Injectable medications in eye care

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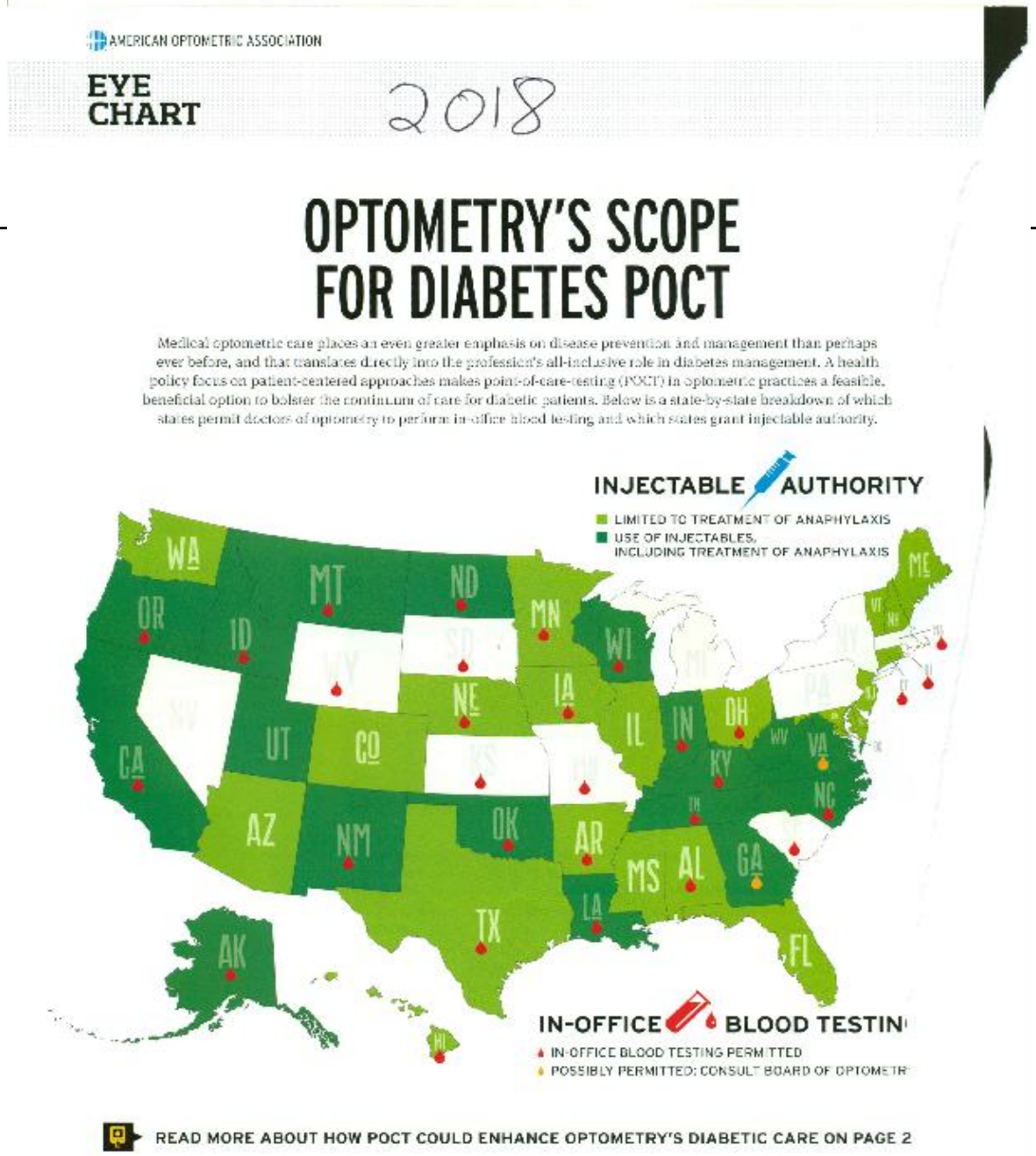
Financial disclosures

- No financial disclosures

Injections by OD's

- Allowed in 38 states
- 20 of those allow for counteraction of anaphylaxis only
- 18 allow for varying degrees of diagnostic and therapeutic use



AMERICAN OPTOMETRIC ASSOCIATION

EYE CHART 2018

OPTOMETRY'S SCOPE FOR DIABETES POCT

Medical optometric care places an even greater emphasis on disease prevention and management than perhaps ever before, and that translates directly into the profession's all-inclusive role in diabetes management. A health policy focus on patient-centered approaches makes point-of-care-testing (POCT) in optometric practices a feasible, beneficial option to bolster the continuum of care for diabetic patients. Below is a state-by-state breakdown of which states permit doctors of optometry to perform in-office blood testing and which states grant injectable authority.

READ MORE ABOUT HOW POCT COULD ENHANCE OPTOMETRY'S DIABETIC CARE ON PAGE 2

Source:
AOA Focus

Types of injections

- Subcutaneous
- Intramuscular
- Intravenous
- Periocular
- Intraocular

- Always ask about allergies!

NBEO

- Injections were a permanent NBEO Part III station, now back to stand-alone optional starting in 2018
- Sterile technique / preparation
- IM
- IV
- Model arms only

