# LIE TO ME!

## The Fallacy of the THREE-SHOT GROUP

**By Tom Gaylord**

Figures don't lie, but liars can figure! So goes the old saying. But at least part of the shooting public seems willing to accept a lie. These are the people who think three shots on target is a group that certifies the accuracy of a gun—firearm or airgun.

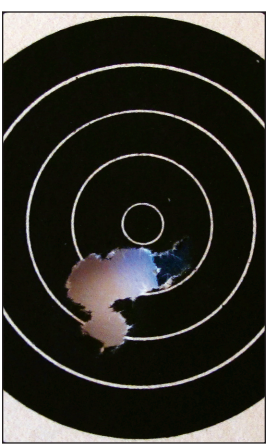
Three shots! Like that tells you anything! Well, it tells me that the author who puts such travesties forward in his articles either has a low regard for his readers or else he has little grasp of what accuracy really is. A three-shot group is nothing but the beginning of a much larger endeavor that will ultimately demonstrate the accuracy level of a given gun or projectile. By themselves, three shots are next to nothing.

### SOME HISTORY

Several years ago while reading some old *American Rifleman* magazines, I noticed that the group sizes given for accuracy testing were all 10 shots at 100 yards. Since I grew up in the 1950s, I remembered reading things like that in gun magazines all the time. When did three-shot groups creep in?

A better question might be: When did five-shot groups come about? I did more reading and discovered that five-shot groups have been around for a very long time, too, but the farther back in history you go the more you're likely to encounter an apology from the author for his offering of an abbreviated number of shots. Those shooters of old understood that the five-shot group does not tell the complete story. And, back in the day, no one dared to offer a three-shot group.

Then, I happened upon David Fortier's report on the Teludyne Tech Straight-Jacket barrel shrouding system in Volume 64, Issue 23 of SGN. Inventor Alan Adolphsen has a new product that strengthens any barrel, resulting in greater accuracy. So, what size groups did the author of that article select to test his claim? Why, 10-shot groups, thank you very much.



**Are three-shot groups valid predictors of accuracy? Gaylord says, "No!" and gives his reasons. They're fine for sighting-in that deer rifle, but you need 10 shots for statistical reliability.**

In fact, Fortier actually tested the Straight-Jacket with 10-shot groups against an established five-shot group average from the same rifle before the Straight-Jacket was installed. In other words, before the Straight-Jacket, five rounds from a certain Mosin-Nagant landed in 2.5 inches at 100 yards. After the installation and with five additional rounds through the target, it still averaged only 1.5 inches between the two widest shots. The 10-shot group using the same ammunition should have been at least 40% larger than the five-shot group from the same gun, so the Straight-Jacket modification proved its mettle by reducing the group size dramatically.

### STATISTICS AND GROUP SIZE

A shot group is simply a demonstration of the accuracy potential of a certain gun—airgun or firearm. The way *[Cont. to page 33]*

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As it turns out, a 30-shot group is so reliable that only three shots out of a thousand, if you were to fire that many more shots, would probably not go into that same group if all the variable elements are held constant. So, why don't gun writers shoot 30 shots? Well, figure it out.

What to do? If 30 shots are too many for practical reasons, how few can we shoot and still get a fairly good idea of the accuracy potential? Any number less than 30 decreases the probability a little.

As it turns out, 10-shot groups are close enough to give a fair representation of the probable accuracy of a particular gun and ammunition combination. That's not to say that a 20-shot group isn't more precise as a predictor than a 10-shot group.

The truth is, however, that the difference between a 10-shot group and a 20-shot group is so small that it really doesn't make much difference. To the anal tester, more might be better—up to a point. However, after 30 shots, you're wasting ammunition.

## 10-SHOT GROUPS ARE BIGGER

There are two separate dynamics happening with groups of five and groups of ten. One is purely statistical and you can demonstrate it to yourself at any time. The other dynamic is motivational and relies on integrity. Let's examine each one separately. Statistics first.

Shoot a five-shot group at any distance with any rifle. I use an air rifle for this, and I find 25 yards to be adequate. Even the most accurate air rifle I own will show some shot-to-shot dispersion at 25 yards. Next, measure that group to your best ability. I use dial calipers and measure across the two holes farthest apart, then subtract one pellet diameter from that measurement. That gives me the distance between the centers of those two holes.


