

Medi Quest BRS Hospital

A monthly News letter from BRS Hospital

COBLATION IN ENT SURGERY

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What is Coblation ?

• Coblation is CONTROLLED ABLATION

• It is the process of reducing the size of something.

• The patented technology combines radiofrequency energy and saline to create a highly energized plasma field called “Glow discharge Plasma”

• This plasma field remains at a relatively low temperature compared to other technologies, while precisely removing targeted tissue .

• It is a proven technology in ENT since introduction of tonsillectomy wand in 1998 .

• The plasma ablates the tissue by a chemical process , not a thermal process, wherein the energized particles breakdown the tissue molecules

• The 100-200 μ m plasma field allows for precise volumetric removal of soft tissue with minimal thermal damage to untargeted tissue.



What is Plasma?

• Plasma is a state of matter similar to gas , except all of the particles carry an electric charge . Plasma can consist of ions , electrons, protons . Eg. Lightning , aurora, the Sun

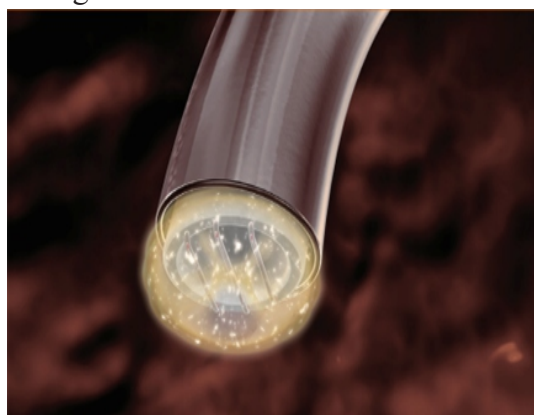


5 Stages of Plasma generation

• First stage – Vapor gas piston formation : This is characterized by the transition from bubble to film boiling. This decreases heat emission and causes increase in surface temperature .

• Second stage – Stage of vapor film pulsation : Tissue ablation occurs during this stage

• Third stage – Reduction of amplitude of current across the electrodes.

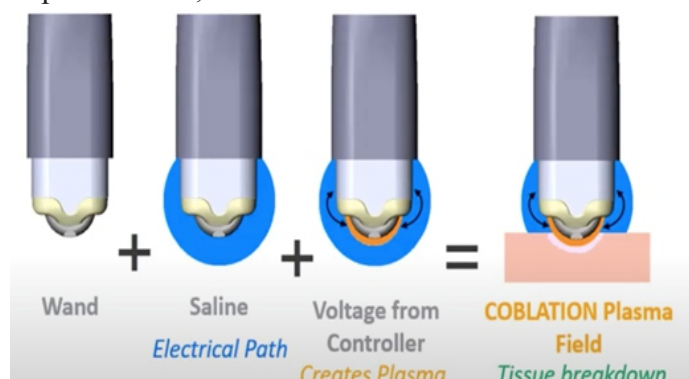




**GENERAL MEDICINE , GENERAL SURGERY,
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OB AND GYN
UROLOGY , VASCULAR AND NEUROLOGY**

