



OCULAR PHARMACOLOGY
Pharmacology for Technicians

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Overview

- Role of the Assistant
- Medication Check
- Patient Safety
- Reaction Prevention
- Drug Categories
- Drug Administration
- Vitamin Supplements
- Drug Instillation Procedure
- Drug Documentation

Sight Gags by Scott Lee, O.D.




The Gallery of Eye Drop Faces



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ROLE of the ASSISTANT AND TECHNICIAN

- Accurate documentation/recording
- Patient Education...can assist in preventing mistakes
- **NEVER** Work in Doubt!
- Read and re-read the medication request
- Be careful with hand-offs/transfers!
- Patient Safety



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The Medication Check



- For "Ophthalmic Use", must be on the container
- Check name
- Check dosage
- Check expiration date
- Check for contamination

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The Patient Checks



- Reason for visit
- Check patient's current health condition
- Verify patient allergies
- Provider medication request
- Check visual acuity...**always**
- Check IOP...**always**
- Check angles...
- Do not leave the patient unattended and routinely monitor
- Check blood pressure before dilation

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PATIENT CASE HISTORY



The best way to prevent an adverse reaction is to perform an excellent case Hx?

- General Health
- Medications
- Allergies



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Current Medications

- Name
- Amount taken
- Frequency
- Prescribed for
- Prescribed by
- Illegal drugs too!



Why is illegal drug use important?

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Critical checks

- Doctor's medications request
- Pupils
 - PERRLA
- Angles
 - Open/clear
- Pressures
- Medications...always inspect medication
 - Heart meds
 - Blood pressure...before dilation
- Current health

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Blood Pressure... note

- Check before medication
- Please understand the procedure
- Correct position
- Explain it
- Perform it
- Document it
- No more than 3 attempts



A sphygmomanometer is used to measure arterial blood pressure.

What is the speed in which you regulate the release of pressure during the measurement

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Readings

- **Normal**
 - The "normal" for adults is approximately 120mmHg /between 70-80mmHg
- **Abnormal**
 - Mild Hypertension
 - 145-159mmHg/90-104mmHg
 - Severe Hypertension
 - 160mmHg or more/100mmHg or more
 - Hypotension
 - Below normal blood pressure 100mmh/ under 70

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Tonometry

- **Instruments**
 - **Applanation- Goldmann...touches patient**

This is the industry gold std

What medication is used during this test?



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Pupil Testing

- Explain test
- Proper lighting
- Perform direct and consensual
- Swinging flashlight
- Evaluate near response
- Recording accuracy



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Pupil Testing

- Light the pupil for _____ seconds?
- Assure that the sensory pathway is working
- Direct/consensual responses to light
- Response to accommodation



APD

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Dilate: Yes or No?



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Pupil Testing

- **Anisocoria- unequal pupil sizes**
 - “cor” = pupil
 - “aniso”=difference
- **Hippus- “jumping” pupil**
 - Most commonly seen in younger patients

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Recording

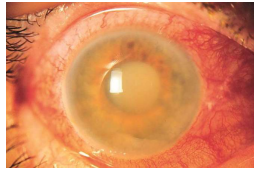
- P-pupils
- E-equal
- R-round
- R-react to
- L-light
- A-accommodation
- [-RAPD/Marcus Gunn](#)



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Verify Angle Depth

- When the doctor has seen the patient
- When the doctor has not seen the patient



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Wash your hands! Before and After Patient Care!



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Drop Instillation

- Clean hands
- Explain procedure
- Remember safety
- Inspect bottle
- Check expiration date
- Do not contaminate the container



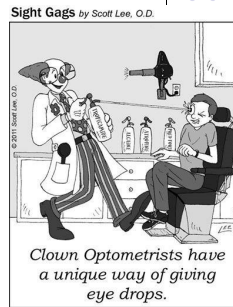
What is wrong with this picture?

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Drops...

Common for clinical applications... (aka combo)

- Tropicamide (.5 – 2%)
- Phenylephrine (2.5 – 10%)
- Proparacaine (.5%)
- Cyclopentolate (1-2%)
- * Children medications...