Sterile draw technique

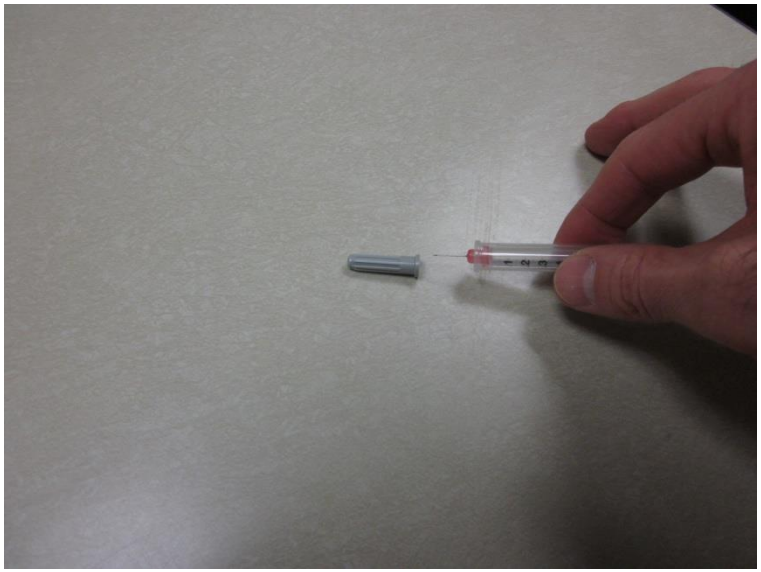
- Gloves
- Alcohol swab cleaning of vial top
- Always inject an amount of air in to vial first that is equal to amount of desired fluid removal: Vacuum sealed
- After draw, remove any air from syringe before use

Sharps

- All needles disposed of in a sharps container: are now usually clear to allow for viewing contents

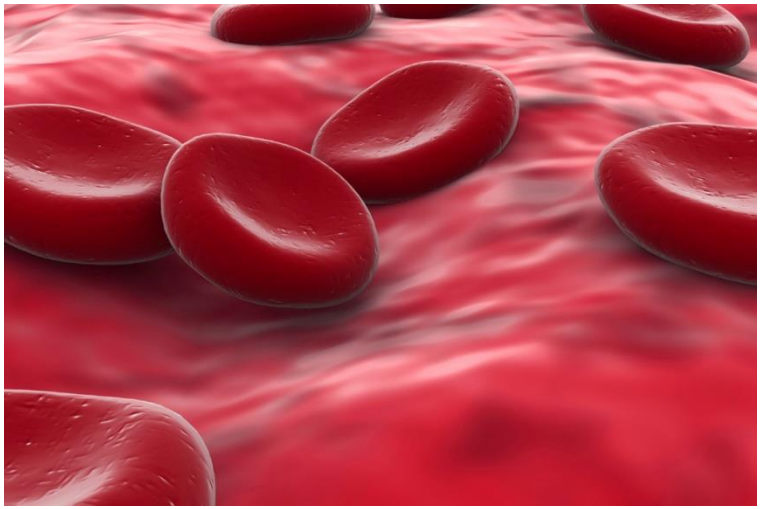
One hand scoop technique

- Needle used only for the drawing up of a fluid can be capped using the “one hand scoop technique”



Re-capping needles

- Needles that have been used on people are never re-capped before discarding them
- High risk of “stick” with contamination



Syringe basics

- 1ml (TB)
- 3ML
- 5ML
- Larger (less common except for blood draws)