**Shot at 25 yards from a tuned Beeman R8, these five JSB pellets went into an extremely tight group. It measures .192 inches between centers. A real one-holer, right? Not so fast!**


**10 shots from the same rifle at the same distance went into this group measuring .473" between centers. In this case, the 10-shot group shot from the same rifle is almost 2.5 times larger.**

With that data recorded, shoot five more shots into the same group. It's always best if you sight the scope or sights to not hit your aim point in an exercise like this. Five additional shots should open your recorded groups by at least 40%. That's not an exact number, but I've found it to be a good rule of thumb that has been born out in observation over the years.

If five shots went into .25", 10 will go into around .35". It will never be exactly that, but it should be in the general vicinity if you're shooting your very best and nothing changes. In other words, to find out how much larger a 10-shot group is over a five-shot group with everything staying the same, multiply the five-shot group by 1.4.

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[Cont. from page 33] If you don't believe me, try it yourself and see what results you get. I bet you'll never be able to shoot a smaller 10-shot group than five shots, keeping all the conditions the same.

The second dynamic reason five-shot groups are always smaller than 10-shot groups is a combination of vanity coupled with a temporary lack of integrity. When a shooter produces a string of five-shot groups, which ones do you think he shows to others? That's right, the smallest ones.

Before long, a subtle mindset starts to creep in. Suddenly, groups that have a wide shot on round No. 3 are not completed. The shooter starts over until he is satisfied that the group is as good as he can make it. If he shoots eight five-shot groups, which five will he select to represent the accuracy of the gun? Presto—you get extremely good five-shot groups that a 10-shot group from the same gun can never equal.


**The first five shots fired went into the group on the right and the next five went into the group on the left. A perfect illustration of why 10-shot groups will always be larger.**

## SO, WHAT ABOUT THREE-SHOT GROUPS?

Is there any validity to the three-shot group? Are they all just lies, or does the three-shot group have any real reason to exist? I believe it does. A three-shot group is what you shoot when sighting in.

You're not interested in the accuracy of the gun at that point. You just want to know where it's shooting so you can adjust the scope or iron sights. That doesn't take a 10-shot group or even a five-shot one. Three shots is all it takes to indicate where the rifle is shooting. The center of the group is the point you use for adjustment purposes. Any more than that is just wasting ammunition, in my opinion.

But just because there's a valid purpose for the three-shot group doesn't mean that it can be used for everything. It's not representative of accuracy, and it takes only one experiment to prove this conclusively. Pick any range of 25 yards or farther and shoot a three-shot group, trying your hardest to shoot well. Now, try as many times as you care to, to equal that group with 10 shots. Keep the same rifle, same pellet and same conditions for all shooting. You absolutely will not be able to equal the group size of a random three-shot group, no matter how many 10-shot groups you shoot.

## WHAT IF I SHOT 10 THREE-SHOT GROUPS?

How will 10 three-shot groups compare to three 10-shot groups? They both entail the same number of shots, so what gives?

All 10 of the three-shot groups will be smaller than any one of the 10-shot groups. If you examine them closely, you'll notice that over the course of shooting the 10 three-shot groups, they'll print over the same area on the target as the three 10-shot groups.

That is to say that the 30 shots in each set of groups will cover the same area on the target. The three-shot groups will just take more attempts to cover the area, while the 10-shot groups cover it in fewer attempts. If that doesn't illustrate why three-shot groups are not representative of a rifle's accuracy, I'm afraid I cannot explain it more clearly.

## TAKEN TO ABSURDITY

The final argument I have arose on my daily blog at pyramydair.com. As the various readers were discussing the usefulness of various group sizes, someone put forth the ultimate argument—the one-shot group! They're incredibly tight every time. As absurd as that sounds, when you think about it, it illustrates what the three-shot group is really doing. It's removing a whole bunch of randomness from the problem and showing the rifle in an artificially good light.

So, lie to me if you must, but if you want me to respect your accuracy claims, give me 10-shot groups every time.