



CRA  
STATUS  
REPORT

### ELECTROSURGERY, BIPOLAR TECHNOLOGY

Bipolar electrosurgery technology provides some significant clinical advantages noted by CRA Evaluators & listed below. Both active & passive electrode tips are part of each handpiece which eliminates use of the patient plate required by mono-polar units. Bipolar technology is not new, but has been used mainly in other areas of medicine for many years, where units have been large & expensive. Report below characterizes a bipolar electrosurgery unit sold for dental use.

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## 1. BIPOLAR ORAL SURGICAL SYSTEM

**COSTS:** \$6,250 per System. (Includes generator, dual function footpedal, 6 disposable handpiece design chosen by dentist, reusable bipolar cord, & instruction manual.)

\$20 - \$25 per Disposable Handpiece. (Sold in packs of 5)

**SOURCE:** Bident International

810 East Cayuga St. • Philadelphia, PA 19124 • U.S.A.

Telephones: 215-743-2241 & 800-469-6369 • Fax: 215-533-5902 • Website: www.bident.com

**DESCRIPTION:** Electrosurgery system where both active & passive electrodes are integral parts of disposable handpiece. See images below for 13 handpiece tip designs available currently. Solid state generator produces unique & separate waveforms for cut & coagulate modes, with separate power level controls. Footpedal has separate controls for cutting or coagulating.



## 2. ADVANTAGES

- A. Can be used to cut soft tissue around implants, crowns, metal restorations, & bone without adverse effects due to heat caused by inadvertent contact by electrode.
- B. Minimal heating & charring of tissue.
- C. Recommended for use in wet field. Air / water spray used at worksite helps to control odor & eliminate tissue sticking to electrode.
- D. Coagulates well using any cutting tip by pressing "coag" switch on footpedal.
- E. Coagulating mode does not cut tissue.
- F. Eliminates chance of burns. Active & passive leads on handpiece eliminate patient plate of mono-polar systems & concerns about danger to patient by concealed metal on body, clothing, & underclothing.
- G. Safety features include double fuses, automatic decrease in power if electrodes short together, & automatic shut off if electrical fault occurs.
- H. Wide stable footpedal with obvious, well labeled separate switches for cut or coagulate, to reduce accidental activation of undesired mode.

## DISADVANTAGES

- A. Cost. Initial purchase price is 4 to 10 times more than mono-polar electrosurgery systems but 2 to 8 times less than soft tissue lasers.
- B. Costly disposable handpiece with tips. For legal & technical reasons clinicians should not process & reuse handpieces.
- C. Wide diameter electrode wires cause wider cut when making deep incisions.
- D. Learning curve is steep while developing technique using handpiece with 2 electrodes.
- E. Large size & weight. With cords: width = 28 cm / 11 in.; depth = 36 cm / 14 in.; height = 13 cm / 5 in.; weight = 6.4 kg / 14 lb.
- F. Large footpedal.
- G. Slower cutting than scalpel & mono-polar electrosurgery systems. Cut speed can be increased by using wet field or making the leading electrode the active cutting electrode.
- H. Electrodes require constant cleaning typical of all electrosurge units.
- I. Manufacturer recommends dentist modify electrode configuration rather than selling electrodes ready-to-use in optimal configuration.



### 3. OBSERVATIONS

- A. Manufacturer recommends dentist modify electrodes by beveling tips using a Joe Dandy disk or Rx Honing machine & bending electrodes closer together to obtain better control of cut.
- B. At nominal power settings of ≤4, only the active electrode cuts. The passive electrode either follows behind, leads, or glides over tissue surface next to the active electrode.
- C. Current Bipolar electrodes produce wide cuts when making deep incisions through tissue.



Original tip design as sold

Tip modified per mfr directions



1 2 3 4

Picture at left shows ~1mm deep parallel cuts made in beef steak using following tips:

1. Bipolar 3301 tip (0.30 mm / .012 in. diameter wire, power setting at 4)
2. Modified Bipolar 3306 tip (0.50 mm / .018 in. diameter wire, power setting at 4)
3. Conventional mono-polar tip (0.24 mm / .009 in. diameter wire, power setting at 4)
4. Mono-polar Microdissection Tip (0.05 mm / .002 in. diameter wire, power setting at 4, from Stryker Leibinger at 616-324-5364).

### 4. CRA CONCLUSIONS

The Bipolar Oral Surgical System offers several significant benefits over conventional mono-polar systems: (1) No adverse effects from inadvertent touching of electrodes to implants, metal restorations, or bone; (2) Can be used in wet & dry fields; & (3) Eliminates patient plate of mono-polar system & use of patient's body in electrical circuit. 100% of 13 Bipolar owner/users stated they would re-purchase based on units' performance. However, at it's current price, 69% indicated they would look at all technologies available before deciding.

See CRA Website ([www.cranews.com](http://www.cranews.com)) for test methods & results.