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TPA – vs DPA

- Therapeutic Pharmaceutical Application...when the problem is **known** and you treat the condition
- Diagnostic Pharmaceutical Application...when the problem is **unknown** and you treat the symptoms

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CATEGORIES



- Anesthetics cause a temporary loss of feeling around the nerve in which applied – (caine)
- Antibiotics – treat infections
- Antifungals – treat fungus caused infections
- Antivirals – treat virus caused infections
- Mast Cell Stabilizers – relief of seasonal allergies and conjunctivitis
- NSAIDS – treatment of inflammatory conditions with out the us of Steroids

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Pharmacology: Diagnostic Agents Mydriatic Drugs



- **Phenylephrine (Neo-Synephrine, Mydrfrin)**
 - Causes pupil **dilation**
 - Strength: 2.5%, 10%
 - Effective: 4-6 hours
 - Systemic Side Effects:
 - **Irregular heart beat**, headache, hypertension, cardiac arrest (very rare)
 - Action: Stimulates the iris dilator muscle

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Pharmacology: Diagnostic Agents Cycloplegic Drugs



- **Tropicamide (Mydracyl)** (muscle paralysis)
 - Causes pupil **dilation**
 - Strength: 0.5%, 1%
 - Effective: 5-6 hours
 - Systemic Side Effects: Uncommon

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**Pharmacology: Diagnostic Agents
Cycloplegic Drugs**



- **Cyclopentolate (Cyclogel) (dilation)**
 - Strength: 1.0% and 2.0%
 - Effective 24 hours
 - Side Effects: Dry mouth, excitation, facial flushing, **tachycardia**, angle closure due to dilation
 - Action: Paralyzes the sphincter muscle of the iris (dilation) and the ciliary muscle (prevent accommodation)

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**Pharmacology: Diagnostic Agents
Stains**



- **Fluorescein...used to stain cornea surface**
 - Strips
 - Mixed with anesthetic
 - Injected (angiography)
- **Rose Bengal...used to stain dead cells**

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Pharmacology: Anesthetics



- **Commonly used anesthetics:**
 - Proparacaine 0.5%
 - Tetracaine 0.5%
 - Lidocaine 1.0%-5.0%
 - Benoxinate plus fluorescein (Fluress)
 - Proparacaine plus fluorescein (Fluoracaine)
- What is the typical duration for routine anesthetics?

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Pharmacology: Therapeutic Agents

- **Miotics**
 - **Action:** contraction of the iris sphincter muscle (**pupil constriction**)
 - **Use:** lowering of intraocular pressure by improving drainage of the aqueous humor through the trabecular meshwork.

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Pharmacology: Therapeutic Agents

- **Glaucoma Treating Drugs (production vs output)**
 - **Adrenergic-blocking agents**
 - Timolol, Betaxolol, Levobunolol
 - **Adrenergic-stimulating agents**
 - Epinephrine
 - Dipiverfrin
 - **Carbonic Anhydrase Inhibitors (CAI) production**
 - Acetazolamide
 - Methazolamide
 - Dorzolamide

*Can **change color** of eyes and lashes
 Can cause **hyperemia** = red irritated eyes
 Patient **allergies** are very important

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Beta Blocker

any of a class of drugs that prevent the stimulation of the adrenergic receptors responsible for increased cardiac action. Beta blockers are used to control heart rhythm, treat angina, and reduce high blood pressure, eye pressure

WARNING!!!!

- Be very sure to verify meds during every visit for glaucoma patients to ensure that the patients are not already on beta blockers
- Be on the lookout for heart, anxiety, and anti-depressive meds

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Pharmacology: Therapeutic Agents

- **Glaucoma Treating Drugs**
 - **Alpha Agonists (watch for heart conditions)**
 - Stimulates mydriasis and vasoconstriction
 - Apraclonidine
 - Brimonidine (Alphagan P)
 - **Prostaglandin Analogs (PGA's)**
 - Reduces aqueous production
 - Bimatoprost
 - Latanoprost
 - Travoprost

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Pharmacology: Therapeutic Agents

