
Welcome to part 2 of your cranial base face and bought lecture. This will be a very brief introduction to the face. We won't be doing as much with facial bones in lab. And so this is just a brief introduction to the anatomy and the physiologic motion of the PRM and some of these bones. But we will not be focusing on this content as much. I certainly encourage those of you who are enjoying this content or want to learn how to use it more clinically to take a full 40 our introduction course into OCMM. And I'm more than happy to help you find those if you need help. And in those you dive deeper into how to treat these facial bones, their anatomy and motions. So again, this should serve more as a brief intro for you.

# Objectives

- Identify each of the cranial bones that are classified as facial bones
- List the seven facial bones that make up the orbit and identify their relative positions within the orbit.
- Identify common patient presentations where an ability to address the facial bones osteopathically may be indicated
- Consider PRM motion of orbit, vomer, sphenoid, and ethmoid bones

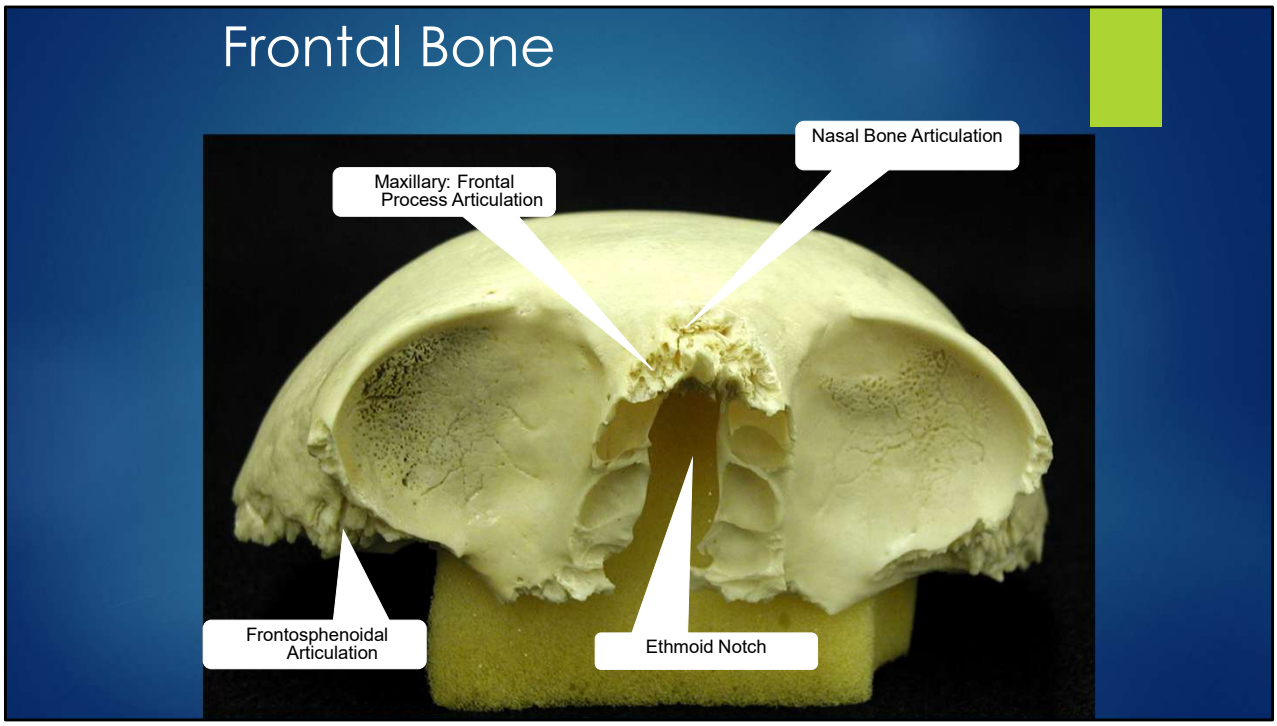
Here are our objectives.
We will be focusing on sphenoid, ethmoid, and vomer in this lecture.

## The Facial Bones

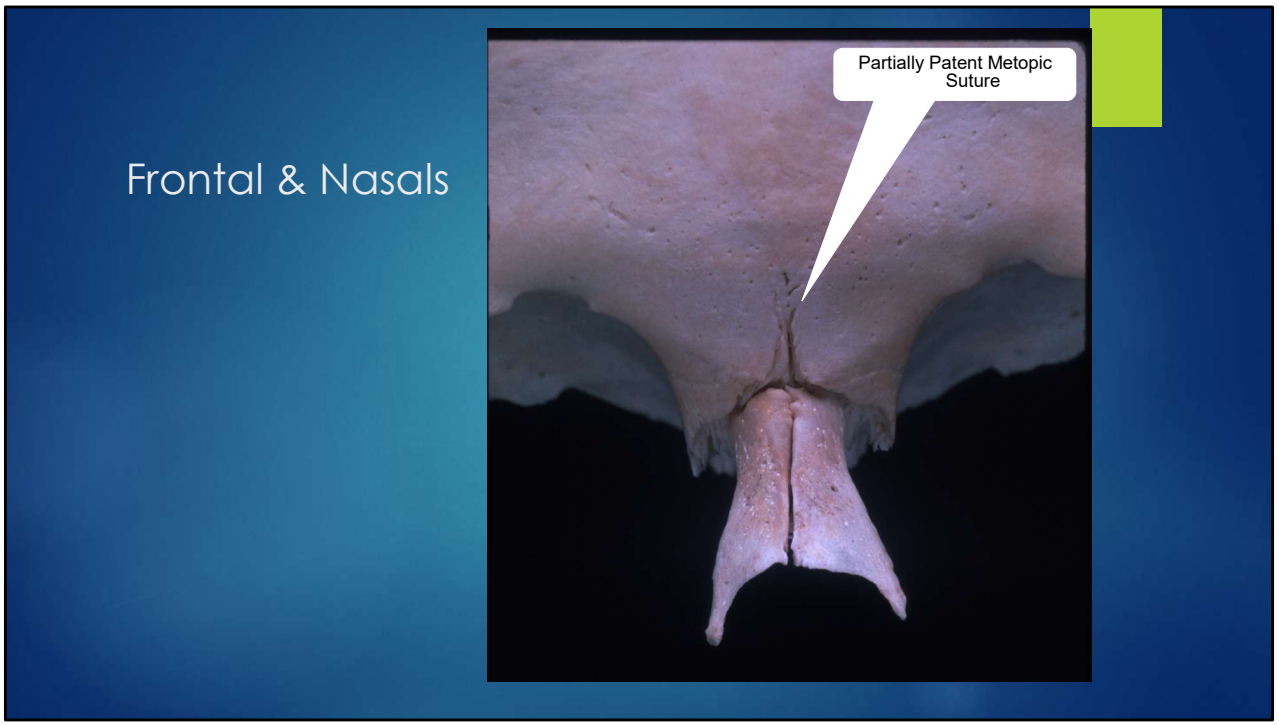
In Alphabetical Order

- Ethmoid bone not viewed (1)
- Frontal bones (1)
- Inferior Nasal Conchae (2)
- Lacrimal Bones (2)
- Mandible (1)
- Maxillary bones (2)
- Nasal bones (2)
- Palatine bones not viewed (2)
- Sphenoid bone (1)
- Vomer bone (1)
- Zygoma bones (2)

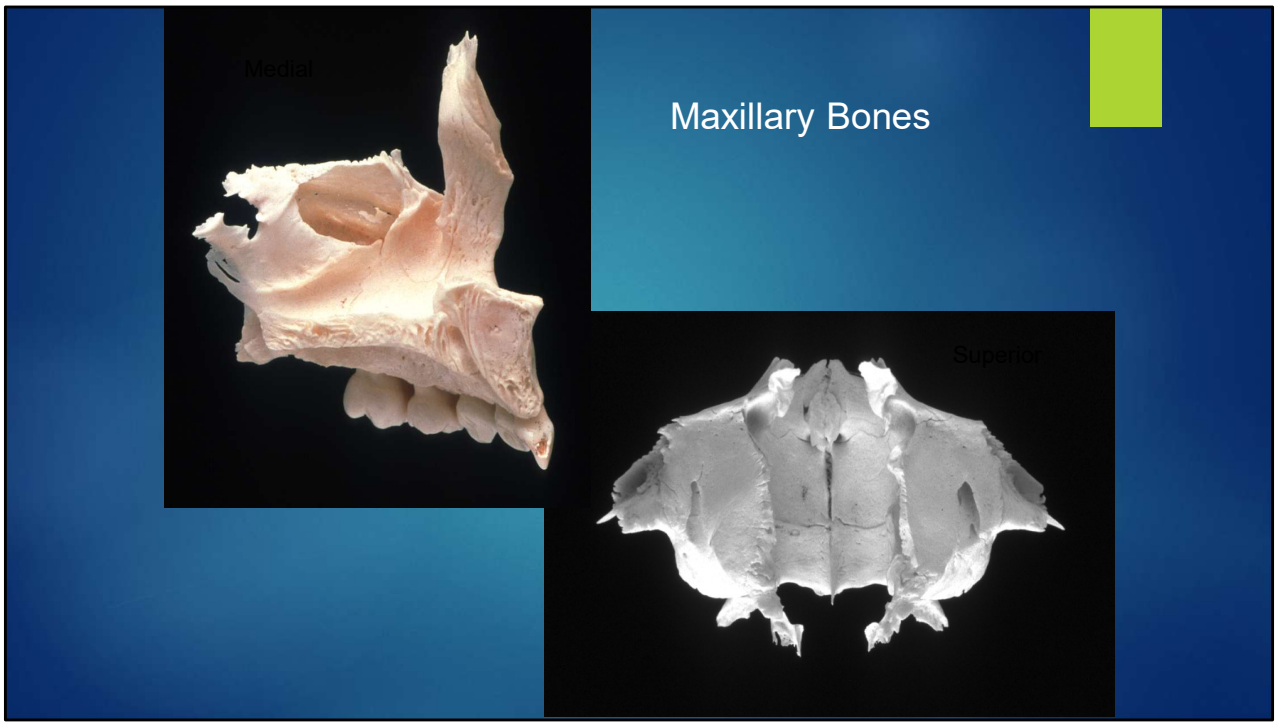
So these are our facial bones just listed in alphabetical order. Our ethmoid bone can't see it here we have frontal bones and remember we have one now, but 2 at birth, the inferior nasal conchae, you can see here our lacrimal bones that makeup this medial portion of the orbit
mandible again, we have one at birth but two initially as they are forming and they act as paired bones.
Maxillary bones, nasal bones up here superiorly articulating with frontal bone, our palatine bones, you can't see from this image. Sphenoid you can see greater and lesser wings in here and the superior orbital fissure between
our vomer extending down from from that sphenoid,
And, and our zygoma laterally here.




