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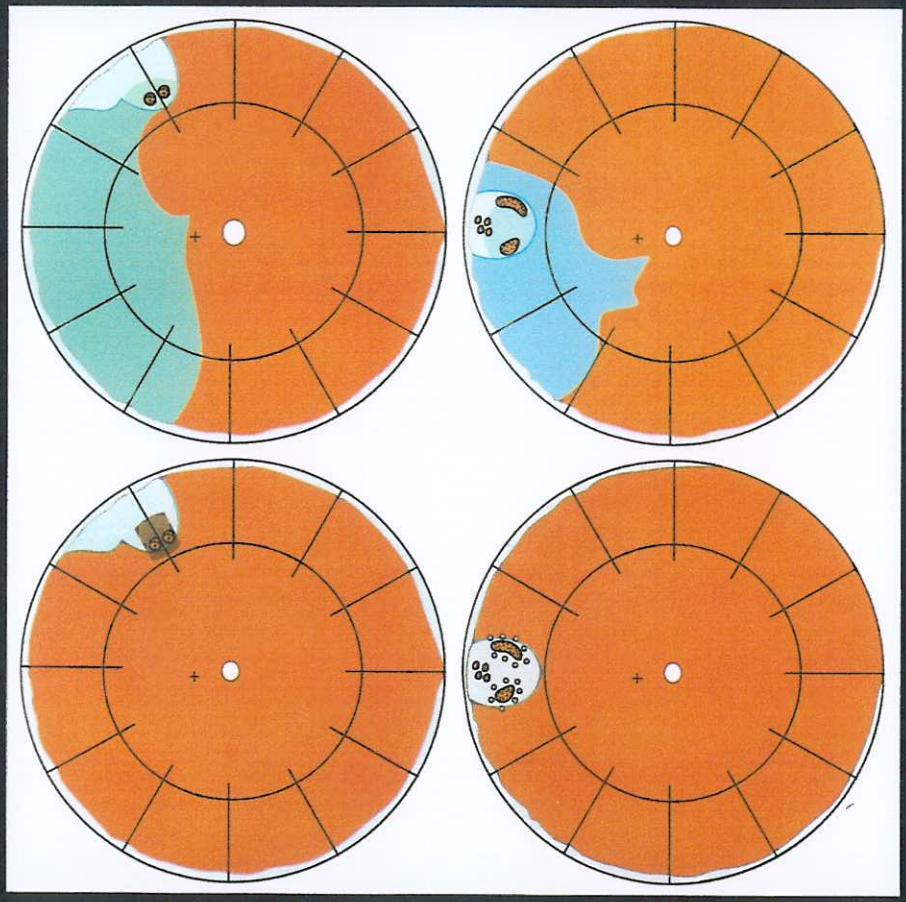

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Minor surgery for the repair of retinal detachment emanating from retinoschisis

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ABSTRACT.

Purpose: **To propose a mechanism for the development of the outer layer retinal tears that occur with retinoschisis and the detachment emanating from it that is consistent with the limited extent of the detachment and the response to binocular occlusion and local buckles.**

Methods: **A consecutive series of 24 patients with retinoschisis, collected over 15 years, was analysed. Seven patients developed a symptomatic retinal detachment emanating from breaks in the outer layers of retinoschisis. The detachments responded to binocular occlusion, a sponge buckle, or a temporary balloon buckle and laser coagulation to the edges of the breaks.**

Results: **Two retinas attached completely after 48 hr of binocular occlusion, four responded to local sponge buckles and one to a temporary balloon buckle. All attached without drainage of subretinal fluid. Final visual acuity was 20/20 in six eyes and 20/25 in one eye.**

Conclusion: **The detachment emanating from retinoschisis responds to ocular rest or a local buckle to breaks in the outer layers. It is proposed that the mechanism for the detachment that emanates from retinoschisis is intraretinal traction by residual transretinal fibres at the edge of the schisis cavity.**

