NYSTAGMUS

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HISTORICAL OVERVIEW

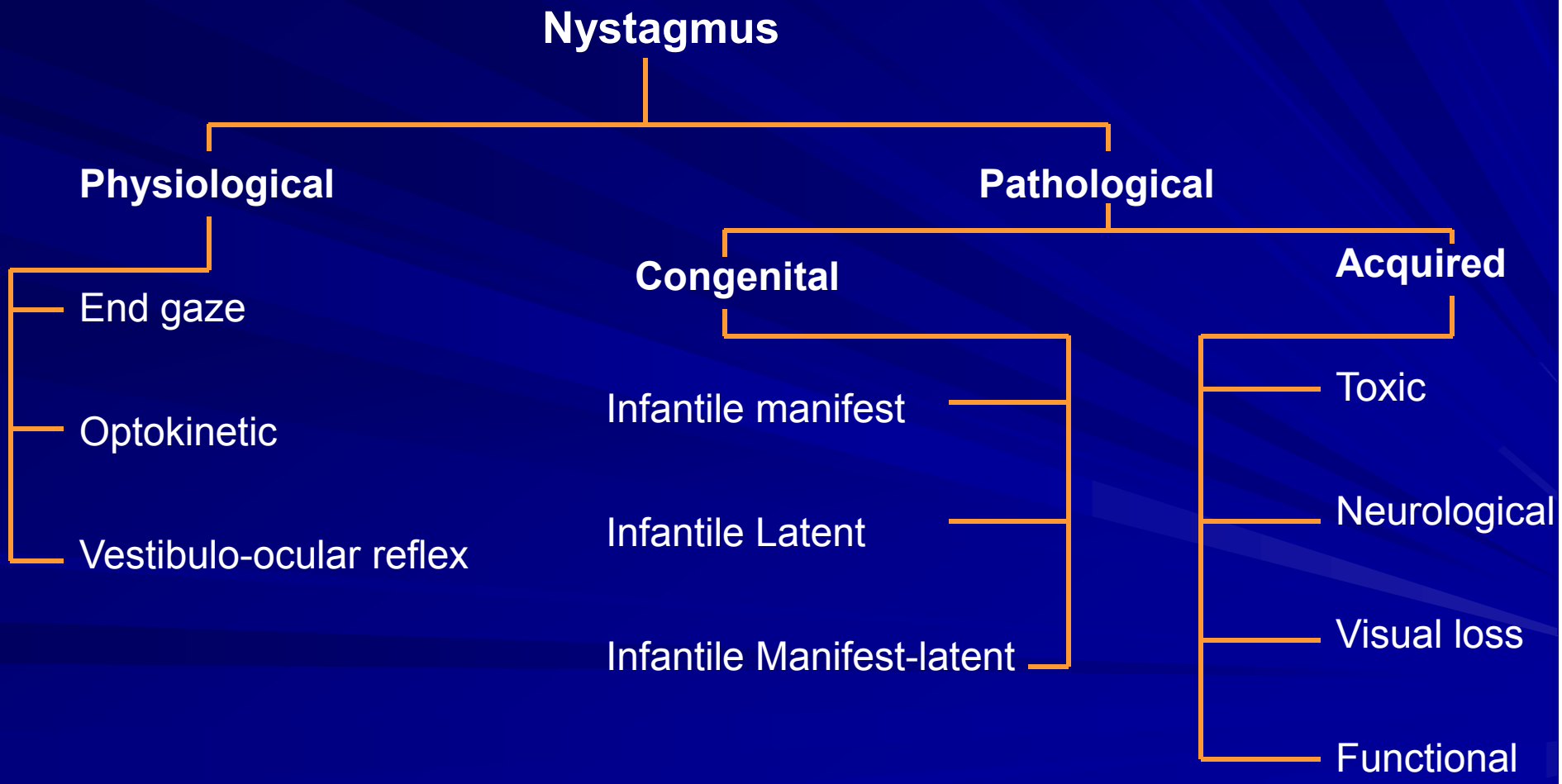
Nystazho{Greek} Wobbly head movements of a sleepy or inebriated individual.

