

Surgical Castration

Surgical castration guarantees that there will be no unwanted pregnancies when running “steers” and heifers together. If properly performed, surgical castration causes less pain in the long run than other methods. The pain involved lasts for a brief period. With non-surgical techniques, the animal is uncomfortable for days. To minimize pain and stress, calves should be castrated at 2-3 months of age.

One of the preferred methods of castration is to cut off the lower one-third of the scrotum so the testicles can be removed. Equipment required is a sharp scalpel and a pail of warm water with an antiseptic. Sanitize hands and scalpel after each calf. Change the solution if it becomes contaminated or after 10-15 calves.

On a young calf, a tail hold with the calf’s head in the feed bunk is usually adequate restraint. A proper tail hold is in an upward as much as a forward direction. This stretches the tendons in the legs and reduces the chance for kicking. Do older calves in a squeeze chute.

Once the calf is restrained, check both testicles to make sure there are no abnormalities such as ruptures or undescended testicles. A veterinarian should castrate any calf with a rupture.

If the examination reveals no abnormalities, grab the bottom of the scrotum with your thumb and forefinger (*Figure 1*). With the scalpel, cut off the lower one-third of the scrotum, exposing the testicles (*Figure 2*). Take hold of a testicle. At this point, do not let it slip back into the body as this will increase the chance of infection. The testicle will be rounded on one side and relatively flat on the other. You will want to cut through the membrane on the more rounded side of the testicle. Take the scalpel and continue splitting the membrane covering the testicle (*Figure 3*) until you can pop out the testicle. Separate the membrane from the testicle. The membrane should remain connected to the bottom of the testicle. Next cut off the membrane above the testicle (*Figure 4*). By cutting away as much of the membrane as possible, excessive swelling and inflammation will be prevented.

The testicle now is supported entirely by the spermatic cord. Take hold of the testicle and extract it with a slow steady pull. Stretching the cord in this way stretches and tears the blood vessels which minimizes bleeding. Cut off any remaining cords or tissue hanging down with the scalpel.

Repeat the same procedure with the other testicle. After you have completed removal of the second testicle, spray the wound with an antiseptic.

The use of emasculators simplifies the procedure and is definitely recommended to help reduce bleeding when castrat-



Figure 1



Figure 2

Bulls

ing older calves (5-6 months). After cutting off the bottom of the scrotum, grasp both testicles and pull down. Place the emasculators as high up on the spermatic cord as possible and cut. The crushing side of the emasculators should be toward the body.

There are a few precautions to keep in mind. There is a major blood vessel on the inside of the calf's hind leg. Be extremely careful not to accidentally cut this vessel, as bleeding may be difficult to control. Provide a clean environment for the calves and observe animals for scrotal infections. Infection may occur 1 to 2 weeks after castration and should be treated by draining the wound and administering antibiotics.

There are other methods of surgical castration. The method described here has worked successfully in keeping bleeding and stress to a minimum.



Figure 3



Figure 4

Bloodless Castration

Bloodless castration of calves is preferred by many dairy people because it reduces the risk of open wound infection and parasites. There are three major methods of bloodless castration: the elastrator (bands) for small calves, banders for larger bulls, and the Burdizzo® (emasculatome). There are several steps you can take to assure a good job of castration by these methods.

Castration with the elastrator is accomplished by placing a band around the scrotum above the testicles. This effectively stops the blood to the scrotum causing the scrotum and testicles to slough off in 3-4 weeks. It is best to use this method on calves prior to 2 weeks of age. In some European countries the law dictates that calves are castrated prior to 1 week of age. To increase the success rate of this method:

1. Maintain the elasticity of the bands by storing them in a sealed container in the refrigerator.
2. Restrain the calf either in a stall, or by laying it on its side.
3. Place the rubber band on the elastrator (*Figure 1*).



Figure 1

Squeeze the elastrator handle to spread the bands while cupping your other hand over the band to protect your eyes should the band break. Wearing safety glasses is an excellent practice. Make sure both testicles are in the scrotum when the elastrator band is applied (*Figure 2*).

5. After the elastrator is removed, check to make sure both testicles are below the band. If not, remove the band and repeat the procedure.
6. Calves with bands may be susceptible to tetanus. Consider giving the calf a tetanus antitoxin shot at the time of banding if there has been a problem with tetanus on the farm.



