



PASIG MONTHLY CITATION BLAST: No.60

May 2011

Dear PASIG members:

Last reminder: Abstract submission deadline is 6/06/11 for CSM 2012. To submit, go to: <http://apta-csm2012.abstractcentral.com/>

PERFORMING ARTS CONTINUING EDUCATION OPPORTUNITIES

****Performing Arts Independent Study Courses****

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- Artistic Gymnastics (A. Hunter-Giordano, Pongetti-Angeletti, S. Voelker, TJ Manal), and
- Instrumentalist Musicians (J. Dommerholt, B. Collier).

Contact: Orthopaedic Section at: www.orthopt.org

Orthopaedic Section Independent Study Course. *Dance Medicine: Strategies for the Prevention and Care of Injuries to Dancers.*

This is a 6-monograph course and includes many PASIG members as authors.

- Epidemiology of Dance Injuries: Biopsychosocial Considerations in the Management of Dancer Health (MJ Liederbach),
- Nutrition, Hydration, Metabolism, and Thinness (B Glace),
- The Dancer's Hip: Anatomic, Biomechanical, and Rehabilitation Considerations (G. Grossman),
- Common Knee Injuries in Dance (MJ Liederbach),
- Foot and Ankle Injuries in the Dancer: Examination and Treatment Strategies (M. Molnar, R. Bernstein, M. Hartog, L. Henry, M. Rodriguez, J. Smith, A. Zujko),
- Developing Expert Physical Therapy Practice in Dance Medicine – (J. Gamboa, S. Bronner, TJ Manal).

Contact: Orthopaedic Section at: www.orthopt.org

Please send information about other courses of interest to our membership to: Amy Humphrey PT, DPT, OCS, MTC; ahumphrey@Bodydynamicsinc.com

For this May Citation BLAST, I've put together abstracts on the topic "Hip Dysplasia and the Dancer." The format is an annotated bibliography of articles from 2001 – 2011. The PASIG Research Committee initiated this monthly Citation BLAST on performing arts-related topics in June 2005 in the hopes of encouraging our members to stay current in

the literature and, perhaps, consider conducting research themselves. Each month we send a new list of performing arts (PA) citations to members of the PASIG to further the pursuit of PA-related scholarship. (Information about EndNote referencing software can be found at <http://www.endnote.com>, including a 30-day free trial).

As always, your comments, suggestions, and entry contributions to these Citation BLASTs are welcome. Please drop me an e-mail anytime.

Regards,
Shaw

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Hip Dysplasia and the Dancer

A colleague of mine recently underwent revision of her total hip replacement. She is only in her 40's and, as a former dancer, seems both blessed and cursed because she has bilateral hip dysplasia. Blessed, because as a dancer, her developpé was incredible, her artistry extraordinary. Cursed, because hip pain prematurely ended her career.

Hip injuries comprise 7 to 50% of the total injuries in professional and student ballet and modern dancers. In 2004, McCormick et al. confirmed that, yes, hypermobility was more common in male and female dancers compared with controls. In a 5-year follow-up, Briggs, McCormack, et al (2009), reported that the dancer with hypermobility is "more vulnerable to injury and healing may be prolonged and incomplete." Recently, Yamazaki et al. (2011) found that females with anterior cruciate ligament injury had an increased prevalence of acetabular dysplasia and generalized joint laxity.

Reijman et al. (2005) reported that subjects with acetabular dysplasia had a 4.3-fold increased risk for radiographic osteoarthritis of the hip compared to those without. One abstract by Kvarthkhava et al. (2008) reported that 1/3 of female Georgian dance studio students with disorder of the musculoskeletal system had of hip dysplasia. However, we still don't know the true incidence of dysplasia in dancers.

A series of elegant studies by Charbonnier et al. (2010, 2011) suggests that early hip osteoarthritis in dancers can be explained by femoroacetabular impingements and subluxations even in a relatively normal hip. This would suggest that the dancer with dysplasia may be sustaining even more harm. How can we proactively teach dancers

joint protection when all they want is higher legs? Is it possible to modify placement while satisfying pedagogical technique demands?

