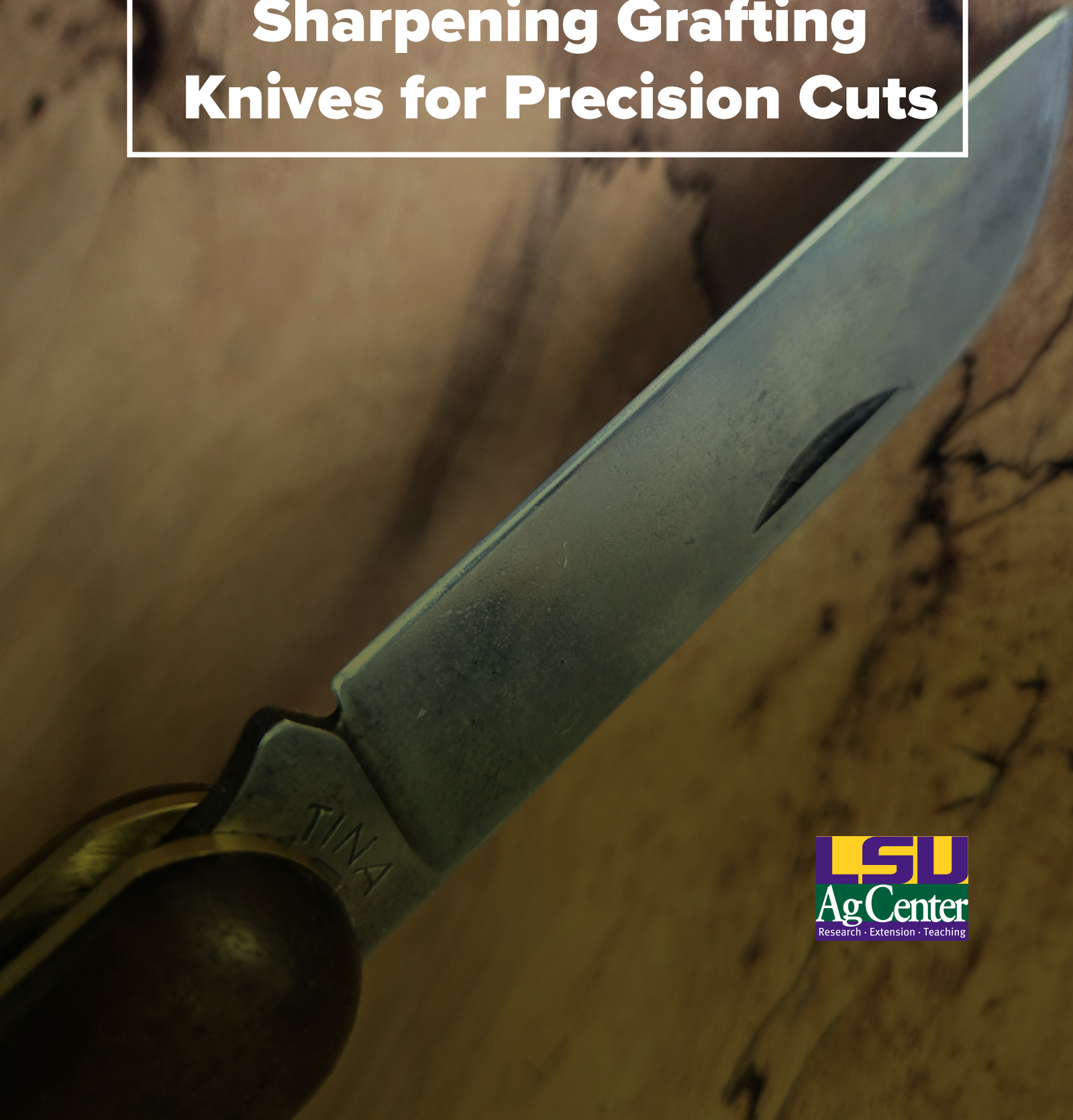


Perfecting the Craft

Sharpening Grafting Knives for Precision Cuts



Introduction

The most important tool for successful grafting is a sharp knife with the correct edge. A dull knife or one with an improper cutting surface greatly increases the risk of injury and can reduce graft success due to uneven cuts. Grafting knives should only be beveled or sharpened on one side. The side with the bevel has a sharp cutting surface while the non-beveled/flat side does not (Figure 1). The side a blade is beveled on should accommodate the user's hand dominance (Figure 2). A single-beveled knife will only experience drag or resistance on one side as it cuts through wood. A double-beveled knife experiences drag or resistance on both sides as it cuts. That is the reason that a single-beveled knife makes straighter and smoother cuts in wood than a blade sharpened on both sides (Figure 3).