Key words: binocular occlusion – outer layer breaks – retinal detachment – retinoschisis – segmental buckle

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Introduction

The detachment emanating from retinoschisis is shallow and limited in extent (Byer 1986). A variety of extraocular and intraocular procedures have been proposed to reattach the retina: some with gas injection and most with drainage of subretinal fluid (Dobbie 1969; Sulonen et al. 1985; Byer 1986, 2002; Ambler et al. 1989; Hoerauf et al. 2001; Lee & Hilton 2001). We found that attachment can be obtained with ocular rest (binocular occlusion) or a local buckle without drainage of subretinal fluid.

Materials and Methods

Seven patients with retinal detachment emanating from retinoschisis became symptomatic when the detachment approached the posterior pole. The detachments were caused by one or more breaks in the external layers of the schisis cavity. Two patients were treated with binocular occlusion for 48 hr, four were buckled with a local silicone sponge, and one with a temporary parabulbar balloon (Lincoff et al. 1979). The breaks were secured with laser applications after they became attached. The patients were consecutive and collected over 15 years on the retina service at the New York Presbyterian Hospital.

Results of binocular occlusion

Patient 1

A 12-year-old girl presented with diminished vision in her right eye of 6 weeks duration. There was a history of pars planitis at the age of 8 that responded to steroid treatment. Examination revealed a shallow temporal detachment that invaded the macula and reduced the visual acuity to 20/40. The detachment emanated from two round holes in the outer layers of an infero-temporal retinoschisis (Fig. 1). A scleral buckle procedure under general anaesthesia was recommended, but the parent rejected it. As an alternative a trial of binocular occlusion was undertaken. An examination after 48 hr of occlusion revealed the retina to be attached. A single interrupted line of laser applications was

