Introduction

Repeated constrains at the soulder joint during sport activities may lead to pain or injuries of different types [1–3]. Scapular dyskinesis relates to altered statics and/or kinematics of the scapula. There are discussions in the literature whether dyskinesis should be considered as a risk factor of pain and/or injury at the shoulder joint [4] [5]. The understanding of the specificities of asymptomatic dyskinetic athletes could contribute to distinguish alterations related to dyskinesis in opposition to alterations related to confounding factors such as pain.

Research Question

The objective of the present study was to evaluate the scapular kinematics in asymptomatic dyskinetic sport participants during a fatigue protocol.

Methods

Eleven male volunteers were recruited in two groups (asymptomatic dyskinetic, non dyskinetic). The volunteers should practice sport and none of the volunteers had a history of surgery or injury in the last six months. The volunteers should also be negative to impingement syndrome and cuff lesion tests. Dyskinesis presence was determined based on clinical evaluations.

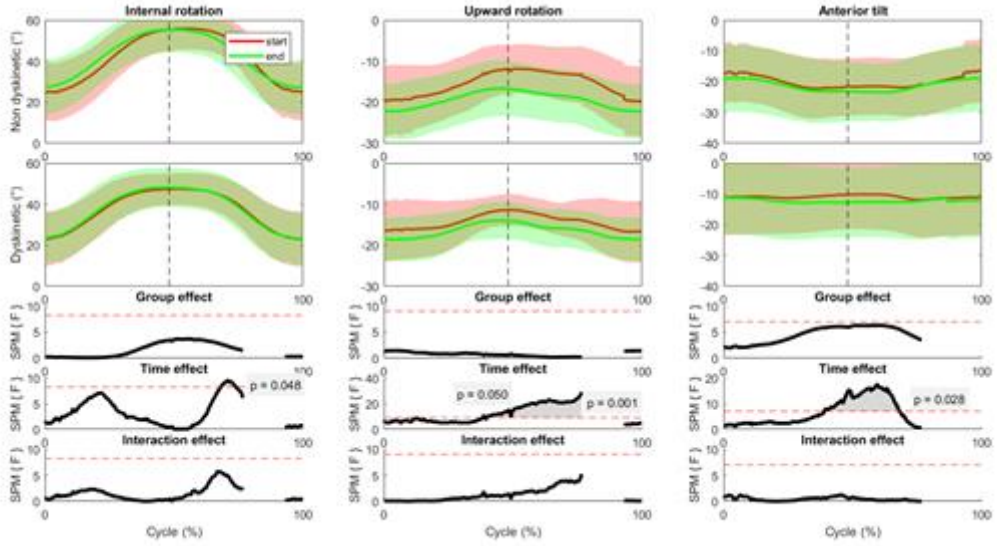
The volunteers were asked to perform active protractions and retractions of the scapula (Knee Plus Fatigue Protocol). Only the “plus” phase was performed. The volunteers had their knees on the ground with the hips flexed at 90° and the elbows were to remain fully extended. The volunteers were asked to perform this motion until they could no longer maintain the task.

The 3D position and orientation of the volunteers’ thorax, and dominant/dyskinetic scapula were tracked using an optoelectronic system. To assess the modification of the scapular kinematics during the protraction-retraction task, one-dimensional statistical parametric mapping.

Results

No statistical difference between the two groups is identified (Figure 1). However, there is a tendency towards a more anterior tilted scapula in the non-dyskinetic group. Fatigue (time) has an effect on the scapular kinematics with an increase of the upward rotation and of the

anterior tilt of the scapula.



Discussion

The comparison between the healthy and the asymptomatic dyskinetic populations did not reveal significant differences for scapular positioning during the push-up plus task. However, even if not significant, the scapula was less anteriorly tilted in the dyskinetic group. This (non-significant) difference would indicate that the non-dyskinetic group adopt a more anterior scapula to control the shoulder complex during the task.

The fatigue task induced modifications of the scapular kinematics including an increase of the anterior tilt. Borstad al. [6] also observed the same modification during an isometric push-up plus task. We also observed an increase of the upward rotation. The combination of the increased anterior tilt and upward rotation could indicate a majoration of the dyskinesis in both groups. Fatigue task could consequently have an interest to better identify dyskinesis in overhead sport practitionners whereas clinical evaluations without loads/fatigue may underestimate kinematic alterations occuring during sport activities.

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