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Chapter 11

PRESS-ON PRISM MANAGEMENT FOR HORIZONTAL DEVIATIONS IN CHILDREN AND ADULTS

I. PRESS-ON PRISM MANAGEMENT IN ESOTROPIC CHILDREN AND ADULTS

A. Method:

1. Measure the deviation to reversal and subtract 2 diopters.
2. Measure distance and near.
3. Measure up, down, right, and left gaze.

B. Perform the following sensory test with the neutralized prism:

1. Red glass and light (distance and near).
2. Worth four dot (distance and near).
3. Stereopsis at near.

C. Place the selected press-on prism in front of the preferred eye in children and in front of the non-preferred eye in adults.

II. ESO DeviATION – NO PREVIOUS SURGERY

A. *Fusion* – two options of treatment

1. Surgery to align eyes for the total amount of esodeviation.
2. Press-on prisms can be considered preoperatively in small angle esotropia to determine response to prism alignment.
 - a. 15 prism diopters or less – attempt to gradually reduce BO prism at 3-5 diopter increments. Check at one to two week intervals. If unsuccessful after three weeks, surgical management is encouraged.
 - b. In patients (usually adults) who do not prefer surgery – Press-on prisms are an excellent tool in determining the correct amount of ground-in prism. Inform the patient that ground-in prisms increase with the passage of time.

NOTE: Press-on prisms over the dominant eye in children and non-preferred eye in adults.

- B. No fusion - No diplopia
 - 1. Esotropia 15 PD or greater
 - a. Surgical management – if the alignment is not acceptable cosmetically.
 - b. Press-on prism may be considered preoperatively in some cases to verify if good alignment is achieved with no change in sensory response.
- C. *No fusion – Constant diplopia* (mainly in adult patients)
 - 1. If binocular diplopia cannot be eliminated with prisms or blurring the deviated eye with Bangerter Foils, consider the following method utilizing a Bangerter Foil in combination with base-out prisms in front of the deviated eye.
 - a. First, select the foil that made the second image least disturbing.
 - b. Next, slowly increase base-out prism in front of the deviated eye to move the second image more peripherally to eliminate the awareness of diplopia.
 - c. The press-on prism is place on the back side of the lens and the foil is placed on the front side of the lens and worn 2-3 weeks before prescribing a ground-in prism.
 - 2. Other methods of occlusion:
 - a. Blenderm (surgical tape)
 - b. Scotch satin tape (Guyton)
 - c. Clear contact paper

NOTE: Surgery depends on cosmetic appearance.

III. POST ET SURGERY

- Over-corrected XT – now secondary ET
- Residual ET after ET surgery
- A. Check sensory and motor response with neutralized prism in the office:
 - 1. Red Glass and light (distance and near)
 - 2. Worth Four Dot (distance and near)
 - 3. Stereopsis (near)

B. Sensory Response to Prisms:

1. *Fusion* - Replace selected loose prism with the press-on prism and check the patient in one to two weeks to determine if the deviation is stable and comfortable fusion is present. If fusion is still unstable at the return visit, increase the strength of the prism and check the patient at one to two week intervals until stable alignment is maintained. Surgery will be determined on the total amount of press-on prism prescribed to achieve comfortable binocular single vision.
2. *No Fusion, no diplopia, and poor cosmesis* – Before considering a second surgery, initiate press-on prism management as described in the Fusion group but the objective is to determine a cosmetically acceptable alignment to prevent a third surgery.
3. *No Fusion* – Constant diplopia (usually in adult patients), use the same procedure as discussed in “No Previous Surgery” section C.

IV. PRESS-ON PRISM MANAGEMENT IN EXOTROPIC CHILDREN AND ADULTS

A. Method:

1. Measure the deviation to reversal and subtract 2 diopters.
2. Measure distance and near.
3. Measure up, down, right, and left gaze.

B. Perform the following sensory test with the neutralized prism:

1. Red glass and light (distance and near)
2. Worth four dot (distance and near)
3. Stereopsis at near

V. EXODEVIATION – NO PREVIOUS SURGERY

A. *Fusion* – Surgery

1. In children, surgery depends on refixation recovery in free space with the cover test and the frequency and length of time the exodeviation is present.
2. Occlusion of the dominant eye if amblyopia is present or alternate occlusion may be used to overcome suppression if the misalignment is observed less than 25% of the day. Patient is

observed at two month intervals, if stable fusion is not obtained in 6 months, surgical management is advised.

- B. *No Fusion, no diplopia* – Surgical management depends on cosmesis.
- C. *No Fusion, with diplopia* (usually adults)– manage as discussed in “Esodeviation – No Previous Surgery” section C. Prisms will be oriented base-in for exodeviations.