This is a view of the frontal bone. So we have our ethmoid notch and you can see ethmoid air cells, which these make up the roof of the ethmoid air cells. But those sinuses formed completely unless you have that ethmoid in place. Here's where our nasal bones are articulating. Our frontal process of the maxillary bone is articulating. And then our frontosphenoidal articulation laterally. And remember that's a very large triangular articular surface that we looked at, when looking at sphenoid previously.

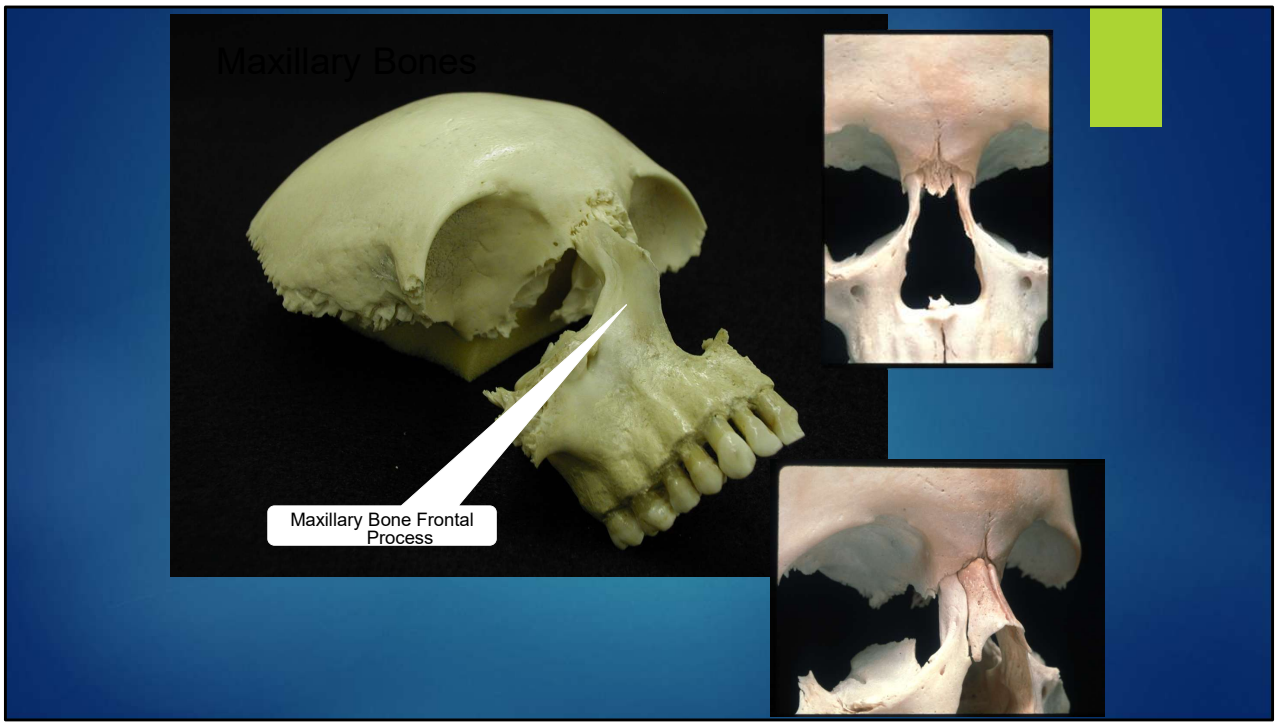



looking at this articulation with the nasal bones in place. These are what our nasal bones look like.
You can see here this is actually a metopic suture that has not completely fused. And we're going to talk about this and in the vault lecture a little bit more. But there is a certain percentage of our population where that metopic suture between the two frontal bones does not completely fuse throughout their life.

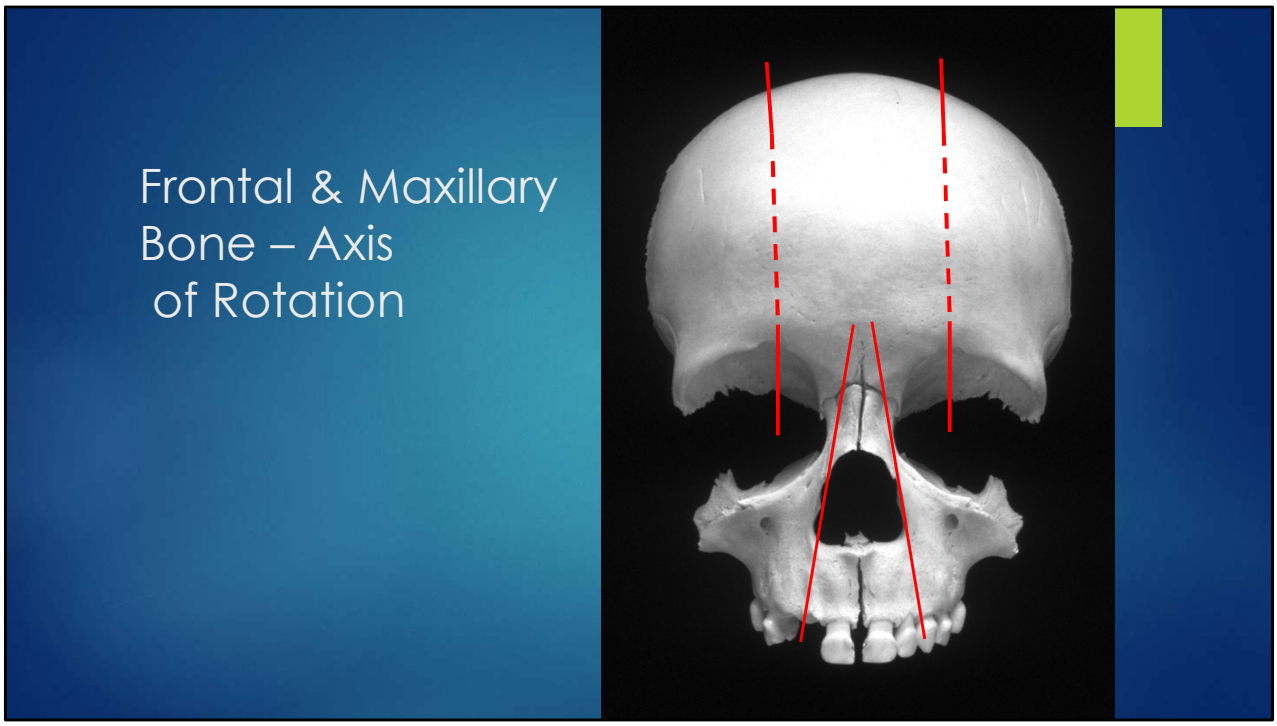



So this is a lateral view, a reminder that we have our teeth here. So problems with malalignment of the teeth or needing orthodontics or anything like that you want to think about these bones or if they have issues with occlusion as well. This is the opening, the ostium of the maxillary sinus. And just a note, look how superior it is and most of the sinus is inferior. So the pumping motion of the PRM allows for fluid movement along with the ciliated cells within that sinus. So the PRM does serve an important function for this.

