Early studies of the effect of pulse duration and laser wavelength showed a narrower safety margin with argon laser between retinal burn and retinal haemorrhage for short pulse durations (<50 ms).[2–5] More recently, a semiautomated argon laser delivery system has been developed and tested on rabbits. Using a pulse durations of 20 ms, the threshold for a visible burn was 110–120 mW while that for retinal haemorrhage was 600 mW; suggesting an adequate safety margin.[6] Also, light retinal burns produced using pulse durations of 10 and 100 ms had similar histological appearances at 1 week.[6] However, whether the histological changes in the long-term are similar for both pulse durations is not known. It is also not known if shorter pulse duration burns have the same therapeutic effect in controlling proliferative diabetic retinopathy as longer pulse durations burns.

Prior to promoting a shorter pulse duration for panretinal photocoagulation on anecdote alone, sufficient evidence should be gathered to show there is a significant reduction in pain during treatment, that treatment is equally effective at controlling proliferative disease and that the shorter pulse duration treatments have an acceptable side effect profile.

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Eye (2007) **21,** 140–141. doi:10.1038/sj.eye.6702569; published online 1 September 2006

Sir,

Quicker painless diabetic laser

We thank Day and Davies for the information they have provided, which seems to support the effectiveness and safety margin of 20 millisecond (ms) pan-retinal photocoagulation (PRP). We would agree that evidence of the superiority of 20 ms PRP should ideally be gathered before promoting it but, for reasons outlined below, that evidence will be elusive. In these circumstances, we counter that for us to fail to advocate this laser treatment would not be correct either. We address their three questions in turn and attempt to persuade them to try 20 ms PRP next time they have a patient who complains of pain.

Firstly, does 20 ms PRP cause less pain? In an attempt to answer this, one could apply, say, several hundred burns at one location at 100 ms and then a similar number at 20 ms at increased power to produce the same level of blanching. The patient could then be asked if one of the two groups of laser burns was more painful than the other. The difficulty here is that if the clinician was biased, in favour of 20 ms burns for example, he could make the 20 ms burns slightly less intense and therefore produce his desired outcome. A photograph covering the two areas might demonstrate equal intensity of the two groups of burns, although the time between laser and photography would be another variable. This strategy has merits, but photographs trying to demonstrate uniformity of smudgy white spots would not convince all. Perhaps, we will have to wait for unbiased clinicians to look into this for us.

Secondly, is PRP at 20 ms as effective as at 100 ms for controlling proliferative diabetic retinopathy? We can only offer circumstantial evidence. A recent audit compared data of vitreoretinal surgery at Peterborough with that at two neighbouring units. We ask the reader to accept the notions that the number of primary retinal detachment procedures over a given period is proportional to a unit's catchment population, and that inadequate PRP would lead to higher diabetic vitrectomy rates. For the period studied, the ratio of diabetic vitrectomies to primary retinal reattachments was 12/36 (1:3) for Peterborough, where nearly all PRP has been at 20 ms for several years. This ratio was between those for the other two units where PRP is probably 100 ms (32/81 and 8/41 or 1:2.5 and 1:5.1; A

Fitt, personal correspondence). Reassuringly, 20 ms PRP does not seem to be leading to a higher diabetic vitrectomy rate and is therefore probably equally effective, or at least effective enough to control proliferative disease.

Indeed, if 20 ms PRP causes less damage to the choroid, quite feasible if one accepts the premise of less pain, it should further enhance oxygen levels of the retina, bearing in mind that Budzynski *et al*[1] have recently proposed that damage to the choroid is probably diminishing the beneficial effects of PRP. TR's team will consider a retrospective comparison of patients before and after he switched from 100 to 20 ms PRP, about 5 years ago. This might reveal differences in numbers of laser shots before the proliferative disease was thought to be under control.

We are probably all agreed that the laser energy is mostly absorbed by the melanin granules close to the apical surface of the retinal pigment epithelium. Immediately in front of this epicentre of energy release are the rods and cones and then the inner segments of the photoreceptor cells. This is fortunate because if the 20 ms burn is shallower, it will still destroy the inner segments. The destruction of the inner segments, more than that of any other tissue, will reduce the demand for oxygen and other nutrients, leaving more for unlasered retina. This is because the voracious oxygen consumption of the inner segments at 15 ml O_2/100 g/min in the dark[2] is as much as cardiac muscle during exercise.[3]

Thirdly, could the side-effect profile of 20 ms PRP be worse than that of 100 ms PRP? TR's 5 years and WW's 3 years of experience of 20 ms PRP (perhaps over 1000 patient sessions) have not raised any suspicion of a difference in loss of visual field (or driving licenses) or complaints of loss of dark adaptation. There has been speculation that these side effects are more likely with elderly patients. Rather than burn duration, these side effects are probably related to the sharp fall of RPE melanin with age, from 80 μg/mg at the age of 40 years to half that at age 70 years.[4] With less RPE melanin the laser energy would be more widely distributed across the whole depth of the elderly retina and choroid, rather than being confined to the apical surface of the RPE cells.

What, then, are the options for clinicians if patients cannot tolerate 100 ms burns of adequate intensity? Retrobulbar anaesthesia would sit rather awkwardly with College cataract surgery guidelines that discourage sharp needle orbital anaesthesia in the absence of an anaesthetist. Sub-Tenon's anaesthesia is possible but the laser contact lens might not be sufficiently sterile to be in contact with the open conjunctival wound, which could still be bleeding. General anaesthesia is occasionally indicated but is altogether more complicated and inconvenient for patients and does displace others from the operating list. We would urge ophthalmologists to try 20 ms PRP as the most practical option, which in addition allows far more shots to be applied over the same time period. Doubters and sticklers for evidence-based medicine might take some reassurance from the fact that 20 ms PRP is commonly used at Moorfields Eye Hospital in London (J Dowler, personal communication).

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Eye (2007) **21,** 141–142. doi:10.1038/sj.eye.6702570; published online 1 September 2006

Sir,

Septic metastatic endophthalmitis complicating *Klebsiella pneumoniae* scalp furuncle

Septic metastatic endophthalmitis is a rapidly devastating ocular infection resulting from the haematogenous spread of organisms to the eye. Several