

Aspetar Orthopaedic and Sports Medicine Hospital, Doha, Qatar.

## **Introduction**

Focal cartilage defects have been reported to be found in 36% of symptomatic knees of athletes (Flanigan et al, 2010). These lesions are often co-related with previous injury to the knee (e.g., Anterior cruciate ligament rupture, meniscus tear and patella dislocation) or repetitive microtrauma from jumping or pivoting during intense physical activity in sports (Aroen et al, 2004; Widuchowski et al, 2007). Common symptoms e.g., pain, locking, catching, swelling and functional impairment may interfere with the competitive performance of an athlete (Richter et al 2016; Aroen et al, 2004). Evidence from previous studies suggest that conservative treatment of knee FCD (e.g., physiotherapy, hyaluronic acid injection, Platelet rich plasma (PRP injection), and medicinal stem cell injection (MSC)) have not been found to be very effective (Southworth et al, 2019; Sherman et al, 2019). Most of the studies in athletes involve surgical cartilage repair which may require prolonged rehabilitation and conflicting evidence of level of return to play (Hacken et al, 2020; Krych et al, 2017; Zaffagnini et al, 2019). Wang et al suggested that extracorporeal shockwave therapy (ESWT) has a chondroprotective and osteogenic effect on the subchondral bone (Wang et al, 2012). We speculate that focal ESWT would have a beneficial effect on reducing pain and expediting return to play in FCD in athletes.

## **Methods**

A retrospective analysis of treatment of athletes diagnosed with knee FCD (full thickness cartilage lesion) with focal ESWT was done from 2015 to 2022. Inclusion criteria were athletes who did not respond to physiotherapy or injection therapy (Corticosteroid or hyaluronic acid or platelet rich plasma injection) or were not indicated for cartilage surgery. Meanwhile, athletes with recent treatment with PRP injection or corticosteroid injection or double anti-coagulation were excluded. Each athlete was treated with up to three treatments (once fortnightly) of focal ESWT (Orthogold 100). Energy flux density (EFD) used was 0.10 -0.27mJ/mm<sup>2</sup>, 1000 – 1400 pulses (depending on the size of lesion (s)). Once the athlete was able to return to play, and was satisfied with treatment, no further treatment was provided. Patients were allowed to continue with physiotherapy. No NSAIDs was recommended. For each athlete, number of treatments, minimum EFD (Elow), maximum EFD (Ehigh), total energy (TotalE), number of pulses, frequency (Hz), site of cartilage lesion, size and total number of lesions was reported. Pain and pain change using VAS (1-10), patient perceived outcome (5-point likert scale), Farrar score for change (7-point likert scale), adverse effects and return to play were routinely collected. Ethics review for the chart review is pending with Aspetar IRB.

## **Results**

In this study, 32 athletes (required 69 treatments) were studied. Patients required median of one treatment (range of 1 to 4). The average age and BMI of the athletes was 32.3±7.3 and 26.7±5.2 respectively. The maximum size of cartilage lesion was 1.5 cm (0.9) (mean (SD)). Most of the athletes were football (34.4%), handball (18.8%) or volleyball (18.8%) players. The athletes observed a pain reduction from 4.7 (2) to 1.9 (1.9). There was no correlation with Elow, Ehigh, Total E, and Hz with pain change. However, athletes treated with a higher number of pulses led to a greater reduction of pain between VAS1 and VAS2 ( $r=0.668$ ,  $p<0.001$ ). In their individual treatments, athletes playing basketball, handball and volleyball respectively responded better than athletes playing football, rugby and throwing sports. Athletes who responded with a greater pain reduction required fewer treatments. Athletes with FCD located at the lateral femoral condyle, lateral tibial plateau, trochlear, and medial patella facet had a better response to focal ESWT ( $\geq -2.9$ ). However, there was no correlation of a poorer response to the total number of lesions and size of lesion. Return to play was only available for

26/32 (72.2% of the athletes). Most of the athletes returned immediately (18 (56.3%)), and 6 athletes (18.7%) returned in 4 weeks or more. No adverse events were reported.

#### **Discussion**

Athletes diagnosed with knee FCD during the competition season who failed other conservative treatment have limited options other than surgery. Our study suggests that focal ESWT may provide a suitable option to provide a quick relief and allow return to play within 1 month of treatment. This may be suitable to enable the athlete to return to play and plan for definitive treatment at the end of season. However, the durability of the treatment is not known as patients were followed not more than 3 months. We were unable to determine if the players played at the previous level of play or whether they had residual symptoms. Return to play was not available for six athletes (27.8%) as they could not be traced.

#### **Conclusion**

Focal ESWT is an effective and safe modality to treat knee FCD in athletes and expedite their return to play. However, further studies are required to determine long-term effect of the treatment.

**Technology:** Focused Shockwave

**Device and Manufacturer:** MTS

**COI:** 'No conflict of interest'.

*25<sup>th</sup> ISMST Congress Daegu, Korea, 2023. P-13.*

Study Performance: **OW100**