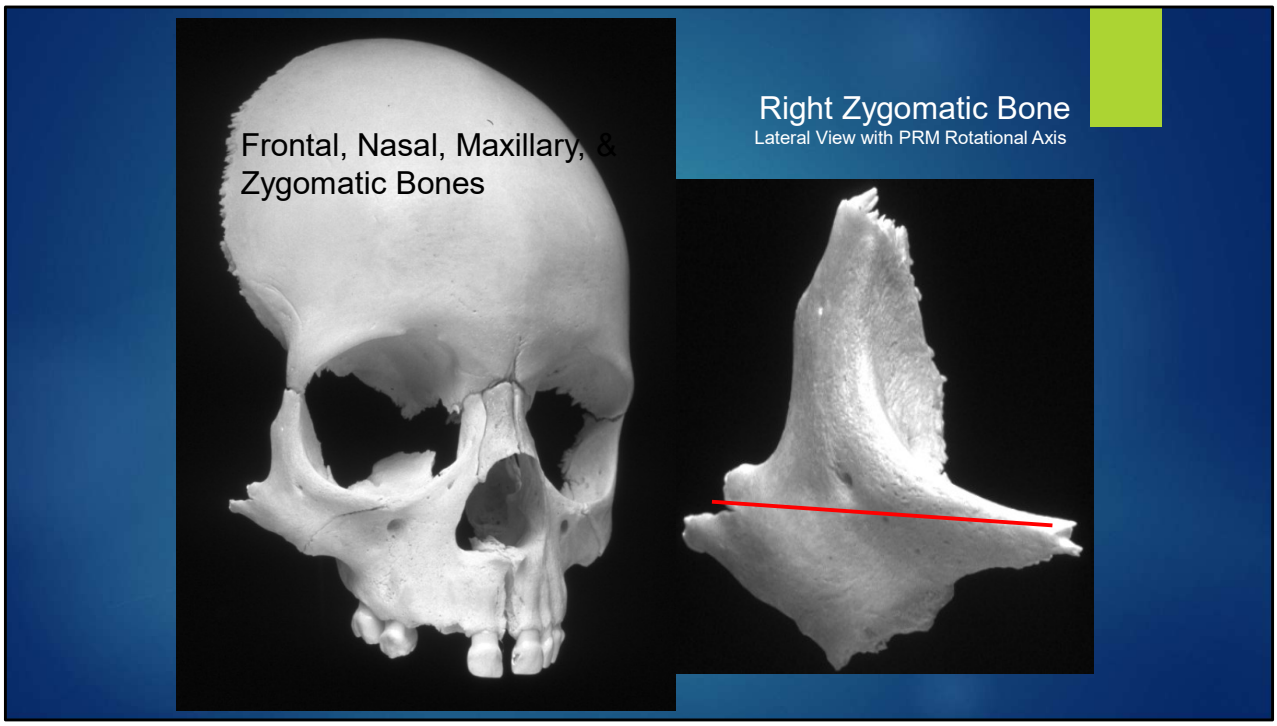
This is an inferior view of those maxillary bones




Looking at the maxillary bone. So this is the frontal process of the maxillary bone that comes up and articulates with the frontal bone just lateral to where those nasal bones are articulating. So you can see what those look like here in place. So again, our nasal bones are removed rate here. And you can start to see how that orbit is forming
And this is what the nasal bones in place.




So here's again the frontal and maxillary bones and their axis of rotation with the PRM. So these are the axis of rotation for our frontals. We're going to talk about this motion more in our vault lecture and lab and the axis of rotation for this maxillary bone. And again, we'll talk about this motion more moving forward but you don't need to know this PRM motion for maxilla for your exam.

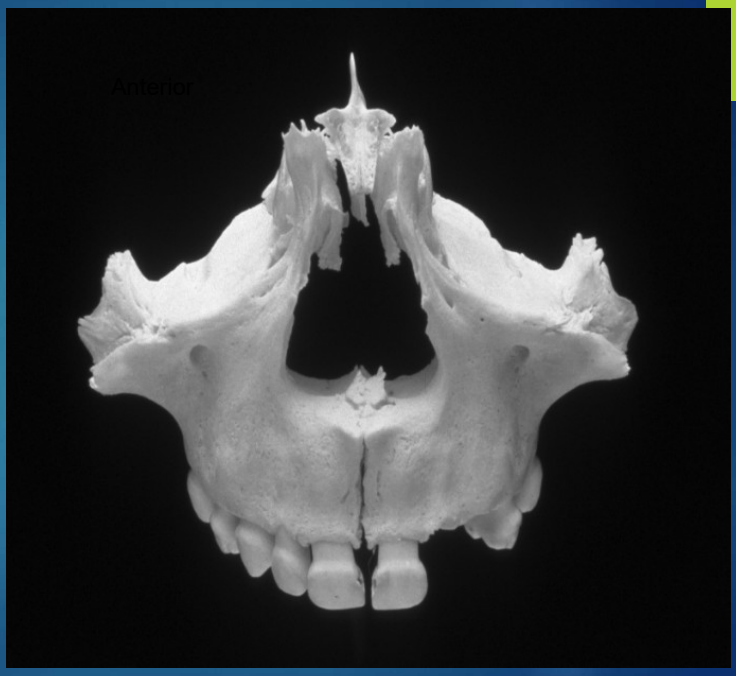



So the frontal, nasal, maxillary, and zygomatic bones are now filled in. So here's our nasal, our maxillary, and our zygoma has been filled in what form the lateral border of the orbit. This is the Axis of motion for this zygomatic bone. So again, here's that zygoma and here's what it looks like zoomed in. And this is the axis of motion. But again, do not worry about the way this PRM moves these bones. You will not be tested on that.

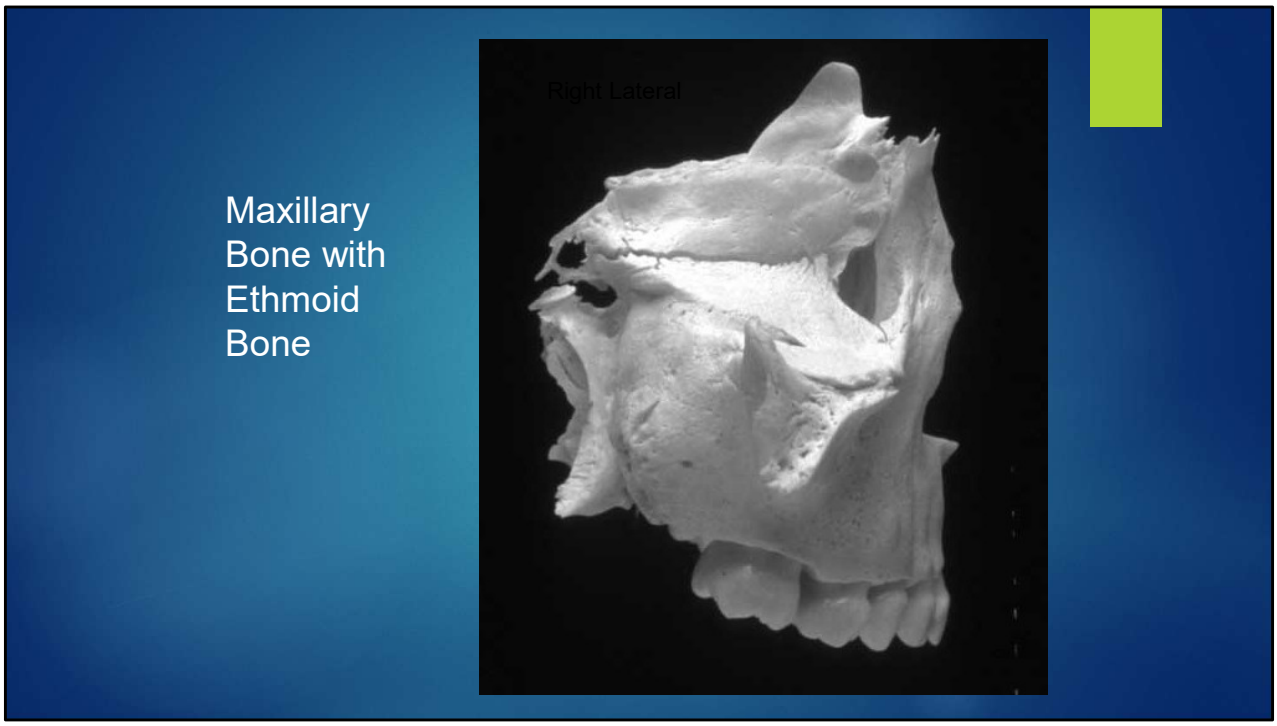
## Right Zygoma & Sphenoid

And here's an articulation. So this is looking anteriorly at the sphenoid. So again, here's our greater wings and then how it articulates with the zygoma

