Dear Editor:

I read with great interest the article published in AJSM by Chappell and Limpisvasti, “Effect of a Neuromuscular Training Program on the Kinetics and Kinematics of Jumping Tasks” (June 2008, pp 1081-1086). In their study, 30 female college athletes performed a neuromuscular training program before practice 6 days per week for 6 weeks. Chappell and Limpisvasti reported task-specific improvements in kinetic and kinematic parameters after participants completed the intervention. Interestingly, they also concluded that “Completion of a 6-week neuromuscular training program improved select athletic performance measures,” referring to vertical jump performance and a 20-foot single-legged hop test for time. It is this performance-related conclusion that I would like to comment on in this letter.

The athletes participating in this study were National Collegiate Athletic Association Division I female basketball and soccer players. It is common for Division I collegiate programs to have strength and conditioning coaches to train their athletes during the academic year. Therefore it would be surprising if the only training performed by the participating athletes during the 6-week study was the neuromuscular intervention. I would suspect that the participants were following a structured training regimen during the course of the study period that probably included some form of resistance training and other plyometric exercises, which have been illustrated by others to improve jump performance by 5% to 9%, 4,5,10 Unfortunately, no details were provided by Chappell and Limpisvasti about the current training regimen of the athletes in their study. If my assumption about Division I collegiate athletic programs and strength and conditioning is correct, it would nullify the cause and effect conclusion made by the authors that enhanced performance was a result of simply completing the neuromuscular warm-up routine. The high level of performance of the participants, as evidenced by the mean vertical jump scores at baseline, strengthens the argument that performing 2 nonspecific plyometric drills (the only exercises in the neuromuscular intervention) would conceivably impact performance of the participants, as evidenced by the mean vertical jump scores at baseline.

Recent evidence suggests that neuromuscular programs designed as structured warm-up routines have limited influence on performance in female athletes.1,3,5,11 Noting the lack of intensity and/or volume as the likely explanation for these outcomes,5 yet these injury prevention programs have proven beneficial for improving lower extremity neuromuscular and biomechanical characteristics8,12; enhancing stability; and reducing landing forces.2 Drills performed in other investigations1,3,11 have focused on reducing landing forces, and only when jump drills were performed with maximal effort, placing a greater emphasis on jumping rather than landing, were improvements in jump performance observed.8 Myer et al12 demonstrated an improvement in counter-movement jump height after 7 weeks of training that included plyometric drills, but they reported a 7.6% increase in dominant limb ground-reaction forces. Therefore, a recurring observation about neuromuscular training programs is that simultaneous plyometric drills are performed (ie, reducing landing forces vs maximal jumping effort). The findings of Chappell and Limpisvasti are in agreement with those of Myer et al,6 demonstrating an improvement in jump height, but also an 8.5% (P = .06) increase in peak vertical ground-reaction forces during the drop-jump test. Still, no indication was provided about how the limited number of plyometric drills were performed during the intervention; therefore it is difficult to interpret the conclusions of Chappell and Limpisvasti in context with previous findings.

Chappell and Limpisvasti have provided new and unique evidence suggesting that neuromuscular training results in task-specific alterations in kinetic and kinematic parameters during several athletic maneuvers. However, without knowledge about the training regimen of the participants and a clear description of how the 2 plyometric drills were performed, extreme caution is warranted regarding the conclusion that completing the neuromuscular training program was the cause of the observed enhancement in physical performance. Ultimately, these programs were designed with an aim of reducing the risk of noncontact anterior cruciate ligament injuries, not enhancing performance. For now, the evidence to date suggests that performance enhancement and injury risk reduction should be considered independent capacities with no single program being able to deliver dual benefits.

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REFERENCES

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Authors' Response: We would like to thank Dr Vescovi for his comments and review of the literature. The main purpose of our article was to explore what effect a simple, concise injury prevention program could have on knee and hip biomechanics during simple jumping tasks. We focused our research on parameters believed to be associated with noncontact anterior cruciate ligament injuries, and the results suggest that the program described in our article did have some effect on knee and hip biomechanics. A secondary hypothesis in our study was that the same program could improve performance in select athletic tasks.

Our methodology to study this hypothesis consisted of a few select athletic tasks with defined objective scores. Results were obtained for these select athletic tasks before beginning the 6-week training program and after completing the program. The 2 collegiate teams in the study completed the 6-week program during the course of their seasons. The exercises were completed as a warm-up before their regular practice session. The teams completed their regular practice sessions including conditioning, agility drills, and weight training. We could not limit these sport-related activities for fear of compromising their performance on the court and field. However, the athletes did not perform conditioning or weight training beyond their normal level of intensity during the 6-week interval of the study. We admit that there is some potential for improved performance during the course of the season due to improved conditioning, but there is also the potential for a performance decline due to fatigue and minor injuries. These athletes train year-round, with little fluctuation in their level of conditioning. In addition, during the off-season there would likely be even greater concern for inaccuracies because agility training and weight training are increased during the off-season.

Improving athletic performance was not the main hypothesis of our study, but our subjects did show improvement in select athletic tasks. Readers, however, should be cautious when attempting to extrapolate improved performances in select jumping tasks to improved performance on the playing field. Hopefully, future studies with more rigorous performance parameters will answer this question.

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