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### TURBO - SPIRAL vs. CONVENTIONAL DIAMOND ROTARY INSTRUMENTS

Diamond rotary instruments with a continuous spiral groove through the cutting area, referred to as "Turbo" or "Spiral" diamonds, are attracting dentists' interest with claims of faster, cooler cutting. Turbo-Spiral diamonds come in 2 designs: (1) Diamond free channel or (2) Diamond within channel. CRA studied 5 Turbo-Spiral diamonds, one from each of 5 companies, plus each company's conventional diamond of similar shape, similar size, & with same diamond particle size serving as the study controls. This report answers following questions:

1. Do Turbo-Spiral diamonds clog less &/or can they be cleaned better than conventional diamonds?
2. How do different brands of Turbo-Spiral & conventional diamonds compare in cost, percent of evaluators who stated they would purchase the particular diamond based its performance in blinded clinical trials, & number of PFM crown preps on lower first molars that could be prepared without exceeding 2.3 minutes\*?
3. How do single-patient use Turbo-Spiral diamonds compare to multi-patient use Turbo-Spiral diamonds?

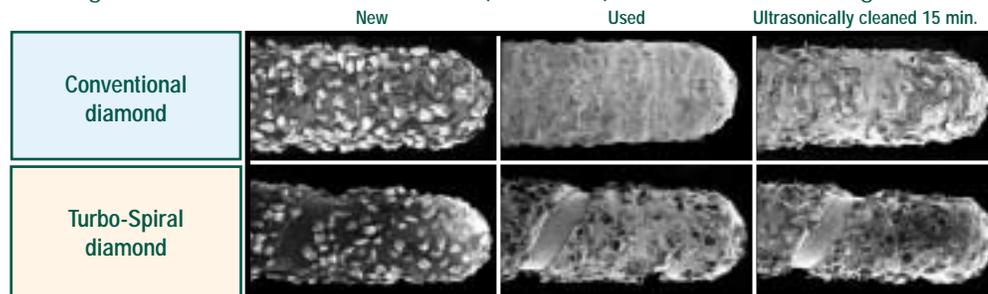
\* = mean time needed to prepare 1 PFM crown prep on lower 1st molars by 4 clinicians cutting 2 teeth each. See CRA Newsletter Sep. '01 & website.

### 1. TEST METHODS

Diamonds were tested in blinded evaluations in 11 dental offices & in blinded controlled clinical lab tests by 4 dentists for speed of cut, longevity, clogging, concentricity, retention in handpiece, & overall grade. Clinicians' purchase preference was also recorded. Controlled laboratory tests were performed on 60 diamonds (6 of each model) by cutting on Macor glass. Data were recorded for times required to remove a volume of Macor glass equivalent to 6 PFM crown preps on lower first molar teeth to determine cut speed & longevity. (See pg 3 for diamonds tested). Temperature changes in Macor were measured by imbedding a thermocoupler & cutting with each brand of diamond using a clinically relevant water flow rate.

### 2. DO TURBO-SPIRAL DIAMONDS CUT COOLER & CAN THEY BE CLEANED BETTER?

Scanning electron microscope (SEM) photographs were made of each diamond new, after clinical use & before cleaning, & after cleaning 15 minutes in a Biosonic UC1-110 (Whaledent) ultrasonic cleaner using Pro-Portion (Sultan) ultrasonic cleaning solution.



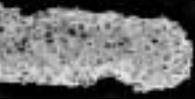
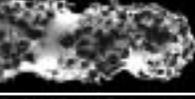
RESULTS:

- Turbo-Spiral designs tested clogged less & cleaned better in an ultrasonic cleaner than conventional diamonds.
- Turbo-Spiral diamonds cut as cool as conventional diamonds when a clinically relevant water flow was used. (15cc per minute, see CRA Newsletter Sep. '01)

### 3. CLINICAL & LABORATORY TEST RESULTS

Diamonds tested are listed in order from shortest to longest cumulative mean time required to cut Macor glass volume equal to the gross removal of tooth for 6 lower first molar PFM crown preps.

\* Single-patient use  Turbo-Spiral diamond  Conventional diamond

	SEM Photos of Each Diamond Tested	Brand Name	Company & Phone	Cost per Diamond	Speed of Cut (minutes)						% Would Purchase	
					Crown Preps <2.3 minutes			Crown Preps ≥ 2.3 minutes				
A		TS2000 Two Striper 2005.8	Premier Dental 610-239-6000	\$10.92	1.1	1.4	1.7	2.0	2.4	2.9	Total time for 6 preps 11.5 min.	66%
* B		Neo Spiral 8118.9C	Microcopy 770-425-5715	\$2.50	1.3	1.6	1.8	2.2	2.6	3.0	12.5 min.	29%
* C		Spring Health 773.9SC Turbo	Spring Health 610-630-9171	\$1.90	1.3	1.7	2.0	2.2	2.6	2.7	12.5 min.	73%
D		Alpen Swiss Rotary R856TC018FG	Coltene/Whaledent 201-512-8000	\$10.58	1.4	1.8	2.0	2.4	2.8	3.3	13.7 min.	23%
E		NTI Turbo SC856-T-018	Axis Dental 972-273-2720	\$9.50	1.5	1.8	2.1	2.6	2.9	3.3	14.2 min.	40%
F		Two Striper 770.8C (Control)	Premier Dental 610-239-6000	\$9.98	1.4	1.9	2.0	2.5	2.9	3.5	14.2 min.	82%
* G		Spring Health 773.9SC (Control)	Spring Health 610-630-9171	\$1.00	1.1	1.7	2.0	2.6	3.2	3.9	14.5 min.	40%
* H		Neo Diamond 1118.9C (Control)	Microcopy 770-425-5715	\$1.25	1.5	1.9	2.5	2.9	3.1	3.7	15.6 min.	75%
I		Alpen Swiss Rotary R856SC018FG (Control)	Coltene/Whaledent 201-512-8000	\$8.57	1.8	2.4	2.5	3.2	3.9	4.6	18.4 min.	31%
J		NTI SC856-018 (Control)	Axis Dental 972-273-2720	\$7.75	2.2	3.0	3.5	3.9	4.5	5.2	22.3 min.	31%