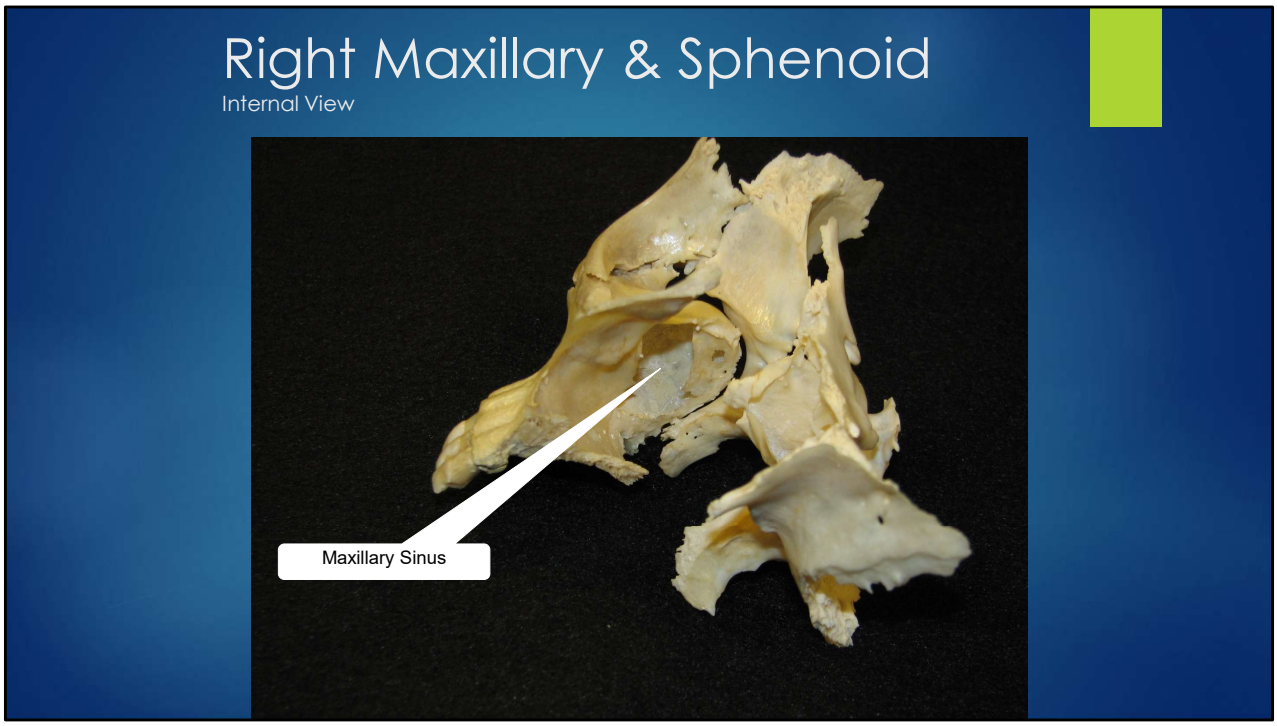
Maxillary Bones with Ethmoid



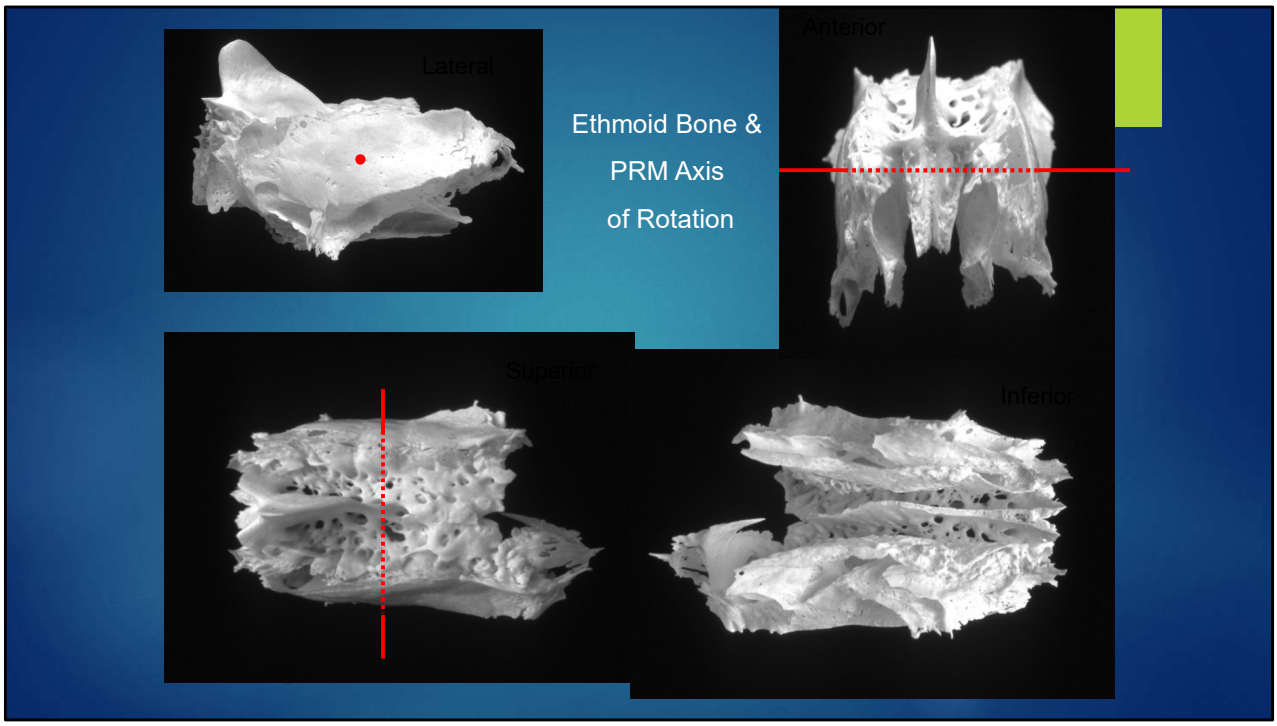

Here's our maxillary bones and now we have our ethmoid in place.



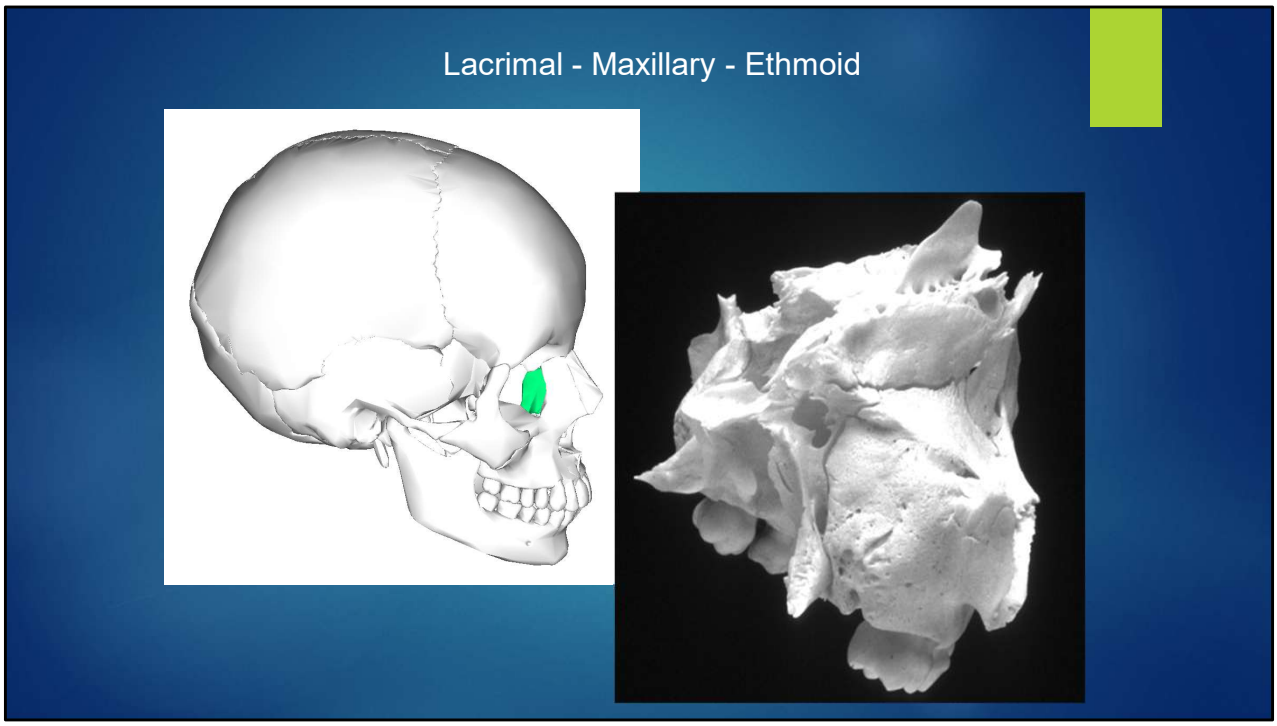

Here's again a lateral view of that. So again, here's our maxillary bone. Anytime you're looking at an ethmoid, you can find the crista Galli, this landmark up here to help you orient to the superior surface.




Here's our right maxillary bone in place with the sphenoid. And here you can see the maxillary sinus.
Here is sphenoid and here's maxilla.

