KINEMATICS OF RESISTANCE SPRINT TRAINING

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INTRODUCTION

An athlete's sprint time is commonly used to determine the athlete's athleticism. With the competitive nature of sports comes the need to produce faster athletes. Restrictive sprinting is one technique used to obtain this goal. According to Cronin et al. (2006), restrictive sprinting involves any form or condition that overloads the sprinters' natural mechanics or muscular system. The agility sled is a piece of apparatus used by many athletic trainers and facilities to help aid in enhancing runners' explosive characteristics and overall speed. Therefore, the purpose of this study was to examine the kinematics of sprint mechanics with different sprint training conditions.

METHODS

Five former high school football players volunteered to participate in the study. Subjects were recorded pushing an agility sled (Driven), towing with a sled (Harnessed), and sprinting over a 10 m distance without resistance (Natural). Each subject completed five trials in each running condition. A standard 2D kinematic analysis was conducted and the running trials were captured at 60 Hz. The subject's hip angle was recorded and analyzed at the moment of foot strike. A one-way repeated measured ANOVA was conducted at $\alpha = 0.05$ and followed by a *t*-test with Bonferroni adjustment when a significant difference was found.

RESULTS AND DISCUSSION

The results of the study showed a significant difference in the hip flexion angle in the sled drive (Driven) compared to the natural sprint (Natural). This could be due to the increased forward trunk lean caused by the fixed position of the drive bar on the agility sled.

Table 1. Hip flexion at foot strike

Conditions	**Mean ± SD°**	***p***
Natural vs. Harnessed	96.58 ± 8.85 vs. 89.05 ± 14.35	0.756
Harnessed vs. Driven	89.05 ± 14.35 vs. 61.58 ± 2.73	0.054
Natural vs. Driven	96.58 ± 8.85 vs. 61.58 ± 2.73	0.003

**Statistical significant at $p < 0.05$*

SUMMARY

The study concludes that the hip flexion joint angle is increased when driving a sled (Driven) compared to the towing a sled (Harnessed) and the un-resisted sprint (Natural). This preliminary finding is valuable to coaches and trainers who incorporate sled pushing and towing based on the principle of sport specificity in their sprint training program. Further research is warranted to examine the effects of various heights of the drive bar on sprint mechanics.

REFERENCES

Cronin, J. Hansen, K. (2006). Resisted sprint training for the acceleration phase of sprinting. *National Strength and Conditioning Association*. 28(4), 42-51.