Proper knife sharpening skills and supplies are crucial in maintaining a blade's edge and sharpness. Grafting knives should not be allowed to go dull. It takes more effort to fix a dull knife than it does to maintain a sharp one. A good quality grafting knife is designed to hold an edge well with regular maintenance. When looking at second-hand grafting knives, one of the most common mistakes you will notice in some is that the blade will be significantly smaller than it initially was due to improper sharpening techniques. When sharpened regularly utilizing sharpening stones they should seldom become smaller in the sharpening process. Care should be taken when grafting to avoid nicking or notching the blade since that is a situation where a reduction in the blade may be needed to correct.



Figure 1. The top picture is the flat side of a grafting knife that has no bevel. The bottom picture shows the beveled side that is sharp.

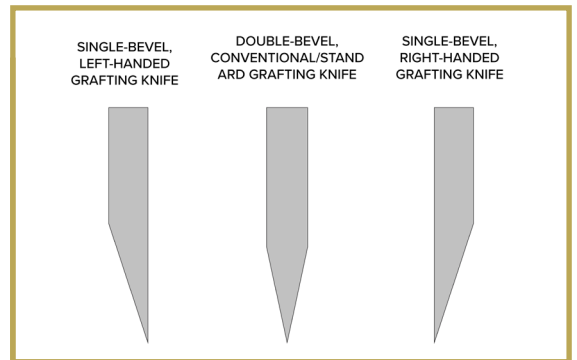
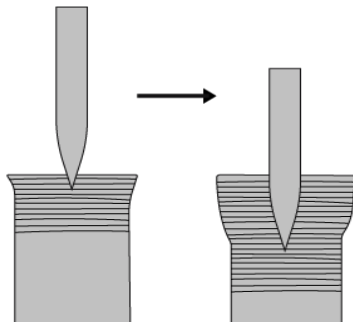
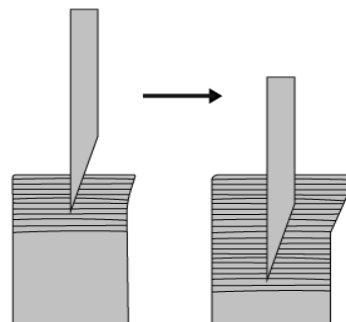


Figure 2. Single- and double-bevel cutting edges. Knives are sharpened on alternate sides depending on hand dominance.