Figure 2

A relatively new practice in the beef cattle industry is the use of banders. Similar in principle to the elastrator, a heavy rubber loop is tightened around the neck of the scrotum and secured with a metal clip. The scrotum shrivels and falls off in two to three weeks. Bulls are banded when they start to show signs of masculinity (between 700 and 800 lbs. in beef bulls) and implanted with a growth promotant. Bulls up to 1200 lbs. have been successfully castrated with this method. Proponents of banding claim increased rate of gain and heavier carcasses because of the testosterone produced by the testicles and stress to the animal is minimal. In very large bulls there can be quite a strong odor from the decaying scrotal tissue four or five days after applying the bands but the bulls continue to eat and grow.

Burdizzo® castration is usually done on calves weighing 200-600 lbs. The Burdizzo® comes in several different sizes. Fit the size to the size of the calf. To tell if your Burdizzo® is working properly, clamp it on a sheet of paper. It should crease the paper without cutting it.

Good animal restraint helps minimize time required for the procedure, stress on the calf and chance of injury to the person performing the task. Whether you use a chute or just push the head through a feeder, a proper tail hold will decrease the chance of injury from kicking. In *Figure 3*, notice the hand is held on the base of the tail, pulling up and forward.

Once the calf is restrained, palpate the testicles to make sure both are present and normal (no scrotal hernias). Work the testicles downward into the scrotum. Place your thumb and forefinger around half of the scrotum at the center septum (*Note Figures 4 & 5*). Move the spermatic cord to the outside edge of the scrotum. When you place the Burdizzo® over the cord, be sure the Burdizzo® doesn't cross over the



Figure 3

center septum. Crushing the center septum may interrupt the blood supply to the scrotum and cause the bottom of the scrotum to slough off.

Position the Burdizzo® as high as you can while still remaining on the scrotum. On younger calves, try to be at least 1 inch above the top of the testicle and on older calves, 2 inches above the top. Close the jaws of the Burdizzo®. Don't slam the jaws together! You should hear a popping sound when the cord snaps.

While the jaws are still closed, take the testicle and pull firmly downward and push forward to make sure the cord is broken. Leave the jaws closed for at least 10 seconds. This reduces swelling and stress on the calf. Lower the Burdizzo® 1/2 inch closer to the testicle and repeat the same procedure (*Figure 6*). Double pinching gives you greater confidence and assurance that the calf is castrated.

You might encounter two problems with this method. Several days after Burdizzo® castration, you may observe calves that are stiff legged and have very swollen scrotums. This causes stress and reduces gains. Another problem with Burdizzo® castration, especially for inexperienced or unskilled operators, is that the spermatic cord may not be completely severed so calves remain bulls. Following the procedures described above will help eliminate both problems.



Figure 4

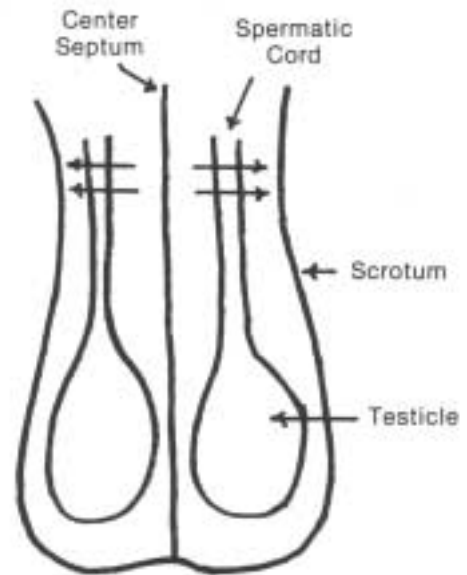


Figure 5



Figure 6

Implanting Dairy Steers

Feedlot operators have used growth promotant implants for years to improve rate of gain and feed efficiency. An average of 10-15% improvement in rate of gain and approximately 7% improvement in feed efficiency is realized by using implants. In addition, finished steers will have more muscle and less fat. A disadvantage may be lower marbling scores.

Optimal implant schedule is determined by diet, end slaughter weight and body type. Holstein steers that are on a high energy diet and are slaughtered at approximately 400 days should probably be implanted three times. The first implant would be at 200-300 lbs. with a lower potency implant listed in Table 1. A moderate potency implant is used at 500-600 lbs. A high potency implant is used 95 days prior to expected marketing weight. If dairy steers are on less than a 80% concentrate diet or are not fleshing well, a high potency implant should not be used, as these cattle will not finish well enough to grade.

