

AbstractID: 8268 Title: Long term stability of thermal type power meter head
intercomparison

Purpose: Establishing the long term stability of laser power measurement in clinic is important for photodynamic therapy. The purpose of this study was to establish the long-term stability among thermal type power head meters use for laser light fluence and power measurements.

Method and Materials: Intercomparison among power meters was performed to determine the consistency of laser power and light fluence rate measured among different power meters. For measurements of power (mW), the beam diameter at the detector surface is smaller than the cross section of the power meter head receiver. For measurement of irradiance (mW/cm^2), the light covers the entire aperture of the detector.

Results: Power and fluence readings were measured and compared among five detectors, for different laser power settings and wavelengths. For all thermal type power meter suitable for power measurement less than 20W, the calibration of power of different power meters can generally change by 8% among different power meters. However, this calibration does not change over time and remains consistent to within 3% for all power meters. Similar results are obtained for laser fluence rate calibration except for a thermal type power meter head with thick absorbing coating that is suitable for measuring laser power up to 150 W, it's calibration factor can be different from other power meters for as much as 34%, 33% and 31% in fluence calibration, for 532nm, 630nm and 730nm, respectively. It's calibration can vary by over 25% over time.

Conclusion: A comparison of power and fluence reading among several power heads used in PDT clinic shows long term consistency for power and light fluence rate calibration to within 3% regardless of wavelength. One should avoid using thermal type power meter head with thick coating, such the LS 150 power meter for light fluence rate calibration.