

# **Training Methodology and Concepts of Dr. Anatoli Bondarchuk**

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**Abstract:**

Dr. Anatoli Bondarchuk's research into training methods concluded in the formation of block training. Block training is a structured individualized training system with a focus on the competitive event of the athlete. Unfortunately, few individuals in the English-speaking world are knowledgeable of this subject. By examining and synthesizing relevant literature and consulting knowledgeable coaches, this paper introduces readers to block training. A look at the underlying principles of block training and their direct application provides coaches with a basic understanding of the training methods.

**Author Biography:**

G. Martin Bingisser is a law student at the University of Washington and has been researching Russian training methods intensely for the past three years. He has attended training camps in Belarus, Slovenia, Canada and Hungary in order to learn first hand from the world's best coaches. Martin has served as a coach at the USATF Junior Elite Training Camp for the past two seasons. He serves as webmaster for several hammer throw web sites including Hammerthrow.org, the official web page for 1956 Olympic Gold Medalist Harold Connolly and the USATF Hammer Development Committee.

**Text:**

The following is a brief introduction to the training methodology professed by Dr. Anatoli Bondarchuk. In this article I will refer to this method of training as *block training*. By block training I mean a structured individualized training system with a focus on the competitive event of the athlete. Other exercises, such as running, jumping, and weight lifting are also used to increase physical abilities. While this article focuses on training an athlete whose competitive event is a throwing event, Bondarchuk also has shown how his theories can also apply to other disciplines. However, most of his literature has referred to the implementation of this system with throwers and I will therefore use the throwing events in my examples.

It should be noted that Bondarchuk was not only a hammer thrower and coach, but also a scientist. He received a doctorate of Pedagogical Science from the University of Kiev. He developed his theories after conducting a series of tests and compiling training information on over several thousand Soviet athletes of all ages including, but not limited to, track and field athletes. This method of training has been most popular among Russian hammer throwers and was used in the training of Yuri Sedykh, Sergej Litvinov, Yuri Tamm and Boris Zaitchouk among others. More recently hammer throwers Ivan Tikhon and Primož Kozmus, among others, have used these principles in their training. Bondarchuk's methodology has been proven effective on athletes of all training ages and skill level.

The information for this article has been collected from published articles by Dr. Bondarchuk as well as other individuals knowledgeable of his methods. In addition to these sources I have consulted with Dr. Bondarchuk and other coaches who have used and understand these training methods.

## **Basic Principles**

There are several underlying principles of block training, which should be understood before I will describe how one constructs a training system. After presenting these principles, I will proceed to clarify each principle individually and finally show how they connect together to form a training system.

### ***Individuality***

Each athlete reacts to training stimuli in a different way. Their reaction to training stimuli can also change throughout the course of their training life. Accordingly, a training plan should be specifically adapted to the athlete's physiology and strengths in order for the athlete to obtain the most benefit from the program.

### ***Change***

The body improves by adapting to the stimuli provided to it during training sessions. After the body fully adapts to the stimuli it is necessary to change the stimuli in order to provide the body with new stimuli to adapt to. Changing exercises too often will also not allow the body to fully adapt to the stimuli.

### ***Intensity***

The intensity of each exercise, and the distribution of intensities throughout training sessions, plays a key role in its effectiveness.

### ***Specialization***

Exercises should be used that most closely mimic the competition movement. This allows for simultaneous development of power and technique. Training power and technique separately is not as effective.

### ***Regularity***

The regularity of your training and rest schedule is nearly as important as the training plan itself.

## **Individuality**

L.P. Matveyev has shown that athletes adapt to training stimuli in one of three different ways. The first type of athlete will experience a phase of increase, immediately followed by a phase of maintenance (Diagram 1). The second type of athlete will have results decrease after being introduced to new exercises and then will see a period of increase and then maintenance (Diagram 2). The final type of athlete will experience maintenance, a decrease, and an increase, followed by maintenance (Diagram 3).<sup>1</sup> The vast majority of athletes are of the third type.<sup>2</sup>

Also individual to the athlete is the amount of time that it takes the him or her to complete the cycle of form development. Athletes can take anywhere from 2-8 months to complete this cycle.<sup>3</sup> Most athletes take only two to three months (40-60 training

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<sup>1</sup> Bondarchuk, Anatoli. Long Term Training For Throwers. Ashmore, Australia: Australian Track and Field Coaches Association.

