

Editorial Commentary: Subspine Hip Abnormalities: Exploring the Difference Between “Morphology” and “Impingement”



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Abstract: Subspine impingement has been increasingly recognized as a source of hip pain over the past 5 to 10 years. Some surgeons routinely perform subspine/anterior inferior iliac spine (AIIS) decompressions, whereas others rarely perform these procedures as part of an arthroscopic hip procedure. Subspine impingement has been implicated with high range-of-motion activities, various AIIS morphologies and deformities, and in the setting of persistent anterior hip pain after intra-articular anesthetic injections. Dynamic computed tomographic imaging has recently shown subspine impingement even with relatively normal AIIS morphology and in the setting of decreased femoral anteversion. These findings further emphasize the importance of understanding and defining relationships between morphology and impingement. Ultimately, subspine decompressions might be critical to achieve the best possible outcome after arthroscopic hip procedures in a subset of patients, but making the diagnosis remains challenging for clinicians.

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Subspine or anterior inferior iliac spine (AIIS) impingement has been characterized as impingement or abnormal contact between the proximal femur/femoral neck and the AIIS that can result in pain with hip flexion, internal rotation, and other flexion-based cutting and pivoting activities. We originally described our experience with this concept and an arthroscopic approach to this disorder in 2011.¹ Subsequently, studies have described a subspine classification system, anatomic footprint, and clinical outcomes after arthroscopic subspine decompressions.¹⁻⁶ Despite this literature, there are still questions regarding the prevalence, existence, and whether or when decompression of the AIIS should be considered.

It is with great interest that I read the article entitled “Frequency of Subspine Impingement in Patients with Femoroacetabular Impingement Evaluated With a 3-Dimensional Dynamic Study” by Brugiatti, Coaquira,

Cantor, and Aguilera-Bohorquez.⁷ I commend the authors for attempting to study this concept utilizing both a previously defined classification system to define subspine/AIIS “morphology” and a 3-dimensional computerized tomographic (CT) model to define subspine/AIIS “impingement.” This is a critical point that must be better understood by the orthopaedic community. *Morphology* is a description of the anatomy present, and although abnormal femoroacetabular morphology can be associated with a pathologic process, it does not confirm impingement. *Impingement* is dynamic and is defined as abnormal contact between the proximal femur and pelvis in the context of femoroacetabular impingement. Impingement can be the result of a combination of complex morphologies including, but not limited to, proximal femoral asphericity and decreased head-neck offset, acetabular overcoverage, and femoral and acetabular versional abnormalities in addition to prominence and or deformities of the AIIS.

The study by Brugiatti et al.⁷ took the analysis of subspine impingement to another level by confirming impingement between the femur and AIIS with a dynamic CT model in addition to classifying the AIIS according to a prior study.⁴ They found that although 23.7% of 194 hips had contact between the femur and AIIS, greater than 50% of these cases were associated

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with a relatively normal type 1 AIIS. This study clearly showed that impingement can occur in the setting of a normal AIIS morphology. The study by Brugiatti et al.⁷ also evaluated femoral version and found that lower degrees of femoral anteversion and more limited forward flexion and internal rotation were more likely to result in subspine impingement. These are critical findings for clinicians as we try to better define the indications and settings most appropriate to perform subspine/AIIS decompressions. The major understandable limitation of the study is the inability to account for soft tissue involvement with subspine impingement using a CT model. I believe that subspine impingement likely occurs prior to contact between the osseous femoral neck and AIIS, and involves impingement of the rectus femoris, capsule, and labrum between these 2 osseous structures. In addition, I have frequently noted soft tissue hypertrophy over the medial femoral neck in the setting of subspine impingement that might alter range of motion to subspine impingement when utilizing CT-based models.

Going forward, I think it is critical to recognize the differences between abnormal morphology and impingement. It is clear from my experience, and from the study by Brugiatti et al.,⁷ that subspine impingement can occur in the setting of relatively normal AIIS morphology (type 1). I have frequently observed this in our high range-of-motion athletes (dancers, gymnasts, hockey goalies, yoga enthusiasts, etc.). Although the most commonly utilized subspine classification system is based on the distal extent of the AIIS in relation to the acetabular rim, this fails to account for the anterior extent of the AIIS that might play an equally important role. Future studies should better define the effect of an anteriorly prominent AIIS in addition to distal prominence that is currently utilized in addition to accounting for the soft tissues with dynamic imaging evaluation. Decreased femoral version should be added

to previously described physical examination, imaging, and intraoperative findings utilized to define the presence of subspine impingement. I have no doubt that subspine impingement exists and is likely underappreciated, and future studies addressing these shortcomings will better define the role for subspine/AIIS decompressions.

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