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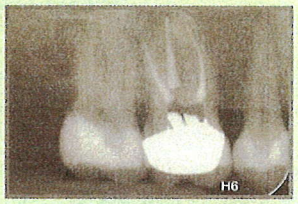
The Forgotten Retention: Core, Posts, and Pins

Gordon's Clinical Observations: How are you providing retention for the crowns you place? Are you leaning too heavily on cements and bonding agents to retain these crowns? Are you using all the retention options available to you? It is time to review and become more familia with THREE often-overlooked or misunderstood options for crown retention: core build-up, posts, and pins. *CR scientists and clinicians hav some important suggestions for you based on clinical observations, in-vitro research, and CR survey data.*

- ***Although 90% of clinicians place core build-up*** in their practice,* many of these procedures could be significantly improved.
- ***Only one third of endo-treated teeth are receiving posts.**** This percentage would likely be higher if clinicians better understood the value of posts.
- ***Posts are NECESSARY for many situations*** after endodontic treatment, such as inadequate tooth structure, bruxers, etc. *(see example at right).*
- ***Pins should be considered whenever core build-up is used.*** However, only half of clinicians use them.*

* *Recent CR survey data. Full results online at cliniciansreport.org*



Is a post necessary here? In such a clinical case where endodontic treatment leaves minimal coronal tooth structure *(<25% here)*, use of posts is suggested.

This report contains practical clinical information relating to: when core, posts, and pins should be placed; how to place them; and representative reliable brands.

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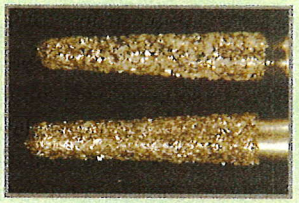
Clinical Performance of Low-Cost Diamonds

Gordon's Clinical Observations: Numerous companies produce low-cost diamonds, and they are very popular. You are probably using some o them. How do they compare? Are they as effective and long lasting as higher cost diamonds? Although the names of some infer single use—Solo Single, etc.—should they be used more than one time, and if so, for what purposes? *In this report, see how the brands compare, and you will be able to make decisions relative to your use of these essential everyday items.*

Diamond burs are the most popular rotary instruments for fixed prosthodontic tooth preparations. Low-cost single-use diamonds offer the following advantages:

- Optimum cutting performance with a new diamond for each treatment
- Elimination of a possible cross-contamination pathway
- Reduced time and effort required to clean and sterilize diamonds
- Reduce cost when performing tasks that damage diamonds *(cutting zirconia, metal, ceramic, etc.)*



For many brands, the clinical performance of low-cost diamonds *(top)* is similar to premium diamonds *(bottom)*.

The following report provides information on current use of low-cost diamond burs, a comparison of brands, and clinical tips related to their use.

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Repairing Dental High-Speed Handpieces

Gordon's Clinical Observations: You pay a significant amount of money for premium handpieces, but they eventually need repair. Where are you getting them repaired: the company that made them, a handpiece repair company, your local distributor, or are you doing it yourself? How often do handpieces need repair? What is the most economical and efficient source of repair? *CR scientists and clinical staff have suggestions for you relative to the various sources of handpiece repair based on research and a large CR survey.*

Using worn dental handpieces decreases efficiency and increases risk—don't procrastinate repairs. Symptoms of worn handpieces include:

- Decreased power
- Increased noise and vibration
- Noticeable bur deflection or non-concentric rotation
- Chuck problems: bur difficult to remove, or slips during use
- Excessive debris upon lubrication
- Increased heat in electric handpieces

This report reviews various repair options, as well as methods to increase dental handpiece longevity.

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Products Rated Highly by Evaluators in CR Clinical Trials

The following four products were rated excellent or good by CR Evaluator use and science evaluations.

Plus Series Pedodontic Forceps: Ergonomic pediatric extraction forceps are lightweight and designed for atraumatic removal

EZ / Cut 12 Blade Trimming & Finishing Needle Bur FG 7902: helpful for refining many surfaces and removing ortho cement

Tooth & Gums Essentials: Herbal toothpaste that is sodium lauryl sulfate free *(SLS Free)* and effectively freshens breath

BioCoat: Pit and fissure sealant with new micro-encapsulated fluoride, calcium, and phosphat

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Clinical Performance of Low-Cost Diamonds *(Continued from page 1)*

Current Trends for Low-Cost Diamonds

The quality and consistency of low-cost diamonds continue to improve. Additional brands have entered the market since CR's last review *(se Clinicians Report January 2014)*, and many brands now offer a range of shapes, sizes, and grits for a variety of clinical procedures.

CR surveyed over 900 clinicians, and the following are key findings.