<sup>2</sup> Kevo, Vladimir. Personal Interview. 7 November 2004.

<sup>3</sup> Bondarchuk, Anatoli. "Individualization of Training." Fitness and Sports Review International 29.3-4 (1994): 183-185.

sessions) to fully adapt to the exercises.<sup>4</sup> Therefore it is initially necessary to provide the athlete with a set of exercises (explained below) and track their results to discover more about their physiology. Every day an athlete's best training results in each exercise should be recorded and charted. For instance in the throwing events, a coach should track an athlete's best performance each day with each implement. After analyzing the results the coach will be able to determine what type of an athlete the person is by determining when they reach a final plateau in their performance. In addition, the coach will also be able to find out how long an athlete spends in each phase of the developmental model. After the athlete reaches peak form, he or she will be able to maintain that form for another 7-14 days and then a decrease in results will occur.<sup>5</sup>

Furthermore, each athlete has other idiosyncrasies that must be taken into account when constructing a training program. In the hammer throw, for example, some athletes perform technically better when their bodies are rested. Other athletes perform technically better when their muscles are fatigued and allow for relaxation of the muscles.<sup>6</sup> As a result, it would be better for the second athlete to throw after performing lifting exercises in order to obtain the best technical results. This is just one example of how each athlete can differ.

## **Change**

While Mateyev discovered the cyclical nature of form development, Bondarchuk's main contribution to training methodology was his method of using change in the training system. Mateyev's concepts were based on a limited acceptance of experimental results and a poor understanding of the sporting activities.<sup>7</sup> As mentioned earlier, in addition to being a thrower and coach, Bondarchuk was also a scientist. He used his scientific knowledge to observe and experiment with different training systems on thousands of athletes. It was his conclusion that athletes using the currently accepted methods of training would experience a plateau in performances after 4-6 years of training. This was due to a lack of change in the protocol of training.<sup>8</sup> Consequently, when an athlete reaches the peak in his respective developmental model, there needs to be a change in the exercises used in training in order to continue improvement and prevent the stagnation of performances.<sup>9</sup>

## **Intensity**

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<sup>4</sup> Sedykh, Yuri. Personal Interview. 19 February 2005.

<sup>5</sup> Bondarchuk, Anatoli. "Constructing A Training System." *Track Technique* 102 (1988): 3254-2359, 3268.

<sup>6</sup> Bondarchuk, Anatoli. Personal Interview. 19 February 2006.

<sup>7</sup> Verkhoshansky, Yuri. "The End of 'Periodisation' In The Training of High Performance Sport." *Modern Athlete and Coach* 37.2 (1999): 14-18.

<sup>8</sup> Connolly, Harold. "Report on the International Hammer Throwing Seminar and Szombathely Hammer Throw Training Center Program." *Hammerthrow.org* Oct. 2003. 12 December 2004

<<http://www.hammerthrow.org/technique/articles/SeminarReport.pdf>>.

<sup>9</sup> Bondarchuk, *Long Term Training For Throwers*.

The intensity of exercises determines the amount of technical and physical progress one can make using their training plan. There is a role for all levels of intensity in training. High intensity can test the body's maximum performance levels, but can also have negative effects if used too much. Low intensity can help the body warm up and recover. Medium intensity can provide some of the benefits of both high and low intensity.<sup>10</sup> Medium intensity (80-90% of the maximal performance) and low intensity have been found the best intensity to improve the technique and break the speed barriers of complex movements. Learning technique at high speeds leads to fatigued and other problems.<sup>11</sup> In the throwing events these intensities are slow enough that one can actively think about his or her technique while still moving at a high enough speed to provide a training benefit.

During throwing sessions, high intensity throws should be used to measure progress. Approximately three throws with every implement you throw should be at maximal intensity. The best throw should be recorded and used as a method for tracking progress in training. Like other aspects of training, the intensity of training should also be individual for each athlete. Different athletes learn better at different intensities. The coach should also pay attention to how the athlete's body reacts during training. If an athlete's fatigue is affecting technique and speed, a lower intensity should be used.

