

## Could Use of Autologous Interleukin-1 Receptor Antagonist Fasten the Return to Sport Time after Sustained Medial Collateral Ligament Injury? Case Series Report

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### Abstract

The medial collateral ligament (MCL) is the most common knee ligament to be injured during knee trauma. In this paper, we present the conservative treatment of 5 elite football players who sustained MCL injury between May 2020 and October 2021. To help to fasten the injured ligament to grow biological treatment using Orthokine was administered.

Patients underwent supervised rehabilitation from the first day after diagnosis, with the according protocol. After 2-3 weeks, MRI was performed. MRI for all patients showed gradual resolution of ligament oedema, ligament remodeling and reabsorption of the fluid

All of the football players in this cohort returned to play within a relatively short period, which suggests that the rehabilitation regimen was good and in helped to RTP faster than what previous studies have reported after isolated MCL injuries. The results may suggest that use of an autologous interleukin-1 receptor antagonist can be a factor that can shorten RTP time.

**Keywords:** Football; Medial Collateral Ligament

### Introduction

The medial collateral ligament (MCL) is the most common knee ligament to be injured during knee trauma [1]. The majority of MCL injuries are isolated, occurring in young sportsmen and women. However, they can occur in association with other injuries of the knee, most commonly the ACL [2]. The popularity of sports, particularly those involving valgus knee loading such as ice hockey, skiing, and football, has contributed to the frequent occurrence of MCL injuries [3].

Fortunately, the majority of patients who sustain MCL injuries of varying severity can achieve pre-injury activity level with non-operative treatment alone [4,5]. MCL injuries are very common and can be managed nonoperatively with excellent clinical outcomes because of their robust healing capacity [6].

We hypothesized that use of autologous interleukin-1 receptor injections will shorten the time of return to sport after MCL injury. The authors' preferred nonsurgical techniques with use of Orthokine injections for ligamentous repair, as well as intensive rehabilitation programme will be discussed.

### Materials and Methods

In this paper, we present the conservative treatment of 5 elite football players who sustained MCL injury between May 2020 and October 2021. Table 1 shows characteristics of the study group.

Diagnosis was made after full physical exam and MRI imaging, which was used to also exclude suspected concomitant injuries.

The main symptoms that patients reported were: swelling and tenderness in the medial knee area. During the physical examina-

Age, mean, SD	26 ± 4.7
Sporting activity	
Professional	5
Gender F/M	1/4
Cause of damage	
Traumatic	5
Location of the injury	
Right knee	3
Left knee	2
Grade of damage	
2	3
3	2

**Table 1:** Characteristics of the patients.

tion, medial laxity of the knee in flexion was found in all the cases. Three patients were classified with second degree damage and two of them with third degree according to proposed Hughston scale [1].

**Therapeutic regime**

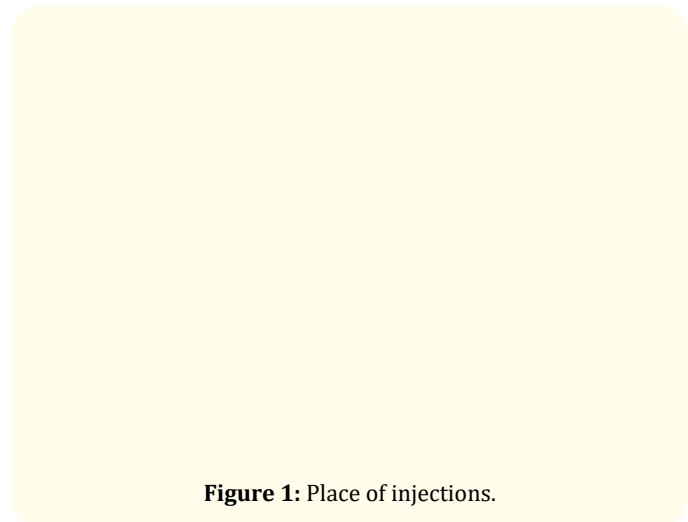
After giving their informed consent, patients immediately undertook functional treatment at the Orto Med Sport clinic.

All five of the patients went through the similar therapeutic regime as presented in the previous studies <sup>7</sup>. To help to fasten the injured ligament to grow biological treatment using Orthokine was administered. The said therapy consists in the administration of an autologous serum made from the patient’s own blood. We took a blood sample from the patient; then it was incubated and separated with a special device (Orthokine®II or EOT®II) to obtain cell-free blood serum containing anti-inflammatory cytokines and growth factors in higher concentrations

**Injections**

The patients received 6 injections - two doses every two days. The detailed procedure of Orthokine therapy has been already described in the literature.

