

or isometric strength.

CONCLUSIONS: The TF group demonstrated greater isokinetic knee extensor strength in their intact limb with knee osteoarthritis compared to the CON group osteoarthritic limb, however there were no differences in isometric strength. This may indicate that isometric strength testing may be more appropriate when comparing TF and CON groups. Further, the differences in isokinetic strength may suggest that those with history of leg amputation may require more strength and power in the intact limb to maintain daily activity and therefore, may require greater thresholds of strength to protect the knee joint from cartilage degradation.

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People With Marfan Syndrome Utilize An Ankle Dominant Strategy During The Sit-to-Stand Task

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PURPOSE: Marfan syndrome (MFS) is a connective tissue disorder that alters fibrillin-1 production, which negatively impacts skeletal muscle function and results in knee joint muscle weakness and pain. Muscle dysfunction in people with MFS may impact lower extremity joint mechanics needed to successfully perform activities of daily living yet biomechanical analyses in the MFS population are lacking. Therefore, the purpose of this study was to assess lower extremity joint loading in people with MFS during the sit-to-stand (STS) task. We hypothesized that people with MFS would exhibit altered joint loading compare to controls during the STS. **METHODS:** Eleven people with MFS (10 F, BMI = 25.8±6.3 kg·m⁻²) and 11 sex and BMI-matched, asymptomatic controls (10 F, BMI = 23.8±2.8 kg·m⁻²) underwent a 3D gait analysis while performing the STS task at a self-selected pace. The participants' test limb was chosen as the dominant limb for the control group and the most painful limb for the MFS group. Peak internal hip, knee, and ankle joint extensor moments, the total support moment (TSM), and hip, knee, and ankle joint contributions to TSM during the STS task were assessed and compared using either an ANOVA, adjusting for age, or a Mann-Whitney U-Test. For both of these statistical methods bootstrapping was performed with 100 samples.

RESULTS: The MFS and control groups performed the STS with similar peak hip extensor moments, TSM, as well as hip and knee contributions to TSM (p>0.05). The MFS group exhibited 46% higher peak ankle plantarflexor moments (p=0.005) and 10% higher ankle joint contributions to the TSM (p=0.002) compared to the control group. The MFS group also exhibited statistical trends of lower peak knee extensor moments (p=0.06) during the STS task.

CONCLUSION: People with MFS utilized altered ankle joint loading patterns to perform the STS task when compared to healthy individuals. Our study suggests that people with MFS utilize an ankle-dominant joint loading pattern to successfully perform the STS task in order to possibly compensate for knee joint extensor muscle weakness. Future work will assess the relationship between time-dependent variables in lower extremity joint loading with joint-related outcomes in MFS.

GRANT OR FUNDING INFORMATION: Marfan Foundation, NIH KL2-TR001996, NIH K01HL149984 and NIH K01AG073698

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Performances In Transverse And Multiplanar Motions Predict Batting But Not Throwing In High School Baseball

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Success among high school baseball players is multifactorial. Throwing velocity (TV) for pitchers and exit velocity (EV) for batters are two important factors. While traditional conditioning programs emphasize general strength, speed, and power, how each individual exercise translates to sport performance lacks comprehensive study.

PURPOSE: To measure relationships between transverse rotation, a simulated shot put motion, TV, and EV in high school baseball players.

METHODS: We enrolled 17 high school pitchers to be tested using Proteus technology (Proteus Motion, USA). Following a standardized warmup, each athlete performed 5 transverse rotations and 3 stationary shot put motions using a Proteus device. Each exercise was performed against 10lbs of 3D isotonic resistance. We recorded maximum force output (w) and peak velocity (m/s²) in each motion. Subjects then performed 5 bat swings on a stationary ball and threw 5 fastballs; peak EV and TV were captured via radar (mph). Simple linear regressions tested the associations between the Proteus exercises and baseball performances.

RESULTS: Subject age was 16.4 ± 1.4 yr, height was 183.9 ± 7.6 cm, and weight was 78.7 ± 11.7 kg. Subjects produced 186.4 ± 24.6 w in transverse rotation, achieving a peak velocity of 4.2 ± 0.6 m/s². In the shot put motion, subjects produced 210.5 ± 32.5 w with a peak velocity of 4.6 ± 0.7 m/s². Maximum TV was 80.4 ± 5.1 mph and EV was 78.8 ± 9.4 mph. TV and EV were correlated (r=0.638; p=0.014). TV was not associated with transverse rotation power (p=0.456) or velocity (p=0.541), nor shot put power (p=0.212) or velocity (p=0.202). EV exhibited a positive trend with higher transverse rotation power (R²=0.211; β=0.170; p=0.073; 95% CI: -0.018 to 0.358), and a weak positive association with transverse rotation velocity (R²=0.188; β=7.048; p=0.094; 95% CI: -1.357 to 15.453). EV was significantly predicted by shot put power (R²=0.523; β=0.203; p=0.002; 95% CI: 0.092 to 0.314) and velocity (R²=0.436; β=9.300; p=0.005; 95% CI: 3.237 to 15.362).

CONCLUSIONS: Among high school baseball players, EV was correlated with isotonic rotational capacity. The association was modest in the transverse plane and significant in a multiplanar motion. Strength and conditioning coaches may consider emphasizing similar exercises in high school training programs.

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Timing Of Peak Shoulder Distraction Force Between Pitch Types Across A Simulated Softball Game

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