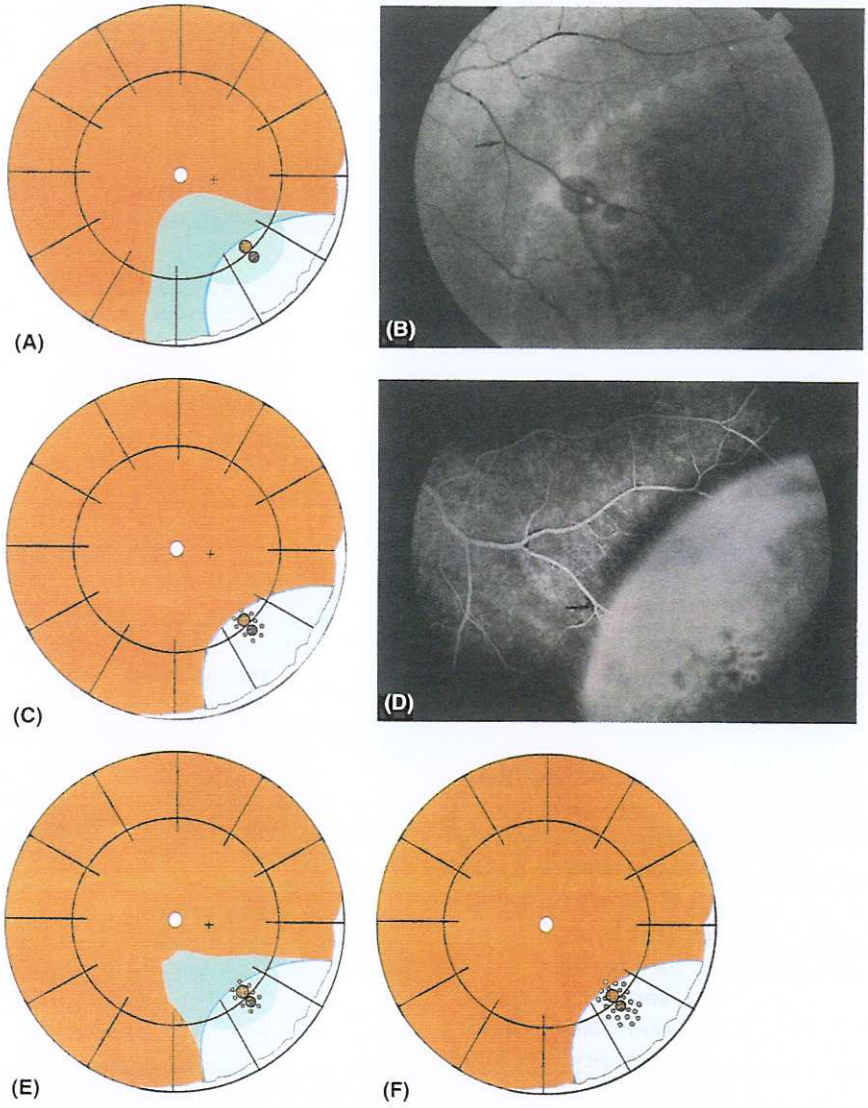

Fig. 1. (A) A shallow infero-temporal detachment emanating from two holes at 4:30 in the outer layers of the schisis cavity. (B) Fundus photo of the breaks in the outer layers. Note that the schisis cavity is shallow (the arrow marks a vessel bifurcation in detached retina beyond the posterior edge of the schisis cavity). (C) After 48 hr of binocular occlusion the retina became attached and the edges of the breaks were lasered. (D) At 4 weeks the schisis cavity had become bullous, overhanging the posterior edge and appearing closer to the vessel bifurcation as noted in (B) (arrow). (E) At 7 weeks the retina redetached because outer layer holes had reopened. The schisis cavity was no longer bullous. (F) After 72 hr of binocular occlusion the retina reattached and the breaks were secured with two additional lines of laser application.

made around the holes in the outer layers to secure them. In the ensuing weeks the schisis cavity was noted to expand and become bullous. In the seventh postoperative week the retina redetached because the outer layer breaks had reopened. With the development of the redetachment the schisis cavity diminished in height. A second period of binocular occlusion for 72 hr reattached the retina a second time and the breaks were secured with two additional lines of laser coagulation. Postoperatively the schisis cavity expanded again, but the breaks remained secure. The patient has been followed for 15 years with no recurrence of the detachment. The visual acuity is 20/20.

Patient 2

A 40-year-old man complained of diminished vision in his right eye of 1 week duration. Examination revealed a temporal schisis elevation that extended to within two disc diameters of the macula. There were three breaks near the posterior edge in the outer layers of the schisis cavity. A detachment emanating from the breaks extended beyond the schisis and invaded the macula (Fig. 2). The visual acuity was reduced to 20/70. A scleral buckle beneath the breaks was considered, but rejected because of the likelihood of it causing macular distortion. Instead, binocular occlusion was attempted. After 48 hr the detachment regressed enough for the breaks to respond to laser coagulation. Subsequent mobilization did not redetach the retina and visual acuity improved to 20/20. The patient has been followed for 14 years without redetachment.

Results of local sponge buckling

Patient 3

A 65-year-old man presented with recent loss of vision in his right eye.