DEFINITION:

Nystagmus： Involuntary,biphasic,rhythmic ocular oscillation which can be either physiological or pathological.

CLASSIFICATION

AETIOLOGICAL CLASSIFICATION



BASED ON MANIFESTATION

- Manifest
- Latent
- Manifest-latent

BASED ON PATTERN OF MOVEMENT

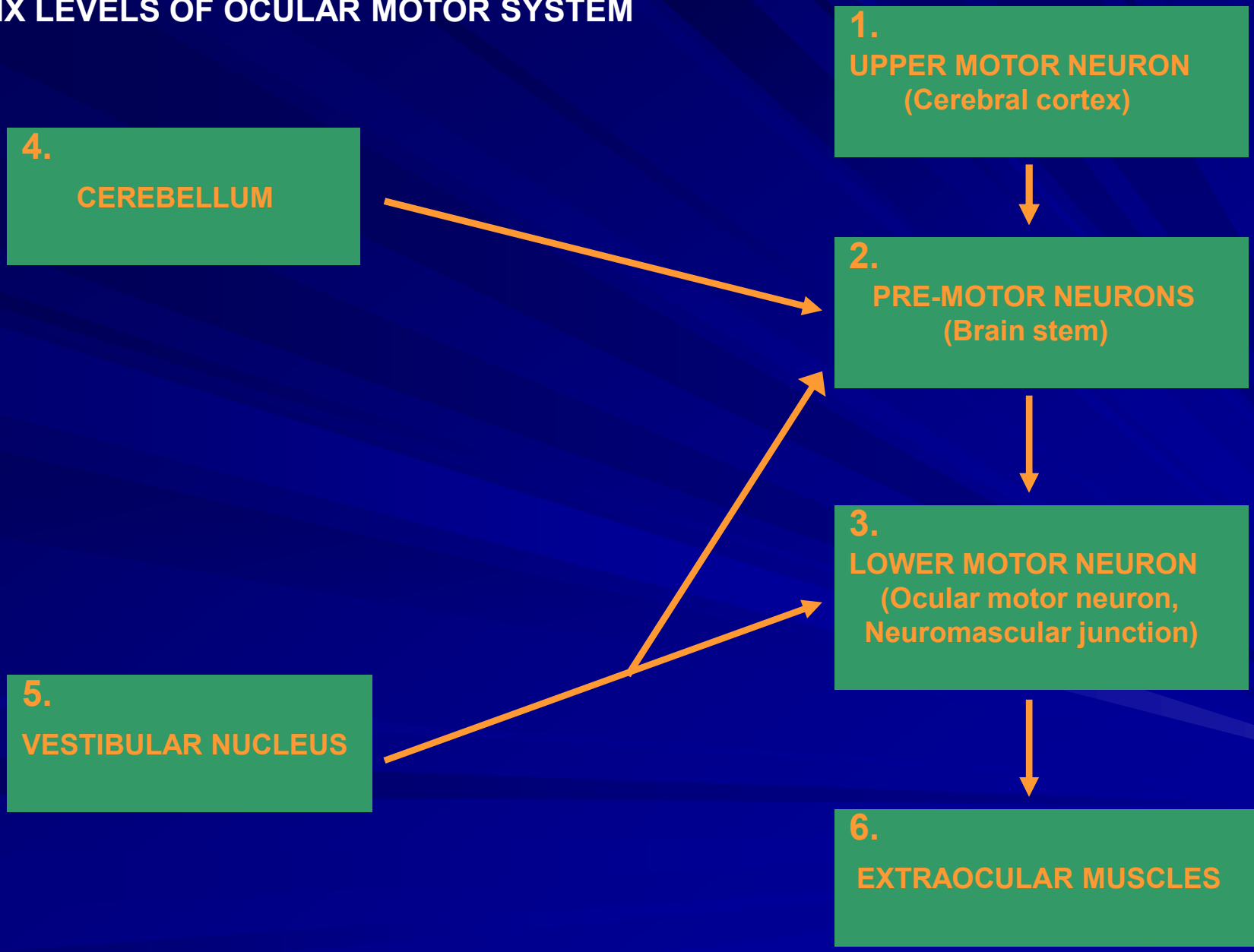
- Jerk
- Pendular

BASED ON DIRECTION OF MOVEMENT

- Horizontal
- Vertical
- Rotary

PATHOGENESIS OF NYSTAGMUS

SIX LEVELS OF OCULAR MOTOR SYSTEM



Upper Motor Neuron Lesion (Supranuclear) → **Nystagmus**, **Gaze palsy**, **Involuntary eye movements**

Lower Motor Neuron (Infranuclear) → **Paralytic strabismus**

CLINICAL FEATURES

GENERAL SYMPTOMS :

To-and-fro Movement of Eyes.

Reduced Visual Acuity.

Blurred or Unstable Vision.

Oscillopsia : At >8 years of age.

GENERAL SIGNS :

Repetitive movements of eyes.

- Binocular or monocular
- Direction
- Waveform
- Effect of gaze
- Conjugate or dysconjugate
- Any change with change in posture.
- Periodicity
- Any associated movement.

❖ JERK NYSTAGMUS

- Slow defoveating drift
- Fast refoveating saccade
- Direction – Fast component
- Horizontal,vertical or rotatory
- Gaze evoked : Vestibular
- Gaze paretic : Brain stem damage

❖ PENDULAR NYSTAGMUS

- Sinusoidal,nonsaccadic
- Slow and equal velocities
- Congenital or acquired
- Horizontal,vertical,elliptical,torsional
- Involvement of pontine tegmentum mainly
- Special types :--

❖ **CONVERGENT-DIVERGENT NYSTAGMUS**

Dysconjugate

Horizontal in opposite direction

Demyelinating disease

❖ **CYCLOVERGENT NYSTAGMUS**

Dysconjugate

Torsional

Upper poles move in opposite direction.

CONGENITAL NYSTAGMUS

Pendular or jerk type.

Pendular nystagmus often becomes jerk on lateral gaze.

Mostly horizontal,rarely vertical.

Increased amplitude on vertical tracking and distant fixation.

Decreased amplitude on convergence.

Increased amplitude when one eye is covered (Latent superimposition).