Table 1. Relative Ranking of Implant Potency for Steers

Implant	Potency
Calf-oid	Lower
Implus-C	Lower
Ralgro	Lower
Synovex-C	Lower
Compudose	Moderate
Implus-S	Moderate
Steer-oid	Moderate
Synovex-S	Moderate
Finaplix-S + (Synovex or Implus or Ralgro)	Higher
Revalor-S	Higher

Good handling facilities make implanting quick and easy. Properly designed corrals with a head gate is a necessity. Larger steers may need an additional restraint such as a nose lead. An experienced person can implant an animal quickly with little animal stress or restraint.

The implantation site is under the skin in the middle 1/3 of the back of the ear (*Figure 1*). If part of the ear has been lost because of frostbite, the implant should be placed in the last third of the ear.



Figure 1

Implanting is a relatively simple procedure, which can be easily mastered following these steps:

1. Assemble the necessary equipment. Make sure the needle on the implant gun is clean and sharp. Have a few replacement needles on hand. Load the implants into the gun properly to prevent crushing of the pellets. Make any adjustments necessary so that the needle can be placed parallel to the ear as the needle is inserted under the skin. Have a disinfectant such as Nolvasan on hand at the right dilution rate.
2. Restrain the steer.
3. Sanitation is important to prevent a bacteria caused abscess from developing at the implant site. If the ear is clean and dry, the implant can be inserted. If the ear is wet it should be brushed with a disinfectant solution before implanting. If the ear is dirty, the dirt should be scraped off with a butter knife before the disinfectant is applied.
4. Pick up the implant gun with one hand and grasp the ear with the other. Place the point of the needle at the implant entrance site. This should be between the cartilage ridges and away from major blood vessels. The needle should be nearly parallel to the ear with the beveled side facing away from the ear (*Figure 2*). Lift the skin slightly and insert the needle under the skin. If you feel resistance, it may be because the needle is at too steep an angle and you are gouging the cartilage of the ear. It may help to rotate the needle so that the point is up towards the skin. If the needle is properly placed, it should slide relatively easily under the skin and you should be able to see the outline of the needle.



Figure 2

5. After the needle is fully inserted, withdraw the needle about 1/2 inch and begin depressing the plunger as you slowly withdraw the needle (*Figure 3*). Physically palpate the implant site to determine that the pellets are deposited in a straight line with the last pellet 1/2 inch from the opening that the needle made. The needle hole should be closed by pressing down on the hole. Rather than pellets, Compudose® is a silicone implant that is impregnated with a growth promotant. Because of its larger size, it can be a bit more difficult to get the needle properly positioned (*Figure 4*). But with a little experience, the successful implantation rate can be as high for Compudose® as the other implants.



Figure 3



Figure 4

6. The needle should be cleaned between animals with a diluted disinfectant. One ounce of chlorhexidine, the blue disinfectant, per gallon of water works well. Alcohol does not. The cleaned implanting needle can be dipped in an approved, non-irritating antibiotic between animals as added insurance. Keep replaced needles on hand in case the needle in use becomes dull or damaged. Dull needles can be resharpened on a whetstone. Make sure there are no burrs on the inside of the needles.
7. If steers are re-implanted later, it is a good idea to use the opposite ear. For example, implant all calves in the left ear, next time use the right ear. If Finaplix and another implant is used, put one implant in each ear.

Implanting is a relatively simple operation and can be mastered with a little experience. Errors that will decrease effectiveness include:

1. Depositing the implant into the cartilage will cause absorption to be too slow.
2. Dirty needles can cause abscesses or infections, which walls off the pellets and prevents absorption.
3. Severing a blood vessel in the ear may cause absorption of the implant to be too quick.
4. Failure to withdraw the needle as the pellets are deposited may cause them to be crushed. Absorption will be too quick and may cause the animal to act as a bull.

By getting steers on implants from 200 lbs. to market, you can realize savings of about \$40 per head or more. With practice, implanting is easy and takes only a few seconds. Follow manufacturer's recommendations for proper implantation and withdrawal times.

Dehorning Calves and Older Animals

Unfortunately, dehorning calves tends to be one of those jobs that gets put off until animals are much older and larger than need be. Dehorning animals at an older age is more dangerous, requires more labor, and greatly increases the level of pain and stress on the animal. In fact, many European countries have passed laws encouraging dehorning at a young age because it is more humane.

The preferred method of dehorning will depend somewhat upon the size of the calf. When dehorning young calves, it is only necessary to destroy or remove the keratin producing cells of the horn bud. Left intact, these cells produce the outer casing of the horn. Skull bone then grows to occupy the center of the horn. Caustic chemical, tube dehorner, or an electric dehorner can be used to prevent the horn from developing. Tube and electric dehorner can generally be used up to about four months of age. Barnes-type dehorner, dehorning clippers and saws are used to remove horns from more mature animals.

