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**Q & A**  
**VETROSON® V-10 BI-POLAR**  
**ELECTROSURGICAL UNIT**

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**QUESTIONS AND ANSWERS**

**1. What is Electrosurgery? Is it different from Radiosurgery?**

Electrosurgery is the use of radio frequency (R.F.) energy to cut and/or coagulate tissue. The American Dental Association defines Electrosurgery as “the passage of higher (radio) frequency current through the tissues to achieve surgical effect”. Therefore the terms Electrosurgery and Radiosurgery are used interchangeably.

**2. What is radio frequency?**

Radio frequency is high frequency electrical current. Radio frequency as used in the VETROSON® V-10 Bi-Polar Electrosurgical Unit is radiated electro-magnetic energy. This energy is concentrated at the tip of the electrode. When contact is made with tissue, the cells in immediate contact with the electrode overheat and vaporize. Since the electrode only serves as a conductor of the R.F. current, it does not itself get hot. The heat is created internally in the tissue by the R.F. energy.

**3. Explain the basic types of current:**

There are four basic types of current

- a. Normal or Fully rectified Current (full wave) which cuts smoothly with measured amount of coagulation, so that it is possible to get simultaneous cutting with hemostasis but without necrotic destruction.
- b. Fine or Filtered current (continuous wave) which cuts very smoothly but provides almost no hemostasis.
- c. Partially rectified (1/2 wave) or coagulation Current which is less destructive than spark, cuts rather coarsely with heavy coagulation approaching necrosis.
- d. Spark or Fulguration Current which is very destructive and useful only for tissue destruction and to stop heavy bleeding.

Please refer to pages 3 & 4 of the ELECTROSURGERY HANDBOOK, Second Edition for diagrams and complete explanation of currents.

**4. Explain mono-polar vs. bi-polar electrode.**

Monopolar has one active tip and a separate ground, usually via a ground plate; bi-polar has two active tips (i.e. forceps) working at the same time so that the energy passes from one to the other rather than radiating around one tip. The two plugs on the bi-polar cord will plug into either the Surgery or Coagulation jacks and Ground jack.

**5. Explain mono-terminal vs. bi-terminal use of the unit.**

Mono-terminal has one active electrode and uses the environment (operator) as a return path for R.F. energy. Bi-terminal has one active electrode and a passive one (ground plate) that provided direct R.F. return to the unit.

**6. If I purchase a VETROSON® V-10 unit, in what areas of surgery would I most likely use the unit?**

No one answer applies here. In essence, the electrosurgical unit may replace cold steel in virtually any phase of veterinary surgery. More specifically, one would probably find the unit most useful in procedures where there is a considerable amount of bleeding or in delicate surgery. Procedures such as removal of tumors, tonsillectomies, ear cropping, biopsies, removal of warts, entropion, ectropion, epilation and certain periodontal procedures come to mind initially.

**7. How do I determine the proper electrode and power setting on the VETROSON® V-10 for any surgical procedure?**

The ELECTROSURGERY HANDBOOK, which is provided with each unit, lists on pages 16 & 17 the commonly employed surgical procedures, grouped under the following headings: **Needles, Loops, Balls, and Special Electrodes**, denoting the types of electrodes most often used. Also in this section approximate power settings are given for each procedure. The veterinary surgeon must, of course, determine the precise electrode and power setting in each procedure.

**8. How can one determine if the power is adjusted correctly for a procedure?**

There will be drag (with coagulum adhering to the electrode) if power is set too low. If coagulum adheres to the electrode it should be removed using a moist sponge or scalpel as coagulum on the electrode will increase resistance and decrease efficiency. Power set much too high will result in heavy sparking and excessive necrosis of tissue due to cellular destruction over too wide a path.

**9. Explain the power setting.**

The power output knob is used to select the correct power for the case on hand. A red indicator light will pinpoint the exact power location between 1 and 10, i.e. between 0 and 140 watts. This is not a straight line correlation. In other words each power location from one does not equals 14 watts.

**10. How important are “watts” in the selection of an electrosurgical unit?**

“Watts” are units of power, and power is what cuts. Inadequate power will limit the usefulness of a unit, and will result in poor cutting and poor healing.

**11. How do you define watts?**

Watts (not frequency) is a measure of power. On page 1008 of Webster’s Seventh New Collegiate Dictionary watts is defined as follows: *“Unit of power equal to the work done at the rate of one absolute joule per second or the rate of work represented by a current of one ampere under pressure of one volt and taken as the standard in the U.S.”*

To repeat, the VETROSON® V-10 Electrosurgery unit delivers between 0-140 watts. If too few watts were dialed, the electrode will drag through the tissue; if too many watts are dialed, too much sparking will occur which would result in much excessive tissue coagulation. This could result in slowing down first intention healing.

**12. What is the difference between frequency and watts? Which is power?**

We have taken the description of frequency from Webster’s Seventh New Collegiate Dictionary, page 334

*“The number of repetitions of a periodic process in a unit of time: as a) the number of complete alternations per second of an alternating current  
b) the number of sound waves per second produced by a sounding body  
c) the number of complete oscillations per second of an electromagnetic wave.”*

Frequency zones for electrosurgical units have been set by the American National Standard/American Dental Association – Specification #44

0-1.0 MHz for “human” electrosurgical units

1.0 MHz to 4 MHz for veterinary dental and electrosurgical units

Frequency has nothing to do with power. Watts is a measure of power.

Frequency in “human” machines must be between 0-1.0MHz. In this frequency zone the hair must be shaved and a gel must be used between the ground plate and the person.