Needle gauges

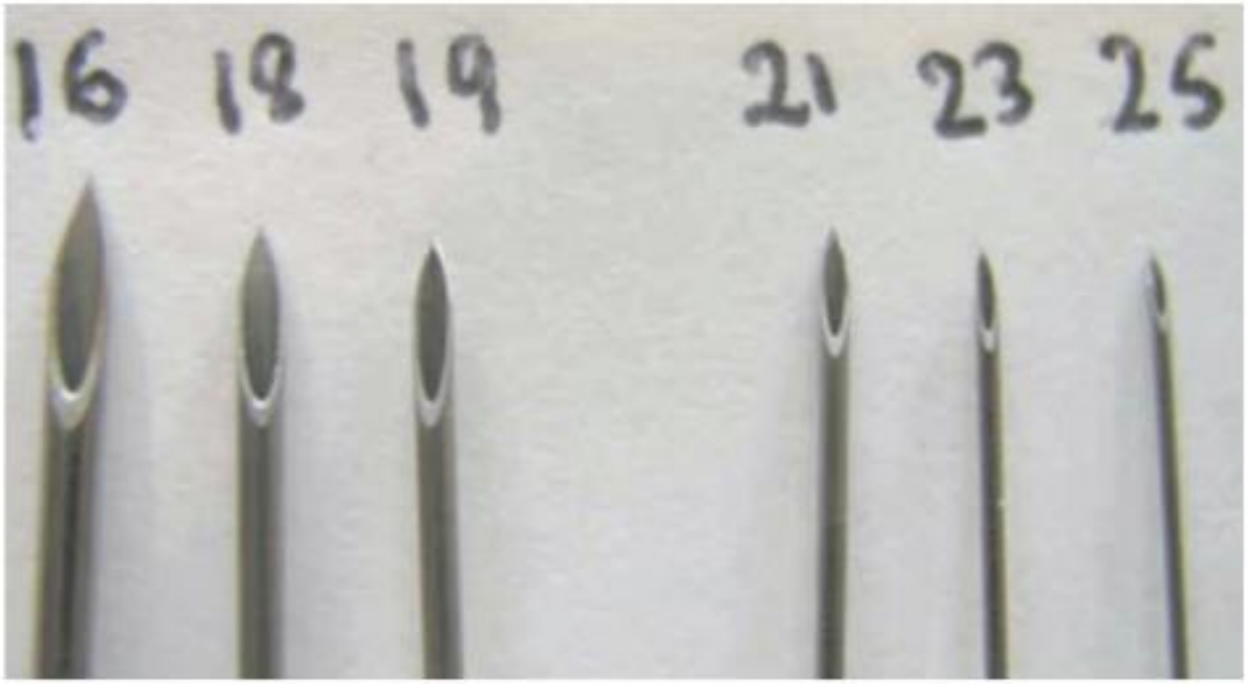
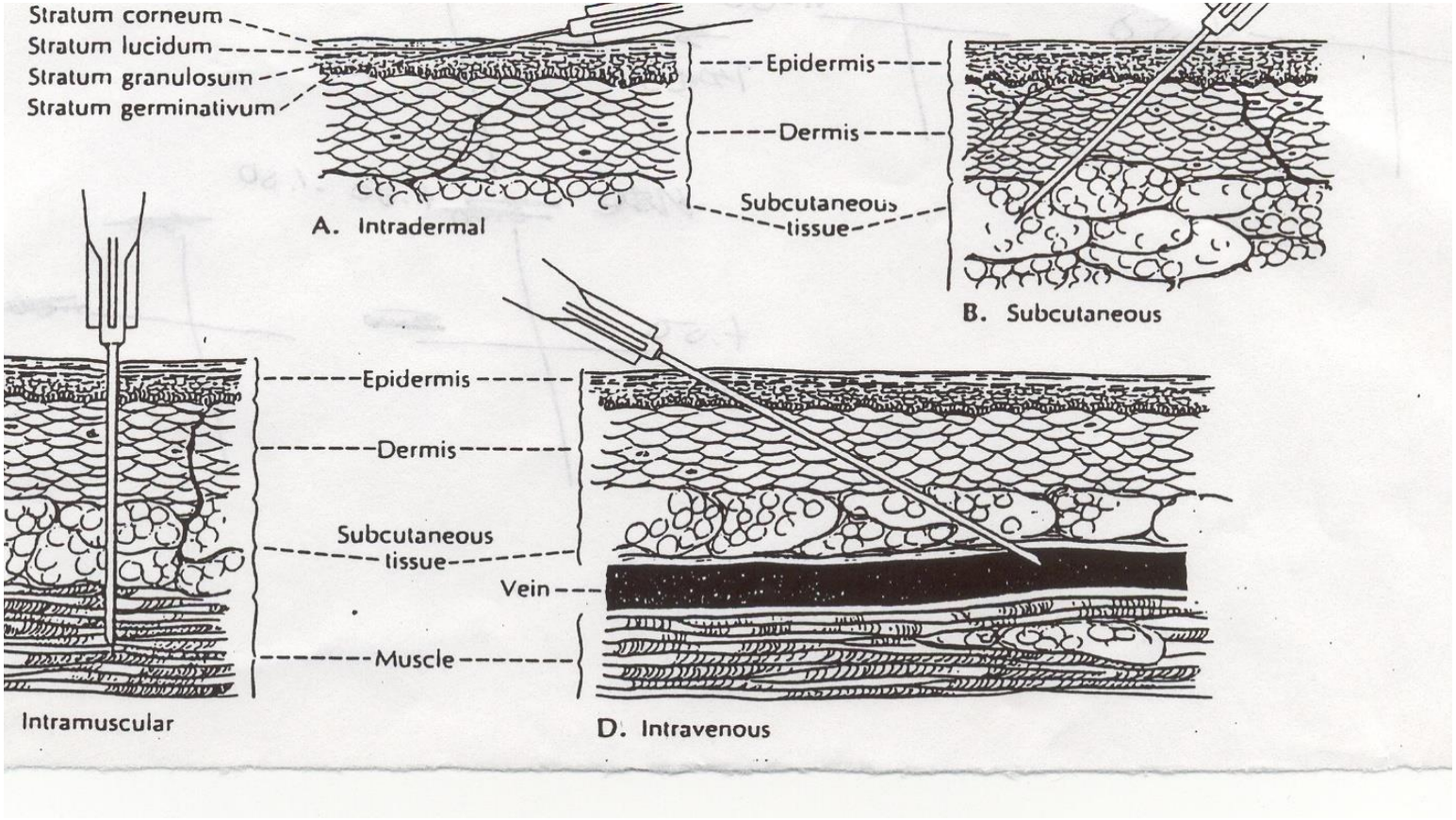


Figure 1. 16-gauge to 25-gauge micropuncture needles.

Needle basics

- Bevel (angled slice)
- Gauge: larger number = smaller needle
- 19, 23, 25, 27, 30
- May have second # indicating length (inches):27 ½ G

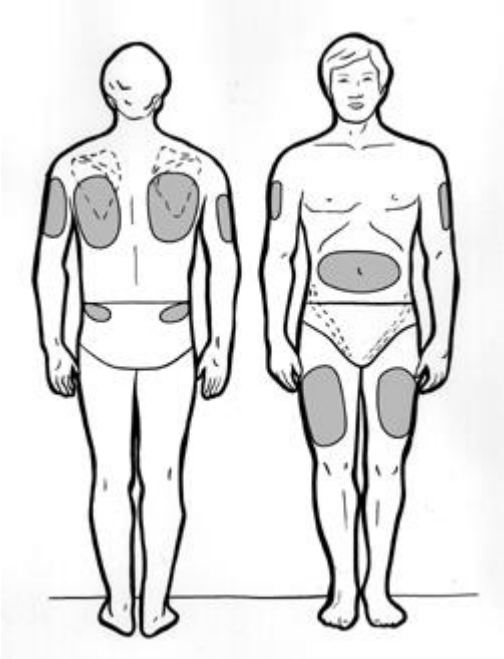
Injection sites

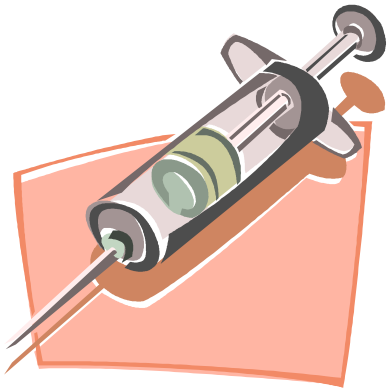


Subcutaneous

- Deposits medication below the skin
- Can use any site that is not over a bony structure and is free of large blood vessels and nerves
- Typical sites include the thigh, back of the arm, and abdomen
- CPT code 96372