CUTTING WITH A
DOUBLE-BEVELED BLADE



CUTTING WITH A
SINGLE-BEVELED BLADE



CUTTING WITH A
SINGLE-BEVELED BLADE

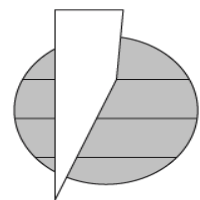
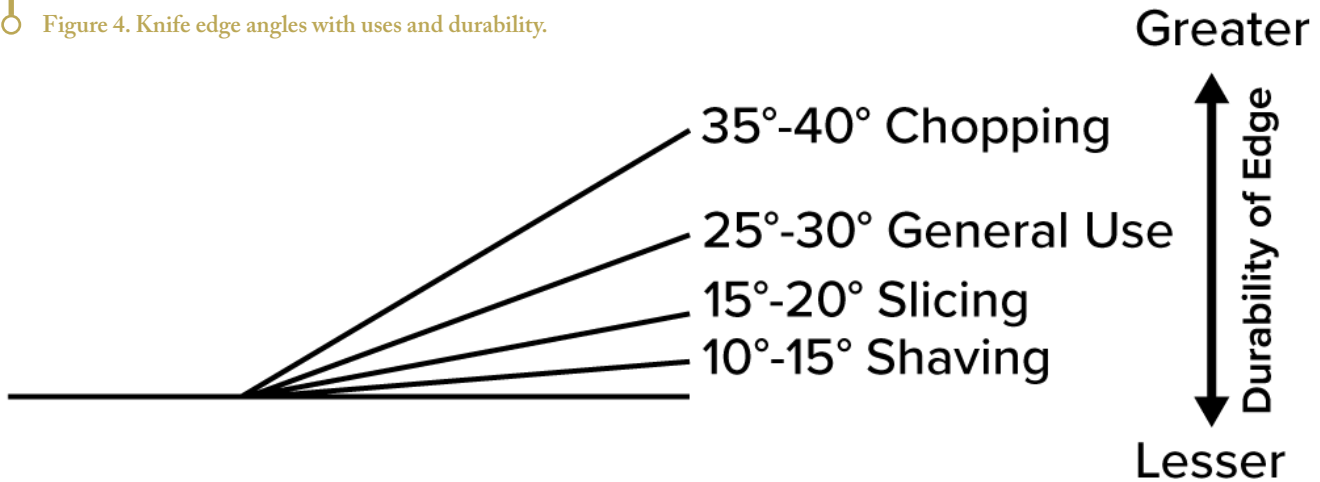


Figure 3. Cutting drag/resistance on a double- and single-beveled blade.

Figure 4. Knife edge angles with uses and durability.



The ideal time to sharpen grafting knives is when they are still cutting well but you begin to notice a drag or resistance in the cutting motions. The rate this can occur varies significantly depending on the diameter of the material being grafted, woodiness of plant material, grafting skill and steel quality of the knife. Thicker and woodier plant material will dull a knife quicker than smaller and less lignified material. Swift, single strokes also create less wear on a knife compared to repetitive whittling. A carbon steel grafting knife will hold its edge and sharpness significantly longer than a lower quality stainless steel one. Carbon steel knives accomplish that by being harder than other types of steel, but this comes with the tradeoff of being slightly more brittle. Because of that, a grafting knife should be exclusively used for grafting and not be used for general cutting or chopping. A good general guideline should be to sharpen or touch up your knife at the end of the day. In a pinch, a good quality knife should be able to get through 250 to 1,000 grafts (larger versus smaller plant material) on one touch-up. Even the best of knives can be dulled by a miscut or odd tree angle so make efforts to sharpen them sooner rather than later if you start to observe jagged cuts or increased resistance.

The general rule for knife angles is that lower angles are sharper and wider ones are more

durable. Some ranges for blade edges are 35-40 degrees for chopping, 25-30 degrees for general use, 15-20 degrees for slicing and 10-15 degrees for shaving (Figure 4). The primary cuts used for grafting most closely resemble slicing cuts. The angle of a grafting knife's edge should be close to about 20 degrees to get the best of both slicing ability and durability. Angles below 17 degrees may be sharper but require more frequent sharpening and touch ups. Angles above 22 are more durable in holding an edge but will not slice through wood as smoothly.

Tools to get started

Tools that are necessary for sharpening grafting knives are some whetstones, honing oil, a leather strop, polishing compound and an angle guide for those that are just starting (see Figure 5 on page 4). Whetstones or sharpening stones are the ideal way to sharpen grafting knives. Medium and soft grit stones are useful for very dull blades or those that have acquired a notch in the cutting surface through some accident or mishap. Fine or ultra-fine grit stones are great for maintaining peak sharpness and touch-ups. Whetstones benefit from having a secure base that assists in keeping them securely in place during the sharpening process. Whetstones can be used with water, but they tend to sharpen and remove debris better when used with an oil instead. There

are many types of oil that can be utilized ranging from specialized honing oils to general purpose to even sewing machine oil. A leather strop is used to remove burs created during the sharpening process and to polish the blade. Polishing compounds are useful for removing scratches on the knife after sharpening.



