

ISSF National Coach Course

PISTOL SHOOTING **Shooting Position**

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TABLE OF CONTENTS

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THEORETICAL PART

1. INTRODUCTION.....	4
2. REQUIREMENTS - PRECISION POSITION.....	5
3. STANCE - PRECISION POSITION.....	11
Leg position.....	11
Body position.....	15
Right arm position.....	18
Right hand position.....	24
Left arm position.....	28
Head position.....	31
4. STANCE - DYNAMIC POSITION.....	36
Sport Pistol - dynamic position.....	36
Rapid Fire Pistol - position.....	42

PRACTICAL PART

1. METHODOLOGY OF APPROACHING AND TAKING SHOOTING POSITION	51
Air Pistol - Sport Pistol - Rapid Fire Pistol	
Establishing middle line of position.....	52
Establishing "Zero Point".....	54
Position correction	54
2. CORRECTIONS OF THE GRIP AND PROPER GRIP FITTING	58
3. EXERCISES FOR DEVELOPING BASIC SHOOTING SKILLS	62
4. WORK WITH BEGINNERS	68
5. DEVELOPING SHOOTING SCHOOL SYSTEM	78
BIBLIOGRAPHY	81

1. INTRODUCTION

At the beginning of this book, I would like to point out one very important fact. Namely, all the elements of the positioning technique are strictly individual to the shooter. The description that follows is a general frame model that should be understood and applied accordingly to the shooter's individual characteristics. Through daily work, feedback and experience, this model has to be adapted to the shooter's best benefit, respecting all the requirements that follow.

Basic principles, described in this text, contain essential values that have been achieved through the work of many years and generations of successful shooters from all over the world. When adding all the experience and knowledge gained from the trainers that have been working with them, a long list of knowledge, research, scientific findings, education systems, experiences and suggestions that come from various experts from the fields of sport medicine, physiology, psychology, physical preparations, biomechanics, technical engineering and information science, one cannot doubt the great importance this text represents. These principles must be taken into account when building a foundation for the development and coordination of the individual characteristics of the shooter through the daily work.

When building a correct shooting position, all the aspects of the position have to be recognized – position of the feet, legs, torso, arms, hands, shoulders and head; as well as movements engaged in the lifting, sighting and triggering techniques. All these technical elements have one goal: **maximum performance output.**

To achieve the ultimate goal, a perfect shot, besides a "good eye" and "steady hand" (as the most primitive and raw definition described by ordinary "amateurs") it is necessary to meet a wide

range of requirements to provide and secure the conditions for satisfactory shooting delivery. This will lead to the conclusion that the shooting position is one of the most important roles in building a successful shooter.

A simple fact, known to all, is that it is not possible to hold the pistol 100% still in the aiming area. This will lead to the conclusion that a smaller area of the movement will give a better chance of scoring 10. Nevertheless, we all know that sometimes the result is not satisfactory, despite the fact that the movement is as desired. A wide range of factors can affect the score. In the majority of cases, it will be due to the technical imperfection or psychological factors that are influencing the lack of coordination between the technical factors responsible for delivering a perfect shot.

Note:

Majority of the photos used in this material are done with help of Walter Lapeyre. It is not because he was a shooter with perfect position, but he was so patient and willing to participate in photo project where were taken over 200 photos. Walter is just a model for educational purpose. Despite all imperfections in his position, he was one of the world leading pistol shooters in a period of 15 years. Thank you Walt.

Also, I would like to thank Damir Mikec for helping in producing the PPT part, regarding the correct position approach.

Special thanks to my former student and colleague Lisa Borgerson, A Class National Pistol Coach from Canada for the great help in editing and correcting material.

2. REQUIREMENTS – PRECISION POSITION

There are 5 key aspects to be achieved in order to build a correct shooting position:

1. **Natural/comfortable** – allowing the shooter easily and naturally to obtain the position securing the maximum comfortable feeling during the entire shooting event. Very often many shooters and/or their coaches are looking into the position of the successful shooters, trying to copy/paste it into their own technique. This is just the beginning of the wrong road. Something that is natural or comfortable for one person is not necessarily natural or comfortable for the other person. This requirement should be adopted on a personal level regarding one's anatomic build, the proportion of the body parts, weight, size (tall or short), distribution of the center of gravity, muscle definition, eye dominance and above all personal feeling of comfortable position. Sure, there are biomechanical rules and limits that must be respected, when talking about the natural and comfortable aspect.
2. **Effective** – demanding minimum effort in order to maintain an optimal position during the shooting even with maximum energy saving, preventing fatigue and securing optimal performance. The simplest example to understand this aspect is if you compare two cars that drive the same distance at the same speed. A car with a bigger engine will consume much more gasoline than one with a smaller, more efficient engine and both will arrive at the same time to the finish line. Simply said, why use more energy in muscle activity if the same outcome can be done with less muscle activity? Such an approach will be beneficial in terms of longer quality

training sessions, less fatigue and faster recovery process, both physically and mentally. These effects are very important when talking about a situation where shooters are going to participate in the final shooting.

3. **Stability** – maximizing the ability to hold the pistol with a minimum arc of movement.

A consensus exists in the scientific literature about the relation between pistol stability and performance (Gulbinskienė & Skarbalius, 2009). Shooting position has been determined, by many authors, as one of the main factors that define the stability of the pistol due to the kinetic chains of the body (Pellegrini & Schena, 2005). Therefore COP (center of pressure) movements are closely related to the movements of the pistol as suggest Ball, Best, and Wrigley (2003). This data leads us to think that the body position is an important factor in pistol modalities' performance. This hypothesis has been confirmed by different books and journals specialized in Olympic shooting (Mon 2012b; Todorovic, 2010) as well as in various science journals (Mason, Cowan, & Gonczol, 1990).

4. **Alignment** – ensuring that stability is beneficially used to point the aiming elements

of the pistol into the center of the aiming area, on the target. The ultimate goal in pistol shooting sport is to score 10, i.e. the center of the target. This statement leads us to the conclusion that all actions in obtaining an optimal position, must be done in relationship with the center of the target. Therefore, obtaining the correct position is rather an ultimate must, than an option. If the position is not aligned properly with the target, when the shooter releases the shot, the arm would move to its natural point of equilibrium, thus disturbing what could have been a well-aimed shot. A poor position alignment causes fatigue and shooter can no longer maintain the reference point on which the aiming point is based. Practicing this process, according to my 30 years of international coaching experience, has been one of the most neglected and overlooked

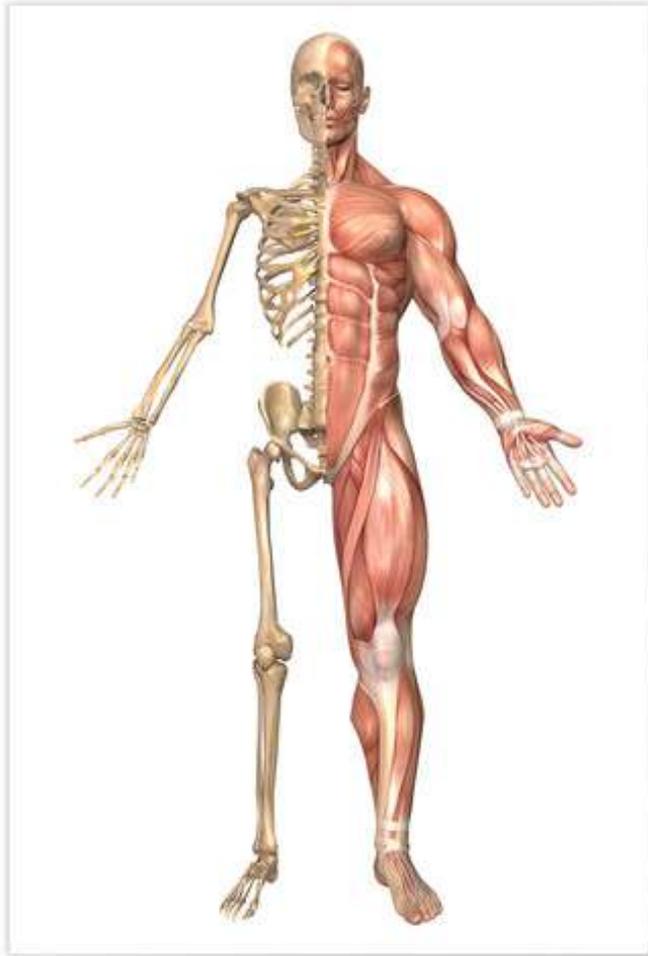
part of training and practice routine. It is well worth the effort if one has dreams of being a world-class shooter.

5. **Consistency** – ability to take or re-take the position in a correct manner at any given moment and still maintain stability and alignment through the entire shooting event. This requirement is a summary of above mentioned four elements. It is not just enough to come to the shooting position and proceed with training/competition. Consistency must be routine of every daily training to become mastered part of the overall performance process.

I cannot count how many times I have been asked this question from trainers or shooters: “How to build a correct position?” In order to explain and understand the answer it is necessary to understand a few basic facts of human anatomy, physiology and biomechanics.

As any good architect will tell you, a solid building is dependent on a good foundation and a correct static frame; this principle also defines a good shooting position. In a human body the skeleton is the core structure used to build the optimal shooting position.





Ligaments, tendons and muscles have the function (among other functions) of ensuring that each bone is securely attached to each other in a certain way, building a multifunctional and solid static and dynamic skeleton (frame). Cartilage ensures that the end parts of the bones do not produce friction and damage to each other during structural movements and will also provide smooth movement.

Understanding the function described above, it is necessary to explain that the structure of the bones, ligaments and tendons are quite rigid, and as a result they represent a constant in terms of the shooting position. This means that during the course of the shooting event there will be no significant changes in the position caused by the elements of the body. Cartilage, due to its structure, will slightly compress during the shooting activity, but will recover its volume and dimensions shortly after (certain physical exercise will help in this process), thus it acts as a small but important variable on the optimal shooting position.

During the whole shooting event activity, muscles perform the greatest work and will be the factor of the most significant variable element in the shooting position. Even though the muscles of the arms, hands, shoulders, legs, back, abdomen and neck are doing most of the

shooting position activity, it will be wrong to forget the activity of the muscles in the heart, lungs, arteries, eyes etc.

All this muscle activity, being large variables in the shooting position, will result to some extent in position change and variations. Furthermore, this activity will produce tiredness of the muscles and will lead to a greater variable factor. As a final result, stability will be reduced in the short term and consistency will suffer in the long term.

To find an optimal solution for this natural phenomenon we have to understand and accept the fact that it is necessary to face the consequences and develop a system that will compensate and minimize these negative effects as well as making tactical compromises in order to maintain optimal conditions for high-performance levels.

To achieve this ultimate goal it is necessary to apply unconditionally the second requirement of the shooting position effective. If we agree on the reasoning that minimal muscle activity will produce minimal variability in the shooting position, the conclusion is leading us to the very simple solution: **“The less muscle activity in maintaining the shooting position, the greater efficiency in stability and aiming, the greater possibility for high-level performance.”**

When applying this simple solution, in most cases, the shooting position will be performed in accordance with the first requirement (natural/comfortable). This will result in the overall mental well-being of the shooter and expansion of their comfort zone, resulting in greater opportunity for high-level performance.

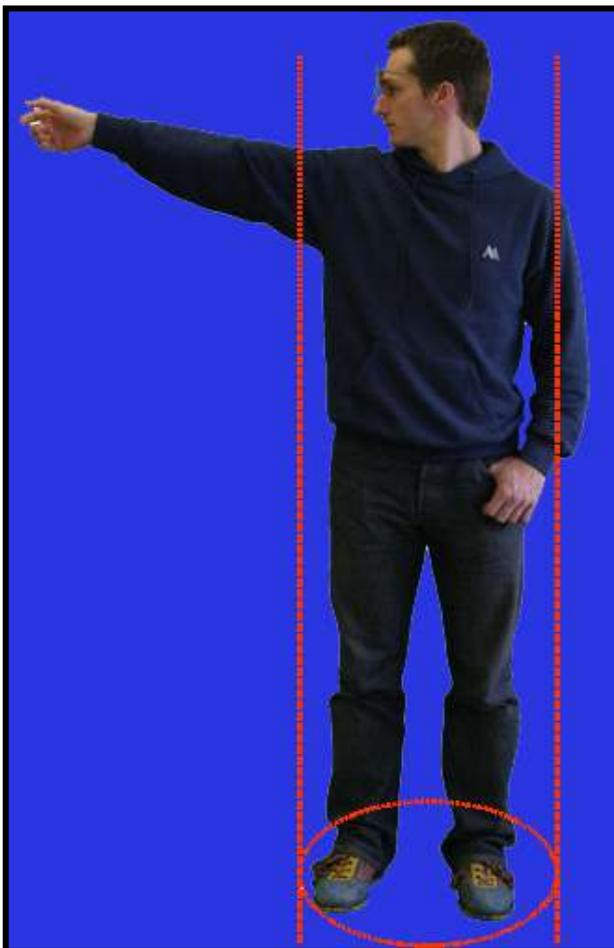
Quote:

***Wrong is wrong – even if everyone is doing it
Right is right – even nobody is doing it.***

3. STANCE – PRECISION POSITION

The ultimate goal that the shooting position must provide is unconditional stability with minimum arc of movement. Building the shooting position must be done systematically and in order, taking into account the above-mentioned five requirements and keeping in mind the shooter's differences; anatomy, physiology, biomechanics specificity, strength, and character. We need to build a solid foundation, therefore starting with the position of the feet, and accordingly the position of the legs.

LEG POSITION



The position of the feet must serve the purpose as would a solid foundation for the static frame that will carry out the rest of the body. From here onward, all the parts of the body will be more or less conditionally directed by the parameters set from this foundation – position of the feet.