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Briggs, J., M. McCormack, et al. (2009). "Injury and joint hypermobility syndrome in ballet dancers--a 5-year follow-up." Rheumatology **48**(12): 1613-1614.

Charbonnier C, Kolo FC, et al. (2011). Assessment of congruence and impingement of the hip joint in professional ballet dancers: a motion capture study. Am J Sports Med **39**(3): 557-566.

BACKGROUND: Early hip osteoarthritis in dancers could be explained by femoroacetabular impingements. However, there is a lack of validated noninvasive methods and dynamic studies to ascertain impingement during motion. Moreover, it is unknown whether the femoral head and acetabulum are congruent in typical dancing positions. **HYPOTHESIS:** The practice of some dancing movements could cause a loss of hip joint congruence and recurrent impingements, which could lead to early osteoarthritis. **STUDY DESIGN:** Descriptive laboratory study. **METHODS:** Eleven pairs of female dancer's hips were motion captured with an optical tracking system while performing 6 different dancing movements. The resulting computed motions were applied to patient-specific hip joint 3-dimensional models based on magnetic resonance images. While visualizing the dancer's hip in motion, the authors detected impingements using computer-assisted techniques. The range of motion and congruence of the hip joint were also quantified in those 6 recorded dancing movements. **RESULTS:** The frequency of impingement and subluxation varied with the type of movement. Four dancing movements (developpe a la seconde, grand ecart facial, grand ecart lateral, and grand plie) seem to induce significant stress in the hip joint, according to the observed high frequency of impingement and amount of subluxation. The femoroacetabular translations were high (range, 0.93 to 6.35 mm). For almost all movements, the computed zones of impingement were mainly located in the superior or posterosuperior quadrant of the acetabulum, which was relevant with respect to radiologically diagnosed damaged zones in the labrum. All dancers' hips were morphologically normal. **CONCLUSION:** Impingements and subluxations are frequently observed in typical ballet movements, causing cartilage hypercompression. These movements should be limited in frequency. **CLINICAL RELEVANCE:** The present study indicates that some dancing movements could damage the hip joint, which could lead to early osteoarthritis.

Charbonnier C, Magnenat-Thalmann N, et al. (2010). An integrated platform for hip joint osteoarthritis analysis: design, implementation and results. Int J Comput Assist Radiol Surg **5**(4): 351-358.

PURPOSE: We present a software designed to improve hip joint osteoarthritis (OA) understanding using 3D anatomical models, magnetic resonance imaging (MRI) and motion capture. **METHODS:** In addition to a standard static clinical evaluation (anamnesis, medical images examination), the software provides a dynamic assessment of the hip joint. The operator can compute automatically and in real-time the hip joint kinematics from optical motion capture data. From the estimated motion, the software allows for the calculation of the active range of motion, the congruency and the center of rotation of the hip joint and the detection and localization of the femoroacetabular impingement region. All these

measurements cannot be performed clinically. Moreover, to improve the subjective reading of medical images, the software provides a set of 3D measurement tools based on MRI and 3D anatomical models to assist and improve the analysis of hip morphological abnormalities. Finally, the software is driven by a medical ontology to support data storage, processing and analysis. RESULTS: We performed an in vivo assessment of the software in a clinical study conducted with 30 professional ballet dancers, a population who are at high risk of developing OA. We studied the causes of OA in this selected population. Our results show that extreme motion exposes the morphologically "normal" dancer's hip to recurrent superior or posterosuperior FAI and to joint subluxation. CONCLUSION: Our new hip software includes all the required materials and knowledge (images data, 3D models, motion, morphological measurements, etc.) to improve orthopedists' performances in hip joint OA analysis.

Ezoe M, Naito M, et al. (2006). The prevalence of acetabular retroversion among various disorders of the hip. *J Bone Joint Surg Am* **88**(2): 372-379.

