

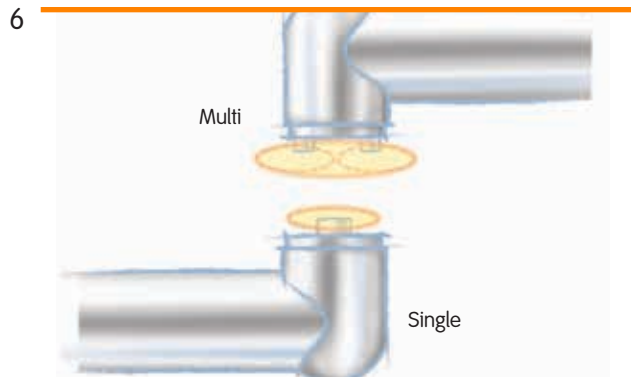
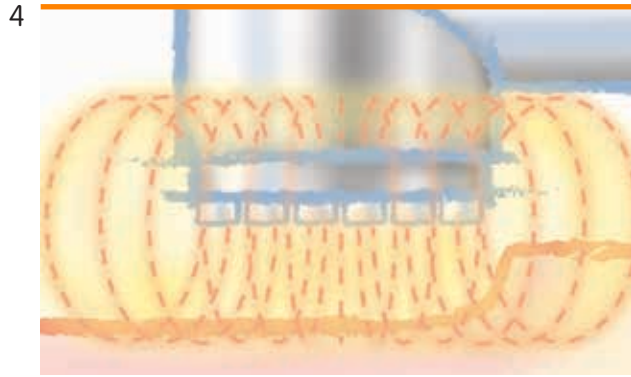
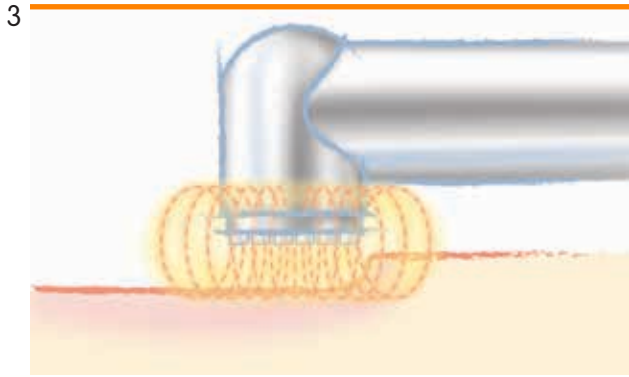
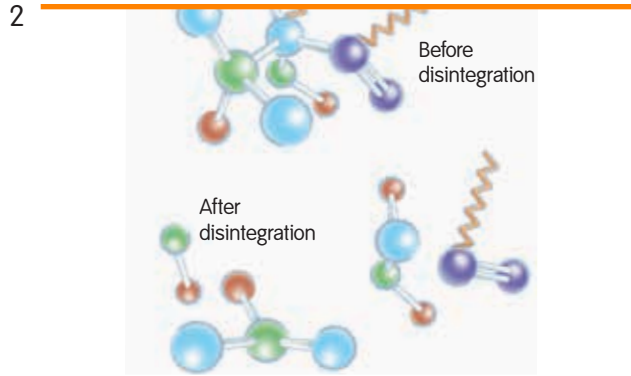
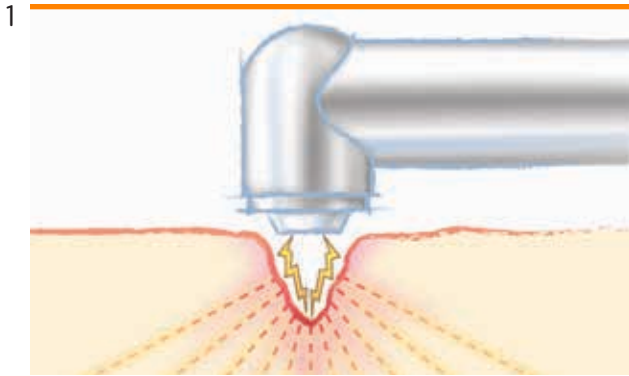
# Multi-electrode devices

Establish, maintain, and maximize a plasma layer



# Multi-electrode technology

- Establishes a plasma layer quickly and efficiently
- Maintains a stable and aggressive plasma layer
- Maximizes the size of the plasma layer



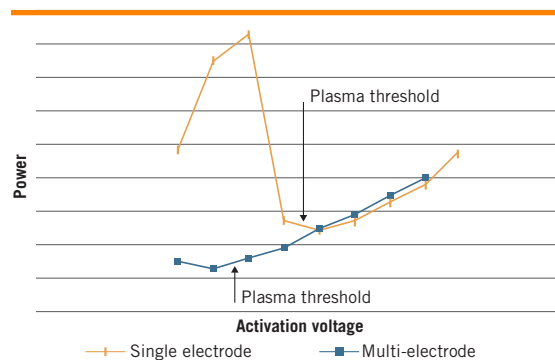
- 1 COBLATION® technology, controlled ablation, offers an alternative from other radiofrequency electrosurgical techniques that cut or remove tissue by delivering large amounts of energy or heat in order to desiccate and pyrolyze tissue to be removed.
- 2 COBLATION devices establish a plasma layer of reactive particles that disrupt organic molecular bonds in target tissue, and rapidly disintegrate the tissue, resulting in volumetric removal of tissue with minimal damage to collateral tissue.<sup>1</sup>
- 3 The COBLATION plasma layer is created by current flowing between closely-spaced, bipolar electrodes. This current forms a high density energy field that rapidly vaporizes a thin layer of a conductive liquid (saline or Ringer's lactate solution) at the surface of the electrode into a glow discharge plasma of very reactive and energized ions and electrons.

