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# THE CrossFit JOURNAL

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## Periodization: Period or Question Mark? Part 2

Lon Kilgore reviews academic literature on periodization from 2000 to 2015 and finds little support for the NSCA's contention that classical periodization is superior.

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Mike Warkentin/CrossFit Journal

*Available evidence suggests the dogmatic position the NSCA maintains on the use of classical periodization might be off the mark.*

Models of periodization have been used in training for almost a century. The models of Mark Berry (1933), Bob Hoffman (1940), Bill Starr (1976) and Mike Stone (1976) periodized workloads by varying the relative heaviness of the weights on various days of the training week. This was the standard approach to periodization until the 1980s, when a Russian influence was felt in the West.

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1 of 11



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***Matveyev's model of periodization is but one of many systems employed to help athletes accomplish their goals. Unfortunately, classical periodization is often presented as the best system, though research does not support definitive claims.***

It should be noted that not everyone periodized training during this early era. A large component of the training population simply utilized linear progression, adding a little more weight or a few more reps in each session as tolerated.

Carl Miller, coach of the U.S. national weightlifting team, set the table for additional models of training in the early '70s when he imported Bulgarian methods. Similarly, Stone published work on periodization in the late '70s and '80s. Also in the '80s, Bud Charniga published translations of Russian training literature. All three primed the Western community for presentation of more elaborate models of training.

Academic evaluation of periodized training has historically been quite limited, and very few experimental papers on the topic were produced before 2000. Attention was firmly affixed to endurance training for heart health as weight training and high-intensity training were not accepted means of improving cardiac health. As a result, very few

(less than a dozen) actual experimental papers were produced on periodization of exercise in the latter part of the 20th century. Virtually all Western thought on the topic was rooted in theory, not data.

Leonid Matveyev's "Fundamentals of Sport Training" was the first periodization book to be made available in the West, and it became the de facto standard. The newly birthed National Strength and Conditioning Association (NSCA) embraced the Russian programming philosophy and began systematically preaching one of Matveyev's models of periodization as the best approach to training, though it should be noted Matveyev presented more than one model in his book. The Russian influence was wholly embraced by the NSCA because the very first Certified Strength and Conditioning Specialist (CSCS) course was taught in part by Angel Spassov, a Soviet-trained émigré.

It's often difficult to have a coherent discussion regarding periodization because people generally do not get weaker or less fit when they train regularly on a periodized program. That fact provides many people all the ammunition they need to hold up periodization as the gold standard for training.

### Periodization Primer

**Classical periodization**—Generally credited to Matveyev. Planned intensity (weight or difficulty) increases over time accompanied by simultaneous reductions in volume (reps, sets, time or distance). Sometimes inaccurately called linear periodization.

**Reverse classical periodization**—An inversion of Matveyev's model. Planned volume increases over time accompanied by simultaneous reductions in intensity.

**Block periodization**—Generally credited to Yuri Verkhoshansky, with Anatoliy Bondarchuk and Vladimir Issurin as later proponents. Training different physical qualities for a multi-week period (two to four weeks) then moving to the next most important quality (general to specific).

**Undulating periodization**—Generally credited to Charles Poliquin. Planned volume and intensity increases or decreases by workout or within another short time period (seven to 10 days).

Conversely, people generally don't get weaker or less fit when they use a non-periodized program or a program based on a periodization plan different from Matveyev's classical variation.

Without comparative data, the argument cannot be settled. Even though periodized programs have lots of anecdotal and some experimental evidence supporting their effectiveness, significant comparative data must be present for someone to definitively say a system of programming—classical periodization, for example—is best. Prior to 2000, there was virtually no such data. The NSCA—and the rest of us who bought into classical periodization as king of all programs—was operating on faith in Soviet science we neither helped create nor translated.

### A New Millennium

There has been an upswing in the amount of research on strength training in the past 15 years or so. During

that span, academics started generating data that shows strength training improves fitness, health, mortality and quality of life. This new interest led to some—but not too much—investigation into periodized exercise training.

