

Gluteus Medius Electromyographic (EMG) Activity and Strength Immediately Following Lumbopelvic High Velocity Thrust Provided by a Novice Clinician

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Abstract. The purpose of this study was to determine the immediate effect of a lumbopelvic high velocity thrust (HVT) on gluteus medius strength when administered by a novice clinician with brief training. Thirty healthy subject's hip abduction strength and EMG activity were assessed at baseline, following a sham (control) intervention, and intervention consisting of a lumbopelvic manipulation (HVT) assigned in random order. These data were analyzed using the independent t-test with a significance level of $p < .05$. The results demonstrated no significant difference in gluteus medius strength between the control and manipulation. The results may suggest that a lumbopelvic manipulation, performed by a novice clinician, may not produce therapeutic effects in gluteus medius strength.

1. Introduction

This study investigated the electromyographic (EMG) activity and strength of the gluteus medius muscle following a commonly applied manual therapy intervention provided by a novice clinician to healthy individuals. The results of this study were meant to help physical therapy clinicians determine the potential benefit of such a manual therapy technique, as well as the necessity for experience in the implementation of such a technique. The hypothesis for this study was that a lumbopelvic manipulation performed by a novice clinician with brief training would yield an increase in strength of the gluteus medius during hip abduction as compared to the control intervention.

2. Experiment, Results, Discussion, and Significance

Subjects

A convenience sample of 30 healthy male and female college aged individuals participated in this study. Participants ranged in age from 22 to 49 years, with an average age of 24.37years. Informed consent was obtained from each participant.

Equipment

Gluteus medius maximum voluntary isometric contraction (MVIC) measurements were taken using a handheld dynamometer (Lafayette Manual Muscle Test System Model 01163) placed just above the lateral femoral condyle, and EMG activity was recorded with a Noraxon 16 channel telemetry EMG system to determine the percent change of maximal gluteus medius activity post intervention as compared to the reference standard per pre-established protocols. The Lafayette Manual Muscle Test dynamometer has been proven to be a valid and reliable instrument for measuring muscle strength in kilograms [1].

Procedure

This study utilized a double blind technique for all measurement procedures. All subjects performed warm-up exercises for 8 minutes and rested following warm-up for 5 minutes. Surface electrodes were placed over the gluteus medius, and a grounding surface electrode was placed over the opposite iliac crest. The subjects were positioned side lying with the dominant leg up. A position of approximately 25° of hip abduction was achieved by placing three pillows between the subject's legs with the testing leg in slight extension and external rotation for the purpose of isolating the gluteus medius. An immobilizing strap was used to resist abduction [2].

MVIC values of gluteus medius strength were determined as each subject underwent a control and manipulation intervention in random order with rest periods in between. If an audible pop was heard with the manipulation, it was recorded as a successful manipulation. Muscle activity was recorded during three MVICs for 5 seconds each with verbal encouragement. 30 seconds of rest followed each measurement with a ten minute rest between each of the three randomly assigned groups.

Results

Pre- and post-intervention measurements of gluteus medius strength were recorded for both the control and experimental groups. Analysis revealed no significant difference in average strength. Analysis also revealed no significant difference in strength between those with successful, and those without manipulation.

Table: 1
Paired Samples Statistics. Pair 1 is control. Pair 2 is intervention.

		Mean [kg]	N [participants]	Standard Deviation	Standard Error of the Mean
Pair 1	Pre	36.7337	30	7.01932	1.28155
	Post	35.7883	30	7.02917	1.28334
Pair 2	Pre	36.7337	30	7.01932	1.28155
	Post	36.2367	30	7.05645	1.28833

Table: 2
Paired Samples Test Results

	Degrees of Freedom	Sig. (2-tailed)
Pair 1	29	.021
Pair 2	29	.265

Discussion

The results of this study indicate that hip EMG activity and strength immediately following manual therapy provided by a novice clinician will not increase significantly to yield beneficial results in the clinic. Specifically, a lumbopelvic HVT applied by a novice clinician with previous instruction from an expert clinician and only two hours of combined practice will not yield a significant increase in gluteus medius strength as compared to the control intervention. The significance of this finding is that a novice clinician may need more time to practice the administration of such an intervention before positive results are seen in hip abduction strength.

3. Conclusions

This study found that lumbopelvic manipulations do not show an increase in gluteus medius strength in healthy subjects when performed by a novice clinician.

4. Acknowledgements

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References

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