The frequency of all components of the machine are tied into the machines frequency. Veterinary electrosurgical machines must be set between 1 MHz to 4 MHz- it makes no difference where the frequency of a veterinary machine has been set in this zone. This may be compared to radio station in your car. The frequency of stations in any city are set by law and have no relationship to power (i.e. a 97.6 or a 107.4 radio setting with stations in the same city are equally powerful).

In the veterinary and dental frequency zone (1.0-4 MHz) hair and feathers do not have to be removed and conductive gels are not necessary.

**13. Why is the V-10 preferred to other electro/radiosurgical units?**

- It has two handpieces – surgery and coagulation – both of which are activated by depressing the foot pedal. Many competitive machines only have one handpiece.
- It is a solid state unit (as opposed to those with tubes) offering the benefit of solid state circuitry.
- It is less expensive than competitive units.
- It has a five (5) year warranty and two week trial period.

The V-10 compares very favorably against any other electro/radiosurgical machine sold to veterinarians. We'd be happy to discuss the specifics.

**14. Where and how should the ground plate be placed?**

The V-10 coated ground should be placed as close to the site of surgery as possible, thus decreasing the resistance and allowing the lowest power setting. The coated ground plate does not require skin contact, eliminating the need for jells or adhesives.

**15. What degree of simultaneous coagulation may be expected while using the surgery handpiece using the fully rectified current?**

Usually, normal tissue will be cut with minimal bleeding. If the tissue is very vascular (hemorrhagic) there may be sufficient bleeding to require the use of the coagulation handpiece.

**What is the procedure for sealing larger capillaries or small vessels that aren't sealed during the cutting procedure?**

Insert a ball into the white (coagulation) handpiece and apply it to the capillary opening while depressing the foot pedal for 1-2 seconds. For larger vessels a hemostat may be used clamping the vessel to be sealed then touching an electrode to the beaks of the hemostat and activating the coagulation (i.e. partially rectified) current for a second or two. Bi-polar forceps may also be used for more delicate coagulation in birds and smaller species. For arterial bleeders or larger venous bleeders ligatures should be applied. Bleeders that are normally ligated when employing cold steel should also be ligated when using electro/radiosurgery.

**16. Is there any way one can get shocked while using the VETROSON® V-10 Bi-Polar Electro/Radiosurgical Unit?**

There is no way you can get electrical shock. It is possible to get a high frequency burn if you make light contact with the patient or metal instrument with bare skin while current is being applied. (R.F. energy goes to the point of least resistance).

**17. If tissue sloughing occurs after electrosurgery, what's the cause?**

Sloughing usually indicates improper technique, causing tissue necrosis. Either the power setting was too high (i.e. too many watts), or the electrode moved too slowly, or both.

**18. When cutting, muscle spasms are sometimes noted. Is this normal?**

Yes. Muscle contraction (facilitation) frequently occurs during electrosurgery.

**19. How does electrosurgical healing compare with the use of steel cutting instruments?**

It is roughly comparable. As in any surgery, remove the sutures only when the suture line is ready. Research indicates that this would probably be in the vicinity of ten days. If the scar has widened or has a scab, don't pull the sutures. (See Dec. 1, 1971 J.A.V.M.A. Vol. 159 #1, Pages" 1447-52 "Healing of Sharp Incisions and Electroincisions in Dogs" C.D. Knecht, VMA Et. Al.)

**20. In what procedures should I use Bi-Polar Forceps?**

In general bi-polar forceps are employed in coagulating extremely small blood vessels in extremely small animals. When discussing bi-polar applications veterinarians generally mention its use in birds as far as species is concerned; in eye and neurosurgery when speaking of anatomy. A basic course in electro/radiosurgery is recommended for the finer applications using the bi-polar technique.

**21. Can the handpiece, cords and electrodes be sterilized?**

The VETROSON® handpieces, cords, bi-polar forceps and electrodes may be autoclaved, but temperatures should not exceed 250 degrees F; 20 minutes is adequate. Sterilization at higher temperatures may cause cracking of the handpiece. To insure sterility of the handpieces during surgery we suggest autoclaving two large syringe barrels. Clip them to the surgical drape and use them to hold the sterile handpieces while not being used. Handpieces and cords should be checked periodically for cracks and frayed insulation.

**22. How does radio surgery fit in?**

Radio surgery is a trade name coined for a particular unit. Electrosurgery is defined as "cutting with radio frequency."

**23. What Precautions and Safety Instructions should I follow?**

Electrosurgery units **SHOULD NOT BE USED** near cardiac pacemakers

a) Good anesthesia is required before electrosurgery is attempted

b) Regarding anesthesia gases:

- Inhalation anesthesia gases such as halothane, isoflurane and nitrous oxide may be used safely with electrosurgery. They are not combustible.
- Ether and ethyl alcohol are combustible and should not be used while performing electrosurgical procedures
- Oxygen and nitrous oxide are acceptable as they are not combustible agents, but would support a situation if combustion occurs.

- c) Be sure handpiece and attachments are dry before using.
- d) Select proper operating mode and power for the procedure at hand DEPRESSING FOOT SWITCH to activate handpiece.
- e) Avoid prolonged tissue contact. Stop cutting at the first sign of tissue blanching. Permit tissue to cool at least 10 seconds between cuts.
- f) Remove tissue that may accumulate on electrodes with alcohol-saturated gauze pads.
- g) If RF Pilot Lamp remains on when foot switch is not depressed, this indicates a malfunction. **DO NO OPERATE UNIT.**
- h) **DO NOT CONTACT METAL, TEETH OR BONE WITH ACTIVE ELECTRODE.**
- i) Handpiece cords should not be coiled or twisted around metal objects.
- j) The unit must be properly grounded at the outlet. **DO NOT** use with underground plugs or outlets.
- k) **TURN THE POWER UNIT OFF BEFORE TOUCHING OR CHANGING ELECTRODES.**