



## Disposable Prophy Angles: What's Best?

**Gordon's Clinical Bottom Line:** There are many more prophy angles and cups than you may have considered. In preparation for this report, CR identified 135 disposable prophy angles (DPAs) being marketed by 34 companies. They vary in important characteristics and in cost. This project has identified the brands most used, their relative effectiveness, and the differences in price. It became very evident that DPAs and cups vary significantly, and these differences relate directly to their clinical effectiveness in both dental hygiene and in restorative dentistry. *CR suggestions about the important features to consider and best overall DPAs reviewed are listed.*

Plastic disposable prophy angle (DPA) use continues to increase; 84% of dentists and dental hygienists responding to a CR survey report using DPAs with the majority selecting latex-free cups (see survey on page 3). DPAs are convenient, can be cost effective, and are individually packaged for each patient. Although well-maintained metal reusable prophy angles offer smoothest operation, low noise, and excellent visibility, the time and effort required for cleaning, lubricating, and sterilizing is considered less convenient by most CR Evaluators and CR Project Directors.

**This report identifies the most used disposable prophy angles (DPAs); provides a table with ratings and cost; lists CR identified desired features; offers clinical tips; and includes CR conclusions.**

### Survey Results (n=626, dentist and dental hygienist respondents)

- **Prophy Angle type used most:** 84% disposable, 16% reusable
- **Angle of prophy angle used most:** 84% 90°, 16% contra-angle
- **Cup material type used most:** 74% non-latex, 22% natural rubber, 4% both
- **Prophy cup rigidity preferred most:** 77% soft, 20% firm, 2% ultrasoft
- **Cup design used most:** 45% webbed, 28% ribbed, 22% webbed and ribbed, 5% spiral ridges
- **Leading 3 criteria for prophy angle purchase (multiple responses allowed):** 72% cost, 62% smooth running, 43% reputable company

- **Features of prophy angle most important to users (multiple responses allowed):** 50% ability to clean/stain removal, 47% flexibility of cup, 41% gentle to gingiva, 37% sub-gingival access



- **Prophy angle company reported most:** 19% Young, 14% Denticator, 10% Dentsply, 7% Patterson, 6% Henry Schein, 5% Preventech, 4% Ultradent, 3% 3M ESPE, 3% Sultan, 29% other

### Comparison of Top Reported Disposable Prophy Angle (DPA) Brands and Unique New Prophy Angles

All DPAs tested were identified as the most used brands in a CR survey, and the DPA companies identified cup designs most sold for those brands (all soft and latex free). New brands with unique features were also tested. The top 16 products are listed by rating then alphabetically.

Company, Brand	Cost Each	% Use (from survey)	Available Cup Firmness	Cup Design Tested (interior)	Interproximal/Subgingival Access	Vibration/Comfort	Notable Features	Rating
ProphyMagic, ProphyMagic soft <b>CR Choice</b>	\$0.29	2.1%	Soft or Firm	Webbed/Ribbed	Excellent	Excellent	Soft cup and smooth running angle	Excellent
Ultradent, Ultrapro Tx <b>CR Choice</b>	\$0.37	4.0%	Soft or Firm	Webbed/Ribbed	Excellent	Exc-Good	Low cost	Excellent
Waterpik, Densco Latex-Free <b>CR Choice</b>	\$0.62	>1%	Soft	Webbed/Spiral Rib	Excellent	Excellent	Unique spiral ribbing	Excellent
Young, Vera Classic Petite Web <b>CR Choice</b>	\$0.91	5.7%	Soft or Firm	Webbed/Ribbed	Excellent	Excellent	Compact head and slim neck	Excellent
3M ESPE, Clinpro Disposable Angle	\$0.69	3.2%	Soft or Firm	Webbed/Ribbed	Exc-Good	Good	Pre-lubricated	Exc-Good
Crosstex, Sparkle	~\$0.60	1.9%	Soft or Firm	Webbed/Ribbed	Exc-Good	Exc-Good	Beveled gear design	Exc-Good
Denticator, Diamond	\$0.63	2.1%	Soft or Firm	Diamond Design	Exc-Good	Good	Long cup, unique ribbing	Exc-Good
Denticator, Original Green	\$0.60	7.6%	Soft or Firm	Webbed/Ribbed	Exc-Good	Good	Popular product	Exc-Good
Dentsply, NUPRO Freedom	\$0.62	5.3%	Soft or Firm	Spiral	Exc-Good	Excellent	Requires Midwest RDH Freedom Cordless Prophy System	Exc-Good
Dentsply, NUPRO revolv	\$0.67	4.2%	Soft or Firm	Spiral	Exc-Good	Exc-Good	Brush or pointed tip available	Exc-Good
Henry Schein, Acclean Disposable Angle	\$0.50	5.9%	Soft or Firm	Webbed/Ribbed	Exc-Good	Exc-Good	Improved design	Exc-Good
Kerr, Perfect Pearl	\$0.72	2.3%	Soft or Firm	Inner/Outer Spiral	Exc-Good	Good	Brush available	Exc-Good
Patterson, Disposable Angle	\$0.49	7.4%	Soft or Firm	Webbed/Ribbed	Exc-Good	Exc-Good	Pre-lubricated, popular product	Exc-Good
Premier, 2pro Total Access	\$0.62	>1%	Soft or Firm	Webbed/Ribbed	Exc-Good	Exc-Good	Gearless, dual-action cup/tip	Exc-Good
Preventech, Pivot NL	\$0.51	3.2%	Soft or Firm	Webbed/Ribbed	Exc-Good	Exc-Good	Brush available	Exc-Good
Sultan, Upgrade	\$0.67	3.0%	Soft or Firm	Webbed/Ribbed	Exc-Good	Good	Beveled gear design	Exc-Good
<b>Control:</b> Henry Schein, Screw Type Ribbed Prophy Cup (100-1800) and Young Care-Free Autoclavable Prophy Angle	\$0.39 and ~\$60	7.9%	Soft or Firm	Ribbed	Excellent	Excellent	Disposable cup (natural rubber) and autoclavable metal prophy angle	Excellent