Figure 5. Tools for sharpening grafting knives include whetstones, leather strop, honing oil, polishing compound and angle guide.

Sharpening your grafting knife

The first step is to wet or oil your whetstone. The purpose of the oil is to assist in the fluid motion as the blade passes over the stone in addition to removing small metal flakes and other debris that are created in the sharpening process. To avoid waste from pouring out too much oil, pour a little into your hand and then rub it on the stone (Figure 6). Some brands, especially multipurpose and sewing machine oils, will have a narrower opening that prevents too much from being put out at once and are great for targeted applications of oil. Once the stone is oiled, it is ready to be used for sharpening.

Lining up the grafting knife on the beveled, sharp edge and at the proper angle is critical. If you accidentally sharpen the wrong side, you can ruin a good grafting knife. Always make sure the beveled sharpened side is down facing the stone and the nonbeveled, flat side is up facing you. To get the correct 20-degree angle for your grafting knife, it is

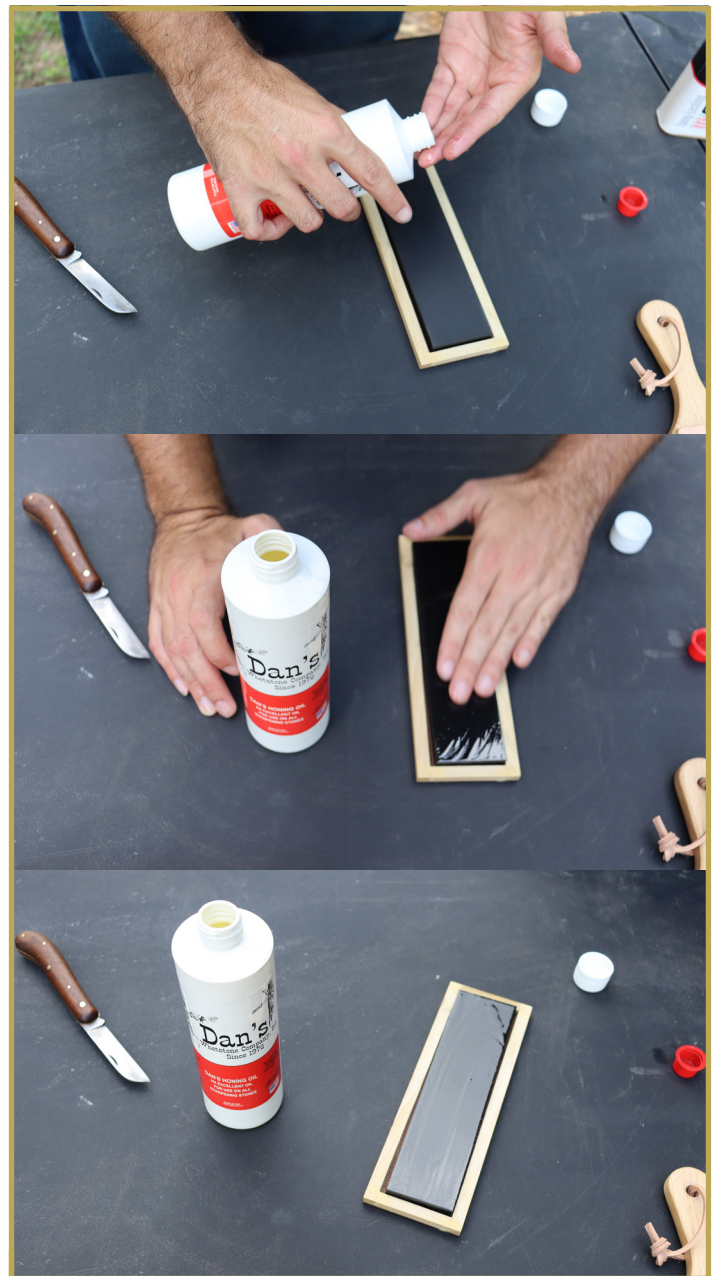


Figure 6. The process of oiling a whetstone, beginning with pouring oil into your hand and ending with an oiled stone.