Multi-electrode technology provides the three key requirements for the clinically-effective COBLATION plasma layer:

- a. Establishes a plasma layer quickly and efficiently
- b. Maintains a stable and aggressive plasma layer
- c. Maximizes the size of the plasma layer

- 4 To establish the ablative plasma layer quickly, high current density is required. The bipolar configuration of the COBLATION device, where the electric field is concentrated between the active electrode at the Wand tip and the return electrode at the base of the tip, provides the energy density to form the reactive ion ablation field.

- 5 The current density necessary to establish a plasma layer is formed first at an electrode edge where there is a current field enhancement. With equal surface areas, multiple electrodes offer more edge length than a single electrode, thus forming a plasma layer more quickly. This minimizes the time between initial application of current and plasma layer formation.



In addition, each electrode has an independent power channel. Current supplied for each electrode is reduced as that electrode forms a plasma layer and resistance increases. This minimizes total current and subsequent power or heat dissipated to collateral tissue.

The plasma layer is in constant flux, forming and reforming 100,000 times per second at each electrode. This layer requires continual renewal as tissue is ablated and fluid flow carries away the vapor layer. With properly positioned electrode arrays, the plasma layer can be renewed and stabilized while avoiding the thermal inertia of single electrodes with larger mass.

- 6 For maximum ablation, the volume of the plasma layer should be as large as possible. Since the distance of the plasma layer around each electrode typically ranges from 50 to 100µm, multiple electrodes can be spaced to create a large, almost uninterrupted, plasma layer without a proportional increase in power.<sup>2</sup>

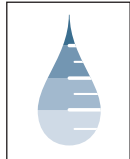
Careful selection of electrode number, size, and spacing creates an ablation layer best suited for your needs. The QUANTUM® 2 system is designed to power a selection of over 50 unique COBLATION devices, each carefully designed for today's arthroscopic procedures.

## The QUANTUM<sup>®</sup> 2 system

QUANTUM COBLATION<sup>®</sup> technology takes arthroscopic surgery to an elevated level by giving you the power and control you require to handle whatever you find, in every joint you treat.



## Multi-electrode COBLATION devices



**AMBIENT<sup>®</sup> COBLATION Wand Collection**  
AMBIENT COBLATION devices are the first and only RF wands that provide real-time visual and audible feedback of the temperature of the irrigating fluid in the joint space. Available in SUPER MULTIVAC<sup>®</sup> 50, SUPER TURBOVAC<sup>®</sup> 90, COVAC<sup>®</sup> 50 and 70 designs.



**STARVAC<sup>®</sup> COBLATION Wand**  
The STARVAC 90 Wand touts an innovative single aperture, star screen design which combines aggressive ablation speed with powerful suction.



**COVAC<sup>®</sup> COBLATION Wand**  
COVAC 50 and 70 Wands feature a wire electrode configuration, 50° and 70° shaft angles and beveled tips for versatility in the knee.



**MENIVAC<sup>®</sup> COBLATION Wand**  
MENIVAC 45 Wands features more than 20 active electrodes for aggressive resection of meniscal tissue. The electrode transects the suction lumen, removing bubbles for added visibility, particularly in the posterior meniscus.



**DOMÉ<sup>®</sup> COBLATION Wands**  
DOME Wands have dome-shaped electrode configurations, providing increased contact with curved tissue structures. This design helps maintain tissue contact when access angles vary. DOME Wands are available in two shaft angles (30° and 60°) for flexibility.



**SUPER TURBOVAC<sup>®</sup> COBLATION Wand**  
The SUPER TURBOVAC 90 Wand has powerful suction that draws free-floating, wispy tissue to the active electrode screen to minimize clogging. It is an instrument of choice for tissue removal in subacromial decompression and ACL reconstruction.



**SUPER MULTIVAC<sup>®</sup> COBLATION Wand**  
The SUPER MULTIVAC 50 Wand is uniquely designed to facilitate access to hard-to-reach parts of the knee with its 50° angle. It contours tissue edges to minimize the rough, jagged appearance that may result from the use of mechanical instruments.



**ELIMINATOR<sup>®</sup> COBLATION Wand**  
The ELIMINATOR 90 Wand is a right angle, non-suction Wand that provides rapid tissue removal for general arthroscopic soft tissue ablation. The 3.5mm 90° Wand is designed for your everyday arthroscopic needs.



**TRISTAR<sup>®</sup> COBLATION Wand**  
The TRISTAR 50 Wand maintains an enclosed ablation field surrounding the whole Wand tip. The low profile allows access to hard to reach sections of the meniscus and around delicate articular cartilage.



**BEVEL<sup>®</sup> COBLATION Wands**  
BEVEL Wands have versatile cutting angles in slim-line designs for ease of insertion. The BEVEL Wands are available with three shaft angles (30°, 45° and 60°) for a wide variety of surgical applications.

### References

<sup>1</sup> Stalder KR, Woloszko J, Brown IG, Smith CD. Repetitive Plasma Discharges in Saline Solutions. Applied Physics Letters 2001;79:4503-4505.

<sup>2</sup> Woloszko J, Stalder KR, Brown IG. Plasma Characteristics of Repetitively-Pulsed Electrical Discharges in Saline Solutions Used for Surgical Procedures. IEEE transactions on plasma science 2002; 30 (3): 1376-1383.

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