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# Quantitative Improvements In Hop Test Scores Following A Six Week Neuromuscular Training Program

Adam Meierbachtol PT, DPT, SCS, ATC<sup>1</sup>, Eric Paur PT, DPT, SCS, ATC<sup>1</sup>, John Bottoms PT, DPT, OCS<sup>1</sup>  
Eric Rohman MD<sup>1,2</sup>, Marc Tompkins MD<sup>1,2</sup>

1. TRIA Orthopaedic Center (Minneapolis, MN)
2. University of Minnesota (Minneapolis, MN)

# Introduction

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- Intensive Neuromuscular Re-education (NMR) programs are becoming increasingly popular both pre and post ACLR
- Mechanism: thought to improve qualitative mechanics to decrease ACL loading
- Understanding quantitative improvements could give additional insight following ACLR and provide guidance for return to play decisions

# Objective

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- Program consisted of a previously described NMR protocol<sup>1</sup> of 5 progressively challenging phases of 10 exercises, supplemented with additional agility, core strengthening and plyometric power exercises
- Met twice per week for two hours per session
- Determine whether completing an intensive six week NMR program following ACLR could improve absolute values, relative percentages, and symmetry between the affected (surgical) and unaffected (non-surgical) legs

# Methods

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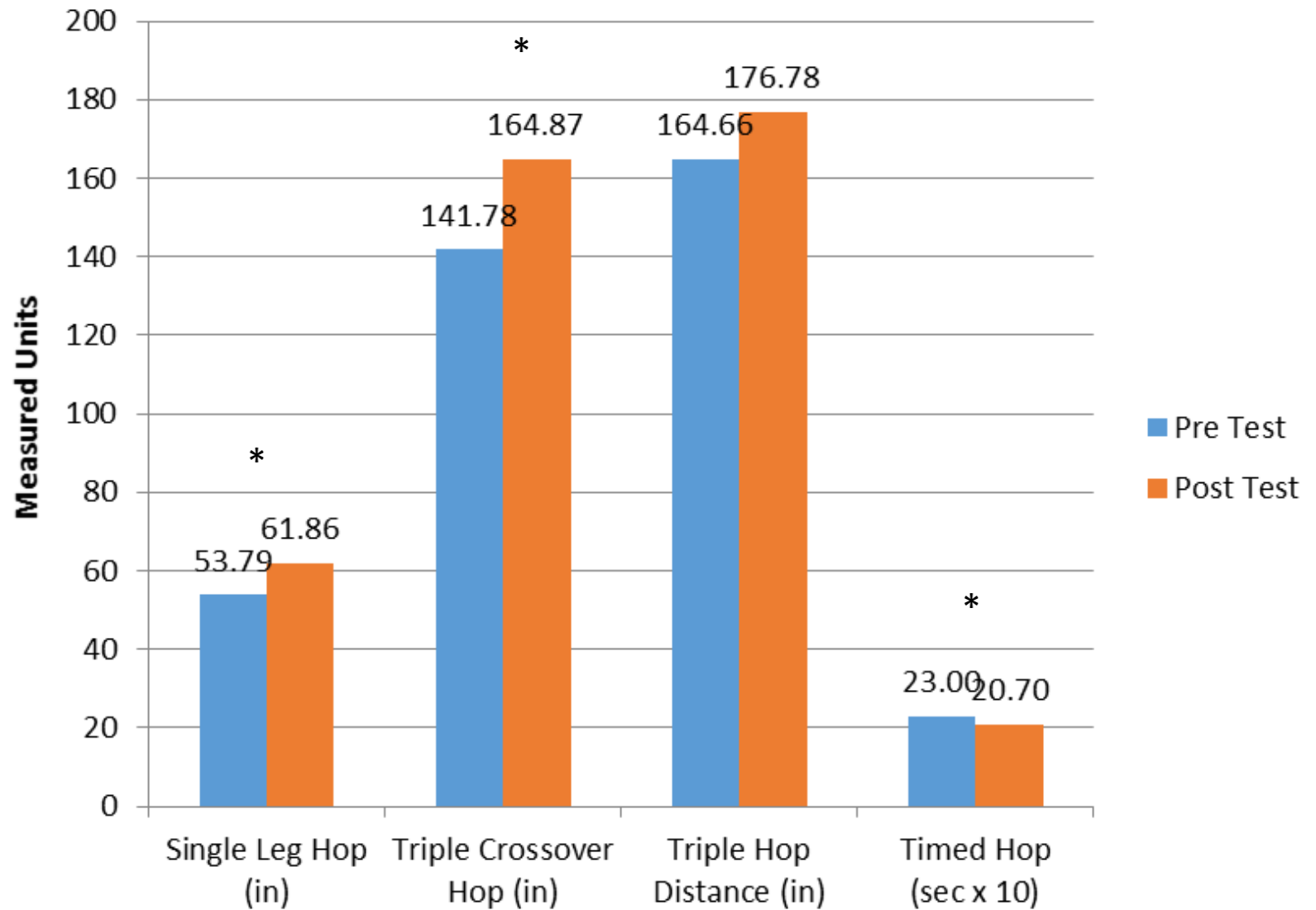


