

Modulation of amblyopia therapy following early surgery for unilateral congenital cataracts

In the early 1980s the first reports appeared of successful treatment of unilateral congenital cataract.¹ These reports sometimes met with a sceptical response.² Unilateral congenital cataract had a bad reputation for producing intractable amblyopia and surgery traditionally did not produce useful vision. Advances in surgical technique have led to earlier surgery using lensectomy. Instant clarity of the pupillary axis following surgery and early correction with a soft contact lens have allowed early optical rehabilitation and these factors combined with aggressive patching regimes have contributed to steadily improving results.³ The development of preferential looking techniques has enabled the accurate measurement of visual function in babies as young as a few days old.⁴

The role of animal research has been vital in developing models of stimulus deprivation amblyopia and increasing our understanding of the critical period.⁵ Stimulus deprivation amblyopia produced in cats and monkeys by lid suture has been the preferred model for most amblyopia research⁶; it produces the most striking anatomical changes in the visual cortex and is the most difficult form of amblyopia to treat. The intractable nature of amblyopia in unilateral congenital cataract is a function of its early onset and the fact that there is an imbalance between the two eyes such that the cataractous eye is at a disadvantage in competition for dominance of the visual cortex in area 17. Bilateral congenital cataracts have always been found to have a better prognosis than unilateral⁷ cataract. This is because the presence of bilateral stimulus deprivation⁸ prolongs the sensitive period and competitive interactions are absent. Animal work has shown that anatomical changes caused by stimulus deprivation amblyopia are reversible^{9,10} suggesting that with adequate occlusion therapy good visual acuity in the cataractous eye might be achieved.

Lloyd *et al* in their paper (p 802) comment that half their patients had early surgery and the other half very early surgery according to the criteria of Birch and colleagues.³ There is good evidence that surgery before 2 months of age carries the likelihood of a better outcome.^{11,12} Recent work by Birch and Stager¹³ has shown that final visual acuity steadily diminishes with age at the time of operation if surgery is carried out later than the sixth week of life. These findings accord with the idea that there may be a precortical period of visual development and that during this time the visual system is refractory to insults such as unilateral cataract, macular haemorrhage, or strabismus.¹⁴⁻¹⁷ The results of the patching regime employed by Lloyd *et al* are excellent in terms of preferential looking acuity and are comparable with the best results from other centres.⁷ It remains to be seen whether these results will translate into good recognition acuity. It is clear that compliance in contact lens wear and occlusion is crucial to success in the management of unilateral congenital

cataract and there is no doubt that a high degree of commitment is required of both the families of these children and the clinical team. In the light of the great effort required it is worrying to hear that the visual function of the normal eye may be compromised by intensive patching.¹⁸ Graded occlusion based on the results of the acuity card procedure combined with the monitoring of compliance as reported by the parents have produced good results and minimised the risk of amblyopia in the fellow eye and also minimised the amount of time spent occluding the fellow eye. Other centres in the UK have yet to report this order of success and it is possible that the population in the Great Ormond Street study is exceptional. However, these authors have set a high standard and shown the way in which success can be achieved. Preferential looking visual acuity within the normal range in 90% of children with unilateral congenital cataract is a goal to aim for.

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