

1. 在 Souza RB 2009 JOSPT 的“Differences in Hip Kinematics, Muscle Strength, and Muscle Activation Between Subjects With and Without Patellofemoral Pain” 文章中使用等速肌力儀與肌電圖測臀部肌群表現，與動作分析系統與腰部以下反光球看下肢運動學與動力學表現，觀察有髌股骨關節疼痛症候群(PFP)與無髌股骨關節疼痛症候群(controls)的受試者表現，有以下發現：

(1) 請以以下三圖表解釋髌關節運動學、肌力與肌肉活化程度與髌股骨關節疼痛症候群(PFP)的關係 (左邊 bar: PFP, 右邊 bar: Control)。(15%)

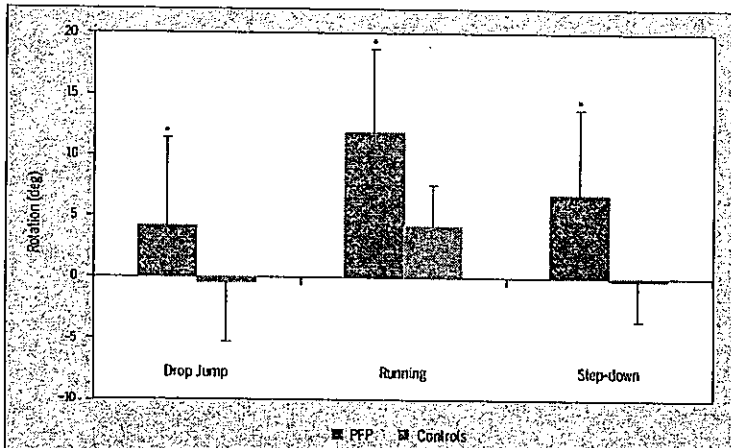


FIGURE 2: Comparison of peak hip internal rotation across the functional tasks evaluated. Data are mean \pm SD. Negative values represent external rotation and positive values represent internal rotation. *Individuals with patellofemoral pain (PFP) significantly greater than controls, when averaged across all tasks ($P < .05$).

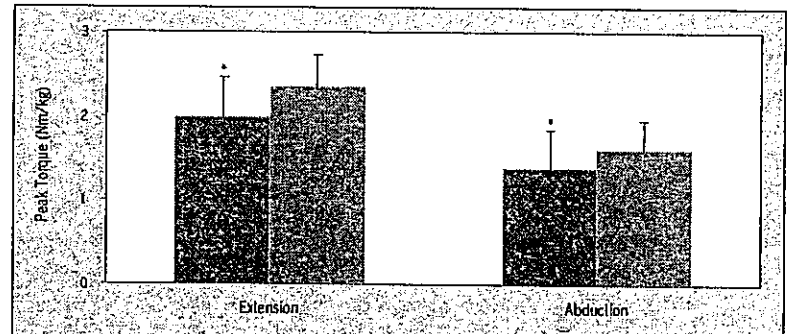


FIGURE 4: Comparison of peak hip torque production during isometric strength testing. Data are mean \pm SD. *Individuals with patellofemoral pain (PFP) significantly less than controls ($P < .05$).

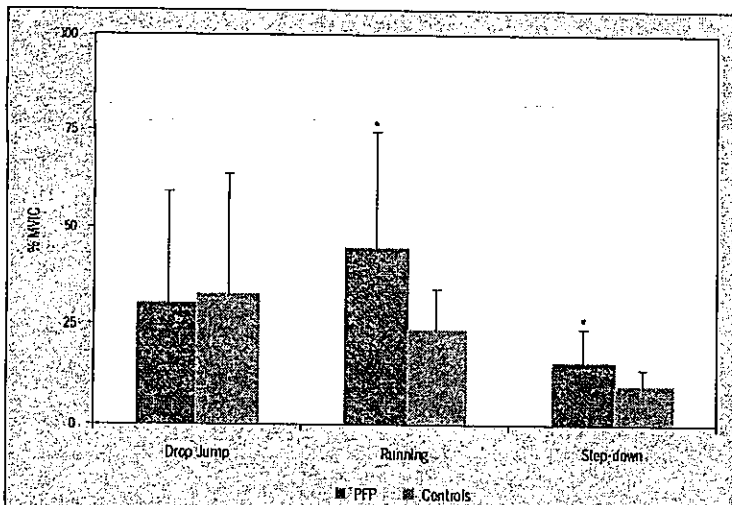


FIGURE 5: Comparison of average gluteus maximus electromyographic signal amplitude across the functional tasks evaluated. Data are mean \pm SD. Significant group-by-task interaction observed. *Individuals with patellofemoral pain (PFP) significantly greater than controls ($P < .05$). Abbreviation: MVIC, maximum voluntary isometric contraction.

