

# Scleral explant removal: the last decade

S Deokule<sup>1</sup>, A Reginald<sup>1</sup> and A Callear<sup>2</sup>

CLINICAL STUDY

## Abstract

**Purpose** To examine the reasons for and outcomes of the scleral explant removal over the last decade.

**Methods** A case note review of patients undergoing scleral explant removal in the operating theatre over a period of 10 years from January 1990 to December 1999. The following information was retrieved: age, sex, reason for explant removal, duration of explant (ie interval between primary surgery and explant removal), type of explant, symptomatic relief, preoperative and postoperative retinal status including redetachment, causes for redetachment, and follow-up. Mann–Whitney *U*-test and Fisher's exact test were used for statistical analysis.

**Results** A total of 72 patients were eligible for the study. The average age was  $54.1 \pm 17.0$  years (range, 17–84 years). The mean duration of explant was 50.1 years (range, 1–282 months) and mean follow-up was 18.3 months (range, 4–120 months). In all, 51 (70.8%) patients had a sponge silicone explant, 13 (18%) patients had a solid silicone explant, whereas eight (11.1%) patients had a combination of the two. The commonest reason for the explant removal was extrusion ( $n = 34$ , 47.2%) closely followed by pain ( $n = 29$ , 40.2%). Symptomatic relief was achieved in 88% of patients. Six patients (8.3%) suffered retinal redetachment post explant removal. There was no statistically significant correlation between the reason for the removal or the duration of the explant and retinal redetachment. The majority ( $N = 5$ ) of redetachment occurred within 6 months of the explant removal ( $P < 0.01$ ).

**Conclusion** The Scleral explant removal provides symptomatic relief to the majority of patients, but is associated with a small risk of redetachment especially within 6 months postoperatively.

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**Keywords:** scleral explant; rhegmatogenous retinal detachment; extrusion; retrospective; redetachment; scleritis

## Introduction

The surgical management of rhegmatogenous retinal detachment (RRD) has changed significantly in the last decade. Pars plana vitrectomy is increasingly used for primary repair of RRD.<sup>1</sup> However, conventional methods with cryopexy and scleral explant are still used in 37.0–64.4% of the cases.<sup>1,2</sup>

Reported rates of removal of a scleral explant vary from 3.8 to 24.0% in the literature.<sup>3–6</sup> Infection of the explant was the common cause for removal in earlier studies,<sup>3,6</sup> whereas extrusion was the commonest reason in a more recent report.<sup>5</sup> Although there are several studies reporting the indications for and complications of the procedure, no study examines the effectiveness of this procedure in relieving patient symptoms.

We conducted this study to examine the incidence and indication for the explant removal, and outcome of this procedure including the rate of symptomatic relief and postoperative retinal status.

## Material and methods

All patients known to have undergone conventional RRD repair with the scleral explant and the scleral explant removal at Birmingham and Midland Eye Centre and Royal Shrewsbury Hospital over a 10-year period, from January 1990 to December 1999, were identified from the theatre register. Case notes of all patients who had undergone explant removal were reviewed. Patients meeting the following criteria were included in the study:

1. Primary detachment should have been RRD.
2. No additional treatment should have been undertaken during or after explant removal.
3. At least 3 months of follow-up after explant removal.

<sup>1</sup>Birmingham and Midland Eye Centre  
Dudley Road  
Birmingham, UK

<sup>2</sup>Royal Shrewsbury Hospital  
Shrewsbury, UK

Correspondence:  
S Deokule  
Birmingham  
and Midland Eye Centre  
Dudley Road  
Birmingham B18 7QU, UK  
Tel: +44 121 554 3801  
Fax: +44 0121 507 6711  
E-mail: spdeokule@hotmail.com

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The following information was retrieved from the case notes: age at the time of explant removal, sex, reason for explant removal, duration of explant (ie interval between primary surgery and explant removal), type of explant, symptomatic relief, preoperative and postoperative retinal status including redetachment, causes for redetachment, and follow-up. Fisher's exact test and Mann-Whitney *U*-test were used for statistical analysis.

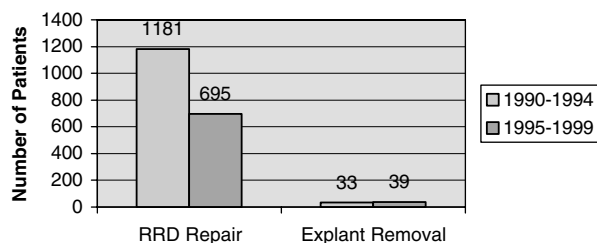
## Results

In all, 1879 patients were identified to have undergone conventional RRD repair from theatre registers. A total of 80 patients had undergone explant removal in the theatre over the period chosen for this study. In total, 78 of these records became available for examination out of which 72 eyes satisfied the study criteria. Six cases were excluded, because of short follow-up in three cases and use of prophylactic laser retinopexy as an additional procedure in another three cases. Figure 1 compares the number of patients with RRD repair and scleral explant removal during the first 5-year period *vs* the second 5-year period.