First dose was injected in the point from adductor avulsion deeply towards the joint space and the second one towards adductor avulsion [Figure 1].



**Figure 1:** Place of injections.

Patients underwent supervised rehabilitation from the first day after diagnosis, with the according protocol described in table 2. All five patients were treated with the same protocol regardless grade of injury. No braces or orthoses were used. There was no prohibition of full loading of the injured side. For one week when injections were performed, patients were forbidden twisting the knee on a locked foot.

Daily	Every 2-3 days	Patient self-work
Functional training	Shock wave	Foam rolling
Game Ready Dry needlework	2x Orthokine injection	Stretching
Lymphatic drain- age	Taping	Ice pack application/ ice bathing
Electrostimulation		

**Table 2:** Therapeutic regime.

**Results**

After 2-3 weeks, MRI was performed. MRI for all patients showed gradual resolution of ligament oedema, ligament remodeling and reabsorption of the fluid – figure 2. The symptoms have subsided. During the follow-up visit in the 2nd week following the injury, they reported that the pain was significantly reduced; the patients walked at full limb load and denied the occurrence of swelling.

All of the patients returned to painless physical activity after 2.5 weeks post injury. After 3 weeks of intensive rehabilitation, the pa-

tients were able to return to sports and play games at the highest level, despite of grade of the injury. Return to sport criteria were: full range of movement, strength equal to contralateral limb, signs of rebuilding of ligament in MRI imaging and painless exercises.

The patients have had further follow-up to assess long-term results of treatment and identify any signs of recurrence.

The meantime of follow-up was 14.5 months.

habilitation program. The timing for rebuilding the ligament and regaining fastest possible effects is most desired of course for professional athletes and their coaches.

The use of Orthokine® injections in such injuries has not been reported before. Nonetheless, their use with rehabilitation program is based in literature as they relate to ligament remodeling resulting from the forces adopted through exercises and activities.

As the example of our treatment scheme shows, we are able significantly shorten the time to return to play, even to 3 weeks. We believe that all kinds of braces, limitation of loading etc., are not needed. In all cases, full load was applied immediately and did not translate into any negative consequences in the form of delayed ligament rebuild. The use of injection components from autologous, multiplied anti-inflammatory proteins had a quick analgesic effect, which additionally enabled intensive training in such a short time following the injury. Despite the two patients had a third degree injury we did not consider surgical treatment. Therapeutic regimen resulted in good clinical and radiological outcome.

Non-operative care has been proposed at the mainstay treatment in the majority of isolated MCL injuries regardless of their severity [1]. There are also reports against immobilization of the injured sites stating it has deleterious effects on the healing ligaments and articular surfaces [8]. To protect from side effects as arthrofibrosis and motion loss, patients should be allowed to perform ROM exercise.

We did not differ treatment according to the grade of injury. Lundblad, *et al.* in their prospective study of 130 football players also evaluated treatment methods used [9]. They stated that the lay-of period was significantly longer for grade II injuries with a stabilising knee brace compared with grade II injuries without bracing [42 (SD 13) days vs. 32 (SD 20 days,  $p = 0.01$ )]. Thirty-two (25.0%) MCL injuries were treated with injection therapy, most frequently PRP injections, followed by corticosteroids in five patients (3.8%). Two players with MRI grade I, 17 players with MRI grade II and one player with MRI grade III MCL injuries were treated with PRP injections. There were no differences in lay-of times in players treated with PRP or not, in grade II MCL injury grading.

## Conclusion

All of the football players in this cohort returned to play within a relatively short period, which suggests that the rehabilitation

**Figure 2:** 1- MRI shows second degree MCL injury, 2- After 3 weeks of treatment.

## Discussion

Conservative treatment of an isolated I and II-degree MCL injuries is a well-known standard of treatment based in literature. [citation needed]. Still there are discussions about what is the best options for III-degree injuries and also what is the best suitable re-

regimen was good and in helped to RTP faster than what previous studies have reported after isolated MCL injuries [9-11]. This may suggest that use of an autologous interleukin-1 receptor antagonist can be a factor that can shorten RTP time.

Further studies are needed to provide precise and definitive advantages of this implemented therapeutic regime. Further implementation of this scheme, with a longer follow-up period and randomization, is necessary to develop an EBM-based gold standard of conduct.

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