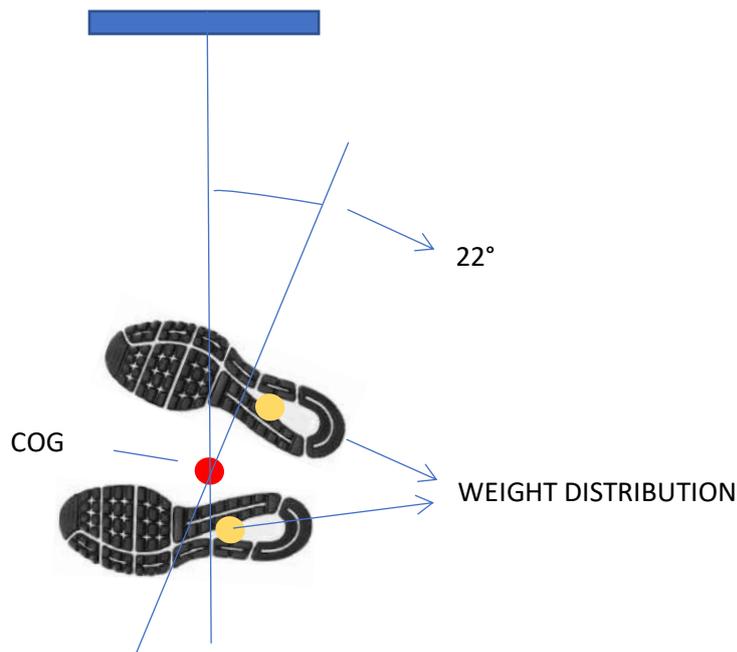
The most steady/stable and the most comfortable position is the one, where the distance between the feet is approximately the width of the shoulders or slightly narrower.



The feet have to be positioned in such a way to provide minimum tension in the legs. To maintain the requirement that the shooting position be natural, leads us to the conclusion that the feet must naturally be spread sideways.

As a result of such foot positioning, the body will get a support foundation surface in the shape of a trapezium that is larger than if the feet were to be placed parallel to each other. The position of the trapezium surface is conditioned with the fact that the right hip has to be placed in a direction towards the target. This will lead to a position of the trapezium surface where the feet are spread in such a way that the aiming line (eye, sighting elements, centre of the target) passes through the middle of both feet, approximately within 22 degrees.





In order to meet the second requirement (*effective*) and minimize fatigue, it is necessary to distribute the body weight in the middle part of the feet or slightly on the heel balls. This surface is providing two important conditions:

- a) Projection space for situating the centre of gravity in its optimal position, centre between feet, and
- b) To provide an appropriate surface for body weight distribution, equally on both legs/feet.

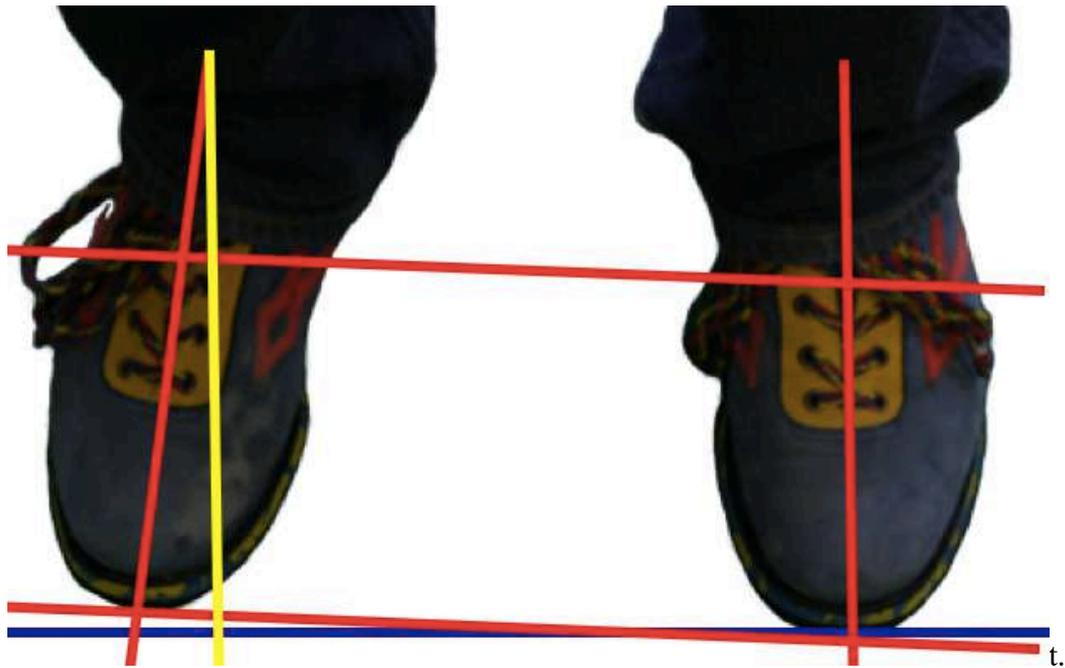
Note:

COG and body weight are two different biomechanical parameters – do not confuse them!

On shooting ranges all over the world it is possible to see many different variations from this model, ranging from 0 - 45° and still allowing shooters to perform with top world-class results.

Another very important element in feet positioning is the relationship between the feet.

Regardless of individual angle modification (0 - 45°), the right foot has to be slightly turned towards target.



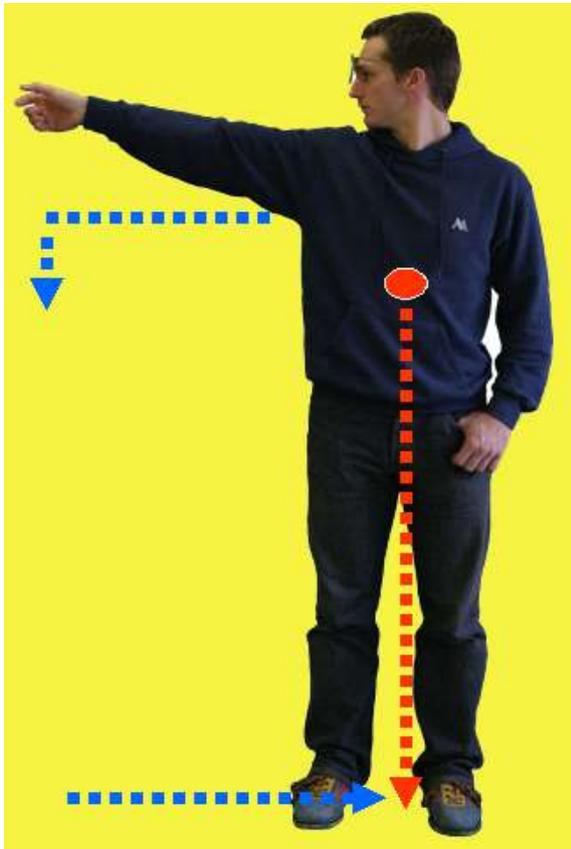
In the case of our model, the feet are not parallel. The right foot is 8° turned to the right, in the direction of the target. Such positioning of the right foot is releasing rotation pressure in the right knee and avoiding injury of the cross ligaments of the knee, which are very common in pistol shooting. Many shooters are neglecting this necessity, as they get a feeling of better stability and better balance. For a few minutes in the short run this might produce a positive effect, but after that time it will turn into a negative effect followed by a very serious injury. The necessity to establish a correct biomechanical position of the feet is paramount in building a correct and functional overall shooting position.

Note:

***Golden rule among successful athletes across all sports,
is to minimize injuries during sports career.***

BODY POSITION

In the normal body position without a lifted gun, the center of gravity (COG) is naturally

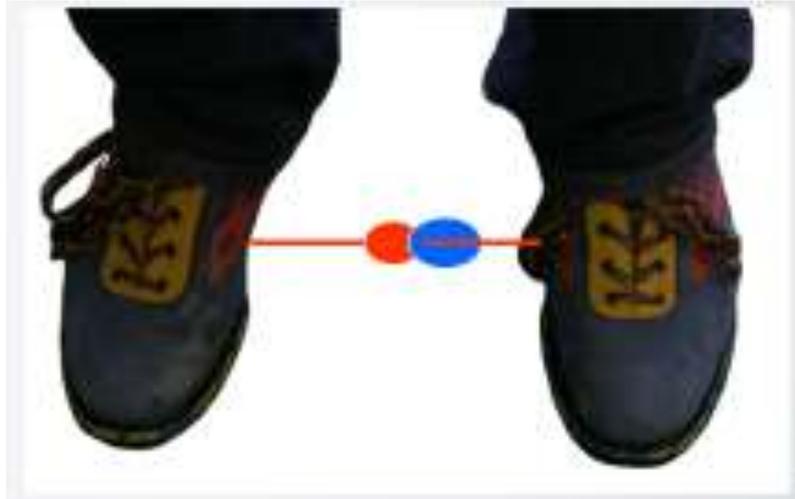


Body position with lifted arm

projected in the middle of the spread feet. The body weight (BW) will then be equally distributed on both legs.

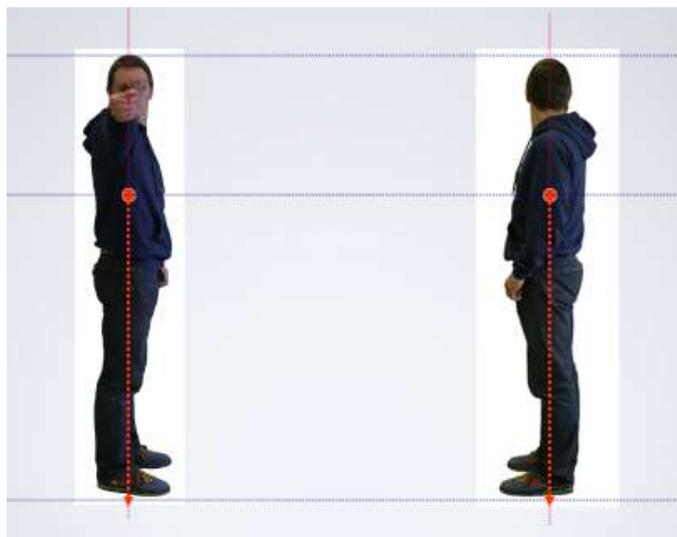
When raising the shooting arm and pistol, the COG will naturally move towards, or beyond, the right foot. This situation will disturb balance greatly. In order to regain a proper balanced position, COG has to be replaced in the most optimal position. At the same time, BW distribution has to be readjusted on both legs. These readjustments are necessary in order to secure the minimum arc of movement of the pistol.

The shooter needs to bend the upper part of the body away from the target, providing a counterweight to the weight of the extended arm with the pistol. If the process of bending the upper part of the body is done solely from the hips and above, COG will move to its desired position, but weight distribution will be jeopardized putting most of the body weight on the left leg. This is one of the most common mistakes we see on the shooting ranges all over the world. Movement of the upper part of the body has to be done in a combined manner by moving the hips slightly toward the target while shifting the position of the shoulders backward. By doing this, the COG is placed between feet or slightly towards the left foot.



Skeletal bone placement in this position will take over body mass distribution equally on both legs, reducing muscle activity. This combined movement will secure the prevention of unnecessary fatigue on the leg joints and muscles, keeping body balance undisturbed. Such a body position will provide the condition whereas only the necessary groups of muscles are engaged in the action to secure the minimum arc of movement. Minimizing muscle activity, down to exclusively necessary ones, will meet the requirement of efficiency, i.e. minimum use of energy, giving the opportunity for longer training practice sessions, without fatigue and overtiredness.

Furthermore, it is necessary to take care that the line crossing through the shoulders is right above the line passing through the middle of the feet, or with a very small angle of deviation. Securing this requirement will prevent unwanted rotation/twist of the upper part of the body in relationship to the feet/leg



position. Any significant displacement of these two axes will produce lateral forces resulting in

greater muscle activity in an attempt to minimize the gun's arc of movement. In reality, the horizontal movement of the pistol will be greater and very difficult to control, as muscle fatigue will quickly show a negative impact.

The part of the body between the last rib and pelvis is the weakest part of the human body, regarding bone structure and support. Only the lumbar part of the spinal cord is bridging this area. Holding the upper part of the body in the correct position requires well-trained and properly developed core stability. This means that lower and lateral muscles of the abdomen as well as lower back muscles play a great and important role in achieving good stability of gun control. Logical conclusion is that shooters need through serious training to improve state of these groups of muscles. It is very demanding task, which is often neglected in our sport.



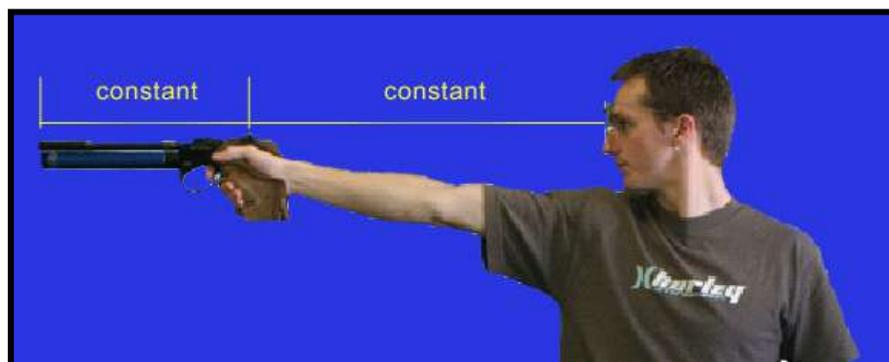
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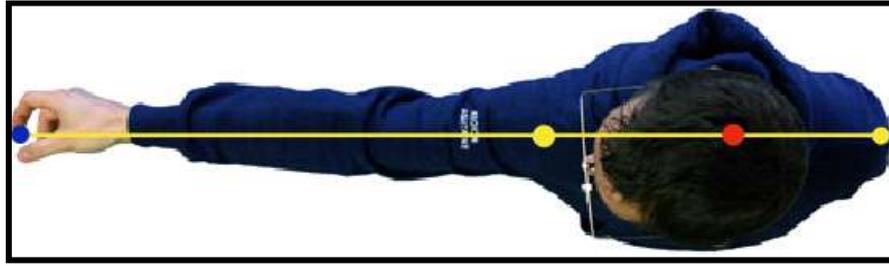
***Do you think training is hard?
Try losing.***

RIGHT ARM POSITION

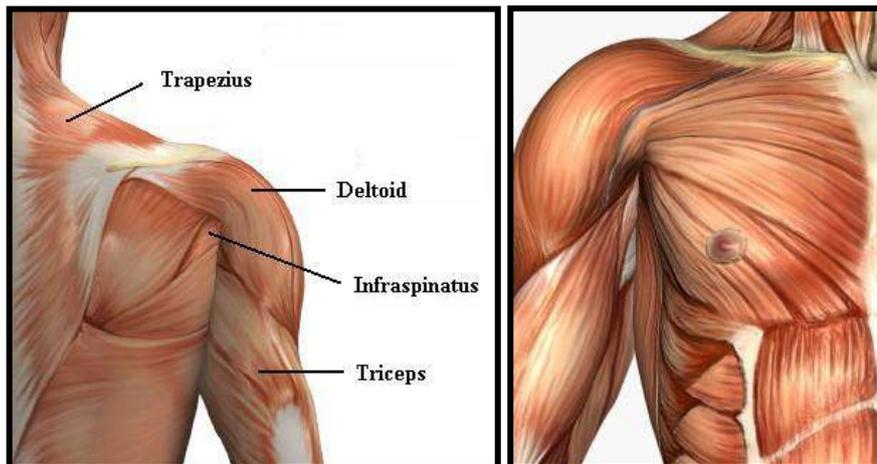
Without being unfair to the importance of the many other body parts and the work done by them, the right arm has one of the most important roles in the shooting process. The right arm has to provide the crucial minimum arc of movement of the pistol, bear the weight of the gun, secure the optimal sighting line condition, and deal with recoil. This multi-tasking cannot be performed successfully without the engagement and support that other parts of the body provide. To provide conditions optimal for those requirements, the right arm has to be totally stretched. This position is necessary for three reasons:

- Distance between the eye and the aiming elements (rear and front sight) must always remain the same. This will mean that the position of the right arm will support the shooting position with the fifth requirement – **consistency**. That will result in one more **constant** in building an effective shooting position.
- Elbow, the upper part of the arm, and the shoulder build a compact unit with stronger connections. This condition will support the fourth requirement of the shooting position – **stability**. The more compact the unit of the arm parts, the better control of the arc of movement.
- A stretched arm is better at absorbing recoil. This will result, consequently in increased **precision**.