May be minimal at a particular point of gaze (Null zone).

Reversal of optokinetic response is characteristic.

FEATURES OF CONGENITAL NYSTAGMUS:

Present at birth but may be detected later.

Good vision unless there is an afferent defect.

No oscillopsia.

Head titubation may be seen.

Causes :Autosomal recessive or X linked.
Achiasmia,
Achromatopsia,
Albinism,
Aniridia,
Congenital cataract
Retinopathy of prematurity,
Optic nerve hypoplasia.

❖ MANIFEST NYSTAGMUS

Nystagmus present with binocular vision.

❖ LATENT NYSTAGMUS

No nystagmus with binocular vision.

Nystagmus with monocular fixation with other eye covered.

Slow phase is directed towards covered eye.

Amplitude increases with abduction of fixating eye.

❖ MANIFEST LATENT NYSTAGMUS

Nystagmus present with binocular vision.

Amplitude increases when one eye is covered.

Management

- Non surgical treatment
- Refraction , commonly associated refractive error.
- Observation is the usual line of treatment , as the patients are frequently asymptomatic and the condition tends to improve with time.
- Contact lens wear can help to dampen the nystagmus and improve the visual acuity.

Refractive Correction

- In children up to 10 years, full cycloplegic refraction
- In adults, subjective, try to push over time if there is a difference in sub and obj refraction

Amblyopia therapy

- May significantly decrease or eliminate MLN …… LN
- Periods of occlusion have to be very prolonged in patients with LN

Optical treatment

- To direct the null point centrally
  - Prisms placed with apex directed towards the null point.
  - Large power prisms may have to be used.
  - Fresnels
  - May degrade vision

Optical treatment

- To stabilize visual image on the retina
  - High plus spectacle with high minus contact lens[-58 & +32]
  - Entire 30 deg field focussed to centre of eye, and CL refocuses to the retina.
  - Image remains stable irrespective of eye movement !!