The mean age of the study group was  $54.1 \pm 17.0$  years with a range of 19–85 years. In all, 40 patients (55%) were male and 32 (45%) were female. The mean duration of explant that is, the interval between primary surgery and explant removal, was 50.1 months with a median of 24 months (range, 1–252 months). The mean follow-up after removal of the explant was 18.3 months with a median of 6 months (range, 4–120 months).

### Type of explant

A total of 51 (70.8%) patients had a sponge silicone explant, 13 (18%) patients had a solid silicone explant, whereas eight (11.1%) patients had a combination of the two.



\*RRD = rhegmatogenous retinal detachment

**Figure 1** Comparison of RRD repair and scleral explant removal between 1990–1994 and 1995–1999.

### Indication

The commonest reason for the explant removal was extrusion ( $n = 34, 47.2\%$ ) closely followed by pain ( $n = 29, 40.2\%$ ). Other categories were scleritis, infection, foreign body sensation, diplopia and others (Table 1). These categories were not mutually exclusive. Of the patients, 37 had a single indication and 35 had multiple indications. Extrusion, pain, and infection were more common indications for removal of a solid explant compared to a sponge explant.

### Symptomatic relief

Excluding patients with extrusion as a sole indication ( $n = 14$ ) for removal of the explant, symptoms were relieved in 51 patients (87.9%), whereas in seven patients (12.1%) the reason for removal persisted. Among patients with persistent problems, two patients had diplopia and one patient had iris rubeosis.

### Retinal status

The retina was flat in 70 eyes (88.8%) at the time of explant removal. Two patients with detached retina at the time of explant removal were excluded from the analysis concerning postoperative retinal status. Retina redetached in six eyes (8.5%) after explant removal. Figure 2 shows the relation between the duration of explant and redetachment. There was no correlation between the short length of duration of explant and redetachment ( $P = 0.06$ , Mann Whitney *U*-test).

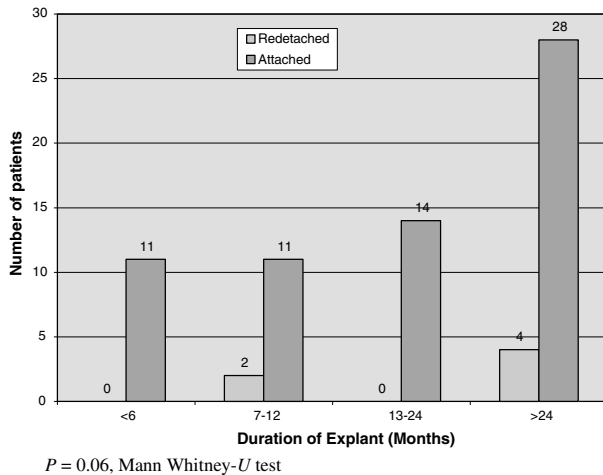
Table 2 presents details of eyes that suffered redetachment. Five patients out of 39 male patients redetached compared to one out of 31 female patients. This was statistically significant ( $P < 0.01$ , Fisher's exact test). Other factors: age, type of explant, and reason for removal of the explant, were not associated with a significant risk of redetachment. One eye out of 12 eyes with solid explant compared to five eyes out of 51 eyes

**Table 1** Reasons for explant removal ( $N=72$ )

	Sponge (%)	Solid (%)	Combination (%)	Total (%)
Extrusion	21 (29.0)	8 (8.3)	5 (6.9)	34 (47.2)
Pain	20 (27.7)	6 (8.3)	3 (4.1)	29 (40.2)
Infection	13 (18.0)	4 (5.5)	2 (2.7)	19 (26.3)
Scleritis/redness	16 (22.2)	3 (4.1)	0	19 (26.3)
FB sensation	4 (5.5)	2 (2.7)	0	6 (8.3)
Diplopia	2 (2.7)	0	0	2 (2.7)
Others	2 (2.7)	0	2 (2.7)	4 (5.5)

Others category included reasons for explant removal, present only in one patient each.

FB sensation=foreign body sensation.



**Figure 2** Duration of explant and retinal status.

with sponge explant redetached. This was not statistically significant ( $P = 0.63$ , Fisher's exact test).

The reasons for retinal redetachment were identifiable in all cases. Three eyes redetached owing to a new 'U' tear, original 'U' tear was responsible for redetachment in one case, one case developed PVR, whereas one developed giant retinal tear. Two eyes with fresh 'U' tear had progressive myopia. The majority of retinal redetachment occurred within 6 months of explant removal ( $N = 5$ ), whereas one retinal redetachment occurred after 24 months ( $P < 0.01$ , Fisher's exact test).

## Discussion

The treatment of RRD with encircling element with drainage of fluid is a method developed by Schepens in the 1950s.<sup>7</sup> Lincoff introduced the technique of limited scleral buckling to the area of the retinal break in the mid-1960s.<sup>8</sup> Both these techniques have been refined and widely used since. However, our study points towards decreasing use of scleral explant for RRD repair. In all, 1181 eyes underwent RRD repair with scleral explant from 1990 to 1995 in comparison with 665 eyes

undergoing RRD repair with scleral explant from 1995 to 1999. This change could be because of the recent trend of using vitrectomy techniques with internal tamponade for primary repair of RRD.