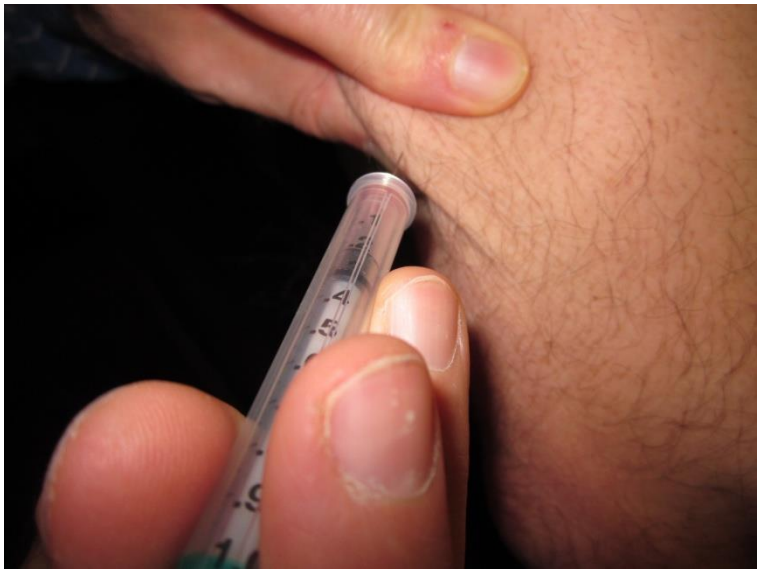
Subcutaneous sites





Subcutaneous technique

- Clean site
- Pinch skin
- Insert needle at 90- degree angle (but tangential for chalazion / eyelid anesthetic / TB type)
- Inject medication
- Release skin



Subcutaneous technique

Subcutaneous

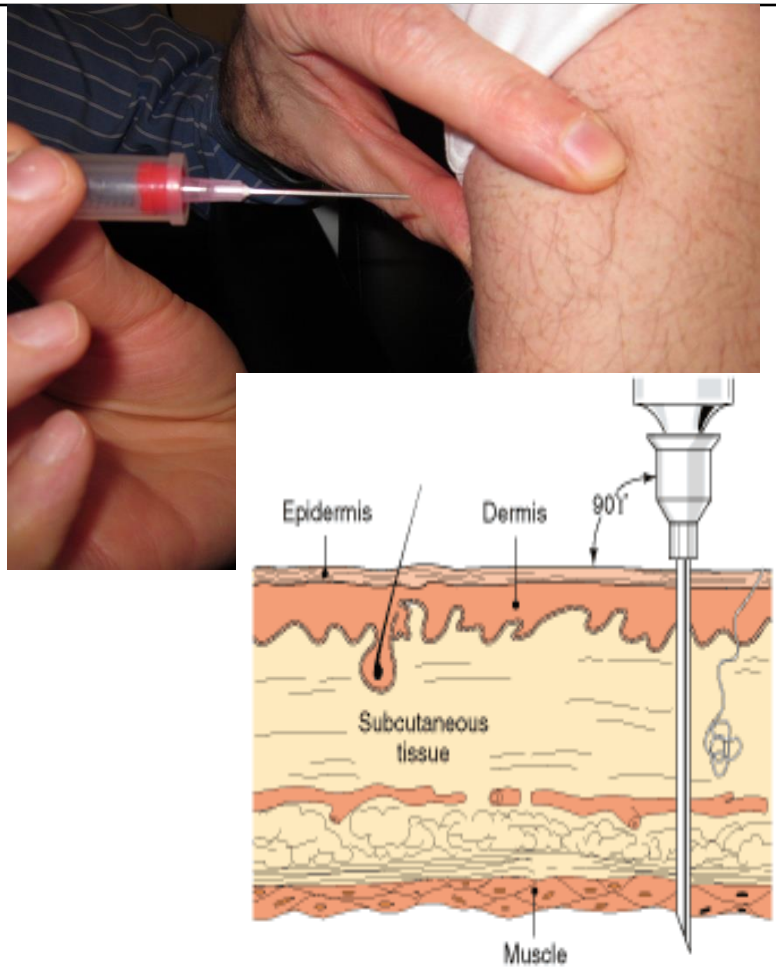
- Medication absorbed more slowly when injected in this manner than with intramuscular or intravenous injections
- Requires small, thin needles which are short
- Used with insulin, anesthetics, PPD testing, copaxone
- Good for small doses of non-irritating solutions. Bad for larger volumes and irritating solutions

Intramuscular

- Deposits medication into muscular tissue free of major vessels and nerves
- Typically given in the deltoid or gluteus muscles (outer buttocks)
- Much more rapid onset of action than SQ route due to the greater blood supply of the tissue
- Good for concentrated or oily substance
- Requires thick, long needles (epipen and obesity?)
- Epipen costly, Teva generic .15 or .3 mg
- CPT code 96372

Intramuscular technique

- Clean site
- Pull skin taught
- Insert needle at 90-degree angle
- Inject medication



Smith et al., 2000, p. 387

Intravenous

- Utilized in eye care for IVFA, ICG angiography, and laser assisted macular surgery (visudyne, etc.)
- Very rapid onset of action
- Greater chance of early onset allergic response
- Remember……once a medication is injected by any means it can not be retrieved!

IV injections: tools

- Must first fill 3 or 5 CC syringe with fluorescein using large needle
- Then discard that needle and attach butterfly tubing: the shorter the better!

IV Injections: technique

- Place tourniquet on upper arm (downstream from injection site)
- Locate vein in antecubital space (preferred) or back of hand (if you must)
- With bevel up, inject butterfly needle (23 – 25 gauge) into vein at an angle of around 30 degrees