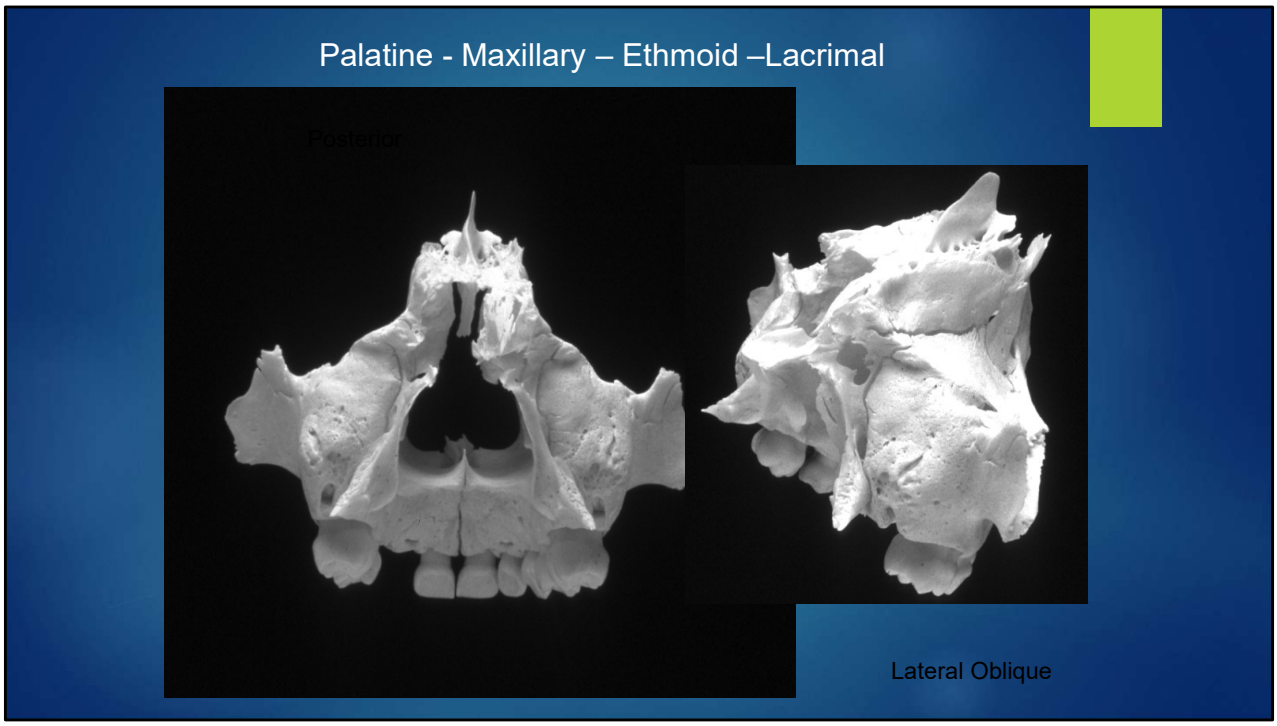



And again, looking at these different views of the ethmoid bone, you can see our cribriform plate with all the holes in it. And remember that's where the terminal fibers of cranial nerve 1 are extending down and those are bathed in CSF.
And the axis of rotation is, again, here's your crista Galli to orient you to this superior portion. It's a transverse axis through this part of the ethmoid. And remember that we're going to talk about this motion on another slide so you can see it relative to our sphenoid, which is going to really drive this motion. But remember that technically this bone has midline and paired bone motion in the PRM.




Looking at our lacrimal bones. So this is what that looks like. It makes up again this medial portion of the orbit and it's this small bone right here. Here's your ethmoid, maxillary, and lacrimal bone.


Looking at our palatine bones, we looked at these previously again in the earlier portion of this lecture with their articulation with the sphenoid. These small tiny bones here. And together they combine near Pterygoid plates of that to form the posterior portion of the hard palate, just posterior to the anterior, the anterior hard palate, which is farmed by bilateral maxillae.

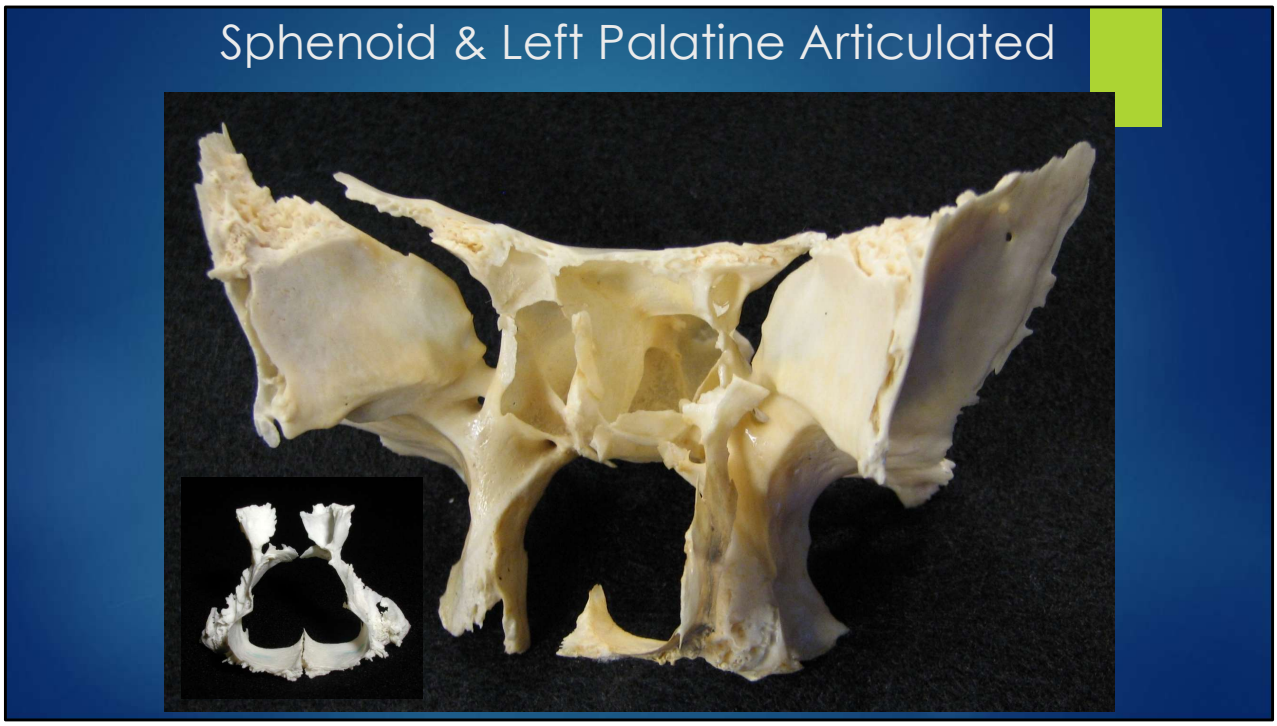



These small tiny bones here. And together they combine near Pterygoid plates of that to form the posterior portion of the hard palate, just posterior to the anterior hard palate, which is farmed by bilateral maxillae.

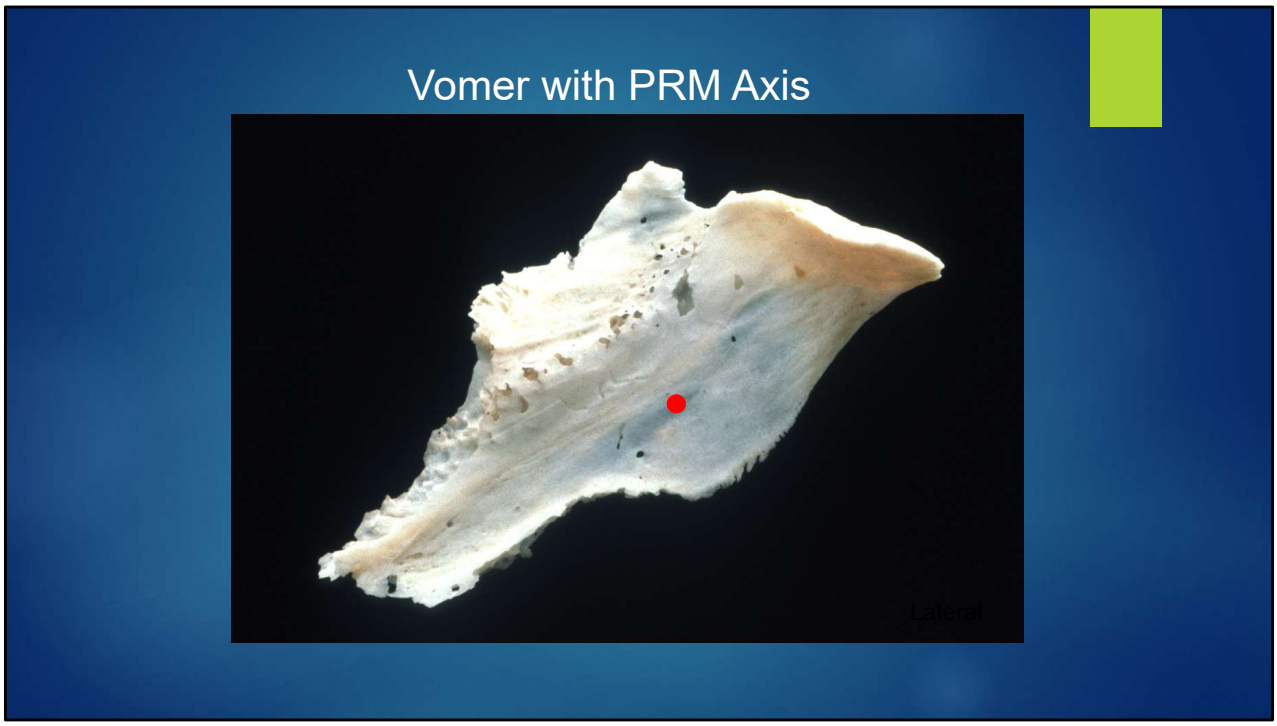
So now we have our ethmoid again, here's our crista galli to orient. Here's our maxilla. And we also have our lacrimal bones in place forming this medial border of the orbit.

