LONGITUDINAL STUDY OF JUMPING MECHANICS IN MASTER ATHLETES

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INTRODUCTION: This investigation forms part of a larger project studying running gait in master athletes. Improved dynamic performance has been shown to be associated with low leg stiffness values (Laffaye *et al*., 2005). Previously a cross-sectional analysis of jumping suggested that leg compression reduced and leg stiffness increased with age, whilst joint contributions to these changes were found to be subject dependent (Diss *et al*, 2006). The aim of this longitudinal study is to examine the effect of ageing on vertical jump performance indicators such as leg compression and stiffness in master athletes. (Work in progress).

METHOD: Two data collection sessions, separated by a two year interval, were conducted. Ten male master athletes of mean age 53.0 (±2.0) years, at the onset of the study performed ten maximal countermovement jumps from a hurdle step approach. Synchronized kinematic (Vicon 612, 120Hz) and kinetic data (Kistler, 1080Hz) were collected. Reflective markers located at 36 anatomical sites were used to create a full body model. All subjects continued with their normal training routine during the two year period. Leg stiffness was assessed using a simple spring mass model where leg compression was defined as the change in length from the mass centre to the mid-toe from touch down to a minimium length. The resultant force at minimum spring length (Peak F_R) was measured in each trial. Comparison of performance indicators derived for each subject for the two sessions will be made.

RESULTS: The data for two subjects are presented in Table 1 and show that vertical take-off velocity reduced over the two year interval. Subject-specific responses were observed in the other three variables.

Table 1 Mean (±sd) vertical jump performance indicators for 2 subjects (A and B)

Subject	Leg stiffness (BW/m)	Leg Compression (m)	Peak F_R (BW)	Vertical Velocity at take-off (m/s)
A (onset)	16.02 (±2.75)	0.17 (±0.03)	2.70 (±0.18)	2.23 (±0.14)
A (+2 years)	23.60 (±4,51)	0.12 (±0.03)	2.75 (±0.18)	2.12 (±0.14)
B (onset)	15.93 (±2.34)	0.20 (±0.02)	3.09 (±0.18)	2.65 (±0.09)
B (+2 years)	10.55 (±2.15)	0.28 (±0.04)	2.89 (±0.13)	2.43 (±0.07)

DISCUSSION: For the two subjects analysed, a decline in performance was observed which is anticipated for all subjects. This performance decline was associated with individual responses and it is likely that similarly variable responses will be observed for the remaining eight athletes.

CONCLUSION: There was a reduction in jump performance with age for the master athletes. Different leg stiffness and compression responses were evident for the two athletes reported, indicating the benefits of customised training for athletes in this masters' category.

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