IV technique

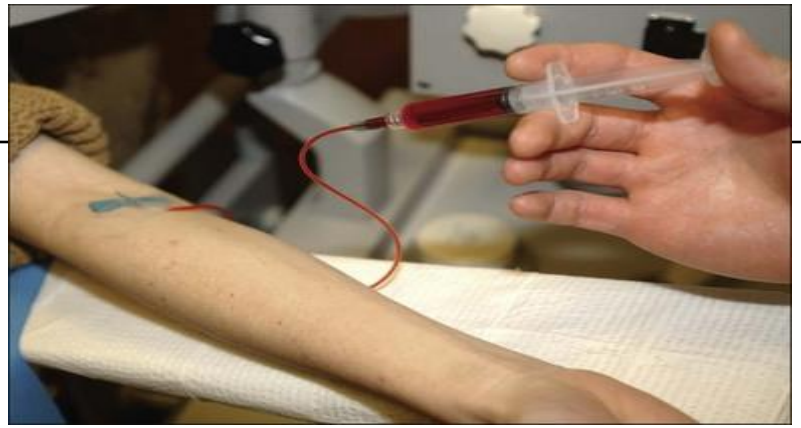
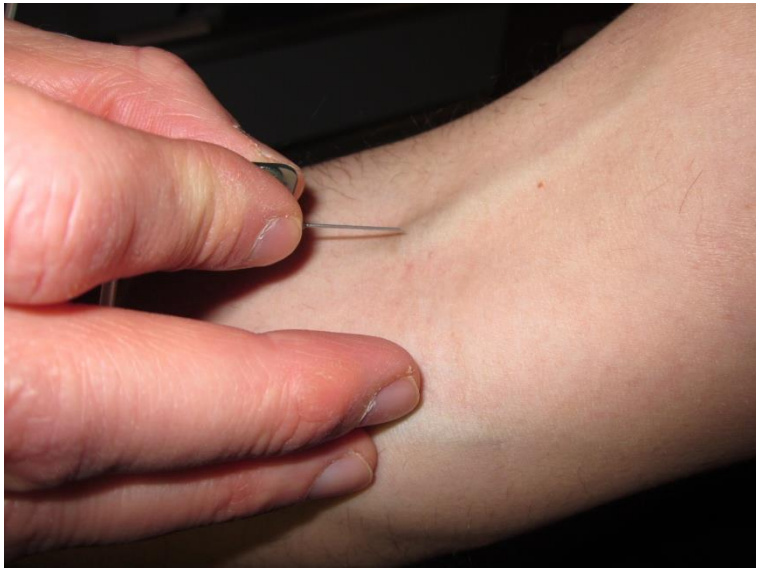
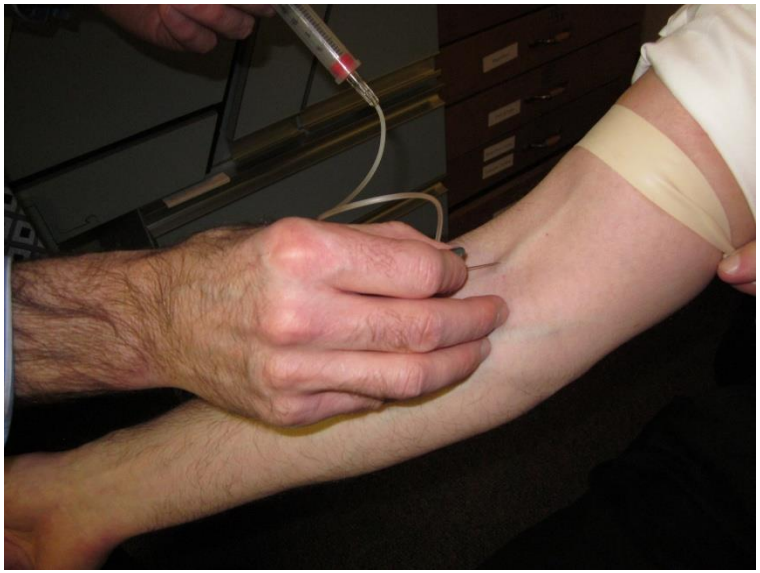


Photo above: Duncan, J

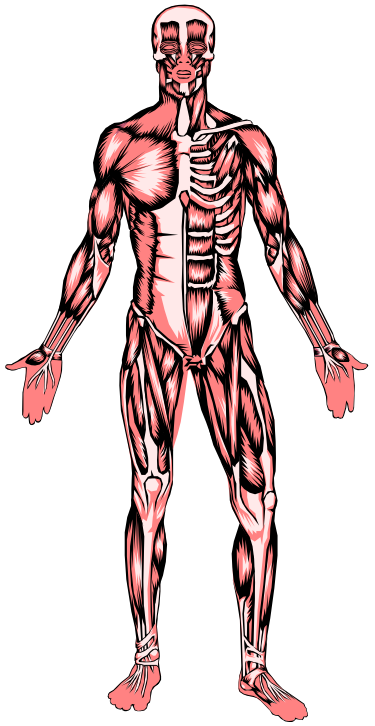




No good!

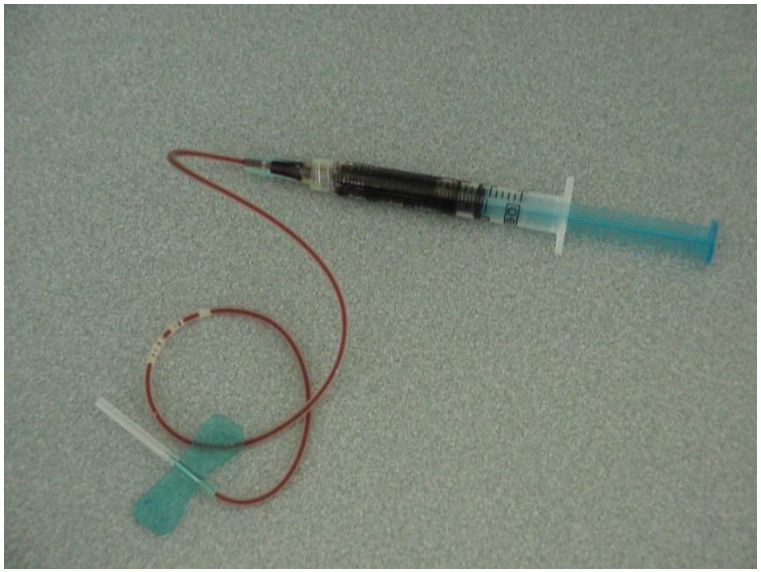
IV Injections

- When blood seen, draw back slightly on syringe to get blood flow in to tubing (saline vs. 10% dye vs. empty tubing*)
- Remove tourniquet and inject 3-5 cc of dye depending upon %