## Disposable Prophyl Angles: What's Best? (Continued from page 3)

### CR Desired Prophyl Angle Features and Main Comparison Observations

- All DPAs tested had acceptable size and design and allowed good access and visualization.
- Cup design is an important consideration.
  - For restorative polishing, web-free cups are preferred. Webs can produce irregularities in the restoration surface.
  - For prophyl polishing, many clinicians often think it is merely esthetic removal of stain and plaque. However, polishing can be very useful in disruption and removal of microorganism colonies located subgingivally and interproximally. In order to gain maximum access to these areas, prophyl cup must be designed with:
    - **Thin lip** for ability to flare with little pressure. Flare is able to access subgingivally and interproximally.
    - **If internal webbed**, webs must be recessed from lip. Webs provide stability to cup and prevent cup lip from folding onto itself during use. However, webs extending to lip of cup produced a rougher polishing sensation for patients and impeded desired lip flare.
    - **Thin internal ribs, also recessed from lip**, help hold prophyl paste and provided some support to cup.
    - **External ridges and features** promoted for improved interproximal cleaning impeded subgingival access and were least comfortable designs reported by patients.
    - **Soft cup** for pliability to adapt easily to tooth contours. Firm cups require more force to flare and this increases heating of tooth structure from friction created.
    - **Small cup size** allowed better access and produced more comfortable polishing for all teeth. Lower anterior lingual surfaces were a challenge to access with some cups.
    - **90° vs. contra-angle design** did not affect access. Long cups were a bigger issue in accessing some posterior tooth surfaces.

### Clinical Tips

- **Optimal handpiece speed is between 1,500 and 3,000 rpm.** Faster speeds produced too much heat and can destroy DPAs.
- **Light to moderate pressure with continuous cup movement** reduces possibility of frictional heating of tooth.
- **Hold cup at a 90° angle to the tooth surface** to avoid subgingival gouging and damage to softer dentin tooth structure.
- **Be aware of surfaces being polished.** Softer restorative materials (*gold, resin-based composite, and others*) should be final polished with fine abrasives to prevent scratching. When used for restorative polishing, non-webbed cups are preferred as webs can produce restoration irregularities.
- **Standardized sequence of prophylaxis** helps ensure treatment of all facial, lingual, interproximals, and subgingival tooth surfaces.

### CR Conclusions:

Overall performance of plastic disposable prophyl angles with small, soft, non-latex cups was surprisingly good. Cup design is most critical to stain, plaque removal, and patient comfort. Desired features are small soft cups with thin lips and internal webs/ribs/spirals recessed from lip for best subgingival, interproximal, and overall access. DPAs with best overall ratings were: ProphylMagic, ProphylMagic soft; Ultradent, UltraproTx; Waterpik, Denso; and Young, Vera Classic Petite Web.

