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# Quantifying Alterations of Macular Thickness before and after Panretinal Photocoagulation in Patients with Severe Diabetic Retinopathy and Good Vision

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**Purpose** To investigate the alterations of macular thickness during and after panretinal photocoagulation (PRP) in patients with severe diabetic retinopathy and good vision, and to compare the outcomes of weekly and biweekly treatments

**Design** Prospective, comparative interventional case series

**Participants:** Thirty-six patients with severe nonproliferative diabetic retinopathy or non-high-risk proliferative diabetic retinopathy whose visual acuity was 20/20 or better before PRP

**Methods:** Seventy-two eyes of 36 patients underwent scatter PRP in 4 sessions. The macular thickness was measured by optical coherence tomography. The photocoagulation sessions were performed weekly to one eye and biweekly to the other eye. Each eye was selected at random.

**Main Outcome Measures** Best-corrected visual acuity and macular thickness

**Results** Visual acuities were maintained in 89% of eyes with weekly treatments and 92% of eyes with biweekly treatments. Macular thickness was increased transiently in the central macula in both eyes, more in the weekly treated eyes, and then decreased to control levels in eyes treated biweekly but remained thickened in eyes treated weekly.

**Conclusion** For eyes with severe diabetic retinopathy and good vision, PRP with either weekly or biweekly treatment did not affect postoperative visual acuity. However, biweekly treatments allowed faster recovery of macular thickening after PRP than weekly treatments. *Ophthalmology* 2003;110:2386–2394 © 2003 by the American Academy of Ophthalmology

Panretinal photocoagulation (PRP) was not recommended by the Early Treatment Diabetic Retinopathy Study research group for eyes with mild or moderate nonproliferative retinopathy. However, it was recommended in eyes with “severe diabetic retinopathy,” including those with severe nonproliferative or non-high-risk proliferative diabetic retinopathy.<sup>1,2</sup> Randomized, multicenter collaborative clinical trials have shown that PRP not only is preferable to no treatment, but also achieves a better visual prognosis when applied in a timely manner.<sup>3,4</sup>

However, photocoagulation does not eliminate the possibility of visual loss in high-risk eyes such as those with more severe retinopathy.<sup>3,5</sup> Previous studies have shown that 25% to 43% of eyes with proliferative retinopathy treated with PRP developed increased macular edema and

visual disturbances,<sup>6–8</sup> whereas PRP of eyes with nonproliferative and early proliferative diabetic retinopathy affected the visual field sensitivity, but not the visual acuity.<sup>9</sup>

In general, the initial PRP consists of placing approximately 2000 to 3000 burns in a scatter pattern, and the amount of treatment during any one session is governed by both the patient's pain threshold and ability to maintain concentration.<sup>10</sup> Therefore it may take 3 to 4 sessions to complete the PRP. The interval between each session also depends on the patient's systemic or diabetic condition.

To investigate the alteration of macular thickness before and after the initial PRP in diabetic patients with severe retinopathy and good vision (20/20 or better), macular thickness was measured by optical coherence tomography (OCT) before and after PRP. In addition, to assess the effect of the interval between the PRP sessions, one eye of each patient was treated weekly and the other eye biweekly.

## Patients and Methods

Thirty-six consecutive diabetic patients with severe nonproliferative or early proliferative diabetic retinopathy without visual disturbances were studied prospectively. Twenty-one patients were men and 15 were women. All participants had visual acuity of 20/20 or better and no clinically significant macular edema in both

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