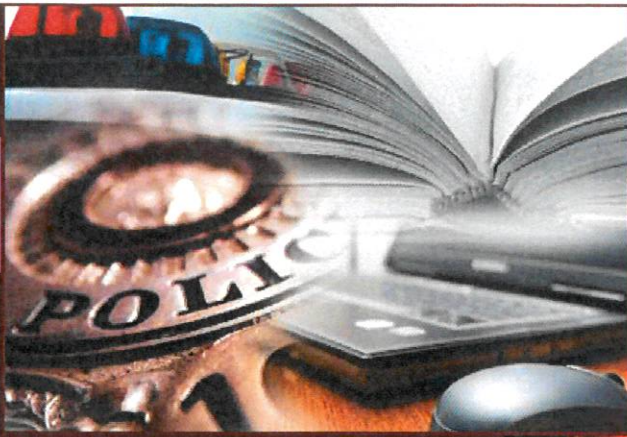


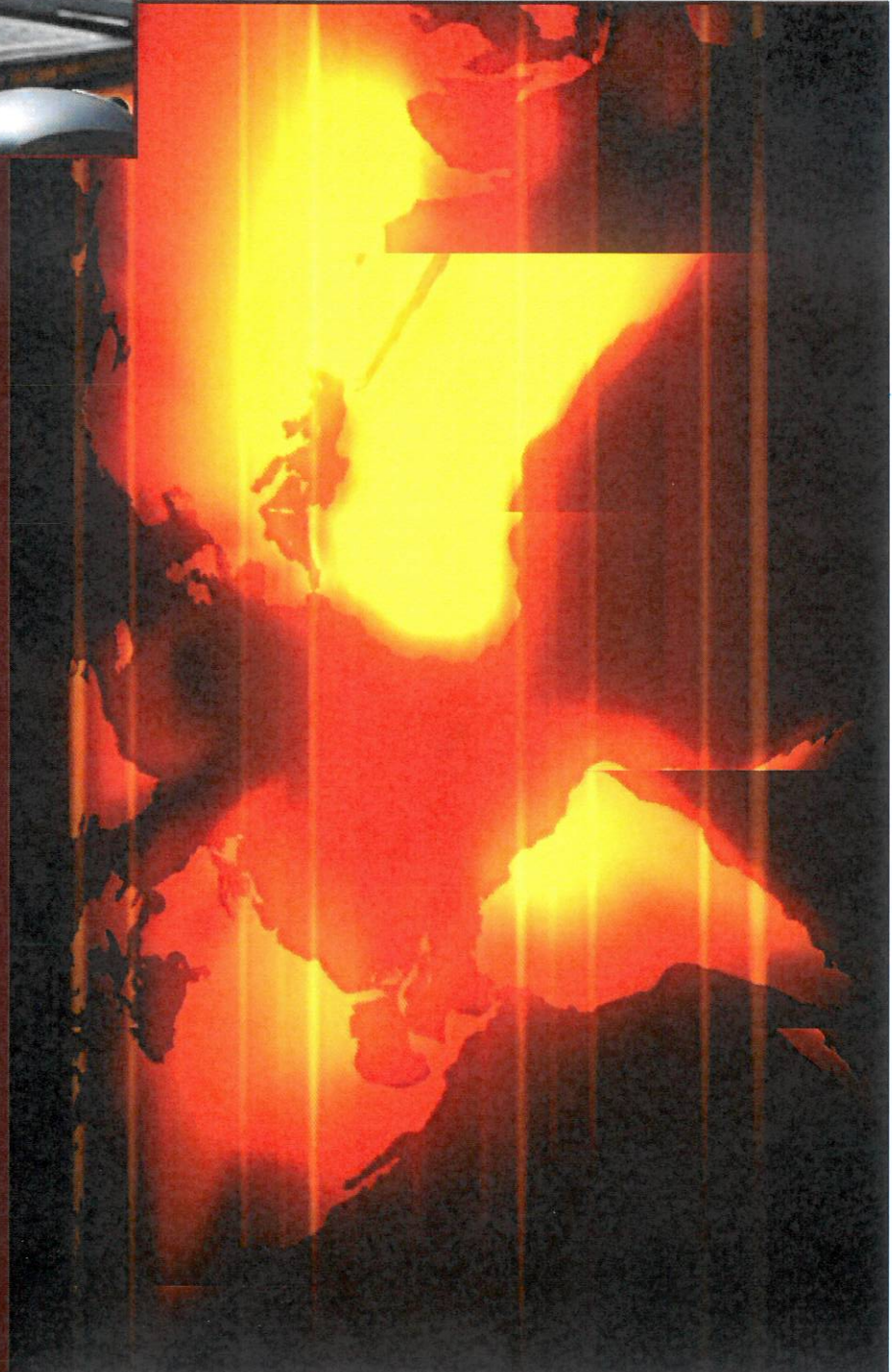
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ILEETA
International Law Enforcement
Educators and Trainers Association