## What is CR?

### HOW DOES CR FUNCTION?

Each year, CR tests in excess of 750 different product brands, performing about 20,000 field evaluations. CR tests all types of dental products, including materials, devices, and equipment, plus techniques. Worldwide, products are purchased from distributors, secured from companies, and sent to CR by clinicians, inventors, and patients. There is no charge to companies for product evaluations. Testing combines the efforts of 450 clinicians in 19 countries who volunteer their time and expertise, and 40 on-site scientists, engineers, and support staff. Products are subjected to at least two levels of CR's unique three-tiered evaluation process that consists of:

1. Clinical field trials where new products are incorporated into routine use in a variety of dental practices and compared by clinicians to products and methods they use routinely.
2. Controlled clinical tests where new products are used and compared under rigorously controlled conditions, and patients are paid for their time as study participants.
3. Laboratory tests where physical and chemical properties of new products are compared to standard products.

### WHY CR?

CR was founded in 1976 by clinicians who believed practitioners could confirm efficacy and clinical usefulness of new products and avoid both the experimentation on patients and failures in the closet. With this purpose in mind, CR was organized as a unique volunteer purpose of testing all types of dental products and disseminating results to colleagues throughout the world.

### WHO FUNDS CR?

Research funds come from subscriptions to the *Gordon J. Christensen Clinicians Report*®. Revenue from CR's "Dentistry Update"™ courses support payroll for non-clinical staff. All Clinical Evaluators volunteer their time and expertise. CR is a non-profit, educational research institute. It is not owned in whole or in part by any individual, family, or group of investors. This system, free of outside funding, was designed to keep CR's research objective and candid.

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*CRA Foundation® changed its name to CR Foundation® in 2008.*

# Products Rated Highly by Evaluators in CR Clinical Trials

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## High-Quality, Disposable Prophy Angle with Reasonable Price and Two Cup Design Options

### Comfort Contra Prophy Angles Prophy Magic



\$60/100 angles  
(60¢ per prophy angle)

Disposable prophy angle designed with a contra-angle to provide better access in hard-to-reach areas. Comfort soft cups offer good flair for interproximal and subgingival access. Mystic cups have diamond-shaped ridges for more active cleaning surfaces. Both have recessed, counter-clockwise ribs/webs inside the cup to reduce splatter. *Note: Hard cup designs are also available, but not evaluated by CR.*

#### Advantages:

- Angles run smoothly and have ergonomic design
- Comfort soft cups have excellent flare and flexibility for interproximal and subgingival access
- Outside texture on Mystic cups increased active cleaning surfaces
- Price

#### Limitation:

- Outside texture on Mystic cups decreased interproximal and subgingival access

**CR CONCLUSIONS:** 91% of 23 CR Evaluators stated they would incorporate Comfort Contra Prophy Angles into their practice. 96% rated them excellent or good and worthy of trial by colleagues.

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## Mini-Sized Prophy Cups on Disposable Angles Aid Visualization and Help Reduce Splatter

### Dinky Prophy Angles Prophy Magic



70¢/Angle

These prophy angles were designed with a mini-sized cup to allow for greater access and better visibility. They are available in soft and firm cups or a tapered brush design. CR evaluated the soft cup version. Cup has ribs on the outside and is webbed on the inside. Design also helped reduce splatter.

#### Advantages:

- Soft cups have flexibility for access and to adapt to tooth
- Small design helps prevent splatter
- Mini size was adequate for adults and children
- Cup runs/spins smoothly

#### Limitation:

- As with other new prophy angle designs, small cup size did not totally eliminate splatter.

**CR CONCLUSIONS:** 70% of 23 CR Evaluators stated they would incorporate Dinky Prophy Angles into their practice. 74% rated them excellent or good and worthy of trial by colleagues.

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## Ergonomic, Prophylaxis Handpiece is Designed for Clinicians with Smaller Hands

### Prophy Magic NLR Hygiene Handpiece Medidenta



\$399 Each

Hygiene handpiece that is lube free, low speed (5,000 RPM), and has 360 degree swivel with friction grip nose cone that accommodates most disposable prophy angles. Design includes: small size, lightweight (2.5oz), good grip, small nose cone, fits E-type attachments, and two pieces for those required to autoclave nose cones and/or desire to switch to contra angle without need of second handpiece on the same patient. It is fully autoclavable, was designed for clinicians with smaller hands, and has 1-year warranty.

#### Advantages:

- Ergonomic design with comfortable grip
- Lightweight
- Consistent speed as controlled by foot pedal

#### Limitation:

- Some clinicians felt it had a higher pitch sound and was more noisy

**CR CONCLUSIONS:** 74% of 23 CR Evaluators stated they would incorporate Prophy Magic NLR Hygiene Handpiece into their practice. 83% rated it excellent or good and worthy of trial by colleagues.

