

recent years, and we appreciate the question posed by the authors. There are several points of interest that deserve mention. First, despite the fact that all patients were reportedly offered either surgical hip dislocation (SHD) or arthroscopy, in the end, 10 SHDs were included without a noted denominator, and only 20 of 684 of the arthroscopic cases were included in the final cohort and analysis. Although the authors attempted to match the groups, it would be more valid to include a large proportion of both groups rather than a large proportion of one small group and a very small proportion of another very large group. It is not clear that the 20 of 684 hip arthroscopies are representative of the entire arthroscopic cohort. Second, there is a significant, yet poorly defined, learning curve for both open and arthroscopic hip preservation procedures, and it is possible that the authors were more proficient at arthroscopic FAI correction compared with SHD, as suggested by the numbers presented. We believe that this issue would introduce significant bias. The analogy would be a surgeon who is well accomplished in open hip preservation, with limited experience in arthroscopy, comparing his open cohort with his arthroscopic cohort. In addition, systematic reviews with larger numbers to date have shown no clearly superior approach with regard to open versus arthroscopic hip procedures for FAI.²⁻⁶ Third, concepts and practice in hip preservation surgery have evolved, and many surgeons who traditionally used open hip preservation procedures have incorporated hip arthroscopy into their practice. As a result, the indications for these procedures have changed for many surgeons, with an increasing number of FAI corrective procedures being performed arthroscopically and SHD often reserved for more complex hip deformities such as circumferential or posteriorly based impingement deformities and extra-articular trochanter-pelvic impingement, now considered 2 pathologically dissimilar groups. Therefore, this question comparing open with arthroscopic surgery without specifying morphologic type may be of more historical significance moving forward. Of interest, the hips that were included in the current study had relatively mild deformities (alpha angle in the 50s), and we are interested in the authors' clinical indications for SHD in these patients. In the end, a larger study with the majority of the procedures performed by qualified surgeons with similar levels of experience in each surgical approach under investigation would be necessary to better answer this question.

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References

1. Domb BG, Stake CE, Botser IB, Jackson TJ. Surgical dislocation of the hip versus arthroscopic treatment of femoroacetabular impingement: a prospective matched-pair study with average 2-year follow-up. *Arthroscopy* 2013;29:1506-1513.
2. Papalia R, Del Buono A, Franceschi F, Marinozzi A, Maffulli N, Denaro V. Femoroacetabular impingement syndrome management: arthroscopy or open surgery? *Int Orthop* 2012;36:903-914.
3. Bedi A, Zaltz I, De La Torre K, Kelly BT. Radiographic comparison of surgical hip dislocation and hip arthroscopy for treatment of cam deformity in femoroacetabular impingement. *Am J Sports Med* 2011;39(suppl):20S-28S.
4. Harris JD, Erickson BJ, Bush-Joseph CA, Nho SJ. Treatment of femoroacetabular impingement: A systematic review. *Curr Rev Musculoskelet Med* 2013;6:207-218.
5. Botser I, Smith T, Nasser R, Domb B. Open surgical dislocation versus arthroscopy for femoroacetabular impingement: Comparison of clinical outcomes. *Arthroscopy* 2011;27:270-278.
6. Matsuda DK, Carlisle JC, Arthurs SC, Wierks CH, Philippon MJ. Comparative systematic review of open dislocation, mini-open, and arthroscopic surgeries for femoroacetabular impingement. *Arthroscopy* 2011;27:252-269.

Authors' Reply

We want to thank Larson et al. for their very astute comments, with which we agree on nearly every point. We are pleased that this research has stirred productive academic dialogue. This is indeed an interesting topic that has evolved significantly in the past few years, and we hope that our responses may contribute to a continued conversation and lead to further study.

Table 1. Comparison Between Open Surgical Dislocation and Hip Arthroscopy in Treatment of FAI

Variable	Advantages	Disadvantages
Open surgical dislocation	Good visualization of joint 360° joint access Enables treatment of all pathologic conditions Templates can be used for femoral osteoplasty to ensure precise sphericity	Major operation Soft tissue damage Trochanteric osteotomy—risk of nonunion and hardware pain Need to sacrifice ligamentum teres Increased blood loss Longer rehabilitation
Arthroscopic surgery	Minimally invasive Outpatient surgery Minor soft tissue damage Faster rehabilitation Easy approach to peripheral compartment and soft tissues	Difficult access to ligamentum teres and inferior portion of joint Traction complications—genital and perineal injury, pudendal neurapraxia LFCN neurapraxia (portal injury) Abdominal compartment syndrome

FAI, femoroacetabular impingement; LFCN, lateral femoral cutaneous nerve.