- Retrospective analysis of all patients who had undergone unilateral ACLR and self selected their participation in the NMR
- Patients had pre and post testing for single hop, triple crossover hop and timed hop (n = 128) and straight triple hop (n = 65)
- Analysis included individual leg absolute, relative, and limb symmetry index (LSI) improvements
  - LSI:  $(\text{affected/unaffected}) \times 100$
- Student's t-test in absolute and relative improvement was significant when  $p < 0.05$  (\*)

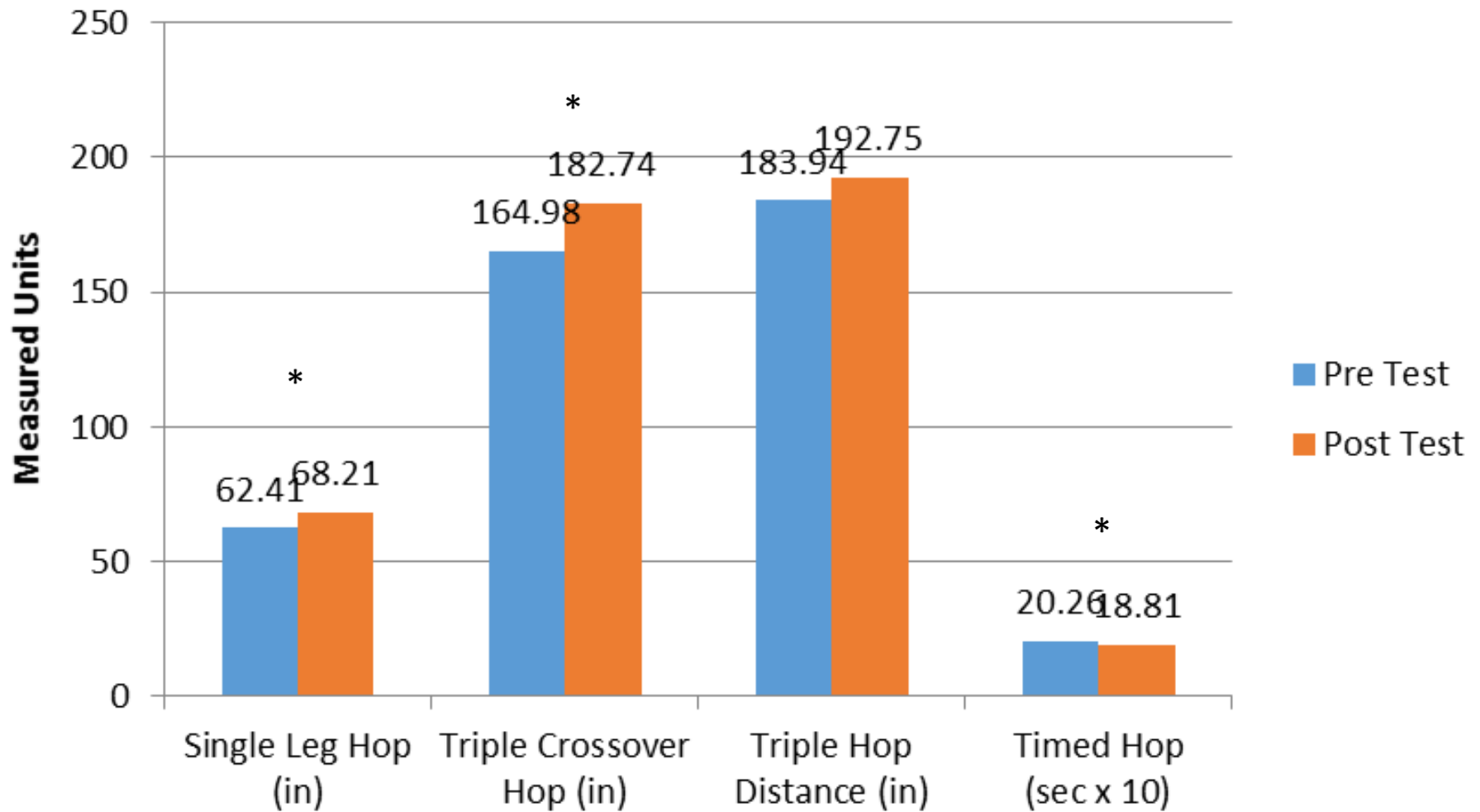
**TABLE 1**  
**Demographic Information**