Editorial Staff

Managing Editor:
Kerry Avery
kerry.avery@shaw.ca

Officer Safety / Use of Force:
Brian Hill
Brian@MentalAmmo.com

Instructor Development:
Thom Dworak
tbdworak@comcast.net

**LE Environment & Health
and Wellness**
Kim Schlau
Kimberly.schlau@gmail.com

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Taking Aim With the “Quiet Eye”

by Det/Sgt Jeff Johnsgaard



There is a wealth of scientific evidence supporting a concept called the “Quiet

Eye” (QE) to improve performance. Decades of scientific study utilizing eye-tracking cameras have helped people ranging from children to professional athletes on improving performance in a variety of modalities including hockey, golf, basketball, soccer, speedskating and ballet. QE has even been studied and applied with medical doctors to improve their techniques as surgeons performing operations. There have also been multiple Olympic sports studied including the shooting sports of rifle and pistol target shooting, biathlon, skeet, trap, and double trap shooting. These shooting sports have immediate cross over into helping anyone train more optimally with firearms.

We have found that few people who use firearms for sport or self-defense, including many in the law enforcement training community, are taking full advantage of QE to improve their performance. This article will briefly lay out the concept of QE and give an example of how it can be trained in a practice session for self-defense relevant shooting skills. It should be noted that QE and the closely related subject of gaze control are not just relevant to firearms application but also to any situation where a person needs to pick up cues in the environment to quickly drive optimal decision-making. This last part goes beyond the scope of this article and if there is interest we will expand on it in future articles.

What is the QE? Simply put, it is when you look to a small, precise spot for at least $1/10^{\text{th}}$ of a second immediately before starting a movement. The term was originally coined by Dr. Vickers in 1996 and since that time a wealth of information has been collected to help performers improve. Vickers breaks down QE into categories and two are immediately relevant to law enforcement training, targeting tasks and interceptive tasks. A targeting task example is stationary target shooting with firearms and for interceptive tasks is skeet shooting at moving targets (Vickers 2016). Also, the QE has been studied in relation to police officers dealing with a sudden threat in a shoot/no-shoot scenario (Vickers & Lewinski, 2012). All of these

have led to a greater understanding of the skills of elite performers and methods for passing that on to others. Perhaps more importantly are the “gaze patterns”, the way elite performers look around a playing field, or police officer visually assess an incident have been studied. It is beyond the depth of this article but understanding that elite performers seem to be able to pick out relevant information to drive optimal decisions before others is a key part of the progression of QE training.

The scientific definition for the Quiet Eye is;

“The final fixation or tracking gaze that is located on a specific location or object in the visuomotor workspace within 3° of visual angle for a minimum of 100ms” (Vickers, 1996).

There are three parts to examine in order to understand the scientific definition of the QE. The first is the phrase, “final fixation or tracking gaze”. This means you focus your eyes on a specific spot on an object, like a golf ball or the center of the target in archery or shooting sports before starting your putting stroke or your trigger press. This also applies to a specific spot on a moving object like in skeet or trap shooting, or where you would look to on the corner of the ice track in speed skating to optimally enter and negotiate a turn. It is important to understand that the start of this look to a specific spot happens before the start of the final movement of the task.

The second part is to keep your eyes looking at the same specific spot, which is the size of “ 3° of visual angle”. This means your eyes do not move away from that spot. How large is 3° of visual angle? To give a reference, if you extend your arm out and put up your thumb, your thumbnail covers approximately 2° of visual angle (O’Shea). So, depending on how far away an object is will mean how much of it you can see within that amount of visual space. A thumbnail will cover a few inches of a person’s torso at 15 feet, but it will cover a much larger area on the same person standing 15 yards away.

The third principle is to understand you need to hold your eyes on the spot for a minimum of 0.1 of a second before beginning the final movement task. Durations of QE far longer than 0.1 have been observed in elite performers.

