

## Smaller and Lighter LED Headlamps

**Gordon's Clinical Bottom Line:** Magnifying loupes of 2.5X to 4.0X have become popular during my career, and they are in almost universal use. Coming along later has been headlamps which improve treatment by directing light along the line of sight, eliminating most shadows. Both loupes and headlamps have improved greatly over recent years. The major change is to smaller and lighter-weight devices. CR scientists have evaluated the latest models of "mini" headlamps. *Look over the data provided; you probably need and want a new headlamp.*

Headlamps are rapidly changing. Just a few years ago most lights sat on the countertop with a fiber optic tether to the clinician and were used almost exclusively for surgery. With the advent of white light emitting diodes (LEDs) which use less power and run cooler, the light source could be mounted directly on the loupes with a battery pack worn on the body. Significant activity in small, lightweight headlight development was stimulated by the introduction of the Featherlight headlight by Ultralight Optics. The future promises continued miniaturization and improvements.

Technical challenges include: generating high intensity output from a small, low-power light source; designing optics for a uniform and well-defined field of light; controlling and dissipating heat; and producing white light for natural-looking tissue color without the blue tint.

A recent user survey indicated that the most desired headlamp improvements were: 1) lighter weight, 2) lower cost, and 3) elimination of the cord. Since the last CR review of headlamps in May 2009, the average weight has dropped from 33 grams to only 11 grams, helping alleviate the greatest complaint. **The following report shows the characteristics of eight of the smallest, lightest-weight headlamps currently available.**



Product Photo								
Brand Company	Odyssey Micro LED Headlight: Neutral Color SurgiTel	MicroLine Mini Headlight PeriOptix	LumaDent LumaDent	Air Feather Light Ultralight Optics	Ultra Mini Designs for Vision	Zeon Endeavour Orascopic	Nano Loupe Light Dentlight	Task Vision Lana LED Clip-On Headlight Vision USA
Cost/System	\$845	\$695	\$395	\$595	\$595	\$1,095	\$599	\$370
Total Weight added to loupes	9 g	11 g	13 g	8 g	15 g	11 g	11 g	12 g
Spot (Diameter at 14 inch distance)	9.0 cm	7.5 cm	8.0 cm	7.5 cm	8.0 cm	6.5 cm	5.0 cm	7.0 cm
Color Accuracy	Excellent-Good	Good	Good	Good	Good	Good	Good	Good-Fair
Glare in Patient's Eyes	None	Moderate	Mild	Moderate	Moderate	Mild	Moderate	Substantial
Controls	Dial on/off/intensity	Switch on/off Dial intensity (retains last setting)	Switch on/off Dial intensity (retains last setting)	Touch switch on/off Button +/- intensity (retains last setting)	Dial on/off/intensity	Touch switch on/off/intensity (retains last setting)	Button on/off Button +/- intensity	Button on/off Dial intensity (retains last setting)
Battery Life*	7.5 hours -2.5 hr recharge	9 hours -4.3 hr recharge (includes 2 batteries)	9 hours -2.7 hr recharge	7.5 hours -3.3 hr recharge	7 hours -3 hr recharge	4.0 hours -3.2 hr recharge	2.5 hours -2.1 hr recharge (includes 2 batteries)	4.5 hours -3.0 hour recharge
Bezel Temperature*	53° C	41° C	41° C	51° C	40° C	38° C	66° C	43° C
User-Replaceable Cord	No	Yes, entire cord	Segment with battery connector	Segment with battery connector	Yes, entire cord	No	No	No
Orange Filter	Yes, removable	Yes, removable	Yes, removable	Optional, \$45	Yes, built-in	Yes, removable	Yes, removable	No
Warranty	2 years	1 year	2 years	2 years	Lifetime	4 years	1 year	1 year
Overall Grade	Excellent	Excellent	Excellent	Excellent-Good	Pre-production model	Excellent-Good	Excellent-Good	Good

## Smaller and Lighter LED Headlamps *(Continued from page 1)*

The previous chart shows eight of the smallest LED headlamps. Numerous other brands and models are available and this technology is rapidly evolving. All technical measurements were made at 14 inches (35 cm) from the light and at highest output setting. Each company offers clips and mounts to make their headlamp compatible with most loupes and eyewear.

### Clinical Tips

- **Intensity:** Headlamps with adjustable output and that retain the last setting are preferred. Best visual acuity is achieved with the intensity set just below what the eyes perceive as bright. Higher magnification requires more light.
- **Position:** Headlamps are generally positioned above the loupes (*or eyes*) to reduce reflected light (*glare*) while minimizing shadows.
- **Filters:** Flip-down filters block blue light to prevent premature cure while placing materials. If filter is not desired, simply turn off the light or aim it to the side during placement.
- **Infection control:** Headlamps and eyewear are contaminated by splatter and aerosols and are difficult to disinfect. If adjustments are needed, pick up a gauze pad and use it to grasp and aim the light, which also minimizes potential burning of the fingertips.
- **Head and neck bands:** Heavy loupes usually require a band that can be tightened to prevent them from slipping down the nose. Lightweight loupes with wrap-around frames and miniature headlamps seldom require the constrictive band.

**CR Conclusions:** LED headlamp technology has rapidly improved. All of the miniature headlamps evaluated provided good to excellent illumination and visualization of oral tissues with minimal added weight. All were easy to use, featured adjustable intensity, and provided adequate white light. SurgiTel Odyssey Micro Neutral Color received high ratings for tissue color accuracy, Air Feather Light had lowest overall weight, and LumaDent had good combination of low cost and features. All headlamps performed well and clinicians can base purchase decision on desired features, mounting options for their loupes, and cost. Most clinicians indicated that the combination of loupes and headlamps significantly improves the quality of care they can provide.

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3. *Laboratory Tests* where physical and chemical properties of new products are compared to standard products.

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**"CLINICAL SUCCESS IS THE FINAL TEST."**