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# The effects of visual and verbal feedback on peak torque in college-aged male and female athletes

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Campenella B., Mattacola C.G. & Kimura I.F., Effect of visual feedback and verbal encouragement on concentric quadriceps and hamstrings peak torque of males and females, *Isokinetics and Exercise Science*, 8 (2000), 1-6.

# The effects of visual feedback and verbal encouragement on peak torque in college-aged male and female athletes

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## Background

Verbal encouragement and visual feedback, both components of Biofeedback technique, have been shown to increase concentric peak torque scores by increasing the amount of exertion demonstrated by the subjects. (Campenella et al., 2000). Visual feedback has been found to increase peak torque output at low velocities, but to have no effect at faster velocities (Hald & Bottjen,1987; Figoni & Morris, 1994). Verbal encouragement has been found to produce much more varied results, as some studies have shown that encouragement can increase peak torque up to 5 percent, while others have found no significant change in peak torque (Campenella et al., 2000; Johansson, Kent, & Sheppard, 1983). Moreover, little research has been published on the relationship between the effect of combined verbal encouragement and visual feedback on isokinetic performance (O'Sullivan & O'Sullivan, 2008).

## Introduction

This study was designed to examine the effects of feedback on concentric peak torque scores. Special focus was applied to the potential differences in response between males and females with respect to verbal encouragement, visual feedback and muscular performance. Males and females were assessed under the same guidelines to determine whether previous training and coaching may make a difference in response to external stimuli.

## Purpose

To investigate the effect that visual feedback and verbal encouragement have on peak torque.

Figure 1: Cybex Isokinetic Dynamometer, used to measure torque produced by knee contractions

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## Results

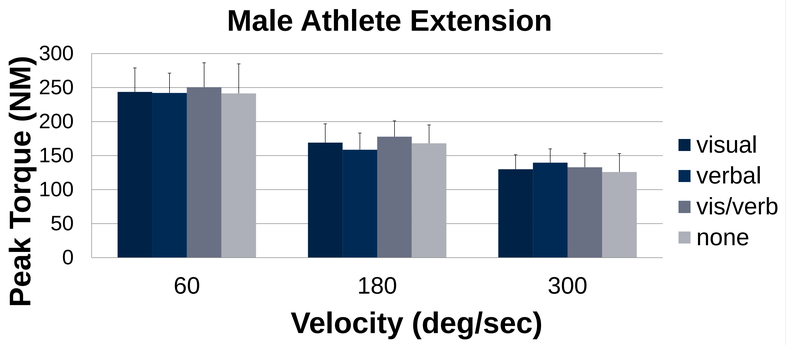


Figure 2. Peak torque during various feedback conditions.

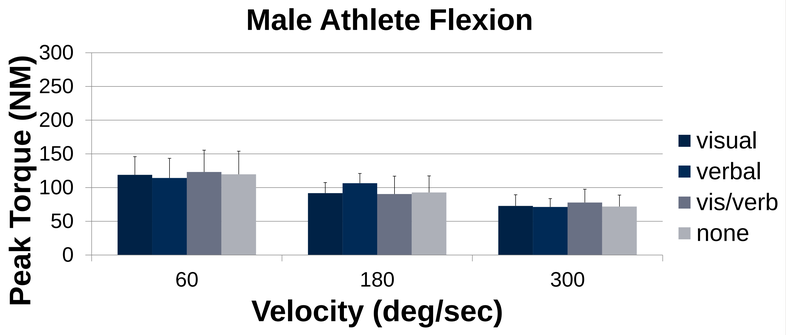


Figure 3. Peak torque during various feedback conditions.

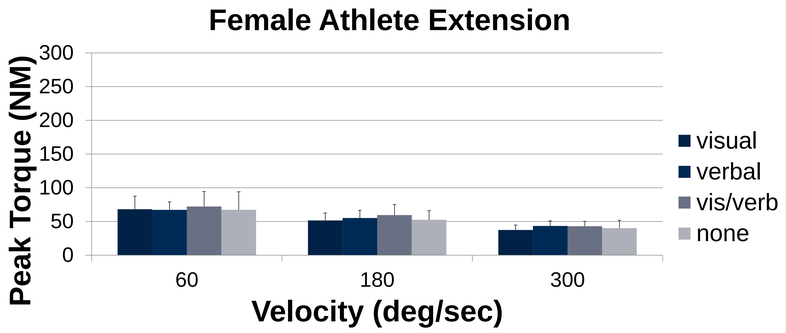


Figure 4. Peak torque during various feedback conditions.

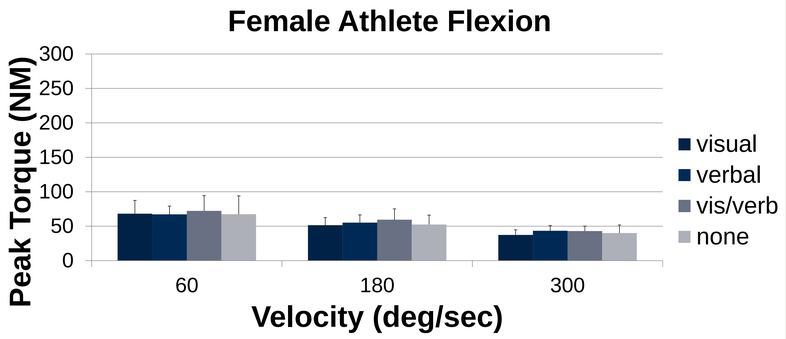


Figure 5. Peak torque during various feedback conditions.

## Materials and Methods

### Subjects

7 apparently healthy college-aged male athletes and 7 apparently healthy college-aged female athletes with no previous knee injuries

### Testing Protocol

A Cybex NORM isokinetic dynamometer was used to collect data (figure 1).

*Warm up*

-five minute warmup on a cycle ergometer, two minutes of lower extremity stretching

-four sub-maximal contractions at 60, 180 and 300 º/s

*Testing*

-2 familiarization sessions:

10 max contractions at 60, 180, 300 º/s with 1 min rest.

-4 experimental sessions:

10 max contractions at 60, 180, 300 º/s with 1 min rest. subjects randomly assigned visual feedback, positive verbal encouragement, both visual and verbal feedback, or no feedback

### Data Analysis

A 3 x 4 ANOVA was used to analyze the data ($\alpha < 0.05$)

## Conclusion

In this population of male and female athletes it appears that feedback had no significant effect on peak torque at any of the three velocities.

## References

Campenelle B., Mattacola C.G. & Kimura I.F., Effect of visual feedback and verbal encouragement on concentric quadriceps and hamstrings peak torque of males and females, *Isokinetics and Exercise Science,* 8 (2000), 1-6.

Figoni S.F. & Morris A.F., Effects of knowledge of results on reciprocal, isokinetic strength and fatigue, *Journal of Orthopedic Sports Physical Therapy*, 6 (1984), 190-197.

Hald R.D. & Bottjen E.J., Effect of visual feedback on maximal and submaximal isokinetic test measurements of normal quadriceps and hamstrings, *Journal of Orthopedic Sports Physical Therapy,* 9 (1987) 86-93.

Johansson C.A., Kent B.E. & Sheppard K.F., Relationship between verbal command volume and magnitude of muscle contraction, *Physical Therapy*, 63 (1983), 1260-1265.

O'Sullivan A. & O'Sullivan K., The effect of combined visual feedback and verbal encouragement on isokinetic concentric performance in healthy females, *Isokinetics and Exercise Science*, 16 (2008), 47-53.