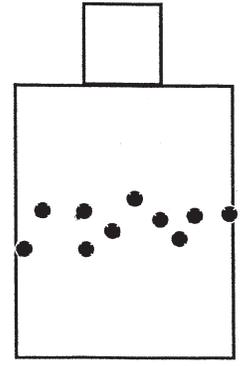
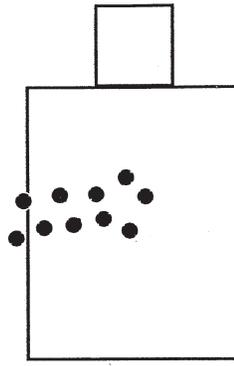
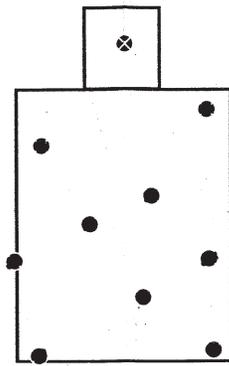
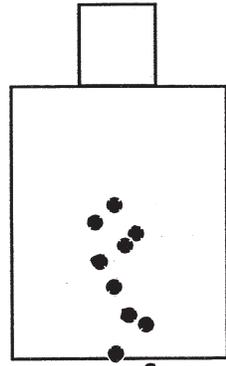
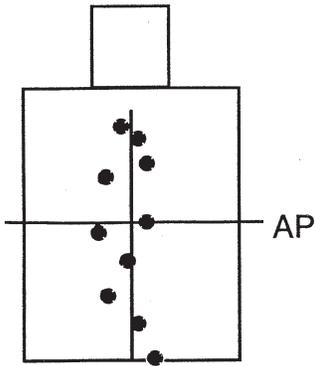


Shot Group Analysis

The most common errors in rifle shooting are caused by shooter failure to fire each shot 'by the numbers'. The aiming point on each target is the 'center of mass'. 'Shooter error' is the focus, so weather effects are not considered. Likewise, rifle and ammo are assumed to be accurate, and rifle zeroed. Where a 'right-handed' shooter is assumed, a left-handed shooter will experience the reverse effect.



Probable Causes:

1. Failure to hold breath or erratic breathing while squeezing the trigger - ie, filling lungs to capacity for one shot but breathing out or exhaling for next shot
2. Eye relief (spot weld) not held constant.
3. Improper vertical alignment of sights.

Solution: Place cheek on same spot on stock for head shot, be consistent in holding breath, and keep your sights aligned.

Probable Cause:

1. Sling becoming looser with each shot. The sling keeper is slipping, or the arm loop is otherwise loose, allowing the sling to slip down on the arm.
2. Loose rear sight.
3. Too lowa position.
4. Change in position of rifle in shoulder after reload.

Solution: Make sure keeper and loop is tight, sling is same place on arm, and sling tension is uniform from shot to shot. Check rear sight elevation tension and retighten. Check fundamentals of position. Do "2round" drill - load mag with one round, get in position, fire, change mags, and fire one round. Both rounds should be in same group.

Probable Causes:

1. No definite group: focusing aiming eye on target, instead of front sight.
2. Loose position.
3. Flinching, bucking, and jerking [improper trigger control] every shot.
4. Failure to keep eyes open when rifle fires.
5. Sight alignment/spot weld not consistent.

Cure: Focus "front sight", not target. Review/practice position fundamentals; fire each shot by the numbers. "Ball & dummy" drill is essential for detecting & curing causes #3 and #4.

Probable Causes:

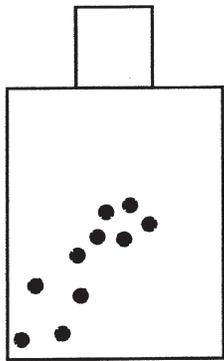
1. Finger placed too far into trigger guard. When rifle fires, the finger moves back rapidly and drags against the right side of the stock, causing the rifle, and front sight, to move to the left.
2. Squeezing trigger on an angle, not straight back.

Solution: Place finger on trigger so that daylight shows between finger and stock - usually, the first pad of the trigger finger will do it.

Probable Causes:

1. Canting the rifle.
2. Front sight not in correct alignment with rear, but is displaced horizontally from shot to shot.
3. Loose front sight
4. Muscling rifle [incorrect NPOA]; loose position

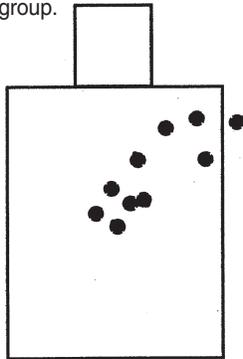
Solution: Keep sights and rifle vertical for each shot; always align sights correctly. Check/tighten front sight. Check NPOA.