(2) 該實驗於冠狀面發現髌關節外展/內收運動學沒有組間差異，你覺得可能原因為何？ (5%)

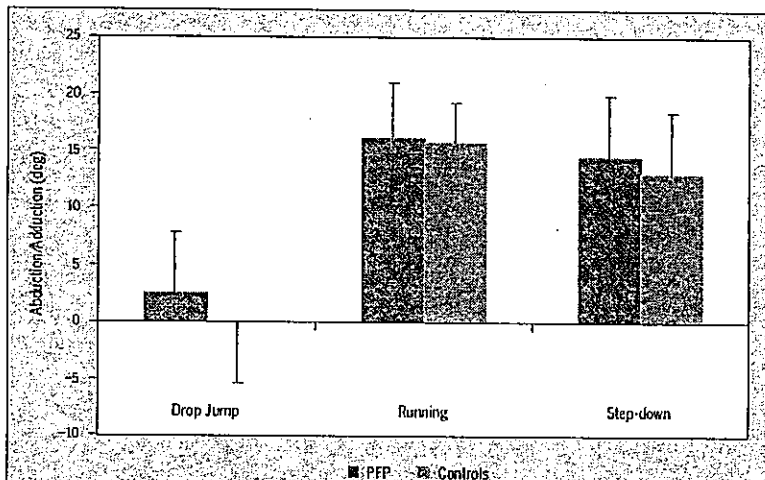
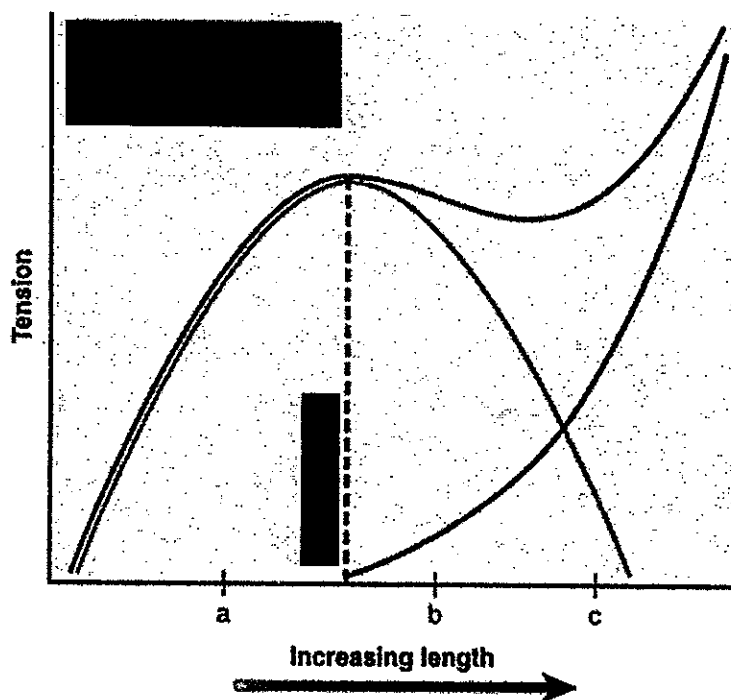


FIGURE 3: Comparison of peak hip abduction across the functional tasks evaluated. Data are mean \pm SD. Negative values represent abduction and positive values represent adduction. No significant interaction or differences between groups ($P > .05$). Abbreviation: PFP, patellofemoral pain.