recommended to use angle guides (see Figure 7 on page 5). Line the blade up with a 20-degree guide, beveled, sharp side down, and ensure that it is flush with it. From this starting point you can start the movement of the knife down the stone for sharpening. Some guides have a notch where you can use a rubber band to hold it in place. This can be a useful addition if you want to line up your knife with every sharpening stroke. A traditional technique used to get a 20-degree angle is the quarter method, but specialized guides take out the guesswork.

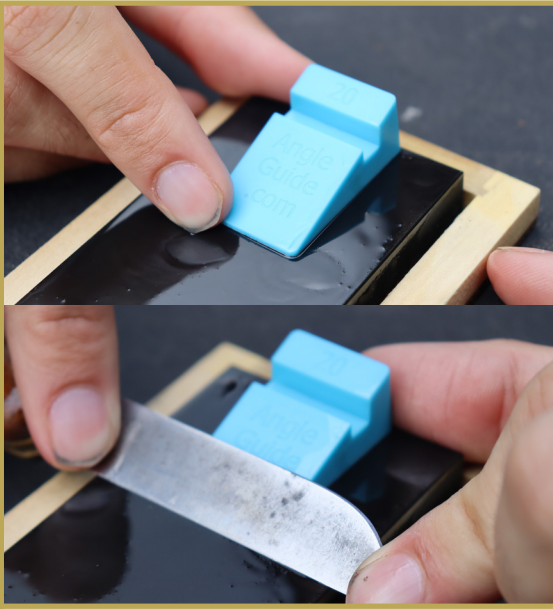


Figure 7. A knife angle guide can assist in getting the correct edge on a knife. Make sure the nonbeveled, flat side is facing up and the beveled, sharp side is facing down when getting started.

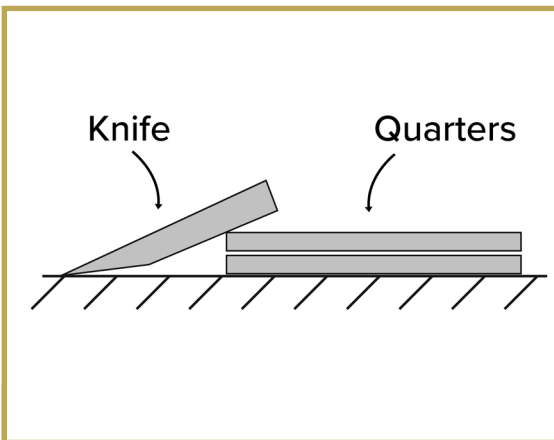


Figure 8. Example of the quarter method for sharpening knives.

To use the quarter method, line up the top portion of the knife on the edge of two stacked quarters to get an approximate 20-degree angle (Figure 8). One of the drawbacks of this method is that the width of the blade being sharpened is a factor in the angle as well. A knife that is 0.5 inches wide would give you an angle closer to 16 degrees while a blade 0.75 inches wide would result in a 21.6-degree angle. The most important part of the process is staying consistent by starting in the same position for the angle. Even if you are off from the desired angle by a few degrees, sharpening at a consistent angle is better than an inconsistent one.

Once the starting angle is established, the next step to master is the stroke of the blade across the stone. This is doubly important for blades that are long enough to extend over the edge of the stone. If a pass over the stone is made without accounting for this, the blade will not be sharpened consistently and there will be uneven wear on the blade. Make certain to line up the base on the cutting surface close to the handle at the top of the stone. As you pass down the stone in a fluid motion, aided by the oil, you should pass over the entirety of the cutting surface. A summary of the process can be seen in Figure 9. When placed correctly over the stone, all parts of the blade should be sharpened evenly upon completion of the pass. It is critical to maintain consistent, even downward pressure on the knife over the course of the stroke. Care should be taken at this step. Your stroke should mimic a light slicing motion gliding over the top of the stone and not be like you are attempting to cut into the stone. Light pressure helps in the sharpening but do not push down hard. Pushing too hard will wear the knife down and increases the chance of accidental injury. The number of passes needed to sharpen will vary based on the initial dullness of the blade



Figure 9. The process of how to pass a blade over a sharpening stone.