Caustic Stick or Paste

Caustic stick or paste is best used on calves less than 2 weeks old. First clip the hair around the base of the horn bud as close as possible. Next clip, scrape with a knife, or file off the end of the horn button or rough tissue over the horn bud. This allows the dehorning chemical to easily penetrate the tissues that produce the horn. Apply a ring of petroleum jelly or Vaseline around the base of the horn to prevent any excess chemical from running into the eye or onto unprotected skin. The Vaseline ring is not necessary if the dehorning chemical is lacquer based.

Apply the caustic stick or paste according to the directions on the label. Cover an area about the size of a nickel (*Figure 1*). If housed in group pens, restrain calves for a few hours to prevent them from rubbing the chemical off on each other, which may cause burns or scars. A scab should form in 6-8 hours. Excellent results have been obtained using this method of dehorning, but for some dairymen, results have been variable and disappointing.

Tube Dehorning

Using a dehorning tube on calves 1 to 4 weeks of age is one of the easiest and safest ways of dehorning. Restrain the calf in a head gate, or more simply lay it on its side on the ground. If inexperienced, you may have difficulty locating the horn bud on young calves. Clipping the hair over the bud will make it more easily visible. With additional experience, clipping the hair will not be necessary.



Figure 1

Tube dehorner come in a set of four different sizes (*Figure 2*). Select the correctly sized tube so that about 1/8 inch of skin around the bud will be removed. Place the tube over the bud (*Figure 3*). Twist with moderate pressure to cut through the skin. When you are through the skin to the bone, slant the dehorner at a 45 degree angle with the tube's handle toward the calf's muzzle. Applying pressure and twisting, scoop out the horn bud. Occasionally, the bud may still be attached by a strip of skin. Have a sharp knife handy to cut through this skin to complete the removal of the horn bud (*Figure 4*).

Sprinkling astringent powder on the wound will help minimize bleeding. If calves are dehorned prior to 4 weeks of age, there is usually very little bleeding and blood vessels may not have to be pulled. However, it is a good practice to check for exposed arteries and pull them to minimize blood loss. When using the large tube dehorner on older calves, the angle of cut is such that it can be difficult to locate and pull the artery. In that case, it is better to use a gouge or

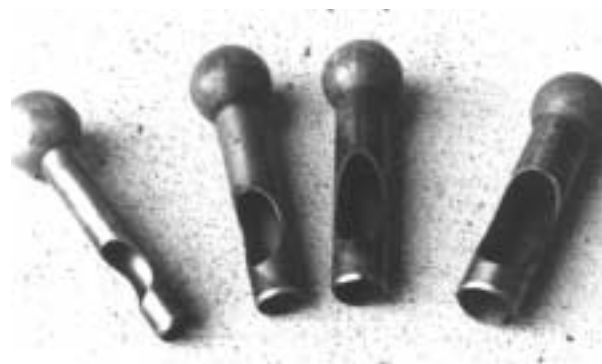


Figure 2



Figure 3



Figure 4

Barnes dehorner, which will expose the blood vessels for easier removal. Observe calves for a few hours and if excessive bleeding is noted, pull the blood vessel.

Apply a fly repellent dressing if dehorning is done during the fly season. Observe the calves for a few weeks and if a maggot infestation is noted, clean the wound and apply a fly repellent wound dressing.

Electric Dehorning

Electric dehorning of calves has gained popularity, particularly for use during the summer. Because it is bloodless, it

eliminates the worry of fly problems. Calves can be dehorned from 1 week to 4 months of age with this method.

There are a couple of disadvantages to electric dehorning. Smoke and odor during the procedure can be offensive. Incomplete dehorning can result in horn tissue that regenerates into scurs.

Here are a few suggestions to help eliminate some of the odor problems:

1. Use the electric dehorner in a well ventilated area.
2. Clip the hair around the horn buttons to help eliminate smoke from burning hair.
3. Dehorn calves at a young age, and use the electric iron appropriate for the size of horn buttons. *Figure 5* shows two common electric dehorner tips. The amount of smoke and odor from the dehorner with the small tip is negligible compared with using the larger tip and the wound is much smaller.