Lastly, in lifting, Table A will provide a general rule of thumb for how many repetitions should be used while lifting at different intensities.<sup>12</sup> Generally, in weight lifting, lower intensities are used earlier in the year while higher intensities are used closer to the competitive season. However, other variations are possible. You will notice that the amount of reps at each weight is not too high. The concept is to avoid fatiguing the athlete so much in the weight room that his throwing will suffer. Throwing comes first, and lifting second. On the day following weight training, an athlete should have enough energy remaining to train with good technique and achieve a maximum result close to the previous day's result.

### **Specialization**

It theoretically makes sense that great results in Olympic lifting will lead to great throwing results since both activities are dependent on the recruitment of explosive and powerful muscles. However, as knowledgeable coaches know, this direct correlation does not exist because there are many other factors involved in the throwing events. For instance, in the men's discus throw, Dr. Bondarchuk does not find a significant correlation between any weight room exercises beyond 55 meters. The bench press is the one exception as it has a significant correlation for throwers until they reach 60 meters. Similarly, in the hammer throw, the correlations with weight room exercises are

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<sup>10</sup> Zaitchouk, Boris. "Evolution of Improvement in the System of Periodization." Presentation Handout. Colorado Springs: 6 November 1998.

<sup>11</sup> Bondarchuk, Anatoli. "The Role and Sequence of Using Different Training-Load Intensities." Fitness and Sports Review International 29.3-4 (1994): 202-204.

<sup>12</sup> Kevo, Vladimir. Personal Interview. 7 November 2004.

insignificant past 70 meters.<sup>13</sup> Many factors are involved in throwing the hammer, and pure power from the Olympic lifts is necessary but not sufficient to throw far. Therefore it is required to do more specific preparation rather than general preparation when training for the throwing events.<sup>14</sup> By specific preparation it is meant to do exercises that more accurately mimic the movements in the throwing events. The best exercise, therefore, is throwing. Unlike weight room exercises, throwing different weight implements has a significant correlation with throwing the competition implement for all levels of throwers.

As Bondarchuk puts it “We should pay attention to those muscles which are stretched out at the time of the main movement’s performance.”<sup>15</sup> The exercises, and the techniques they are executed with, should have the highest possible correlation to the competition event.<sup>16</sup> When applying these ideas to training, one of the first consequences will be that exercises should be done with speed. For instance, a very quick and explosive bench press at 70% of a maximum has a better correlation to the throwing events than a slow bench press at 95% of a maximum. In the throwing events, quick movement and reaction time are necessary to throw far; exercises that mimic the competitive throwing movement (these exercises will be henceforth referred to as special exercises) play a key role in developing the same muscles used in the throw. For instance, many variations of twisting exercises can be done with a lifting plate, dumbbell, or barbell to help build the necessary oblique muscles necessary in the hammer throw. Winds with lifting plates can also be helpful. However, just working the correct muscles is not enough. These exercises should be done while keeping in mind throwing technique and speed. The arms should be relaxed like they are in the hammer throw and attention should be paid as to when the weight is accelerated. The athlete’s feet should remain about shoulder width apart with the knees slightly bent, just like in the throw. Bad technical habits can be learned in the weight room as well as in the ring or on the runway. An athlete should consider technique more important than the amount of weight used with these special exercises until proper form is developed. The speed should also be close to that of the competitive movement.

The advantage of performing the exercises in this manner is that one can develop technique and power at the same time and therefore more effectively develop power by working the exact muscles used in the throw. Training power and technique separately is not as effective as training them both simultaneously.<sup>17</sup> Many claim that world record holder Yuri Sedykh was not very strong, which is a false claim. Although many modern throwers have better personal bests in Olympic lifting than he, he was by no means bad at those lifts. Moreover, the Olympic lifts are not the only measure of strength. Sedykh’s strength was concentrated in the more important special exercises. That, rather than a

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<sup>13</sup> Bondarchuk, Anatoli. Training Transfer in the Hammer Throw. Kamloops, B.C.: Kamloops Track and Field Club; Bondarchuk, Anatoli. Training Transfer in the Discus Throw. Kamloops, B.C.: Kamloops Track and Field Club;

<sup>14</sup> Bondarchuk, Anatoli. “Relationships between Technical and Physical Training.” Fitness and Sports Review International 29.2 (1994): 109-111.

