

# Osteochondral lesions of the ankle joint and mosaicplasty: literature review

## Abstract

Osteochondral lesions of the ankle joint are one of the common disorders, especially after ankle joint injury. This study reports the results of studies that evaluated the mosaicplasty procedure for osteochondral lesions of the ankle joint. This review included all articles published during 2000 to 2018 and search was performed in databases of Science Direct, Google Scholar, PubMed and ISI Web of Knowledge using OR, AND, NOT between the selected keywords. The results of this review article showed that mosaicplasty can reduce pain and increase function in patients with Osteochondral lesions of the ankle joint and so it can be a good treatment option.

**Keywords:** mosaicplasty, osteochondral, treatment, osteochondral lesions of the ankle joint

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## Introduction

Osteochondral lesions of the ankle joint are a complication that often occurs due to trauma, but is sometimes idiopathic. One of the most commonly traumatic causes of this disease is the ankle sprains. Other causes of this disorder include Ischemia, necrosis and genetics.<sup>1</sup> Due to this complication, the complete or partial part of the structure is detached in the ankle joint. Symptoms of this disorder include pain, functional limitations, limitation in the range of motion, and sometimes swelling.<sup>2</sup> Commonly these patients have more limited daily activities due to suffering from pain. Diagnosis and treatment of this disorder is important, because neglect and non-treatment of this disease can lead to arthritis of the ankle joint.<sup>3</sup>

There are various surgical treatments for treating this disorder. Some of these surgical procedures include bone-grafting, chondroabrasion, fragment fixation, fragment excision, antegrade drilling, retrograde drilling fixation, chondral trimming and autogenous (cancellous) bone graft.<sup>4</sup> One of these surgical methods is mosaicplasty. The criterion for considering mosaicplasty is those injuries that more than 10 mm in diameter and are associated with detached or missing osteochondral fragments. In case of osteoarthritis, the mosaicplasty is not appropriate.<sup>5</sup> In this technique, the cartilage and the required bone are removed from the other parts of the knee, and like mosaics, they are placed side by side at the damaged site, until the entire damaged part is restored and filled. The osteochondral grafts were harvested from the non-weight-bearing zone of the medial or lateral femoral condyle.<sup>5,6</sup> The aim of this study was to evaluate the effect of this method on the symptoms of individuals with Osteochondral lesions of the ankle joint.

## Method

### Data sources and searches

We searched Science Direct, Google scholar, PubMed and ISI web of knowledge from 2000 to 2018, by using OR, AND, NOT between the selected keywords (mosaicplasty, mosaicplasty technique, Osteochondral lesions, Osteochondral lesions ankle).

## Study selection

This review contains those articles which evaluated the effects of mosaicplasty in subjects with Osteochondral lesions of ankle joint. Studies which involved other groups were excluded; such as other surgical procedures or other ankle joint disorders were excluded. Only studies written in English language were used for analysis. Finally, 9 articles were selected from final evaluation.

## Results & discussion

The objective was to perform a review of the literature on mosaicplasty on Osteochondral Lesions of the ankle. Osteochondral Lesions of the Ankle often occurs in active young. It also has a high prevalence in those who are athletic and at risk for ankle sprain. One of the symptoms of these people is pain, which causes functional limitations. Also, the ability of these patients to continue to sport activity is also reduced.<sup>7</sup> Treatment of this disease prevents injuries such as osteoarthritis. One of the treatment options for symptom improvement in these patients is the mosaicplasty (Table 1).

This method was first used by Hangody et al in 1997 and has reported success results.<sup>8</sup> According to this study, limited studies have examined the effect of this method. Based on the data available in this study, it was shown that mosaicplasty can reduce pain in patients with Osteochondral lesions of the ankle. Five studies examined the pain of patients before and after mosaicplasty. These studies reported pain relief after treatment.<sup>9-12,7</sup> Guney and colleagues also report in their study that mosaicplasty reduces the pain of affected individuals more than arthroscopic microfracture and this result can be due to the quality of the hyaline cartilage formed with the former strategy.<sup>9</sup> Almost can be said that the mosaicplasty is a reliable method for reducing symptoms under the conditions of Osteochondral lesions of the ankle joint. Some studies have acknowledged that the subchondral bone has an important role as a pain source that heals in this treatment.<sup>13</sup>

Six studies have confirmed the positive effect of mosaicplasty on the functional ability of individuals with Osteochondral lesions of the

ankle joint.<sup>7,9,10,12,14,15</sup> 34% of the studies presented did not report any benefits. The results of these studies show that these patients with functional limitations will perform better after treatment. Perhaps it can be concluded that pain can be one of the reasons for reducing the

functional ability of affected subjects. Therefore, when the pain of these patients decreases after mosaicplasty, these patients find better function.