BACKGROUND: Acetabular retroversion can result from posterior wall deficiency in an otherwise normally oriented acetabulum or from excessive anterior coverage secondary to a malpositioned acetabulum, or both. Theoretically, a retroverted acetabulum, which adversely affects load transmission across the hip, may occur more frequently in hips with degenerative arthritis. The aim of this study was to assess the prevalence of acetabular retroversion in normal hips and in hips with osteoarthritis, developmental dysplasia, osteonecrosis, and Legg-Calve-Perthes disease. METHODS: We retrospectively examined anteroposterior radiographs of the pelvis of 250 patients (342 hips). Fifty-six patients (112 hips) had normal findings; sixty-six patients (seventy hips) had osteoarthritis; sixty-four (seventy-four hips), developmental dysplasia; thirty (thirty-six hips), osteonecrosis of the femoral head; and thirty-four (fifty hips), Legg-Calve-Perthes disease. The sole criterion for a diagnosis of acetabular retroversion was the presence of a so-called cross-over sign on the anteroposterior radiograph of the pelvis. RESULTS: The prevalence of acetabular retroversion was 6% (seven of 112 hips) in the normal group, 20% (fourteen of seventy hips) in the osteoarthritis group, 18% (thirteen of seventy-four hips) in the developmental dysplasia group, 6% (two of thirty-six hips) in the group with osteonecrosis of the femoral head, and 42% (twenty-one of fifty hips) in the group with Legg-Calve-Perthes disease. In patients with Legg-Calve-Perthes disease, the prevalence of acetabular retroversion was 68% in twenty-five hips with Stulberg class-III, IV, or V involvement. In contrast, only four (16%) of twenty-five hips with Stulberg class-I or II involvement had acetabular retroversion. The difference was significant ($p = 0.0002$). Patients with osteoarthritis, developmental dysplasia, or Legg-Calve-Perthes disease are significantly more likely to have acetabular retroversion than are normal subjects ($p < 0.05$). CONCLUSIONS: Acetabular retroversion occurs more commonly in association with a variety of hip diseases, in which the prevalence of subsequent degenerative arthritis is increased, than has been previously noted.

Fujii M, Nakashima Y, et al. (2010). Acetabular retroversion in developmental dysplasia of the hip. *J Bone Joint Surg Am* **92**(4): 895-903.

BACKGROUND: Patients with developmental dysplasia of the hip are prone to the development of degenerative changes in the affected hip. The aim of this study was to evaluate the prevalence, morphological features, and clinical relevance of acetabular retroversion in these patients. METHODS: We investigated the version and morphological features of the acetabulum using pelvic radiographs and computed tomography images of ninety-six hips in fifty-nine patients with developmental dysplasia of the hip. A diagnosis of acetabular retroversion was based on the presence of a positive cross-over sign on the pelvic radiograph. Using computed tomography images, we determined the acetabular anteversion angle at various levels in the axial plane. The acetabular sector angle served as an indicator of acetabular coverage of the femoral head. We evaluated the association

between acetabular version and the patient's age at the onset of pain. Fifty normal hips were examined as controls. RESULTS: We observed acetabular retroversion in 18% (seventeen) of the ninety-six hips in the patients with developmental dysplasia of the hip. The mean acetabular anteversion angle in the hips with acetabular retroversion was significantly smaller, at all levels, than that in the hips with acetabular anteversion; this tendency was more evident at proximal levels. There was significantly less posterior and posterosuperior coverage in the hips with acetabular retroversion than in those with acetabular anteversion, but superior acetabular coverage did not differ between the groups. Multivariate analysis showed that the onset of pain occurred at a significantly earlier age in patients with acetabular retroversion (27.9 years) than in those with acetabular anteversion (40.5 years), regardless of the severity of the dysplasia ($p = 0.003$). CONCLUSIONS: In patients with developmental dysplasia of the hip, acetabular retroversion results from relatively deficient coverage by the posterior portion of the acetabulum. Developmental dysplasia with acetabular retroversion is associated with an earlier onset of pain than is developmental dysplasia with anteversion, suggesting a correlation between deficiency of the posterior acetabular wall and the earlier onset of pain.

Giori NJ, Trousdale RT (2003). Acetabular retroversion is associated with osteoarthritis of the hip. Clin Orthop Relat Res (417): 263-269.

