Do trainers pay enough attention to posture adjustment when athletes perform strength exercises in a leg press machine?

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Abstract

The aim of this study was to analyse trainers' appraisal of body posture adjustment -specifically joint alignment and flexion/extension of the legs- in athletes performing a leg press exercise. Ten strength trainers observed 15 video records of 15 athletes with no musculoskeletal problems. Kinematic analysis was based on motion capture data from athletes, combined with data from the semantic differential that trainers used to appraise joint alignment and flexion/extension. Multiple analysis of the two kinds of data showed that trainers' appraisals did not always coincide with what the kinematic parameters indicated regarding the athletes' posture adjustment while performing the leg press exercise.

Keywords: Leg press; posture adjustment appraisal; flexion parameters; flexion adjustment appraisal.

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1. Introduction

The leg press is one of the most commonly performed exercises in fitness centres, a setting where personal trainers are often on hand to assist users and correct their movements. It is therefore worth asking to what extent trainers are capable of perceiving the finer details of the performance variables involved in this kind of exercise. Correct posture is fundamental to all our body movements (Castaner, Torrents, Anguera, Dinusova & Jonsson. 2009), and it is especially important when exercise series (load and repetitions) are performed using fitness machines (Novatchkov & Baca, 2013). This study aims to identify the kinematic parameters of the flexion phase when athletes perform a leg press exercise and to examine whether these parameters are reflected in trainers' observations. The comparison of naked-eye appraisals with kinematic data is an approach that has yielded valuable results in other areas of exercise research (Castaner, Torrents, Morey, Jofre & Anguera 2011).

1.1. Aims

To compare trainers' perceptions with objective kinematic data regarding the leg press exercise, focusing on the following variables: time, amplitude and angle of flexion.

2. Method

We conducted a regression analysis between several variables and we state here those variables related to the time, speed, amplitude and angle of flexion while performing the leg press exercise.

2.1. Participants

Participants were ten personal trainers, ranging in age between 24 and 40 years (*M = 31,70 ; DT = 6,15*). They all had either a degree in physical activity and sports science or a diploma in physical education. The videos they were asked to observe were recordings of 15 students (from a degree course in physical activity and sports science) performing a leg press exercise. None of the students had any musculoskeletal problems.

2.2. Instruments

Trainers' appraisals were gathered by means of a semantic differential. This was based on a seven-point Likert-type scale whose anchors corresponded to the opposing extremes for the appraisal of each variable (e.g. 1 = very little amplitude of flexion, 7 = very large amplitude of flexion). The variables they were asked to assess were: speed of flexion, speed of extension, fluidity, amplitude of flexion and amplitude of extension. These variables were related to the following kinematic parameters: angle of flexion, angle of extension, time of flexion, time of extension and total exercise time. The software package Kinovea v0.8.15 was used to analyse the 15 videos in relation to the angles of flexion and extension while performing the leg press, as well as the speed with which the exercise was performed.

2.3. Procedure

The ten trainers made two individual observations of each of the 15 videos and used the semantic differential to record their appraisal of the leg press exercise.

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3. Results

Regression analysis for the variables time and speed of flexion showed that all the observers made similar appraisals (Fig. 1a). By contrast, the regression analysis for the variables amplitude and angle of flexion revealed that the appraisals made by two of the observers differed considerably from those of the others (Fig. 2b).

4. Interpretation

These results are consistent with the fact that the duration of exercise (Novatchkov & Baca, 2013) is known to be a key determinant of effectiveness when athletes use a leg press machine. In this context the American College of Sports Medicine recommends that each repetition be performed at a moderate speed and with a duration of 6 seconds (2-3 seconds for flexion and extension) (Westcott, 2009). Our results show that trainers' appraisals of athletes' performance does not always coincide with what an analysis of kinematic parameters indicates, and in the case of a variable such as the amplitude of flexion, the two sets of data differ considerably.
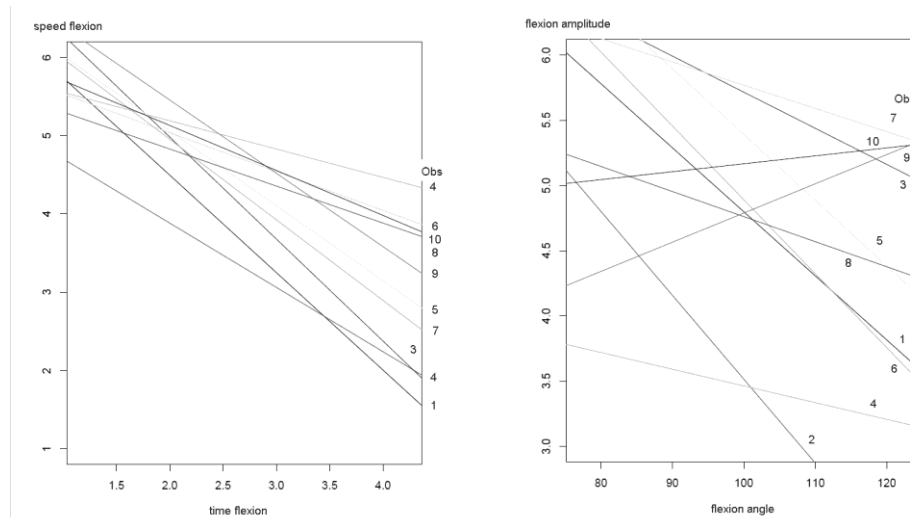

Figure 1. a) Regression analysis for the variables time and speed of flexion; (b) regression analysis for the variables amplitude and angle of flexion.

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5. Conclusions

The results of this study provide a platform for further investigation of how trainers perceive the performance of athletes in a range of fitness exercises, especially as regards the extent to which they pay attention not only to exercise load and duration but also to posture adjustment.

Acknowledgments

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