Optical treatment

- To induce convergence
  - Base out prisms bilaterally
  - Induce a convergence
  - Useful only if there is a convergence null
  - May have to compensate with a -1.0 sph for induced accommodation

Chemodenervation

- Botox
  - 2.5 – 5 units into all horizontal recti
  - Retrobulbar injection of 25 – 30 units

Chemodenervation

- Useful to reduce amplitude of nystagmus
- Has been shown to improve foveation time and improve visual acuity slightly.
- More useful in neurological acquired nystagmus, particularly in oculopalatal myoclonus
- RB injection effect lasts for several weeks

Chemodenervation

- Complications include
  - Ptosis
  - Diplopia
  - Filamentary keratitis

Surgical treatment:

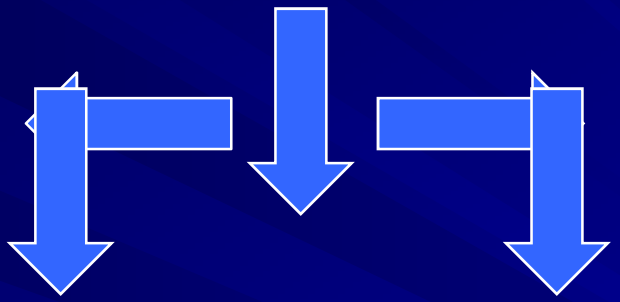
- Aims of surgery for nystagmus :

- 1- To reduce a compensatory head posture where this is unacceptable.

- 2-To improve visual acuity. By reducing oscillopsia .

Aims of surgery for nystagmus :

Congenital nystagmus



Improve head posture

Recession/ Resection all 4 horizontal rectus muscles

improve visual acuity

Recession of all 4 horizontal rectus muscles

1- head posture :

Compensatory head postures occur in nystagmus because of the existence of a “null point“, which is the position of gaze in which the nystagmus is most dampened .

The null-point is the position of gaze in which visual acuity is best .

Procedures

- **Face turns right / left surgery involves recessions and resections of all rectus muscles of both eyes, in order to realign the eyes within the orbit, without inducing adeviation (**Kestenbaum or the so-called 5,6,7,8) procedure.

- this procedure produces deviation of the eyes in the direction of the head turn, and therefore helps to straighten the head.

- Augmented K-A procedure
  - Classic + 40% - For > 30 deg of face turn
  - Classic +60% - for > 45 deg of face turn

- Problems
  - Intractable diplopia

Table 13-4 Amount of Surgery for Kestenbaum Procedure and Modifications*

Procedure	Kestenbaum, mm	40% Augmented, mm	60% Augmented, mm
Eye adducted in null point			
Recess medial rectus	5.0	7.0	8.0
Resect lateral rectus	8.0	11.0	12.5
Eye abducted in null point			
Recess lateral rectus	7.0	10.0	11.0
Resect medial rectus	6.0	8.5	9.5

*Amounts listed are for the original Kestenbaum procedure plus 2 modifications in which the amount of surgery is increased.

Surgery to correct HP

Vertical HP

- Chin up
  - IR recess 6 mm – SR resect 6 mm
- Chin down
  - IR resect 4 mm – SR recess 8 mm

