

Correlation of Clinical and MRI Findings in Professional Dancers' Hip: A New Femoro-acetabular Impingement?

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INTRODUCTION

Professional ballet dancers use extreme hip range of motion (ROM) to achieve ideal ballet technique. Many of them complain of inguinal pain during dancing, and they are at higher risk to present early hip osteoarthritis [1].

Aims of the study were (1) to look at femoroacetabular lesions explaining the pain described by many dancers, (2) to investigate if femoroacetabular joint congruency was preserved while doing extreme movements as splits; (3) to clinically evaluate professional dancers' hip, and (4) to correlate clinical findings to MRI examination.

METHODS

Professional female ballet dancers and active healthy female matched for age (control group) were recruited. The study was approved by the local ethics committee and the volunteers gave written informed consent. All of them had to complete a questionnaire on hip pain. All of them underwent a complete physical examination of the hip with measures of ROM in flexion/extension, abduction/adduction and internal rotation/external rotation in supine position with hip and knee flexed at 90°. Anterior and posterior impingement tests were done, looking at elicited pain.

MRI of the hip in supine position was performed for all patients to look for femoroacetabular lesions, and dancers also went in MRI while doing splits to see hip position and congruency in this extreme position (Fig.1). Acetabular depth, neck-shaft angle, neck anteversion and alpha angle were measured on MRI for each participant.



Figure 1: Hip MRI of a dancer while doing split.

RESULTS

We recruited 20 professional ballet dancers and 15 healthy active female as controls. The questionnaire on hip pain revealed that 12/20 dancers complained of hip pain (VAS 2-6), 4 bilaterally, 7 on the right hip and 1 on the left. Pain was inguinal and felt only while dancing, mainly at end of ROM of « grand battement à la seconde », « grand plié » and « développé à la seconde ». Pain could be reproduced by the anterior impingement test for 9 of them. Control group was by definition asymptomatic, and impingement tests were not painful.

The mean hip range of motion (ROM) for the dancers was 133/0/19 in flexion/extension, 56/0/20 in abduction/adduction, and 33/0/56 in internal/external rotation (90° hip flexion). For the control group, hip ROM was 127/0/20 in flexion/extension, 46/0/20 in abduction/adduction and 40/0/44 in internal/external rotation.

Hip morphology measured on MRI revealed a mean acetabular depth of 7.9 mm for dancers and 8.8 mm for controls, a mean neck-shaft angle of 132° for dancers and 135° for controls, and a mean femoral neck anteversion of 12° for dancers and 14° for controls.

Mean alpha angle [2] in anterior position is 48° (range 39.9-68.3) for dancers and 47.5° (range 39-55.1) for controls. In antero-superior position, alpha angle was 53° (38.2-76) for dancers and 47.5° (37.3-62.3) for controls. Cam morphology was found in only one dancer (maximal values), none in the control group. Hip MRI of dancers doing

splits showed a femoroacetabular subluxation of 2.05 mm (range 0.63-3.56 mm).

MRI of dancer's hip revealed 3 types of lesions: labral tears, cartilage thinning, and pits. Every lesion was in position superior and some in postero-superior position (Fig.2).

Correlation of clinical and MRI findings lead to classify dancers in 4 groups: 1- pain with lesions on MRI (11 dancers), 2- pain without lesions on MRI (1 dancer), 3- no pain but lesions on MRI (7 dancers), 4- no pain and no lesion on MRI (1 dancers). Lesions on MRI were the same for symptomatic and asymptomatic dancers (group 1+3 = 18/20 dancers). No difference of ROM, bone morphology and alpha angle was found between these 4 groups.

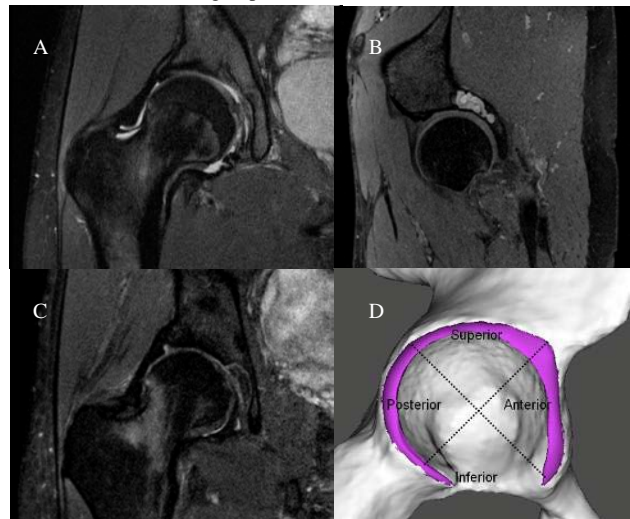


Figure 2: A: labral tear. B: cartilage thinning with subchondral cyst. C: femoral neck pit. D: lesions on acetabular rim were located in postero-superior position.

DISCUSSION

Dancer's hip ROM is normal and comparable to control group ($p=0.05$), however with tendency to increased flexion, external rotation and abduction, and a decreased internal rotation, as already described in other studies [3], in relation to the "turnout" position in dancing.

In this study, almost all ballet dancers present labral and/or cartilaginous lesions on MRI, symptomatic only for some of them. No criteria in the data explain why some dancers present pain and/or femoroacetabular lesions while others don't. This discrepancy between clinical and MRI findings lets us think that surgical treatment should not be only based on MRI findings.

Dancers' labral and acetabular cartilaginous lesions are the same as those found in patients with femoro-acetabular impingement (FAI) [4]. However, they were located in the superior or postero-superior position of the acetabular rim, as opposed to the anterior or antero-superior lesions found in patients with cam or pincer FAI type. In this study, only one hip presented a cam impingement explaining usual MRI lesions. For the others, such lesions could be explained by repetitive extreme movements, leading to a superior/postero-superior dance-related FAI. Consequently, early osteoarthritis in dancers' hip could be prevented by limiting these extreme movements implying femoro-acetabular abutment.

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