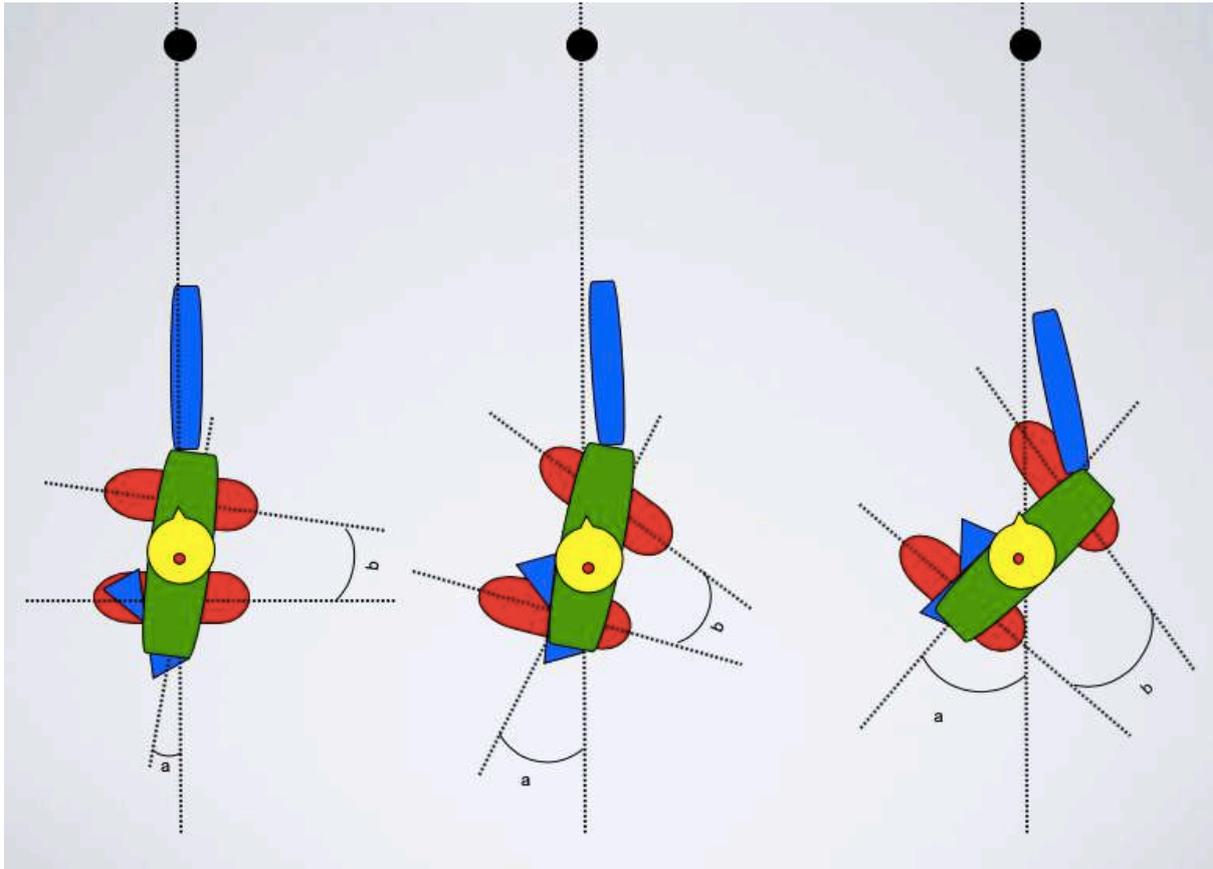




To allow the right arm to perform best it is necessary to place it in the line that is passing through both shoulders or a bit to the left from that line. This way it provides the best conditions for the static work of all three parts of the deltoid muscle. This will result in the optimal placement of the right shoulder in the lower or middle-high position. Very often, we can see the high position of the shoulder and this model will be elaborated in the study case.



The position of the right arm is one of the most discussed topics among the profession, leading to a vast variety of shooting styles. Basically, we can differentiate three major groups of shooters, regarding the position of the right arm, as shown in the graphic below.



1. The left figure is showing a very “open” position, where the right arm is forming a relatively small angle with a line passing through the shoulders (angle a), sometimes running from -3° to $+7^{\circ}$.
 - a. Disadvantages of such position of the right arm will dictate the necessity that the head has to be sharply turned to the right in order to provide optimal conditions for the eye apparatus and its function. This will result in excessive neck muscle activity leading to quick fatigue and unnecessary use of energy directly jeopardizing the requirement for the correct position - first, **natural/comfortable**, and second, **effective**. Furthermore, the right carotid artery will be severely compressed, leading to insufficient blood flow to the left brain hemisphere, according to the study of late Dr. Hainz Lösel former Chairman of the ISSF Medical Committee, which in a longer period of time might have negative health consequences. At the same time, there is

unnecessary compression of the nerves on the right side exiting between cervical vertebrae, which might cause irregular innervations of corresponding muscles. The last disadvantage is that the “chest” muscle group is extended, while the “back” muscle group is compressed, increasing chances for lateral movement of the arm when corrupted with fatigue.

- b. The advantages of this position will be displayed through a firmer and more compact unit of the right arm and right shoulder, hopefully minimizing arc of movement within a short window of time, as well as better recoil absorption. When talking about air pistol vs sport pistol precision position, it is fair to say that there is very little advantage, as air pistols nowadays have little recoil.
2. The middle figure is showing a “zero point” position, where a line passing through the right arm is forming an angle with the line passing through the shoulders (angle a), somewhere around 22.5° .
 - a. Disadvantages of this position style are expressed through the head position, which is turned to the right with some neck muscle activity. This fact is still compromising first, **natural/comfortable**, and second, **effective**, but not so much as the case in the first figure. Compression on the carotid artery and vertebral nerves is less than in figure 1, but still existing.
 - b. Advantages are obvious in chest/back muscle activity, which are in quite good activity balance, thus providing optimal conditions for work of three parts of muscle deltoideus, which is most responsible for holding the outstretched arm with pistol in the hand with minimal arc of movement.
 3. The right figure is showing a very “closed” position where angle a is somewhere between $32 - 45^\circ$.

- a. Disadvantages are most obviously the unbalance between chest/back muscle groups, which is the opposite effect from figure 1. When athletes are exposed to fatigue, lateral movement of the gun will be compromised while shots will have a tendency to group on the right side of the target center. Furthermore, the absorption of the pistol recoil will not be as effective as in the previous two models. The angle between barrel axle and hand is forced under a certain angle with axle passing through the right arm. This condition might produce some uncomfortable and unnatural function of the right hand and its finger function. It will most likely compromise finger pressure distribution on the pistol grip and function of the trigger finger.
- b. Advantages are obvious in the position of the head, giving optimal conditions for work of visual apparatus, as eyes will be naturally placed i.e. straight forward in relationship with head position. There is no pressure on blood vessels, as well as there will be no pressure on vertebral nerves.

Conclusion:

All three above mentioned models, with their individual modifications, are present on all shooting ranges and practiced with a wide range of athletes. We can identify that there are many shooters and champions that use one of these models with great success, so it would be wrong to say that one is better than the others. Very often, shooters themselves, or instructed by their coaches, are trying to copy/paste the position of their preferred champion. Certainly, this is the wrong approach. Each person is unique in their physical, biomechanical, emotional, and psychological qualities and characteristics, as are the shooters. Therefore, all these characteristics must be taken into account before selecting one of the above-mentioned models and their modifications.

The main goal of this paper is to provide an insight view of various possibilities, but at the same time giving some recommendations. As a shooting position is always compromised between

advantages and disadvantages, the logical conclusion is that the balance between those might be the best choice. If we speak about building the best possible position for the beginner, without any hesitation the second figure will be the position of choice. When speaking about an already established shooter it would be wrong and unprofessional to give any suggestion, before making a set series of assessments, measurements, and tests before suggesting some, if any changes.

Another great discussion between coaches is about the position/elevation of the right shoulder. Very often we see shooters with a high position of the shoulders, or with a somewhat lower position. For me, as part of the international coaching team through the past thirty years, this was a topic to look at. As there is no significant biomechanical advantage of high vs low shoulder I was trying to find out why and when this habit was appearing. After conducting more than 80 interviews with some of the best precision shooters through three decades of active work, one fact was repeating very frequently. Namely, the majority was building this habit through their young age (10 – 13), while their skeletal and muscular systems were not developed sufficiently to hold a pistol for a longer period of time during training units. In order to compensate for the pistols arc of movement and arm shaking, instinctive action was to raise the shoulder and try to improve their performance. At those periods it was giving progress, but such a habit was producing long term disadvantages. In order to practice pistol shooting with a high position of the right shoulder, there was a need for heavy-duty physical training of this part of the body. Many potentially talented youngsters gave up on shooting sport, while those that continued with this style, often suffered serious injuries. The very small number continued and made their career. There is a second group of shooters that adopted this technique and they are represented with those who made copy/paste decisions.

When working with beginners, it is of utmost importance to introduce our sport on the methodical, didactical and pedagogical way. Gradually building shooters position with many existing aids,

methods, and most importantly taking care of athletes' physical and health status. More on this subject will be explained in other chapters of the Academy education.

RIGHT HAND POSITION

Top-level shooters say that a correct grip hold is halfway to successful shooting. That is correct!

A correct grip has two essential elements:

1. Providing a hold of the pistol with minimum arc of movement in the middle of the aiming area, with consistency and the minimum use of energy.
2. Providing optimal conditions for the index finger to pull the trigger without disturbing the established minimum of arc movement.

Meeting these requirements is acquiring to achieve correct placement of the right hand on the correctly built pistol grip. The position of the right hand has a major role in the correct holding of the weapon. There are three important points on the hand and on the grip that must be considered:

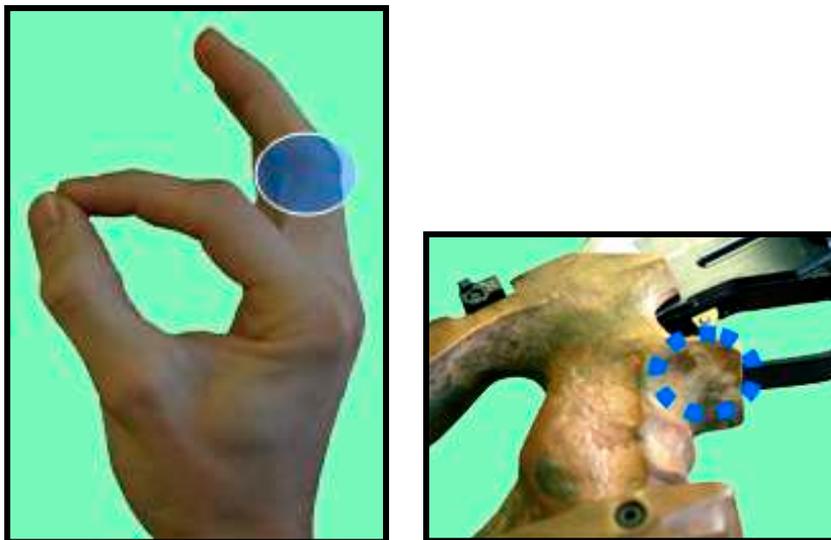
- Space between thumb and index (trigger) finger - behind barrel and under the rear sight.



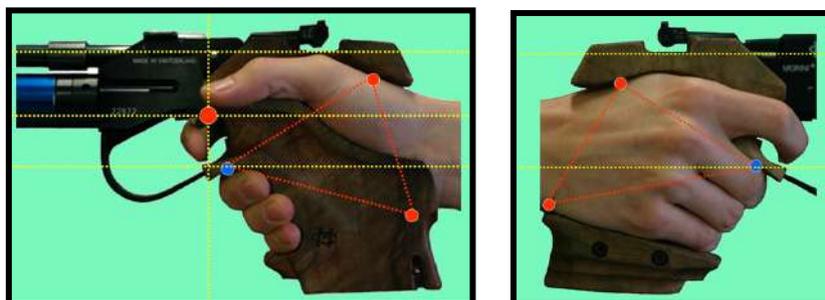
- Lower part of the hand, next to the wrist ankle (art. ulnaris) – upper (supportive) part of the grip.



- Upper part of the middle joint of the middle finger on which is laying the part of the grip that is under the trigger mechanism.