Nearly half of the patients in our study had multiple indications for explant removal. This finding is in variance with previous reports where a single indication has been ascribed to each case. We believe our finding represents the clinical reality, where the patient often has more than one symptom. Extrusion was the commonest indication for removal of the explant in our study (47.2%). This finding concurs with Deutsch *et al*,<sup>5</sup> although extrusion accounted for 74% of reasons of explant removal in their study. The actual rate of extrusion in our study may be higher as some cases may have had explant removal on slit lamp in outpatient. Scleritis was an indication for the removal of explant in 19 cases (26.3%), which is much higher than previously reported. Some of these cases diagnosed as scleritis may have had a foreign-body granuloma reaction.

The majority of patients gained symptomatic relief from the procedure. This aspect of explant removal has not been explored before. In our study, nearly 88% of patients were relieved of their symptoms. Among those who did not get symptomatic relief two patients had diplopia, whereas one had anterior segment ischaemia and rubeosis. Transient ocular motility disorder is common after retinal detachment repair, but diplopia may persist in 5–25% of patients.<sup>9</sup> Management of persistent diplopia often requires a stepwise approach. In one study, only 20% of patients were relieved of diplopia by removal of the scleral explant, 60% required additional measures such as prisms or strabismus surgery, whereas diplopia persisted in 20% of patients.<sup>10</sup> In our study, diplopia persisted in both patients after explant removal. Prisms relieved diplopia in one case, whereas other patients required strabismus surgery. One patient with persistent rubeosis developed a painful blind eye despite several sessions of pan retinal photocoagulation. If these three patients are excluded from the analysis then symptomatic relief was achieved in 93% of cases.

**Table 2** Details of patients with redetachment

Number	Sex	Reason for removal	Type of explant	Duration of explant (months)	Time to redetachment (months)	Cause of redetachment
1	Male	Pain, infection <sup>a</sup>	Sponge	180	5	Fresh 'U' tear
2	Male	Pain	Sponge	180	6	PVR
3	Male	Extrusion	Tyre	84	4	Fresh 'U' tear
4	Female	Pain	Sponge	9	6	Original tear
5	Male	Pain, scleritis <sup>a</sup>	Sponge	9	24	Fresh 'U' tear
6	Male	Extrusion	Sponge	252	1	Giant retinal tear

<sup>a</sup>Some patients had multiple reasons for removal.

**Table 3** Reason for explant removal and redetachment (N=70)

Reason for removal	Attached	Detached	Total	P-value <sup>a</sup>
Pain	25	4	29	0.72
Extrusion	30	2	32	0.31
Infection	15	1	16	0.68
Scleritis	15	1	16	0.68

<sup>a</sup>Fisher's exact test.

The redetachment rate of 8.3% with an average follow-up of 29.3 months is similar to that reported by Deutsch *et al*<sup>5</sup> and Schwartz and Preutt,<sup>6</sup> but is lower than in other series. Infection as a reason for explant removal has been suggested as a contributing factor towards redetachment.<sup>4,6</sup> However, Deutsch *et al*<sup>5</sup> did not demonstrate an association between infection as a reason for removal of the explant and a greater risk of redetachment. Infection accounted for 20% of reasons for removal of the explants in their study. Our study supports the later finding that no single reason for explant removal posed a higher risk of redetachment. The relation between four major reasons for explant removal and redetachment is presented in Table 3. In fact, the risk of redetachment following explant removal may not be increased at all. The risk of redetachment after a conventional retinal detachment surgery varies from 8.1 to 12.1%.<sup>11,12</sup>

The duration of explant was not related to incidence of redetachment. None of the patients ( $n = 11$ , 15.2%) who required explant removal within 6 months of original surgery suffered redetachment. Retina redetached in three eyes even though the duration of explant was greater than 10 years. Male sex was found to be a significant risk factor for retinal redetachment. However, the small numbers involved prevent multivariate analysis to minimize the effect of confounding factors.

The redetachment is more likely to occur in the first 6 months of explant removal. Lindsey *et al*<sup>4</sup> performed survival analysis on patients with redetachment and demonstrated that most redetachment occurred within 90 days of explant removal. Likewise, in a study by Schwartz *et al*,<sup>6</sup> 82% of redetachment were detected within 6 months. In our study, five out of six patients had retinal redetachment within 6 months of explant removal. The patient who had redetachment after 24

months had progressive myopia and was found to have fresh 'U' tear. Continued vitreous retinal traction could have a role in causing the redetachment. Certainly in our study three out of six patients with redetachment developed new tear, whereas in one case original tear opened up again, presumably because of vitreous traction.

Our study provides a valuable insight into the reasons for scleral explant removal and outcomes of this procedure. Removal of the scleral explant provides patients with excellent symptomatic relief, but is associated with a small risk of redetachment especially in the immediate 6-month postoperative period.

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