# Left Palatine & Sphenoid

Looking at the left palatine in place with the sphenoid again, you've seen this image before just to remind you where these are in space

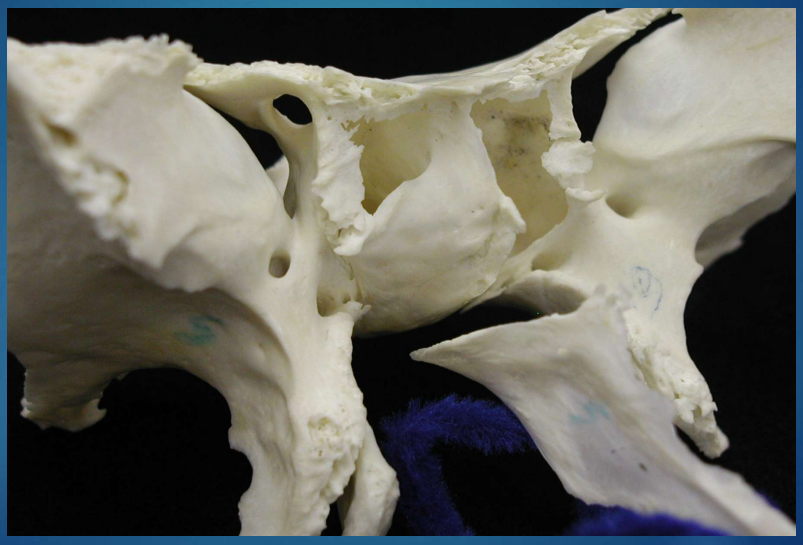



Here's what bilateral palateine look like together. And again, here’s sphenoid and the left palatine articulation from a slightly different angle.



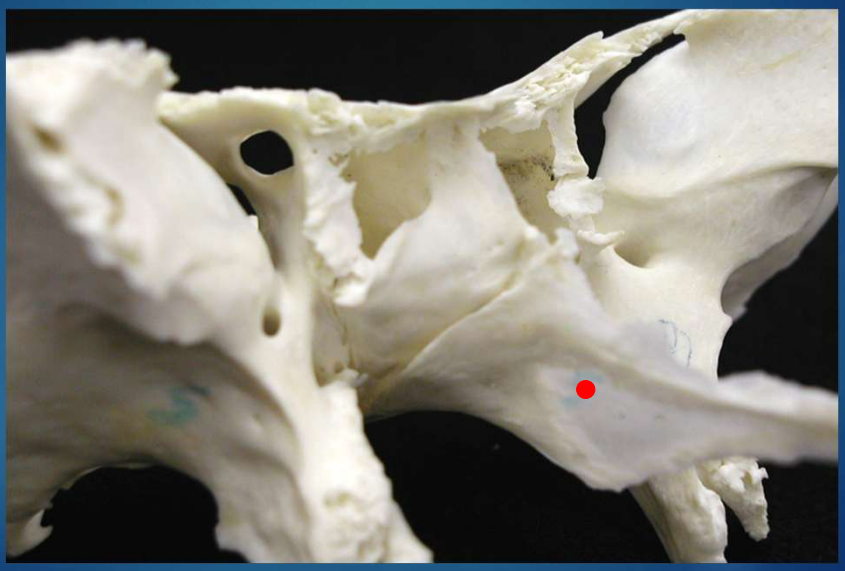

Here's the vomer with the PRM axis. We've already talked about vomer appear in motion and we're going to review that in just a second. But this is where its axis goes through the bone.

## Vomer and Sphenoid



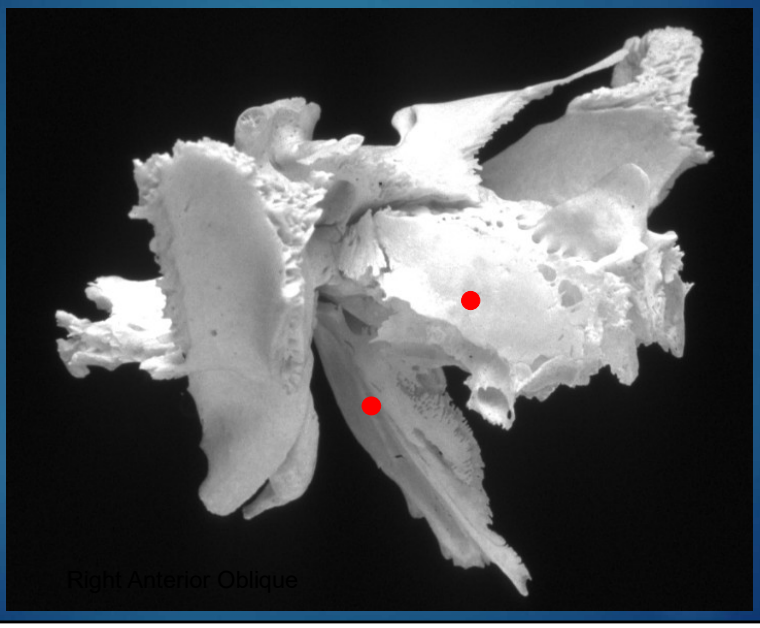
looking at the vomer and the sphenoid. And again that there's the articulation between them.

## Sphenoid & Vomer Articulated



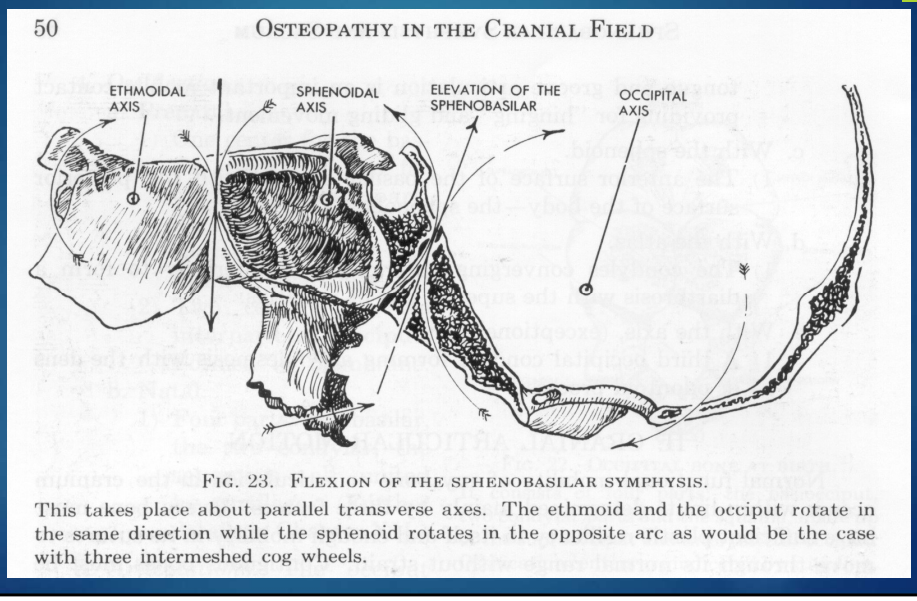
Here's our axis of motion in PRM, and that gets driven by that sphenoid motion

## Sphenoid – Ethmoid – Vomer bones

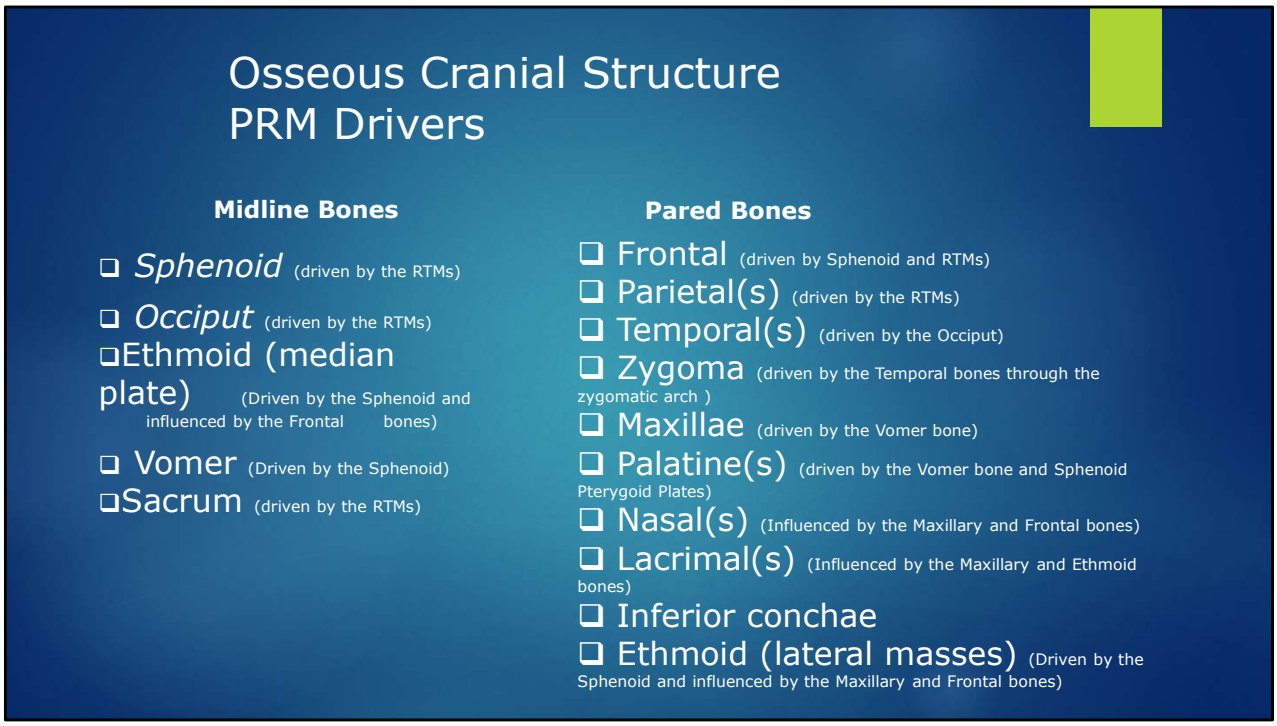



So again, here's our sphenoid, here's our vomer and our ethmoid again, here's our crista Galli. And you can see this articulation or axes of PRM motion with these red dots.

