 1, 2024	London (England)	<u>International Conference on Physiotherapy, Physical Rehabilitation and Sports Medicine</u>
Oct 15-18, 2024	Montreal (Canada)	<u>The Association for Applied Sport Psychology annual conference</u>
Oct. 21-24, 2024	Online	<u>IOC 15th Advanced Team Physician Course</u>
Oct 23-26, 2024	Las Vegas (USA)	<u>The Association for Applied Sport Psychology annual conference</u>
Nov 7-8, 2024	Coventry (UK)	<u>British Association of Sport and Exercise Medicine annual conference</u>
Nov 15-16, 2024	Rochester (United States)	<u>33th Annual Mayo Clinic Symposium on Sports Medicine</u>
Dec 3-4, 2024	Singapore (Singapore)	<u>Asia-Singapore Conference on Sport Science (ACSS 2024)</u>
Dec, 2024	San Francisco (USA)	<u>University of California San Francisco 19th Annual Conference Sports Medicine for Primary Care</u>
Apr 22-27, 2025	Kansas City (USA)	<u>American Medical Society for Sport Medicine annual symposium</u>
May 27-31, 2025	Atlanta (USA)	<u>American College of Sport Medicine Annual symposium</u>
July 2-4, 2025	Melbourne (Australia)	<u>15th International Conference on Sport and Society</u>
May 26-30, 2026	Salt Lake City (USA)	<u>American College of Sport Medicine Annual symposium</u>
Jun 1-4, 2027	Indianapolis (USA)	<u>American College of Sport Medicine Annual symposium</u>