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## Cordless Endodontic Handpiece with Built-in Apex Locator and Auto Reverse

### ACE (Advanced Cordless Endo) MOTOR Medidenta



\$1,300/Handpiece System

ACE (Advanced Cordless Endodontic) Motor is compact and has a built-in apex locator. It has multi-function settings and is programmed for eight continuous systems and three reciprocating systems. The Genius AutoSense technology changes automatically from rotary to right cutting reciprocation based on the resistance and file apical progress for fast, safe treatment. Touchscreen panel and LED display shows file position during instrumentation. The apex locator was easy to use and accurate, but it added a cord to the cordless system.

#### Advantages:

- Lower cost than major competitors
- Compact, cordless, versatile with lightweight handpiece
- Wide range of files accepted/programed into unit

#### Limitations:

- Screen menus are complex and would benefit from a simple guide
- Learning curve to locate HP buttons during use

**CR CONCLUSIONS:** 82% of 11 CR Evaluators stated they would incorporate ACE Motor into their practice. 91% rated it excellent or good and worthy of trial by colleagues.



## Cordless Prophy Handpieces: Are they worth the expense?

**Gordon's Clinical Observations:** Surveys have revealed that dental hygienists often appreciate cordless prophy angles over traditional tethered counterparts. The benefits are obvious—improved mobility and reduced strain. These points raise a question: Are cordless handpieces as reliable in torque, RPM, longevity, cost, and other factors as corded ones? *CR Scientists offer insights to guide your choices.*

CR's recent survey showed 20% of hygienists now use cordless prophy handpieces with a strong preference for the Nupro Freedom by Dentsply Sirona for its ergonomic design and integrated rheostatic control. Many users praised cordless versions, but most still prefer traditional tethered equipment. Their concerns center around reliability and the limited lifetime of batteries in cordless units.

CR scientists provide an inside look at popular brands and offer insights and recommendations.



Push button load test

### Summary of Testing

- **All models demonstrated efficient polishing** with speeds ranging from 500 to 4500 RPM with enough torque to maintain at least 90% speed under a simulated 200 g load.
- **The Nupro Freedom was the easiest to use** because of its unique integrated rheostatic control within the handpiece itself; however, CR Evaluators preferred the speed control of the included rheostat pedal. The one drawback was the requirement for a brand specific prophy angle whereas all the other units evaluated were engineered to accept standard angles.
- **Basic performance in terms of RPM and torque were excellent with all units tested.** CR Choices were based primarily on the availability of rheostatic control, price, and having the option for a battery replacement. For these reasons, the Freestyle Pro (Medidenta) and the ProMate CL (Pac-Dent) were *CR Choices*.



Freestyle Pro (Medidenta)



Nupro Freedom (Dentsply Sirona)



Proxeo Twist HP (W&H Impex Inc)



ProMate CL (Pac-Dent)



AeroPro (Premier)



Ultrapro (Ultradent)



iProphy Mobile (NSK)

### Challenges with Cordless

- **ADA's shift towards "selective prophylaxis"** emphasizes careful polishing to preserve tooth structure. Hygienists and assistants are encouraged to remove deposits selectively rather than aggressively affecting the entire tooth. Factors like torque and maximum RPM may not be as critical as speed control and precision.
- **Performance vs. pressure:** Training enhancements could guide dental assistants to apply appropriate pressure, protecting teeth. The tendency is for too much rather than too little. Current concept in electric toothbrushes—pressure-sensitive designs guided by AI—should be innovations manufacturers pursue in future versions.
- **Battery lifespan:** Battery life varies among tested cordless prophy handpieces. Some manufacturers (Medidenta, Pac-Dent) offer replacement options outside of standard warranty period, but cycle data and specific battery warranty information were not readily published, and most manufacturers were hesitant to elaborate when asked.
- **Ergonomic impact of repeated button pressing:** All handpieces tested required around 1–1.5 lbs button pressure to turn on and off. This equates to some 500 or more pounds moved by the assistant's finger over ten patients. Over time, this could lead to hand and wrist issues. CR suggests using a rheostat if possible.

*Interestingly, some of the manufacturers also offer other products with user-replaceable batteries. Information regarding the cycle rating is not always disclosed, but this area represents an opportunity for growth and transparency in the industry.*

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# Cordless Prophy Handpieces: Are they worth the expense? (Continued from page 1)

## The Case for Cordless

Manufacturers have been championing cordless prophy handpieces as an innovation in dental care.

