Dilation Protocol

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Learning Objectives

- Understand the purpose and indication for a dilated fundus exam
- Understand contraindications and precautions with dilation
- Important components of pre-dilation work-up
- Intraocular pressure measurement; advantages and disadvantages of techniques presented
- Anterior chamber angle evaluation, advantages and disadvantages of technique presented
The Dilated Fundus Exam

Purpose

➢ Improve visualization of the fundus
➢ Improve visualization increases detection rate of abnormalities
➢ The American Optometric Association’s 2015 evidence-based clinical practice guideline states that pharmacological dilation is generally required for the thorough evaluation of ocular structures.
The Dilated Fundus Exam

**Indications**

- Routine examination on **ALL** patients
- For patients between the ages of 18 and 39, a comprehensive eye examination including ocular health evaluation is recommended at least every **two** years
- For patients age 65 and older, comprehensive eye examinations are recommended **annually in the absence** of a diagnosed ocular condition
The Dilated Fundus Exam

Indications

- More frequent monitoring with dilation is indicated in a patient with a previous diagnosis of ocular pathology
- Patients at higher risk of intraocular disease
  - Diabetic, high myopia
- Patients with symptoms or signs indicative of intraocular disease
  - Flashing lights (photopsia), floaters, and reduced visual acuity
Contraindications & Precautions

- Sensitivities to pharmacologic agents
  - Phenylephrine: adrenergic supersensitivity
  - Cyclopentolate: spastic paralysis and brain damage
  - Sensitivity to preservative
The Dilated Fundus Exam

Contraindications & Precautions

- Narrow anterior chamber angle
  - Consider prophylactic peripheral laser iridotomy prior to DFE if angle appears susceptible to closure on gonioscopy

- Presence of iris-fixed intraocular lens
  - Risk of IOL dislocation with pupil dilation
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Contraindications & Precautions

- Documentation/Preservation of pupil status
  - Pupil status may serve as an important vital sign in patients with intracranial disease (coma evaluation)
  - Dilate with care in patients with recent history of head trauma
  - Unilateral pharmacologic mydriasis may masquerade as a sign of intracranial disease (Hutchinson’s pupil)
Pre-Dilation Work-Up

- History
- Visual Acuity
- Pupil Reflexes
- Intraocular Pressure
- Anterior Chamber Angle
Pre-Dilation Work-Up

History

➢ Vitally important in guiding the DFE
➢ Aids in what you are looking for during ophthalmoscopy
❖ Review lecture on case history
History

- Demographic data, occupation, hobbies
- Chief Complaint plus FOLDARS
  - secondary complaints?
- Ocular history
  - LEE, vision correction
- Medical history
  - LME
  - Review of systems
  - Drugs & medications, Allergies & reactions
  - Family ocular & medical history
  - Social history
Pre-Dilation Work-Up

Visual Acuity

- Always be performed prior to any other procedure for medico-legal reasons
- Helps detect problems associated with:
  - Refractive error, optical media, the retina, optic nerve, and the visual pathways, however there are serious disorders that do not affect visual acuity
    - Review lecture on visual acuity
Visual Acuity

Say to patient
- “I’m going to check your vision,” then follow with appropriate patient directions.

Recording in patient chart
- Example
  - Visual Acuities:
    - VAsc: OD 20/100⁻, 20/25 @ 40cm
      OS 20/100⁺, 20/25⁺ @ 40cm
    - VAcc: OD 20/15⁻, 20/15 @ 40cm
      OS 20/15⁻, 20/15 @ 40cm
Pre-Dilation Work-Up

Pupil Reflexes

- Screen for abnormalities prior to dilation
- Especially important to search for an afferent pupillary defect in patients with decreased acuity in one eye

Review lecture on pupils
Pupil Reflexes

Say to patient
- “I’m going to check how your eyes react to light,” then follow with appropriate patient directions.