Primary osteoarthritis of the hip may have a structural basis. It was hypothesized that the radiographic appearance of acetabular retroversion could be created by altering the morphologic features of the acetabular walls, and that acetabular retroversion, as defined on an anteroposterior radiograph of the pelvis, is associated with osteoarthritis of the hip. A model pelvis was used to simulate normal, augmented, deficient, and rotated walls of the acetabulum, and radiographs were taken to compare the projections of the modified acetabular walls with the known plain radiographic appearance of a retroverted acetabulum. One hundred thirty-one good quality anteroposterior radiographs of the pelvis taken before total hip arthroplasty for idiopathic hip osteoarthritis were compared with 99 good quality radiographs taken for nonorthopaedic reasons. The prevalence of radiographic acetabular retroversion is 20% among patients with idiopathic hip osteoarthritis and 5% among the general population. The appearance of acetabular retroversion on an anteroposterior radiograph of the pelvis is created by deficiency of the posterior wall of the acetabulum. There is a statistically significant association between radiographic acetabular retroversion and hip osteoarthritis. These findings have applicability to understanding the mechanical etiology of hip osteoarthritis, and to surgical technique during periacetabular osteotomy and total hip arthroplasty.

Grahame, R. (2007). Joint hypermobility is a liability for the performing artist. International Symposium on Performance Science 2007, Porto, Portugal, European Association of Conservatoires

Joint hypermobility is defined as a range of joint movement that is considered excessive, taking into consideration the age, gender, and ethnic background of the individual, being greater in women and in those of Asian origin compared with other ethnic groups. All newborn babies can be considered to be hypermobile, but the range of movement diminishes progressively during childhood and then more gradually during adult life. Elderly hypermobile people have retained many facets of their hypermobility throughout life. Originally perceived to be a feature of rare inherited diseases such as Marfan and Ehlers-Danlos syndromes, it was only in the 1960s that hypermobility syndrome was seen to exist apart from these diseases and as an entity in its own right. In the early 1970s it was first linked to ballet dancers. There is now evidence that it represents a risk factor for injury in performing artists in general.

Jacobsen S, Sonne-Holm S (2005). Hip dysplasia: a significant risk factor for the development of hip osteoarthritis. A cross-sectional survey. Rheumatology **44**(2): 211-218.

OBJECTIVES: The aim of this cross-sectional survey of 2232 women and 1336 men (age range 20-91 yr) was to investigate individual risk factors for hip joint osteoarthritis (OA).

METHODS: Standardized, weight-bearing pelvic radiographs were evaluated. Radiological hip joint OA was defined as minimum joint space width (JSW) ≤ 2.0 mm. Hip dysplasia was evaluated according to common radiographic indices. Radiographic findings were correlated to general health and lifestyle information obtained at baseline examinations and questionnaires. The study focused on age; self-reported hip pain, occupational exposure to repeated daily lifting, body mass index, smoking and hip dysplasia. RESULTS: Hip dysplasia (HD) prevalence ranged from 5.4-12.8% depending on the radiographic index applied. Hip OA prevalence was 1.0-2.5% in subjects < 60 yr of age and 4.4-5.3% in subjects ≥ 60 yr of age. Of factors entered into logistic regression analyses, only age ($P < 0.001$ for right hips and $P < 0.001$ for left hips) and hip dysplasia ($P < 0.001$ for right hips and $P = 0.004$ for left hips) were significantly associated with hip OA prevalence in women. In men, only hip dysplasia was associated with hip OA prevalence, $P < 0.001$ in right hips and $P = 0.001$ in left hips. CONCLUSIONS: Of the individual risk factors investigated in this study, only age and hip dysplasia were associated with the development of hip osteoarthritis.

Kvartskhava ML, Tsimakuridze MP, et al. (2008). [Factors associated with the health status of Georgian dance studio students]. Georgian Medical News(155): 52-55.

The article investigates factors associated with occupational disease among Georgian dance studio students. The problem of work-related neuromuscular and musculoskeletal disorders is outlined. Reiterating and stereotypical movements cause tension of specific muscles, constrained body, monotonous work, and emotional tension lead to occupational support-motor apparatus disorders. The aim of the work is to study the health status of Georgian dance studio students. 254 Georgian dance studio students were examined. It was found that pathology of cardio-vascular, respiratory and digesting systems was more frequent among male students than females; musculoskeletal disorders were common only among the girls. 1/3 of girls with disorder of musculoskeletal system had inborn dysplasia of hip joint bones. In three male students hernia had developed during the first year of the study.

