

Greater/Lesser occipital nerve blocks

Patient position: Sitting up, often bent over a pillow

Anatomy: Draw imaginary line between external occipital protuberance (EOP) and mastoid process (MP). Greater occipital nerve emergence is 1/3 lateral to EOP on that line, and lesser occipital nerve is 2/3 lateral to EOP. Palpating for tender areas may improve accuracy

Needle/syringe: 3 or 5 ML syringe with 25, 27, 30 gauge 0.5 to 1 inch needle

Drug: 1-2% lidocaine and/or 0.25-0.5% bupivacaine (if combined, lidocaine/bupivacaine ratio of 1:1 to 1:3). Optional steroids (especially if given for cluster):

- triamcinolone ~ 5-40 mg
- methylprednisolone ~ 20-160 mg
- dexamethasone ~ 4 mg
- betamethasone ~18 mg

Volume: 1.5-2 mL per nerve (up to 3 mL for GON)

Technique: Insert 3-4 mm (+/-touch periosteum) then slightly withdraw needle. Pull plunger back to make sure not intravascular. Inject in single injection or fan-like distribution. Should create a “goose egg” of fluid. Assess for numbness in the GON/LON dermatomes by testing sharp/dull with pin.

Supraorbital/Supratrochlear nerve blocks

Patient position: Often supine (if sitting, consider leaning back on something to stabilize head)

Anatomy: Supraorbital nerve comes out of supraorbital notch approximately 2.5 cm from midline; often in line with mid-pupil. Supratrochlear nerve emerges above medial eyebrow (within medial corrugator)

Needle/syringe: 1 ml syringe, 30 gauge 0.5 inch needle

Drug: 1-2% lidocaine and/or 0.25-0.5% bupivacaine (if combined, lidocaine/bupivacaine ratio of 1:1 to 1:3) No steroids due to increased risk of skin/hair/bone changes over eyebrow

Volume: 0.2-1 ml per nerve

Technique: Insert 3-4 mm, aiming away from eye. Pull plunger back to make sure not intravascular, then inject. Apply pressure to avoid periorbital hematoma. Should create a small “goose egg” of fluid. Assess for numbness in the SON/STN dermatomes by testing sharp/dull with pin.

(Alternate injection technique: start at SON origin and aim medially—after injecting at SON, advance toward STN origin and inject; or inject at STN origin and advance laterally to inject at SON)

Auriculotemporal nerve block

Patient position: Often supine, head turned to side (depending on patient/clinician comfort)

Anatomy: Comes from behind TMJ within superior parotid gland. It runs close to superficial temporal artery, with multiple branches coursing over temporal fossa

Needle/syringe: 1 ml syringe, 30 gauge 0.5 inch needle

Drug: 1-2% lidocaine and/or 0.25-0.5% bupivacaine (if combined, lidocaine/bupivacaine ratio of 1:1 to 1:3) No steroids due to increased risk of skin/hair/bone changes

Volume: 0.5-1 ml per nerve; may inject additional 0.25 ml into superior branches

Technique: Insert approximately 2 mm anterior to tragus at a depth of 4-6 mm. *Carefully* verify not intravascular by gentle negative aspiration. Additional injections may be performed more superiorly at temporal fossa to cover multiple branches. Assess for numbness in the ATN dermatome by testing sharp/dull with pin.

(Alternate technique: insert needle at posterior margin of mandibular ramus just inferior to tragus, injecting at depth of 20 mm)

Sphenopalatine ganglion block using commercially available delivery devices

Delivery devices for anesthetic to the sphenopalatine ganglion/sphenopalatine foramen (Sphenocath[®], Allevio[™], Tx360[®]) each have videos available on their websites or on YouTube to demonstrate technique.

Sphenocath[®], Allevio[™]

Patient is supine, with head tilted back. A local anesthetic may be administered topically before the procedure (A small amount of anesthetic like lidocaine can be dripped into nostril and patient can “sniff” to aerosolize).

Prepare syringe to deliver 1-2.5 (average 1.5 ml) of anesthetic (lidocaine 2%, 0.5% bupivacaine, or 4% lidocaine) in each nostril and attach to Sphenocath[®], Allevio[™] device.

Withdraw the tip of the catheter into the sheath. With hub facing anteriorly, advance applicator along anterior nasal passage until catheter tip touches mucosa over the cribriform plate (if excessive resistance is encountered, do NOT force it forward). Withdraw applicator 3-5 mm, then (keeping the hub anterior in the nose) advance the catheter into its extended position. Dispense fluid and withdraw. Patient remains in position for approximately 10 minutes. Patient may swallow some amount of fluid. Patient may use a candy to help with unpleasant taste.

Tx360[®]

Recommendations are 0.3 ml of 0.5% bupivacaine on each side (in AHS survey, some clinicians give up to 0.5 ml)

This delivery system is performed while patient is sitting upright. Fill syringe with 0.6 cc of 0.5% bupivacaine. Connect the syringe to the Tx360 device and “lock it into place.” Set the device for which

nostril you will be injecting. Keeping the handle pointed upward, insert the device into the nostril, angling inferiorly (to the floor of the nose) and medially. Then depress the injector delivering the 0.3 cc. Patient may use a candy to help with unpleasant taste.

OnabotulinumtoxinA

Dilute onabotulinumtoxinA to a concentration of 5 units per 0.1 ml. Using a 30 gauge needle with 1 cc tuberculin syringe, inject 5 units into each of 31 sites outlined by the PREEMPT trials (see list below; it is advised to view images used in PREEMPT papers or in reference article #2). Aim for a depth injecting into the belly of the muscle if possible, avoid hitting periosteum (in thin muscles or slender patients, may err on superficial aspect of muscle).

- Corrugator (above medial eyebrow, find by having patient scowl): 5 units each (90° angle, aim away from eyes)
- Procerus: 5 units (90° angle, aim away from eyes)
- Upper third of forehead: 5 units at four sites evenly spaced
- Temporalis: 5 units at 4 sites spread through bulk of muscle (typically 45° angle, aim away from eyes with anterior injections)
- Occipitalis: 5 units at three sites on each side, stay above nuchal line
- Cervical paraspinals: 5 units at four sites in the suboccipital region, near midline. Do not allow patient to flex head too far forward, or injections may be too low/deep and cause neck pain/weakness
- Trapezius: 5 units at three sites on each side
- Optional: additional 1-2 injections using a “follow-the-pain” protocol, into occipitalis, temporalis, or trapezius

For more information...

- Blumenfeld A, Ashkenazi A, Napchan U, Bender SD, Klein BD, Berliner R, Ailani J, Schim J, Friedman D, Charleston IV L, Young WB, Robertson CE, Dodick D, Silberstein SD, Robbins M. Expert Consensus Recommendations for the Performance of Peripheral Nerve Blocks for Headaches-A Narrative Review. *Headache* 2013; 53: 437-446
- Blumenfeld AM, Silberstein SD, Dodick DW, Aurora SK, Brin MF, Binder WJ. Insights into the functional anatomy behind the PREEMPT injection paradigm: guidance on achieving optimal outcomes. *Headache* 2017; 57: 766-777
- Robbins MS, Robertson CE, Kaplan E, Ailani J, Charleston IV L, Kuruvilla D, Blumenfeld A, Berliner R, Rosen NL, Duarte R, Vidwan J, Halker RB, Gill N, Ashkenazi A. The sphenopalatine ganglion anatomy, pathophysiology, and therapeutic targeting in headache. *Headache* 2016; 56: 240-258