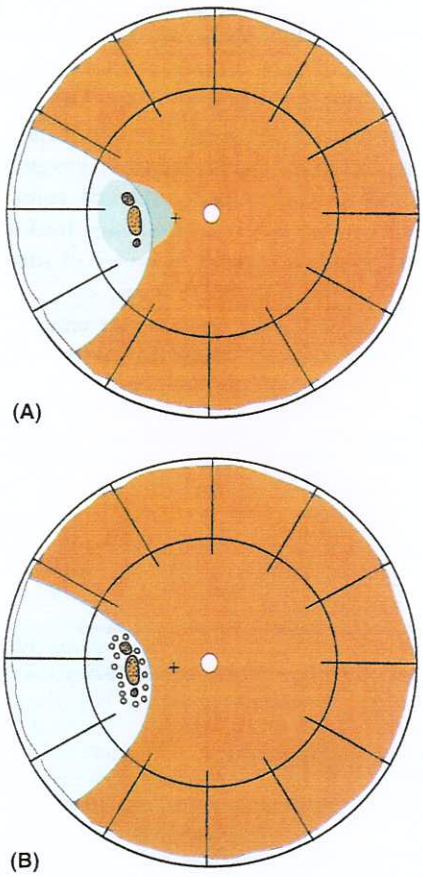

Fig. 2. (A) A detachment invading the macula emanates from three breaks near the posterior edge of a schisis cavity. (B) After 48 hr of binocular occlusion the detachment regressed and the breaks were secured with laser coagulation.

The visual acuity was 20/40. Examination revealed a shallow temporal detachment that invaded the macula. The detachment emanated from two breaks in the outer layers of a supero-temporal retinoschisis cavity (Fig. 3). The breaks were buckled with a 5 mm radially oriented silicone sponge. Subretinal fluid absorbed overnight and the breaks were secured with laser applications. Visual acuity improved to 20/25.

Patients 4, 5 and 6

These patients had retinal detachments emanating from breaks in the outer layers of infero-temporal schisis cavities. The detachments approached the posterior pole and were symptomatic, but did not invade the macula. Visual acuity was 20/20 in the three eyes. The breaks in each detachment were buckled with a radially oriented segmental silicone sponge. All of the detachments regressed without drainage of subretinal fluid and the breaks were secured with laser applications. Postoperative visual acuity remained 20/20 in the three eyes.

Results of temporary balloon buckle

Patient 7

A 42-year-old man presented with a temporal retinal detachment in the right eye emanating from a small schisis cavity in the horizontal meridian. The patient complained of a nasal shadow. The visual acuity was 20/20. Examination revealed two oval-shaped breaks in the outer layers at the posterior edge of the schisis cavity. There were four small round holes anteriorly in the inner layers (Fig. 4). Because the schisis cavity and the breaks were in line with the lateral rectus muscle, they were buckled with a temporary balloon inserted through the tendon of the lateral rectus muscle and expanded beneath the muscle with 1 ml of sterile water. The retina became attached by the next day and the two outer layer breaks were secured with laser coagulation.

No treatment was applied to the inner layer holes. The balloon was deflated and withdrawn after 7 days, the retina remained attached and visual acuity remained at 20/20. The horizontal diplopia that had occurred with the insertion of the balloon remitted over the next week.

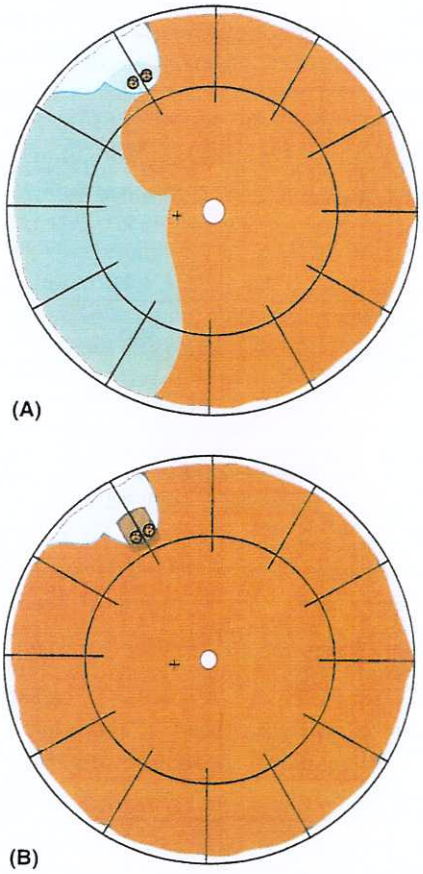

Fig. 3. (A) A detachment invading the macula emanating from two breaks at the posterior edge of a supero-temporal schisis cavity. (B) A 5 mm radial sponge effected complete regression of the detachment.

