Kim J, Wilson MA, Singhal K, Gamblin S, Suh CY, Kwon YH. Generation of vertical angular momentum in single, double, and triple-turn pirouette en dehors in ballet. Sports Biomech. 2014 Sep;13(3):215-29.

The purpose of this study was to investigate the vertical angular momentum generation strategies used by skilled ballet dancers in pirouette en dehors. Select kinematic parameters of the pirouette preparation (stance depth, vertical center-of-mass motion range, initial shoulder line position, shoulder line angular displacement, and maximum trunk twist angle) along with vertical angular momentum parameters during the turn (maximum momentums of the whole body and body parts, and duration and rate of generation) were obtained from nine skilled collegiate ballet dancers through a three-dimensional motion analysis and compared among three turn conditions (single, double, and triple). A one-way (“turn”) multivariate analysis of variance of the kinematic parameters and angular momentum parameters of the whole body and a two-way analysis of variance (“turn” x “body”) of the maximum angular momentums of the body parts were conducted. Significant “turn” effects were observed in the kinematic/angular momentum parameters (both the preparation and the turn: p < 0.05). As the number of turns increased, skilled dancers generated larger vertical angular momentums by predominantly increasing the rate of momentum generation using rotation of the upper trunk and arms. The trail (closing) arm showed the largest contribution to whole-body angular momentum followed by the lead arm.

Goodwin H, Arcelus J, Geach N, Meyer C. Perfectionism and eating psychopathology among dancers: the role of high standards and self-criticism. Eur Eat Disord Rev. 2014 Sep;22(5):346-51.

This study examined the associations between conscientious perfectionism (high standards), self-evaluative perfectionism (self-criticism) and eating psychopathology among dancers. A sample of 244 female dancers with a mean age of 20.11 years (standard deviation = 1.97) completed the Perfectionism Inventory and Eating Disorder Examination Questionnaire. Self-evaluative perfectionism predicted eating psychopathology (eating restraint, eating concern, weight concern, and shape concern). This relationship was not moderated by conscientious perfectionism. The mediation analyses showed that although conscientious perfectionism predicted eating psychopathology, this relationship was fully mediated by self-evaluative perfectionism. These findings demonstrate the greater influence of self-evaluative perfectionism, rather than conscientious perfectionism, on eating psychopathology in dancers.

Han J, Waddington G, Anson J, Adams R. Level of competitive success achieved by elite athletes and multi-joint proprioceptive ability. J Sci Med Sport. 2015 Jan;18(1):77-81.

Proprioceptive ability has been suggested to underpin elite sports performance. Accordingly, this study examined the relationship between an athlete’s proprioceptive ability, competition level achieved, and years of sport-specific training. One hundred elite athletes, at competition levels ranging from regional to international, in aerobic gymnastics, swimming, sports dancing, badminton, and soccer, were assessed for proprioceptive acuity at the ankle, knee, spine, shoulder, and finger joints. An active movement extent discrimination test was conducted at each joint, to measure ability to discriminate small differences in movements made to physical stops. Multiple regression analysis showed that 30% of the variance in the sport competition level an athlete achieved could be accounted for by an equation that included: ankle movement discrimination score, years of sport-specific training, and shoulder and spinal movement discrimination scores (p < 0.001). Mean proprioceptive acuity score over these three predictor joints was significantly correlated with sport competition level achieved (r = 0.48, p < 0.001), highlighting the importance of proprioceptive ability in underpinning elite sports performance. Years of sport-specific training correlated with an athlete’s sport competition level achieved (r = 0.29, p =
Bowerman E, Whatman C, Harris N, Bradshaw E, Karin J. Are maturation, growth and lower extremity alignment associated with overuse injury in elite adolescent ballet dancers? Phys Ther Sport. 2014 Nov;15(4):234-41.