- 58% are regularly using low-cost diamonds
- 66% are re-using low-cost diamonds *(usually 2 or 3 times);* 34% dispose of them after each patient
- 28 brands were reported used; most popular were NeoDiamond *(Microcopy),* Solo *(Premier),* and Single-Use Diamond Burs *(Henry Schein*
- Most commonly used shapes were: 81% round-end taper; 63% football/egg/barrel; 49% flame/point; and 37% round-end cylinder

Performance Evaluation

Sixteen low-cost diamond brands *(about $2 or less)* were evaluated for features and performance. Two premium diamonds acted as controls. coarse, round-end taper design was selected for testing. Numerous additional brands, shapes, and grits are available.

Appearance	Brand	Company	Cost per Diamond	Individual Sterile Packaging	Shank Accuracy	Clinical Performance	Initial Cutting Efficiency	Durability *(multiple uses)*	Overall Ratin
Low-Cost Diamonds									
	Dollar Diamonds	Dollar Diamonds	$1.70	Yes	Excellent	Excellent	Excellent	Exc–Good	Excellent
	Alpen x1	Coltene	$2.00	Yes	Excellent	Exc–Good	Exc–Good	Excellent	Excellent–Goc
	Solo	Premier	$1.92	Yes	Excellent	Exc–Good	Exc–Good	Excellent	Excellent–Goc
	NeoDiamond	Microcopy	$1.96	Yes	Excellent	Exc–Good	Exc–Good	Excellent	Excellent–Goc
	Single-Use Diamonds	Patterson	$1.41	Yes	Excellent	Exc–Good	Exc–Good	Good	Excellent–Goc
	3D Disposable Diamond	Pearson	$1.00	Yes	Excellent	Exc–Good	Exc–Good	Good	Excellent–Goc
	Piranha	SS White	$2.24	Yes	Excellent	Exc–Good	Exc–Good	Good	Excellent–Goc
	Singles	Meisinger	$1.86	Yes	Excellent	Exc–Good	Exc–Good	Good	Excellent–Goc
	1 Diamond	Crosstech	$1.19	Yes	Exc–Good	Exc–Good	Exc–Good	Good	Excellent–Goc
	Midwest Once	Dentsply Sirona	$1.92	Yes	Excellent	Exc–Good	Exc–Good	Good	Excellent–Goc
	Spring Diamond	Spring Health Products	$1.92	No	Excellent	Exc–Good	Exc–Good	Good	Excellent–Goc
	Simple PREP	Coltene	$1.58	Yes	Excellent	Exc–Good	Exc–Good	Good–Fair	Excellent–Goc
	Single-Use Diamond Burs	Henry Schein	$1.66	Yes	Excellent	Exc–Good	Good	Good	Excellent–Goc
	BrioPrep	Brasseler	$1.85	Yes	Excellent	Good	Good	Excellent	Good
	Kut Premium	Dental Savings Club	$1.87	Yes	Excellent	Exc–Good	Good	Good	Good
	Value Line	Strauss	$2.02	No	Excellent	Exc–Good	Good	Good	Good
Premium Diamonds *(Controls)*									
	Two Striper	Premier	$11.60	No	Excellent	Excellent	Excellent	Excellent	Excellent
	Maxima	Henry Schein	$8.40	No	Excellent	Excellent	Excellent	Exc–Good	Excellent

Summary of table

- **Average cost** of low-cost diamonds was $1.76 each *(range of $1 to $2);* which was about one-fifth the cost of premium diamonds.
- **Individual sterile packaging** was available for most brands, and most were indicated for single use.
- **Shank dimensions and accuracy** were generally excellent which reduces wear on handpiece chucks. Diamond coatings and bur shapes appeared uniform.
- **Clinical performance** was evaluated in controlled comparisons by CR clinicians and based on perception of initial speed of cut, feel, control, e
- **Initial cutting efficiency *(aggressiveness)*** varied among brands and appeared to be related to diamond coating. Aggressive diamonds provided greater precision and control because less effort was required to move instrument through tooth structure. Rating was based on controlled clinical and laboratory tests.
- **Durability *(performance over multiple uses)*** varied among brands. Controlled clinical testing on human molars revealed that all diamonds tested could cut multiple crown preps, although all exhibited a perceptible loss of aggressiveness after just 1 or 2 preps. All diamonds are disposable and should be discarded when performance is reduced.
- **Overall rating and comparison to premium diamonds:** All diamonds tested cut adequately well. Cost did not always correlate with performance or durability. Premium diamonds may utilize premium materials, different manufacturing processes, multiple coatings, and tighter quality control; but these details were not always perceptible in their clinical performance.