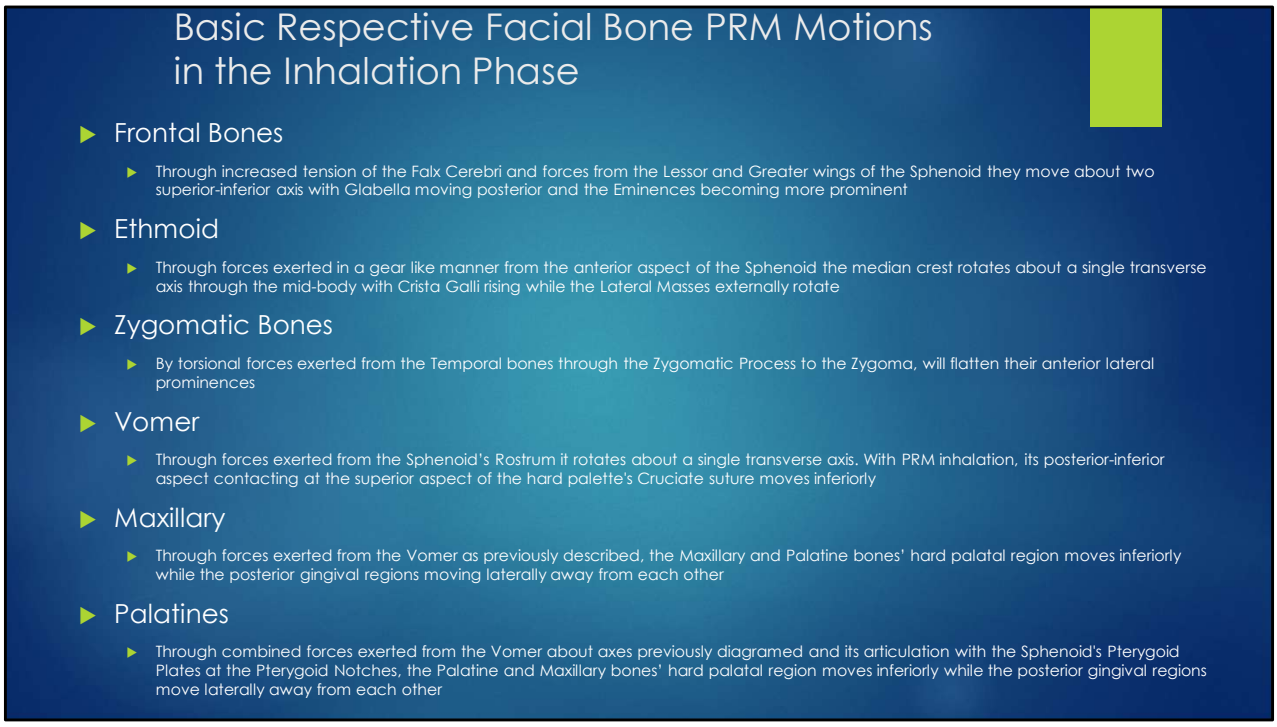
## Cranial Midline Bone Respective Motion in the Primary Respiratory Mechanism - *Flexion*




this is the image that works best for me to understand how these moves. So again, a reminder you've seen this before when we talked about SBS motion and that with flexion, this yes will rise and extension this joint falls. So here's our occiput right here, here's our sphenoid and the axes of motion for each of these. And a reminder that this ethmoid is then going to be driven by this sphenoid as well as vomer. And so you can see as this, this motion happens with flexion. It's going to drag this sphenoid into this counterclockwise motion. And as a result, will drive ethmoid and clockwise motion, just like the occiput is doing.



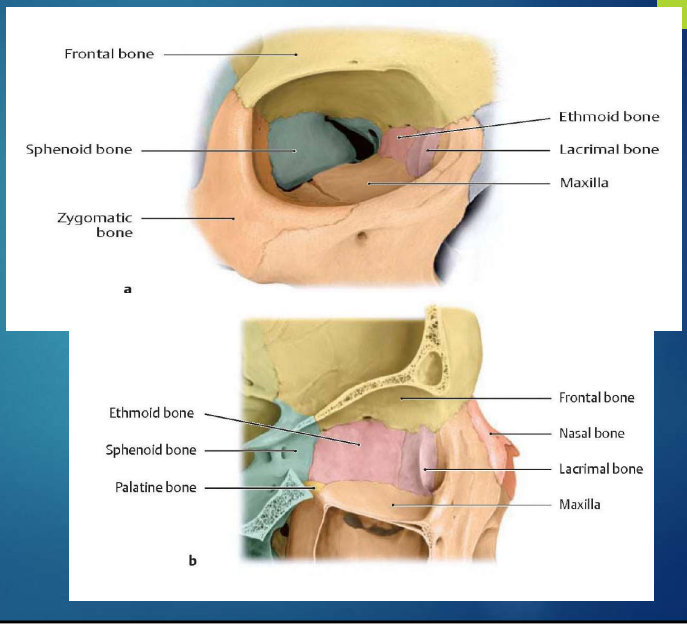

So this are a nice summary slide of all of these bones and how they're moving. we've covered most of these and we'll be covering the rest in the remainder of this lecture coming up on the vault. But a reminder of, how each of these bones are driven in the primary respiratory motion,
some are driven by the reciprocal tension membrane -The main one to focus on there is sacrum.
Some of them are driven by other bones. Some of the ones we've highlighted are the vomer and ethmoid being driven by sphenoid and then the temporal bones being driven by the occiput. So those are some of the main ones that we focused on.



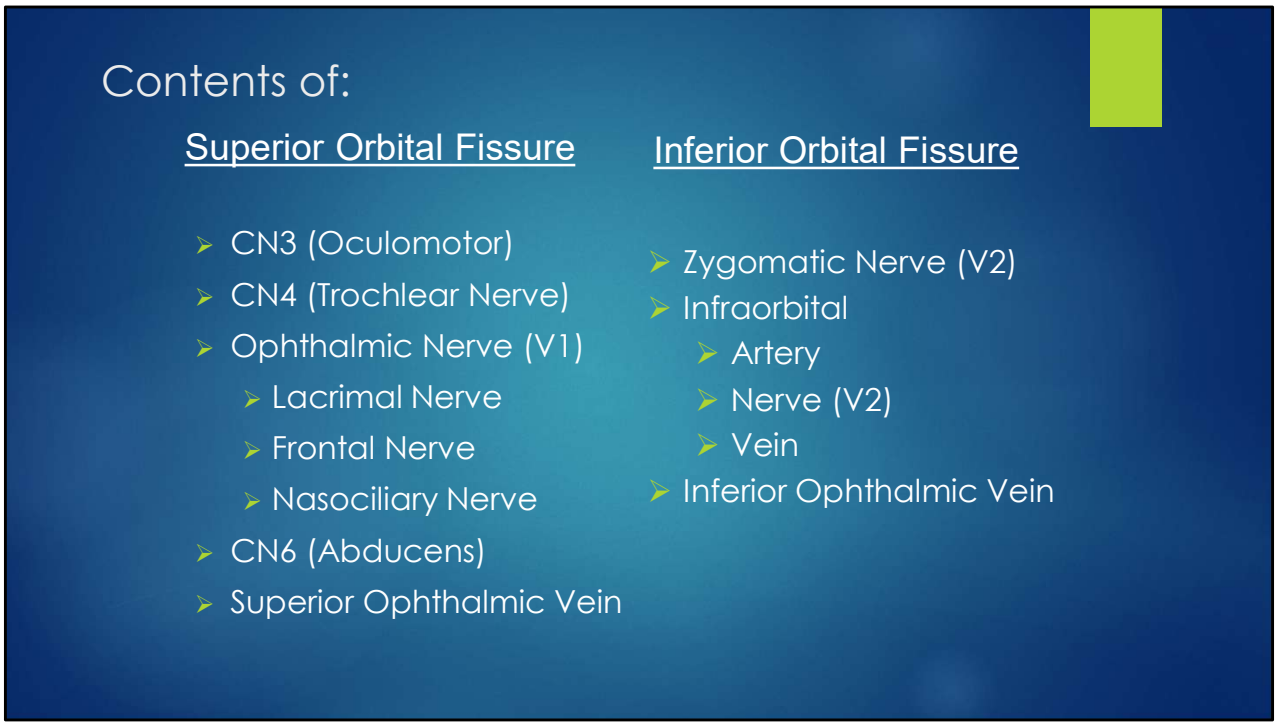

And then these are descriptions of the facial bone motions. Again, I would love you to read through them and process some of them, but you will not be tested on all of these. You will be tested on frontal bone motion. We're going to go over that in our vault lecture. And we will be treating those in lab
again focus on vomer as well. We have talked about that and relative to being driven by the sphenoid.
But the rest of these you'll not be tested on in our OCMM, content.