**SUMMARY OF CHART:**

Comparing Turbo-Spiral & conventional diamonds from the same company:

- Turbo-Spirals cost \$1.00 - \$1.50 more
- Turbo-Spirals cut faster
- Turbo-Spirals cut 1-2 more *in vitro* crown preps within 2.3 minutes
- Neither design was always preferred by clinicians in blinded clinical-use tests.

Comparing single-patient use (SPU) vs. multi-patient use (MPU) Turbo-Spiral diamonds:

- SPU diamonds were less expensive
- SPU diamonds cut comparable to MPU diamonds for speed & number of *in vitro* crown preps within 2.3 minutes.

Of 5 Turbo-Spiral diamonds tested, Spring Health SPU diamond was most preferred by the clinical evaluators.

### 4. CRA CONCLUSIONS

Turbo-Spiral diamond instruments cut about 20% faster, cut about 80% more preps in <2.3 minutes, clogged less, could be cleaned better, & with clinically relevant water spray volume cut as cool as conventional diamonds, but cost more than their corresponding conventional shaped diamond instrument. Single-patient use diamond performance was comparable to multi-patient use diamonds in both Turbo-Spiral & conventional diamond designs. Most preferred diamonds based on clinical performance only were Two Striper & Neo conventional shape & Spring Health & TS2000 Two Striper Turbo-Spiral shape.

See CRA Website ([www.cranews.com](http://www.cranews.com)) for test methods & results.

CRA  
CONFIRMED  
USEFUL**NOTEWORTHY—****INTRAORAL DENTAL FILM REDUCES X-RAY EXPOSURE**

\$47.35/package of 150 single film packets

Eastman Kodak Co. Dental Division  
343 State Street • Rochester, NY 14650 • U.S.A.  
716-724-5631 • 800-933-8031 • Fax: 716-724-3384  
Website: www.kodak.com/go/dental

**INSIGHT**

InSight F-speed film requires 60% less exposure time than Ultra-speed D-speed film, & 20% less exposure time than Ektaspeed E-speed film without substantial loss in diagnostic capability as judged by 49 practicing dentists. Available in 5 sizes (0-4); in single or double film packets; & packaged in paper, Super Poly-Soft, or Super Poly-Soft with ClinAsept barrier. Advantages: (1) Less radiation & (2) Image quality as good or better than other films reported by 65% of 49 Evaluators. Disadvantages: (1) Cost 10% more than Kodak D & E films & (2) Grainy, dark, or otherwise poor images reported by 29% of 49 Evaluators.

**65%** of 49 CRA Evaluators stated this product would replace products they use currently, & **86%** rated it excellent or good & worthy of trial by colleagues.

Radiographs taken using a GE 1000 unit by technician with 20 years clinical experience.

**D-speed film**

15 mA  
68 kV  
Time: .30 sec.

**E-speed film**

15 mA  
68 kV  
Time: .20 sec.

**F-speed film**

15 mA  
68 kV  
Time: .13 sec.

**NON-LATEX DENTAL DAM**

\$19.42 / box of 30 (65¢ each)

Coltene/Whaledent, Inc.  
750 Corporate Drive • Mahwah, NJ 07430 • U.S.A.  
201-512-8000 • 800-221-3046 • Fax: 201-529-2103  
Website: www.coltene-whaledent.com

**FLEXI DAM**

Textured, odorless, 6 x 6 inch non-latex dental dam that stretches easily. Provides effective isolation & eliminates possible allergic response by clinicians &/or patients sensitive to latex. Advantages: (1) Easy to place; (2) Very flexible; (3) Resists tearing; (4) Non-latex; (5) Purple color provides good contrast with oral tissues; & (6) Does not catch or rip when nicked by bur. Main disadvantage noted by 27% of Evaluators was material "relaxes" during use & may need adjustment during procedure which results in large amount of excess material outside of frame.

**73%** of 22 CRA Evaluators stated this product would replace products they use currently, & **100%** rated it excellent or good & worthy of trial by colleagues.