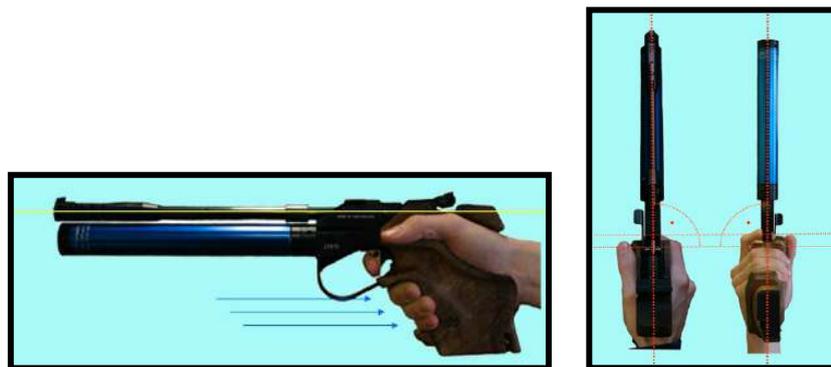
When these three points of the hand are correctly placed on the appointed places on the grip, they will form a triangle.



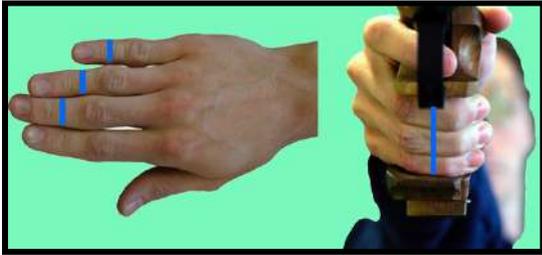
The best place to hold the gun is at its construction COG (left photo – red dot), but for obvious reasons, it is not possible. Therefore, we are trying to get as close as is physically possible to this mark by supporting it at point two (blue dot), as a center of the triangle hold. This technique

of gripping results in the use of the law of the lever. Such an approach gives the possibility to hold the gun with minimum muscle activity, saving energy, and minimizing the arc of movement of the pistol. Because training unit or competition is comprising a great number of shots, saving energy in gripping technique is one of the most important elements one has to master. Besides this fact, the proper gripping and correctly built grip will play a major role in preventing injuries that are quite common among pistol shooters. One of the most frequent injuries is in the form of “tennis elbow”. The wrong gripping technique or poorly adjusted grip or a mix of both, can produce problems within 20 minutes that can take months, sometimes even a couple of years to be solved. Therefore, attention to grip adjustment and gripping technique demands serious and dedicated work.

In order to maintain achieved minimum arc of movement during the triggering process, the pistol barrel has to remain in balance with the forces applied on the grip and trigger. This condition can be provided only if both lateral and vertical forces applied on the grip remain parallel with the barrel and in 90° with the barrel axis.



Three fingers - the little, ring, and middle finger are banded around the grip with nice, smooth tension which is always the same. Pressure on the grip is done with the middle phalanges of the three fingers.



Any other deployment of the forces will result in lateral deviations of the axis of the barrel.

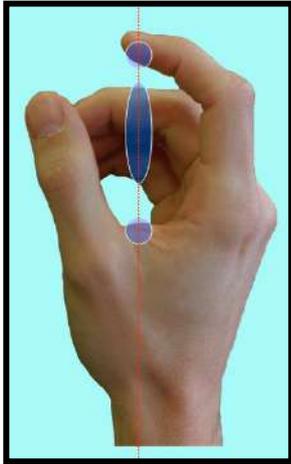
Often a debated subject is what is the quantitative pressure on the grip? When speaking about Air Pistol, where trigger weight is limited to minimum 500 grams, the logical conclusion is that if the shooter has to overcome trigger resistance, the remaining three fingers bent around the grip, should do the same pressure activity, i.e. 500 gr (or more – depending on trigger weight setup). This conclusion is finding support in the fact that there is no need for the brain to deliver various information for four fingers, excluding the thumb.



Last phalanges of the thumb - little – middle – ring finger, can have contact with the grip, but **without** any significant pressure. They are responsible for maintaining an inclination angle between 12 -15°, from relaxed to the shooting position of the pistol with Air Pistol, and 18 - 22° with Sport Pistol.



The most important finger of the hand, trigger finger, must be free of any contact with the grip. Only in this way the optimal condition for the correct activity of the trigger finger and correct triggering action is secured. If this is not the case i.e., trigger finger has contact with the grip, every attempt of triggering will result in movement of the pistol from the optimal sighting point, and precision will be decreased. A common mistake is that shooters “feel” when there is contact, that they have better control of the pistols’ arc of movement. It might be correct, but when the index finger is executing the triggering technique that is where an unwanted effect takes place. Displacement of the barrel axis is an inevitable result of such action and shot placement is not where desired.



The last phalange of the index finger has to be placed with its most sensitive part, middle of the fingertip, on the trigger shoe, building with the axel of the barrel 90° angle. This placement will secure that lateral movements of the barrel will be avoided, while the triggering process will be executed straight backward, against the V-space between thumb and index finger.

LEFT ARM POSITION

The shooting position in pistol shooting demands that the left hand and shoulder have an absolutely passive role. Such a role is determined by the fact that we need to produce as many constants as possible in the shooting position and process of firing the shot. By placing the left hand in the pocket or attaching it to the trouser belt, the left arm will keep the same place at each shot process. This will result in a more compact unit: arm-shoulder-body, and will increase the body's balance. The projection of the COG will be aided by moving the left arm to an optimal desired area. Such a position will be the closest one to the "immobilizing position". i.e. "anatomic passive position".



Alternatively, just placing the left arm in a passive role is not good enough. The left arm and left hand have to be positioned the same way each and every time. To demonstrate such importance we would need to understand the importance of posturology.

I have extracted a part of the text that is important for our understanding and analysing the situation with the position of the left arm/hand.



“Posturology is a multidisciplinary medical discipline that examines the major plumb lines in the human body. Postural pathology is an imbalance of these plumb lines, producing excess stress that causes musculoarticular pathologies and changes in the motor pattern.”

POSTURAL DEFICIENCY SYNDROME (P.D.S.) is characterised by a clinical picture comprising stabilometric and clinical symptoms and signs:

- The patient complains of feeling ill on standing: he either staggers or experiences pain in this posture.
- Stabilometric recording confirms that his performance falls outside of normal limits (control of postural oscillations is abnormal).
- The clinical examination reveals abnormal symmetry of his postural muscle tone (**regulation of his muscle tone activity is abnormal**).

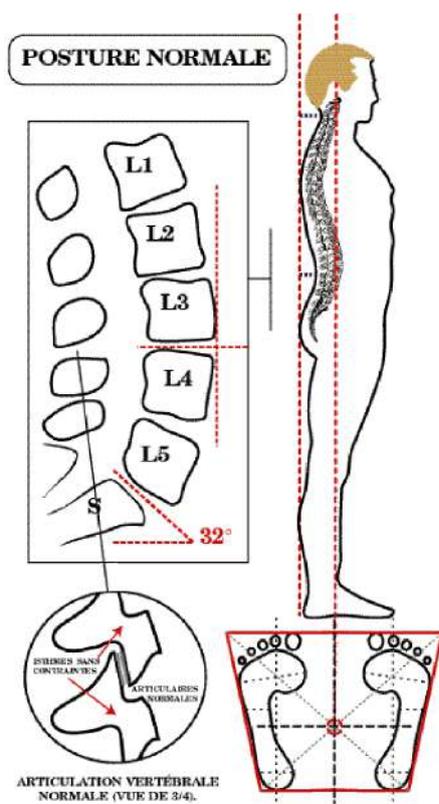
The last statement is a crucial one for our discussion.

The following test will demonstrate the importance of the correct placement of the left arm/hand. As a matter of fact, it should be understood it is a must for all other parts of the body as well.

A test person is standing upright with arms spread sideways at shoulder height. The Assistant, who is standing behind the test person is applying force on the test's extending arms while test is giving resistance.

It will be obvious that both of test's arms are delivering fairly equal counter-pressure.

We will then place a 1-centimeter high object under the heel of the right foot of our test person and repeat the same procedure. It will be very obvious that the test person's right arm is much less resistant, actually becoming very weak. The reason for such tremendous loss of power in the right arm is the fact that we have temporarily made the person's posture configuration unbalanced.



Conclusion: any change in the positioning of the left arm, i.e. altering the position of the left arm/hand during the course of training or competition will lead to changing the posturology of the body.

Most likely it will result in abnormal muscle tone activity of the entire upper part of the body, giving a negative impact on the arc of movement of the gun. I had the “opportunity” to experience such a situation during the pre-Olympic period in 2008 with one of my shooters.

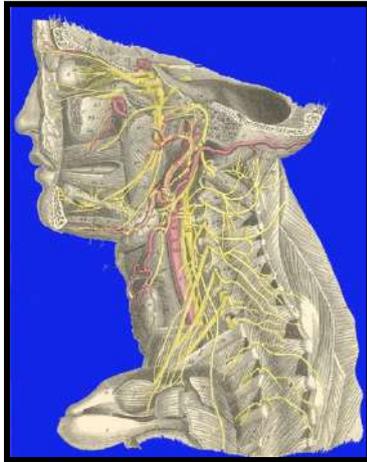
References & suggested material for reading:

Posture and posturology, anatomical and physiological profiles: overview and current state of art.

Francesco Carini, Margherita Mazzola, Chiara Fici, Salvatore Palmeri, Massimo Messina, Provvidenza Damiani, Giovanni Tomasello

Acta Biomed. 2017; 88(1): 11–16. doi: 10.23750/abm.v88i1.5309

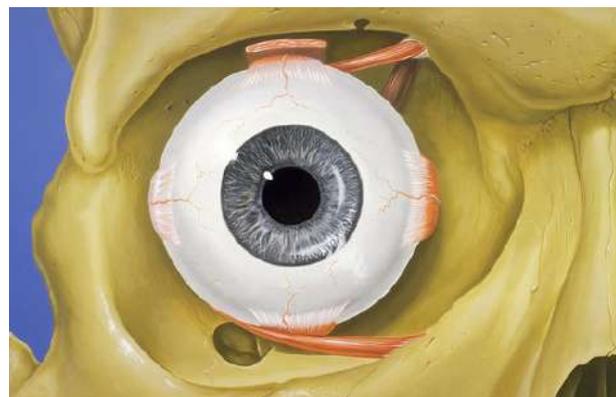
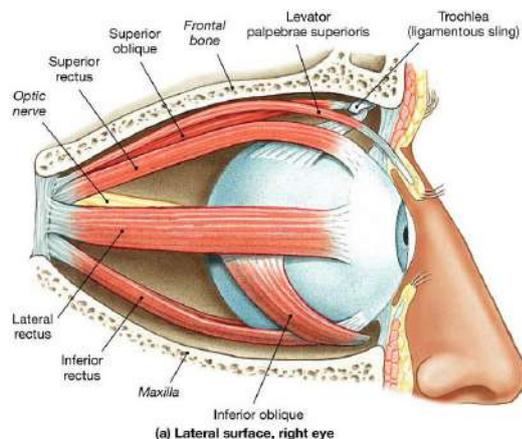
HEAD POSITION



The ultimate goal in shooting sport is to score 10, or better to say 10.9. Such that all actions, finding a suitable position, various techniques such as lifting, sighting, aiming, triggering, follow-through, breathing, mental preparation, and control are obligatory to serve this single goal-scoring center of the target. It is well known that humans are getting approximately 70-75% of the outside stimuli through the visual sensors (eyes). All activities

that athletes are doing are in accordance with the ultimate goal, and the eyes are the sole organ that is guiding the rest of the body for this activity. It is never enough to be reminded that the position of the head is most decisive in providing optimal conditions for achieving the ultimate goal. The position of the head, more than any other part of the body, should provide a natural and comfortable condition for the shooter. An average head weighs about 5 kg and requires very delicate attention in terms of its positioning and its control of movement.

Natural and comfortable condition demand is dictated by the function of the eyes. Humans have the best vision when looking at objects that are placed directly in front of us.



“Oculomotor function can be divided into two categories:

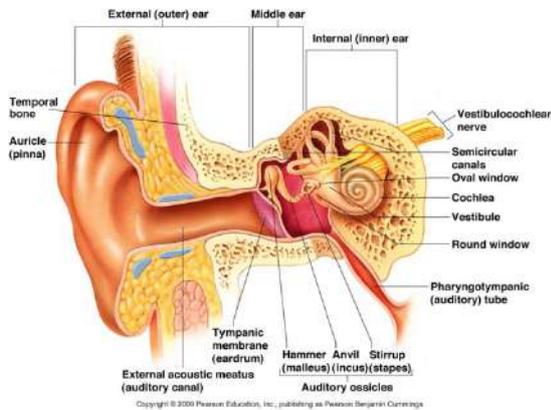
1. Extraocular muscle function that include:
 - a. medial, inferior, superior recti, inferior oblique, and elevator palpebrae muscles, all innervated by the oculomotor nerve (III)
 - b. superior oblique muscle, innervated by the trochlear nerve (IV)
 - c. lateral rectus muscle, innervated by the abducens nerve (VI)
2. Intrinsic ocular muscles (controlling the lens and pupil) are innervated by the autonomic systems and include:
 - a. iris sphincter and the ciliary muscle (innervated by the parasympathetic component of cranial nerve III)
 - b. radial pupillodilator muscles (innervated by the ascending cervical sympathetic system with its long course from spinal segments T1 through T3).”

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Any deviation of the head position from a normal/natural position will mean that the athlete is moving towards a set of compromises. Those will activate a chain of reactions that will be noted through the position of the shoulders, right arm, upper body position, etc. It will subsequently lead to some compromises in various elements of certain shot delivery techniques.

The ear is a sensory organ that picks up sound waves, allowing us to hear. It is also essential to our sense of balance: the organ of balance (the vestibular system) is found inside the inner ear.



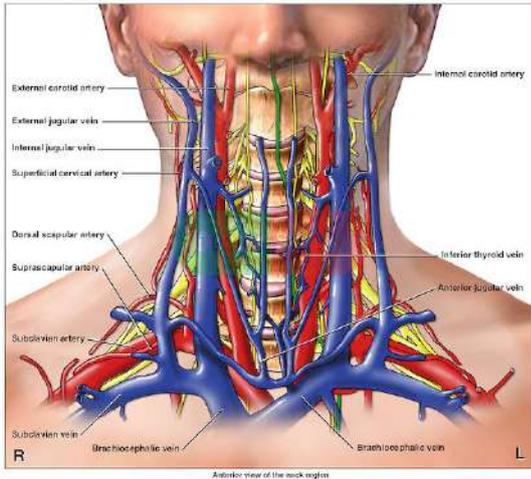
“ It is made up of three semicircular canals and two otolith organs, known as the utricle and the saccule. The semicircular canals and the otolith organs are filled with fluid.