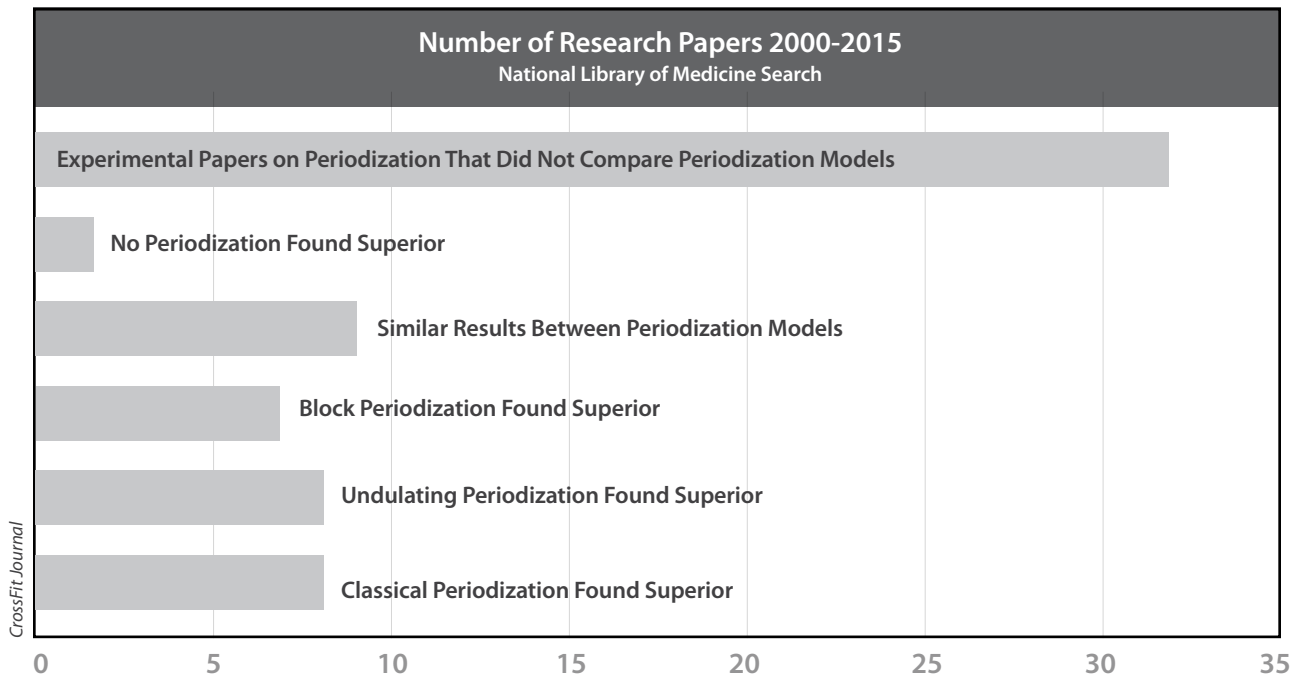
Examining the strength of classical-periodization literature requires library time. Using the search terms “periodization” and “periodized training” on the PubMed search engine at the National Library of Medicine produces 67 experimental papers relevant to periodization, published from 2000 to 2015. Dozens more review and methods papers can also be found, but such papers cannot be used to make a case as they present opinion, rehash previous research or simply propose instructions on implementation.

The pressing question we want the literature to answer is this: Can the NSCA unequivocally state that classical periodization is superior to all other programming methodologies?



Chad Hamilton

*In one research paper supporting the classical model, only the bench press and leg press were periodized and studied. That “partial periodization” is an abrupt departure from Matveyev’s model and forces readers to question the value of the study’s conclusions.*



*Figure 1: A survey of research papers reveals a large number made no comparisons among periodization models, while papers that compared the effectiveness of different models came to disparate conclusions.*

### The Hard Facts

So how many 2000-2015 papers actually present data that can support the NSCA's contention that classical periodization is clearly the superior method? Eight.

Eight papers that conclude classical periodization is better than other programming models might seem like enough. Indeed, eight research groups all coming to the same conclusion would be powerful if they all used the same methods, durations and populations; measured the same outcomes; and implemented Matveyev's original model. These papers did not do any of these things.

An example of this problem can be seen in one paper's periodization of only two exercises (bench press and leg press) according to Matveyev's model. All other exercises used in that experiment were not periodized—a rather significant departure from Matveyev's model and NSCA instructions, as NSCA instructions on periodization do not include partial periodization of individual workouts. Although there are a wealth of methodological problems in this paper—and others—the findings of these eight papers are generously considered here in support of the NSCA's position.