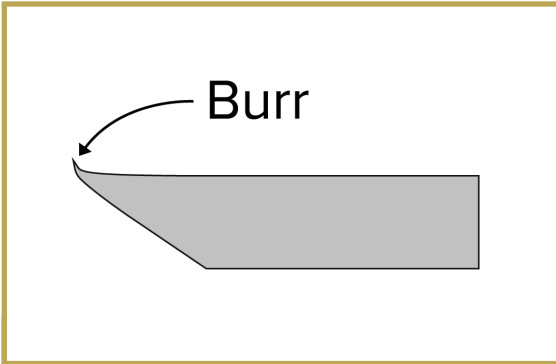


Figure 10. Burrs are created during the sharpening process.

During the process of sharpening, a burr will be created (Figure 10). Burrs are a curved lip that is formed when the knife is passed over the whetstone. A burr can feel like a small ridge and prevents the nonbeveled, flat side of the knife from feeling completely smooth after sharpening. Be careful if you attempt to feel for a burr. The safest way to test for burrs using a tactile finger method would be to feel on the nonbeveled, flat side of the knife by pushing lightly down as indicated in Figure 11 (A). While you can test for and feel burrs as indicated in Figure 11 (B), it is not recommended as there is a much higher likelihood for injury, especially with a very sharp knife. The flashlight method is another way to see and test burrs on a knife edge. Shining a bright flashlight on the cutting surface should reveal burrs as the light will reflect off them.



Figure 11. The top photo (A) is the safer method of testing for burrs based on the feel of the nonbeveled, flat side. The bottom photo (B) is a riskier way to test for burrs on the beveled side and is not recommended.

There are several strategies that can be employed to remove burrs created in the sharpening process. Since single-beveled grafting knives are only sharpened on one side, one technique that can be used is to make flat passes on the whetstone on the nonbeveled, flat side (Figure 12). It is important to ensure that each pass is flat and flush with the stone to make sure you do not sharpen an angle on the nonbeveled, flat side. Another technique that can remove burrs is to lightly rotate the grafting knife with the nonbeveled, flat side on the whetstone as illustrated in Figure 13. One drawback to both of those methods is that they can create light scratches on the nonbeveled, flat side of the blade. Scratches can be corrected with a polishing.

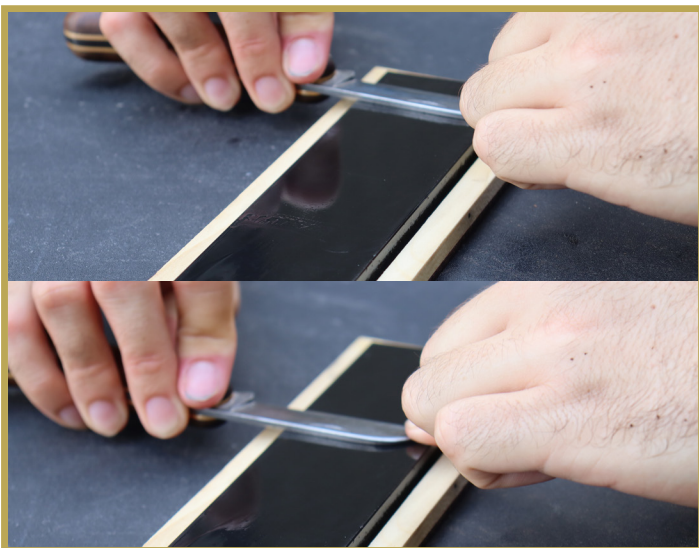


Figure 12. A flat and even pass on the nonbeveled, flat side of the grafting knife can be done to remove burrs created in the sharpening process.

