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PEAKING FOR MAJOR COMPETITIONS

This is a synopsis and commentary on an article by Dr. Tudor Bompa, professor of physical education at York University. This article was in the April 1984 issue of Sports (published by the Coaching Association of Canada). Dr. Bompa is also the author of a book covering this material and more, called "Theory and methodology of training – the key to athletic performance" published by Kendall and Hunt Co. in Dubuque, Iowa. A search on www.amazon.ca shows that some of Dr. Bompa's books are available, but this one may be a little hard to find.

Dr. Bompa asserts that peaking to achieve a high level of performance at the major competition of the year is not magic. Peaking, he says, is a very complex state that is achieved by carefully orchestrated training.

The Training State

He describes the training state of the individual athlete as have three inter-dependent components:

1. The "Degree of Training" is the base that the athlete will use to build his performance. It determines the capacity the athlete will ultimately have to produce a peak performance. From this state, the athlete will be able to produce an above-average performance; that is, before the athlete starts to develop his program towards peaking, his performance is already very good just based on his degree of training. The athlete will be able to produce results efficiently and recover quickly and completely. He will be able to demonstrate technical competence in his sport. He will be psychologically prepared and have an attitude of positive self-expectancy. The importance of this foundational level of training cannot be overstated. The athlete's ultimate ability to perform at his peak is dependent on his degree of training. If this level of training is low, the athlete's ability to peak will be reduced proportionately.

2. The second layer of training performance, Bompa asserts, is the "Athletic Shape". This is an extension of the base provided by the "Degree of Training". This develops from the latter stages of the preparatory training cycle and largely develops during the competitive portion of the training cycle. The athlete develops his sport-specific fitness. His technical and tactical efficiency are near maximum capacity and his performances reflect these capabilities. He has developed a psychological base

from which peaking can be initiated.

3. Peaking is the crest of the athlete's ability to perform. It is controlled through the scheduling of activities prior to the major competition(s). The purpose of this manipulation is to ensure optimum performance at the desired moment.

Characteristics of Peaking

This "peaking" state is temporary (not sustainable). It is characterized by having both mind and body performing at maximal levels. In addition, adaptation capacities are at the top level and neuro-muscular coordination is near-perfect.

Adaptation capabilities are significant to all athletes who must cope with the stress of travel and competition. For shooters, adaptation is also important during the match because they must, for example, adapt to changing weather conditions and continue to read the wind intently and accurately throughout the competition. Further, adaptation capabilities are also important to shooters who must perform over a long period of time, and respond appropriately to changing internal and external conditions, such as the tiring of muscles or the changing weather or light conditions during competitions that last several hours.

A high degree of neuro-muscular coordination is essential to all shooters, who rely on fine motor control and hand-eye coordination in order to fire consistently accurate shots.

Another characteristic of peaking that Bompa identifies is a high state of synergism, that is, all of these separate skills and capacities working together in a way that increases each other's effectiveness.

Bompa divides sports into three fitness groups: anaerobic, aerobic and combined. Most shooting sports are combined anaerobic and aerobic. At peak level, Bompa says, this "combined" group needs to have the capacity to handle many moments of maximum stimulation.

Psychologically, the peaking athlete is ready to compete, and he adapts well to the stress of competition. This adaptability can be enhanced by ensuring that the athlete participates in training matches.

The athlete is highly motivated and has a high tolerance for any frustrations that may arise in training or competition. This level of tolerance can be enhanced by structuring training events that help the athlete develop coping techniques and contingency plans. This type of training can also help the athlete develop tolerance to frustrations as a function of aversion training, where the feared event becomes less feared simply through familiarity.

Seven Factors of Peaking

The basic process is to load the athlete to produce first the basic "Training State" and then, as the competition phase approaches, to load the athlete to produce the "Athletic Shape" (enhanced sport-specific fitness, technical and tactical efficiency and the appropriate psychological base). Then the coach "unloads" the athlete in order to produce the natural rebounding of "overcompensation" during which peaking occurs.