Figure 5

Proper dehorning will eliminate scur growth. If scur growth occurs, the heat from the dehorner did not penetrate deep enough to destroy the blood supply to the horn tissue. You can avoid this by using the appearance of the horn button as a guide for when the procedure is finished, rather than just using a certain number of seconds as the stopping point. Amount of time required will be influenced by temperature of the dehorner, amount of force applied to the dehorner and the fit of the dehorner tip over the horn button.

A copper ring around the horn is generally used as an indicator that the dehorning is complete. However, if the dehorner is applied without enough force, this copper ring can appear without enough heat penetration to destroy the underlying blood supply to the horn button and horn or scur growth will occur. Some people prefer to apply the dehorner just a bit longer until it penetrates through the skin to the skull. Note the white ring inside the copper ring in *Figure 6*. In this case you can be sure that there will not be horn regrowth.

Following are pointers for effective dehorning:

1. Restrain the calf so its head is immobile. The calf's head can be pulled through a feedbunk or stanchion and the head tied with halter or nose lead to the opposite side being dehorned. Another method of restraint is to lie the calf on its side and put your knee on the neck. Be careful of the feet and legs with this method. It may be advisable to have someone help hold the calf still.



Figure 6

2. Plug the electric dehorner in 10-15 minutes before dehorning, so the iron can preheat. The iron is hot enough as soon as it can char a piece of straw or paper.
3. With your free hand, grasp the ear of the calf on the side to be dehorned. Place the dehorner around the button with good pressure. Twist the dehorner clockwise and counter clockwise slowly to help distribute the heat evenly (Figure 7).



Figure 7

4. The dehorner has to be left on the button for approximately 5-20 seconds. The time will seem longer, because of the combined unpleasantness of burning hair and a struggling calf. If the horn button doesn't show a good copper ring, or separation between the hide and button, if that is desired, apply the dehorner again for another 5-10 seconds. Keep checking the button until a good copper ring surrounds the button. Another indicator that dehorning may be complete is when you hear a squeaking sound as the dehorner is twisted. It is the sound of the dehorner tip rubbing against the bone of the skull. Figure 8 shows where the dehorner penetrated through the hide to the calf's skull and the horn button removed. This will not generally cause a problem. The calf will not be unduly injured if the dehorner is inadvertently applied a little longer than necessary. The skull is fairly thick in young calves at this location and underneath is the sinus cavity space.



Figure 8

5. After dehorning, a scab will form in the area. Scab and horn bud will fall off in 4-6 weeks. Even though this is a bloodless form of dehorning, if the calf disturbs the scab, a small amount of bleeding may occur which could attract flies in the summer months. While this is seldom a problem, calves should be observed and if a maggot infestation is noted, the wound should be cleaned and a fly repellent wound dressing applied.
6. Always use an iron free of charred material. Use a wire brush or scraper to clean the dehorner top as you work. Charred material acts as an insulator between the hot tip and the horn button.
7. The younger that the calf is when electrically dehorned, the less stress it is on the calf and the person performing the operation. A dehorner with a small tip should be used on the younger calves. The dehorner with the larger tip should only be used on older calves whose horn buttons are already too large for the smaller dehorner.

- Use a heavier extension cord than the 18 gauge cords most commonly sold to assure ample voltage at the dehorner. If the cord is less than 50 feet long, a 16 gauge cord is recommended. If longer, go with 14 gauge. If too light or excessively long cords are used, resulting voltage drop will cause the dehorner's heating elements to heat to a lower temperature and may cause them to fail prematurely.

With more calves being raised in calf hutches without a convenient electricity source nearby, battery operated, butane fueled or propane fueled dehorner are becoming increasingly popular (*Figure 9*). They are more expensive to purchase, but are very convenient and work well.



Figure 9

Barnes-type Dehorner, Clippers, Saws

Barnes-type dehorner, clippers, and saws may be used on cattle varying in age from 2 months to maturity. Use caution when dehorning larger cattle. The exposed sinus cavity and blood after dehorning attract flies during the fly season. During cold weather, the exposed sinuses can lead to respiratory problems. Therefore, it is generally best not to dehorn large animals during summer or winter months.

Barnes-type dehorner can be used on calves from 6 weeks to 12 months of age.

- Assemble equipment needed: Barnes dehorner, disinfectant to sanitize dehorner between calves, forceps or pliers, roll of cotton and styptic powder (blood clotting powder).
- Restrain the animal properly. A chute with a head table is preferred. Haltering the calf and securing its head through a fenceline feeder is also an adequate method of restraint.
- Place the Barnes dehorner over the horn or horn button. The knives of the dehorner should be placed so 1/4 inch of skin is taken all the way around the horn button. Proper placement is critical in calves with larger horns because of the oblong shape of the horn. *Figure 10* shows placement that will facilitate proper dehorning.