Clinical Performance of Low-Cost Diamonds (Continued from page 4)

Clinical Tips

- **Water lavage:** Adequate water spray should reach the diamond while cutting to cool the tooth, remove debris, and keep diamond surface from clogging and burning. Indications of inadequate spray are burning smell, scorch marks on tooth, and loss of diamond particles and plating.
  - **Cutting zirconia, metal, and ceramics:** Use a fine diamond with a light touch and copious water spray. Proceed at a slow to moderate pace. Heavy pressure strips diamond particles from bur and causes overheating and loss of diamond plating. Low-cost disposable diamonds are ideal for procedures that rapidly destroy burs.
- **Re-Use:** Strong opinions persist, but today's high quality, low-cost diamonds give clinicians an economical option for a new, clean, sharp instrument for every patient. Like disposable scalpel blades, they are intended for single-patient use. Regardless, most offices attempt to clean and sterilize all diamonds for re-use until their performance becomes unacceptable. There is no consensus on whether using diamonds once or multiple times is more economical due to the variables associated with their use.
- **Cleaning:** Whether or not a diamond can be truly cleaned is controversial. Before cleaning, disinfect using a potent solution sprayed or soaked onto diamond. Remove debris clogging diamond surface with a dressing stone *(NTI Diamond Cleaning Stone by Kerr, Clean-A-Diamond by Premier)*, wire brush, or enzymatic cleaner in an ultrasonic bath.

CR CONCLUSIONS: The performance of low-cost diamonds has improved and many are now clinically indistinguishable from premium diamonds. Low-cost diamonds provide a viable option for single use with the advantages of a clean, sharp instrument for each prep, and elimination of handling and processing with the associated risks of cross-contamination. All diamonds tested performed adequately well and can be used with clinical success. Brands with the best combination of features and performance were Dollar Diamonds by Dollar Diamonds, Alpen x1 by Coltene, Solo by Premier, and NeoDiamond by Microcopy.

Repairing Dental High-Speed Handpieces (Continued from page 1)

Handpiece Repair Methods

A CR survey of 1,025 clinicians indicated that, on average, high-speed dental handpieces last 1 year for air rotor handpieces and 2 years for electric handpieces. However, handpiece longevity varies greatly and is highly dependent on how aggressively the handpiece is used, and how well it is maintained.

When handpiece repairs are required, several options are available. The following options were rated by clinicians according to quality, longevity, turn-around time, and perceived cost of repair.

Average User Satisfaction with Handpiece Repair Methods – All Handpiece Types *(5 point scale: 5 = very satisfied, 0 = not at all satisfied)*

Repair Method	% Use	Quality of Repair	Longevity of Repair	Turn-around time	Perceived Cost
Local repair company	27%	4.0	3.7	3.8	Moderate
Dental distributor *(Henry Schein, Patterson, etc.)*	22%	3.6	3.4	3.1	High
Manufacturer	20%	3.9	3.7	3.1	Moderate–High
In-office repair *(by clinician or staff)*	17%	4.5	4.1	4.7	Low–Moderate
Independent mail-in repair company *(Hayes, etc.)*	14%	3.8	3.7	3.6	Moderate

Selection of a repair method was most dependent on handpiece type *(air rotor vs. electric)* as well as by brand, geographic location, warranty, etc. The following charts show popularity and average turn-around time of various repair methods based on high-speed handpiece type:

Air Rotor Handpiece Repair

Repair Method	% Use	Average Turn-Around Time
Local repair company	32%	Same week
Dental distributor	22%	1 week
In-office repair	18%	Same day
Manufacturer	15%	1 week +
Independent mail-in repair company	13%	1 week

- **Local repair company:** most common repair method, provides quick turn-around time
- **Distributor:** popular, convenient option
- **In-office repair:** fastest turn-around time, high satisfaction

Electric Handpiece Repair

Repair Method	% Use	Average Turn-Around Time
Manufacturer	55%	1–2 weeks
Dental distributor	18%	1–2 weeks
Local repair company	15%	Same week
Independent mail-in repair company	11%	1 week
In-office repair	<1%	Same day

- **Manufacturer repair:** most common repair method, most often used when handpiece is under warranty
- **Distributor:** popular, convenient option
- **Local repair company:** quick turn-around time

Selecting a repair method: Consider the following when choosing a repair company

- **Warranty:** It is recommended that you take full advantage of manufacturer warranties.
- **Satisfaction with current repairs:** Stay with your current repair method/technician if you are satisfied. If unsatisfied, consider other options, and ask clinicians in your area for recommendations.
- **Turn-around time:** Can you afford to wait for a repair? Warranty repairs and other lower-cost options often have longer turn-around times.
- **Handpiece type:** Electric handpieces *(with enclosed gear systems)*, new handpieces, and those still under warranty are generally best served by a professional repair. Many high-speed air rotor handpieces are relatively easy to repair in-office.