

AbstractID: 13880 Title: Effective photodynamic dose delivered by head and neck visualization light sources

**Purpose:** In photodynamic therapy (PDT), it is possible that light sources used for visualization can cause unintended dose delivery. We sought to determine the effective PDT dose delivered by these light sources to provide guidelines for their safe use. **Method and Materials:** We have measured the spectrum and power of a range of light sources typically used in the evaluation of head and neck cancer. The power was measured using a calibrated thermopile detector when possible, and separately using a semiconductor photodiode attached to a 6-inch integrating sphere. The integrating sphere was connected to a fiber-optic spectrograph, which recorded the spectrum of each lamp. The relative sensitivities of the photodiode detector and spectrograph were evaluated relative to the sensitivity at 630 nm. The spectral power of each source was multiplied by the published excitation spectrum of the photosensitizer protoporphyrin IX (PpIX) to obtain an effective power, defined as the power at 630 nm required to produce the level of PpIX excitation as the source. This effective power was used to determine the maximum exposure time for each source. We have evaluated the effect of colored plastic optical filters placed on these sources. **Results:** We have characterized the output of several light sources. The equivalent power emitted by these sources varies from tens to hundreds of milliwatts. The effective power can be reduced by up to a factor of three by appropriate filtration. The effectiveness of this filtration is dependent on the light source spectrum and the sensitizer being used. Exposure time recommendations are summarized for each light source. **Conclusion:** A range of light sources may be suitable for use in conjunction with PDT. These light sources can be used safely and effectively through a combination of limited exposure time and appropriate filtration.