10% dye vs 25% dye

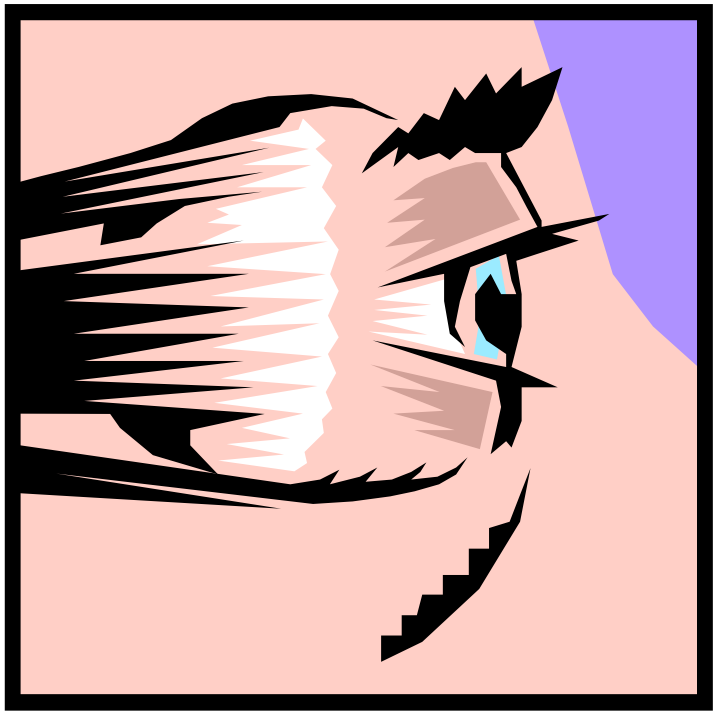
- Less nausea / vomiting with 10% (100mg/ml)
- Have to use more 10%: 5ml vs. 3ml of 25%
- Can see blood better with 10%



Fluorescein Dye

Periocular injections

- Intralesional
- Subconjunctival
- Subtenons
- Peribulbar/local anesthetic blocks
- Specialty uses- botulinum toxin
- Intraocular (intravitreal, intracameral)



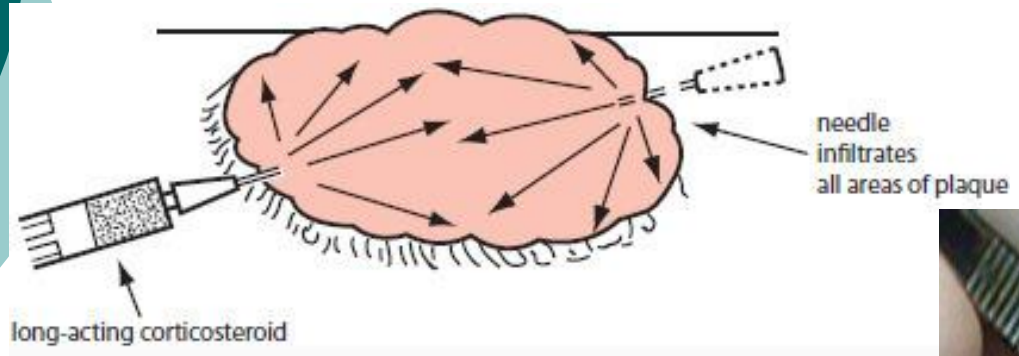
Intralesional injections

- Utilized in the treatment of chalazia and less frequently pyogenic granulomas.
- Inject steroids into the lesion to hasten resolution
- Typically, will use kenalog 10 or 40 mg/ml (triamcinolone)

Intralesional injection

- Utilize a 1 cc (TB) syringe with a 27 or 30-gauge needle
- Bevel up
- Inject approximately .2 cc of steroid (usually kenalog) into lesion
- Can do skin side or palpebral side; skin side more comfortable. Can’t really pinch skin
- Lesion may be too hard, may have to go near it instead of in it
- Really no significant subcutaneous space on the eyelid, so intradermal

Intralesional injection



Source: John Murtagh: *John Murtagh's Practice Tips*, 7e:
www.murtagh.mhmedical.com

Intralesional injection

Intralesional injections

- Contraindications/adverse reactions include allergic responses and skin depigmentation with kenalog (infrequent-personal experience)
- Follow up in two weeks…..some lesions will require a second injection
- Billable procedure with its own CPT code

11900

Subconjunctival injections

- Utilized to deliver high dose of long-acting steroid or antibiotic to the anterior segment
- Main uses include steroid delivery in cases of recalcitrant inflammation or CME
- Can give antibiotic injection for severe corneal ulcers or in endophthalmitis cases

