Clinical Benefits of LED Surgical Lights
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Much has been written about the transition of OR lighting away from traditional incandescent technology to LED technology. By now, some of the advantages of LED roll off the tongue: less heat, longer life, better energy efficiency. But these advantages are just the beginning.

If the point of new technology is to provide better patient outcomes, only one of these often stated advantages, less heat, directly applies. LEDs radiate much less heat than incandescent bulbs, so the surgeon and staff are more comfortable (important during long cases). And cooler light means less heat in the surgical field, reducing the risk of drying out exposed tissue. There are several other advantages of LED lighting, beyond reducing heat, that have direct clinical benefits.

Pure white color
One of the most notable features of a high quality LED surgical light is how white the color of the spot is. Traditional halogen bulbs are inherently yellow, with typical color temperatures around 3200 Kelvin (K).

Manufacturers attempt to correct this yellowness by using expensive coatings and filters to remove some of the yellow light, which raises the color temperature to a more desirable level (around 4400K). This filtering makes the light whiter but the color is still not as white as with LED lighting. Also, the coatings and filters used are very difficult to apply consistently, so lighthead-to-lighthead color variability is very high.

If you take two or three halogen lights in your OR and put the spots next to each other, a discerning eye can see the differences in color and intensity between the spots; these differences can become distracting for surgeons.

On the other hand, LED’s can be engineered to produce white light at the preferred color temperature of 4400K, so no filters or reflective coatings are needed to “correct” it. Also, since there are many LEDs per lighthead, any variations among LEDs tend to cancel each other out, so the color match among LED lightheads is much more consistent than in halogen lightheads.

More accurate color rendition
The final clinical benefit of LED lights is their color rendering capability. The Color Rendering Index (CRI) defines how well a light allows an observer to make distinctions between subtle differences in color. Most halogen lights have a very high CRI, but unfortunately, CRI focuses only on how well you can visualize pastel colors.

To determine how well a light renders deep, saturated red colors (the most critical color for surgical procedures) the lighting industry developed a special measurement, called the R9.

LED technology makes all of this filtering unnecessary. LEDs can be designed to only emit light within the visible spectrum. There is no need to filter out IR because it isn’t created in the first place. This has allowed some LED manufacturers to increase their R9 values from the low 70s to the mid 90s.

Surgeons will immediately notice how red colors appear more color and vivid, helping them make tissue identification and diagnosis faster and more accurate.

Clinical justification leads to LED value
Right now, LED surgical lights cost significantly more than older halogen lights. In justifying the increased purchase price, you can look at total cost of ownership using energy and replacement bulb cost savings. The more compelling arguments are the clinical benefits that LED technology provides, which should lead to better patient outcomes.

If cost is a major concern, ask your current surgical light manufacturer about the ability to upgrade to LEDs without replacing the entire suspension. For some manufacturers, upgrading to LED technology can be as easy as swapping the lightheads and updating the control center. This approach saves money and time since these upgrades can be performed in 1-2 hours instead of 1-2 days.

If you are still not sure LEDs are worth the additional investment, have a manufacturer bring in an LED on a mobile stand. A side-by-side comparison between a good LED surgical light and a good halogen surgical light will be no contest. In almost all cases, even an untrained observer will prefer the LED light.

...Just think what a difference it will make to a highly trained surgeon.