

RESEARCH UPDATE/COMMENTARY: “BLOCK” PERIODIZATION

Dan Lorenz, PT, DPT, ATC/L, CSCS, USAW

There's an interesting article in the latest *Sports Medicine* that is thought provoking and interesting for the sports PT. I have always been interested in how we can utilize strength and conditioning principles in athletic rehabilitation. I think we've all heard of “periodization” at some point, and this particular article challenges the accepted dogma of traditional periodization schemes. My summary isn't exactly scientific this time because I use the information in the article to provide a theoretical framework to implement the concepts. So, forgive me if I'm a little more conversational and the “summary” is a little more lengthy...

The concept of periodization is not new and has been around for over 30 years. In a nutshell, periodization is dividing the training cycle into distinct phases with specific objectives in mind with the idea of meeting peak performance at the time of competition. It was originally used with Russian weightlifters and has been used with success since. The literature has many studies on linear and non-linear programs on healthy trained and untrained subjects.

Even though periodization is systematic, progressive, and has been used for a number of years, there are a few problems with it. The first issue is that it was originally designed for Olympians who had to peak once per year and didn't have multiple competitions throughout the year to have to peak for. For sports PT's, that's an issue with multi-sport athletes, or for example, college football players who have the regular season, and then a month off prior to bowl competitions. Secondly, periodization is not athlete specific per se. Regardless if the athlete is a football player, basketball player, or a distance swimmer, there are periods of endurance, hypertrophy, strength, and power/conversion to power. Therefore, it's not exactly as “sport specific” as it should be. Finally, traditional training involves the increase in basic athletic abilities (endurance, strength, hypertrophy, and power) with a decline of those in the competition phase. Likewise, sport specific abilities are suppressed in the preparatory period and increased during the competition phase because they aren't worked on in the initial phases. The “block system” allows athletes to maintain basic and sport specific activities in a narrow range during the entire season to allow multiple peaks (Issurin).

Because of the above issues, the concept of “block periodization” has evolved over the last 20 years, although no controlled studies on it have been done. It is defined as a “training cycle of highly concentrated specialized workloads. Such cycles contain a large volume of exercises directed at a minimal number of targeted abilities.” The most basic principle of block periodization calls for a high concentration of training workloads in a given block, meaning a large number of tasks/exercises on selected target abilities are used while others are not (Issurin). 60-70% of the athlete training time is devoted to these 1 or 2 target abilities, while the remainder of the training cycle is devoted to warm up, cool down, and restoration. A second principle is the minimization of the number of target abilities in a single block. For example, a block scheme would not use training like “complex training”, whereby an athlete performs a back squat immediately followed by plyometric exercise. They would be performed in separate blocks in this scheme. The third principle revolves around the idea that in most sports, the number of sport specific

abilities (balance, coordination, reaction, strength, etc.) exceeds the number of abilities that can be trained simultaneously. Therefore, consecutive development is the only approach, and the athlete emphasizes these aspects in very short blocks, discussed subsequently. Finally, the fourth principle is appropriate implementation of mesocycle blocks, covered over the course of several weeks to a month. Medium sized blocks, in 2-4 week intervals, are the central tenet of block periodization (Issurin).

The taxonomy of mesocycle blocks is divided essentially into three phases, with the fourth being competition. The first phase is *accumulation*, which is devoted to promoting basic abilities such as general fitness, strength and coordination. It consists of relatively high volume and reduced intensity, lasting from 2-6 weeks. The second phase, called the *transmutation* phase, focuses on sport specific abilities like metabolic training, proper technique, and tactics. It's the most exhaustive cycle and only lasts 2-4 weeks. The final phase is called the *realization* phase, used to restore the athlete and prepare them for competition. It contains drills to model competitive performance and a sport specific program for active recovery. The final phase lasts 8-15 days. Therefore, the training stage in total lasts anywhere from 5-10 weeks, instead of a year like traditional models. The cycle closes with competition.

Obviously in rehabilitation, we're dealing with recovering athletes, often from surgery. Because of that, we have to modify it, but I believe we can use the principles. Using ACL reconstruction as an example in a football player, it may look like this:

Weeks 0-8 – Allow proper time for healing, pain relief, edema reduction, and development of strength and hypertrophy.

Weeks 8-10 - Development of proprioception and neuromuscular re-education in multiple planes with sport specific emphasis.

Weeks 10-14 – Eccentric strength development with emphasis on unilateral leg presses, squats, step downs, and Nordic hamstring exercises. Athlete would perform concentric portion with both limbs, and eccentric portion w/ involved limbs. Exercises would be performed over 4 sets with 6-8 repetitions. Heavy chain/elastic band training may be a training modality used in this phase.

Weeks 14-16 – Technique development for sport specific impact activities, emphasis on repeated practice and consistent feedback. Sagittal plane movements emphasized.

Weeks 16-20 – Random practice, sport specific development of plyometric/agility drills. Progression to frontal plane and transverse plane movements.

Week 20-24 – Power development phase. Emphasis on speed of performance with resistance training. Maximum effort, 1:4-5 work to rest ratios with plyometric exercises. Exercises would not be performed in a “complex training” format. Sessions would be performed on alternate days.

Weeks 24-28 – Metabolic training for football. Rehabilitation consists of multiple bouts of maximum effort for 7-10 seconds followed by 25-45 seconds rest between sets.

Alternatively, the athlete could perform exercises in a “two-minute drill” format, whereby exercises are performed for 7-10 seconds at varying intensity but continuous performance.

Weeks 28 – 30 – Restoration phase to prepare for competition and/or return to practice. Emphasis on recovery prior to unrestricted activity. Soft tissue techniques, yoga, dynamic warm ups, position specific footwork drills, and resistance training consisting of light weights with multi-joint lifts.

Obviously, the above program doesn't follow the block format as designed, but it's also for a recovering athlete. Hopefully, you see the point of this design – instead of working on various things simultaneously like I think most of us do (i.e. sessions that include strength training and balance training); it allows us smaller phases to focus entirely on one aspect of training. Additionally, you'll see a higher emphasis on metabolic training towards the end of the rehab process. Plus, it may help with training monotony due to the constantly changing training emphasis. Since benefits of training are largely neuromuscular anyway, the ever changing stimuli may lead to better outcomes and not allow “plateaus” to occur.

I think this is very interesting. I hope it was helpful. I'm very interested to hear what others have to say...

Issurin V. New horizons for the methodology and physiology of training periodization. *Sports Med.* 2010; 40: 189-206.