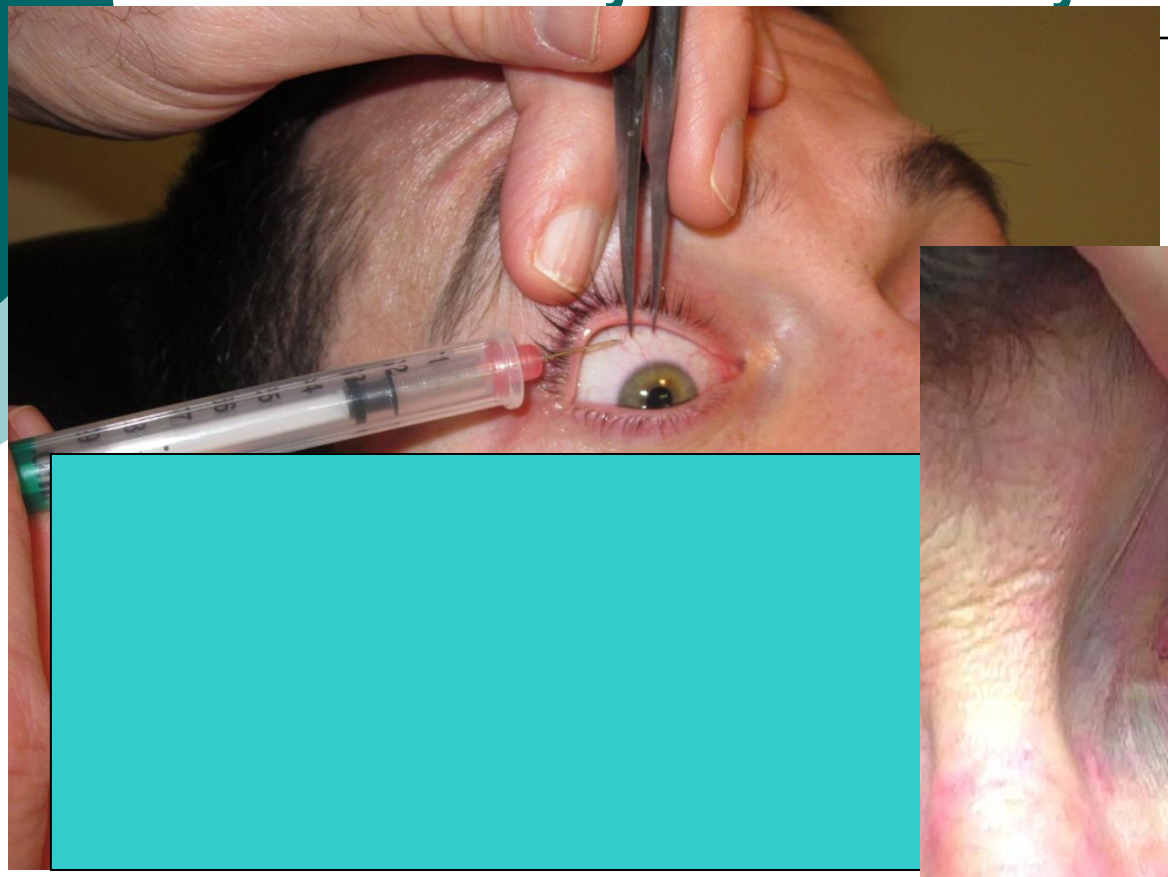
Subconjunctival injections

- Adverse reactions include allergic response and increased IOP with steroids
- IOP elevation can be difficult to control because med can not be “discontinued” like with topical steroids
- Can occur weeks to months after the injection
- Can occur with long history of not pressure responding to topical steroids
- Dexamethasone or Durezol trial?

Subconjunctival injections

- Perform on bulbar conjunctiva under upper lid or lower lid (hides any subconj. heme)
- Use forceps to tent conjunctiva and create potential space
- Insert small gauge needle (27 or 30) on a 1 cc syringe bevel up into space, release conjunctiva, and inject .1-.2 cc of medication to form a bullous
- CPT code 68200

Subconjunctival injection



Subtenons injections

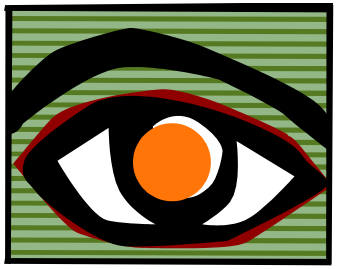
- Similar to subconjunctival in uses and indications
- Only difference in procedure is that the needle penetrates Tenon's capsule
- Indications include pars planitis or other forms of intermediate uveitis and CME
- In the majority of cases this technique holds little advantage over a more simple subconjunctival injection
- Some glaucoma meds in trials to be delivered this way

Subtenons injection

- Utilizing small needle (27 or 30 gauge), insert needle into lower fornix where bulbar and palpebral conjunctiva meet
- Move needle laterally and observe globe to ensure no movement
- Inject approximately .2 cc
- CPT code 67515

Intravitreal injections

- Generally not performed by OD's (but nurses in England, Norway)
- Kenalog, Lucentis, Avastin, Eylea, Jetrea
- Many uses
- Small risk of endophthalmitis, RD, IOP increase



Anesthetic application

- Done to prepare for surgical procedures such as lid lesion removal, chalazion excision, etc.
- Often give block that numbs the entire lid

Specialty uses-Botulinum

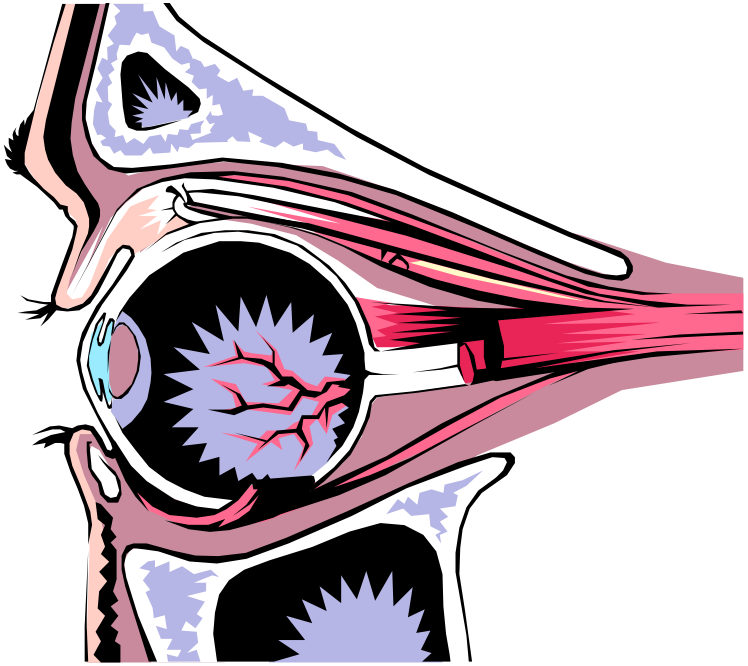
- Botulinum toxin is derived from the organism that is responsible for botulism
- It is a very powerful neurotoxin and its use results in paralysis of muscles
- It is utilized in the management of blepharospasm and strabismus
- Also used by plastic surgeons and dermatologists to temporarily remove wrinkles

Botulinum

- In blepharospasm cases, it is injected SQ at several locations to paralyze affected muscles and eliminate or decrease the spasm
- Has to be repeated every few months
- Complications include ptosis and exposure problems secondary to incomplete lid closure