But there are more questions to be answered.

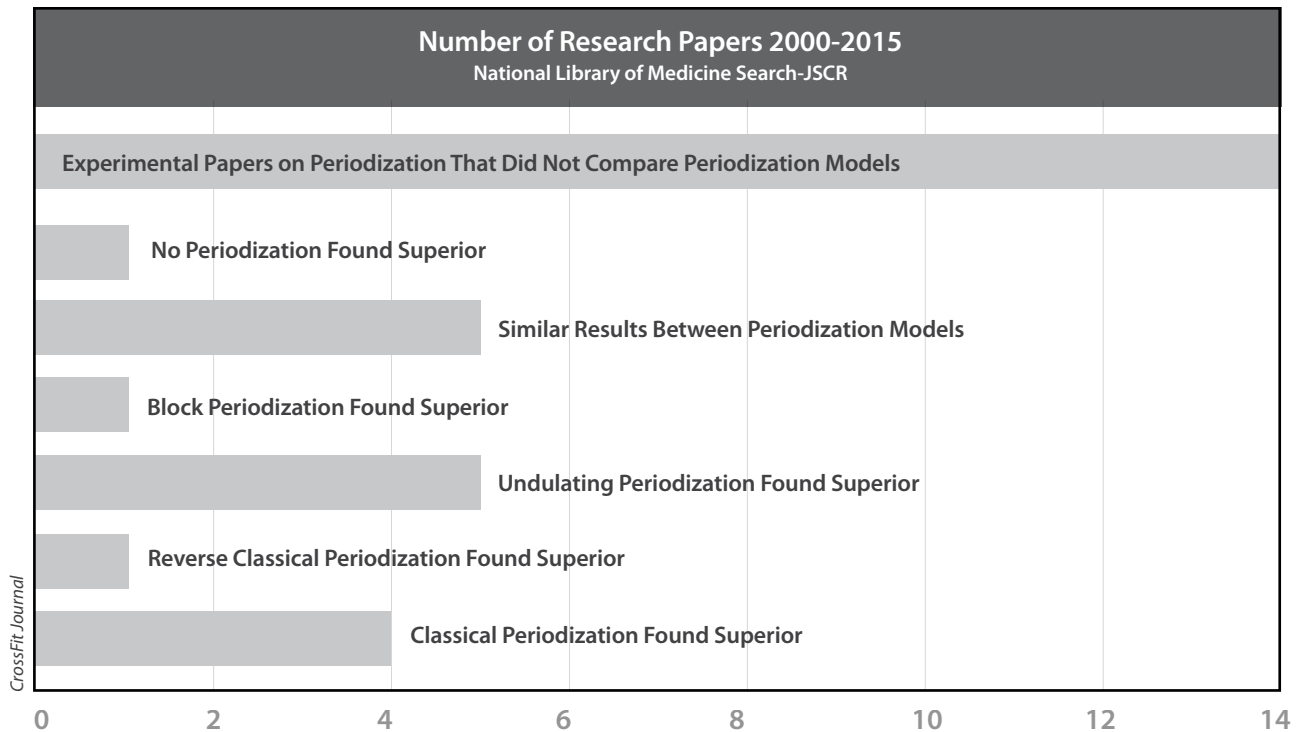
How many papers published between 2000 and 2015 presented data indicating classical periodization was less effective than no periodization at all? Two.

How many papers published between 2000 and 2015 presented data indicating the block-periodization model was more effective than classical periodization? Seven

How many papers published between 2000 and 2015 presented data indicating the undulating-periodization model was more effective than classical periodization? Eight.

How many papers published between 2000 and 2015 presented data indicating some other model of periodized training yielded similar results to other models of classical periodization? Nine.

This information hardly paints the picture of classical periodization as the best programming model in existence, something worthy of being dogmatically recommended as the linchpin of all exercise programming. Rather, this information suggests the model is just one tool in an arsenal of potentially useful approaches to improve fitness. In light of these studies, classical periodization is a tool that should be used at the right time and for the right purposes, not blindly applied to all fitness trainees.