Bompa identifies seven factors that affect peaking:
1. High working potential and quick rate of recovery;
2. Near-perfect neuro-muscular coordination;
3. Unloading;
4. Overcompensation;
5. Recovery;
6. Motivation, arousal and psychological relaxation;
7. Nerve cell working capacity.

High working potential and quick rate of recovery

There refer to the athlete's ability to work hard, recover quickly and work hard again. Without this capability, the athlete will not be able to handle the work load required to develop a high degree of training.

Near-perfect neuro-muscular coordination

This refers to the athlete's ability to perform the technical skills well. At top levels, athletes must be able to produce flawless demonstrations of their skill or routine. In shooting, there is no substitute for being able to fire a perfect shot, on demand and repeatedly.

Only with this fundamental ability, can overall performance be amplified.

Unloading

Bompa says that unloading is one of the most important factors in peaking. Unloading is a systematic, progressive de-escalation of the stressors an athlete faces in training and competition. This de-escalation includes physical, technical, tactical, social and psychological factors. It is done just before the main competitive event where peaking is required. The purpose of the de-escalation is to facilitate the desired state of arousal at the "peak performance" event.

Usually, the athlete reduces the volume and intensity of training, and he may also focus on rest and recovery. Bompa says that the unloading period for a well-trained athlete should not exceed two weeks.

The specifics of the unloading period vary from sport to sport, and shooting sports have characteristics from both major groups that Bompa describes: endurance sports and sports requiring coordination.

Bompa describes unloading in terms of both volume and intensity. Volume is a quantitative measure of time, distance, number of repetitions, etc. Intensity is a more qualitative measure of, for example, velocity or complexity in a given unit of time. In shooting sports, for example, to reduce intensity, the 3-position shooter might practice only one position in a training session or the long-range shooter might work with a partner to help call the wind.

For endurance sports Bompa says that the coach should reduce intensity to about 50% immediately and then gradually reduce it to zero over a two-week unloading period. At the same time, volume is more or less maintained during the first week and then gradually reduced to about 50% over the second week of the unloading period. In addition, in the first week, the number of training sessions is reduced to a maximum of two per day. There may be a couple of intensive training sessions during this week, but they should be as short as possible. Non sport-specific training should be eliminated to provide additional time for recovery. During the second week of unloading, the intensity of training is reduced so that there are no stressful activities.

For sports requiring coordination, Bompa says that the volume of training should be reduced to about 50% in the first week. Intensity should be similarly reduced, but within this reduction, the coach may schedule a couple of intense training sessions (not exceeding the 50% guideline). During the second week, both volume and intensity are further reduced and the emphasis should be on enjoyment, confidence building and optimism.

Overcompensation

Overcompensation is a term commonly used in sport science; however, it seems a strange label to apply to what is a desirable state. "Rebounding" might be a better, more descriptive term. It refers to a largely biological mechanism whereby during the recovery phase (the rest period

between two training sessions) the body rebounds and temporarily exceeds the previous capacity. Unloading enhances this rebounding effect, and its timing must be coordinated with the main competition in order to achieve a peak performance at that event.

Recovery

Allowing sufficient recovery time throughout the athlete's training is essential to ensuring that the athlete will peak. Without sufficient recovery time, the athlete will become fatigued, mentally, physically and neuro-logically.

Motivation, arousal and psychological relaxation

Bompa says that motivation, arousal and psychological relaxation are instrumental in the process of peaking at the right moment. He suggests that the athlete can use relaxation techniques, massage and bio-feedback. He further suggests that it is the coach's job to ensure that the athlete has a relaxed environment prior to competition.

Nerve cell working capacity

The nerve cell working capacity is not something that you hear shooting coaches hanging around the range discussing. However, it is evident in the shooters they are coaching. Nerve cells are responsible for the activation of the muscles that produce the athlete's performance. They have a finite capacity. That capacity is determined partly by the athlete's training state and partly by the cell's level of excitability.

The nerve cell's high working capacity cannot be maintained for a long period of time without the cell becoming overworked or tired. If the athlete places excessive demands on the nerve cell, the cell appears to just quit, and the athlete's performance drops abruptly. We have seen this phenomenon in the shooter who, after an outstanding performance on the range, seems to lose their physical coordination, becoming "klutzy" and accident-prone.