Probable Causes:

1. "Bucking" - a slight push with the right shoulder on the butt in anticipation of recoil will move the sights, and the shot, in the 7-8:30 area. Effect is opposite for left-handed shooter.

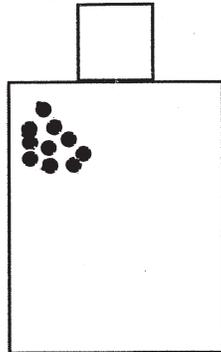
Solution: "Ball and Dummy" drill to detect and correct. Feed the shooter dummy rounds or empty rifle until he quits flinching, bucking, and jerking the trigger - all revealed by muzzle motion when the hammer falls on a dummy or empty chamber. Once he settles down, feed him a couple live rounds and then some more empties as a double-check.



Probable Causes:

1. "Heeling" or "heeling" the rifle in anticipation of the discharge. As the sear releases at the end of the squeeze, the palm or heel of the right hand is pushed forward slightly, causing the sights to go up and right. Effect is opposite for left-handed shooter. [especially M 16/M 14E2 pistol-grip stocks]

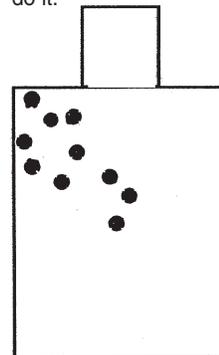
Solution: "Ball & Dummy" until shooter is cured.



Probable Causes:

1. Same error each time, in this case a left-handed shooter 'heeling' each shot.
2. Natural Point of Aim [NPOA] not obtained, forcing the shooter to 'muscle' the sights onto the target.

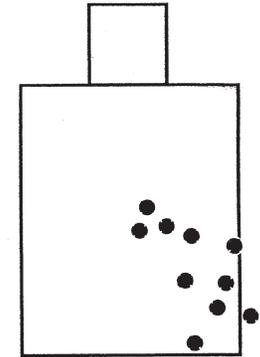
Solution: Check NPOA: line sights up on the target, close your eyes, relax your body, deep breathe in, let it out, and open your eyes. If the sights are now off the target, shift your weight slightly around the elbow under the forearm [prone] to bring the sights back on the target. Repeat the process until you open your eyes, and the sights are on the target. Then anchor elbow.



Probable Causes:

1. Failure to 'follow through'; shooter failed to hold trigger back an instant after the shot and started to relax too soon. Releasing the trigger too soon allows the hand to move, which moves the sights.

Solution: Think the word "follow through" as you hold the trigger back an instant after the rifle discharges, and you will solve the problem.



Probable Causes:

1. "Jerking" the trigger, not squeezing it, causing the front sight to dip to the right.
2. "Flinching"; shooter pulls right shoulder to rear in anticipation of shot.
3. Left elbow not being under the rifle, right elbow slipping, loose sling [prone], or the left elbow slipping down the leg, right elbow slipping [sitting].
4. Binding of forearm with left hand.

Solution: On 1) and 2) above, "ball and dummy" training.

Seldom does a shot group show only one error. Remember to eliminate from consideration any 'called' shots - you already know about them! Never forget: 'bucking' shots are usually 7 to 10 o'clock, 'flinching' and 'jerking' shots tend to 1 to 5 o'clock, but may be anywhere on the target. Remember you have a zero for each position, and a zero for varying cadences, which you establish via actual practice.



Line up the front and rear sights: Simply center the front sight in the rear sight.

1. Sight Alignment

2. Sight Picture

Keeping the sights lined up correctly, bring them onto the target

3. Respiratory Pause

As you breath the front sight will pass vertically through the target. Use the natural act of breathing to adjust your vertical alignment Breath deep, slowly exhale, and pause.

4A. Focus your eye on the front sight

It may be a little hard to do at first, as you naturally want to look at the target. But keep your eyes focused on the front sight, even if it means that the target gets blurry.

4B. Focus your mind

Keep front sight on target: your concentration should be on "keeping that front sight on the target". It may help for you to consciously repeat, "front sight on target, front sight on target."

5. Trigger Squeeze

Squeeze straight back while front sight stays on target: While you are doing both parts of step 4, you'll take up the slack and squeeze the trigger straight back: At the same time, you MUST keep your concentration on the front sight! Don't let the front sight off the target; if it does move off target, gently bring it back on target, while continuing to squeeze the trigger. The discharge should *surprise* you.

6. Follow Through

Call the shot and feel the trigger sear: With your sighting eye open, take mental picture of *where* the sights were when rifle discharged. If you can't, "call the shot", you won't ever be able to tell whether the shot was bad because *you* did something wrong. Next, feel the trigger sear reset and/or hear the trigger sear reset. Now you're ready for the next shot.

NPOA (Natural Point of Aim)

A Rifleman takes his shooting position so that his rifle, with his body relaxed, is pointing at the target. He doesn't have to fight muscle strain and he makes his job of firing the shot a lot easier. Best of all, his shots will be on target, accurately and consistently, because he's not fighting his body's natural position.