**Figure 2: Of 31 periodization papers published in the Journal of Strength and Conditioning Research, 14 made no comparisons among models, and the other 17 produced conflicting information.**

### But Periodization Works!

Thirty-two of the 67 papers included here found periodized training of some type led to fitness gains for their subjects. These papers can be used to demonstrate periodized training does produce positive results, but they cannot be used to demonstrate the superiority of one model of periodization over another or superiority over any other exercise-programming model.

Because these papers make no direct comparisons between two or more models, they offer little in the way of definitive answers. These papers also suffer from the same problems as the aforementioned comparative papers—different methods, different durations, different populations, not measuring the same outcomes. Not only do these papers not enable comparison among periodization models within the experiment, but there is also no way to compare the results of these papers to other papers on classical periodization as the methods, populations and measurements were dissimilar.

The bottom line is we know classical periodization works, but we can only say it works about as well as any other systematically applied model of training.

### Ignoring the Obvious

It's an interesting and telling observation that 31 of the 67 papers relevant to this topic were published in the NSCA's flagship journal, the Journal of Strength and Conditioning Research (JSCR).

The conclusions forwarded by the authors of those papers can be presented as follows:

- Supporting classical periodization as superior: 4
- Supporting undulating periodization as superior: 5
- Supporting block periodization as superior: 1
- Supporting reverse classical periodization as superior: 1
- Supporting no periodization as superior: 1
- Providing similar results among models of periodization: 5
- Papers on periodization that did not actually compare models of periodization: 14

It's certain there is no convincing and consistent evidence anywhere that classical periodization is clearly superior to any other model of programming. The overall literature

would suggest undulating and block periodization are just as good, and some evidence suggests other programming models are also effective. Simply stated, not enough high-quality research has been subject to replication to allow us to state that any model of exercise programming—regularly applied—is superior. Research only supports that these models work to some degree.

How can the NSCA promote classical periodization as the only scientifically supported programming practice—one that should be applied to all populations—when the evidence from its own journal does not support such a stance?

It's fine that the NSCA chose that position, promulgates materials supporting it and provides implementation instruction. Every professional organization has the right to adopt its own position stands. Having a system, believing in a system and teaching a system are good things.

However, why would a “world authority” on all things strength and conditioning want to adopt such a narrow and myopic approach?

History? Investment? Could the position be related to the fact that 28 current members of the JSCR editorial board and five current and past NSCA presidents are listed as authors on the papers identified here?