VI. POST XT SURGERY

- Over-corrected ET – now secondary XT.
- Residual XT after XT surgery.
- Check sensory and motor response with neutralized prism in the office.

A. Central Fusion – 15 PD or less:

Initiate BI press-on prism and attempt to reduce prism in 3-5 prism diopter increments. If unsuccessful after two to four weeks, use ground-in prisms or advise surgical intervention.

B. Central Fusion – 20 PD or greater:

Use press-on prism for the total amount of the exodeviation. Check patient in one to two weeks; if good alignment is maintained, plan surgery. If alignment is still unstable, give additional prism. Monitor at one to two week intervals until alignment is stable. Surgery is determined on the full amount of prism prescribed.

C. No Fusion – No diplopia:

Surgery if cosmetic appearance is not acceptable. In this group, press-on prisms are used to prognosticate if good alignment will be achieved. This prevents a third surgery.

D. No Fusion – Diplopia (usually adults):

If binocular diplopia cannot be eliminated with prisms or blurring the deviated eye with Bangerter Foils, consider the following method utilizing a Bangerter Foil in combination with base-in prisms in front of the deviated eye.

1. First, select the foil that made the second image least disturbing.
2. Next, slowly increase base-in or out prism to move the second image more peripherally to eliminate the awareness of diplopia.
3. The press-on prism is placed on the back side of the lens and the foil is placed on the front side of the lens.

VII. NEUROGENIC AND MYOGENIC DEVIATIONS (RECENT ONSET)

A. Paretic

1. Prism is preferred over patch – place in front of non-preferred eye to prevent secondary muscle contraction.
2. Residual face turn – may be present once comfortable binocular vision is achieved with press-on prism.
3. Prism reduction as the paresis slowly resolves or surgical management after six months.

B. Thyroid – Graves Eye Disease (GED).

1. Eye signs in patients with excessive hormone concentration includes: eyelid retraction, lid lag in down gaze, dry cornea, ptosis, strabismus due to fibrotic extraocular muscles and optic neuropathy. These patients have severe diplopia because the misalignment can be horizontal, vertical, or both.
2. Treatment may require multiple visits and complex surgical procedures.
 - a. Medical management with a neuro-ophthalmologist.
 - b. Plastic surgeon to perform decompression surgery to remove the bone and scar tissue behind the eye in order to create more space for the thickened muscles and tissue.
 - c. Orthoptist for measurements and prism management.
 - d. Pediatric ophthalmologist who specializes in adult strabismus, to surgically correct eye misalignment.
3. In the majority of cases, the patient is given an eye patch to be worn in front of the affected eye (if both eyes are involved then the most affected eye) to prevent secondary contractures. This method is not cosmetically accepted by patients and prevents binocular vision. The press-on prism over the

affected eye is an excellent alternative, which is not only cosmetically acceptable but facilitates binocular single vision.

4. The ocular misalignment is measured with a cover test to select the correct press-on prism to eliminate diplopia. The prism is placed on the back surface of the lens in front of the involved eye. The patient is seen at four to six week intervals during their surgical and medical management and the press-on prisms may be continually adjusted during this period.

C. Myasthenia Gravis

1. Medications – Mestinon, steroids, Cellcept.
2. Abnormality of the nerve in the muscle junction, leading to excessive muscle fatigue.
3. Eye signs include ptosis and diplopia which appear or worsens as the day progresses.
4. A trial of press-on prisms in front of the non-preferred eye may be extremely beneficial to facilitate comfortable binocular vision. These patients are very challenging because their deviations frequently change therefore it is difficult to obtain the correct prism to eliminate their diplopia.
5. If the amount of deviation is too great for ground-in prism, surgical management is advised.

VIII. SELECTION OF THE PRESS-ON PRISM, CUTTING TECHNIQUE, AND APPLYING TO LENS

A. Prism Placement:

1. Non-preferred eye for adults.
2. Dominant eye in children.
3. Equal OU – poorly accepted.

B. Strength and Direction of Press-On Prism:

Tests with loose prisms

1. Cover Test
2. Single Maddox
3. Red Filter
4. Diplopia in Free Space

C. Cutting Technique

1. Make sure the flat side of the prism is placed on the inside of the lens.
2. Trace the size of the lens onto the prism with a washable marker.
3. Cut prism on the line you traced so that the prism is the same size as the lens, this allows the prism to be less visible to others.

D. Applying Prism to Lens

1. Once prism is cut to size, wash prism with soapy water and rinse.
2. Place a pool of water on the inside of the lens.
3. Place prism on the pool of water and apply pressure to remove all excess water.
4. Dry lens with a cloth that is lint-free to avoid lint getting stuck in ridges of prism.
5. Advise patient how to clean and apply prism at home.