Recording in patient chart
- Example

- Normal results may be recorded as:
  - PERRL, - MG or PERRLA, -RAPD
    - Pupils
    - Equal
    - Round
    - Reactive to
    - Light with no APD
Intraocular Pressure (IOP)

- Serves as a baseline against which post-dilation IOP can be compared
- Normal range is considered to be 8 to 23 mm Hg
- The average intraocular pressure is 15.5 mm Hg
- A difference in pressure readings of more than 2 mm between the two eyes is considered significant
Diurnal variations of 3 to 4 mm Hg are considered normal

Patients with open-angle glaucoma will often experience a mild transient elevation of IOP following dilation with an anti-cholinergic agent
IOP Measurement

- Digital Palpation
- Non Contact Tonometry
- Goldman Applanation Tonometry
  - The Gold Standard for IOP measurement
IOP Measurement

Digital Palpation

- Simplest and least expensive technique for approximate Intraocular (IOP) assessment
  - Used for conditions where tonometry is not possible
Digital Palpation

**Advantages**

- Simplest, least expensive
- Instrumentation not required
- Useful when external tonometry is not possible, for example, after penetrating keratoplasty or corneal scarring
- Palpation may be the only feasible technique in patients who are unwilling or unable to undergo other methods of IOP measurement
Digital Palpation

Disadvantages

- Least accurate method of IOP measurement
- Palpation is best avoided in eyes with significant trauma or in certain postoperative conditions
Digital Palpation

**Technique**

- Make sure hands are clean
- Say to patient:
  - “I’m going to check the pressure in your eyes,” then follow with appropriate patient directions.
- Ask patient to close their eyes
- Feel eyeballs with fingertips through closed lids
  - Video demonstration: [https://www.youtube.com/watch?v=9fz7GXwgw3I](https://www.youtube.com/watch?v=9fz7GXwgw3I)
Digital Palpation

IOP Measurement

- Determine if eye feels
  - Soft (IOP < 6 – 8)
  - Hard (IOP > 30)
  - Or somewhere in between
Digital Palpation

Tips

➢ Feel the tip of your nose – the tender part – with your fingertip

• If your patient’s eyes feel like this, it is probably somewhere in the worry-free range
Digital Palpation

Tips

Feel your chin – the bony part

- If your patient’s eyes feel like this, the IOP is probably too high.
Digital Palpation

Tips

Feel your cheek

• If your patient’s eyes feel like this, the IOP is probably too low
Digital Palpation

Recording in patient chart

IOP

- OD, OS
  - Low to palpation
  - Normal to palpation
  - High to palpation

Plus time!
Digital Palpation

Recording in patient chart

- Example

IOP

- OD, OS Normal to palpation @ 1:00 pm
Non Contact Tonometry (NCT)

- The cornea is applanated by an air pulse, and IOP is measured without direct contact between the eye and the instrument.
- Particularly useful when contact techniques are contraindicated, as in the case of a red eye of infectious origin.
Advantages

- Quick
- No anesthetic required
- Can be delegated
- No epithelial damage
- Measure thru contact lenses
NCT

Disadvantages

➢ Cost
➢ Large instrument
➢ Less portable
➢ Must be factory calibrated
➢ Multiple readings necessary (ocular pulse)
➢ Most patients are apprehensive
NCT

**Technique**

➢ Say to patient
- “I’m going to check the pressure in your eyes. Please keep both eyes open and look at the light, you will feel a light puff of air.”

➢ Set-up
- Turn instrument on
- Disinfect forehead and chin rest
- Adjust table and chin rest to align the patient’s outer canthus with the notch on the upright support of the headrest
NCT

Recording in patient chart

- Example

- IOP

  - NCT @ 10:30 am
    - OD 15mmHg
    - OS 15mmHg
A narrow anterior chamber angle increases the risk of angle closure glaucoma.
Anterior Chamber Angle Evaluation

► **Shadow Test**
- Anterior chamber depth can be estimated with oblique penlight illumination across the surface of the iris.