Lequesne M (2002). [Osteoarthritis of the hip]. Rev Prat **52**(6): 605-610.

If all the etiological factors are taken into consideration, idiopathic coxarthrosis is less prevalent than formerly. Three factors are new or reappraised: sport practice (more than 10 years in competition), certain occupations (dancer, heavy load worker) and heritability. Three are classical and yet present: developmental dysplasias, acquired dysmorphias and traumas. Hip osteoarthritis should be followed up with the help of pain intensity measured on visual analog scale, algofunctional index and self-assessment of handicap. These 3 parameters--and not the X-ray image--are the basis of the decision for total hip replacement. However, the latter could be foreseen as necessary within the next 1-4 years when a rapid joint space narrowing is observed (about 5-7% of cases).

Lequesne M, Dang N, et al. (1997). Sports practice and osteoarthritis of the limbs. Osteoarthritis Cartilage **5**: 75-86.

Participation in sports has evolved as a cause of osteoarthritis (OA), especially in the hip and knee joints. OA often occurs at a relatively young age in adult life, in certain sports (soccer, rugby, racquet sports, and other track and field sports) and under certain conditions (high level of practice). We review preclinical considerations and published epidemiological studies. Joint overuse even without notable trauma is likely the main mechanism of OA both in these sports and in certain occupational activities (relative risk ranges from 1.5 to more than 5 depending chiefly on the category of sport and on the level and duration of practice).

Irregular or sudden impacts, heavy load application on the dominant weightbearing lower limb and the pre-existing state of the joint including dysplasia, dystrophy or previous trauma are risk factors for OA. However, recreational sport activities at a reasonable level are not likely to be harmful for most individuals, in most sport activities.

Leunig M, Parvizi J, et al. (2006). Nonarthroplasty surgical treatment of hip osteoarthritis. Instr Course Lect 55: 159-166.

The two conditions that give rise to osteoarthritis of the hip are dysplasia and nondysplasia. Dysplasia, commonly associated with anterolateral acetabular deficiency, may lead to osteoarthritis in 40% of patients in the United States with this condition. In a distinct category of patients with so-called idiopathic arthritis, there is no apparently identifiable cause for osteoarthritis. There is emerging evidence that subtle morphologic abnormalities around the hip, resulting in femoroacetabular impingement, may often be a contributing factor to osteoarthritis in young patients.

Martin HD, Kelly BT, et al. (2010). The pattern and technique in the clinical evaluation of the adult hip: the common physical examination tests of hip specialists. Arthroscopy 26(2): 161-172.

PURPOSE: The purpose of this study was to systematically evaluate the technique and tests used in the physical examination of the adult hip performed by multiple clinicians who regularly treat patients with hip problems and identify common physical examination patterns. **METHODS:** The subjects included 5 men and 6 women with a mean age (+/-SD) of 29.8 +/- 9.4 years. They underwent physical examination of the hip by 6 hip specialists with a strong interest in hip-related problems. All examiners were blind to patient radiographs and diagnoses. Patient examinations were video recorded and reviewed. **RESULTS:** It was determined that 18 tests were most frequently performed (>or=40%) by the examiners, 3 standing, 11 supine, 3 lateral, and 1 prone. Of the most frequently performed tests, 10 were performed more than 50% of the time. The tests performed in the supine position were as follows: flexion range of motion (ROM) (percentage of use, 98%), flexion internal rotation ROM (98%), flexion external rotation ROM (86%), passive supine rotation test (76%), flexion/adduction/internal rotation test (70%), straight leg raise against resistance test (61%), and flexion/abduction/external rotation test (52%). The tests performed in the standing position were the gait test (86%) and the single-leg stance phase test (77%). The 1 test in the prone position was the femoral anteversion test (58%). **CONCLUSIONS:** There are variations in the testing that hip specialists perform to examine and evaluate their patients, but there is enough commonality to form the basis to recommend a battery of physical examination maneuvers that should be considered for use in evaluating the hip. **CLINICAL RELEVANCE:** Patients presenting with groin, abdominal, back, and/or hip pain need to have a basic examination to ensure that the hip is not overlooked. A comprehensive physical examination of the hip will benefit the patient and the physician and serve as the foundation for future multicenter clinical studies.