Botulinum

- In strabismus, the injection is directed into the muscle to be weakened (the overacting muscle)



Pharmacokinetics

- Absorption dependent upon several factors……
- 1) route of administration
- 2) concentration of medication
- 3) solution / suspension (sol. Is more rapidly absorbed and shorter acting)

Steroids

- One of the most common medications delivered via injection when it comes to eye care
- Uses include chalazia, recalcitrant iritis, CME, pars planitis, and others

Injectable steroids

- Three main injectable steroids
- 1) Dexamethasone
- 2) Kenalog (Triamcinolone)
- 3) Depo-medrol (methylprednisolone)

Dexamethasone

- Dexamethasone 4.0 or 2.0 mg/ml
- Water soluble and very short acting
- Clear solution, not milky suspension like kenalog
- Duration of action is often too short to be utilized effectively with uveitis or long-standing chalazia

Kenalog

- Triamcinolone 10 or 40 mg/ml
- Suspension: slow absorption and moderately long acting
- Great choice for chalazia, sub-conjunctival / sub-tenons treatment of uveitis (usually 40 mg/ml)
- Watch for IOP increase and PSC!

10 mg/ml Kenalog

Depo-medrol

- Depo (long acting) version of methylprednisone
- Very slowly absorbed and very long acting
- Duration of action is often too long to be practical (increased IOP, etc)

Anesthetics

- Utilized to prep for lid lesion removal, etc.
- Injected intradermally at the site (not really any subcutaneous space on the eyelid)
- Marcaine .25% and Lidocaine (Xylocaine) .5%, 1.0%, or 2% solutions with or without 1:100,000 epinephrine
- Epi decreases bleeding and loss of effect through systemic absorption (thus approximately doubling the duration of action)

Anesthetics

- Can have allergic response, but Marcaine and lidocaine are amides, not esters like novacaine or tetracaine. No cross allergy
- Other side effects include ptosis if injected into Mueller's muscle
- Use .5 to 1cc (ml) of medication
- Inject while withdrawing needle to spread coverage

Anesthetics

- Injection stings! Acidic
- Mix with sodium bicarbonate to significantly decrease the stinging

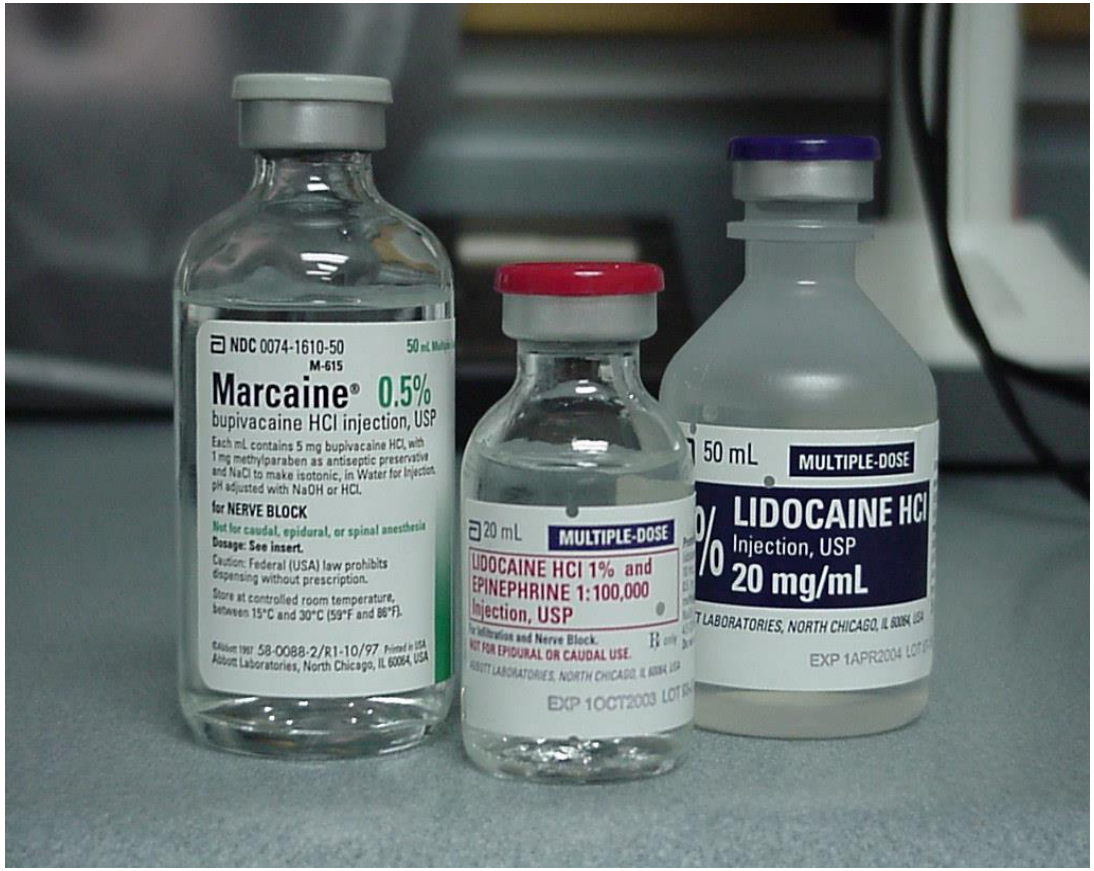
Anesthetics: Lidocaine

- Fast acting, about one minute or less
- Duration of 30-60 minutes without epinephrine
- Most commonly used for eyelid anesthesia

Anesthetics: Bupivacaine (Marcaine)

- Onset about 5 minutes
- Duration up to 2 hours
- Less commonly used

Anesthetics



Botulinum toxin

- Purified neurotoxin complex made from Botulinum toxin type A (Clostridium Botulinum) : Botox
- Comes in 100-unit vials, powder that is reconstituted with saline
- Used for blepharospasm, strabismus, cosmesis
- Side effects include ptosis, exposure
- Must be used within a few hours

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