Restoring lens capsule integrity enhances lens regeneration in New Zealand albino rabbits and cats.

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Abstract:

In studies conducted by numerous investigators for 150 years, lenses regenerated following endocapsular lens extraction in New Zealand albino rabbits have been irregular in shape, appearing primarily doughnut-shaped as a result of lack of lens growth at the site of the anterior capsulotomy and its adhesion to the posterior capsule. In the present study, we restored the lens capsule integrity by inserting a collagen patch at the time of surgery to seal the anterior capsulotomy and to improve the shape and structure of the regenerated lenses. We then filled the capsule bag with air to prevent adhesions between the anterior and posterior capsule and maintain capsule tautness and shape. Lens regeneration was first noted as early as one to two weeks. Regenerated lens filled approximately 50% of the capsule bag at two weeks and 100% by five weeks. Subsequent growth was in the anterior-posterior direction and measured by A-scan biometry. Lens thickness increased by 0.3 mm per month. The regenerated lenses were spherical with normal cortical structure and a nuclear opacity. In conclusion, restoration of lens capsular integrity with a collagen patch following endocapsular lens extraction enhanced the shape, structure, and growth rate of the regenerated lenses. In addition, lens regeneration was shown to occur in two cats.