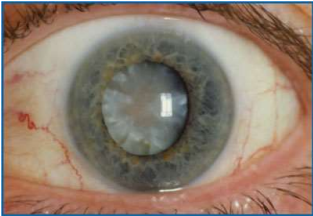
- Antibiotics
- Antivirals
- Antifungals
- Beta Blockers
- Corticosteroids...prevents swelling
- Non-steroidal Anti-inflammatory Drugs (NSAIDS)
- Decongestants
- Antihistamines
- Mast Cell Stabilizers
- Lubricants

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Cataract Medications

Pre-surgery drops:

- **Antibiotics**
- **NSAIDS**
- **Steroids**



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Medication Application Procedures



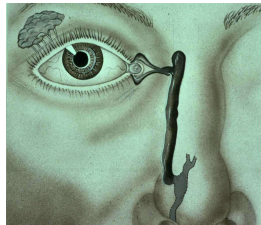
- Wash hands thoroughly before administration
- Give medications with patient in inclined position...why?
- Tilt head backward or lie down and gaze upward/downward
- Gently grasp lower eyelid below eyelashes and pull the eyelid away from the eye to form a pouch
- Place dropper directly over the eye. Avoid contact of the dropper with the eye, finger or any other surface
- Release the lid slowly and close the eye
- Occlude puncta for 2-3 minutes
- Wait 5 minutes before administering a second medication or drop
- Dim room lighting can assist in reducing blink reflex

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Punctal Occlusion

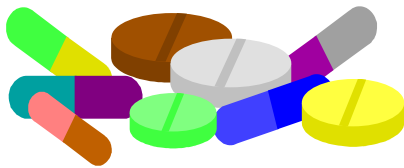


- Prevent systemic absorption
- Aids in reducing reactions
- Patients with heart condition must be watched
- Close eyes for 2-3 minutes



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VITAMIN SUPPLEMENTS



These are very important, especially during the surgery process

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Do the math



When validating the cost of supplements, make sure that you **perform the calculations on the properties and amount and quality of the product** that you are attempting to administer to the patient. How much is in the product that you are purchasing

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CLASSIFICATIONS



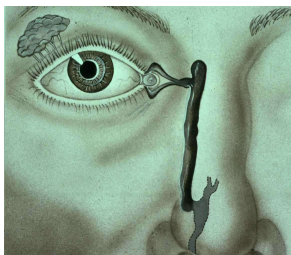
- Orals
- Solutions
- Suspensions (must be shaken)
- Ointments
- Pumps
- Implants

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Topical Anesthetics



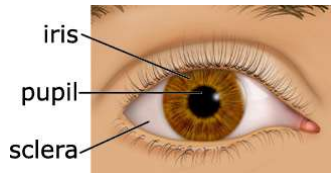
- Proparacaine
- Tetracaine
- Cocaine



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Mydriatics & Cycloplegics

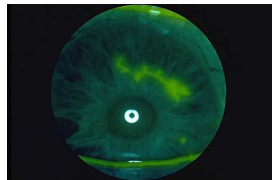
- Tropicamide
- Phenylephrine 2.5-10%
- Cyclogyl
- Atropine
- Homatropine
- Scopolamine



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Dyes & Stains

- Fluorescein
- Rose Bengal
- Lissamine Green
- Fluress



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CLINICAL ADMINISTRATION

- Patient History
 - Ask about recreational drug use!
- Clinical Procedures Which May Be Influenced by Medications

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THERAPEUTIC AGENTS

TPA – known problem



- Antibiotics
- Anti-virals
- Drugs that lower IOP
- Anti-inflammatory agents
- Non-Steroidals
- Combinations

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GLAUCOMA MANAGEMENT



- Pilocarpine
- Beta-Blockers
- Carbonic Anhydrase Inhibitors (CAI)
- Adrenergic Agonists

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OCULAR INFLAMMATION



- Corticosteroids
- Steroid-Antibiotic Combinations
- Non-Steroidal Anti-inflammatory Drugs (NSAIDS)
- Oral Analgesics

