New Horizons for the Methodology and Physiology of Training Periodization
Block Periodization: New Horizon or a False Dawn?

Professor Issurin’s review[1] is to be commended on its overview of the historical evolution of periodization planning theory and the interesting general discussion. However, the central contention of the review, i.e. that block periodization represents a ‘new horizon’ in training planning, is, I suggest, premature and unsupported.

To substantiate this position, consider the two layers of evidence and rationale within Professor Issurin’s review promoting the superiority of block-training designs. The first layer is anecdotal, and consists of selected exemplar cases of athletes and coaches who have achieved high levels of success employing block-training designs. However, within the elite sports environment it would seem readily apparent that high honours are commonly achieved using a variety of training approaches, reflecting distinct coaching philosophies and differing planning models. Hence, while the offered examples are undoubtedly interesting and deserve consideration, they remain unconvincing as evidence, lacking both contextual detail and critical comparisons.

The second layer of supporting evidence refers to “two contemporary scientific concepts” that have been instrumental in the formulation of the block-periodized model; namely, the cumulative training effect and the residual training effect. However, within the review, the key citations for these concepts do not pertain to scientific evidence but, rather, refer to self-referenced opinion pieces by the author and another well known block-periodization advocate.[2] In reality, acknowledging that the benefits of physical training gradually accumulate over time (the cumulative effect) and that these benefits persist for some period after training is terminated (the residual effect) are, perhaps, better described as self-evident truths, as opposed to scientific constructs. Indeed, Matveyev,[3] the foremost formulizer of the traditional periodization model, also considers the cumulative training effect and concepts corresponding to the residual training effect in his influential Fundamentals of Sports Training. What is not clear is how an awareness of such poorly understood concepts provide scientific support for block-periodization principles. In order to discriminate between either traditional or block-planning methods on the basis of these very broad concepts, specific knowledge would be required relating to (i) the projected timeframes for retention or decay of specific fitness attributes; (ii) an understanding of how ongoing training interacts with previously conducted training to either accelerate or delay the erosion of previously developed fitness components; and (iii) an understanding of how these factors interact with a spectrum of individual-specific considerations, such as training histories and genetic predispositions. This is a knowledge base that clearly does not exist.

Consequently, while the proffered anecdotal examples and accompanying logic may be alluring, block periodization cannot be rightly framed as a scientifically-validated planning construct, any more than could Matveyev’s seminal model or the raft of subsequently proposed periodization derivations.[4-7] Here, I hasten to add, experienced coach/scientist opinion is certainly not to be devalued or dismissed. However, before block periodization can rightly claim to be scientifically supported, an evidence-led, conceptually-valid chain of reasoning surely needs to be more coherently outlined.

As an additional concern, while there is an apparent dearth of evidence supporting the block-periodization concept, there is existing evidence that would appear to strongly challenge its central premise, i.e. that “each of these (fitness) targets requires specific physiological, morphological and psychological adaptation, and many of these workloads are not compatible, causing conflicting responses,” and that hence, “high performance athletes enhance their preparedness and performance
through large amounts of training stimuli that can hardly be obtained using multi-targeted mixed training"[1] (page 194). Unravelling the interactivity of multi-targeted mixed training modes is obviously a complex task to address empirically. However, it has been tangentially explored in studies investigating the effects of concurrent strength and endurance training. The training modes required to develop strength and endurance frequently appear diametrically opposed, and these attributes would seem prime candidates for exhibiting inhibited training responses consequent to concurrent training. Hickson[8] classically demonstrated an ‘interference effect’ between concurrent strength and endurance training resulting in compromised strength development in previously untrained subjects, with similar findings subsequently reported by several other authors.[9-12] More recently, studies have demonstrated that concurrent training can be as effective in developing both strength and endurance as single attribute-focused interventions.[13,14] More pertinently, studies in a variety of sports, variously using well trained, elite and world-class athletes, have established that simultaneously training for both strength and endurance can bestow synergistic benefits to a variety of athletic performance measures, above and beyond the benefits realized by single modality training.[15-28]

Without doubt, there is still much to be learned in relation to the intricacies of concurrent training. However, it appears clear that (i) the ‘optimized’ development of a single fitness attribute does not necessarily preclude the simultaneous advancement of other attributes; and (ii) mixed modality training has the potential, in an evidenced range of circumstances, to bestow synergistically-additive performance benefits.

A more conceptual, less demonstrable, challenge to the logic presented in Professor Issurin’s review, relates to an implicit conceptual dogma evident throughout the periodized planning literature. Specifically, the paradoxical assumption that, despite the evident complexity and inherent unpredictability of the human adaptive response to any set of imposed stressors,[29-35] the future training of an inherently complex biological system is best pre-planned using deterministic logic, mechanistic design frameworks and generalized rules.

Reflecting on the evidence, it would appear premature to herald block periodization as a ‘new horizon’ in training planning, partly because of a fundamental lack of supporting evidence and clearly delineated rationale, and partly because contradictory evidence exists questioning its universal efficacy in elite contexts. What block periodization does positively contribute to current planning methodologies is a more formal description of a particular planning tactic that may be advantageously added to the elite coaches menu of potential planning options.

