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## ORIGINAL ARTICLE

# Arthroscopic ablation of an osteoid osteoma of the elbow: a case series with a minimum of 18 months' follow-up

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**Background:** Arthroscopic excision of an osteoid osteoma was first reported in the knee joint; since then, there have been several reports of arthroscopic excisions in the knee, shoulder, and elbow, with inconclusive outcomes because of a limited number of cases. The aim of this prospective study was to evaluate the medium-term functional effects of arthroscopic ablation in cases of an osteoid osteoma around the elbow.

**Methods:** We treated osteoid osteoma of the elbow through arthroscopic ablation in 10 patients. The arthroscopic resection procedure was performed  $23 \pm 9$  months (range, 12-36 months) after initial symptoms. At the preoperative examination and last follow-up examination, the elbow flexion-extension and forearm supination-pronation ranges of motion were measured. The patients were assessed by the Mayo Elbow Performance Score, the visual analog scale for the elbow and wrist, and the Quick Disabilities of the Arm, Shoulder, and Hand score. Finally, the patients' general satisfaction was assessed.

**Results:** The postoperative elbow flexion-extension range of motion was significantly higher compared with range of motion before surgery ( $P = .001$ ;  $r = 0.86$ ). According to the Mayo Elbow Performance Score, the average score increased significantly at the final follow-up examination. The mean preoperative and final Quick Disabilities of the Arm, Shoulder, and Hand scores were  $47 \pm 14$  and  $1.6 \pm 2.8$ , respectively ( $P < .001$ ). All patients were satisfied with the operation result.

**Conclusion:** According to the results of our study, arthroscopic ablation is a safe and efficient method of treatment for osteoid osteoma of the elbow, with a fast rehabilitation time.

**Level of evidence:** Level IV; Case Series; Treatment Study

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**Keywords:** Arthroscopy; orthopedics; osteoid osteoma; elbow joint; range of motion; visual analog scale

The Medical Ethics Committee of the Orthopedics Department of Shariati Hospital (Tehran, Iran) approved the study, and informed consent of the patients was obtained after explanation of the available treatment options before surgery.

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Juxta-articular and intra-articular lesions of an osteoid osteoma are relatively rare and mostly affect the hip joint, yet these lesions have been reported in the knee, elbow, and wrist joints.<sup>9,29</sup>

Osteoid osteoma of the elbow is extremely rare and is similar to intra-articular osteoid osteoma in other joints. Elbow

osteoid osteoma seems to be associated with atypical clinical presentation, such as monoarthritis with joint effusion, instead of nocturnal pain responsive to salicylates, which is the classic presentation.<sup>1,19,26,32</sup> Owing to its nonspecific clinical presentation and inconclusive plain radiographs, osteoid osteoma of the elbow is commonly missed, and patients are frequently treated for other conditions for several months before being properly diagnosed.<sup>4,10,30,33</sup> As in other body regions, computed tomography (CT) provides a definitive diagnosis and furthermore assists in identification of the exact location of the nidus.<sup>12-14,24,25,31</sup>

The treatment of choice for osteoid osteoma is en bloc surgical ablation of the nidus. Radiofrequency ablation has also shown promising results, but it has the limitation of not being applicable near the joint's articulating surfaces.<sup>6,17,24,28</sup> Arthroscopic excision of an osteoid osteoma was first reported in the knee joint<sup>15,33</sup>; since then, several studies that evaluated the arthroscopic resection in the knee, shoulder, and wrist have followed. However, the results were inconclusive because of the limited number of cases.<sup>2,8,33</sup>

The aim of this prospective study was to evaluate the medium-term functional effects of arthroscopic ablation in cases of osteoid osteoma around the elbow joint.