- **Silent operation:** Enhancing patient comfort with quieter treatments.
- **Disinfection:** Simplified designs for more thorough cleaning.
- **Ergonomic benefits:** Addressing some professional injuries.
  - Reduced weight
  - Larger grip, accommodates smaller hand sizes
  - No cord-induced drag
- **Improved access:** By removing the tether, auxiliaries can pivot and rotate the handpiece into any position required without hesitation.

All models promised efficient polishing with speeds ranging from 500 to 4500 rpm with enough torque to maintain at least 90% speed under a simulated 200 g load.

Brand (Manufacturer)	Cost	Ergonomics				Performance				Warranty	
		Handpiece Weight (g) <small>Measured with one included sleeve and no prophy angle</small>	Modes 1. Button control fixed speed(s) 2. Rheostat (foot pedal) variable speed 3. Rheostat (handpiece) variable speed	Grip Diameter <small>Measured 1 cm below operation button</small>	Button Pressure <small>Load required to depress button and change mode</small>	Fixed Speed Settings (RPM)	Torque Under Load (200g) <small>Best: no loss in RPM Better: less than 5% loss Good: less than 10% loss</small>	Battery		Entire Unit	Battery Specific
								Capacity (mA/h) <small>Based on a single charge</small>	Lifetime Cycle Rating <small>Total number of times battery can be run and recharged while retaining at least 80% capacity (Cycles per year in clinical use estimated at 300)</small>		
 Freestyle Pro (Medidenta)	\$999	114 g (4.0 oz)	1 & 2	21 mm	1.2 lbs	.5K, 1K, 1.5K, 2K, 3K, 4K	Better	3.6V 750mAh	500 cycles	2 years against manufacturer defects	If battery dies before warranty period ends, free. After, \$99 replacement fee with a 3-day turnaround.
Nupro Freedom (Dentsply Sirona)	\$1,935	126 g (4.4 oz)	2 & 3	19 mm	0.9 lbs	No fixed settings - "Smart Mode" and rheostat control Max - 3.4K	Best	3.7V 750mAh	300 cycles	1 year against manufacturer defects	2 years, no replacement plan
Proxeo Twist HP (W&H Impex Inc.)	\$1,691	119 g (4.2 oz)	2 only	22 mm	1.6 lbs	No fixed settings - rheostat controlled only Max - 3K	Best	3.7V 680mAh	500 cycles (at 60% capacity)	1 year against manufacturer defects	No specific warranty on battery
 ProMate CL (Pac-Dent)	\$1,186	113 g (4.0 oz)	1 & 2	21 mm	1.1 lbs	.5K, 1K, 1.5K, 2K, 3K, 4K	Better	3.6V 750mAh	500 cycles	2 years against manufacturer defects	If battery dies before warranty period ends, free. After, \$99 replacement fee with a 3-day turnaround.
AeroPro (Premier)	\$1,153	121 g (4.3 oz)	1 only	21 mm	1.7 lbs	Low: 500 RPM Medium: 1500 RPM High: 2800 RPM	Best	3.6V 800mAh	300 cycles	3 years against manufacturer defects	From company: "The battery life determines the product's life cycle." No replacement offered.
Ultrapro (Ultradent)	\$999	112 g (3.9 oz)	1 & 2	20 mm	1.1 lbs	No fixed settings - rheostat controlled only Max - 4K	Best	3.6V 750mAh	500 cycles	5 years against manufacturer defects	2 years, no replacement plan
iProphy Mobile (NSK)	\$851	94 g (3.3 oz)	1 only	21 mm	0.9 lbs	.5K, 1K, 1.5K, 2K, 2.5K	Better	3.6V 660mAh	300 cycles (at 60% capacity)	1 year against manufacturer defects	1 free replacement within 3 years

### CR CONCLUSIONS:

- **Cordless handpieces represent a significant ergonomic advancement** over traditional tethered models, providing invaluable flexibility and convenience—particularly in non-traditional settings like nursing homes, hospitals, and schools. Their designs address key ergonomic challenges, such as weight and grip adaptability, with a freedom of movement not seen with corded models, offering a much needed solution for dental professionals.
- **Key improvements** should focus on a user-replaceable battery (e.g., 18650 lithium ion battery) and a force sensor to alert user when using excessive pressure. Rheostatic operation, if available, is recommended for greater precision and control.
- **CR Choice brands ProMate CL (Pac-Dent) and Freestyle Pro (Medidenta)** have desirable ergonomics, performance, and were the only models where batteries could be replaced if needed which could extend their usable life.