Here's how to obtain your NPOA:

1. Close your eyes, relax your body, take a deep breath in and out.
2. Open your eyes and check your sight picture. 9 times out of 10, your sight picture will have changed, because your body is now relaxed.
3. You'll now reestablish your sight picture by making slight adjustments in your position. If you are in the prone position, you'll shift position pivoting around your forward elbow to bring the sights back on the target. In other positions, you will make whatever small adjustments in your position so that the rifle points naturally at the target.
4. Repeat until you've obtained your NPOA

MOA (Minute of Angle)

Degrees and *Minutes* are measurements of angle. There are 60 minutes in one degree. While 1 degree is a very tiny angle, one minute is only 1/60th of that. And by coincidence, one Minute of Angle (MOA) is 1 inch per 100 yards. Hence, one MOA at 200 yards is 2 inches, one MOA at 300 yards is 3 inches, and so on and so on. Think of a very long ice cream cone, one designed for a 1 inch scoop of ice cream. Imagine it stretching out of the muzzle all the way down to your target, one hundred yards away. The imprint of the cone on the target would be one *Minute of Angle* circle. If you could fire all rounds within that circle, you would have shot a one *MOA group* at 100 yards.



AR -15 Sight Adjustments at 25 meters
20" barrel

AI Front (round)	1 click = 1/4" (1 moa) elevation
AI Rear	1 click = 1/4" (1 moa) windage
A2 Front (square)	1 click = 3/8" (1.5 moa) elevation
A2 Rear	1 click = 1/8" (0.5 moa) windage
14.5" or 16" barrel	
AI Front (round)	1 click = 3/8" (1.5 moa) elevation
A1 Rear	1 click = 3/8" (1.5 moa) windage
A2 Front (square)	1 click = 1/2" (2 moa) elevation
A2 Rear	1 click = 3/16" (0.75 moa) windage

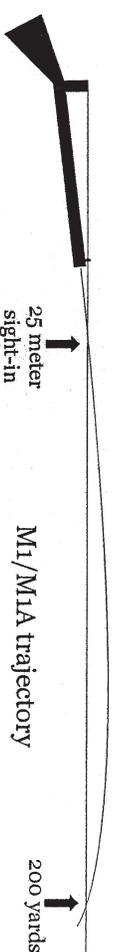
The RWV A Safety Rules:

1. The prime rule: Always keep your muzzle pointed in a safe direction! Follow it without fail.
2. Never load until you are given the "Load" command. That means action open, mag out, safety on, grounded on the mat or in the rack, and no one is touching the rifle..
3. Keep your finger off the trigger until your sights are on the target.
4. Make sure others around you comply with these rules. You, along with everyone else are range safety officers.

Inches, Minutes, and Clicks (IMC)

Understanding the relationships of inches, minutes, and clicks is paramount when attempting random range shots. If one learns the concepts of IMC, one can easily determine the proper sight setting, or hold over, for any known distance.

As a bullet leaves the barrel it immediately begins to drop. The further it goes, the more it drops. The path of a bullet makes a low angled arc. This arc crosses the shooters line of sight twice. Once close up, and again much further out



Sighting in at 25 meters: If you are sighting in your rifle at 25 meters and you missed the bun by 1112" to the right and 3/4" high. You would move windage 6 clicks left and elevation 3 clicks down. Using an M1/M1A, **One click is one MOA and 1 MOA equals 1/4" at 25meters/yards.** And when sighted in at 25meters, you are also sighted in at 200 yards.

Come ups: Most military .30 caliber rounds are pretty much the same out to 500 yards. Learn the trajectory for one, and you can do pretty well with any military .30 caliber. For those of you using either a Garand or M1A, your trajectory studies are pretty simple. Just memorize the following Come-ups: 3, 3, 4, 4, 5 (100-600yds). These numbers represent how many clicks up you have to make with an M1/M1A to compensate for trajectory. Example: If you are sighted in at 200 yards and your target is at 400 yards, you would raise your sight 7 clicks (add 3 clicks to go from 200-300, plus 4 more clicks to go from 300-400). Example 2: If you are sighted in at 200 yards and your target is at 600 yards, you would raise your sight 16 clicks (3+4+4+5).

Battle Sight Zero is sighted in at 275 yards or 250 meters/25 meter sight in plus 2 clicks. Its function is to give you a simple sight setting for most battle situations. If your target is at 400 yards and you aim center of mass you'll hit 5 MOA (5 clicks) low; 5MOA X 4" = 20". At 400 yards that's just below the belt on a human target. So aim a little higher and you'll be right on. If your target is at 200 yards, you'll hit 2 MOA (2 clicks) high; 2 MOA x 2" = 4 inches @200 yards.