PURPOSE: Research evidence has shown hemispheric specialization in the utilization of proprioception. The purpose of this study was to investigate the immediate effect vibrating foam roller exercise (VFRE) on bilateral ankle proprioception in recreational basketball players (RBP).
METHODS: This was a randomized cross-over study. Twenty-two right-footed male RBP (Age=23.6±0.3) volunteered. After baseline assessment of ankle proprioception in barefoot, RBP were randomly assigned to either vibrating the peroneal muscle (VFRE-p, n=11) or the gastrocnemius muscle (VFRE-g, n=11) group. Bilateral ankle proprioception was re-assessed after VFRE. After 24h washout, the two groups swapped exercise and bilateral ankle proprioception was re-assessed. The VFRE for each muscle group was 3×30s vibration at the frequency of 50 Hz, with a 30s rest between sets. Ankle proprioception was measured by active movement extent discrimination apparatus (AMEDA). Repeated measures and Pearson's correlation was used to analyze the data.
RESULTS: There was no significant Side (R=0.411, p=0.057), Muscle or Time effect (F=0.826, p=0.445; F=0.441, p=0.647, respectively). However, when RBP were divided into superior (SG, n=11) and inferior (IG, n=11) groups, according to the median of bilateral ankle proprioception, we found: 1) the dominant right ankle proprioception worsen significantly after both VFRE-p (p=0.022) and VFRE-g (p=0.02) in the SG, but not in the IG (F=1.748, p=0.2); 2) the non-dominant left ankle proprioception improved significantly after both VFRE-p (p=0.046) and VFRE-g (p=0.01) in the IG, but not in the SG (F=1.461, p=0.256). These findings suggest that VFRE can impair the dominant right ankle proprioceptive performance in those who initially have superior proprioception, and conversely improve the non-dominant left ankle proprioceptive performance in those who initially have inferior proprioception.
CONCLUSIONS: This study has revealed a novel hemispheric specialization effect in proprioceptive information processing associated with VFRE. Specifically, VFRE affects proprioception of the dominant and non-dominant hemispheric systems differently suggesting that the clinical application of VFRE should be considered regarding each individual's initial ankle proprioception and footedness.

2586 Board #47 May 29 9:30 AM - 11:00 AM

Comparison Of Warm-Up Strategies On Internal And External Rotation Mechanics In Collegiate Pitchers

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(No relationships reported)

Rotator cuff strains are the most common musculoskeletal injury in collegiate baseball pitchers. A variety of warm-up routines are employed, the effects of these routines on the subsequent function of the rotator cuff lack comparison.
PURPOSE: To test the effect of four different warm-up routines on internal (IR) and external rotation (ER) shoulder kinematics.
METHODS: Seven D1 collegiate pitchers were enrolled in an experiment involving four testing sessions. Each session began with one of four warm-up protocols: 1) Jaeger bands (JB), 2) standard dynamic warm-up (DW), 3) Jaeger bands and standard dynamic warm-up (JBDW), or 4) dynamic warm-up using collinear resistance (CR). Immediately after the warm-up, athletes underwent biomechanical analysis of internal and external shoulder rotation using Proteus (Proteus Motion, USA). They performed 12 repetitions of each motion using 5lb of 3D magnetic resistance. 48 hours of rest separated each session. The assigned sequence of protocols was counter-balanced. Proteus software computed peak power in watts (w), peak force development rate in watts/second, range of motion in meters (ROM), consistency (the ability to replicate ROM in three-dimensional space), and endurance (replication of power parameters in successive repetitions). A one-way repeated measures ANOVA was used.
RESULTS: Subjects were 20.4±1.4 years of age. Across all conditions, peak power was 96.3±13.7 w in IR and 99.3±15.7 w in ER; peak force development rate was 387.7±118.5 w/sec in IR, and 418.7±195.6 w/sec in ER. Differences were detected in the four warm-up conditions in peak power (CR highest; p=0.015), peak force development rate (CR highest; p=0.072), and ROM (CR highest; p=0.015). No difference was found in deceleration (p=0.336), consistency (p=0.903), or endurance (p=0.769). External rotation was different in the four warm-up conditions in peak force development rate (CR highest; p=0.045). No statistical difference was found in power (CR was highest, but did not reach significance; p=0.104), deceleration (p=0.520), consistency (p=0.478), endurance (p=0.145), or ROM (p=0.543).
CONCLUSION: The simulated dynamic warm-up using three-dimensional resistance elicited the best subsequent function, follow up studies should examine mechanisms that produce this difference.

2587 Board #48 May 29 9:30 AM - 11:00 AM

The Relationship Between Mountain Bike Seat Tube Angle, Knee-pedal Alignment, And Knee Range Of Motion

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(No relationships reported)

PURPOSE: Newer bicycles have increasingly steep seat tube angles. Seat tube angle (STA) is consistent within each bike model, but changes with seat height and post positioning. Traditionally, a bike fit will vertically align the knee with the pedal at the midpoint of the downstroke. This positioning has an effect on a rider's knee range-of- motion (ROM) potentially affecting fatigue rates. Additionally, the ROM may affect the knee-pedal spindle alignment position thereby affecting power capacity. Therefore, the purpose of this study was to determine if effective seat tube angle affects knee-pedal alignment and knee ROM.
METHODS: Participants included 17 male and female (176.9 ±3.9 cm, 66.6 ±25.4 kg), amateur and elite, cross-country mountain bike racers. Reflective markers were placed by the same researcher at locations on the participants dominant side: greater trochanter of femur, lateral condyle of femur, and lateral malleolus of fibula. Photographs were taken of the bike alone and with the participant in their typical riding position, with leg at full extension, full flexion, and halfway through the downstroke. Photographs were analyzed to determine knee-to-spindle horizontal distance (KTS), peak knee flexion angle (KFA), and STA using digital measurement software (Dartfish USA, Alpharetta, GA). Linear regression was used to statistically analyze the data (alpha=0.05).
RESULTS: For every 1 degree increase in STA, knee position moved forward 1.42 cm closer to the handlebars (p=0.050, R^2= 0.23). After accounting for STA, KFA explained an additional 44% of the variance in KTS (p<0.001) where every 1 degree increase in KFA resulted in knee position moving 0.58 cm further away from the handlebars. When combined, STA and KFA explain 67% of the variance in KTS.
CONCLUSIONS: It is generally accepted that KTS should be 0 to have optimal power transfer to the pedals and limit sagittal forces on the knee joint. Changing STA in order to decrease KTS may be effective to increase performance. Further research should examine how individualized STA could affect rider positioning and performance during endurance efforts.

E-26 Free Communication/Poster - Acute Exercise

Friday, May 29, 2020, 9:30 AM - 12:00 PM

Room: CC-Exhibit Hall