


Scope Performance TriAngle #2

Balancing the Triangle of: **High Magnification vs. Brightness vs. Long Depth of Field for Less Parallax**

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Balance your priorities – since you can get only 1 or 2 of the 3 sides of the triangle

3 Components: If you increase 1  you decrease the other 2 (usually)

Explanation

A long depth of field (DoF) provides a longer stretch (“field”) where the *image sharpness* and the *parallax error* are well enough adjusted. (The DoF could also be called the SPR = the *sharpness and parallax range* – since it is kind of similar to the *point blank range*, PBR, which is the stretch where the point of impact is well enough adjusted to hit inside the kill zone.)

Importance of a long DoF (SPR): It allows for quicker shots because the side parallax turret or adjustable objective (AO) do not have to be adjusted as often as long as the quarry is within the DoF (SPR). The closer the *range*, the shorter the DoF (SPR) – in other words the closer the range the quicker *sharpness* and *parallax* adjustment will

be off. E.g., a moving target will leave the DoF (SPR) quicker, requiring an adjustment.

The trade-offs: • *To get a longer DoF* usually results in less brightness (through smaller objective lens diameter) and/or reducing the magnification. • *To get more scope image brightness* usually results in a shorter DoF and/or reducing the magnification. • *To get more magnification* usually results in a shorter DoF and/or in less brightness.

Brightness: Useful for low light shooting and scope cam filming. A larger objective lens diameter increases brightness, but also with better lens coatings and better optical engineering (=expensive) (all other things equal).

Remedies for the Lack of High Magnification

(A) For high magnification to see better in general:

- Get an eye operation.
- Get glasses/ contact lenses.
- Get a scope with clear glass (could cost \$).

(B) For high magnification to see quarry better:

- Learn the art of stalk hunting and get closer to your quarry. Build better hides for closer ambush hunting.

(C) For high magnification to spot your hits on paper targets:

- Use splatter targets (commercial/ DIY).
- Stop using target cards with large black bulls’ eyes that make hits hard to see.
- Shine bright lights onto targets.
- Use a spotting scope (\$300–1000) on a tripod (\$40–100).
- Use a camera with a powerful tele zoom. Take a photo, and review your hits on the camera’s viewing screen.
- Shoot a larger caliber.

Remedies for the Lack of Brightness

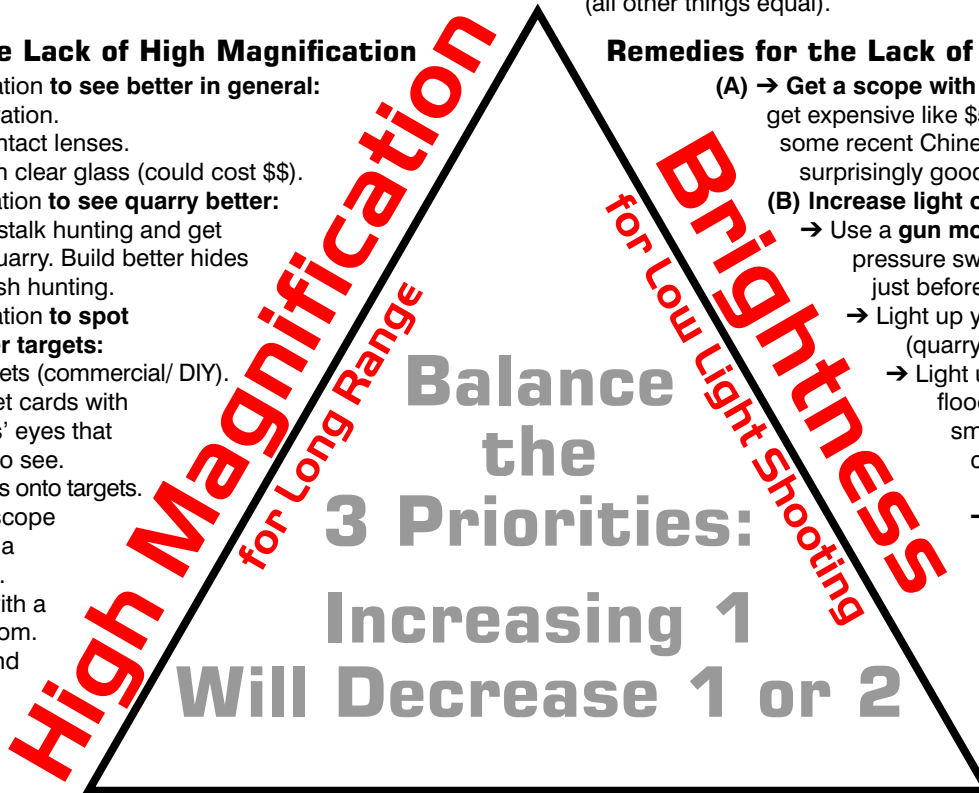
(A) → Get a scope with good glass quality (which can get expensive like \$500, 1000, or 1500 – however some recent Chinese products can have surprisingly good glass).

(B) Increase light on target:

- Use a **gun mounted flashlight**, maybe with a pressure switch to conveniently turn it on just before pulling the trigger.
- Light up your **baiting area** with red lights (quarry will get used to it after a while).
- Light up the **barn** with some LED floodlights (late models are as small as a cell phone, and one charge gives several hours of bright light for less than \$50).
- For target shooting shine one or more flashlights or LED floodlights onto your target.

(C) For scope cam filming:

Reduce frames-per-second (e.g., from 60fps to 15fps)



Long Depth of Field (DoF)

for a Longer Stretch where Sharpness and Parallax Are Well Adjusted

DoF could also be called SPR = Sharpness and Parallax Range

Remedies for the Lack of a Long Depth of Field (DoF, or SPR)

(A) To remedy parallax error when quarry is outside the DoF, i.e. outside the sharpness and parallax range (SPR):

- Find a good cheek weld and practice consistent eye placement; the more consistent, the less parallax error.

(B) To remedy sharpness/ parallax error when quarry is outside the DoF (i.e. SPR):

- For very close shots that require quick action, use additional sights that are zeroed at close range: laser sights (\$20–100), red

dot sights (\$40–200), or open sights. Mounting: angled mount on rail, or top of scope, airtube, or forestock.

(C) To make adjusting parallax/ sharpness easier:

- Get a scope with *side* parallax instead of *front* parallax (AO).
- Get a side wheel to mount on the side parallax.
- Learn to estimate the range and quickly pre-set the parallax to that range before raising the gun and taking the shot (a calibrated range tape on the parallax turret helps).