# Point Counterpoint: Lighting

*Headlamps or track lighting – that's what we're talking about today. We all have our own preferences, and there are noted pros and cons to every option. We've taken a pro-headlamp message board and paired it up with an article on track-lighting benefits. Read both and jump back on the message boards of Dentaltown.com to tell everyone which camp you're in.*

## Operatory Lighting: Controversies and Opportunities

**by David J. Ahearn, DDS**

In dentistry, new technologies bring with them challenges that shape the future of what dentistry is and how dentistry is delivered. There are tipping points that occasionally make change occur rapidly and, more commonly, gradual changes where new technologies are assimilated into the old. Over the coming years, lighting will be one of those areas of change.

### History

The history of lighting in dentistry reflects that of lighting technology in general. From its inception, electric lighting technology has been good at general lighting and less so at point source illumination. Further, lighting has historically been extremely inefficient with much of the energy used to produce light being wasted as heat. Lighting is responsible for 35 percent of the energy cost in a typical inefficient office.[1] It can be even greater in hotter climates, when the extra cost of air conditioning is factored in.

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### Rules

A further challenge in lighting design relates to the much quoted "accommodation ratio," which states that the ratio between direct lighting (the light that is directly placed upon a task) and ambient lighting (the general room light) should be no more than 3:1.[2] This would mean that for a room illuminated to a recommended level of 300 footcandles (fc) of general lighting, the intraoral light level would be no more than 900 fc. In today's world, this is significantly and unrealistically low. The least powerful dental light is rated at 1500 fc (at 700 mm focal distance) and many dental headlights have illuminations approaching 3000 fc, so no effort at satisfying this lighting requirement will ever be successful. A treatment room with a background light level of 500 fc would be uncomfortably bright, considered over-lighted and would likely exceed electrical power density standards of most state energy codes.

1. *2005 Buildings Energy Data Book*
2. *Dental Clinics of North America, 1978*

This is the reason why headlight and microscope users often have trouble seeing outside the oral cavity during treatment. The contrast ratio is simply too great to permit rapid iris adjustment.

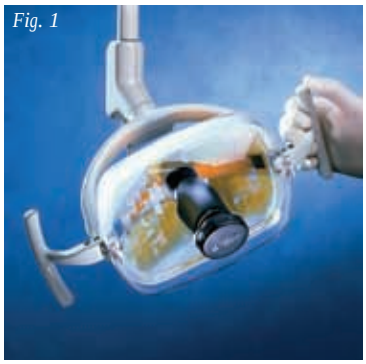
Fig. 1

## Choices

With so many negative feelings about lighting and its costs, it is not surprising that the advent of improving technology in loupes and head lighting would lead to the concept that dental intra-oral lights could be replaced by headlights completely. Indeed, we see a number of practitioners around the globe are experimenting with headlights-only practice.

The potential benefits of a headlight-only practice are clear: reduced cost and simplified operatory setup. This type of practice should be considered for startup and perhaps for high volume, high room count offices. Certainly if the cost savings in lights permits the addition of two more rooms, then the economics might dictate this, at least in the start-up phase. Unfortunately, rarely is the lighting so costly as to eliminate the funding of more than one additional room, at which point the benefits become less clear. Furthermore, converting to headlight-only practice does present other problems. First and foremost is what to do about the assistants. The solution here very much depends upon the degree to which assistants in your practice actually provide care. If the care provided is limited to logistics and custodial care (moving patients and sucking saliva), lights might not be required. However, if their practice includes fabricating temporaries and prophy polishing, you will need to outfit them with lights, and this most commonly means loupes as well. This diminishes cost savings significantly.

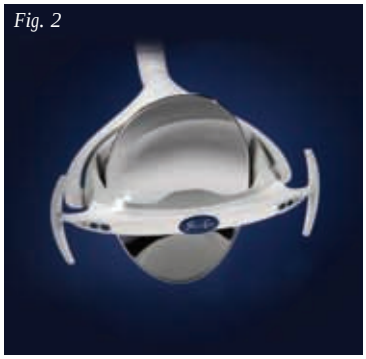
Fig. 2

The question of what to do in hygiene is much more simple. This is an area where wide field, relatively low-magnification loupes with headlights will have great benefit and very little downside. If you have dedicated hygiene rooms, never do assisted procedures there and all doctors wear headlights, you certainly can go headlight only here.

