

Is Hip Arthroscopy Effective in Patients With Combined Excessive Femoral Anteversion and Borderline Dysplasia? Letter to the Editor

DOI: 10.1177/0363546519859831

Dear Editor:

We read the recent article titled “Is Hip Arthroscopy Effective in Patients With Combined Excessive Femoral Anteversion and Borderline Dysplasia? A Match-Controlled Study”⁴ in the *American Journal of Sports Medicine* with lots of enthusiasm. We made a few observations on the study, and any clarification on them would increase the readers’ understanding. The authors did not describe the method that they used to measure the femoral anteversion, as different methods and the imaging type (computed tomography vs magnetic resonance imaging) have a significant difference on the anteversion measurement values.^{1,2} This is a very important factor to consider, as it was a retrospective study and imaging protocol may not have been standardized. This has become more relevant as the difference between the control group and the excessive femoral anteversion and borderline dysplasia group is only 5° in some cases and we often get 5° as a measurement error. This makes the differentiation of groups based on femoral anteversion subject to error.

Studies have shown that hip disease is often associated with abnormalities on both the acetabulum and the femur. Patients with dysplasia have been shown to have more acetabular abnormalities than normal hips.⁶ In this study, the authors did not have acetabular anteversion details or rotational range of motion assessment to study the effect of acetabular version. Combined version assessment has been shown to be more relevant in defining dysplasia in the settings of version abnormalities on both the acetabular and femoral sides³ and to assess the dysplasia globally. The excessive femoral anteversion contributes to anterior instability and potentially influenced the outcome. However, without acetabular version details, it is very hard to isolate the effect of femoral anteversion on overall outcome, as acetabular version abnormalities are high when there are abnormalities with the femur, and the outcome in this study may be influenced just by the acetabular borderline dysplasia. In most periacetabular osteotomy corrections for hip dysplasia, the derotational femoral osteotomy is indicated only when femoral anteversion is very high (>40°),⁵ and for lesser femoral version abnormalities, periacetabular osteotomy alone is indicated and has been shown good results. Hence, we believe that the femoral anteversion would not have

influenced the outcome, especially when the femoral anteversion difference between the groups is too narrow (around 5° between normal and abnormal groups).

We believe that more studies examining both acetabular and femoral version, preferably with computed tomography, as it is more accurate—will help us to understand the effect of femoral anteversion on borderline dysplasia.

Sivashanmugam Raju, MBBS, MS Ortho

St Louis, Missouri, USA

Karthikeyan Chinnakkannu, MBBS, MS Ortho

Birmingham, Alabama, USA

Address correspondence to Sivashanmugam Raju, MBBS, MS Ortho (email: drsivashanmugam.raju@gmail.com).

The authors declared that they have no conflicts of interest in the authorship and publication of this contribution. AOSSM checks author disclosures against the Open Payments Database (OPD). AOSSM has not conducted an independent investigation on the OPD and disclaims any liability or responsibility relating thereto.

REFERENCES

1. Beebe MJ, Wylie JD, Bodine BG, et al. Accuracy and reliability of computed tomography and magnetic resonance imaging compared with true anatomic femoral version. *J Pediatr Orthop.* 2017;37(4):e265-e270.
2. Botser IB, Ozoode GC, Martin DE, Siddiqi AJ, Kuppuswami S, Domb BG. Femoral anteversion in the hip: comparison of measurement by computed tomography, magnetic resonance imaging, and physical examination. *Arthroscopy.* 2012;28(5):619-627.
3. Chadayammuri V, Garabekyan T, Bedi A, et al. Passive hip range of motion predicts femoral torsion and acetabular version. *J Bone Joint Surg Am.* 2016;98:127-134.
4. Chaharbakhshi EO, Hartigan DE, Perets I, Domb BG. Is hip arthroscopy effective in patients with combined excessive femoral anteversion and borderline dysplasia? A match-controlled study. *Am J Sports Med.* 2019;47(1):123-130.
5. Kraeutler MJ, Garabekyan T, Pascual-Garrido C, Mei-Dan O. Hip instability: a review of hip dysplasia and other contributing factors. *Muscles Ligaments Tendons J.* 2016;6(3):343-353.
6. Lerch TD, Todorski IAS, Steppacher SD, et al. Prevalence of femoral and acetabular version abnormalities in patients with symptomatic hip disease: a controlled study of 538 hips. *Am J Sports Med.* 2018;46(1):122-134.

Is Hip Arthroscopy Effective in Patients With Combined Excessive Femoral Anteversion and Borderline Dysplasia? Response

DOI: 10.1177/0363546519859827

Authors' Response:

We thank Drs Raju and Chinnakkannu for their interest and comments regarding our article “Is Hip

Arthroscopy Effective in Patients With Combined Excessive Femoral Anteversion and Borderline Dysplasia? A Match-Controlled Study.”² The points that they raised are important ones, and we hope that the following will provide some clarification and encourage further research.

