

## A Masking Method to Create “Custom” Laser Spots for Use in Photodynamic Therapy (PDT)

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### PURPOSE

A masking device or method to create custom PDT laser exposure patterns would be desirable in multiple settings. This study tests the feasibility of a prototype of such a masking device and method. Such a method would optimally be reproducible, accurately patterned, and simple to use. It should also have a distinct margin, visible to the treating physician.

### METHODS

A site was identified in the Lumenis Opal™ and Visulas 690s™ lasers where the beam could be masked. Masks of different patterns and materials were tested. The percentage of light transmission through the masks was tested. The size and geometry of the mask patterns was measured at the slit lamp focal plane. Fluence across the masked treatment area was measured, as was the “intensity drop off” at the edge of the mask. The masks were projected on the fundus of a volunteer to correlate the mask size and orientation to retinal image size and orientation. Masking of the optic disc was also confirmed visually. Patients treated using the mask were monitored with fluorescein angiography.

### RESULTS

For the Lumenis Opal™ laser, and Mainster™ lens, the ratio of mask size to image size at the slit lamp focal plane was calculated to be 1:1. This was consistent with clinical observations on the retinal surface. For the Visulas™ laser, the ratio was 2:1. The size of the masked image varied directly with laser spot size, in an apparent linear relationship. Unmasked areas of laser light had the expected fluence (i.e., no masking effect). Of the materials tested, Post-it note™ paper allowed 18% transmission of laser light, while electrical tape, and black card stock were completely opaque. The “intensity drop off” at the mask edge was equivalent to the edge of the unmasked beam. To date, five treatments have been performed using masks and the Lumenis Opal™ laser, with no ill effects noted, and evidence of benefit from treatment as would be normally expected.

### CONCLUSION

This method allows relatively easy-to-create masks for individualizing laser exposure patterns during PDT. This would allow treatment of peripapillary lesions that could otherwise not be safely treated, and would also limit exposure of healthy tissue to risks of treatment such as choroidal ischemia.