



Reply to Letter to the Editor

Reply to Letter to the Editor: Subchondral Calcium Phosphate is Ineffective for Bone Marrow Edema Lesions in Adults with Advanced Osteoarthritis

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To the editor,

We thank Dr. Wyland and appreciate his interest in our study. We would like to respond to the concerns raised in his letter to the editor [2].

We agree with Dr. Wyland that reporting the outcome in five separate subscales (symptoms; pain; function, daily living; function, sports and

recreational activities; quality of life), enhances interpretation. However, as stated by Roos and colleagues [7], even though it makes it impossible to closely monitor the stages of rehabilitation, the calculation of a total KOOS score can show an improvement. Due to the fact that our objective was to report the general patient-relevant outcome at a minimum of 6 months postoperatively (and not to optimize rehabilitation), we decided to report a single score in this initial retrospective case series.

Dr. Wyland noted that “the grading system described by Mitsou et al. and previously by Tegner actually evaluated the success of ACL reconstruction, not knee osteoarthritis treatments.” Due to lack of a specific patient-reported outcome score for treatment evaluation of subchondral

bone marrow edema lesions, we decided to use the Tegner-Lysholm Score which, as correctly stated by Dr. Wyland, was initially developed and validated for ACL injuries. The rationale behind our decision lies in the fact that in up to 80% of ACL-ruptured knees, bone marrow edema lesions are present [3, 4].

We also feel that the critique by Bengsston and colleagues [1] on the sensitivity of the Tegner Lysholm Score regarding ACL injuries and other lower extremity conditions corroborates as opposed to discredits our choice. The grading of the score allows a more critical analysis of the outcome [1].

Dr. Wyland also correctly noted that “... there was no discussion of surgical revisions in evaluating clinical failure or surgeon learning curve, which one would expect to influence failure rates.” Within the confines of manuscript length, we reported the followup data that was available for this retrospective study; none of the patients had revisions. However, three patients were lost to followup. Also, the minimum followup to be included in this

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study was only 6 months (and the median was only 1 year). Even at short followup, 10 of the 22 patients had either fair or poor patient-reported outcome scores.

The point by Dr. Wyland regarding the surgeon learning curve had also been raised by a peer review referee. We agree that, especially for novel techniques, the learning curve should be addressed. However, as stated in the operative technique section, the 22 reported surgeries were performed by four of our fellowship-trained surgeons, and based on the current literature, the number of procedures performed by each of the four surgeons is not large enough to adequately power meaningful statistical analyses regarding learning curves. We agree with Dr. Wyland that surgeon learning curve may influence failure rate, but for such an investigation, a larger case series is needed.

Dr. Wyland believed our suggestion of a negative relationship between postoperative outcomes and severity of osteoarthritis was an overstatement given the lack of K-L Grade 4 patients, the relatively weak R^2 value presented, and the small sample size. However, the lack of K-L Grade 4 patients in this retrospective case series is due to our general indication for this procedure as we deemed the most advanced grade of osteoarthritis to be a contraindication, as there is little reason to think that treating marrow edema below a

bare joint surface would provide durable pain relief or regrow cartilage. In light of other studies [5, 6] which have shown that the prevalence of symptomatic bone marrow edema lesions rises with increasing Kellgren-Lawrence Grade, we were not surprised by the negative correlation between K-L Grade and outcome scores. Our small sample size has been discussed as a limitation and we believe further studies with a larger number of study subjects would corroborate our finding. Therefore, we encourage Dr. Wyland and other orthopaedic surgeons to report their data on this novel percutaneous calcium phosphate injection technique in the orthopaedic literature.

Dr. Wyland also mentioned in his letter that "... the raw data presented show that 20 of 22 patients (91%) in this small cohort study actually demonstrated improvement from baseline in one or both scores. The magnitude of mean improvement was clinically significant while the improvement in mean scores from the cohorts' baseline was statistically significant. The authors suggested the concomitantly performed arthroscopies likely contributed to the observed improvements, discounting the probable effect of the CaP injection." We agree with Dr. Wyland, and also mentioned in our results that we observed a statistically significant improvement in the outcome scores. However, we believe the outcomes

graded according to the Tegner Lysholm Knee Scoring Scale represents more accurately the dissatisfaction of our patient population; it is not the mean score of the population that best describes the results here (as might be the situation in many small case series), but rather the proportion of patients doing well and the proportion doing poorly. In terms of this group, only 12 of 22 patients had good or excellent knee scores, while 10 of 22 had fair or poor scores, and three others were lost to followup before the 6-month minimum. The short followup, study design (a retrospective case series), and loss to followup all suggest that our results were a best-case scenario for this approach, and the fact that nearly half scored "fair" or "poor" on the Tegner scoring system, supported our conclusions, which we stand by.

In our opinion, as stated in the discussion, the low rate of clinical success might be due to the high proportion of patients treated who had osteochondral and meniscal pathologies. To capture the true benefit of calcium phosphate injections, we believe patients with minimal osteochondral and meniscal damage need to be investigated.

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