*Drugs used in Dehorning procedure*

* Firstly a sedative/chemical restraint (Ketamine stun) was given at the dosage of :

**Xylazine**

(0.025mg/kgx150kg)/20mg/ml= 0.2mls

**Ketamine**

{(0.05mg/kgx150kg)/100}x10mg/ml=0.75mls

These were given IM in the gluteal muscles using standard technique.

* The reversal drugs Tolazanine, Atropine and Epinephrine was also calculated:

**Tolazanine**

((0.025x4mg/kg)x150kg)/100mg/ml=0.15mls

**Atropine**

(0.04mg/kgx150kg)/0.54mg/ml=11mls

**Epinepherine**

(0.02mg/kgx150kg)/1mg/ml=3mls

If these were used IV administration would be done.

* The Antibiotic was then given at:

**Penicillin/Streptomycin**

(10000IUx150kgs)/200000IU=7.5mls

This is also and IM administered drug

* Followed by an NSAID:

**Flunixin**

(1.1mg/kg/150kg)/50mg/ml=3.3mls

This drug is given via IV using the Jugular vein. The vein is held off in the jugular groove and given in the caudal two thirds.

* And finally the anaesthetic

**Lidocaine**

Toxic dose

(10mg/kgx150kg)/20mg/ml=75mls

Half toxic dose

75/2=37.5mls

Dosage

(2mg/kgx150kg)/20mg/ml=15 mls

*Technique:*

1. Restrain the calf with a halter tied to a ring, a post, or the head gate of the chute.
2. Preferably, sedate the calf with an injection of an appropriate dose of a sedative and a non-steroidal anti-inflammatory drug as per label directions.
3. Locate the injection site for the local anaesthetic by putting your thumb on the skin just beside the outside corner of the eye. You will feel a soft depression at this site. Now, move your thumb backwards toward the horn. You will feel a small groove that runs in the bone of the skull. The nerve runs along and under this groove. The injection site is in the upper third (closer to the horn bud) between the corner of the eye and the base of the horn.
4. Disinfect the site with an alcohol swab.
5. Use a 20- or 18-gauge, 1 to 1.5 inch needle.
6. Use a 6 or 10 cc syringe.
7. Use from 3-10 cc of 2 per cent lidocaine with epinephrine for each horn. The volume depends on size of calf.
8. While holding the head steady and with the needle on the syringe, push the needle through the skin at the injection site. The needle should penetrate perpendicular to the skull at the site. Once you are through the skin, pull back on the plunger to be sure the needle is not in a blood vessel; then inject about 1.5 cc of lidocaine. Push the needle in about 0.25 inches and inject another 1.5 cc. Push it in about another 0.25 inches and inject the remaining lidocaine. Then withdraw the needle. If you hit the bone with the tip of the needle, withdraw it slightly and give the last of the lidocaine.
9. Repeat on the other side of the head. The lidocaine is similar to the product used by dentists to freeze your tooth.
10. You may need to wait several minutes for it to take effect. The upper eyelid usually droops with correct injection techniques. Failure may occur if the injection went too deep at the site.

The nerve that is blocked is the *Cornual branch of the Lacrimal nerve* located running along the frontal crest. In our procedure only 8mls per horn was administered under the over-seeing doctor's advice. However one block was repeated as the animal appeared to be in pain at the beginning of the procedure. Therefore the total given was 24mls.

For goats, however, two nerve are requires to be blocked, the Cornual branch of the Lacrimal nerve and the Cornual branch of the Infratrochlear nerve. The second is located midway between the base of the horn and the caudal aspect of the eye. A Tetanus Antitoxin (Dose:300-500IU) is also administered pre- and post- surgery as goats are prone to such infections.