**Poster 303: Radiographs Demonstrate Poor Interrater Reliability and Accuracy for Evaluation of Postoperative Healing for Osteochondral Allograft Transplants of the Knee**

Authors: Navya Dandu MD, Tristan Elias, Sachin Allahabadi, Christopher Brusalis, Corey Beals, Nicholas Trasolini MD, Blake Bodendorfer MD, Erik Haneberg, Brian Cole MD, MBA, Adam Yanke MD, PhD Atrium Health Wake Forest Baptist1 Miller Orthopaedic Specialists2 Midwest Orthopaedics at Rush3 Rush University Medical Center4

**Objectives:** To evaluate the reliability of radiographs to evaluate healing of osteochondral allografts in the knee compared to CT scans as gold standard imaging.

**Methods:** A retrospective review of prospectively enrolled patients who underwent osteochondral allograft transplantation for focal chondral defects of the knee was performed. At 6 months, all patients prospectively underwent CT scan of the knee. A retrospective review was performed to assess knee radiographs obtained in clinic at 3 and 6 months postoperatively. Three board-eligible orthopaedic sports fellows independently graded available radiographs while remaining blinded to the CT scan results. Separately, two board-eligible orthopaedic sports fellows graded CT scans utilizing the ACTOCA system, and their consensus measurements served as the gold standard for this study. Intraclass correlation (ICC) with a two-way random effects model and kappa coefficients were calculated for grades between the three raters.

**Results:** Among the 44 grafts prospectively imaged, 13 (29.5%) grafts had radiographs at 3 months and 28 (63.6%) grafts had radiographs available for evaluation at 6 months. Among three graders, assessment of integration demonstrated low to moderate reliability (ICC: 0.25–0.41). Contrary to this, assessment of qualities such as graft sclerosis and cyst formation on radiographs demonstrated poor interrater reliability with inability to reject the null hypothesis that all grades were assigned randomly (p>0.05) (Table 1). At 6 months, in patients with large cysts (≥3 mm) on CT, only 2/18 (11%) were accurately detected on radiographs and 5/18 (27.8%) were underestimated as small cysts. In patients with small cysts (<3 mm) on CT, only 4/42 grafts (9.5%) were accurately graded, and 3/42 (7.1%) evaluated grafts were overestimated to have large cysts (Figure 1). Among patients who had small or large cysts at 6 months, only 1/21 (4.8%) and 1/3 (33.3%) radiographic assessments detected this cystic change at 3 months, respectively. Patients with crossing trabeculae on CT were associated with a mean radiographic integration score of 81.0 ± 15.7, which was significantly greater than those with a discernible cleft <3 mm (mean 68.7 ± 19.3, p=0.01). However, these groups were not significantly different than radiographic scores for grafts that had discernible clefts >3 mm (80.0 ± 19.7, p>0.05). Among the 23 patients with a 6-month radiograph available, 4 required subsequent surgery for symptomatic failure. Three (75%) of these patients demonstrated large cyst formation on CT scan at 6 months.

**Conclusions:** Evaluation of osteochondral allograft healing by radiographs alone may be inaccurate and associated with missed abnormalities such as cyst formation.
|                          | 3 Months          | 6 Months         |
|--------------------------|-------------------|------------------|
| **Integration (0-100)**  | ICC = 0.25 (p=0.01) | ICC = 0.41 (p<0.001) |
| **Sclerosis**            | κ = 0.03 (p=0.41) | κ = 0.15 (p=0.05) |
| 0 = normal, 1 = mild    |                   |                  |
| sclerosis, 2 = moderate  |                   |                  |
| sclerosis, or 3 = severe |                   |                  |
| sclerosis                |                   |                  |
| **Cyst Formation**       | κ = -0.11 (p=0.76) | κ = 0.05 (p=0.32) |
| (0=no, 1=yes)            |                   |                  |
| **Cyst Size**            | κ = -0.10 (p=0.75) | κ = 0.12 (p=0.08) |
| 0 Absent, 1 Present < 3  |                   |                  |
| mm, 2 Present > 3 mm)    |                   |                  |
Figure 1. High false negative rates for detection of cyst formation on radiographic evaluation.