Coaching Applications

The Effects of Static Stretching Warm-up Versus Dynamic Warm-up on Sprint Swim Performance

Authors

Michael P. Moran[1], James R. Whitehead[2], Joshua D. Guggenheimer[3], Ronald H. Brinkert[2]

[1]Office of the Registrar, University of South Dakota, Vermillion, SD 57069. [2]Department of Kinesiology and Public Health Education, University of North Dakota, Grand Forks, ND 58202. [3]Department of Nutrition & Exercise Science, St. Catherine University, St. Paul Minnesota, 55105.

Abstract

Recent research has questioned the use of static stretching (SS) in warm-ups for power performance, but most of that research has focused on dry land performance. This study, using elite college swimmers, examined the effects of an SS warm-up versus a dynamic warm-up (DW) on sprint freestyle performance. Specifically, the swimmers swam a 50-meter freestyle sprint after two different warm-up protocols that were designed to mirror typical practice among competitive swimmers, while allowing any practically significant experimental effects from the SS versus DW contrasts to occur. Analysis of results showed no significant differences between times over the first 25 meters, the second 25 meters, or the overall 50-meter sprint time. It is possible that the swimming warm-up done subsequently to the SS or DW component may have blunted any SS-induced performance deficits. Further research is necessary before unequivocal advice can be given about including SS in the warm-up protocols of sprint freestyle swimmers.

SO WHAT? Implications for Swim Coaches

What is already known on this topic?

A review of existing professional and research literature suggests that:

- Warm-up procedures are advocated by many coaches because they are assumed to reduce the risk of injury, improve range of motion, decrease muscle soreness and have a positive effect on performance.
- Overall analysis of existing research supports the premise that warming up generally does improve performance, including swimming performance.
- Despite the generally accepted benefits of warming up for power performance activities, evidence from studies that have specifically

focused on the use of static stretching, has led many researchers to conclude that it is justifiable to exclude static stretching from the warm-up for strength and power activities.

- A recent meta-analytic review of the effects of static stretching on performance has documented and quantified static stretching-induced performance deficits, and its authors consequently recommended avoiding the use of static stretching as the sole activity during warm-up. However, those authors also suggested that incorporating static stretching into a comprehensive warm-up might be a practical solution for coaches who still wished to include it for its possible benefits.
- Although there is sufficient evidence to question the use of static stretching as a warm-up for *dry-land* power performance activities, there is very little empirical evidence of the effects of static stretching on *aquatic* power performance.
- In summary, at this time there is little or no evidence for or against the use of static stretches before aquatic power performance activities such as sprint swimming.

What does this research study add?

Given the dearth of specific experimental studies on the topic of aquatic performance—especially with high caliber swimmers—the results of this study give some support to the premise that the use of static stretching *as an initial part* of a traditional swimming warm-up will not unequivocally harm sprint swimming performance. However, this should be seen as a preliminary study of the topic, and further experimentation is needed. Future studies might also employ designs specifically structured to test if static stretching immediately before sprint swimming affects performance. It would be especially helpful if future studies could be conducted on high-level swimmers at a point during the season when they are well-trained, but relatively tapered and fresh.
In summary, this study provides *some evidence* that inclusion of static stretching as a preliminary part of swimming warm-ups may not harm performance—but due to the limitations of the research, this evidence is far from equivocal.

What are the implications for swimming coaches and researchers?

Because unequivocal evidence for or against the inclusion of static stretching in warm-ups for swimming is not available, clear advice to coaches is not possible at this time. However, coaches who are concerned because of the accumulating evidence that static stretching impairs subsequent dry land power performance, might note that there were no overall differences in sprint freestyle performance when the athletes in this study did callisthenic-type dry land activities before the swimming component of their warm-up for sprint swimming. Thus, coaches can be reasonably confident that dynamic dry-land activities plus an appropriate in-water warm-up is likely to be a suitable preparation for sprint swim races. However, a recent meta-analytical review of the studies of the effects of static stretching on performance does make the case that prolonged static stretches

immediately prior to power performance will likely produce performance deficits. Thus, given the current absence of contrary evidence from swimming-specific studies, it might be prudent for coaches to dissuade their swimmers from doing static stretches poolside immediately before their races. Coaches might also consider that the issue of improving the flexibility of their swimmers might be better addressed during routine physical conditioning—rather than immediately prior to a competition.

With regard to future research, there is a clear need for more experimental studies that focus on the components of warm-ups for swimming. Because there is persuasive evidence showing that dry-land power performance will likely be impaired when it immediately follows static stretching, more research on the influence of static stretching on aquatic power performance is clearly warranted. In such experiments, researchers might vary both the amount and the timing of the static stretching component within the overall warm-up procedures.