Causer et. al., (2010) found QE durations for elite-level skeet, trap, and double trap shooters to be longer than for sub-elite level shooters and longer for successful shots versus misses.

There are many training applications for utilizing this QE information to perform targeting tasks to a higher level. One simple place to start with self-defense pistol shooters is on the draw and fire. We typically see two common errors committed when drawing and firing the pistol in reference to QE principles.

1. Their eyes are not picking a small enough spot on the target (within 3° of visual angle). When we bring their attention to this, they discover that they may be looking to center mass of the target, but they are moving their eyes around a much larger area than they thought. As the eye can move extremely fast (up to 900°/s) and we may never be aware of the movements consciously, this issue is hard for some students to believe. Fortunately, the eye-tracking equipment to capture QE has been increasing in quality. One such device is a set of glasses called the "Pupil Core," 200 Hz eye tracker by Pupil Labs. Weighing only 22.75 grams it is very non-obtrusive, can record both eyes (beneficial if one eye closes to aim) to within 1° of visual angle, and even works in complete darkness utilizing infrared LEDs. This will give a 100% recording for the student to watch and see exactly what their gaze patterns were. Specific techniques can then be given to optimize their exact characteristics.

Without the eye-tracking hardware and software, it is still possible to increase a student's techniques. By simply having them slowing down their movements so they can be consciously aware and attend to the process of selecting a small spot and keeping their eyes there, we have seen excellent results. Of course, the next step is to speed up the process, then to have a moving target, moving shooter, and lastly both moving.

2. The second common error is to look away from the target altogether. Once again, without eye-tracking technology, many people are not consciously aware

they are doing this. The key here is that they are unaware because they are looking away from the target to the sights of their pistol as it is being brought up to the target. This is not optimal for complying with QE principles. We see people identify a deadly force threat, look to center mass, bring the pistol up but then look away from the target to their front sights as the pistol is being brought up to the target. This exact phenomenon was identified with elite-level pistol shooters in 1985 by Ripoll et. al. They found that near-elite shooters looked downward off the QE sightline on target to their sights as they brought up their pistols, but elite level shooters did not. They kept their gaze on the target and brought the sights up to that view before looking to find sight alignment and sight picture.

This phenomenon was also identified in elite shotgun shooters and broken down further. They were looking at moving targets and found that elite shooters started their QE gaze sooner and had a longer total QE than non-elite shooters. The duration was even sooner and the total time even longer for successful shots to non-successful. Mentioning one other important finding of this study to hopefully dive into in a future article, elite shooters moved their gun barrel slightly *slower* than non-elite showing they had more stable gun motion (Causer et. al., 2010).

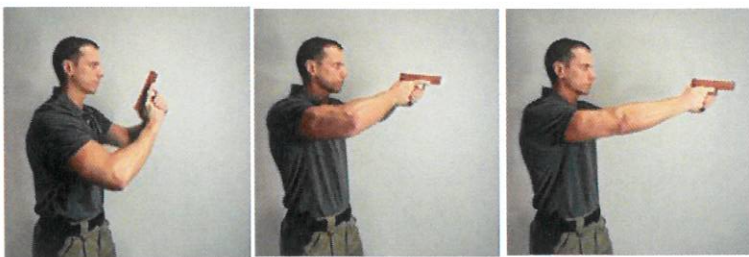
How can the concept of QE be utilized if you do not have access to the expensive eye-tracking equipment used in many of the scientific studies? We address this in two parts.

1. Teaching the principle of the quiet eye as has been briefly laid out in this article is the first step. To have people understand the "why" for a technique we believe is paramount. Understanding there is a wealth of scientific evidence on a particular topic may help the person to believe in it and practice it with more intention. The knowledge will hopefully help direct their attention to their eye movements during training and slow practice.

2. Second, we show techniques for pistol presentation that keep with utilizing the QE. Though these techniques themselves have not been studied to our knowledge, we do find that they increase the likelihood of the person maintaining the QE. This is because we present the sights of the pistol up closer to the face than traditionally done. We found that this presentation eliminates the person breaking QE to look downward to the sights. Second, we find that the ability to “roll” out the pistol toward the target will also allow for a safe time to earlier take off any external safety, touch the trigger, and, depending on the distance possibly take up the slack of the trigger. This has led to the placing of faster, more accurate first rounds off a ready or draw as is evidenced with a PACT timer.

Here are three examples for performing a ready or draw to fire more keeping with the principles of QE:

- I. High Ready – The following movement from high ready to firing will immediately place the sights up and on the same plane as the eyes. This will mean the eyes will not look away toward the sights and break the QE.