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OCULAR INFECTIONS



- Topical Antibiotics
- Oral Antibiotics
- Anti-Viral
- Analgesics

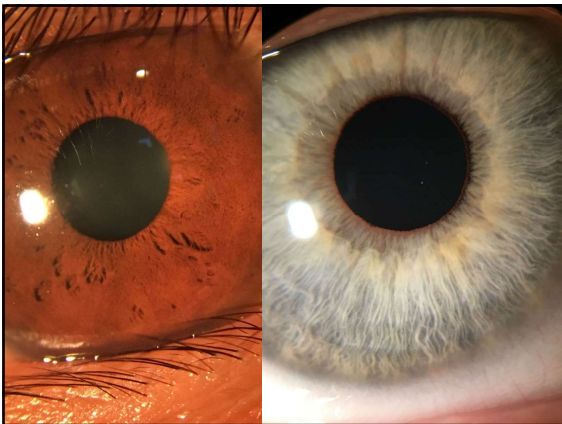
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OCULAR ALLERGIES



- Artificial Tears
 - castor oil
- Antihistamine
- Decongestants
- Mast Cell Stabilizers
- Corticosteroids

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Other considerations



- Eye color
- Chronic illnesses ... diabetic pts
- Age
 - Older patients take longer to dilate due to small pupils
 - Very young patients take longer due to trust
- Ask the patient if they have ever been dilated before

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CAP Colors



Cap Color	Drug Class
Tan	Antibiotics, Antivirals, Antifungals
Pink	Anti-inflammatory/Steroids treats allergic reactions, swelling, redness (slows healing can cause cataracts and glaucoma). Do not use on fungal infections
Red	Mydriatics/Cycloplegics (dilate pupil)
Grey	Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) control inflammation caused by ocular allergies without steroidal side-effects
Green	Miotics (stimulates sphincter and causes pupil constriction)
Yellow or Blue	Beta-Blockers traditionally used to treat glaucoma, reduce IOP by decreasing aqueous humor
Purple	Adrenic Agonists (reduce IOP)
Orange	Carbonic Anhydrase Inhibitors (reduce IOP)
Turquoise	Prostaglandin Analogues (reduce IOP by increasing aqueous outflow)

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IN-OFFICE PROCEDURES



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Patient Instruction- Solutions and Suspensions



- Wash hands thoroughly before administration
- Tilt head backward or lie down and gaze upward
- Gently grasp lower eyelid below eyelashes and pull the eyelid away from the eye to form a pouch
- Place dropper directly over the eye. Avoid contact of the dropper with the eye, finger or any other surface
- Release the lid slowly and close the eye
- **Occlude punta** for 2-3 minutes
- Wait 5 minutes before administering a second medication or drop

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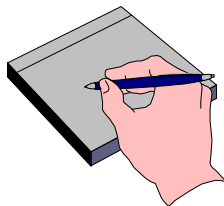
Patient Instruction- Ointment



- Wash hands thoroughly
- Tilt head backward or lie down and gaze upward
- Gently pull down the lower lid to form a pouch
- Place .25 to .50 inch of ointment with a sweeping motion
- Close the eye for 1-2 minutes
- Temporary blurring of vision may occur.
- Remove excess ointment with a tissue
- Wait 10 minutes before applying the second ointment

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ABBREVIATIONS



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Examples



- ad lib- freely as needed
- ac – before meals
- bid- twice a day
- gtt- Drops
- hs- at bedtime
- pc -after meals
- po- by mouth
- prn- as needed

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Examples- con't



- oint- ointment
- q- every
- qh- every hour
- q4h- every four hours
- qid- 4 times a day
- sig- instructions
- sol- solution
- susp- suspension

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Examples- con't



- tab- tablet
- tid- three times a day
- top- topically
- ung- ointment
- ut dict- as directed

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HOW TO WRITE AN Rx



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Make sure that you include:



- Full name of patient
- Address can be optional
- Date of Rx
- Inscription: name of drug; concentration
- Subscription: amount to be dispensed
- Instructions: route of administration; number of drops or tablets; frequency of use; refill

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What else?



- Make sure that it is legible!
- Legal considerations
- Never go beyond your training
- Don't rush patient care
- Protect your patients and your practice
- Documented training



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References and resources



- Ophthalmic Drug Facts 2002
- Ophthalmic Medications and Pharmacology
- Review of Optometry: 2002 Clinical Guide to Ophthalmic Drugs (Melton and Thomas) May issue

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THANK YOU!
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