Each of the semicircular canals end in a space that has small hair cells in it. These spaces are called ampullae. Whenever we turn our head, the inner ear turns along with it. But it takes a very brief moment for the fluid in the semicircular canals and ampullae to move with our head too. This means that the sensory hair cells in the ear are bent by the “slow” fluid. The hair cells then send this information to the brain via nerves.

The otolith organs are found diagonally under the semicircular canals and have a similar function: There are also thin sensory hair cells in both organs. The difference is that, unlike in the semicircular canals, there are small crystals on the hair cells – like pebbles on a carpet. These crystals are called otoliths or “ear rocks.” The otolith organs detect acceleration, for instance when you take an elevator, fall, or gather speed or brake in a car. Information coming from the vestibular system is processed in the brain and then sent on to other organs that need this information, such as the eyes, joints or muscles. This allows us to keep our balance and know what position our body is in.”

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A very delicate network of many nerves leaving the spinal cord and connecting CNS with peripheral body parts, should be additional demand.

Full attention must be taken into account concerning the blood circulation system that supplies the brain, eyes, ears etc.

Conclusion:

The head has to be turned to the right without deviation in any direction, providing the following benefits:

- optimal conditions for the eyes sighting function,
- optimal conditions for the function of the vestibule mechanism
- optimal condition for the blood flow
- optimal condition for the neck muscles, preventing unnecessary fatigue



Earlier, when describing the position of the right arm, we were elaborating through three major models of the shooting position, some advantages, and disadvantages of various positions regarding the position of the head. Nevertheless, in the “Practical” part of this

course, we will elaborate in detail some techniques of obtaining a position, but right now I would like to make a statement. The relationship of **target – the eye** is the most fundamental starting point of building the correct position. The relationship of the **eye – position of the head** is a natural sequence of this process and is supposed to determine the rest of the position build-up. This statement is aimed at building the correct position when starting to work with beginners. In daily work as coaches, often we meet with a spectrum of head position variations and it is very important how to handle every single case. Shooting is a very individual sport and there is no “one size fits all” rule, so it is necessary to take into account all anatomical, biomechanical, etc. differences before applying changes or modifications.

See Power Point Presentation Position.pptx – slide 1 - 42

Self-evaluating questions:

1. Name basic requirements for the precision position.
2. Describe the projection and placement of COG.
3. Explain main role of the right arm.
4. Describe the function of the left arm.
5. Describe head position requirements.
6. Name and describe the advantages and disadvantages of typical position variations.
7. What is the optimal value of angle “a” in precision position?
8. Make your own prefeed position description with arguments.

3. STANCE – DYNAMIC POSITION

SPORT PISTOL – RAPID STAGE

When talking about dynamic shooting positions we are differentiating the rapid stage of the Sport Pistol position and the Rapid Fire Pistol position. Even though they are used in time-limited shooting disciplines, there are similarities and differences respecting their specific needs.

Comparing the positions of the Sport Pistol rapid stage event to the Sport Pistol precision event, one can find many similar details.

By analysing the different requirements, it is obvious that it is necessary to produce a position for the shooter to make a vertical lift and delivery of the shot in a time-limited environment (3–7 seconds) with a repetition of five cycles. The conclusion is that principles of the position requirements are the same as in the precision position, including an additional sixth element:

1. **Natural/comfortable** – allowing the shooter to obtain the position, securing the maximum comfortable feeling easily and naturally during the entire shooting event. This requirement should be adopted on a personal level regarding: one's anatomic build (the proportion of the body parts, weight, size (tall or short), distribution of the center of gravity, muscle definition, eye dominance) and above all, the personal feeling of a comfortable position. There are biomechanical rules and limits that must be respected when talking about the natural and comfortable aspect.
2. **Effective**– demanding minimum effort at maintaining an optimal position during the shooting event, maximizing saving energy and preventing fatigue while securing optimal performance. This approach will be beneficial in terms of longer quality

training sessions with less fatigue and faster recovery processes, both physically and mentally. These effects are very important when talking about a situation where shooters are going to participate in the final shooting.

3. **Stability** – maximizing the ability to hold the pistol with minimum arc of movement. A consensus exists in scientific literature about the relationship between pistol stability and performance. The shooting position has been determined by many authors, as one of the main factors that define the stability of the pistol due to the kinetic chains of the body. Therefore Center of Pressure (COP) movements are closely related to the movements of the pistol. This data demonstrates that the body position is an important factor in the pistol modalities' performance. This hypothesis has been confirmed by different books and journals specializing in Olympic shooting.
4. **Alignment** – ensuring that stability is beneficially used to point the aiming elements of the pistol into the center of the aiming area, on the target. The ultimate goal in pistol shooting sport is to score 10, i.e. the center of the target. This statement leads us to the conclusion that all actions in obtaining an optimal position must be done in relationship with the center of the target. Therefore, obtaining the correct position is a necessity, rather than an option. If the position is not aligned properly with the target, the arm would move to its natural point of equilibrium when the shooter releases the shot, disturbing what could have been a well-aimed shot.
5. **Consistency** – ability to take or re-take the position in a correct manner at any given moment and still maintain stability and alignment through the entire shooting event. This requirement is a summary of the above mentioned four elements.
6. **Flexibility** in SP Rapid Stage must be greater than in AP due to the repetitive gun lifting technique. Five cycles repeating vertical movement, lifting, and lowering the gun, are

definitely demanding a good portion of flexibility if we want to meet the fifth requirement – consistency.

Ensuring that the gun lift is done properly and with consistency, it is necessary to make some compromises in position layout. The Rapid Stage position might not offer a possibility for the most comfortable one, but it will be possible to overcome this disadvantage due to the short time of the position efficient usage (3 seconds of active interaction followed by 7 seconds semi-active relaxation) and 60 seconds break between series.



The major difference in Rapid Stage position is that the feet are positioned to form a slightly larger trapezium-shaped support than in precision position. It is done by placing the feet wider apart and turning the right foot slightly more towards the target. The result of such feet placement will create a larger surface for support, with COG being a bit lower and closer to the ground. This will secure more uniformed conditions for a vertical lift of the gun, consequently increasing stability during repetitive cycles, as well as providing greater flexibility for this

process.

The angle-forming lines that pass through the middle of the feet and the shooting line (angle a) is between $0 - 22^\circ$. This position corresponds with the first position model previously described in the “PRECISION” chapter. This angle is in favour of consistent gun lift, with a more compact upper body system (hand-wrist-arm-shoulder). The advantage is better absorption of the recoil, while a disadvantage is the position of the head. As described, this is the position with a high level of compromise. Fortunately, in comparison with Precision Position, such position will not jeopardize the result thanks to two facts:

1. The shooting cycle is relatively short, with fairly sufficient recovery time between series, so it is possible for the athlete to successfully cope with negative aspects of this position.
2. The 10 ring is 100 mm in diameter, which is a fairly large area to shot at even with all the above-mentioned disadvantages.

In order to increase stability during the lift and live firing followed by recoil, muscles in both legs are a bit tenser than in the Precision Position. Another important difference in comparison with Precision Position is that COG is falling in the middle of the feet or a bit closer to the right foot. Such layout is often used to produce a more firm and counterweight effect against the rapid vertical lift of the gun, serving for better absorption of the recoil. Following all these minor adjustments, weight distribution must be equally spread on both legs or in co-ordination with the projection of the COG slightly shifted on the right leg. The reason for such weight distribution is for the purpose of assisting more aggressive lifting techniques and more efficient recoil control. Last, but not least, greater feet distance is a very important element as it is leading towards unlocking the hips. During the dynamic stage in Sport Pistol, it is necessary to maintain a locked hip position, whereas for example in Rapid Fire Pistol the athlete has to obtain a position providing unlocked hip requirement. The necessity for locked hips is in the fact that, to some extent, Rapid Stage of Sport Pistol is still dealing with the great requirement of Precision demands, as the vertical rise of the gun and the target is the main object of importance.

Regarding all of the above mentioned, a very important part of building the correct position is core stability. The athlete has to maintain the same position through a repetitive series of five shots while lifting and lowering the gun which has to be done without displacing travel of the right arm. Core stability and its activity is the major element providing optimal conditions for securing the correct execution. This means that the activation of the muscles in the lumbar area are responsible

for this requirement with greater engagement during the entire process of five shots. It leads to a logical conclusion that the shooter has to be adequately physically fit in order to meet this demand.



As a consequence of more engaged core stability, the upper part of the body (torso) is also more erect than in Precision Position, requiring a more active role of the back muscles. All these adjustments are necessary to provide greater agility during

gun raise, more effective absorption of the gun recoil, and provide better stability during the five-shot series.

The right hand with wrist, arm, and shoulder is a more compact and firm unit, contributing to better recoil absorption and a more unified reproduction of the gun lifting technique during the five shot series. This requirement is common in all dynamic pistol disciplines. Special attention has to be paid to the firmly locked wrist, as it will greatly aid the shooter in controlling and maintaining sighting elements in the same manner during the entire series sequence, while additionally aiding the correct transfer of the recoil energy through the arm.

Right-hand placement in the grip is with the same requirements as in Precision Position, but with rather firm gripping. This is necessary in order to prevent displacement of the gun during repetitive shots, due to greater recoil and trigger weight resistance in Sport Pistol than with Air Pistol.

The left arm has the same function and position as in precision position. The left elbow should be placed as close to the body as possible, providing a more compact unit with the body. This will prevent unwilling disturbance of the balance during both the lifting technique and delivery of the

shot. Also, it is ensuring that there is no lateral displacement of the COG. As mentioned earlier in Precision Position, the uniform position of the left arm is contributing to the correct maintenance of the body's postural constant requirement. This means that the left arm is with a passive, but important role.

The position of the head, due to the more "open" position will result in a more demanding turn of the head to the right. Consequently, the position of the head will "suffer" all disadvantages that were described earlier - tension in the neck muscles, compression on neck nerves and blood circulatory system, vestibular system, and eye function. Fortunately, the short shooting time and size of the 10 ring will compensate for this disadvantage in position.

Self-evaluating questions:

1. Name additional basic requirement needed for the Rapid Stage of SP position.
2. Describe the projection and placement of COG.
3. Describe the function of the left arm.
4. Describe head position requirements.
5. What is the optimal value of angle "a" in the Rapid Stage of SP position?

Make your prefeed position description with pros and cons arguments.

RAPID FIRE PISTOL POSITION

In Rapid Fire Pistol shooting it is necessary to obtain a stance that will provide optimal conditions for vertical raise, followed by horizontal rotation from target one through 2-3-4 and 5, and imaginary 6th target (follow-through). One has to bear in mind each series is done in various time limitations - 8, 6, or 4 seconds, from the moment when targets are turning (green light turns on).

POSITION REQUIREMENTS

To perform all of the above-mentioned, position elements must be most ideal for the individual characteristics of the shooter. Nevertheless, basic position requirements described in Sport Pistol Position must be taken into consideration with additional requirements that have to provide more stability in the target direction - a fast vertical lift of the gun, and quick rotation to the next target.

Taking into account that Rapid Fire Pistol is a very specific dynamic shooting discipline with a complex series of repetitive continuous movements, it is important to stress the importance of the stability of the system "body-weapon". With that said it is essential to build a correct position that incorporates two very important requirements:

- more stability
- more body flexibility

TYPICAL STANCE

Looking at the position of the feet we recognize that they are placed further apart, greater than the width of the shoulders. Greater surface in the shape of a trapezium is necessary because in Rapid Fire Pistol it has to provide sufficient supporting area, contributing to greater stability of the body.

The second reason for such feet placement is that when legs are further apart, the position of the hip joints is “unlocked”, resulting in greater flexibility.

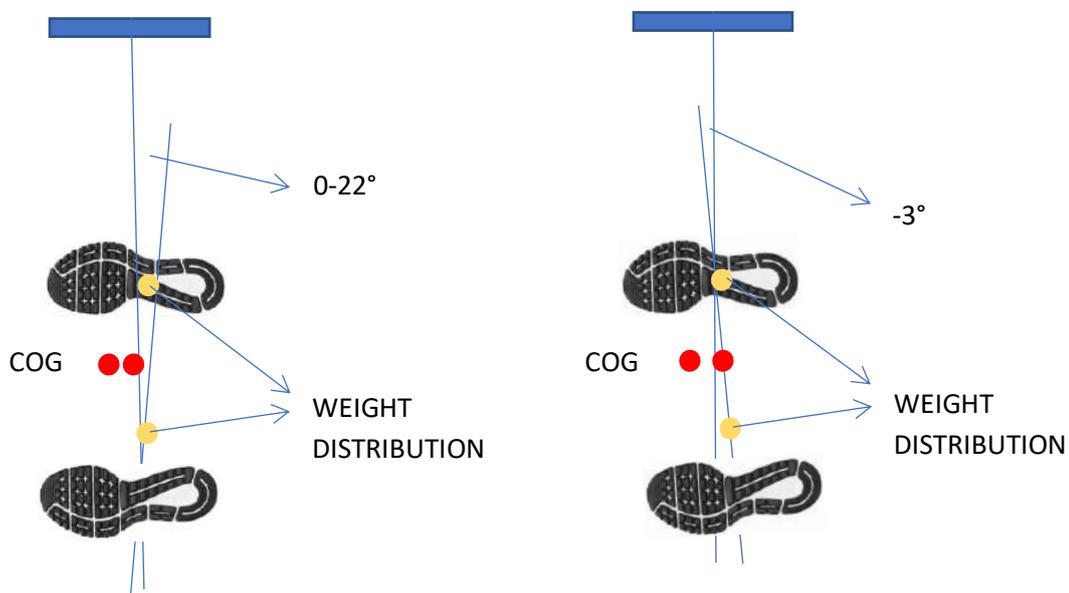
Keeping in mind that Rapid Fire Pistol is a very complex Olympic event where, regarding the position, there are three important elements that have to be taken into account in order to provide optimal conditions for the successful execution of the series:

- reaction time
- a quick vertical movement to the first target
- quick, even and steady horizontal movement through targets 1 to 5

Greater flexibility is an additional aid for rotating technique.

Of course, there are additional requirements regarding various techniques, but those will be subject to discussion in other chapters in Academy education. Here we are describing position, only.

The upper part of the body is erect and/or leaning towards the target, providing optimal conditions for a fast vertical movement of the right arm and at the same time securing better stability in the target direction. In the ready position, COG is shifted toward the right foot, consequently “dragging” weight distributions more in the same direction. At the same time COG is placed in the middle of the feet or towards the toes.

