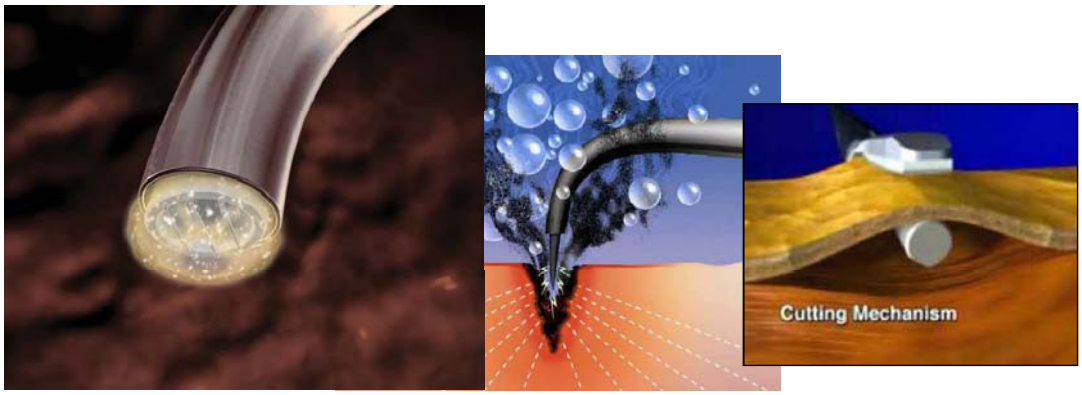
ArthroCare ENT
Coblation Technology

P/N TR-ENT-DOC03

Coblation® | Rapid Rhino® | Sinu-Foam™ | Gel-Knit™

Electrosurgery (RF) evolution

- Monopolar
- Bi-Polar



- Coblation (bi-polar)

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Radio-Frequency (RF)

- Not all radio-frequency is the same.
- **ArthroCare uses RF energy to create *plasma* and *the plasma energy ablates the tissue.***
- Other generators use RF energy directly on tissue (high temperature causes moisture within cell membranes to *explode* the cells).

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What is Coblation?

- Coblation is ArthroCare's Core Technology
- Coblation = Controlled Ablation
- Ablation is a term used to mean many things
- For Coblation technology is means tissue removal

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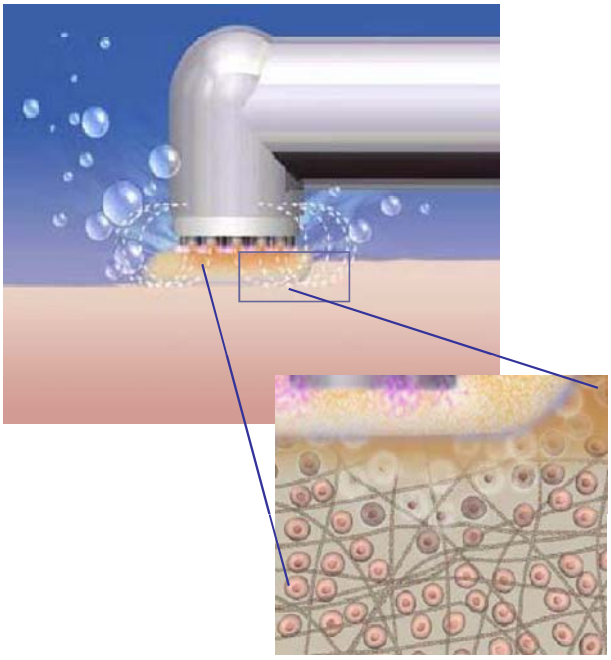
Coblation Explained

- Coblation involves applying high voltages to the conductive irrigant (Na+, sodium) that is located between the electrode and tissue.

- The high voltage converts the sodium ions into an ionized vapor layer (in physics this is referred to as **plasma**)



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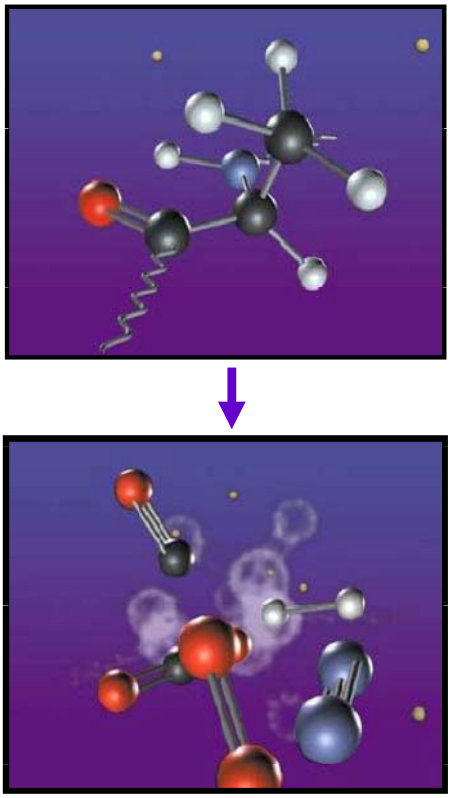
Coblation Explained (cont)

