Individuals with excessive internal hip rotation and knee valgus during functional movement often develop abnormal lateral patellar tracking, sometimes resulting in anterior knee pain. A configuration of currently available biofeedback instruments, including an electronic goniometer, can provide feedback on limb position, which is useful in correcting the knee valgus. The article reports on the use of this biofeedback system with three individuals with measurable knee valgus, producing a remediation of the limb angle in each case.

Introduction
Excessive internal hip rotation and knee valgus in functional movements can result in abnormal lateral patellar tracking that stresses the subchondral bone within the patellofemoral joint; thus anterior knee pain can be caused (Powers, 2003; Powers et al., 2004). Valgus refers to the degree to which a limb is twisted or angled away from the midline of the body. Although there is a patellofemoral brace (SERF Strap, DonJoy, Vista, CA) designed to treat patellofemoral pain stemming from excessive knee valgus, no electronic form of biofeedback has been utilized to monitor the knee valgus when clinicians are treating patellofemoral pain.

This article is a technical paper that describes a simple method using existing biofeedback instruments already available on the market to help correct the postural knee valgus in squatting and rising from sitting motions.

Instruments
1. Electronic goniometer (SG110, Motion Lab Systems, Baton Rouge, LA)
2. Amplifier for goniometer (Angle display unit, Biometrics, Gwent, U.K.)
3. Auditory biofeedback unit (Temp/SC 200T, Thought Technology, Plattsburgh, NY)
Configuration of Biofeedback Instruments

The above battery-powered instruments can be connected to assemble a limb position biofeedback system (Figure 1). The goniometer is placed on the lateral side of the lower leg; thus the inclination of the lower leg at the coronal plane can be measured (Figure 2).

Preliminary Result

Three asymptomatic female subjects (ages 25–28) with postural knee valgus in squatting were invited to use this biofeedback. With real-time audio feedback that reminded them whenever the knee valgus was over 10 degrees, all subjects were able to correct their knee valgus in squatting (Figures 3 and 4) and rising from sitting almost immediately.

Discussion

This article is a technical paper rather than a clinical study. Although the above configuration of instruments is practical to implement an electronic form of biofeedback for postural lower leg position in the clinic or at home, potential therapeutic effects of the biofeedback for patellofemoral pain is beyond the scope of this article. The three subjects utilized in this study were asymptomatic, although they displayed measurable valgus of the knee. In addition, the portable limb position biofeedback could work with a data logger, to trace a subject’s lower leg position in daily life.

References


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