McCormack M, Briggs J, et al. (2004). Joint laxity and the benign joint hypermobility syndrome in student and professional ballet dancers. J Rheumatol. 31(1): 173-178.

OBJECTIVE: To ascertain the prevalence of hypermobility and the benign joint hypermobility syndrome (BJHS) in male and female student and professional ballet dancers, and explore whether BJHS has any effect on a dance career. **METHODS:** Students from the Royal Ballet School and professional dancers from the Royal Ballet Company, London, were compared with a control group of teenagers and adults from a local secondary school and The Royal Opera House, respectively. The data, examined by variance analysis, included anthropometric variables, the Beighton score, and clinical features constituting BJHS. Odds ratios for hypermobility and BJHS in dancers were calculated, and the prevalence and distribution of BJHS was examined. **RESULTS:** Hypermobility and BJHS were common in male and female dancers compared with controls. An OR of 11.0 (95% CI 3.3-31.8) was

found for hypermobility in dancers for both the ballet school and the professional company. The prevalence of BJHS was found to decline both from student to professional and within the ballet company from corps de ballet to Principal. Odds ratios for BJHS in student dancers were significant, OR = 3.9 (95% CI 1.3-11.3), but not so in professional dancers: OR = 1.7 (95% CI 0.6-4.7). Arthralgia was common in dancers and was reported more often in males than females. In females, pain was reported most by dancers with other features of BJHS, in particular stretchy skin. CONCLUSION: Hypermobility and BJHS are common in both male and female student and professional ballet dancers. The fall in prevalence, and the greater reporting of arthralgia with other features of BJHS in young female dancers, suggests that BJHS may have an important negative influence, and this may have implications for training. The same pattern was not observed in males, suggesting that their pain-reporting and injury are related to factors other than BJHS.

Nogier A, Bonin N, et al. (2010). Descriptive epidemiology of mechanical hip pathology in adults under 50 years of age. Prospective series of 292 cases: Clinical and radiological aspects and physiopathological review. Orthopaedics & Traumatology, Surgery & Research **96**(8 Suppl): S53-58.

Two hundred and ninety-two patients, aged between 16 and 50 years and presenting with mechanical hip pathology, were included in a prospective multicenter study. The descriptive study concerned the clinical examination and analysis of three X-ray views (AP pelvic, Lequesne false profile and lateral axial view). The series comprised 62% males, mean age 35 years, with 53% right side and 22% bilateral involvement. Initial trauma was reported in 19% of cases, and direct familial history of hip pathology in 20%. Seventy percent of the patients played sports, 30% were high-level athletes, and 17% played combat sports. The physical impingement sign was present in 18% to 65% of cases depending on the variant studied. On imaging (n=241), 62% of hips showed osteoarthritis, with 25% at the evolved stage. In the series, as a whole, there was a 35% rate of dysplasia, 63% of impingement and 5% of normal X-ray results. The radiologic impingement aspects were 58% cam-type, 19% pincer-type and 23% mixed. Twenty-two percent of dysplasia cases showed signs of associated impingement. Pain experienced exclusively in flexion/internal rotation/adduction on examination showed little sensitivity (20%) but considerable specificity (86%) for the main diagnosis of impingement. The links between impingement and dysplasia are discussed, and an integrative schema of all risk factors is put forward.

Reijman M, Hazes JM, et al. (2005). Acetabular dysplasia predicts incident osteoarthritis of the hip: the Rotterdam study. Arthritis Rheum **52**(3): 787-793.