The objective of this study was to identify growth, maturation and biomechanical risk factors for overuse injury in elite adolescent ballet dancers. Maturation (Tanner scale), growth (foot length change), and age at onset of menarche were recorded in elite adolescent ballet dancers. A modified knee valgus angle and lateral tilt of the pelvis were measured using 2D video during two dance movements (fondu, temps levé) to quantify lower extremity alignment. Overuse dance injuries were recorded by a physiotherapist. The injury rate ratio (RR) associated with each variable was estimated using over-dispersed Poisson regression modelling. Changes in right foot length (RR = 1.41, CI = 0.93-2.13), right knee angles during the fondu (RR = 0.68, CI = 0.45-1.03) and temps levé (RR = 0.72, CI = 0.53-0.98), and pelvic angles during the temps levé on the left (RR = 0.52, CI = 0.30-0.90) and fondu on the right (RR = 1.28, CI = 0.91-1.80) were associated with substantial changes in injury risk. It is concluded that rate of growth in elite adolescent ballet dancers is likely associated with an increase in risk of lower extremity overuse injury and better right lower extremity alignment is likely associated with a reduction in risk of right lower extremity overuse injury.

Sanches SB, Oliveira GM, Osório FL, Crippa JA, Martín-Santos R. Hypermobility and joint hypermobility syndrome in Brazilian students and teachers of ballet dance. Rheumatol Int. 2015 Apr;35(4):741-7.

The current literature has been discussing the risks and benefits of joint hypermobility (JHM) for careers in ballet. This study aimed to evaluate the prevalence of JHM and joint hypermobility syndrome (JHS) in a group of ballet teachers and students, looking both at aspects related to the flexibility required to dance, and at the risk of injuries when hypermobility is associated with other symptoms, in the case of JHS. We evaluated ballet teachers and ballet students, with age ranging from 18 to 40 years. All participants completed identification and sociodemographic questionnaires and underwent a physical examination. JHM was assessed using the Beighton score with goniometry. Symptoms of JHS were evaluated according to the Brighton criteria. Final sample consisted of 77 participants, being 44 ballet students and 33 ballet teachers. The prevalence of JHM in the sample as a whole was 58%. Teachers and students had no significant differences regarding the prevalence of JHM (p = 0.74; OR = 1.21; 95% CI = 0.48-3.07). However, the prevalence of JHS was significantly different (p = 0.04) between students (16%) and teachers (36%). Teachers were three times more likely than student to have JHS (OR = 3.02; 95% CI = 1.03-8.85). Teachers and students also presented differences in the frequency of specific items of Beighton score and Brighton criteria. These data provide elements to discuss the relationship between hypermobility, ballet technique, and selection for dance, suggesting that dancers with JHS could find in ballet teaching an alternative to maintaining professional activity with dance, while remaining protected from the higher risk of injury to which professional dancers may be exposed.

Moser BR. Hip pain in dancers. Curr Sports Med Rep. 2014 Nov-Dec;13(6):383-9.

Dancers require extreme ranges of motion in their hips. They require this for many styles and performances. Hip pain and hip injury in dancers can lead to lost work and performance time. There are many potential causes for hip pain in the dancer, including dysplasia, hyperlaxity, both intra- and extra-articular impingement, and soft tissue injuries. This article reviews the current literature on these topics in dancers and how they can be applied to the dancer patient.

Cahalan R, O’Sullivan K. Musculoskeletal pain and injury in Irish dancing: a systematic review. Physiother Pract Res. 2013;34(2):83-92.

The popularity of Irish dancing has increased enormously since the success of “Riverdance, The Show.” The evolution of Irish dance to professional status has placed increased demands on dancers, yet scant investigation of musculoskeletal pain and injury among Irish dancers has been undertaken. This review examined the evidence regarding the rate of injury among Irish dancers, and the factors associated with injury risk. Electronic databases were searched by two independent assessors. Studies were included if they examined the rate of musculoskeletal pain or injury among Irish dancers, or the factors associated with musculoskeletal pain or injury among Irish dancers. Study quality was assessed using the Oxford levels of evidence scale. Only two retrospective studies met the eligibility criteria. These studies indicate that lower limb injuries, especially in the foot and ankle, are most common in Irish dancers. There is preliminary evidence that dancers who did not complete a warm-up and cool-down, who did not use split-shoe sneakers while training, and who perform at higher levels of competition may be at greater risk of injury. No high quality prospective studies of injury have been completed in Irish dance. The existing retrospective studies demonstrate that foot and ankle injuries are the most common, and some potential contributing factors to injury have been identified. However, prospective studies which evaluate these risk factors for injury, as well as common injury risk factors identified in other forms of dance, are required.