<sup>15</sup> Bondarchuk, Anatoli. Training in Sports. Unpublished in English.

<sup>16</sup> Bondarchuk, Anatoli. The Hammer Throw. Unpublished in English.

<sup>17</sup> Zaithouk.

great clean and jerk, is one reason why he, using only three turns, was able to accelerate the ball better than anyone.

### **Regularity**

Bondarchuk states that there are various options available for setting up weekly and monthly training schedules. Athletes can train on a 2 + 1 pattern (2 days training, one day rest), a 3 + 1 pattern, a 3 + 1 + 2 + 1 pattern, a 1 + 1 pattern, or numerous other variations.<sup>18</sup> The pattern chosen depends on three things. Most important are time constraints of athlete and coach. Secondly, the availability of facilities needs to be a consideration. Lastly, and most importantly, it depends on how the athlete feels. Training six days a week will allow the athlete to obtain a higher volume of throws, but some athletes may not be able to recover from such a volume of training and that would result in declining performances in training. This scenario would eventually lead to overtraining. The volume amassed in training is important, but not as important as the quality of training. Ten quality throws is preferable to thirty throws with sloppy technique that engrain poor technical habits.

After saying that, however, it is important that athletes try to obtain as much volume as possible. Athletes, especially beginners and athletes in highly technical events, will need many repetitions to develop top form. Here is an area where Europeans have an advantage on American hammer throwers. Since Europeans typically start throwing at a younger age, they are able to build a solid technical base through years of training.

Once the coach chooses a weekly schedule for training, the athlete should not stray from that schedule. Frequently changing the number of days of training per week can confuse the body. It is also necessary to complete the set of exercises in the exact order each training session. This includes throwing, weight training, lifting, jumping, sprinting, and all other exercises. It is necessary in order to better adapt to the exercises as well as to more precisely track performance gains and losses. The body needs to be presented with a consistent training plan in order to specifically adapt to it. During an established training block changes can be made in the volume and intensity of the exercises, but not in the order of the exercises.

Rest days are often an overlooked part of the weekly training schedule. These necessary days help the athlete recover from training loads and gain from the previous days trainings. Athletes must treat rest days as seriously as training days. There are a variety of methods used by top throwers to help aid in the recovery. Massage, sauna, cryotherapy, electrical stimulation, stretching, and massage or combinations thereof have provided benefits to various top athletes.

### **Building A Training Program**

Now that the underlying principles of block training have been laid out it will be easier to show how these principles can be combined to form a complete training plan. As long as the aforementioned principles are taken into account, there are an innumerable number of possible training routines. Only a few are shown below in order to demonstrate how these principles can be applied to an athlete's training plan.

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<sup>18</sup> Bondarchuk, Long Term Training For Throwers.

We will start by looking at the yearly plan of a hypothetical athlete. After examining the way that this athlete adapts to training, the coach has determined that it takes the athlete ten weeks to develop top form. His yearly training program could look like Table B assuming his most important meet is at the end of June.

After finishing the previous year's training plan, the athlete would the next year with some rest. This rest is not necessarily passive rest; the athlete should do something to stay in shape during this time. In August the athlete will start his first block of exercises. He will perform 8-10 exercises in a weekly schedule detailed below for the entire ten weeks it takes him to fully adapt to the exercises and reach top form. After the ten weeks are complete he will have several weeks of active rest in order for the body to recover and get ready for the next block of training. The label 'R' in Table B denotes the active rest period. The rest period is a time when the volume is significantly reduced and supplementary exercises are done. The key is to provide some additional rest for his body. It has been shown that despite the reduced volume, performances will only drop 1-3% during this period.<sup>19</sup> For the next block of training, approximately 50% of the exercises need to be changed. Another two blocks of training and rest will be completed before this athlete reaches the competition period. The label 'CP' in Table B denotes the competition period. In order to maintain results throughout a long competition period, exercises should be changed more quickly, approximately every three to four weeks. During this period the volume and intensity of training are drastically reduced.