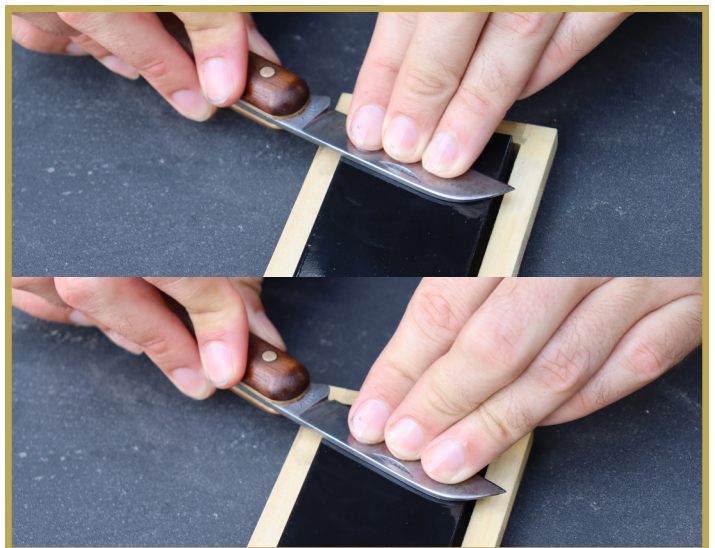


Figure 13. Rotating the grafting knife's nonbeveled, flat side down on the whetstone can remove burrs created during the sharpening process



Figure 14. Stropping a knife over leather after sharpening can help remove burrs and lightly polish the knife.



Figure 15. Polishing the knife on both sides after sharpening helps increase the knife's lifespan and contributes to a smoother, cleaner cut. The top pictures are polishing of the nonbeveled, flat side and the bottom pictures are polishing the beveled, sharp side.



Figure 16. Oiling the wooden blade handle and pivot point on a grafting knife helps increase its lifespan.

Photos by Sara R. Shields
Cover photo by Michael Polozola

The most frequent strategy used to remove burrs is stropping a knife against leather. This has the added benefit of lightly polishing the knife as well. Stropping the grafting knife against leather involves pulling it in the opposite direction than it was sharpened. This is accomplished by pulling the knife against the leather surface at a small angle on the nonbeveled, flat side. This is normally performed in a rapid fashion. It can be helpful to start slow and guide the knife against the leather as illustrated in Figure 14 until you are comfortable enough to make rapid pulls. Make certain you are pulling upward with the nonbeveled, flat side against the leather to remove burrs. This upward pull removes the burrs and prevents accidental cutting into the leather.

Polishing a grafting knife is an important step in maintaining its longevity. Often, the light polish that is accomplished in the stropping process is enough. A more in-depth polishing can be beneficial in maintaining the knife and ensuring that it is performing optimally. A polished knife will not dull as quickly and will cut cleaner than one that is not polished. A polished finish also reduces friction and drag in strokes in addition to reducing the amount of organic residue that accumulates on knives in the grafting process. While polishing to a mirror finish would be ideal, from a practical standpoint, a light polish that removes or reduces the light scratches that can occur on a grafting knife from normal use is adequate. To polish a grafting knife, you will need honing compound and a piece of leather. The honing compound will discolor the leather so make certain that is an acceptable outcome on the piece you are using. Lightly spread the honing compound on the leather and then make flat passes of the blade on that area (Figure 15). It is beneficial to polish both the sides of your grafting knife. The nonbeveled, flat side often needs a bit more polishing than the beveled, sharpened side.

One final step that can be beneficial is to oil the pivot point and wooden handle of the knife (Figure 16). Oiling the pivot point can help keep the knife opening smoothly. Oiling the wooden handle can keep it from drying out. Since grafting knives are used outside, they can occasionally get wet or be out in humid conditions. A thin layer of oil on the moving parts and handle can prevent rust or damage of the wooden handle.

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P3946-A (online) 9/24

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