		Age	BMI	Days from surgery to start of LEAP	Days from surgery to end of LEAP
	n	Mean±SD	Mean±SD	Mean±SD	Mean±SD
<b>Overall</b>	128	21±8	24±3	216±116	269±125
<b>Sex</b>					
Male	51	23±9	26±3	232±144	293±160
Female	77	19±8	23±3	205±92	253±93
<b>Age</b>					
12-18	82	16±1	23±3	212±114	259±115
19 and over	46	30±8	26±3	223±119	286±140

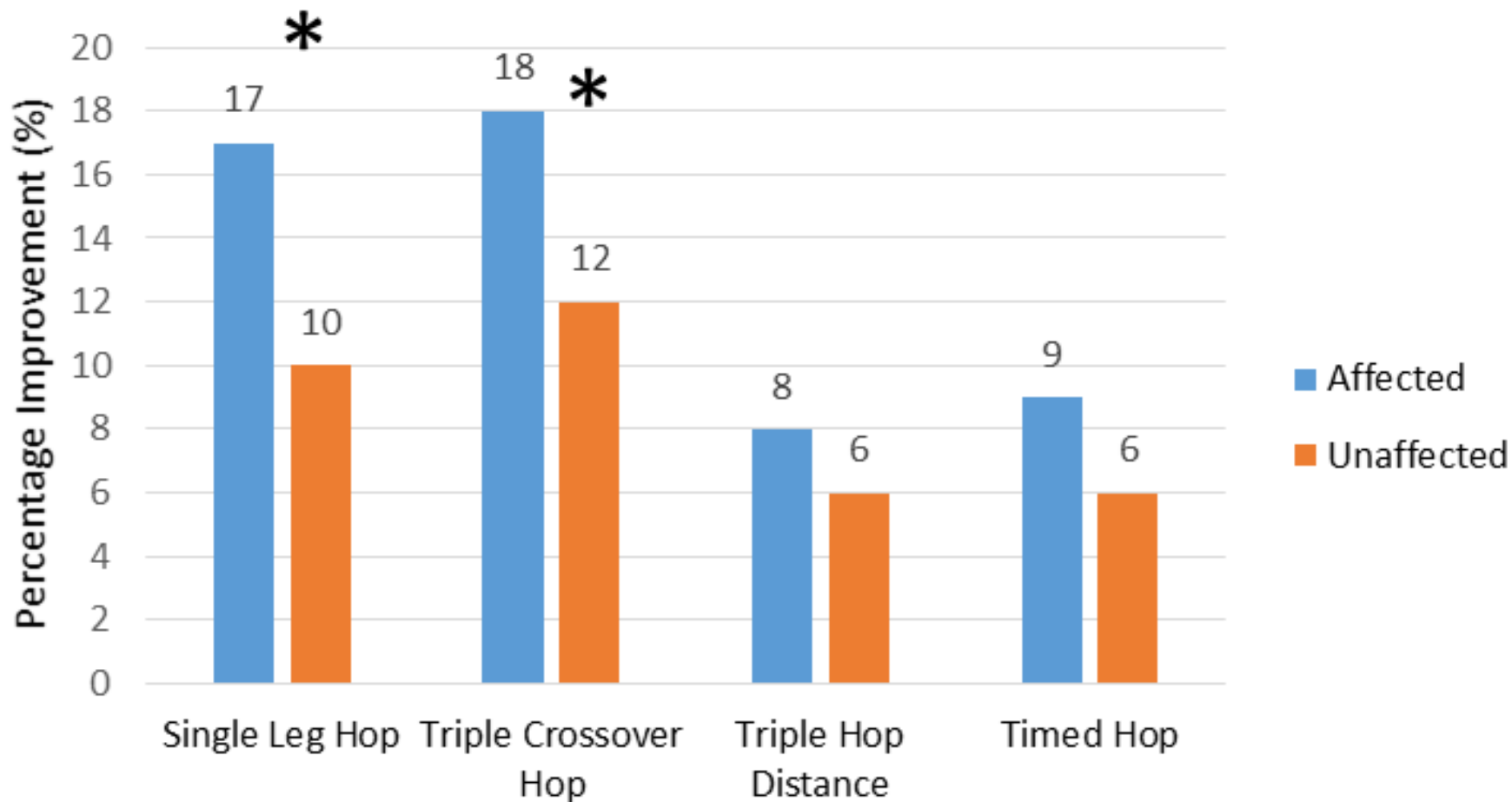
# Involved Limb



# Uninvolved Limb

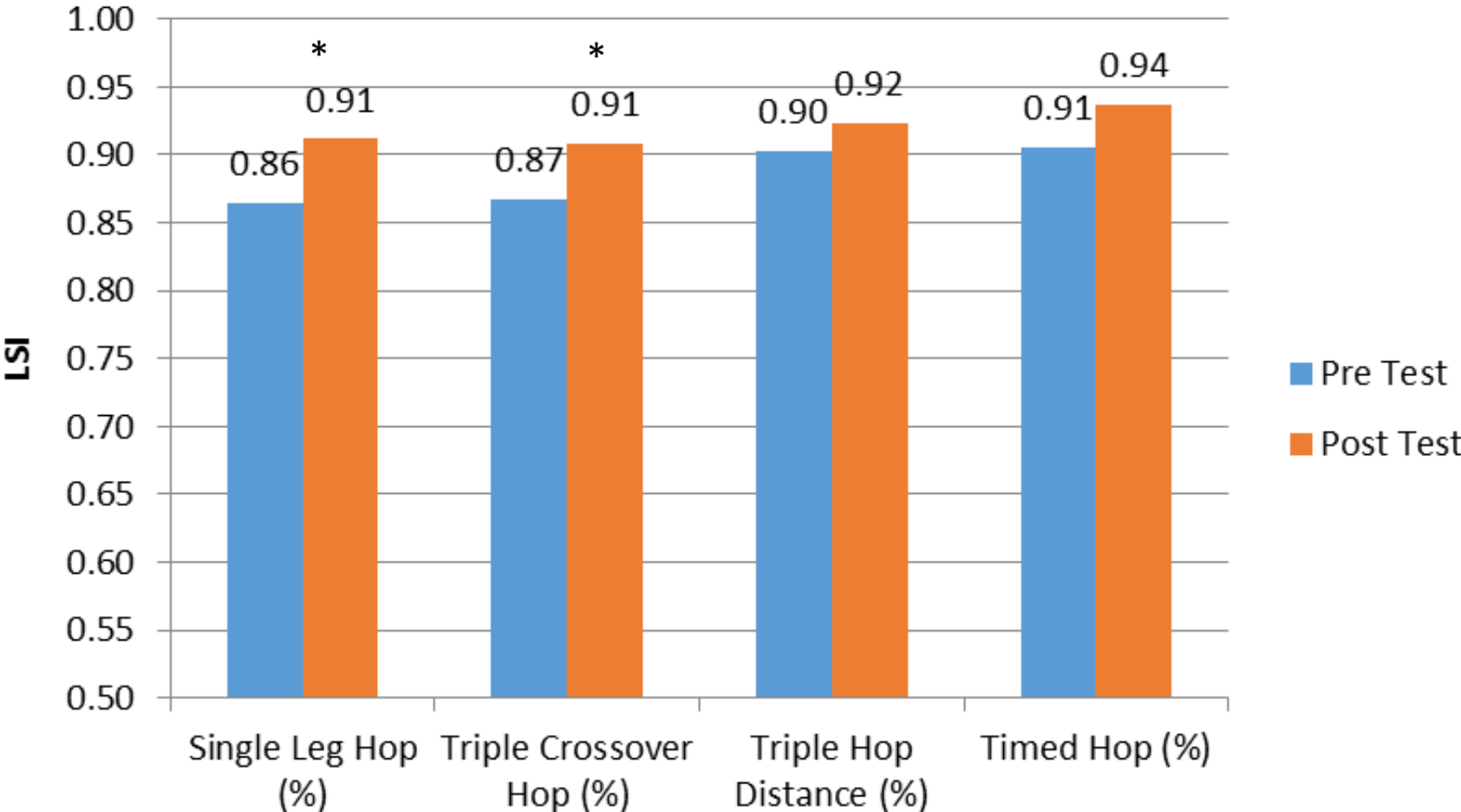


## Relative Improvement





# Limb Symmetry Index



# Discussion

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- Absolute improvements are seen in both affected and unaffected legs across all four hop tests
- Greater relative improvement in affected leg, therefore improved LSI scores
- Single and triple crossover hop improved to “passing” (>90% symmetry)

# Conclusions

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- Quantitative improvements in hop tests are seen following an intensive NMR program
- Affected leg improves relative to unaffected, although both show absolute gains in hop tests measures
- All hop tests showed improvement in LSI – another possible mechanism to decrease re-injury risk



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**Thank You!**

# References

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1. Myer GD, Chu DA, Brent JL, Hewett TE. Trunk and Hip Control Neuromuscular Training for the Prevention of Knee Joint Injury. *Clin Sports Med.* 2008;(27): 425-448.