

## Subchondroplasty of the Ankle at UCDHS

Subchondroplasty (SCP) of the Ankle is a relatively new surgical procedure that is being utilized with increasing frequency here at the UC Davis Health System in the Foot and Ankle Department of Orthopaedic Surgery. Patients receiving this novel treatment include, but are not limited to, individuals with bone marrow edema found on imaging due to:

- Osteoarthritis
- Trauma induced osteochondral defects.

SCP is performed with patients under general anesthesia openly or arthroscopically depending upon any concomitant procedures. A calcium tri-phosphate cement is prepared and injected into the bone to fill the defect in hopes to decrease pain and further edema of the bone. In most cases SCP is an outpatient surgery and patients are able to return home the same day.

## Study Background

### Clinical and Radiographic Characteristics of Patients Treated with Subchondroplasty of Ankle

#### Background:

Subchondroplasty (SCP) is a novel procedure developed in 2007 that uses fluoroscopically guided injection of a calcium phosphate biologic into an osteochondral defect (Cohen & Sharkey, 2015). Osteochondral defects are predominantly caused by trauma and osteoarthritis, and are the major contributor of morbidity in these situations. Edema of the bone marrow is often a consequence of chronically unhealed Osteochondral defects. This edema is more highly correlated with the pain associated with traumatic injuries and osteoarthritis than narrowing of cartilage, thickening of subchondral bone, growth of osteophytes, and most other pathological findings (Bollet, 2001). Knowing this, the goal of SCP is to stabilize these defects in order to minimize pain associated with the conditions. Currently, SCP is predominantly utilized in treating osteoarthritis of the knee, and the majority of the literature revolves around this indication. SCP of the ankle, being such a new procedure, has not been well described in the literature; this is an issue that can cause confusion in many areas of patient care. More specifically, the lack of a radiological description of post-operative SCP can lead to mistakes in diagnosis and treatment of these patients if treating physicians are not yet familiar with the procedure. There are reports that describe the radiographic characteristics of knee SCP (Nevalainen et al., 2016). A similar study on the radiographical appearance of ankle SCP would prove to greatly improve the care of patients receiving this procedure, and avoid unnecessary imaging and pathological work ups.

## Imaging



Figure 1: Fluoroscopic image of treatment of talar osteochondral defect. Fluoroscopy is commonly used to guide procedure and confirm location of injection.

Figure 2: Arthroscopic image of active injection of calcium tri-phosphate cement into OCD lesion following micro fracture.

Figure 3: Arthroscopic image of OCD lesion after calcium tri-phosphate injection, confirming fill of the defect.

## Study Design

### Hypothesis:

There are specific radiographic characteristics that can be identified and described in imaging of the foot and ankle following Subchondroplasty (SCP). These characteristics can be used to differentiate SCP from other procedures and/or pathologies on ankle imaging.

### Study Design:

The purpose of this study is to identify key characteristics found on imaging of the foot and ankle after Subchondroplasty (SCP) is performed in order to establish a standard radiographic appearance of patients' foot and ankle joints post surgery. With a well described radiographic appearance, we hope this novel technique will be less often misdiagnosed as other procedures or pathologies. In order to establish these characteristics, patients that have received SCP within or near the ankle joint will be identified by their surgeons and organized into a spreadsheet. This spreadsheet will use electric medical record (EMR) to include date of birth, date of surgery, and listing of any x-rays, MRIs, or CT scans taken before or after surgery. Additionally, the spreadsheet will denote whether each patient has been scheduled for follow up. If there is no follow up scheduled for the patient, contact will be made to arrange an office visit. At follow up appointments, post-surgery imaging will be taken for patients who have not yet had any. When all post-surgery imaging has been collected, the radiology department will use the picture archiving and communication system (PACS) to compare, characterize, and describe the appearance of patient imaging after SCP. Individual reports will then be collected and summarized into a single report describing the general characteristics of post-SCP imaging

## Study Update

Identify patients that have undergone SCP



Collect imaging and clinical data



Review & describe pre & post surgery imaging



Analyze any statistically significant correlations between imaging & clinical data\*

\*Currently all patient data has been collected, and all patient imaging has been evaluated by two separate radiologists. Data is now under statistical analysis and manuscript drafts are being written.

## References

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2. Cohen, S. B., & Sharkey, P. F. (2015). Subchondroplasty for Treating Bone Marrow Lesions. *J Knee Surg*. doi:10.1055/s-0035-1568988
3. Nevalainen, M. T., Sharkey, P. F., Cohen, S. B., Roedl, J. B., Zoga, A. C., & Morrison, W. B. (2016). MRI findings of subchondroplasty of the knee: a two-case report. *Clin Imaging*, 40(2), 241-243. doi:10.1016/j.clinimag.2015.11.015