

Merlin Bows

Technical Advice Sheet

Tuning

This is aimed at the archer shooting compound with release aid.

The compound on the outset certainly seems a lot harder to tune than it is, and I think a lot of archers are not getting the increased performance the compound is capable of giving them, purely because their bow is not tuned correctly. Improvement is not just a result of good practice. No matter how much you practice, if you are practicing with a badly tuned bow, you just won't be able to achieve the results you might like.

There are a few of you out there who just won't accept that the bow may be shooting badly, you will continue to practice, looking at your technique, just assuming it must be you. It is sometimes worth just standing back and reassessing your set up. You never know, you could be shooting 20 points lower than you are capable of.

But before we go into the mechanics of tuning the bow, the first problem area I would put high on the list is the human factor. The bow could be suffering from thrombosis; a clot behind the string.

Understanding is the corner stone of tuning. What I will try to do is to help you understand how to tune your bow. It is equally important to be honest with your self. No amount of tuning can compensate for bad and inconsistent technique. This doesn't mean that you shouldn't try to tune your bow, but just try to be realistic in what result you are expecting, after all, you can't expect to group all your arrows in the ten ring if your sight isn't in the 10 ring on release, but you can expect to minimize your grouping within your given skill level.

Step one.

Selecting your rest. There are dozens of different rests, if not hundreds, and this can be confusing. All of these can be categorized into 4 styles.

1. Launcher. This is a rest with no side, pressure where the arrow is mounted on an arm or prong.
2. Drop away. Similar to the launcher, but where the mounting arm falls away when shot.
3. Shoot through. Where the vane passes between supports holding your arrow.

4. Shoot around. Where the rest has a side pressure mount, and a bottom arm. e.g. Springy or flipper style rest.

All of the above rests can be tuned perfectly, but each require slightly different tuning procedures, and certain rests may suit your shooting style better.

Step two.

Nocking point. Firstly, make sure your tiller is level. I have explained my reasons for this in previous articles, (see tec-talk menu) and it would be too lengthy to explain in this article.

The nocking point height is something that will be determined later in the tuning procedure. There is no fixed height that any one can give you, as there are so many factors which influence its position. But in all cases I have found that the arrow will be somewhere between square and 3/8 above. If it becomes outside these parameters, then some other factor must be influencing its position.

Step three.

Centre shot. When trying to determine the position of the rest, it is important to use the string track on your cam for reference. This is the true centre shot of the compound. Quite often other references are taken, such as the centre of the riser, or the stabiliser, but these may not be following the correct path of the string. If you look at the cam you will notice that the string track is on the left hand side (for right handed archers), and that the cam itself might not be positioned in the exact centre of the limb. You must use the position of the string track for your reference, and you will probably find that your rest will be slightly left of centre of the bow. From looking behind the string, the arrow should be in perfect alignment with the string.

Step four.

Paper testing.

This is a valuable first step to tuning your bow. You will be required to shoot through a taught piece of newspaper, or something similar, supported on a frame, from approximately stabiliser length to begin with. This is an excellent method of determining what your arrow is doing as it comes out of the bow. You will no doubt have seen diagrams illustrating the desired shape of the hole you must achieve, and ever so simple explanations of adjustments that must be made to correct sideways tears etc. But how many of you have tried this and just can't seem to get the elusive 'bullet hole'.

Unfortunately, sometimes the paper test can be a lot more awkward than commonly thought. I will try to explain the types of tears that you get and the causes.

The vertical tear. (Nock high) If you are getting a nock high tear, but straight, then this is a good sign and is one of the easiest to correct. First of all, just try lowering your nocking point, but remember never to let the arrow go below square. Also don't be afraid to raise

your nocking point, as it is possible that the arrow maybe starting off nock low but bounces up off the rest giving a false impression of a nock high tear.

Still tearing high?

The next step would be to reduce the spring tension on the support holding your arrow, assuming that you are using a launcher style rest. The tension must still be strong enough to support the weight of the shaft if you press it down with your finger. If you are using a drop away style, the length of rubber or cord is quite critical. The rest should reach its upright position only a couple of inches before you reach full draw. Make sure that you can still come forward 2-3 inches from the full draw position before the rest starts to move downwards. If the rubber is too tight, then the rest may not drop away in time and you can still get the arrows striking the rest. After changing any spring tensions, re try different nocking point heights.

Still tearing high?

Next you must check for fletching contact on the rest as this may cause a bounce. An excellent way to try this is by spraying the arrow with a dry white powder, such as foot powder. It will clearly show up any contact marks. If you have contact, a common reason is that there is too much rest holding the arrow. You can make minor modifications to the rest to help this. If you have a 'lizard tongue' style arm, carefully squash the end to leave a smaller loop on the end. On a shoot through rest, have another look at the spacing between the arms and adjust it to the maximum gap you can afford, without the arrow dropping through. It maybe the case that the arms are just to fat for some smaller diameter carbons. If so, then maybe you should try a different rest.

The simplest answer might just be to rotate your nocks. A good way to determine if your fletches are catching your rest and you don't have any spray powder is to shoot a bare shaft through the paper at stabiliser length. If your tear is better without fletches then you can be pretty sure contact may be a problem.

Still tearing high?