Unfortunately, what tends to happen is that once all the staff members are fitted with quality loupes, the cost savings compared to lights is negligible. So what is it about dental patient lights that causes doctors to hate them so much in the first place?

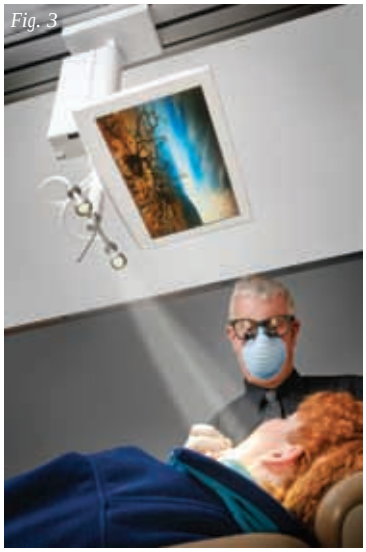
Fig. 3

## Why Most Patient Lights Are Inadequate

The most common and generally least expensive patient light-mounting method – the chair mount – is also the least desirable and most trouble prone, with the combination of both drift and vibration being the most common complaints. Chair-mount lights also obstruct the operatory, which may be problematic with the use of some specialty equipment such as sedation monitors and portable nitrous units.

Ceiling- and wall-mount lights are generally less aggravating to use with ceiling mounts having a rather specific need for exact placement, lest the unit regularly become rotated such that the operator or assistant must physically get up and use two hands to reposition the lights. Wall mount units generally do not have this problem, however, due to their arm length, they are much more susceptible to drift.

For more than 30 years, the gold standard in dental lighting has been ceiling-mounted, dental-track lighting. Unfortunately, not all of these are universally great, but, there are a number of very good products on the market which I would like to specifically mention. The first is the A-dec 6300 (Fig. 1). A-decs's lights are universally known for their flexible adjustability; their multi axis articulation eliminates much, if not all of the main complaints regarding operatory lights. The second light of note is the Pelton & Crane Helios 3000 (Fig. 2). This LED lighting system is the most energy efficient and advanced product in terms of actual per watt light delivery by a good measure. Pelton has a decades-long history of leadership in this segment.

Next I should mention the TLC light by the Technology Lighting Center (Fig. 3). This light has perhaps more active fans and detractors than any other light. The TLC light contains efficient spot lights to the oral field and therefore acts much more like a headlight than

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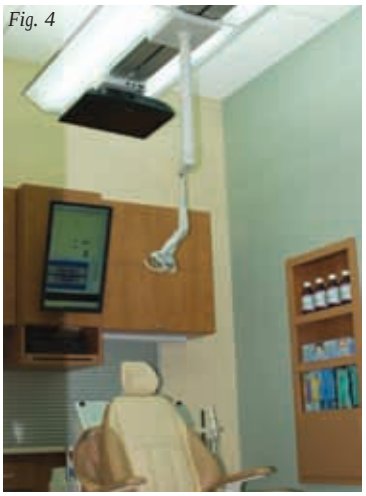
Fig. 4

does any other extraoral lighting product. This light also includes full patient monitor integration in both supine and upright positions.

The last light that I would mention is the Ergonomic Products TBL light, which is new to the dental marketplace (Fig. 4). This light combines the features of the traditional track light by having a wider visual field with patient video monitoring for supine patients and then adds additional task lighting to critical work surfaces (to reduce the accommodation problems of headlight wearers). In addition, the TBL created an entirely new option for treatment illumination – single fixture mounting. The TBL light is an entire room solution with no other light source needed for the entire installation.

For the mature general practice, intraoral dental lighting is here to stay. This will be enhanced by headlights and perhaps only replaced entirely in a microscope exclusive practice, which, for economic reasons, will continue to remain a rarity for some time.

