

Standardizing Muscle Strength Measurement in Femoroacetabular Impingement Syndrome: Response

Dear Editor,

Thank you for providing us the opportunity to respond to the letter by Dr Memarzadeh et al concerning our recent article titled, “Preoperative Hip Extension Strength Is an Independent Predictor of Achieving Clinically Significant Outcomes After Hip Arthroscopy for Femoroacetabular Impingement Syndrome.”¹ Their analysis of our study is appreciated and continues to encourage other orthopaedic colleagues to critically review the continuously growing literature. We agree with several of the points the authors made and can address the limitations in the context of this study.

As mentioned by the authors, an a priori analysis was not performed in the current study, as to our knowledge, no other study had evaluated the association between preoperative hip strength and functional outcomes in patients with femoroacetabular impingement syndrome. The 2 studies^{2,3} the authors referenced did not evaluate outcomes and did not measure strength of the affected and unaffected hip; and as such, it would not be appropriate to use the results from these studies to establish a minimum sample size for achieving sufficient study power. Additionally, we established the post hoc power based on hip flexion, as this measure demonstrated the most statistically significant difference between the surgical and nonsurgical hip. It is possible that some aspects of the analysis were underpowered, which was explicitly stated in the Limitations section. Last, we agree that measuring hip muscle strength accurately and consistently is difficult to establish using a handheld dynamometer. Unfortunately, we did not keep records of which researcher recorded each measurement, which is why an inter-rater reliability analysis was not performed in this study.

The authors mention that the dropout rate of nearly 20% is significant. Currently, there is no agreed-upon threshold rate that is considered “significant.” Previous studies have stated that a follow-up rate of 60% to 70% is adequate for minimizing bias, while others have favored a minimum of 80% follow-up as a high rate for patient-reported outcome measure follow-up.^{4,5} As previously acknowledged, it is difficult to achieve a follow-up of more than 80% of study participants in large orthopaedic surgery cohorts and registries.⁶ The authors of the current study agree that it is never possible to eliminate all bias with respect to loss to follow-up and that it is impossible to achieve 100% follow-up in

longitudinal studies; however, we respectfully disagree with the statement that 20% dropout rate is considered significant.

We congratulate the letter writers on conducting a robust study and look forward to reading their findings once published. The authors thank the letter writers for taking the time to read our study and for providing thoughtful feedback. We have addressed all their points to the best of our abilities.

Best regards,

—Edward Beck, MD, MPH

*Department of Orthopaedic Surgery,
Wake Forest Baptist Health,
Winston-Salem, North Carolina*

—Benedict U. Nwachukwu, MD, MBA

*Division of Sports Medicine, Department of Orthopedic
Surgery, Hospital for Special Surgery,
New York, New York*

—Laura M. Krivicich, BS

—Philip Malloy, PT, PhD

—Sunikom Suppauksorn, MD

—Kyleen Jan, BS

—Shane J. Nho MD, MS

*Division of Sports Medicine, Department of Orthopaedic
Surgery, Rush University Medical Center,
Chicago, Illinois*

REFERENCES

1. Beck EC, Nwachukwu BU, Krivicich LM, et al. Preoperative hip extension strength is an independent predictor of achieving clinically significant outcomes after hip arthroscopy for femoroacetabular impingement syndrome. *Sports Health*. 2020;12:361-372.
2. Casartelli NC, Maffiuletti NA, Item-Glatthorn JF, et al. Hip muscle weakness in patients with symptomatic femoroacetabular impingement. *Osteoarthr. Cartil*. 2011;19:816-821.
3. Harris-Hayes M, Mueller MJ, Sahrman SA, et al. Persons with chronic hip joint pain exhibit reduced hip muscle strength. *J Orthop Sports Phys Ther*. 2014;44:890-898.
4. Rolfson O, Bohm E, Franklin P, et al. Patient-reported outcome measures in arthroplasty registries Report of the Patient-Reported Outcome Measures Working Group of the International Society of Arthroplasty Registries Part II. Recommendations for selection, administration, and analysis. *Acta Orthop*. 2016;87(suppl 1):9-23.
5. Rosales RS, Rebozo-Morales L, Martin-Hidalgo Y, Diez de la Lastra-Bosch I. Level of evidence in hand surgery. *BMC Res Notes*. 2012;5:665.
6. Tariq MB, Vega JF, Westermann R, Jones M, Spindler KP. Arthroplasty studies with greater than 1000 participants: analysis of follow-up methods. *Arthroplast Today*. 2019;5:243-250.

For article reuse guidelines, please visit SAGE's website at <http://www.sagepub.com/journals-permissions>.

The following author declared potential conflicts of interest: S.J.N. reports receiving personal fees from Ossur and Springer.

DOI: 10.1177/1941738120977419