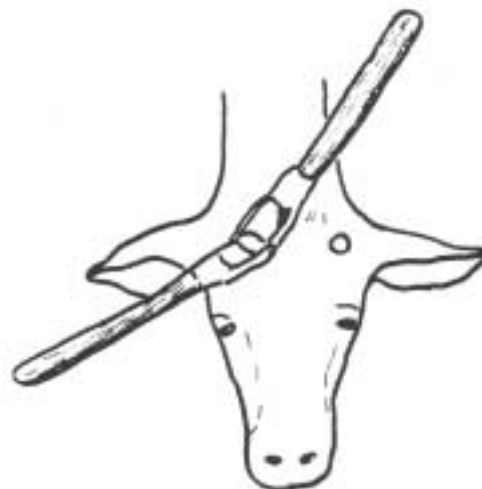


Figure 10

- Spread the handles apart quickly with inward and downward pressure, twist, and lift up. A complete ring of hair should be removed with the horn (*Figure 11*). If all the horny tissue is not removed, a second or third cut may be necessary to prevent scurs. Proper positioning of the dehorner the first time will make this unnecessary.



Figure 11

- Stop excessive bleeding by cauterizing or pulling the exposed arteries. The major arteries will be located at the bottom of the wound between the base of the ear and the eye. In older animals, an artery may also be fairly well developed opposite the major ones at the top of the wound. Forceps, hemostats, needle-nosed or regular pliers can be used to pull arteries. Actually most people are more efficient at pulling arteries using an ordinary set of slip joint pliers found on most farms because they have a wider gripping surface. The broken artery will retract into soft tissue and bleeding should stop. Pulling arteries will not cause internal bleeding (*Figure 12*).



Figure 12

The arteries can also be cauterized using a hot iron. A soldering tip directed at the bleeding source works well. Avoid using a large electric dehorner for this purpose, as it will result in more destruction of tissue than necessary and may not penetrate deep enough to stop the bleeding.

A blood clotting powder can be applied if the sinus cavity is not exposed. If it is, as in *Figure 13*, cover the sinus with a thin layer of cotton after the main arteries have been pulled. This will help facilitate clotting and prevent entry of foreign matter into the sinus. The brain sinus should swell shut in 3-4 days. Calves should be observed periodically for 24 hours to spot excessive bleeders. Calves that continue to bleed need to be restrained and the artery cauterized or pulled.



Figure 13

As calves become older, the amount of bleeding, stress on the calf, and labor requirements become greater. Cattle more than 1 year of age may be too large for the Barnes dehorner. They will have to be dehorned with a dehorning clipper or a saw. Saws need to be used on mature animals, rather than clippers, to prevent the possibility of cracking the bone that forms the horn core. You want at least 1/4 inch of skin or ring of hair all the way around the horn. Don't start at too deep of an angle when using a hand saw. Pull the arteries.

Anesthetic During Dehorning

With increased concern for animal welfare, there is increased interest in reducing pain to the calf. In fact, in some countries calves must be given an anesthetic prior to being dehorned. The nerve for the horn area extends from near the eye and runs under a small ledge of the skull to the horn. Using a 1/2 to 1 inch needle, the anesthetic is injected under this ridge (*Figure 14*). Anesthetic and dosage levels can be procured from your veterinarian. The anesthetic works almost immediately if deposited on the nerve. However, you should wait at least 5 minutes before dehorning. This is the time required for the anesthetic to diffuse through the tissue to the nerve if the injection was off by just a little. A vein and artery run along side the nerve and if the anesthetic is inadvertently injected directly into the blood stream it can cause the animal to temporarily go down. This is usually not a problem, but it is sometimes recommended to withdraw the plunger of the syringe slightly before depositing the anesthetic. If blood flows into the syringe the needle is in a blood vessel. Reposition the needle before making the deposit.



Figure 14

An alternate protocol was recently reported by researchers to minimize pain related behaviors in 4-8 week old calves dehorned with an electric dehorner. Calves received a non-steroidal, anti-inflammatory drug (ketoprofen) before dehorning as well as 2 and 7 hours afterward. Calves received a sedative (xylazine) and local anesthetic (lidocaine) a few minutes before dehorning. Consult your veterinarian if you wish to adapt these procedures for your farm.