Bompa suggests that nerve cell capacity may be heightened for the last week or so prior to the main competition, and he thinks that it may be part of the normal cycle of recovery, relaxation and overcompensation. During the day(s) of the competition, nerve cell capacity reaches a maximum.

After the competition, there is normally a drop in capacity to the base level for that person (dependent on the general training state). Sometimes, if the athlete has overworked, the drop may be sub-normal. This state may well be part of the post-event "blues" that many shooters experiences.

This nerve cell behavior is fundamental to good shooting performance, yet it is mostly neglected by shooters and shooting coaches alike. It is the reason that the micro-cycle is such an important part of the training plan. This allows the athlete to recover completely, and prevents burnout at the cell level.

Peaking too early

Peaking too early is usually caused by training too much and too intensely and/or because of a heavy competition schedule during the pre-competitive or competitive phase. To me, this has always appeared to be the same thing as "cramming" for an exam – we have all done it, but we only do it because we feel that our regular learning/training season was inadequate.

Peaking too late

Peaking can occur after the main competition. The athlete produces a better performance and better scores after the main event. Many shooters attribute this to "less stress". Bompa suggests that it is caused by the lighter training schedule producing the correct

"overcompensation" state, where performance rises significantly. He further suggests that the coach needs to ensure that the athlete prepares for the main competition by properly unloading so that the normal overcompensation state can occur at the correct time.

LINDA'S RULE OF THUMB

By Linda Miller

When I was first trained in coaching, I was taught that the way to ensure that the rifle fits the shooter is to place the end of the butt stock in the crook of the elbow and have the shooter try to reach the trigger. If the shooter's finger is well past the trigger, the stock is too short; if the shooter's finger does not reach the trigger, the stock is too long.

I never understood why this was recommended. We don't shoot a rifle held that way, so why would we measure the fit that way? Over the years, I have coached hundreds of different shooters and studied thousands. What I noticed was that the shooters who "looked good" while firing and produced good results down range had something in common. No matter the rifle, no matter the support equipment, no matter the position, they all looked like they had "wrapped" themselves around the rifle. I intensified my efforts to figure out what made these shooters look this way. I noticed where their elbows were, where the center of the rifle fell in their position, where the balance point of the rifle was, where the trigger was in relation to the position, where the rifle parts were in relation to the base of support. Finally, I noticed a single simple thing that I could easily coach, and that became "Linda's Rule of Thumb".

In a nutshell

When in a shooting position, the shooter's nose should be approximately above his thumb. If it is not, shorten the butt stock until it is. Then, adjust the scope or rear sight for correct eye relief.

What I have found in my coaching (from Olympic-style smallbore to police snipers) is that Linda's Rule of Thumb applies to every type of rifle and all shooting positions.

If I needed any additional confirmation, what really made it clear was coaching our police snipers. The average guy is about 6'6" tall and if you do the "forearm measurement", you would think he needs a very long butt stock. However, he weighs about 250 lbs. He works out a lot and has well-developed chest and shoulder muscles. When he puts on the armor he wears on duty, his chest is even thicker. So, when he gets in position with the rifle, the rifle is effectively pushed away from him by this bulk. The distance from his shoulder has been reduced by body building and body armor. He needs a *shorter* butt stock than a skinny lanky guy would need. And if he is using the usual factory-length butt, when the rifle fires, the muzzle jumps like a wild stallion! That excess muzzle jump results in large group sizes.

Once we started using Linda's Rule of Thumb, the whole process of fitting the rifle became simpler.

Fitting the Rifle – for rifles to be fired from a bipod

For a police sniper, (using a rifle with a bipod and a telescopic sight in the prone position) fitting then becomes quite simple.

1. First you adjust the butt stock until the Rule of Thumb is demonstrated.
2. Then you adjust the cheekpiece until the shooter's eye is centered in the lens of the scope. (The coach can check this by looking back at the shooter through the front of the scope.) This may be easier with the scope magnification at its minimum setting.