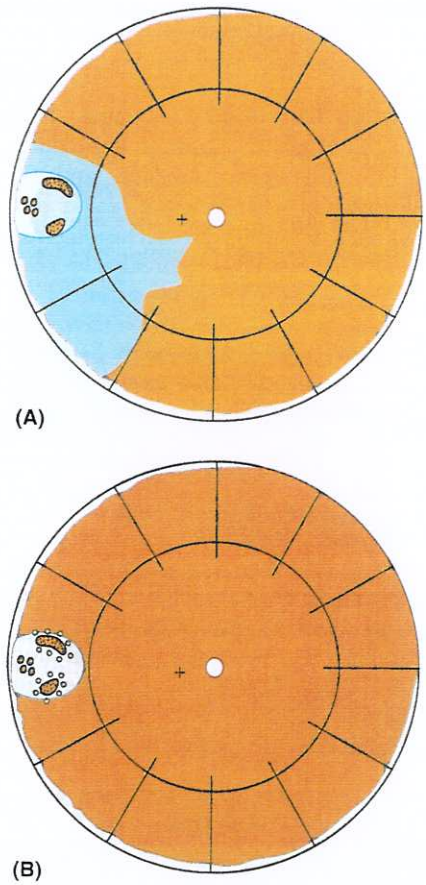

Fig. 4. (A) A temporal detachment emanating from two oval-shaped breaks in the outer layers of a schisis cavity at 9 o' clock. There were four small inner-layer breaks anteriorly. (B) A temporary balloon buckle effected attachment and made the outer-layer breaks suitable for laser coagulation.

Discussion

If retinoschisis becomes symptomatic it is because a retinal detachment has occurred secondary to breaks in the outer layers. The breaks tend to occur at the posterior edge of the schisis cavity. Their occurrence is asymptomatic and in most eyes the outer layers remain attached (Byer 1986). In a few the edges of the breaks are lifted apparently by intraretinal traction and an outer-layer detachment develops. If the detachment spreads beyond the border of the schisis cavity and invades the posterior pole, it may become symptomatic. Most never become symptomatic because they emanate from breaks in schisis cavities in the infero-temporal quadrant and the detachments never rise to the level of the posterior pole. They may be discovered on routine retinal examinations and are appropriately managed with periodic examination.

The retinal detachment complicating schisis is shallow and limited in extent because the source of the subretinal fluid is the fluid from the schisis cavity. An indication that this is a valid assumption is the observation that as the detachment develops; the schisis cavity diminishes in height. It is suggested that progress of the detachment ceases when the combined extent of the detachment and the schisis cavity provide enough area of exposure to pigment epithelium to affect equilibrium between the fluid production into the schisis cavity and the outward fluid transfer action of the pigment epithelium. After the breaks are closed, the detachment regresses and the schisis cavity expands again