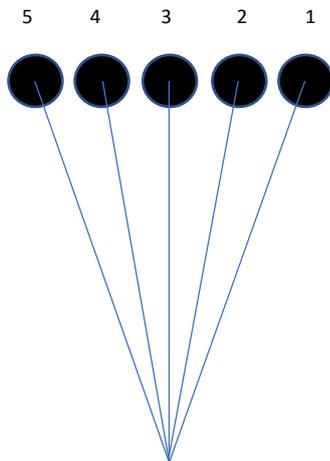




Depending on the chosen technique, we can differentiate two major models of COG transfer during lifting technique; COG maintains on the same spot or, moving slightly towards the left foot. The advantage of the first position is that the shooter, during the lifting and rotating technique is not making any additional body movement. The disadvantage is the more stressed muscle activity in the right leg and back muscles. The second model is offering an advantage in lesser stress of these muscle activities and better recoil absorption. The disadvantage is the additional necessity to control the movement of the body backward. Either model has to be done in a way of providing the requirement for greater stability in the

target direction during the quick vertical lift of the right arm.

The axis passing through the middle of the feet regarding the axis passing through the chosen reference target can be from $+22^\circ$ to -3° . Those variations are based on two factors; personal preference and choice of reference alignment target. The reference target can be target N°1 or target N°3.



Let's first elaborate on the geometrical relationship between targets and the shooter. Distance between the center of each target, regarding the 25 m distance from the firing point, where the athlete is standing is forming an angle between each target of 1.72° , meaning that the total angle across target 1-5 is 6.88° - roughly speaking 7° .

This information will be very important for elaborating the rotating technique in detail in the next Academy Course.

There are two major methods to take the correct position. One according to the first target and one according to the third target. Right now, regarding the understanding of the position of Rapid Fire Pistol said previously, due to the personal preference and reference alignment target we can conclude the following:

- Advantage of choosing target N°3 as reference alignment target, is offering even distribution of horizontal movement from targets N°1-N°3 and target N°3-N°5, meaning that horizontal movement across 7° travel is equally spread to the right or the left. This method prevents the tightness of the muscle groups which are engaged in the body's fixation, especially in the lower back, and the distance from the "zero" position to the first i.e., fifth target is the same. The theoretical disadvantage will be that the athlete has to turn approximately 3.5° to the right when assuming the ready position. Due to the rapid vertical lift the athlete is risking lateral displacement of the pistol in reference to the middle of the target.
- When choosing target N°1 as reference alignment target, advantage will be in dismissing above-mentioned disadvantage i.e. it will be more likely to reach the middle of the target in a rapid vertical movement. The first shot has the most important role for the whole series as the movement to the first target is the longest one. Consequently, due to the horizontal travel across the entire 7° , disadvantage is in the

probability of moving the gun from target 1 through 5 in lowering the gun on the end of the motion, i.e. risk of shooting low shots on target 4 and/or 5.

Legs are straight but without tension. As said earlier, weight distribution is not equally distributed on both legs, but to some extent is with compromise - shifted more to the right leg. This way the shooter is seeking a more beneficial position to deal with fast lifting and gun recoil. Low or no tension in the legs is necessary for providing efficient rotation from targets 1 through 5.

Movement to the next target must be provided through the leg muscle activity (groups under knees). Rotation of the body around the axis that is passing through the body's center of gravity is possible only if the muscles that are providing this activity are allowed to freely shorten or extend. They should not be interacting with overwork of the ligaments (which are having a contradictory role), and opposing groups of muscles that are fixating certain parts of the body. Therefore it is of major interest to loosen the legs by spreading them wider. As mentioned earlier, hip joints are getting “unlocked” to achieve a higher degree of flexibility. It can be found in various older literature statements that rotation is done in/with the rotation of the ankle joint. This statement has no validity in biomechanical and physiological function. Ankle joints cannot rotate! There is a “slack” in this joint that is a maximum of 5°. This means that actual rotation motion is done by lower leg muscles, between knee and ankle, where the pivoting point is located in the hip area. This fact is important when teaching young shooters how to perform horizontal movement across targets. Telling one that rotation is done from ankle joints will result in building the wrong rotation technique which will most likely result in the “leading by arm” technique. The probability of shortening the angle of motion towards target N°5 is inevitable and the probability of placing shots low is almost certain.

The upper body, torso, is rather erect and compact serving a multipurpose role:

- muscles that fixate the right scapula and the right arm are obtaining the optimal conditions for their work
- the right arm is "locked" together with torso and head position
- unified manner of rotating the entire upper body as one unit to the next target

To provide such position of the upper body, as in the Sport Pistol Rapid stage, a very important role is played by higher activation of core stability. The athlete has to maintain the compact body unity through the entire series of five shots while performing lifting and rotating techniques without displacing the stoppage in the center of the target. Core stability and its activity is the major element providing optimal conditions for securing the correct execution of this activity. As a consequence of a need for more intense core stability, abdominal, lumbar, and dorsal groups of muscles require a more active role during the entire process of five shots. It leads to a logical conclusion that the shooter has to be physically fit to meet this demand.

In comparison with all other pistol disciplines, the left arm in the Rapid Fire Pistol event has a semi-active role. It is often an applied technique where the left arm, with the left elbow placed backward, is used to contribute as an aid in horizontal movement technique. Nevertheless, either shooter is using a "relaxed" or "backward" technique. The position of the left arm must always provide conditions in the optimal position where balance and stability are maintained. During the entire process, the COG should be anchored to the same projection spot between the feet.

As Rapid Fire Pistol event rules have been changed over the past 15 years, there was a need to change most of the techniques. Those will be subject to a detailed description of the next course material. For now, it would be enough to say that it is a most common tendency to move the left arm closer to the body.

The head never moves its position during lifting and rotating movement. Before or during the countdown, the shooter raises the pistol and sights to the reference target. During this procedure,

the correct head position is located and then locked in. When executing the respective series, the head turns only as part of the entire upper body unit. Neck muscles are not used to rotate the head. The position of the head, due to the more “open” position will result in a more demanding turn to the right. Neck muscles together with the part of the jaw are in contact with deltoid muscles and/or with the collar bone, and recovery time is long enough. Consequently, the position of the head will “suffer” all disadvantages that were described earlier - tension in the neck muscles, compression on neck nerves and blood circulatory system, vestibular system, and eye function. Fortunately, a very short time of series duration, 8-6-4 seconds will certainly compensate for those disadvantages. Also, the size of the 10 ring will greatly contribute as an additional compensatory factor in overcoming disadvantages of the head position, as well as sufficient break time between series; one minute.

The right arm must be totally stretched out allowing the elbow joint to be completely locked. Tension in the arm muscles is greater than during precision shooting, which is securing a better fixation of the moving parts of the shoulder, underarm and hand.



This will not only transfer the energy from the recoil to the entire upper torso but most importantly, after a shot is fired and movement to the next target begins, it will hold the arm in place while the rotation to the next target is taking place.

In order for the shooting arm and body to be one compact unit, the right shoulder must be fixated strongly. This is best achieved when the body is erect or slightly bent forward, right shoulder lifted high and pulled forward. The actual amount of the angle between the shoulders axis and the arm axis will be a little different from shooter to shooter, depending on their stance and alignment to the target. Experience shows that the axis that passes through the right arm is

building an angle of 12 - 25° with axis passing through the shoulder line. In this way, we have secured all conditions for the optimal work of the "body-arm" unit.

The right hand, wrist, arm, and shoulder have to build a more compact and firm unit, contributing to better recoil absorption and a more unified system during the lifting and rotating technique through a five shot series. This requirement is common in all dynamic pistol disciplines.

It is needless to say that attention to the firmly locked wrist is a must rather than an option. The shooter has to be in charge of controlling and maintaining sighting elements in the same manner during the entire series of five shots while controlling the correct transfer of the recoil energy through the arm, followed by rotation motion. The wrist joint is fixated by using underarm muscles (not ligaments), so that the declination angle "barrel axis - shooting line" in the passive position is as less as possible. In this way, all conditions for the optimal work of the trigger finger are improved. The declination angle is approximately 15 - 23°. When the wrist and arm are aligned properly and firmly locked up, the arm is a single unit. Thus, when recoil hits, it is not absorbed by the wrist breaking or by the arm moving off in some direction, but rather travels straight from the entire arm to the shoulder and torso.

Right-hand placement in the grip is with the same requirements as in Sport Pistol Rapid stage. Such gripping technique will prevent displacement of the gun during repetitive shots, due to greater recoil and trigger weight resistance. Gripping is a bit stronger than in precision shooting. The grip must be built in a way that the hand should come as close as possible to the axis of the barrel. A deeper hold ensures better recoil absorption, and barrel deviations are with smaller amplitudes. This is of essential importance, especially when the movement to the next target must be done in such a short time, and sighting elements stay alert.

The two first joints of the trigger finger cannot have any contact with the grip, and the only function that it has is to pull the trigger.

Conclusion:

Rapid Fire Pistol position has to meet all common position requirements, especially accommodating flexibility and consistency of the position. Three major needs have to be optimally served with a properly built position:

- lifting
- rotating
- recoil absorption

When taking into account that the entire match is fired in 72 seconds, one can not stress enough that the correct position is of essential value for performing a complex set of techniques during such a short time.

Advice is: take a good deal of time to properly learn how to obtain Rapid Fire Position.

Self-evaluating questions:

1. Name additional requirements needed for the Rapid Fire Pistol position.
2. Describe the projection and placement of COG.
3. Describe the function of the left arm.
4. Describe head position requirements.
5. What is the optimal value of angle “a” in the Rapid Fire Pistol position?
6. Describe the advantages and disadvantages of reference targets 1 and 3.

Make your prefeed position description with pros and cons arguments.

METHODOLOGY OF APPROACHING AND TAKING THE SHOOTING POSITION

The first part of the course was describing the theories of shooting positions, biomechanical requirements, advantages and disadvantages of various modifications. After studying and learning different aspects of the position we need to find a suitable technique of how to transfer that information in the correct system of approaching and taking suitable shooting positions. To find the correct position the shooter must first assume the correct stance. During this process, one has to recognize the individual characteristics of the shooter's body constitution and personal motoric behavior. Besides building an efficient position, we need to keep in mind that the suggested position will not result in injuries or deformities during a longer period of practicing sport.

The ultimate goal of our sport is to hit the middle of the target. In saying that, the logical conclusion is that the target is our main point of reference. This means that the athlete has to establish the middle line of the position following the middle of the target. This is probably the most important technical element that will decide the “fate” of the future training/competition activity. In the open space of the shooting range, the shooter needs to find secondary reference objects that will aid in finding this line. Often, for various reasons (ex. right-hand shooters with a dominant left eye), shooters are not able to stand in the middle of the firing line. Even in this case, athletes have to establish the middle “firing line” to establish the correct offset of the optimal individual shooting position. This will help in finding an exact position mark every time, regardless of stepping out from position during tactical breaks or shooting at various shooting ranges.

The most efficient method of determining the **middle line of position** is done by using our visual sense. As humans are receiving 70-75% of outside world sensations through eye function, we should use this benefit in learning how to approach the correct shooting position.

Process of approaching the correct shooting position is done through the following phases:

- The shooter is standing approximately two meters behind the firing position, facing the target. Consistently looking at the middle of the target, the athlete is correcting his position until he feels that he is facing the target straight forward.
- Now, it is time to walk towards the firing point, still looking at the middle of the target. Once the desired place is reached, the athlete stops. While still looking at the middle of the target, he begins rotating to the left. Limit of rotation is done by establishing a comfortable and natural position of the neck muscles, eyes must have optimal visual function position and the position of the head has to be without tilting or vertical line deviation.
- Aiding this process, the athlete is moving their feet in necessary directions, taking care that there is no unnecessary strain in legs muscles and/or joints. Once comfortable/natural and a pleasant position is established, the athlete is turning their head straight forward regarding the position of the body and closing the eyes for the several next steps.
- Both hands are placed down in front of the body, holding each other in a relaxed manner.
- During this phase, the shooter is performing several different tasks. This process we define as establishing an inner position. Checking from the feet and above, towards the head, the tension in all muscles needs to be in the most possible relaxed state. Working on achieving optimal balance is one of the major goals during this activity. Correctly

balanced body position will greatly contribute to stability in the process of performing various techniques during shot delivery.

- When finishing the inner position process, the athlete is “unfolding” his hands, placing the left hand at the preferred position, as earlier described in the theoretical part.
- Still, with closed eyes, the shooter turns the head towards the target, finding a comfortable and relaxed position, without muscle tension.
- Once the position of the head is placed in a satisfactory position, the athlete is lifting the right arm in the manner of preferred lifting technique, establishing necessary muscle tension, and positioning it as correct as possible in the position towards the target.
- Now it is time to open the eyes and check where the “V” shape, between thumb and index finger is pointing in relation to the “bull eye” of the target. If “V” shape is pointing correctly towards “bull eye” we can say that the position was approached in a correct and satisfactory manner.
- In the last phase shooter is gripping the pistol and performing the lifting technique, controlling if the sighting elements are correctly corresponding with the desired aiming area on the target.

If the rear sight, front sight, and target are properly aligned, without the necessity for corrections, we can state that the process of approaching the correct shooting position was successfully done. In real life things are not always going to be as was described in theory - approaching the correct position is no exception. If we want to master this technique, it will be necessary to practice this segment of overall shooting technique, seriously and frequently. Also, one has to know how to correct imperfections that can occur in the process of learning. Several steps can help.

[See Power Point Presentation Taking_position.pptx– slide 1 - 15](#)

Zero point

Before discussing the adjustments needed, we must talk about zero point. The zero point represents the point where sighting elements are aiming when the shooter is in the correct position. Logically, the zero point has to be in the middle of the target. To meet this demand, we must achieve the arc of the movement to be equally maintained in the horizontal and vertical axis. Besides being stable during the aiming process, zero point must be obtained after recoil as well. The fact that zero point has to be maintained in the middle of the target during the entire match/training session is putting additional importance on mastering the technique of approaching the correct shooting position.

Horizontal corrections can be divided into two major groups - small deviations and large deviations. Let's first talk about the situation if the position taken is to the left side of zero point.