OBJECTIVE: To investigate the association between acetabular dysplasia and the incidence of radiographic osteoarthritis (OA) of the hip in a population-based sample of elderly subjects. METHODS: Radiographs of the hip at baseline and at followup (mean followup time 6.6 years) were evaluated in 835 men and women (age ≥ 55 years) from the Rotterdam Study. Subjects with a baseline Kellgren/Lawrence grade of 0 or 1 in both hips were included in the study. Incident radiographic OA of the hip was defined as a decrease of joint space width of the hip (≥ 1.0 mm) at followup. Acetabular dysplasia was assessed using the center-edge angle and the acetabular depth. The association between acetabular dysplasia and incident radiographic hip OA was assessed by calculating odds ratios using multivariate regression analysis. RESULTS: In this study population with a mean \pm SD age of 65.6 \pm 6.5 years, 9.3% developed incident radiographic hip OA. Subjects with acetabular dysplasia (center-edge angle < 25 degrees) had a 4.3-fold increased risk for incident radiographic OA of the hip (95% confidence interval 2.2-8.7) compared with subjects without acetabular dysplasia. These associations were independent of known determinants of hip OA such as age, sex, and body mass index (BMI), but tended to be enhanced by female sex, heavy mechanical load, and low BMI. CONCLUSION: In a study population age ≥ 55

years, acetabular dysplasia is still a strong independent determinant of incident radiographic hip OA.

Revel M, Thiesce A, et al. (1989). [Professional dancing and coxarthrosis]. Rev Rhum Mal Osteoartic **56**(4): 321-323.

The turn out, which is an external rotation of the lower limb used when dancing, demands a great deal of the hip, as does the extreme amplitude that is sought and used. Fig.1. We estimate that 17.5% of dancers, over the age of 40, suffer from arthritis of the hip. This prevalence is higher than that of the general population which stands at between 2 to 4.7%. It is also higher than that of the sporting world which does not exceed 10% in any research study. The pain starts between the ages of 25 and 65. It has no bearing on sex or the dominant side. It would appear to be triggered by abduction movements in external rotation (battements tendus, and développés à la seconde), arrondis, jumps and sustained movements when the dancer is supported on one foot. Pain is much more of an operational problem than articular stiffness. Limitation in articular movement mainly affects internal rotation and extension. When comparing X-rays (Fig.2), we find that 80% of dancers' hips, affected by osteoarthritis, show a slight morphological anomaly known as dysplasia or subdysplasia. We, also, find very few osteophytic hips, commonly known as sports' hips. It takes about 11 years, from when the symptoms first appear, before prosthetics surgery needs to be performed.

Yamazaki J, Muneta T, et al. (2011). Hip acetabular dysplasia and joint laxity of female anterior cruciate ligament-injured patients. Am J Sports Med **39**(2): 410-414.

BACKGROUND: It has been noted that some female anterior cruciate ligament-injured patients have complaints of both coxalgia and joint laxity. **HYPOTHESIS:** Female anterior cruciate ligament-injured patients tend to have both acetabular dysplasia and generalized joint laxity. **STUDY DESIGN:** Cohort study (prevalence); Level of evidence, 2. **METHODS:** Hip radiographs of 100 female anterior cruciate ligament-injured patients and 40 female athletes without any hip joint complaints or history of anterior cruciate ligament injury were evaluated by measuring their center-edge angle (CEA). In addition, generalized joint laxity tests using 8 items were performed for anterior cruciate ligament-injured patients. Anterior-posterior (A-P) tibiofemoral translation of the uninjured knee was measured using a KT-1000 knee arthrometer to evaluate joint laxity under anesthesia before anterior cruciate ligament reconstruction. **RESULTS:** The average (+/- standard deviation) CEA of female anterior cruciate ligament-injured patients was 25.5 degrees +/- 5.3 degrees (uninjured side) and 25.8 degrees +/- 4.8 degrees (injured side), and that of the control group was 28.2 degrees +/- 4.2 degrees (right side) and 29.2 degrees +/- 5.7 degrees (left side), both $P < .05$. Among the 100 patients with anterior cruciate ligament tears, both the generalized joint laxity score and A-P tibiofemoral translation of the group with acetabular dysplasia (CEA of <25 degrees, $n = 37$) were significantly greater than that of the normal group (CEA of ≥ 25 degrees, $n = 63$). There was a negative correlation between the CEA of female anterior cruciate ligament-injured patients and both the generalized joint laxity score and A-P tibiofemoral translation. **CONCLUSION:** The CEA of female anterior cruciate ligament-injured patients was significantly smaller than that of the control group. Statistical analysis showed a moderate negative correlation between the CEA and generalized joint laxity score. Female athletes with an anterior cruciate ligament injury had an increased prevalence of acetabular dysplasia and generalized joint laxity.