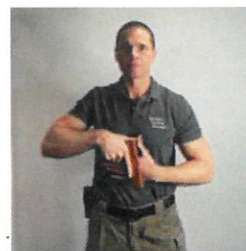


Embedded commands for the High Ready are: **Up – Touch – Roll – Slack – Sight – Press**

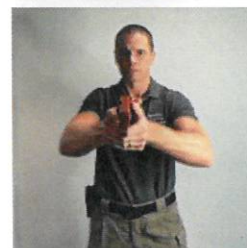
- II. Low Ready or the SUL Position – From a lower/ compressed ready or SUL we ask the student to bring the pistol up under their dominant eye while still fairly close to their face. This is to maintain the QE principle and not have the person look to the sights before the pistol is up in their existing QE gaze. We have found that it is possible to become very fast and

accurate with this technique by s-l-o-w-l-y teaching the process of concurrent activity.

- a. Deadly force threat is identified, eyes remain locked onto center mass of the threat.
- b. Pistol starts to come up under the dominant eye.
- c. Once the pistol is on the same plane as the eyes it can be rolled forward and the trigger can be initially touched.
- d. As the pistol continues to roll forward the slack can be taken up on the trigger.
- e. The eyes can then move to confirm the front sight is on target without violating the QE principles. This is helped by the pistol being rolled forward to the target and not just brought up with arms extended already, hoping to stop the upward motion on target.
- f. As the sights are confirmed the trigger can be pressed to shot discharge.

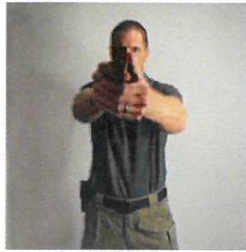


From Position SUL

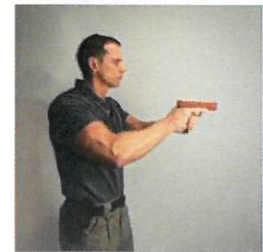


Pistol starts to move upward but also forward toward the target. You can see in this photo the person has lost the QE as they have looked at their sights.

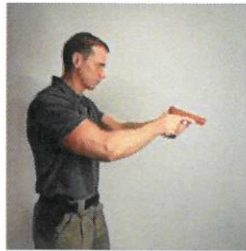
Quiet Eye...con't



More optimal is to bring the pistol upward first and then



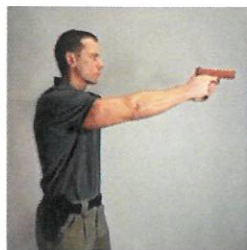
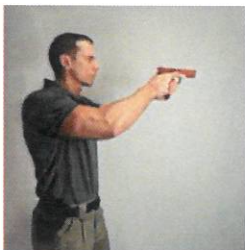
Person looks to the sights, breaking the QE.



Pistol is brought up to target and person looks downward. This breaks the QE principle.



Pistol is brought up under the dominant eye immediately. Then rolled forward.



Pistol is brought up to target then rolled forward. Person does not look to the sights until they are brought up "into view".

- III. Draw and fire – The following photos show a more QE compliant draw to fire technique. In the photo showing the hands coming together in Stage 3 the pistol is immediately brought up under the dominant eye. As the pistol is pressed forward the left hand grips for stability. This technique mimics that of the high ready in order to help the person maintain their QE focus on the target while bringing the sights up into view. This allows for a longer time period to see the sights as they are pushed out toward the target.

We realize this article has been brief and would welcome the opportunity to further expand on the concept of QE in reference to tracking moving targets, barrel kinematics. Also, QE in relation to not just firearms but driving, defensive tactics, and all forms of high performance. The concept of an external focus of attention and the training of expert decision-making all have commonalities with the QE. Also worthy of discussion is the eye-tracking cameras and software to specifically train individuals is within reach of many law enforcement departments. If you have any questions, comments, or if you would like other teaching progressions for using the QE please feel free to contact us.

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About the Author

Jeff Johnsgaard is a Canadian police officer in his 18th year and currently a Detective Sergeant. He is a trainer for his agency and the police college, a Nationally Certified Instructor under IADLEST, certified by Force Science Research® as an Advanced Analyst, and trains decision-making and use of force internationally with his company Natural Tactical (www.NaturalTactical.com) and consults with several others. Please feel free to contact him with questions or comments at Jeff@NaturalTactical.com

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