► **Slit Lamp Evaluation**
- Van Herick technique of peripheral anterior chamber depth estimation.

► **Gonioscopy**
- The Gold Standard for anterior chamber angle evaluation.
Shadow Test

- Gross estimation method
- Used only when slit lamp is not available
- Light is presented from the temporal side
- Shadow provides a rough estimate of chamber depth
Shadow Test

**Technique**

- Instruct patient to look straight ahead
- Light is presented from the temporal side
- Shadow provides a rough estimate of chamber depth
Shadow Test

https://quizlet.com/33677530/eyes-flash-cards/
Shadow Test

GRADE 1
<1/3 Illuminated

GRADE 2
1/3 to 2/3 Illuminated

GRADE 3
>2/3 Illuminated

GRADE 4
Fully Illuminated

http://4.bp.blogspot.com/-lGfpDcouBQY/UzpkrkQ5Rvl/AAAAAAAWE/H5_rag2Yji0/s1600/Pentorch.PNG
Shadow Test

- Useful for basic screening where availability of more sophisticated equipment may be limited

- Video demonstration: https://www.youtube.com/watch?v=81jEkGmQ4so
Shadow Test

Say to patient

- “I’m going to take a quick measurement using this light,” then follow with appropriate patient directions.

Recording in patient chart

- Example
  - Anterior Chamber Angle estimation
    - OD: Grade 4
    - OS: Grade 3
Anterior Chamber Angle Evaluation

- Patients with **narrow anterior chamber angles** may develop acute angle-closure glaucoma following pupil dilation, with a rapid and severe elevation of IOP.
  - Post-dilation IOP check recommended in persons with narrow angles.
  - **Warn** about the signs and symptoms of angle-closure glaucoma and instruct patient to contact you if the symptoms occur.
  - **Document** warning and instructions gave to patients.
Angle-closure Glaucoma

Risk Factors for Narrow-Angle Glaucoma

➢ Age
   ➢ As we grow older, the lens inside our eyes gets larger, increasing the risk for pupil block. Also, the anterior chamber tends to become increasingly shallow, and the drainage angle may narrow as we age.

➢ Race
   ➢ Asians, as well as Inuits and other northern indigenous people, who have anatomically narrower anterior chamber angles than whites, have a higher incidence of angle-closure glaucoma.

➢ Sex
   ➢ 3x more frequently in women than in men
   ➢ Among African-Americans, men and women appear to be affected equally.
Narrow-Angle Glaucoma

Causes of Narrow-Angle Glaucoma

- Hyperopia
  - People who are farsighted are more likely to have eyes with shallow anterior chambers and narrow angles, increasing their risk for angle-closure glaucoma from pupil dilation or aging changes in the eye

- Pupillary Block*
- Iris Plateau*
- Tumors and other causes*

*will be discussed more in depth in future lectures
Angle-closure Glaucoma

- Signs and symptoms of include:
  - Severe eye pain
  - Blurred vision and/or seeing halos around lights
  - Headache
  - Nausea and vomiting
  - Profuse tearing
  - Red Eye
  - Dilated pupils

- Ocular Emergency!
  - If not reduced within hours, may cause permanent vision loss
  - If experience any symptoms, need to contact eye care provider ASAP or go to a hospital emergency room
Dilation is a key component of an annual comprehensive exam, but may be also indicated more often in certain cases.

A complete history is key to determining indications, contraindications, and precautions when dilating.

Important components of pre-dilation work-up include history, VAs, Pupils, IOP, and anterior camber evaluation.

There are several techniques to measure IOP, and advantages and disadvantages with each.

Pre-dilation IOP and anterior chamber angle evaluation are important, particularly in cases where patients are at risk for angle closure glaucoma. It is important to make sure the patient is aware of the signs and symptoms.