As mentioned above, there are numerous combinations of blocks of training, rest, and competition periods that can be used. The variations seen in Table C, as well as many other possible variations, could also be used for the same athlete who takes 10 weeks of training to reach top form.

In looking at the training plan at the weekly level, we are able to see what exercises should be used during the athlete's daily workouts. This particular athlete trains two out of every three days (see Table D). Of the exercises used by a hammer thrower, three should be throwing hammers of different weights (a light, competition, and heavy hammer). Results decrease when the competitive implement is not used in training and therefore the competitive implement should normally be included as one of the exercises.<sup>20</sup> The other hammers used in training should always be changed with each new block of training.

Another thrower, whose time to train may be limited or who is inexperienced, may find a different training schedule more suitable. One such as that presented in Table E might be appropriate.

These are just two possible combinations using the similar blocks of exercises. The amount of days one will train each week and the exercises executed on each day can be altered to fit the athlete's needs and schedule. The coach should be creative when creating a training routine and keep in mind the aforementioned principles of training. With these principles in mind, innumerable training routines can be created. An athlete can train up to six days a week if his or her body is able to accommodate such training. It is important, however, to limit the athlete to doing the same set of exercises in the same

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<sup>19</sup> "Constructing A Training System."

<sup>20</sup> "Constructing A Training System."



order. While this training plan may seem monotonous, Bondarchuk explains that it allows the body to adapt to the exercises better in both the long term and short term.<sup>21</sup>

The number of reps done may also be altered throughout the block of training. At the start of the first block in August an athlete may do 5 sets of 10 repetitions at 50% of their maximum performance (see table A) and by the end of the block of training in October they may be performing sets of 6 repetitions at 75% of their maximum. The general trend is that more reps are done earlier in the training season. Some coaches suggest testing athletes in the lifts should occur monthly in order to determine what the athlete's maximum performance is.<sup>22</sup> From this performance the coach is able to determine how much weight 50% or 75% is. Other coaches will just estimate what the athlete's best is and use a reasonable weight in training. No matter what, if an athlete is feeling fatigued on a specified day, it is necessary to either reduce the weight or number of reps to accommodate them on that day. As mentioned earlier, one must always listen to the athlete's body and adjust training accordingly to promote quality over quantity. If an athlete is extremely fatigued, there is no sense in trying to take forty throws. All that will do is engrain poor technique.

The exercises chosen should include a global (Olympic lifting) exercises that increase explosiveness in more than one muscle group. A lift for the legs and special exercises are also necessary. The other key muscle groups, abdominals and back, are normally exercised in the warm up or after training, but are not normally a major component of training unless an athlete has a weakness in one of those muscle groups. Within each muscle group there exists many available exercises from which to choose a set of exercises. For instance you can choose between doing a snatch from the floor, from the knee, with a close grip, with a wide grip, etc. If the snatch is one of the exercises chosen as an exercise for the first block of training, any one of the alternatives can be chosen the subsequent block in order to slightly change the stimuli. The same variety is available for legs. Squats, step ups, lunges, one-legged squats, and many other exercises are very effective in building leg strength. The warm up should be approximately 10-15 minutes of low intensity exercise to prepare the body for the workout.<sup>23</sup> Jogging, leg swings, and light abdominal exercises can be used in this portion of the workout. At the end of the workout low to medium intensity jogging or another form of exercise helps to quicken the recovery process.

One of the most important aspects of the training routine is the maximal effort throws. As stated earlier, it is harder to improve technique at high speeds. Therefore only a few throws each practice should be of high intensity (perhaps three maximum throws with each implement). These throws are used as a gauge of how training is going. The best throw of the day with each implement should be recorded in order to track the athlete's progress. High intensity throws are also better near the start of practice, before the athlete becomes fatigued.<sup>24</sup>

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<sup>21</sup> Bondarchuk, Anatoli. "Training Load Volumes and the Length of the Sports-Form Cycle." Soviet Sports Review (Dec 1990): 205-207

<sup>22</sup> Kevo, Vladimir. Personal Interview. 8 November 2004.

