Grant Information Summary:

The Effects of Chronic Ankle Instability and Fatigue on Dynamic Postural Control

Practical Implications:

The results of this study demonstrate that chronic ankle instability disrupts dynamic postural control most noticeably by altering neuromuscular control proximal to the knee. This effect is magnified with the presence of fatigue.

Background

There has been extensive sports medicine research investigating the residual effects of lateral ankle sprains and chronic ankle instability (CAI). While there are a plethora of studies of neuromuscular control in CAI subjects using instrumented methods, there is a clear lack of non-instrumented clinically applicable tests to assess neuromuscular and functional deficits in patients with CAI. There also appears to be a relationship between altered neuromuscular control and muscle fatigue. Deficits in static postural control related to CAI and fatigue have been investigated separately, but there is little evidence to link these factors to performance measures of dynamic postural control.

Objective

To investigate the effects of fatigue and CAI on performance measures of the Star Excursion Balance Test (SEBT), a measure of dynamic postural control.

Design and Setting

For each of the three designated reaching directions, four separate 5 [Day] x2 [Side] x2 [Time] ANOVA's with a between factor of Group were performed for normalized reach distance, maximal ankle dorsiflexion, knee flexion, and hip flexion angles. All data were collected in a research laboratory.

Subjects

Thirty subjects (16 Healthy, 14 CAI) participated.

Measurements

All subjects completed 5 testing sessions during which sagittal plane kinematics and reaching distances were recorded while performing 3 reaching directions (anterior, medial, and posterior) of the SEBT (Figure 1) with the same stance leg before and after different fatiguing conditions. The procedure was re-peated for both legs during each session.

Results

The involved side of the CAI subjects displayed smaller reach distance values for all three reaching directions compared to the non-injured side and the Healthy group. (Table 1). The effects of fatigue amplified this trend.

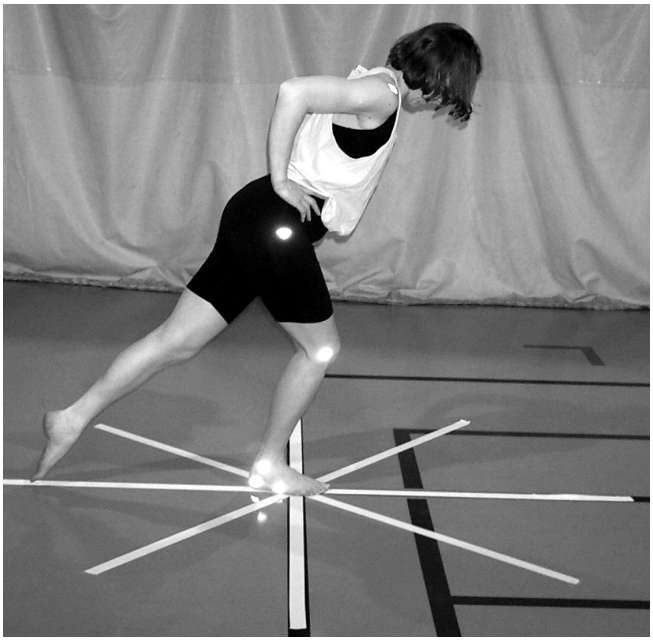
Conclusions

The results demonstrate that CAI and fatigue disrupted SEBT performance (MAXD) most noticeably by altering control of sagittal plane joint angles proximal to the ankle.

Table 1: Group by Side Interaction: MAXD [reach distance (cm)/leg length (cm)] ± standard error

	CAI: injured side	CAI: un-injured side	Healthy: matched injured side	Healthy: matched un-injured side
Anterior Reach (F1,28=5.56, P=.026)	0.784 ± .016	0.818 ± .017	0.768 ± .015	0.771 ± .016
Medial Reach (F1,28=5.88, P=.022)	.875 ± .015	.900 ± .018	.877 ± .014	.871 ± .017
Posterior Reach (F1,28=7.01, P=.013)	.890 ± .024	.909 ± .024	.908 ± .023	.899 ± .022

Figure 1: Star Excursion Balance Test



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