3. Then you adjust the sight for correct eye relief. (The shooter should be on the back edge of the range of eye relief in prone, and so that he will be at the front edge of the range for standing and within that range for the other positions.)

Fitting the Rifle – for rifles to be fired with a sling

For an Olympic style rifle, (i.e., one with a single-point sling and iron sights), whether fullbore or smallbore, fitting can be a little more complicated. What follows are the instructions for an individual to set himself up in the prone position.

Step 1 – Prepare your equipment.

First, get someone to help you... doesn't need to be a coach, just someone to do a couple of things under your guidance. Do not put a target up. For safety, do not have ammo. Have a location that is approximately like the place you will be shooting (i.e., concrete or floor for ISSF and mound-shaped grass for target rifle). Take the sling off of your jacket, but otherwise, put on your normal shooting clothing. Use your shooting mat as you would normally. Take the handstop and the rear sight off of the rifle. Put the butt plate up as high as it goes, or as high as the rules allow.

Step 2 – Adjust the butt length.

Now you can lie down with the rifle... rest it on something about the right height, or have your helper hold the weight of it. You want to have your head rest comfortably on the stock... do not push your neck out, or pull it in... just let it rest comfortably. Then put your hand on the hand grip... here's the first check, "Linda's Rule of Thumb": the tip of your nose should be roughly above the knuckle of your thumb. If it is not, shorten the butt until it is.

Step 3 – Install the handstop.

Now, still supporting the weight of the rifle on a rest or a helper, put your arm in a comfortable position under the forestock, making sure that you are on a part of your elbow area that does not cause <u>any</u> pain. In general, we advocate that your arm be at as low an angle as the rules allow, because this lowers the center of gravity and increases the base of support. Your shoulder joint should be slightly over-rotated and your elbow should be just outside the line of the gun. Make sure your wrist is straight – do not let it cock in any direction – and make sure the contact with the rifle should is nearer the wrist than the fingers. Have your helper mark the forestock at the web of your thumb & forefinger... that's where you want to put the front of the hand stop. Put the handstop on, making sure that it is angled towards your hand.

Step 4 - Install the sling

Now let's deal with the sling. Your sling keeper should be as high on the jacket as the rules allow (normally not allowed to be sewn on the back of the jacket, so as high on the sleeve as possible) and in line with the direction that you want the sling to pull. (The general idea is to get the tension transferred from the sling to the back of the jacket in as straight a line as possible.) This may be easier to see once you're in position. Put the sling on the jacket... tighten the keeper so that the sling is as high as possible, and make sure that there is some device to keep the sling from rotating. If there isn't, add a small bolt or a piece of coat hanger or something to keep it in place... this is critical, as any rotation of the sling changes the effective length of it. To get a rough starting point, hold your arm at the approximate angle that you use in position and run the sling down your arm and across the back of your hand... the tip of the hardware that attaches to the handstop should just barely reach the web of your thumb & forefinger.

Get in position with the rifle & attach the sling. Make sure you have about 5-10 pounds of

pressure in your shoulder... if it is less, DO NOT CHANGE THE HANDSTOP. Move your right (presuming you are right-handed) elbow forward, wrapping yourself more securely around the gun... if this disrupts the "rule-of-thumb" change the length of the butt. (The critical principle here is to honor the rule of thumb... change your shoulder or the butt to change shoulder contact.) The contact point should be in the pocket that is formed when you put your arm forward... never on bone, only on soft tissue, but as close to your body as possible.

Make sure you have contact (but not pressure) with the handstop. The handstop just stops your hand so that the angle of the position is found quickly and maintained consistently throughout your shoot. If you have too much pressure, the wrist will not stay straight, and the wrist must stay straight. Also, you must take the recoil in your shoulder, not your hand... during recoil, the rifle must meet shoulder resistance before it meets any handstop resistance... so the pressure in the shoulder must be greater than the contact in the handstop.