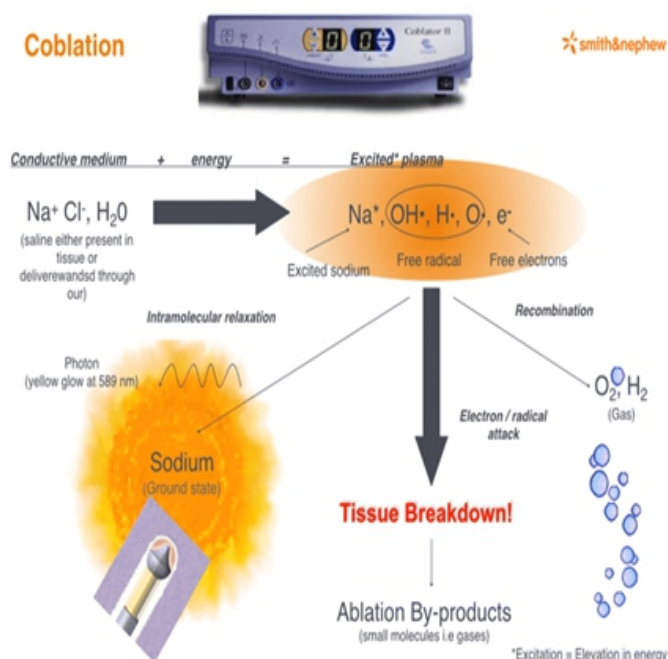


- Fourth stage : Dissipation of electron energy at the metal electrode surface.
- Fifth stage : Stage of Thermal Dissipation of energy: This stage is essentially due to recombination of plasma ions , active atoms and molecules.



Effect of plasma on tissue

- Plasma generates H^+ and OH^- ions. It is these ions that make plasma destructive. OH^- radical causes protein degradation.
- When coblation is being used to perform surgery the interface between plasma and dissected tissue, acts as a gate for charged particles.
- Coblation causes low temperature molecular disintegration - volumetric removal of tissue
- Minimal damage to adjacent tissue



COBLATION-TISSUE EFFECT

- The plasma formed according to the Coblation process breaks down the molecular bonds in the tissue.
- Tissue ablated at relatively low temperature , 40°C- 70°C.

History:

- First discovered by Hira V. Thapliyal and Philip E. Eggers.
- This was a fortuitous discovery in their quest for unblocking coronary arteries using electrosurgical energy.
- In order to market this emerging technology , they started an upstart company ArthroCare .

Components of Coblation system

1. RF generator
2. Foot pedal control
3. Irrigation system
4. Wand



- The Console- RF Generator
- The generator generates RF signals. It is controlled by microprocessor.
- The generator is capable of adjusting the settings as per type of wand inserted.
- It automatically senses the type of wand and adjusts setting accordingly.

Two settings are set ie. Coblation and Cauterization.

1. Modes of operation- 4 in one - Dissection, Suction, Ablation and Coagulation
2. Operating Frequency- 100 kHz
3. Power consumption – 110/240v, 50/60 KHz



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The Wand

Coblation wand has two electrodes

1. Base electrode

2. Active electrode

- These electrodes are separated by ceramic. Saline flows between these two electrodes .

- Current generated flows between these two electrodes via the saline medium.

- Different types of wands available to perform coblation procedure optimally

- Tonsil and adenoid wand - commonly used for all oropharyngeal surgeries. Can be bent slightly to reach the adenoid.

- Laryngeal wand -two types.

- Normal laryngeal wand which is used for ablating laryngeal mass lesions.

- Mini laryngeal wand is used to remove small polyps from vocal folds. The main advantage of mini laryngeal wand is its ability to reach up to the subglottic area.

- Nasal wand and nasal tunneling wands are commonly used for turbinate reduction.

- Separate tunneling wands are available for tongue base reduction.

- Pedal

- Two color coded pedals.

- Yellow one is for coblation and the blue one is for RF cautery.

- This device also emits different sounds when these pedals are pressed indicating to the surgeon which mode is getting activated.

Efficiency of ablation can be improved by:

1. Intermittent application of ablation mode

2. Copious irrigation of normal saline

3. By using cold saline plasma generated becomes more efficient in ablating tissue. Cold saline can be prepared by placing the saline pack in a refrigerator over night.

Coblation is a smokeless procedure.

If smoke is generated during the procedure -indicates the presence of ablated tissue in the wand between the electrodes.

Applications of Coblation in ENT

1. Tonsillectomy

2. Adenoidectomy

3. UPPP- Uvulopalatopharyngoplasty

4. Tongue base reduction

5. Turbinate reduction

6. Kashima procedure for bilateral abductor paralysis.

7. Papilloma vocal cords.



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