**Table 1** Results

Authors	Study design	Sample size	age	Outcome measures	Results
Guney et al. <sup>9</sup>	Comparative Study	32 M 22 F	40.1 ± 14.7	Pain (VAS) Function (American Orthopedic Foot and Ankle Society (AOFAS) scores)	In this study, two methods of arthroscopic microfracture surgery and mosaicplasty were compared for the treatment of osteochondral lesions of the talus. The findings showed that pain in both affected patients improved after both treatments, but improvements in mosaicplasty were better reported ( $p = 0.018$ ). function improved in both groups and there was no significant difference between the two methods
De L'Escalopier et al. <sup>10</sup>	Multicenter Study	29 M 8 F	33 years (17–49 years)	Pain function	In this study, they investigated the effect of mosaicplasty surgery on people with osteochondral lesions of the ankle. Eventually, they reported that 78% of the patients had less pain after the mosaicplasty and had better performance.
Leumann et al. <sup>11</sup>	Research Support,	11 M 3 F	39.6 (14.4)	pain Radiographic results	In this study, a mosaicplasty method was used to treat osteochondral lesions of the ankle. After this treatment, pain score decreased from 6.6 (1.3) to 1.4 (1.9). Also Radiographically good plug osteointegration was reported in 9 patients.
Chiang et al. <sup>14</sup>	Case Reports	2 F	24 and 27 years	function	After mosaicplasty, the ankle joint function was good reported, and the American Orthopedic Foot and Ankle Society ankle/hindfoot scores improved from 16 to 84 in case 1 and from 43 to 87 in case 2. These patients did not report side effects and complaints after surgery.
Emre et al. <sup>4</sup>	prospective study	29 M 3 F	27.5 (range 20 to 47)	Radiographic results	They evaluated the effects of mosaic graft harvested from the knee on subjects with osteochondral lesions of the talus. Radiographic evidence showed no evidence of graft dislocation of graft necrosis.
Valderrabano et al. <sup>7</sup>	Case series	8 M 4 F	43 years	pain evaluation (visual analog scale [VAS] American Orthopaedic Foot and Ankle Society (AOFAS) ankle score sports activity score range of motion radiological evaluation	Valderraba et al. Used mosaicplasty to treat patients with Osteochondral Lesions of the Ankle Joint. The results at the end of this study showed that the pain of these patients after mosaicplasty was reduced from 5.9 to 3.9. After treatment, 6 patients were able to return to sports activity and 4 patients returned to their previous level. But in general, the sports activity of these patients has been reported significantly reduced. The range of AOFAS was 35 to 100. This score after mosaicplasty increase from 45.9 to 80.2. And this increase represents a functional improvement. The results also show that the dorsiflexion of the ankle joint that has been surgically has been reduced. However, radiographic evidence showed some recurrent lesions and discontinuity in some patients.
Kilic et al. <sup>12</sup>		1 M 7 F	35 years; range 18 to 74 years	Function (AOFAS (American Orthopaedic Foot & Ankle Society) scoring) Pain (VAS) radiological evaluation	A study by Kilic and colleagues examined the effect of mosaicplasty on patients with Osteochondral Lesions of the Ankle. In this study, the functional score of these patients before treatment was 58, which increased to 89 after surgery. Also, the pain scores of these patients decreased from 8 in the previous surgery to 2 in the postoperative period. Also radiological evaluation indicated graft incorporation in all the subjects.
Reddy.	Case series	7 M 8 F	29 years (range, 21–44 years)		This study showed that this method can have side effects such as instability or problems in daily activities. Therefore, it is best for the surgeon to make patients aware of these complications.
Kreuz et al. <sup>15</sup>	Cohort study	18 M 17 F	30.9 years	Function (AOFAS (American Orthopaedic Foot & Ankle Society) scoring)	In this study, 35 patients with Osteochondral Lesions of the Ankle who had previously failed with primary arthroscopic management were treated with mosaicplasty. They found that after mosaicplasty improvement between preoperative and postoperative AOFAS scores was 35.5 points. Therefore this method can be improvement functional ability.

We previously mentioned that this disorder is common in athletes. Therefore, it is important to choose a method that subjects can then return to their sports activities. Valderrabano and colleagues in their study showed that almost all of these patients could continue their exercise after mosaicplasty.<sup>7</sup> Although some studies have reported no complications after mosaicplasty,<sup>14</sup> other studies have shown that there are problems such as recurrent lesions, discontinuity and graft incorporation and one of the most important disadvantages of this technique is donor-site morbidity.<sup>10,7,12</sup> Ultimately, the accuracy and delicacy of this surgical procedure are important and in general, according to the data in this study, it can be concluded that mosaicplasty are an appropriate treatment option.

## Conclusion

For the treatment of Osteochondral lesions of the ankle joint, one of the surgical techniques is the mosaicplasty, which seems to be an effective treatment to improve the symptoms of these patients. This surgical procedure, despite some problems, can reduce the pain of these patients, improve the functional ability, and also allow patients to continue to exercise activity.

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## Conflict of interest

Author declares that there is no conflict of interest.

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