見背面

2. 請說明以下肌肉 length tension curve 中各曲線與虛線之意義，以及特別解釋在 b 點時的肌肉收縮特質與曲線的關係為何？ (10%)

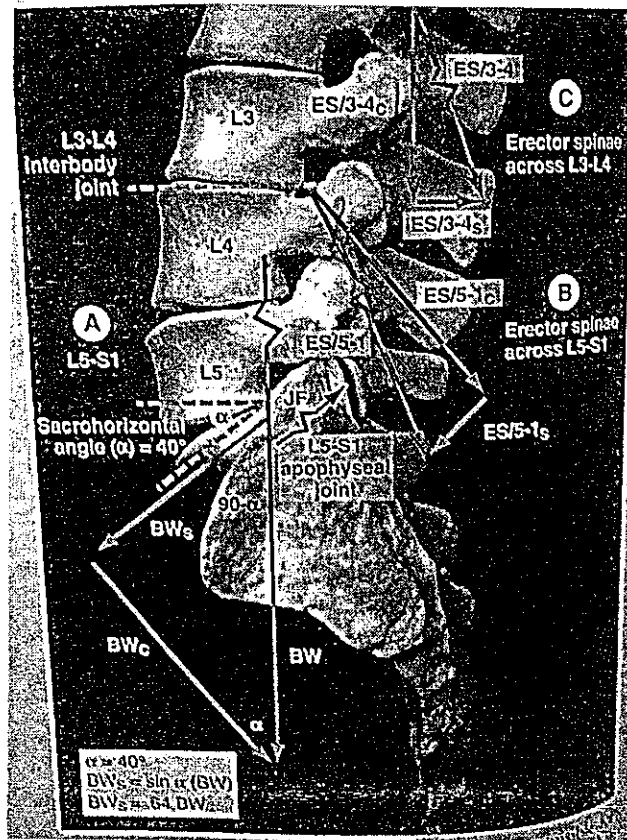


3. 請以下圖之下肢關節位置(髖、膝、踝關節)與地面反作用力關係分析外在力矩(地面反作用力產生甚麼方向外在力矩)與內在力矩(哪些肌肉群收縮以對抗外在力矩)的關係。 (10%)

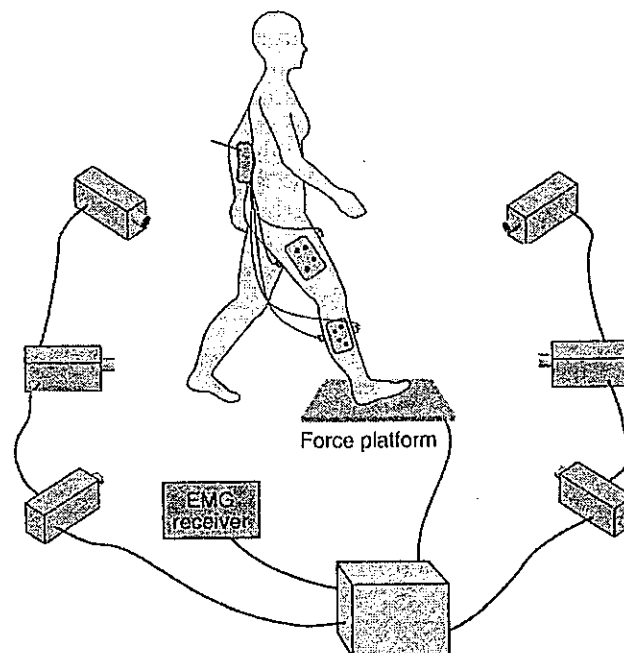


4. Donald Neumann 於 Kinesiology of the Musculoskeletal System: Foundations for Rehabilitation 一書中提到腰椎與重力及肌肉力量的關係，請說明

- (1) 下圖重力(BW)與豎脊肌(Erector Spine, ES)對於腰椎關節動作與穩定的影響。(10%)
- (2) 倘若腰大肌(Psoas major)在圖中，其影響為何?(10%)



5. (1) 請參考下圖，詳細說明步態分析時所需使用的儀器設備及其功能。(15%)
- (2) 詳細描述步態週期(gait cycle)的分期。(15%)
- (3) 畫出正常步態週期中，地面反作用力(ground reaction force)圖：
 - (a) 垂直方向地面反作用力。(5%)
 - (b) 前後方向地面反作用力。(5%)



試題隨卷繳回