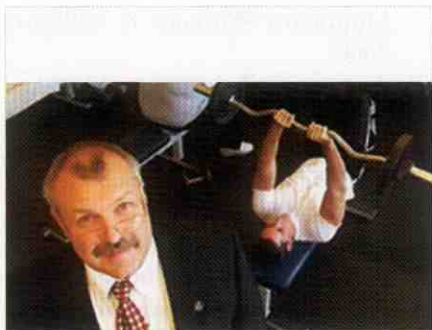




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Column Editor

## summary

Using current research to develop a factual base in the construction of a resistance training program is important and essential for creating a cutting edge program.

**R**esearch is not just for scientists. Although research can span from important basic research into the nature of life itself to obviously applied research in our field of strength and conditioning, ultimately an end user is hoped to be the beneficiary of such efforts. In today's infomercial world still filled with the myths of our conditioning heritage, research is a way of looking at the world around us, a way of evaluating information and making decisions. Getting started has been a topic that I first wrote about back in 1982 (1). However, the key factor in this process is to figure out how to incorporate a research element into your program.

One idea is that you must become familiar with what is going on in the world of science. The National Strength and Conditioning Association (NSCA) has worked

# Putting a Research Component Into Your Program

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for years to help you achieve this with 2 professional journals, including a research journal: *The Journal of Strength and Conditioning Research (JSCR)*. You also have complete online search capabilities for journal articles at the click of your mouse at <http://www.nsca-lift.org>. With the many treasures in the virtual vaults of this online library, you can start to build your search for both ideas and efficacy. In addition, you can use several search engines to find other articles in other journals that may be of relevance to your quest for understanding (see <http://www.ncbi.nlm.nih.gov/PubMed>).

Another idea is that you must then make time in a program's schedule to discuss research, research findings, present your own findings, and discuss the impact of such findings on your various program elements and practice. You must view the world as one in which its efficacy is based not only on your art of practice and your gut feelings but also on what we know about the world around us from a factual research perspective.

Although some coaches may think this is a stretch, it truly is not. Here at the University of Connecticut, I have seen a prime example showing me that strength and conditioning professionals can use research in the practice of the profession, and ultimately the athletes benefit. Weekly meetings consist of more than just the administrative and

logistical demands of the program. Many elements can be brought into the practice of the profession with presentations of various teams' conditioning data, discussions of new research papers relevant to a sport you are working with, and invited guests talking about certain research findings and new products. Ultimately, the program is helped by the continual search for understanding in the deci-

sion-making process and program-design development. Coupled with this is the evaluation of the efficacy of an approach and the ability to change on the basis of data. You then have a research-based program.

Research is a way of looking at the world to help support that gut feeling and as-



sist in the art of understanding how to coach. The key is to have your practice grounded in the factual basis of the profession. Over the years, I have been amazed not only at how this is possible but that the best professionals and programs in the profession have thrived on this approach. No single study can provide all the answers, but one may make you pause to think and evaluate a concept, and it may point you in the right direction. We will talk more about how to better read and understand research in each passing column.

For example, one controversial question that a coach might ask is, "Should I have my high jumpers stretch just before they make one of their attempts in a competition?". Even though this article is not the place to definitively address this question, investigators have tried to understand this from several different perspectives. Articles in the *JSCR* and other scientific journals have attempted to shed light on this issue, but the ultimate answer will come down to how you interpret the data presented in these manuscripts. We will start to work on each of these aspects of reading, evaluating, and understanding research in this column, yet it is not too early to start with a research approach. However, beyond the answer to this question comes the approach. Finding out what is known and what the facts are as the backdrop before making a decision is the first step in putting a research component into your program. ♦

## Reference

1. Kraemer, W.J. Research: Reading and understanding: The starter steps. *Natl. Strength Cond. Assoc. J.* 4(3):49. 1982.

## Your Research Challenge:

Look at some articles and see if you can address the coach's question above. Get on *Pub Med* (<http://www.ncbi.nlm.nih.gov/PubMed>) and the NSCA online journal search, look at the abstracts and papers, and see if you can come up with as a research-based answer to this question that has not been directly studied in

high jumpers in a real event. Maybe you can make a connection with some of the known facts. We will have some fun with this in the future, but here are a few citations to get you going:

Bergel, D.H., M.C. Brown, R.G. Butler, and R.M. Zacks. The effect of stretching a contracting muscle on its subsequent performance during shortening. *J. Physiol.* 225(2):21P-22P. 1972.

Church, J.B., M.S. Wiggins, F.M. Moode, and R. Crist. Effect of warm-up and flexibility treatments on vertical jump performance. *J. Strength Cond. Res.* 15(3):332-336. 2001.

Cornwell, A., A.G. Nelson, and B. Sidaway. Acute effects of stretching on the neuromechanical properties of the triceps surae muscle complex. *Eur. J. Appl. Physiol.* 86(5): 428-434. 2002.

Evetovich, T.K., N.J. Nauman, D.S. Conley, and J.B. Todd. Effect of static stretching of the biceps brachii on torque, electromyography, and mechanomyography during concentric isokinetic muscle actions. *J. Strength Cond. Res.* 17(3):484-488. 2003.

Fowles, J.R., D.G. Sale, and J.D. MacDougall. Reduced strength after passive stretch of the human plantarflexors. *J. Appl. Physiol.* 89(3):1179-1188. 2000.

Knudson, D., K. Bennett, R. Corn, D. Leick, and C. Smith. Acute effects of stretching are not evident in the kinematics of the vertical jump. *J. Strength Cond. Res.* 15(1):98-101. 2001.

Koch, A.J., H.S. O'Bryant, M.E. Stone, K. Sanborn, C. Proulx, J. Hruby, E. Shannonhouse, R. Boros, and M.H. Stone. Effect of warm-up on the standing broad jump in trained and untrained men and women. *J. Strength Cond. Res.* 17(4):710-714. 2003.

Kokkonen, J., A.G. Nelson, and A. Cornwell. Acute muscle stretching inhibits maximal strength performance. *Res. Q. Exerc. Sport.* 69(4):411-415. 1998.

Nelson, A.G., and J. Kokkonen. Acute ballistic muscle stretching inhibits maximal strength performance. *Res. Q. Exerc. Sport.* 72(4):415-419. 2001.

Smith, C.A. The warm-up procedure: To stretch or not to stretch. A brief review. *J. Orthop. Sports Phys. Ther.* 19(1):12-17. 1994.

Worrell, T.W., T.L. Smith, and J. Winegardner. Effect of hamstring stretching on hamstring muscle performance. *J. Orthop. Sports Phys. Ther.* 20(3):154-159. 1994.

Young, W., and S. Elliott. Acute effects of static stretching, proprioceptive neuromuscular facilitation stretching, and maximum voluntary contractions on explosive force production and jumping performance. *Res. Q. Exerc. Sport.* 72(3):273-279. 2001.

Young, W.B., and D.G. Behm. Effects of running, static stretching and practice jumps on explosive force production and jumping performance. *J. Sports Med. Phys. Fitness.* 43(1):21-27. 2003.

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