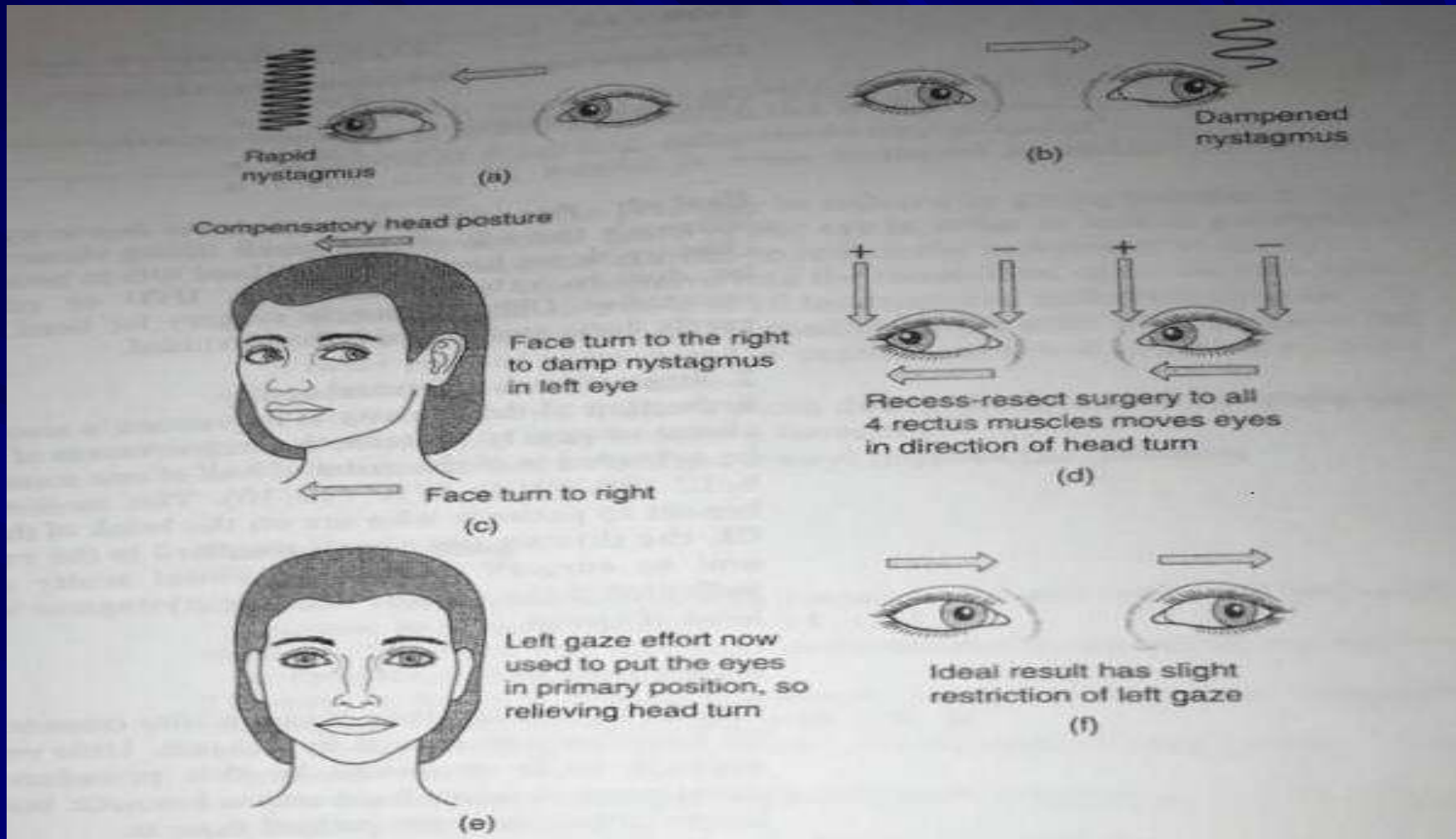


Figure 11.2 Nystagmus. (a) When eyes look to the right the nystagmus increases; (b) The nystagmus dampens on left gaze; (c) Face turn to the right to damp nystagmus in left gaze; (d) recess–resect surgery to all four muscles moves eyes in direction of head turn; (e) left gaze effort now used to put eyes in primary position, so relieving head turn; (f) ideal result has slight restriction of left gaze

2-Improvement of visual acuity

- Reduction of the velocity of movement is associated with an increase in visual acuity.

- Procudres

the surgery to improve visual acuity consists of very large recessions of all four horizontal recti by 10 mm.

little restriction of eye movement appears to produced by this procudres , but the change in the nystagmus is immediate and cosmetic bonus if the improvement in visual acutiy is less than the patient expects .


THANK YOU !