

Studying the Relationship between Leg Deformities and Patellofemoral Pain Syndrome in Athletes

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Abstract

We examined leg length difference (LLD), varus and valgus knee and foot deformities in athletes with and without patellofemoral pain syndrome (PFPS). Twenty three healthy participants (seven women and 16 men) and 15 participants (three women and 12 men) with PFPS aged 20-30 participated in the study. Leg length difference, genu varum, genu valgum, foot pronation and flat foot were measured and the groups were compared. No significant differences were found in LLD, genu varum, genu valgum, foot pronation and flat foot between the two groups. Our findings suggest that abnormal biomechanics of lower limb do not increase the risk of PFPS.

Keywords: Patellofemoral pain syndrome; leg length difference; lower leg malalignment; knee deformities.

Introduction

Disorders of the patellofemoral joint continue to be some of the most perplexing pathologic conditions in orthopedic and sports medicine [1]. Patellofemoral pain syndrome (PFPS) appears as diffuse anterior or retropatellar knee pain in the absence of other pathology exacerbated by activities such as stair climbing, prolonged sitting, squatting and kneeling [2]. Generally, one out of four persons will likely experience PFPS at some time [3, 4]. Although PFPS presents the most common knee problem, the etiology of this pain syndrome remains vague and controversial [5, 6, 7]. A commonly accepted assumption concerning the etiology of PFPS is related to increased patellofemoral joint stress and subsequent articular cartilage wear [8]. Eng stated that abnormal patellofemoral mechanics and anatomical variations throughout the entire lower extremities cause malalignment of the patellofemoral joint [9]. Some abnormal biomechanics and anatomic risk factors may be associated with overuse injuries [10, 11]. Common abnormalities include leg length discrepancies, excessive rearfoot pronation, poor flexibility, inadequate pelvic control, genu varum, genu valgum, excessive quadriceps angle, and genu recurvatum [1, 8].

Leg length discrepancy (LLD) is defined as a

condition in which paired legs are noticeably unequal [12]. Several authors have found that LLD created significant changes in gait such as increased ground reaction forces, increased energy consumption and increased lower extremity kinetic energy [13, 14]. LLD is thought to contribute to the occurrence of many clinical syndromes such as low back pain, scoliosis and a variety of running injuries [15].

Excessive foot pronation is a risk factor contributing to alterations in lower-extremity kinematics and musculoskeletal injury [16]. Excessive foot pronation during the stance phase can alter the normal rotation of the tibia in the frontal and transverse planes as a result of anatomical incongruence of the talus within the ankle mortise. In turn, aberrant tibial rotation can disrupt the normal patellofemoral relationship [9].

The purpose of this investigation was to determine whether LLD, genu varum, genu valgum, foot pronation, flat foot and high arch foot are the risk factors of PFPS.

Methods

Participants

Participation in the study was voluntary. Participants were placed in an experimental group (N=15) or a control group (N=23) based on the presence or absence of symptoms of PFPS (in one or both knees), respectively. All participants must

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