Is knee joint distraction (KJD) effective in the setting of posttraumatic osteoarthritis?

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BACKGROUND

- Posttraumatic knee osteoarthritis (PTOA) remains a challenging condition to treat, especially in younger and active individuals for whom joint replacement is undesirable. Knee joint distraction (KJD) has emerged as a joint-preserving technique aimed at promoting intrinsic cartilage repair and modifying disease progression.

AIM

This study reviews the biological an mechanical principles of KJD and evaluates its regenerative effects in KJD. In addition, we present a clinical case report demonstrating the therapeutic potential of KJD.

METHODS

KJD involves temporary mechanical unloading of the tibiofemoral joint using an external fixation frame that maintains a controlled joint space (typically 5-7mm) for 6-8 weeks. This controlled environment enables intra-articular fluid pressure changes during motion, stimulating chondrocyte metabolism, subchondral bone remodelling, and cartilage matrix synthesis. In addition to a literature review of recent and clinical imaging studies, we present the case of a 33-year old female patient with posttraumatic osteoarthritis who underwent KJD following failure of conservative treatment.

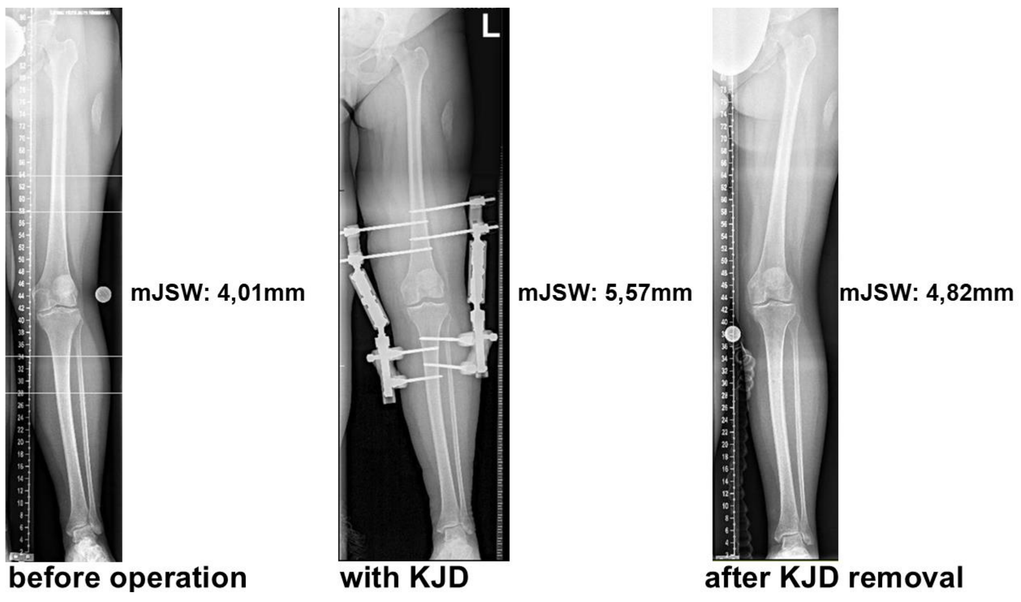
RESULTS

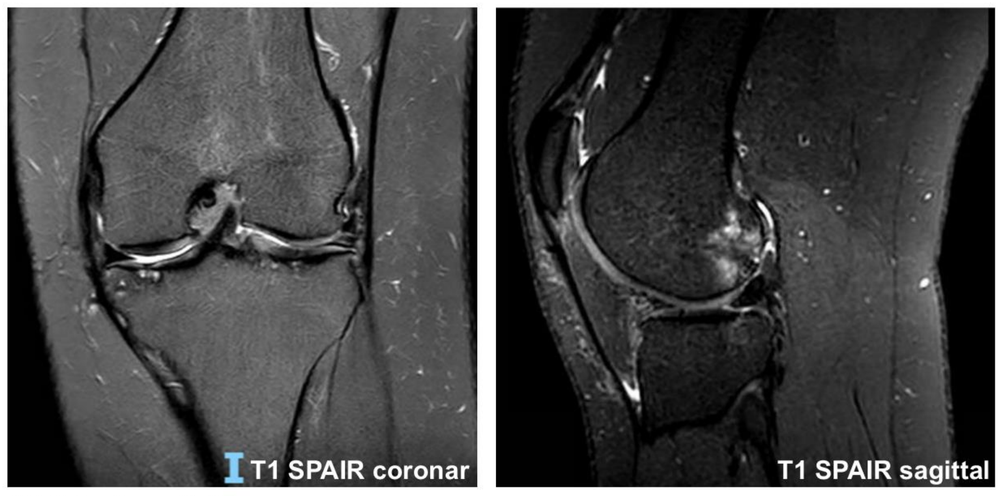
Published studies demonstrate that KJD provides significant pain reduction and functional improvement, comparable to or exceeding outcomes from high tibial osteotomy and microfracture at mid-term follow-up[1,2]. Quantitative MRI and radiographic analyses show increased cartilage thickness and reduced subchondral bone sclerosis, reflecting genuine tissue regeneration. In our clinical case, the patient exhibited substantial symptomatic relief and functional recovery, accompanied by radiological signs of cartilage restoration at two-year follow-up[3].

CASE DEMONSTRATION

A 33-year old female patient presented in our clinic with chronic knee pain. 12 years ago she had sustained a proximal medial tibial plateau fracture which was treated operatively with internal fixation. Removal of the implant was performed after radiographic fracture consolidation. At the time of presentation in our clinic, 12 years after the initial fracture, she reported progressively worsening knee pain, beginning at rest and increasing with weight-bearing activities. Radiographic imaging showed a bicompartmental medial and lateral gonarthrosis, as well as a valgus deformity. Given the bicompartmental osteoarthritis, a corrective osteotomy was not considered as viable treatment option. Taking into consideration the young age of the patient, a KJD was performed using the KneeReviver (Fa. Arthrosave). 6 weeks after implantation the KJD was removed.

Radiologic imaging showed a significant improvement of the minimal joint space width (mJSW) of the knee not only during the treatment with the KDJ but also after removal of the KJD. Similarly, signs of osteoarthritis had regressed in the MRI with bone marrow edema and subchondral cysts regressing. Most importantly, the patient reports a very good outcome with no pain during activities of daily living as well as sports, 2,5 years after the operative treatment.





MRI before KJD



MRI 9 months after KJD

CONCLUSIONS

KJD represents a promising regenerative treatment option for posttraumatic knee osteoarthritis, capable of promoting structural cartilage repair and delaying arthroplasty in younger patients. The presented case supports the growing evidence for KJD as a viable biological joint-preserving intervention.

Literature:

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