Now let's check the sling length. Put the rear sight on... adjust it on the rail so that you are more or less comfortable with the eye relief (this is not the last we deal with the rear sight, just the first step). Look through the rear sight (assuming it is correct enough that you can do this; otherwise go on to the sighting step below and then come back to sling length). While you are looking through the rear sight, drop the weight of the rifle on to the sling; in fact, push it towards the ground until you can't push it further, and then relax. If the front sight is a too high or a lot too low, change the whole angle of the rifle by changing the position of the butt in the shoulder, and/or change the butt plate. If it is a little too low, tighten the sling. (There's a little more to this, but it's a place to start...) Have your helper look at the angle of the gun... it should be roughly parallel to the ground or the muzzle should point slightly upwards. Ultimately, it will need to point to the target, which is usually a little higher than horizontal. Your handstop is the pivot point of the teeter-totter... what we are trying to do now is tune the overall altitude of the rifle (which depends on your size and shape and style of position). If you are sensitive on the elbow (and many shooters are) focus on preserving the integrity of that contact point, and make compromises on the butt end.

Step 5 – Adjust sight alignment

Now we can do the detail work on the sight alignment. Close your eyes and relax completely in position, making sure your head is level (eyes level) and your upper jawbone is putting weight (about the weight of the head) straight down, never pushing laterally at all. Make sure you keep your chin pushed out enough to keep your face fully "presented" to the rear sight. Wait a few minutes with your eyes shut... if you've done this before, wait about 2-3 minutes (have your helper time you). Then WITHOUT MOVING A MUSCLE other than eyelids, open your eyes. If you are looking directly through the rear sight and the front sight is right in the middle of the rear sight, you are ready to start some training exercises. If you are not looking straight through the rear sight, change the cheekpiece until you are... and when I say change, I mean move it up and down and get out the rasp and carve out a dish in the wood... do this over several sessions over several days. The idea is to get your aiming eye directly behind the rear sight while using the stock to support your head naturally... for most people, this means the crest of the cheekpiece needs to be a little outside of the bore of the rifle.

Once you are looking straight down the rear sight, make sure that the front sight is centered without you having to steer it in any way. If it is not, adjust shoulder position/butt plate...

this is where those butt plates with 6-way adjustment can really help. Here are the compromises:

- If you shoot smallbore, let the rifle cant and keep your eyes level;
- If you shoot fullbore, never cant, you may tilt your head just a little towards the stock (no more than about 10 degrees... have your helper estimate this by holding a ruler or rod at the angle of your eyes).

Step 6 – Adjust the eye relief

Now you can make the final adjustment on the rear sight to set your eye relief. Of course, the rear sight must be far enough away from you so that you won't get hit during recoil. The next most important thing is that the sight picture must be proportional.

The most critical element in an aperture sight picture is the alignment of the front and rear sights. This is seen as the ring of light around the front sight hood in the sight picture and is represented in the outermost white ring in the diagram above. I am always surprised by the number of shooters who do not understand this. Many of them set up their sights so that they cannot distinguish the front sight hood at all, which means that they cannot perceive sight alignment at all. The positioning of the rear sight determines how much space there will be around the front sight hood. (An adjustable rear iris should be used simply to adjust the amount of light that is reaching the shooter's eye. My personal recommendation is to adjust eye relief while in good light with the adjustable iris set at about 1.0 mm.)

Fitting the Rifle – for firing a rifle from positions other than prone

Linda's Rule of Thumb applies to positions as well. With rifles that do not adjust, this can be a challenge; however, if you work towards maintaining the Rule of Thumb, you will find that it is easier to build stable positions. No matter how I tune the positions, the main principle I try to abide by is this: drive the weight of the rifle through the center of the body-support system.

In smallbore free rifle, it is easy to adjust the rifle so that the Rule of Thumb can be maintained. Start by putting your shooter in the required position. (I always start with a classic "book" position and then tune it to the individual's physiology.) Then follow the sequence of steps outlined for prone (adjusting for the position and skipping the sling for standing, of course). As long as you maintain the position of the thumb in reference to the nose, you will find it much easier to ensure that the shooter ends up with a stable, well-balanced position.

Summary

Linda's Rule of Thumb may not be the answer to all of your coaching or shooting needs, but I have found it an easy way to get off to a good start. I hope you do too!

The average pencil is seven inches long, with just a half-inch eraser – in case you thought optimism was dead.

Robert Brault