The first point addresses the study design, which was a matched-pair cohort comparison. We certainly debated between this design and the design Larson et al. suggest, which would compare all surgical hip dislocation (SHD) patients to all patients in the much larger arthroscopy group. Ultimately, our statisticians carried the day, and we heeded their recommendation that a matched-pair comparison is a more statistically powerful design. However, having heard the readers' perspective that it would be more valid to include a large proportion of both groups, we will proceed in performing a follow-up study using the design suggested and will submit that study to *Arthroscopy* as well.

The issue of the learning curve is also an important issue, and one that pervades our orthopaedic literature. Multisurgeon studies may attempt to address this by including physicians with differing expertise; however, the study design is confounded if those physicians have different goals or levels of skill. Although a single-surgeon study may arguably be more subject to learning curve bias, it has the very significant advantage that the same surgeon will likely have the same goals in every operation, irrespective of approach. For example, it is our belief that the goal of a femoral osteoplasty is a spherical femoral head.¹ However, this philosophy is not shared by all surgeons. Thus, if we were to compare a surgeon performing open procedures to an arthroscopic surgeon, and one surgeon aimed for a spherical femoral osteoplasty while the other did not, we would have an apples-to-oranges comparison. In this sense, the single-surgeon design yields an apples-to-apples comparison, in which the goals of surgery remain constant, whereas the only variable is the approach.

As Larson et al. point out, our group previously published a systematic review on this very subject that

found primarily Level IV evidence.² No definitive answer was found as to which approach was better in that study. Indeed, the very fact that our systematic review found nothing better than Level IV evidence highlighted the need for the present Level II study, which was initiated at our center in January 2008. Certainly a Level I study would be a wonderful addition to the literature in the future.

The next point is in regard to the transition that has occurred in the field, wherein many surgeons who traditionally used SHD have converted to using arthroscopy as their primary approach for femoroacetabular impingement (FAI). In deciding to convert to arthroscopy, those surgeons must feel that arthroscopy is superior to SHD for treatment of FAI, otherwise they would not convert. This widely occurring transition seems to echo the findings of the present study.

As for indications in the current study, at the time of the study period, there was intense debate about which approach was better for FAI—arthroscopy versus SHD—and there was minimal literature comparing them. The present study was undertaken to help resolve the controversy of the time between the “open camp” and the “scope camp.” Because of the paucity of evidence, all patients who presented with FAI during the study period were offered the choice of approach and were presented with the advantages and disadvantages as delineated in [Table 1](#).

At present, based in part on the results of this study, we believe that in experienced hands, the arthroscopic approach has significant advantages over SHD. We maintain that the quality of the FAI remodeling is more important than the approach and that the surgeon's attention to the details of the bony work is critical. Therefore, FAI surgery through SHD by an experienced surgeon may be superior to arthroscopic surgery by a

less experienced surgeon. Having had experience in both approaches, we currently believe that the results of arthroscopic FAI surgery are superior to SHD at our own institution.

In conclusion, we concur that the roles of arthroscopy versus SHD have evolved and are becoming better defined. Although arthroscopy will likely become the dominant approach for FAI, there will remain an important role for SHD for complex deformities, including Perthes disease, slipped capital femoral epiphysis, circumferential cam impingement, and trochanter-pelvic impingement. In response to the suggestion on study design that it would be more valid to include a large proportion of both groups, we have previously prospectively collected those data, and we will therefore perform a study according to those suggestions for submission to *Arthroscopy*. Lastly, we invite all the authors to join us in a larger multicenter study to continue to delineate the roles of these 2 excellent approaches.

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References

1. Jackson TJ, Stake CE, Trenga AT, Morgan J, Domb BG. Arthroscopic technique for treatment of femoroacetabular impingement. *Arthrosc Tech* 2013;2:e55-e59.
2. Botser IB, Smith TW, Nasser R, Domb BG. Open surgical dislocation versus arthroscopy for femoroacetabular impingement: a comparison of clinical outcomes. *Arthroscopy* 2011;27:270-278.

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