Therefore, while blocked-training schemes may be useful ploys in specific training contexts, the claim that this framework represents a new departure in training planning may be somewhat overly enthusiastic. Hence, perhaps a more appropriate description of block periodization is ‘new variation’, rather than a ‘new horizon’, in sports training planning.

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Letter to the Editor

A letter to the editor has become a reason to continue consideration of training periodization on the pages of Sports Medicine.[1] I appreciate it and would like to thank Mr Kiely for this opportunity.

The letter to the editor contains a number of issues, which need clarification. I will address them in the order of their appearance in the letter. Block periodization (BP) as an alternative to the traditional model has drawn the attention of Mr Kiely, who has marked two “layers of evidence and rationale...” based on his understanding of their importance.

1. The first layer in Mr Kiely’s view belongs to “anecdotal reports” which, as far as I could understand, he estimates as having low value as a source. My own evaluation of these sources is quite the opposite. Having worked for the major part of my life in close cooperation with coaches...
(including world known and highly recognized experts in their sports), I have developed great respect for anecdotal reports as a source of successful experience, common sense and real creativity. However, be that as it may, in this concrete case my opponent is wrong; the sources cited in the review are not “anecdotal” they are serious publications, which summarize the data of well documented long-term projects with world-class athletes who have achieved the highest awards.[2-7]

In saying that, the outcomes of the projects mentioned are not supported by “contextual details and critical comparisons,” which makes no sense; the review format does not allow the insertion of details, which interested readers can find in the cited items. In addition to the references mentioned, a number of newer publications can be listed in which the results of block periodized preparations are considered in accordance with standards of peer reviewed journals. A long-term project of a Spanish research group, complete with critical comparisons, resulted in a gold medal in the Beijing Olympic Games;[8] a similar project by Belorussian researchers was followed by high awards at the Athens and Beijing Olympic Games;[9] and a well balanced study in Alpine skiing was completed in Switzerland.[10] A number of PhD dissertations devoted to various aspects of BP training were defended.[11-13] Of course, as a new branch of the coaching science, BP needs many serious studies. In the meantime, curious readers can refer to my own recently published books,[14,15] which are also listed in the review.[1]

2. The second layer, as Mr Kiely has defined it, refers to concepts of cumulative and residual training effects. These essential basic concepts of training theory are qualified in the letter as “self-evident truths.” Having expressed familiarity with one book on the theory of training, Mr Kiely has confused the commonplace of training science reality. Professor Matveyev[16] as “the foremost formuliser of traditional periodization,” described the cumulative training effect approximately 4 decades ago, but he never used or even mentioned the term “residual training effect,” not in Russian, not in English, not in Chinese. This term was proposed and conceptualized by James and Brian Counselman 3 decades later.[17] The importance of these generalized concepts for coaching science and training practice can not be underestimated. The text on page 260 of the review[11] clarifies the role of “residual training effect” in elucidating BP. Those requiring additional explanations for a better understanding of BP and how it differs from the traditional model can refer to earlier publications where these issues are clarified.[14,15,18]

3. Another part of the letter is devoted to consideration of the potential benefits of concurrently developing many targeted abilities, as proposed in the traditional model. Mr Kiely has cited 16 publications where the benefits of combined training for strength and endurance are proposed. He does not take into account that the number of targeted abilities (about nine to ten) greatly exceeds the number of proposed abilities by BP block mesocycles. Apparently, each mesocycle should be focused on developing a number (usually three) of abilities – but not one. Mr Keily totally ignores the fact that the block-mesocycle accumulation for developing basic motor abilities (page 201) prescribes concurrent training for muscular strength and aerobic endurance. Therefore, the 16 references cited in the letter do not refute, but rather support the methodic approach of BP, which proposes combined development of compatible abilities and separating work on incompatible training modalities. Thus, this critical attack seems to stem from a careless reading of the review.

4. The final part of the letter contains a passage on the “...inherent unpredictability of the human adaptive response to any set of imposed stressors...,” which is supported by citations from a number of scientific publications. Addressing such a statement to a serious sport science journal seems strange at best. It is commonly accepted that each training system, every researcher and the approach of each coach is based on the supposition that expected response will be adequate for transmitting athlete stimulation. This doesn’t mean that each estimate of adaptive response can be numerically predicted. However, limitations on predictability do not imply a lack of determinism in training response but could be caused by an insufficiency of available information. This generally accepted deterministic approach completely corresponds to evidence provided by Professor Bouchard.
and co-workers in publications\cite{19,20} cited by Mr Kiely in support of his agnostic declaration. Ongoing studies by this research group are intended to unravel the reasons underlying human heterogeneity in response to regular training.

Finally, Mr Kiely considers pre-planned training following deterministic logic and generalized rules as a “paradoxical assumption.” It is known that various paths can be used to lead to outstanding athletic achievements but it is hard for me to imagine that anyone can excel in contemporary sport by working contrary to deterministic logic and generalized rules.

I hope this additional consideration of my paper will attract further interest by the *Sports Medicine* audience in the actual problems of high-performance athletic training.

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