Scleral buckling

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Surgical Treatment

• Pneumatic retinopexy
• Scleral buckling.
• Primary pars plana vitrectomy.
**Scleral buckling**

- **Indications for scleral buckling.**
  
  SB is used to treat the majority of cases with rhegmatogenous RD without significant PVR (PVR less than C1)
  
  Inferior retinal breaks
  
  Retinal dialysis
  
  Pediatric population

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**Scleral buckling**

- **Principles of scleral buckling.**

  1- close retinal breaks by apposing the RPE to the sensory retina.

  2- reduce dynamic vitreoretinal traction at sites of vitreoretinal adhesion.
Scleral buckling

**Surgical Technique**
1. Peritomy & isolation of muscles.
2. Localization of breaks.
3. Treatment of retinal breaks.
4. Scleral buckling.
5. ±Drainage of SRF ±air injection.

DACE technique
Scleral buckling
Surgical Technique

• Peritomy & isolation of muscles

precise localization of retinal breaks on the sclera is crucial for accurate placement of the buckle on the sclera.
Indirect ophthalmoscope & scleral localizer.
The position of each break is marked externally on the sclera.
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Surgical Technique
• localization of breaks.
  ➢ small breaks are marked with single spot.
  ➢ Large horseshoe tear → marked with 3 spots.
  ➢ Retinal dialyses → mark the 2 ends and the posterior extent of the mid point

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Surgical Technique
• localization of breaks.
  Difficult localization
  ➢ Highly elevated retina
  ➢ Posterior break
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Surgical Technique
• localization of breaks.

Highly elevated retina
The retinal break may appear because of parallax, further posterior than its true location when the detachment flattens.
- Scleral indentation is begun anteriorly in the meridian of the break where the retina is closest to the choroid then move posteriorly.
- Presence of RPE changes underlying the retinal break.
- Drainage of SRF + intravitreal saline injection.
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• Treatment of retinal breaks

Rationale for treatment: is to form an adhesion between the RPE & retina.

Methods:
1- cryotherapy
2- diathermy
3- photocoagulation

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• Treatment of retinal breaks

A-Cryotherapy

Mechanism

✓ Expansion of a high pressure gas (nitrous oxide) at the tip of a probe generating temperature down to -89°C.
✓ The temp. effect is confined to the tip of the probe by insulating sleeve
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• Treatment of retinal breaks
  A-Cryotherapy

Goal of treatment
➢ To surround all retinal breaks with 1-2 mm of contiguous treatment without significant overlap.
➢ Treatment should include both retina and choroid to create stronger adhesion.
➢ The treatment endpoint is retinal whitening. Allow to melt before removing the cryo probe.
➢ Don’t freeze bare RPE in the bed of the retinal break… why?

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• Treatment of retinal breaks
  A-Cryotherapy

• A common mistake is to use the shaft, rather than the tip, of the cryoprobe to indent the sclera.
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• Scleral Buckling

**Purpose** to close retinal breaks & relieve vitreoretinal traction.

**Methods of buckling**

1- *explant* → the buckling material is sutured to the surface of the sclera.

2- *implant* → the buckling material is placed beneath scleral flaps after lamellar scleral dissection.
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- Scleral Buckling

Methods of buckling

- Buckling materials
  1. solid silicone rubber → tire, band, strips or wedges.
  2. silicone sponge
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**Surgical Technique**

- **Scleral Buckling**
- **Type of scleral buckle (orientation)**
  - 1- **Segmental**
    - **radial** placed at right angle to the limbus
    - **Circumferential** placed parallel to the limbus
  - 2- **Encircling**
    placed around the entire circumference of the globe to create 360° buckle
**Scleral buckling**

**Surgical Technique**

- **The height of the buckle** is determined by:
  - The greater the **diameter of the buckle**, the greater height
  - The greater the **separation of sutures**, the higher the buckle
  - Low buckle → 2 mm wider than the buckle size
  - High buckle → 3-4 mm wider than the buckle size
  - The **tighter the sutures** over the buckle the greater the height
  - The **lower of the IOP**, the higher the buckle

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**Buckle sutures**

- The sutures are arranged in mattress fashion.
- One-half of the scleral thickness.
- Intrasclearal course 4-5 mm long.
- Parallel to the long axis of buckle.
- The tip of the needle should be visualized at all times as it is passed through the sclera.
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- **Buckle sutures**
  - Type of needle: spatulated 3/8 of circle
  - Type of suture: 5/0 Ethibond polybutylate Coated braided polyester

- **Buckle size**
  - The buckle must be of sufficient width to leave a safety margin of 1 mm of retina between the break and the edge of the buckle

![Images of scleral buckle application](image-url)
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**Surgical Technique**

- **Buckle size**
  - The width of the buckle is mainly determined by:
    - The size of the retinal break to be closed
    - The distance separating multiple breaks if present

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**Surgical Technique**

- **Scleral Buckling indications**

  **Radial buckle**
  1. Large flap tear
  2. Relatively posterior tear.
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- Scleral Buckling
- Radial buckle

5 mm
7 mm
10 mm
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- Scleral Buckling
  
  **Radial buckle**

  ![Image of eye with retinal tear]

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- Scleral Buckling
  
  **Circumferential buckle**
  
  1. Long retinal tear e.g., retinal dialysis
  2. Multiple breaks close together.
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• Scleral Buckling technique

Circumferential buckle.

1-retinal breaks involving 3 or more quadrants
2-diffuse retinal pathology eg extensive lattice degeneration
3-to support local buckle
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Encircling buckle.

Rationale
1. To diminish the intraocular volume so as to allow elevation of the buckle without elevation of IOP.
2. To allow the retina to settle on elevated buckle by removing fluid from the subretinal space.

- Drainage of subretinal fluid (SRF)
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• Drainage of subretinal fluid (SRF)

When Where How

Indications (when)

1. Bullous RD to place the retinal break in apposition to the buckle

2. Inferior retinal break:
   ➢ inferior breaks tend to settle less readily on the buckle
   ➢ inferior breaks are less effectively managed postoperatively with air injection.

Indications

3. Chronic RD (old standing RD & retinoschisis with RD)
   Viscous SRF → delayed absorption.

4. Poor RPE function as in high myopia → delayed absorption.

5. The need for internal tamponade.

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• Drainage of subretinal fluid (SRF)

Selection of drainage site (where)

➤ Done in an area where there is sufficient SRF.
➤ Drainage just above & or below the horizontal meridian → the choroid is less vascular → nasal quadrant may be preferred why ?.
➤ Drainage is avoided in areas treated with cryotherapy → because choroidal congestion induced by cryo → predispose to hemorrhage.
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- Drainage of subretinal fluid (SRF)

Technique
Thank You