First, regarding the method for measuring femoral version, we stated that all patients underwent magnetic resonance imaging (MRI) within 6 months preoperatively. Although we agree that computed tomography (CT) imaging may possibly have provided a more accurate measurement of femoral version, only select patients had coincidental CT imaging. This study would not be feasible with our inclusion/exclusion criteria if CT imaging were required. At our institution, CT is not a frequent first-line imaging modality for patients with suspected labral tears, as it exposes patients to radiation while providing limited information on the chondrolabral junction and other intra- and extra-articular pathologies. For consistency, we utilized MRI-measured femoral version values for the data analysis.

While some studies have shown differences between CT and MRI, others have demonstrated reliable and reproducible results.^{1,4,5} A recent study comparing femoral version measured by MRI and CT, with further correlation to 3-dimensional reconstructed images, demonstrated that MRI and CT measurements were similar.³ Furthermore, we would like to reiterate that the mean difference in femoral version between groups was 12.2° ($P = .01$). While we agree that most of the patients in the present study were not extremely anteverted, a difference of 12 degrees is, in our experience, a clinically relevant difference.

Regarding the lack of acetabular version and its effect on rotational range of motion in this patient population, the MRI scans performed in this study were not all performed at a single institution. Thus, the data points for acetabular version were not available for all patients in this study. We made sure to mention our inability to control for acetabular version in the limitations section of the discussion.

Appropriate patient selection for hip arthroscopy is critical in this controversial patient population. Overall, we hope that these findings and our discussion shed further light on the relationship between femoral version and lateral acetabular coverage and its impact on patient outcomes in the field of hip arthroscopy. We would be interested in formulating or reading new research that examines the combined 3-dimensional effects of femoral version, acetabular version, and lateral coverage. This would allow us to better counsel patients with symptomatic

borderline hip dysplasia on alternative interventions that may be warranted for optimal benefit.

Edwin O. Chaharbakhshi, BS
Maywood, Illinois, USA
David E. Hartigan, MD
Phoenix, Arizona, USA
Itay Perets, MD
Jerusalem, Israel
Benjamin G. Domb, MD
Des Plaines, Illinois, USA

Address correspondence to Benjamin G. Domb, MD (email: drdomb@americanhipinstitute.org).

One or more of the authors has declared the following potential conflict of interest or source of funding: B.G.D. has ownership interests in Hinsdale Orthopedic Associates, the American Hip Institute, SCD#3, North Shore Surgical Suites, and Munster Specialty Surgery Center; has received research support from Arthrex, ATI, Kaufman Foundation, Pacira Pharmaceuticals, Medacta, and Stryker; has received consulting fees from Adventist Hinsdale Hospital, Arthrex, MAKO, Medacta, Pacira Pharmaceuticals, and Stryker; has received educational support from Arthrex, Breg, Medwest, and Stryker; has received royalties from Arthrex, DJO Global, MAKO Surgical, Stryker, and OrthoAmerica; has received speaking fees from Arthrex and Pacira Pharmaceuticals; has received Travel and Lodging from Arthrex, Medacta, and Stryker; and is a board member for the American Orthopedic Foundation, American Hip Foundation, AANA Learning Center Committee, *Journal of Hip Preservation Surgery*, and *Arthroscopy*. AOSSM checks author disclosures against the Open Payments Database (OPD). AOSSM has not conducted an independent investigation on the OPD and disclaims any liability or responsibility relating thereto.

REFERENCES

1. Botser IB, Ozoude GC, Martin DE, Siddiqi AJ, Kuppuswami S, Domb BG. Femoral anteversion in the hip: comparison of measurement by computed tomography, magnetic resonance imaging, and physical examination. *Arthroscopy*. 2012;28(5):619-627.
2. Chaharbakhshi EO, Hartigan DE, Perets I, Domb BG. Is hip arthroscopy effective in patients with combined excessive femoral anteversion and borderline dysplasia? A match-controlled study. *Am J Sports Med*. 2019;47(1):123-130.
3. Fuller CB, Farnsworth CL, Bomar JD, et al. Femoral version: comparison among advanced imaging methods. *J Orthop Res*. 2018;36(5):1536-1542.
4. Guenther KP, Tomczak R, Kessler S, Pfeiffer T, Puhl W. Measurement of femoral anteversion by magnetic resonance imaging—evaluation of a new technique in children and adolescents. *Eur J Radiol*. 1995;21(1):47-52.
5. Tomczak RJ, Guenther KP, Rieber A, Mergo P, Ros PR, Brambs HJ. MR imaging measurement of the femoral antetorsional angle as a new technique: comparison with CT in children and adults. *AJR Am J Roentgenol*. 1997;168(3):791-794.