There are a number of products that stand out from the field that will meet the needs of virtually every practitioner without inconvenience or compromise, as a number of practitioners continue to experiment with lightless practice. ■

## Author's Bio

**Dr. David Ahearn** is a full time practicing dentist in Westport, Massachusetts. Though located in a small rural town, his office ranks among the nation's most productive practices. Trained in prosthetics at the University of Michigan, Dr. Ahearn, like many of us, struggled to reconcile the desire for the utmost quality with the requirements for practice success. His discovery and application of the principles of the Toyota Production System in the early 90s began a quality and productivity revolution that is at the heart of his design work. As the founder of Design/Ergonomics, Dr. Ahearn works with doctors across the country in designing comfortable, productive, and cost-effective practices. He has held faculty positions at both the University of Michigan and NYU's College of Dentistry. He is also a founding member of the ADA's Ergonomics Subcommittee and a contributor to numerous dental publications. He can be contacted at 508-636-6566 or 800-275-2547.

# No Overhead Lights

**wisnerjb**
Posted: 6/11/2011
Post: 1 of 75

I'm beginning construction on a Janacek/Design Ergonomics inspired building this month, and I'm contemplating no overhead dental lights. I love my LED headlight, and they've gotten so small and affordable that I'd prefer to just buy them for the staff and delete overhead dental lights.

Anyone tried this or think of a reason it won't work?

I imagine it would be "less intimidating" to the patients and I might even avoid the stank eye glare from the old lady who accidentally has the overhead light in her eyes when we turn it on.

Any thoughts? ■

**Molardaddy**
Posted: 6/11/2011
Post: 2 of 75

This is what Scott Leune has preached at Breakaway seminars. I do use loupes with a light, but there are times when it's a hassle to put them on just to take a quick peek. Pulling the overhead light quickly helps. I wonder how the assistants are going to see if they have to pack cord or make a temporary when I am not there. The ambient lighting might not be enough. Some people have had luck with it and others like me are a little cautious. If you are absolutely cash strapped and want to save money on the overhead lights then it might be an idea you could flirt with as it is being done. ■

I never use my overhead light, but I always have on my loupes and light source. If your assistants had a light source too I see no need for overhead light. If I were building new office I wouldn't have them. ■ Nick

**donnanick**
Posted: 6/11/2011
Post: 3 of 75

Just be sure to have spare headlights on hand. I removed half the overhead lights for six months because we all use headlights. Well then my light developed contact issues and stopped working. I had to hustle to re-install the overheads. But 99 percent of the time they are swung out of the way, unused. ■

**skr RDH**
Posted: 6/11/2011
Post: 4 of 75

Headlights are great as supplemental lighting. The primary issue with headlights is the fact they are point source lights. Thus they are easily blocked and hard shadows are a fact of life.

As far as light in the patients eyes. Best be very careful where you point your head.

Headlights are secondary to a good operating light. You do not see the surgeons in the OR working without the operating light. Their headlights are secondary, the overhead light is primary.

A quality overhead light is a necessity, despite what is promoted by those that sell seminars. Lighting in dentistry is a number one priority; one can hardly have too much light.

Intensity, color and shadow reduction are the three primary requirements. Headlights can hit one or two of those three.

Headlights are great; they are not a replacement for a quality overhead light. ■

**ricklin**
Posted: 6/11/2011
Post: 6 of 75

No overhead lights in our office either. We have LumaDents, Designs for Vision DayLite Minis and also a couple from that young dental student from USC, Ultra Light Optics. All work fine. Each team member has goggles or loupes with them attached, and we rarely miss the overhead light. We did have one hygienist who groused about it, but she is gone now (not because of the light thing).

Our rooms are small, maybe 9x9, but in my opinion seem larger thanks to no overhead light. The ladies in the office even have had the idea of turning off all the lights when they are treating patients, except for our headlamps. What do you think, would "Dentistry in the Dark" go over with your patients?

One thing I would recommend if using headlamps is to provide sun goggles to the patients. Every once in a while I will move my head and if they did not have sun goggles on, they would probably take exception. The sun goggles also makes it easier for them to sleep. ■

**john galt dds**
Posted: 6/12/2011
Post: 13 of 75

I have not used overhead lights since I got Designs for Vision Mini.

I would however suggest that you have the overhead lights installed at least in one to two ops. The reason I say this is because if in the future you get an associate or hygienist that does not use illumination then it would not be an issue. ■

**Raj D**
Posted: 6/13/2011
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