- The ionized vapor layer contains excited particles which accelerate towards the tissue and break the tissue's molecular bonds, resulting in tissue removal.
- The tissue is not exploded into smaller pieces, but is molecularly broken down into simpler hydrocarbons and oxides



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Coblation versus Electrocautery

	Coblation-Based Devices	Conventional Electrosurgical Devices	Conventional Laser Devices
Temperatures	40° C to 70° C	>400° C	>400° C
Thermal penetration	Minimal	Deep	Moderate to Deep
Effects on target tissue	Gentle removal Dissolution	Rapid heating Charring Burning Cutting	Rapid heating and Vaporization
Effects on surrounding tissue	Minimal collateral effect	Inadvertent charring or burning	Inadvertent burning and bleeding

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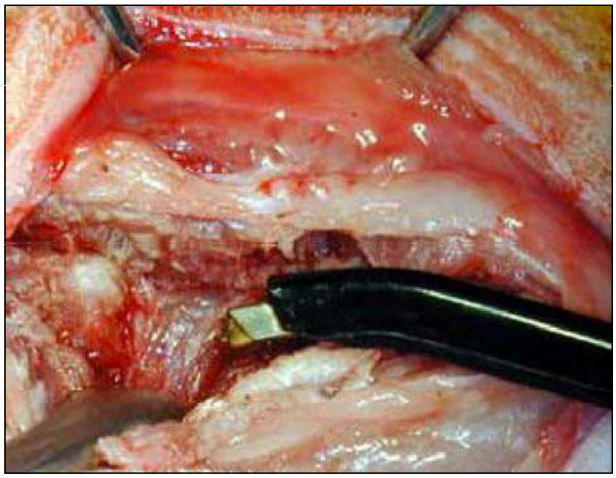
Electrocautery vs. Coblation

Electrocautery



Coblation

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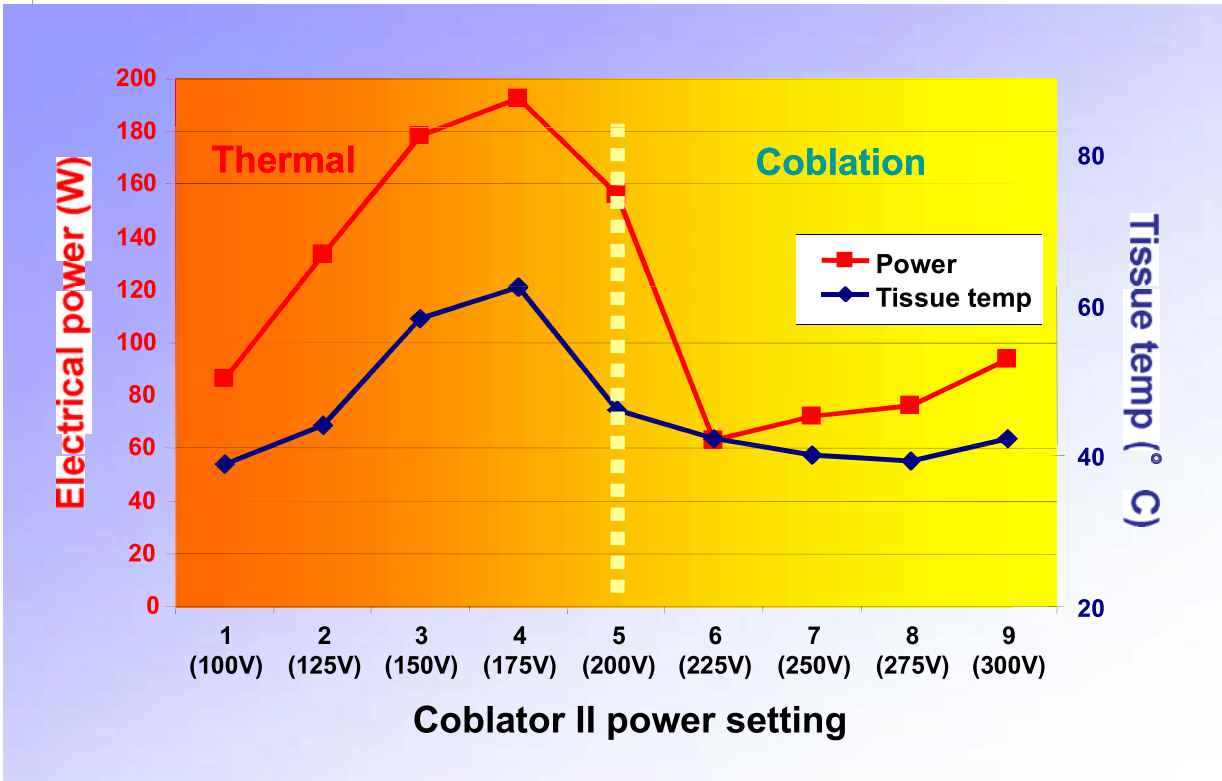
Coblation Tissue Temperature and Coblator II Settings