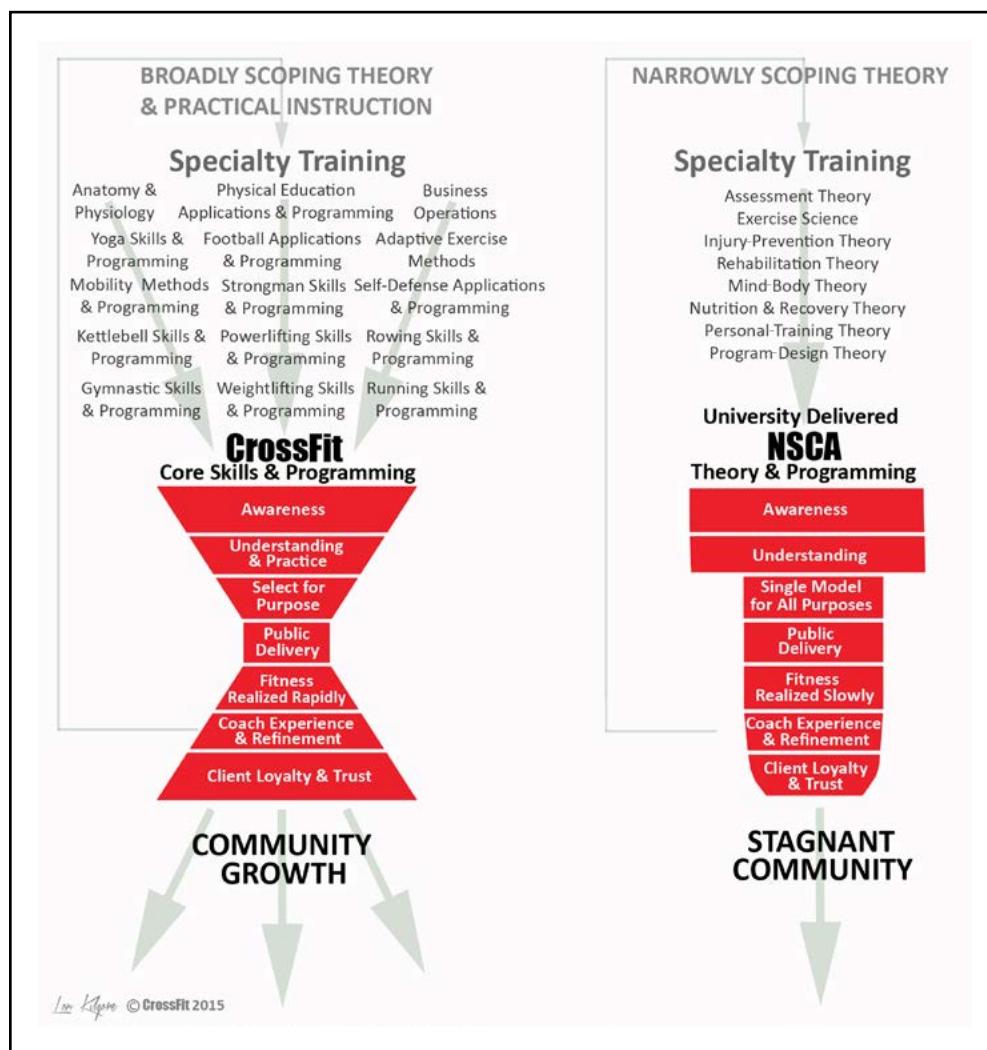


Figure 3: A comparison of CrossFit and NSCA educational strategies and outcomes.

The fitness industry is so much larger than a single model of exercise programming. It's about making people strong, making people enduring, making people mobile. To truly be an expert, one needs to have more than just classical periodization in the professional toolbox. This is true for the individual coach and for the professional organization.

CrossFit coaches and CrossFit Inc. understand this. Just look at the formal specialty certification system and the system of continuing education. This is where the diverse elements of fitness theory and methodology are delivered to coaches for integration into the CrossFit model of training and in support of practice in other fitness arenas such as weightlifting, powerlifting, strongman, running, etc.

This consideration of classical programming points out a defining difference between the NSCA and CrossFit: The NSCA attempts to apply one single approach and model of programming to all ends, including improved fitness, sport performance, rehabilitation, health, etc. The association is attempting to use one thing, one tool, to accomplish all these goals, but sound craftsmen simply won't use a hammer when a screwdriver is called for.

This approach stands in stark contrast to CrossFit's educational system, which draws on a broad spectrum of programmatic, theoretical and practical resources to create fitness, a concept it has clearly defined.

CrossFit trainers strive to use everything relevant to accomplish one important and well-defined goal—improving fitness—and having a broad set of tools at their disposal affords them the ability to select the optimal approach for each client in reflection of that client's goals.



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### About the Author

Lon Kilgore graduated from Lincoln University with a B.Sc. in biology and M.Sc. in kinesiology from Kansas State University, and he earned a Ph.D. from the Department of Anatomy and Physiology at Kansas State University's College of Veterinary Medicine. He has competed in weightlifting to the national level since 1972 and coached his first athletes from a garage gym to national-championship event medals in 1974. He has also competed in powerlifting, the first CrossFit Total event, wrestling and rowing. He has worked in the trenches, as a coach or scientific consultant, with athletes from rank novices to professionals and the Olympic elite, and as a collegiate strength coach. He was co-developer of the Basic Barbell Training and Exercise Science specialty seminars for CrossFit (mid-2000s). He was a certifying instructor for USA Weightlifting for more than a decade and a frequent lecturer at events at the U.S. Olympic Training Center. He is a decorated military veteran (sergeant, U.S. Army). His illustration, authorship and co-authorship efforts include the best-selling books "Starting Strength" (first and second editions) and "Practical Programming for Strength Training" (first and second editions), recent releases "Anatomy Without a Scalpel" and "FIT," magazine columns, textbook chapters, and numerous research-journal publications. His professional goal is to provide the best quality, most practical, most accessible and highly affordable educational experiences to fitness professionals through his university work and through his *AnatomyWOD*, *PhysiologyWOD* and *YogaWOD* courses. His students have gone on to become highly notable figures in weightlifting, powerlifting, cycling, fitness and academia.