- In the case that sighting elements are pointing left of the target or even further left from shooters target, the first recommendation is to repeat the entire process described above until the shooter is getting within their own target.
- If zero point is in the left white area, the shooter should make a turn to the right, rotating the body in reference to the projection of COG. That means that both feet should slightly move, right foot to the back/right and left foot left/forward.
- If zero point is left within "bull eye", the left foot should be placed slightly left/forward. This is not a typing mistake, as many would think. By correcting as described, it will result in decreasing or "closing" the angle that forms of the right arm and shoulder axis line. The result will be shifting the zero point to the right. When performing this adjustment it is also necessary to slightly turn the toes of the right foot towards the right, releasing the rotating forces from the right knee meniscus.

The right side position of zero point is corrected in the same way as above described, just in the opposite direction.

When speaking about **vertical adjustment** we can also differentiate a larger or smaller degree of displacement.

- The very high zero point is corrected by a soft lowering of the right arm.
- If zero point is slightly high, besides lowering the right arm, the athlete can move the torso a bit forward or narrow the distance between the feet.
- In the case sighting elements are very low, the athlete can use one of the following:
 Spread feet wider apart, place torso slightly backward or lift the right arm.
- When zero point is just a bit low, correction can be done by slightly lifting the right arm, gently bending the torso backward, or slightly inhaling. Breathing technique in controlling vertical zero point alignment was largely used in Free Pistol, but it was no stranger to other precision events.

One cannot stress enough that correct and uniform gripping is paramount in learning how to correctly approach shooting positions. The athlete can largely jeopardize the learning process if the gripping technique is different from shot to shot or from one series to the next.

Besides correcting zero point by changing body biomechanics, it is possible to adjust zero point by adjusting the position of the pistol body within the grip. Different manufacturers have developed their own construction options for adjustments. The athlete will carefully need to study the gun manual regarding this topic. Basically, each pistol model has the possibility of making the fine-tuning adjustment with a set of screws that are placed inside the grip construction.

Learning how to approach the correct shooting position demands serious and dedicated training. Too often shooters are neglecting this part of their development and taking it for

granted. The preparation procedure for obtaining the correct position will increase the shooter's ability to achieve the desired result. It is also important to know and understand that zero point during the course of competition/training can and will change its position. This is happening due to the change in muscle activity/fatigue. Once the shooter knows how to approach the shooting position systematically and repetitively, it will help in applying the adequate response to the problematic situation. We can talk about the situation when the shooter needs to take a rest, by stepping out from position, leave the shooting stand to have a consultation with a coach or simply needing to go to the restroom 😊.

All the above described is mainly applicable for static disciplines - Air Pistol and Sport Pistol Precision events. However, the dynamic disciplines - Sport Pistol Rapid Stage and Rapid Fire Pistol, are with the same basic rules, with a minor adjustment regarding the specific requirements we described previously in the theoretical part of this material.

The main differences will be in the muscle tension adjustment when establishing an inner position.

Sport Pistol Rapid stage will need additional attention when establishing the middle line of the target due to the specific layout of the targets. Namely, targets are with a lesser distance between them than the distance between firing positions which will result in different visual perspectives for athletes. This can be confusing and the only way to overcome this situation is extensive training from different firing points until the shooter learns how to approach the position correctly. Establishing zero position is the second objective to master, as it has to be repeated five times during the rapid stage series. The answer can be found in the correct lifting technique which will be subject to a detailed description of the next Academy course.

Rapid Fire Pistol is dealing with some similarities as Sport Pistol. Adjustments have to be made regarding the chosen reference target. The consequence will be in adjusting the position to the middle of the target and zero position, but all the above described is easily applicable through systematic training of this technique.

Self-evaluating questions:

1. Describe the middle line of position.
2. Describe Zero Position.
3. Describe horizontal position adjustments.
4. Describe vertical position adjustments.
5. Describe the process of establishing the correct shooting position.

Make your contribution to the process of obtaining the correct shooting position.

CORRECTION OF THE GRIP AND PROPER GRIP FITTING

In the theoretical part, we elaborated what requirements grip and gripping techniques need to meet, providing optimal conditions for delivering desired shot execution.

The first and foremost important element that a correctly built/adjusted grip has to provide is to maintain a minimum arc of movement during the triggering process. Pistol barrel has to remain in balance with the forces that are applied on the grip and trigger. This condition can be provided only if both lateral and vertical forces applied on the grip remain parallel with the barrel, and in 90° with the barrel axis.

The second element that the grip has to secure is when established the desired position, the sighting elements are pointing in the middle of the target while in zero position.

When getting a new pistol, the shooter chooses one of the standard offered sized grips that might generally fit the purpose. The common mistake is that instead of adjusting the grip to the shooter's hand, the shooter is adjusting the gripping technique to the grip. Anyhow, it is absolutely necessary to customize the grip to the shooter's hand. Technically speaking it is a simple and straight forward process.

First, we remove the factory finish from the surface of the grip (oil or varnish), to get the clean wood texture for further processing. Applying the necessary layer of special wood molding material or other soft material, followed by gripping the grip, we will get the imprint of the palm. According to the obtained result, it is necessary to remove or add more material until the grip properly fits the hand.

This sounds easy, and it is not a complicated process, but there can be trouble if the one that customizes the grip does not understand which demands need to be achieved, or how to correct mistakes that are appearing when the shooter is trying to fire the correct shot. After general adjustment of the grip, the geometry of the hand placement must be checked in relation to the grip.

As we previously described in the theoretical part, the first focus is to establish that the three fingers that are bent around the grip are applying parallel forces in relation to the barrel axis.



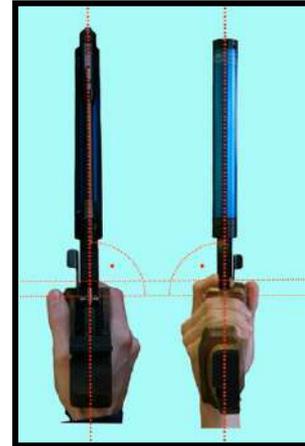
Also, middle phalanges need to form one straight line (see photo). When this condition is



established, we can state that forces applied to the grip are in a proper vertical 90° direction, and will not disturb the barrel position when firing the shot.

Here are the most common problems and solutions. All following descriptions are with the condition that approaching the shooting position is done properly and the lifting technique is executed correctly.

1. After generally adjusting the grip, the geometry of the hand placement in relation to the grip must be checked. Often the problem is shooters with long fingers, or shooters with very short fingers. In any case, it is a must that we adjust the position of the three fingers to form 90° to the axel of the barrel, by adding or removing material in the frontal part of the grip.



2. If the pistol is pointing to the left, it means that the right side of the grip is too bulky and is rotating the position of the pistol around the pivoting point which is, in this case, situated in the middle-vertical projection. The solution will be to remove material from above point 2 on the grip.

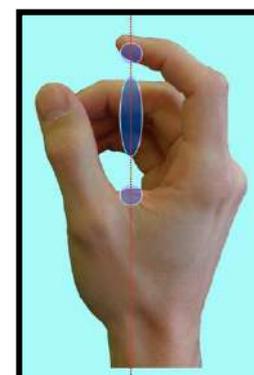


3. If the pistol is pointing to the right side, some material should be added in the above-described area.

4. If the front sight is placed left in the rear sight area, it means that there is contact between the trigger finger and the grip. The correction has to be done by removing material from this part of the grip.



5. If the front sight is pointing to the right in the rear sight space, most likely there is excessive contact in the “V” shape area on the side of the thumb. Correction is done by removing material from the grip in this area.



6. Lateral movements to the left can often be caused by inappropriate high pressure with the last phalanx of the three fingers bent around the grip. Slight removal of grip material in this area can help, but the proper gripping technique is a major cure for this kind of deviation.



7. In the vertical alignment displacements (high or low position of the gun), two reference points are regulating those issues. Removing or adding material on grip point 2 (see above photo), or lifting or lowering the supporting piece of the grip, can make the necessary adjustments.

8. The second way to overcome vertical displacement can be done by adding or removing material from point 3 on the grip. As this is the main pivoting point in the gripping technique it is a piece of good advice to give serious consideration to adjusting in this area.



9. Thumb pressure can be an additional reason for lowering the position of the barrel (see the photo in section 6). Shooters are often applying additional force in this area, creating a false feeling of better pistol hold control. Thumb contact with the grip should be comfortable, but any pressure is contra-effective regarding the equilibrium of the forces applied on the grip. Removing or adding material on the grip in the area of the thumb can resolve these problems.

Self-evaluating assignment:

Make custom adjustment on the grip to one of your shooters.

EXERCISES FOR DEVELOPING BASIC SHOOTING SKILLS

In the theoretical part biomechanical requirements in building the correct position were introduced, while in the previous chapter we spoke about the methodological approach of taking the correct position. These are two fundamental key elements to learn before moving to the next phase - implementing theoretical knowledge into training units.

Linguists state that the Chinese language (speaking in general terms) is the most complex and difficult foreign language to learn. One can start learning it in the correct or incorrect way.

Both models will be equally difficult.

Simple conclusion – learn it in the correct way from the beginning.

This course is about educating coaches. Dear colleagues, teach your athletes correct things from the very beginning. Elements learned wrong from the very start are difficult to correct later. Also, it will result in slow progress of the shooter, or worse, limit the possibility for an athlete to reaching a high level of performance.

Some of the fundamental methods in learning & teaching methodology are common for any kind of education, and we will have to engage those. Exercises should be designed to meet the following:

- An easy task to a more difficult one
- Simple element to a more complex one
- Low training load to higher training load

Generally, we recognize three major groups of exercises:

- Physical exercises
- Technical exercises
- Mental exercises

1. Physical exercises are divided into two parts:

- General physical fitness
- Specific physical fitness
- General physical fitness has to improve the overall physical state of the athlete.

It is done through exercises that improve:

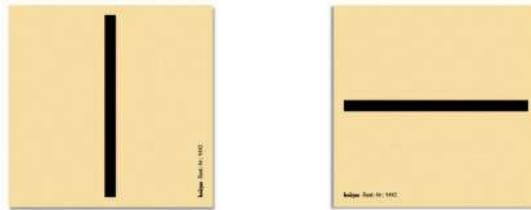
- Cardiovascular system
- Lungs capacity and better oxygenation
- Muscle strength and endurance
- Flexibility of the muscles
- Specific physical fitness is aiming for the development of:
 - Strength and endurance necessary for the motor activity of specific muscle groups, providing optimal physical conditions for the specific event
 - Stability of the body in the shooting position during training/competition
 - Balance improvement necessary for training/competition unit

Even though exercises for general and specific fitness improvement are well known, it is highly recommended to engage specialized physical experts. The necessity for such expertise is mainly intending to prevent unwilling overload, as well as a high possibility of developing injuries. Often teams (club or national) can't afford to have a physical trainer on payroll, but external low-cost services can be a solution-serving purpose.

Technical exercises are dealing with:

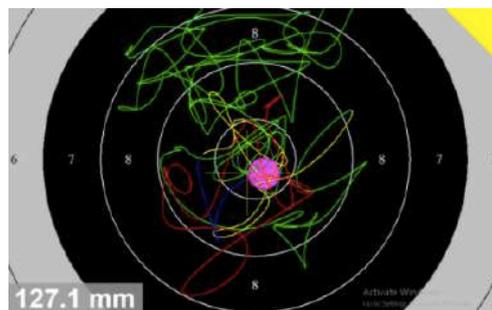
- Approaching correct shooting positions
 - Shooting series of shots (ex. 3-5-7...) followed with stepping out from position and retaking it
 - Training in front of a mirror
 - Video/photo recording from different angles followed by analysis
 - Dry fire exercise with an approach as the main goal of exercise 3. Providing balance (standing) and inner position
- Improving body balance in designed position:
 - Improving inner position with closed eyes
 - Standing on one foot with closed and/or open eyes
 - Using various balance pads, wooden half-balls, etc.
 - Aiming with closed eyes, followed with open eyes
 - Systematic relaxation of the muscles in the shooting position with closed eyes
 - Using a force platform with parameter readings in various above-mentioned modes
- Training hold with systematic timing intervals:
 - 25 dry fire shots - 15 seconds hold followed with 15 seconds break, between each shot
 - 5 minutes break
 - 15 dry fire shots - 20 seconds hold followed with 20 seconds break, between each shot
 - 5 minutes break

- 10 dry fire shots - 25 seconds hold followed with 25 seconds break, between each shot
- Triggering – sighting exercises
 - Dry firing 10 cm from a white background without a reference point
 - Live firing on a blank target
 - Shooting on targets with vertical and horizontal stripes



This exercise is very useful to check the balance of the position and aiming picture.

- Training target approach
 - Approaching the center of the target has to always be in the same manner. Depending on the sighting technique (more in the second course of education) it is highly recommended to be straight from above – 12 o'clock (or from below 6 o'clock) ending in the final aiming area.



The most efficient way to train this element is by using one of the various optoelectronic devices (shown photo is with the use of SCATT).

- Follow through routine is a very important segment of the overall shot process. It requires additional attention in the daily training routine.

All the above-mentioned elements, and those that will be subject to the next course material, can be performed through the methodology of Dry Firing. Personally, through 30 years of experience in international coaching, I can say that dry fire training is the most superior method in comparison with any other supplementary solution.

Dry Firing method is done with the pistol's front sight being 10 cm from a white background. It can be done at any place, home, office, backyard..., and it is inexpensive. During Dry Fire training, the athlete is "free" of score objective and is fully focused on the most important goal, learning how to control and develop all necessary skills for becoming a complete champion.

Dry Firing is offering a wide range of benefits and here is the list of most important ones:

- Improving specific fitness condition
- Improving balance
- Improving gripping technique
- Improving lifting technique
- Improving sighting technique
- Improving aiming technique
- Improving triggering technique
- Improving "follow through" technique
- Improving rhythm
- Improving tactical solutions
- Improving performance goal delivery
- Improving mental preparation
- Improving "self-image" quality
- Improving overall self-confidence

Surely, dry fire training mixed with proper live training can be an excellent combination.

Important note

Every single training unit or competition has to contain 3 elements that are a must:

- Thorough physical warm-up
- 30 Dry Fire shots
- Thorough stretching after training/competition

Proper physical warm-up will prepare muscles for the upcoming shooting activity. Dry Fire training will prepare both mind and body to perform a set of well-executed mental and technical skill. Adequate stretching at the end of the event will recover muscles from activities done during the event. These 3 activities will not only better prepare the athlete for the event but will also prevent and minimize the danger of developing an injury.