The only thing left if all the above has failed is wheel timing on a twin cam system. If one wheel is travelling ahead of the other you will get a vertical tear. If the bottom wheel is rotated ahead of the other, the arrow will attempt to come out nock low, but remember it may bounce on the rest resulting in a nock high tear. (see section on Balancing your twin cam)

Vertical tear (nock low) It is actually quite difficult to get a low tear. This is because most causes for a low tear just bounce off the rest showing a high tear. The only exceptions are with the drop away type rest. On a launcher, having the support arm tension to soft may cause a low tear, but the usual nockpoint adjustments and wheel timing should clean this up. Check also wheel timing.

Horizontal tear. Unlike vertical tears, horizontal tears are more difficult to get rid of. This is because, unlike vertical tears, they tend to show up a lot of inconsistencies in the archers form, where as vertical tears tend to be 90% equipment. By the nature of the compound bow, it becomes very much easier to torque, and torqing (being left to right twisting of the bow) shows up terribly on the paper test. (see Torque on Tech-Talk menu)

For a right handed archer it is assumed that a right tear shows a stiff arrow and left tear is weak. In reality, just changing arrows rarely solves the problem. Of course, using the correct spine arrows is essential, but you should also be able to get pretty good tears through the paper using one or even two spines either side of the recommended selection chart. Spine selection becomes more noticeable when you are shooting for groups, and therefore more important, as optimum grouping is the end goal. You will also find that small adjustments to the centre shot may only have a marginal effect. Assuming the rest has been aligned with the string track on the wheel the path of the string should travel in a straight line behind the arrow. Unlike shooting fingers, there is only a very small sideways movement of the string as it rolls off the release aid right at the start of the loose, but generally it is not enough to warrant movement of the rest.

More often than not, a sideways tear comes down to torque. The first thing to do is if you shoot a cable guard, is to minimise the rake on the bar to give the minimal amount of clearance, but make sure your arrows don't catch the cables when you shoot. Also check that your arrow has clearance against the cable at full draw, as the gap is different when at brace.

You can apply torque to the bow in two ways. Firstly via the bow grip. Unintentionally you can be forcing the bow away from its natural line. Don't grip the bow, relax your fingers. Try different hand positions to see if that has any effect. It is important that any position you pick must be comfortable and easy to repeat. It is no good finding a position that improves your tear but may vary from shot to shot as this will give inconsistent horizontal grouping. A grip that is too big can cause problems. The bigger the area on the grip only gives more area for inconsistent placement of your hand. Try a slimmer grip or remove the grip completely and try a few off the metal of the riser. Remember that will increase your draw length, so shorten it down first.

If none of that has helped then the second way, which is more difficult to prevent, is dragging the string to the side when you draw and anchor. I have explained this in previous articles, but I will briefly go over it again. At full draw you are holding a very low weight, and it is extremely easy to move the string sideways. The friction of your hand on the grip prevents the whole bow moving on a parallel plane, so the result is the string being moved out of line with the bow. On release the string starts traveling diagonally causing the nock to be thrown to the side. It is impossible to tune this out of the bow. The only correction is to change your style. When you draw the bow and prepare to anchor, any movement of the release hand must be mirrored by the bow hand. Try to imagine positioning your self around the bow rather than bringing the string to your anchor point. Just tip your head slightly into the string to achieve that final position.

It is difficult to notice these slight differences in the drawing and anchoring of the bow, particularly when you have been doing it one way for a long time, but this small part of shooting the bow is often overlooked. If possible get some other people to shoot your bow through the paper, and see if they get straighter tears. You might be surprised with the results.

The bullet hole is what every body attempts to get. This is the classic tear and shows the arrow must be leaving the bow cleanly resulting in good arrow flight. Unfortunately, the perfect tear is not always achievable for some people. This goes back to what I said at the beginning about being honest with your own ability and what you should expect. To get a bullet hole tear you must shoot a perfect shot. If not, just strive to get the tear as small as possible.

Step five, and most important.
Group tuning.

After achieving the best tear possible, its time to test the results. Group tuning takes a lot of patience and can't be rushed. This is also an area of shooting which comes down to trial and error, as you may find that something that works one time may not have the same result the next.

Adjustments that you make must be very small, and always take measurements of where you were so that if the result gets worse you know how to get back. Group shooting should be done at different distances, but start off at around 40-50 meters. Use a systematic approach to your adjustments so not to get confused.

A good place to start is knocking point. Only make very small adjustments, approx. 1 mm at a time. Move up and down, and settle on a height that you feel is giving the best results. Do the same with the centre shot, but always remember where the original settings were.

Change the tension on your rest.

A good test for wheel timing is to shoot a few arrows pulling firmly on the stops, and then a few arrows under drawing by $\frac{1}{4}$ inch or so. If your wheels are balanced the arrows should land at the same height. If you get a vertical group, then your timing is out.

Spining of arrows and different point weights can make a big difference to your groups. Don't worry about trying arrows slightly out of the recommend range in the arrow selection charts, (never go below 5 grains per pound) as bows can vary as much as 60 feet per second at the same poundage. The same arrow will shoot completely different out of bows this different.

Also experiment with different rests. Yes. That means repeating all of the above again. I said you have to be patient. Tuning can take many hours of good quality shooting, but if you are serious about improving, then it is a small price to pay.