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Advantages of Coblation

- Very limited depth of thermal penetration
- Minimal collateral tissue damage
- Localized effect
- Controlled, volumetric tissue removal
- Surface tissue temperatures 40-70 degrees C
- By-products/gases that form are different from those of conventional devices

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Coblation Summary

- Energy from the electrodes is used to ionize the sodium particles creating a plasma
- Little heat is generated in this process and the depth of penetration is minimum
    - With Coblation, tissue temperatures are 40-70 degrees C
    - Traditional electrosurgery generates temperatures of 450-600 degrees C
- Orange glow is created from the ionization of the sodium particles in the conductive irrigant

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Resistive Heating

Coagulation and Tissue Shrinkage

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Arthrocare has two modes of bipolar tissue effect

- Coblation
  - Controlled ablation (removal) of tissue
- Resistive Heating
  - Coagulation-thermal treatment or lesion formation
  - Tissue dehydration
  - Tissue shrinkage

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Resistive Heating Defined

- Low intensity current (not enough current to create a plasma layer) is applied through tissue
  - Ablation does not occur
  - Tissue absorbs part of this energy, which is then dissipated into heat
  - Current passes through tissue, ions and molecules of the tissue absorb the energy and causes the tissue particles to vibrate
  - Vibration causes the tissue temperature to increase and the collagen fibers to shrink
  - The amount of energy absorbed by the tissue depends on the impedance or resistance of the specific tissue to the passage of the current
- The general term used to describe this effect is “resistive heating”

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Coagulation and Tissue Shrinkage

- Low voltages are applied to achieve coagulation (bleeding during tonsil removal) and shrinkage (soft palate)
- Therefore, no plasma layer and no molecular dissociation
- Collagen shrinkage = 60-70 degrees celsius

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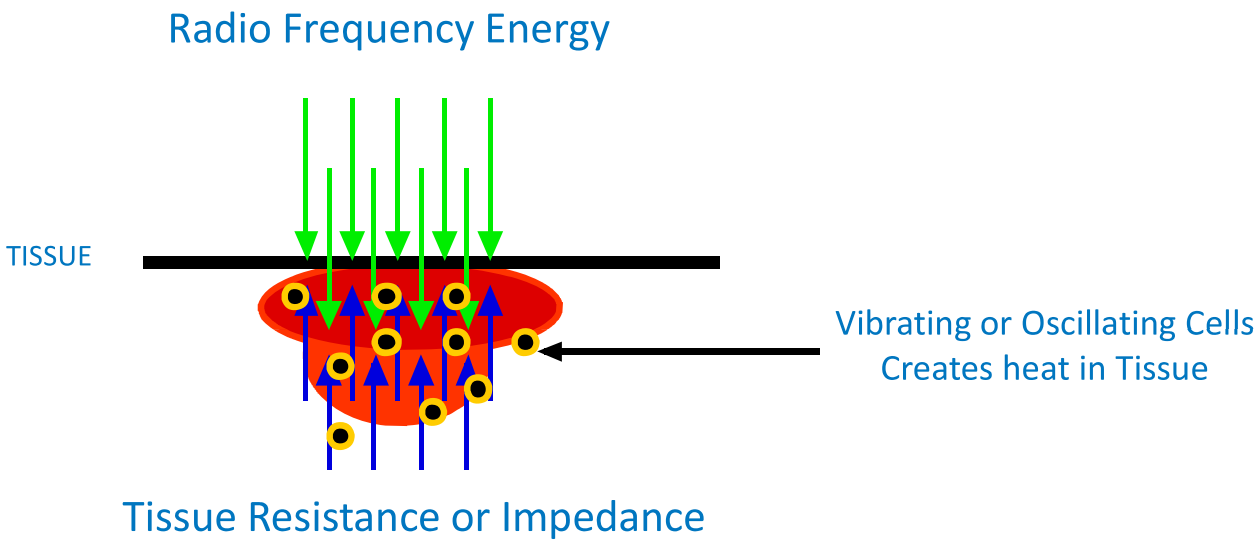
Mechanism of Resistive Heating



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Coblation vs. Resistive Heating

Coblation

- Tissue Removed
- Low depth of penetration
- Plasma Layer formed
- Higher voltages use
- Molecular Dissociation

Resistive Heating

- Tissue not removed
- Higher depth of penetration
- No plasma layer formed
- Lower voltages used
- Cellular Vibration/Oscillation

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