2. Mental exercises are a very important part of the development of basic shooting skills.

I will not elaborate on this topic, as you will find it in the section “Sport Science” written by my colleague Prof. Claudio Robazza.

I will just allow myself to say that the brain and its mental activity are responsible for the motoric activity. Therefore it is an absolute necessity to develop basic shooting skills (referring to motor skills) together with mental skills. Unfortunately, very often coaches are neglecting this aspect of athletes' development, especially until they reach a medium score level. By then a great deal of damage is done in athletes' education and development.

Self-evaluating assignment:

Make 6 units training plan with exercises for one of your beginner shooters.

WORK WITH BEGINNERS

One of the most challenging and demanding jobs in the coaching business is to work with beginners. Stereotyping all around the world is that working with young athletes is delegated to enthusiast trainers, former midclass shooters, or instructors. It is a very wrong approach to our sport. If we want to discover new potential champions, we need to have highly educated and experienced coaches engaged in working with beginners. As I stated earlier, when learning, one has to learn correctly from the beginning. Once a correct system is established with the correct application, there is a great chance that beginners can develop to the top-level shooters in the shortest possible time. Very often we have a situation where quantity and a lengthy period of time are hopefully showing a small number of individuals with some “satisfactory” scores. Even when this is happening and we get a “potential” shooter, we are dealing with an athlete who has a wide range of wrong and bad habits, that take a very long time to correct, if ever. Experience is showing that in such systems we are losing too many youth because they can’t develop in the desired time frame and within the satisfactory score level. Those that “survive” the test of time often are struggling to improve their progress.

For more efficient development of the beginners in our sport, part of the solution can be found in a better-designed system of working with them, from their first visit to the shooting range. Better coach education is just one link in the chain of proper progress.

Pedagogical, didactical, and systematic teaching is another main goal when designing a more optimal environment for speedy progress of beginners' development.

Below described system is just one of the variations that are created from a wide range of international experiences.

Pedagogical objective

Through 25 years of work as ISSF Academy Tutor, I found out that many students did not know the definition of Pedagogy.

The word pedagogy itself comes from the Greek word Paidagogos which means - a servant who takes his masters' child from home to school, to play and walk. For one of the founders, pedagogical science is considering the German philosopher J.F. Herbart (1776 - 1841) who pointed out the difference between pedagogy as a science (theory) and practical activity (skills). The term pedagogy is very often used in the field of sports, and the term pedagogy in the sport was first used in Germany in the early 1970s. From then it is often used in English-speaking countries and sports pedagogy is already clearly formulated as a separate academic discipline in the field of sports.

Most authors define the term pedagogy as 'The Science of Education'.

When talking about sports pedagogy, it is necessary to point out two important characteristics; purpose and intent. Pedagogical work in sports is often viewed as training in order to transfer or acquire knowledge. Sometimes something can be learned without real pedagogical work, such as children who kick the ball in the backyard. By trial and error, they will eventually acquire a certain level of kicking skills without any instructions. In this case, one cannot speak of pedagogical work because it was no one's intention to transfer knowledge. The pedagogical process can only be spoken of if it is purposeful and intentional knowledge transferred with a certain outcome (result).

Properly directed and guided sports have a positive effect on anatomical-physiological, biochemical, motor, and psycho-social characteristic individuals and as such represent an area of specific educational challenges that are the subject of a special pedagogical discipline - sports pedagogy (Cokorilo, 2001).

A very important aspect is the coach's concern for the right motivation with which young athletes approach sports to prepare through training. The type of motivation of a young athlete determines the quality of work in training, which in turn, determines his ultimate sporting achievement.

See Power Point Presentation Practicl didactics.pptx – slide 1 - 22

If we speak about young beginners it is very important that we take some parameters into account:

- Gender – often coaches tend to separate male from female athletes. It has some advantages, but far more disadvantages. Athletes should be seen only from the perspective of their abilities and capacity to develop within sports activities. Mixing boys and girls is not only welcome, but rather a necessity.
- Age – has to be seriously considered especially with the youngest categories. Physical and mental differences between age 8 and 12 are great, so the didactical approach has to respect those differences when working with these groups.
- Physical state – differs within the same age group, and has to be seriously considered when delegating tasks and evaluating the outcome.
- Social aspects – regarding family background, cultural differences, financial possibilities, religious belonging, education attendance, etc. are very important elements that have to be considered.

- Parent involvement – is a very important factor in youngsters' development. Sometimes parents can be a factor of progress, but often can be an obstacle, as we all well know those situations.

On a practical side of working with beginner pistol shooters, here is one of the models that can be used.

The first visit to the shooting range has to be relaxed and pleasant for a new coming shooter. The introduction of the facility, fellow athletes, and club staff should be done in an appropriate and well-organized way. When agreeing about a youngster's first visit, it is advisable to insist that parent/s should be part of it. It is necessary to give all necessary information to the parents regarding club rules, training processes, development systems, duties and privileges, education phases, selection models, etc.

Shooters education is starting with theoretical lessons dealing with:

- club rules
- safety rules
- introduction of the weapons and their functionality
- basic technical elements (position, hold, aiming, triggering, follow through)

Lessons should be conducted with the use of visual presentations and practical demonstrations. Every segment in this stage has to be separately elaborated with simple words and simple examples. Special attention has to be paid to the fact that the youngster has correctly understood the information given. After finishing the initial theoretical introduction, beginners will start with their first training units, supervised by coach/trainer/instructor, during the entire training unit.

A very important aspect in working with young beginners is that the learning process should be conducted through game-designed training units. Children tend to lose concentration rather

quickly if there is no fun in what they do. Additional to the technique learning time, there should be carefully designed time with play activities, which can serve the purpose of physical training, warmup and stretching. These activities in the form of fun and games can play an important role in their motivation to stay in shooting sport and make the desired progress. One should never forget that children are not small adults, but children, with their needs for play and discovery.

In many countries around the world, national federations have established various models of work with beginners. The intent of this paper is not to analyze those variations, but to give guidelines and ideas for building one that can be used as a model.

In my private club, we made a serious plan on how to establish work with beginner pistol shooters and produce a respectable international result within a period of three years.

The first step was to recruit and educate the coaching staff. We found a few trainers with domestic experience and got two students from the third year of faculty for Physical Education. A total of six people were selected and the first step was to send them through ISSF Academy education. Four of them have completed the “D” course, one “C” course, and one “B+” level. In this way, we secured that all coaching staff had adequate and uniformed knowledge. This was a very important fact, as all of them could work in the same direction with the same system and knowledge, with an understanding of how to do their job and how to support each other.

The second step was to outline the system and methodology of work, starting on day one when a new potential shooter entered the club.

The third step was to get a sufficient number of weapons needed for the anticipated number of club members.

The first weapon of our choice for beginners was the “Zastava” air rifle.

It is a simple rifle, lightweight, with a mechanical spring system in the



cylinder, open sights, and a rather heavy trigger weight. This choice was made because the price is low, it is easy to repair, open sights were optimal for developing skills needed for pistol shooters and it was easy to place supporting aids (cushion or fork stand).

The pistols that were chosen for further work and development, were Morini Armi junior model air pistols with a mechanical trigger system.

We chose this model of pistol for the reason that it was very easy to transfer them from the junior to senior model by simply changing the barrel and air cylinder. That also made it relatively easy for shooters to adapt to the gun as they were physically growing. Each purchased pistol was supplied with two additional grips, as well as with one extra barrel and two larger (senior) air cylinders. Additional grips made it possible to have three shooters using one gun (in different training times), each grip custom adapted for a shooter. The only thing they had to do is to adjust the rear sight to their personal needs.

Training methodology used is a straight forward process, consisting of the following steps:

1. Theoretical lessons

- Rules of the shooting range – discipline, training hours, cleaning maintenance of shooting range, weapon maintenance, personal hygiene
- Safety rules, regarding behavior on the shooting range – safe behavior on the shooting range, corridors that can be used for free stay and preparation, procedures of bringing and returning weapons to the storage room

- Safety rules, regarding handling the guns – safe handling of the weapons, barrel pointing directions, procedures in the case of gun malfunction, etc.
- Steps in training system – a precise description of the developing steps which will be applied to make the transition from a beginner to an advanced shooter.
- Warm-up and stretch exercises – description of the physical exercises before and after shooting practice
- Various positions and their approach – depending on the development phase, shooters are learning how to obtain the correct position for that particular phase
- Aiming technique – general rules and pictures of the aiming technique
- Sighting technique – steps of correct sighting technique and their coordination with other techniques
- Triggering technique – various triggering techniques and their application with other techniques
- Follow through technique – as universal and a must technique
- Performance goal preparation – outlining, writing (or voice recording) steps of each sequence in the one-shot process and its imagery.

2. Practical training

- Every shooter starts with an air rifle, from sitting position with supporting aide for rifle hold. Goals during this phase are:
 - learning **performance goal preparation**
 - to learn proper **aiming technique**,
 - followed by correct **triggering technique** - special attention on pulling instead of pushing trigger and holding it in the back position
 - while executing **follow through** technique

One could be surprised that from day one we introduced an element of mental preparation through “performance goal preparation”. The idea behind this method is that beginners, especially children are quickly learning simple motor skills. Unfortunately, too often we see beginners training only technical parts for a rather long period, without any engagement of mental tools. Naturally, scores are growing through this period, giving a false impression of quality progress. Shots are delivered on an instinctive basis, without a systematical approach and intellectual guiding of the process. During this period a large number of mistakes are being adopted as “normal” elements of the shot delivery. Once built and adopted, those mistakes are very difficult to be changed into the correct technique.

Our approach is to establish the entire system, from the beginning to the match system needed for the world-class shooter. Remember the statement of learning the Chinese language?

- In the next phase, shooters are practicing the same elements, but from the standing position using aiding equipment for supporting the weight of the rifle. We chose to use an adjustable supporting stand with a half-rounded plastic end on which the barrel is resting. The goal of this phase is that shooters are starting to deal with **inner position** management. It means they need to understand how to control their muscle activity while being in the shooting position.
- The third phase is to combine shooting practice with and without support for the rifle. It is necessary to make the correct proportion of these two methods, respecting the personal physical abilities of the shooters. The goal is to learn about their physical capacity.

- Phase number four is to start using a pistol instead of a rifle. In this period shooters are exclusively shooting by using supporting aid equipment. The goal in this phase is to familiarize shooters with specifics of the pistol. Special attention is given to the **gripping technique**. As this phase is progressing, **the triggering technique** is the main objective.
- The next phase is to combine shooting practice with and without support. The main goal during this period is to learn about **sighting techniques** when practicing without support aid.
- Phase number six is shooting without support. During this period the shooter is learning through lighter training volume, how to coordinate all previously learned elements.

3. Test matches and competitions

- Small, internal test matches are conducted from time to time with two purposes:
 - To make training units “colourful” – previously we stated that children have to play. One, but not the only form of play is a competition between them.
 - To start teaching shooters how to compete - competition should be adopted as a normal process in the shooters development, not as some kind of “external exam”. Learning to compete is a skill to be learned, just as learning a motor skill or various technical skills.
- Domestic or interclub competitions are the next stage and represent an extension of the previous phase.

Summary:

During the second season, our club members were establishing or breaking new national records 16 times in youth and junior classes. During the third season, a junior girl improved

the national record seven times (from 368 – 376) and at her first WC in Munich shot a respective 377 points, establishing a new national record. That performance was the best national representation for that country.

Unfortunately, the national authority on which the shooting range was built, withdrew the permit for further use of the shooting range and the entire system was dismissed.

Sure, that was a sad end for the project.

The positive side is that the system was functioning and was re-established in another country (the subject of discretion).

See Video.MOV – 1 - 5

Self-evaluating questions:

1. Define the term pedagogy.
2. Describe the pedagogical approach to work with beginners.
3. Name training methodology steps in work with beginners.
4. Name topics of theoretical lessons.
5. Name topics of practical training.

Compare your work with beginners with the above-described system.

Outline existing and missing elements.

DEVELOPING SHOOTING SCHOOL SYSTEM

For a better understanding of this chapter, we need to elaborate on the importance of school sport system in general.

It is a well-proclaimed statement that young people should have the possibility to live healthy and active lives. Fact that physical and sport activity at a young age is building positive habits, a lasting lifetime. Not only that sport system is aiming for creating future champions but is also a goal for many governments on how to improve the education system.

Sport shooting is just one among many sports that are finding their place in those systems.

Providing the possibility for young people to have access to our sport on a daily basis can create additional benefits for students and schools, improving learning achievements, behavior, and teamwork within a specific group.

Before making plans and programs, National Federations need to make an action plan in the form of a statement of intent. All relevant and possible “stakeholders” represented by the Department for Education, Sports Department, Health and Social Department, NOC, possible sponsors should be involved in designing a joint commitment. The main goal is to create conditions that sport and physical activity are an integral part of both the school day and after-school activities. Besides promoting physical activities, and sporting goals it is also important to point out the benefits of mental development and wellbeing of children and young people.

Cooperation of all the above-mentioned segments of society is based on the fact that single organizations or groups, clubs, schools, parents, or private sports providers, cannot manage the systematic offer and its maintenance for improving access to sport and activity on their own.

A very important element in establishing an efficient system is to outline the precise measurement of these actions and their impact on targeted groups and organizations.

Competition and the School Games are one of the forms to enhance and promote sport shooting on the local and national level.

The joint effort supported with digital expertise and services will provide optimal conditions by making it easier for interested groups to find and subscribe to physical activities in their local area.

After meeting all the described requirements, practical setup and methods are rather straightforward.

Anyhow, the following requirements have to be achieved and available.

- Human resources - necessity to select and educate various profiles such as coaches, leaders, administration staff, various assisting staff that can be hired on-demand, or borrowed from other sports (physical trainers, doctors, physiotherapists, sports psychologists), etc.
- Infrastructure resources – shooting range/s can be own property or renting one, cooperation with fitness clubs, athletic clubs, swimming clubs, biking clubs, etc.
- Financial resources – from various local or government funds, NOC funds, IOC funds, sponsorship funds, scholarships, commercial incomes, membership fees, personal donations

As a well-established system, I would recommend to interested ones to get more information about Singapore Sport Shooting School.

A practical example of club setup and training methodologies are described in the previous chapter, as a model. One should design a system that will fit their own needs.

Self-evaluating assignment:

Create an optimal Shooting School System that fits the environment in your country/region.

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