<sup>23</sup> Bondarchuk, Long Term Training For Throwers.

<sup>24</sup> Accambray, Jacques and Thieurmél, Michael. "Bondarchuk and the Tirrenia Hammer Conference." Hammer Notes 7. Trans. Kevin McGill. 3-21.

## Conclusion

While this training method may seem complex, the flexibility makes it quite simple to adapt to any athlete. An athlete needs only to be prepared to spend more time in the ring as opposed to in the weight room. This, and variations of traditional exercises will lead to a development of the *special* strength and technique that is necessary to throw far.

In the hammer throw, block training is not the only method to train world-class throwers, however this has been the only method proven to produce multiple throwers over 84 meters. Perhaps a new method will be developed and provide a better path to 90m, but for now this method has proven the most successful. Bondarchuk also emphasized at the IAAF Hammer Seminar in 2003 that block training is designed to produce results for the drug-free athlete.<sup>25</sup>

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<sup>25</sup> McAtee, Glenn. "Bondarchuk's Long Term Preparation of Hammer Throwers." Glenn McAtee's Home Page 2003. 12 April 2005  
<<http://people.clemson.edu/~gmcatee/Bondarchuk-seminar.htm>>.

## Appendix

Diagrams 1-3:

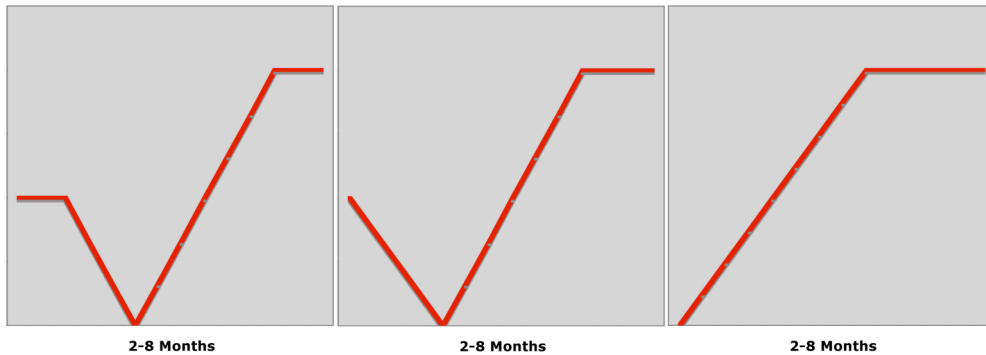


Table A:

Table A: Intensity and lifting	
Intensity	Number of Reps
50%	10
60%	8
75%	6
80%	5
90%	3

Table B:

Mo	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
	Rest	Block 1			R	Block 2		R	Block 3		CP	CP

Table C:

Mo	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
	Rest	Block 1			Block 2		Block 3		Block 4		CP	
	R	Block 1			R	Block 2		R	Block 3		CP	CP
	Rest	Block 1			R	Block 2		R	Block 3		CP	

Table D:

Day 1	Day 2	Day 3
Morning Warm up with Short Sprints and Standing Long Jump 10 throws with the 6kg hammer (3 max throws) 10 throws with 7.26kg hammer (3 max throws) 10 throws with 8kg hammer (3 max throws)  Afternoon Warmup Power Clean x 3 sets Snatch x 3 sets Back Squat x 3 sets 2 Special Exercises 3 x 10	Same as Day 1	Passive Rest. Sauna or other recovery methods.

Table E:

Day 1	Day 2	Day 3
Warm up with Short Sprints and Standing Long Jump 10 throws with the 6kg hammer (3 max throws) 20 throws with 7.26kg hammer (3 max throws) 10 throws with 8kg hammer (3 max throws)	Warmup Power Clean x 5 sets Hang Snatch x 5 sets Back Squat x 5 sets Romanian Dead lift x 5 sets 2 Special Exercises 3 x 10	Passive Rest. Sauna or other recovery methods.