## Materials and methods

### Patients

In a prospective study design, 10 patients with osteoid osteoma of the elbow were treated with arthroscopic ablation between January 2004 and October 2011. The indication criteria for arthroscopic ablation were as follows: classic clinical presentation of osteoid osteoma around the elbow, meaning nocturnal pain and good response to nonsteroidal anti-inflammatory drugs; typical plain radiography or CT scan findings, including a lucent nidus and surrounding sclerosis; and the nidus was protruded to the elbow joint within the articular capsule or located <5 mm from the articular surface (where radiofrequency ablation may be harmful for the articular cartilage). In 6 patients, the limb that was operated on was dominant. All patients presented with pain and limited elbow motion. The mean age was  $26 \pm 9$  years (18-48 years). The arthroscopic resection procedure was performed  $23 \pm 9$  months (12-36 months) after initial symptoms. All operations were performed by the senior author (R.S.K). The study was approved by the Medical Ethics Commit-

tee of the Orthopedics Department of our hospital, and informed consent was obtained from all patients after explanation of the available treatment options (open vs. arthroscopic).

### Assessments

During the perioperative examinations, the data were documented as follows: interval between initial pain and visiting the physician; interval between the first visit and confirmation of the osteoid osteoma diagnosis; pain relief status after using nonsteroidal anti-inflammatory drugs; preoperative range of motion (ROM) of the elbow and forearm; method of confirming the diagnosis; postoperative ROM of the elbow and forearm after 1 week; and pathologic assessment results.

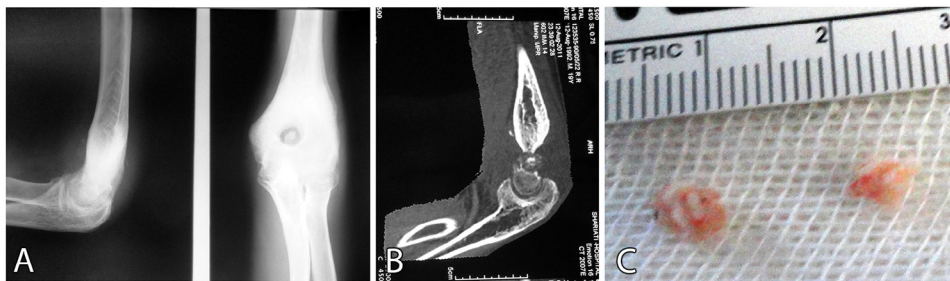
At the preoperative examination and last follow-up, the following assessments were conducted: the elbow flexion-extension and forearm supination-pronation ranges of motion; the Mayo Elbow Performance Score; the visual analog scale for the elbow and wrist; and the Quick Disabilities of the Arm, Shoulder, and Hand score. Finally, general satisfaction of each patient was assessed.

### Surgical technique

The procedure was performed in the prone position under general anesthesia with the application of a tourniquet. We chose either the anterior or posterior elbow arthroscopy setup (Figs. 1 and 2), with respect to the location of the nidus, localized by preoperative radiologic assessments (radiograph and CT scan) and intraoperative anatomic landmarks (Table I).

The forearm was suspended and the elbow was flexed to 90°. We used a 4.0-mm arthroscope with a visual angle of 30° and a wet technique with normal saline solution provided through the arthroscopic cannula. Initial diagnostic arthroscopy was performed through standard anteromedial-superior and anterolateral-superior portals for anterior arthroscopy and posterolateral and transtriceps portals for posterior arthroscopy. The intra-articular findings were carefully documented.

During the arthroscopy, we used anatomic landmarks and occasionally fluoroscopic evaluations for the exact localization of the nidus. The local synovial membrane affected by synovitis was then shaved. Visible lesions were excised with a grasper and sent for pathologic examination. The residual bed was then ablated with a 3- or 4-mm cutting burr. In the cases that showed no visible lesion in the joint, arthroscopic ablation with a burr was performed according to the anatomic landmarks, preoperative radiologic assessments, and, if necessary, real-time fluoroscopy; no pathologic evaluation was



**Figure 1** Case 2. (A) Preoperative radiograph. (B) Preoperative sagittal computed tomography scan showing olecranon fossa osteoid osteoma. (C) Excised nidus by posterior elbow arthroscopic setup.

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