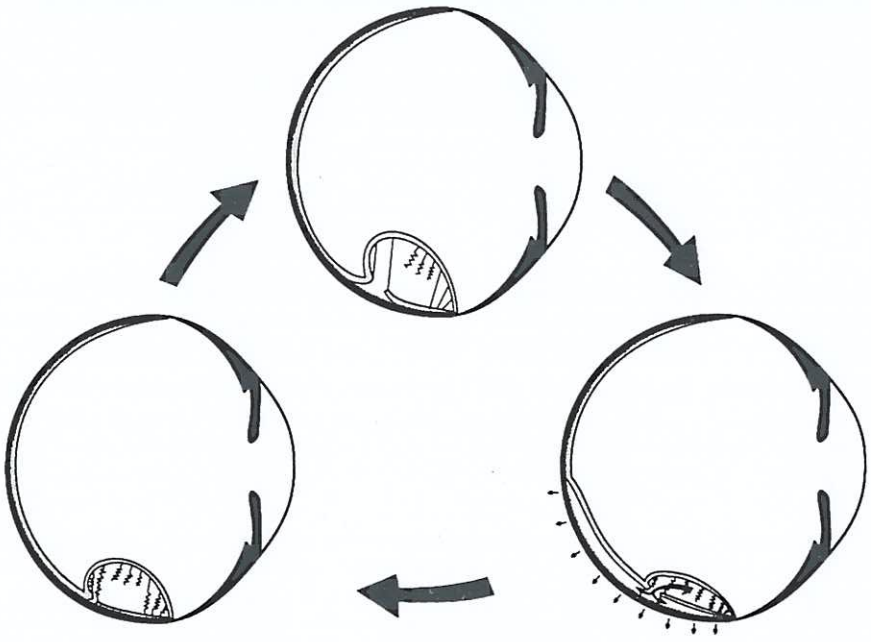

Fig. 5. A suggested mechanism for retinal detachment emanating from retinoschisis: the edges of an outer-layer break in bullous schisis are lifted by taut intraretinal fibres at the edge of the schisis cavity (top centre). Schisis fluid empties into the subretinal space causing a shallow detachment. The spread of the detachment stops when the outflow by the pigment epithelium equals the fluid production of the schisis cavity (bottom right). At this time the intraretinal fibres are relaxed and binocular occlusion can yield attachment (bottom left).

and reasserts intraretinal traction on the outer layer breaks, as it did in patient 1. The sequence of spontaneous attachment with binocular occlusion and redetachment after the schisis cavity expands again suggests a mechanism for the detachment that emanates from retinoschisis. It is likely that intraretinal traction is exerted by residual intraretinal fibres that persist at the edge of the schisis cavity (Straatsma & Foos 1973; Limon & Haut 1976). It is suggested that these fibres lift the edges of the tears that occur at the posterior edge of a schisis cavity and initiate retinal detachment. This occurrence may coincide with an aggravated period of diurnal secretion into the schisis cavity. This mechanism would be consistent with the occasional elevated posterior flap seen in tears at the posterior edge of schisis cavities. After the detachment occurs, the schisis cavity diminishes in height and the fibres relax. It is then that ocular rest, obtained by binocular occlusion, may allow the outer-layer breaks to reattach (Fig. 5). The observation of redetachment after the schisis cavity reexpands – as occurred with patient 1 – suggests that a scleral buckle beneath the outer layer breaks may be the optimal procedure for repair.

Acknowledgements

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References

Ambler JS, Meyers SM, Zegarra H & Gutman FA (1989): The management of retinal detachment complicating degenerative retinoschisis. Am J Ophthalmol **107**: 171–176.

Byer NE (1986): A long term natural history of senile retinoschisis with implications for management. Ophthalmology **93**: 1127–1137.

Byer NE (2002): Perspectives on the management of the complications of senile retinoschisis. Eye **16**: 359–364.

Dobbie JG (1969): Cryotherapy in the management of senile retinoschisis. Trans Am Acad Ophthalmol Otolaryngol **73**: 1047–1060.

Hoerauf H, Joachimmeyer E & Laqua H (2001): Senile schisis detachment with posterior outer layer breaks. Retina **21**: 602–612.

Lee SS & Hilton GF (2001): Degenerative and secondary retinoschisis. In: Ryan SJ (ed.). Retina. St Louis: Mosby, 2100–2120.

Limon S & Haut J (1976): Structural study of retinoschisis. Bull Soc Ophthalmol Fr **76**: 805–808.

Lincoff H, Kreissig I & Hahn YS (1979): A temporary balloon buckle for the treatment of small retinal detachments. Ophthalmology **86**: 586–592.

Straatsma BR & Foos RV (1973): Typical and reticular degenerative retinoschisis. XXVI Francis I Proctor Memorial Lecture. Am J Ophthalmol **75**: 551–575.

Sulonen JM, Wells CG, Barricks ME et al. (1985): Degenerative retinoschisis with giant outer layer breaks and retinal detachment. Am J Ophthalmol **99**: 114–121.

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