# The Seven Orbit Bones

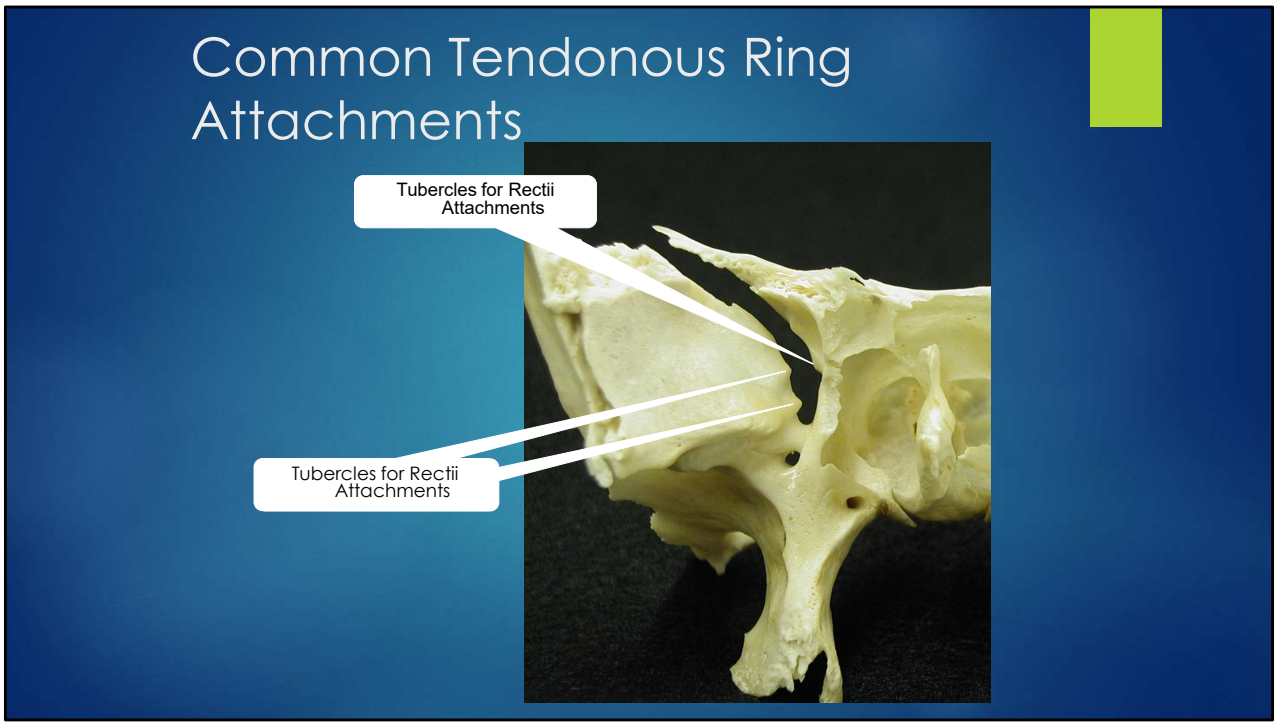
1. Frontal
2. Zygomatic
3. Maxilla
4. Lacrimal
5. Ethmoid
6. Palatine
7. Sphenoid




Look at the seven orbit bones. These are important for you to know. Frontal zygomatic maxilla, lacrimal, ethmoid palatine, and sphenoid. I would say the Palatine is the most commonly forgotten ones. So just make sure you're paying attention to where that is. It's this little bone right in here that's coming up in the posterior portion of the orbit.

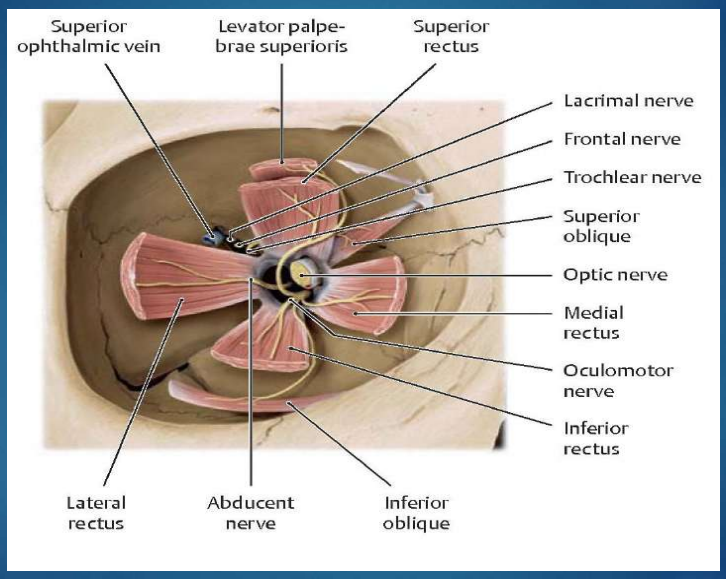



The contents of our superior and inferior orbital fissure. Remember, we learned about these structures when we were treating sinuses in our first year lab on sinuses and URI. So these are a reminder of the contents and why when we do inhibition over over these landmarks, we are treating these nerves that are under our hands. So for superior orbital fissure, cranial nerve 3, 4, all v1 and cranial nerve six as well. Vascularly , you also have the superior ophthalmic vein, inferior orbital fissure has cranial nerve V2 and the infraorbital, which includes V2. And then we have the infraorbital vein




We talked about the common tendinous ring when we were looking at sphenoid before. But here's another view of this that shows tubercles for recti, attachments for those extraocular muscles.

## Orbital View - CNs II, III, IV, & VI

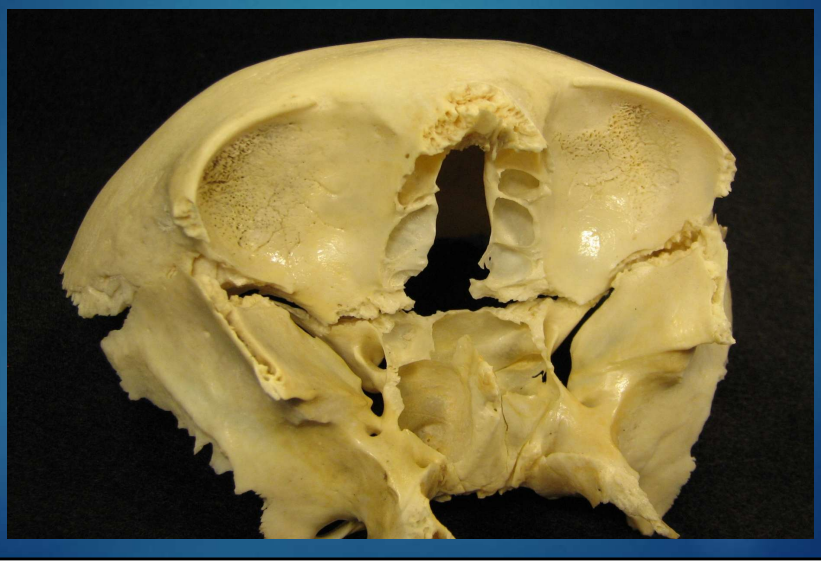





Another view of the orbit and a reminder that although it looks like there's tons of space in here when we are looking at these, there really is very little space in a living patient that has The globe of their eyeball in here, and then all of the fluid around it. And so it's very easy to see that if there's increased intracranial pressure or impingement, well along with any motion of any of these separate seven bones, especially thinking about young infants who barely have any space to give, you can see why they would develop vision problems strabismus with changes in extraocular muscle movement. So again, just remembering that this is a much tighter structure than it appears to be when we look at these nice anatomy drawings with everything removed.

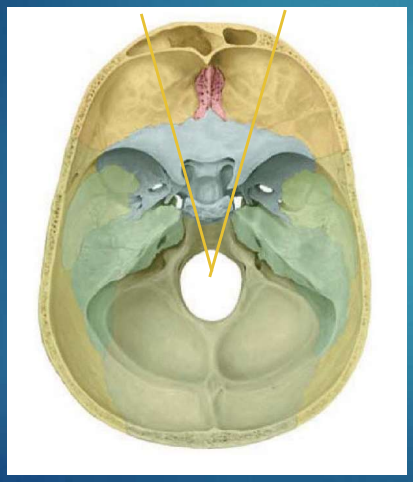
These next few slides will feature some different views of structures you've seen before but focusing on construction of the orbit.

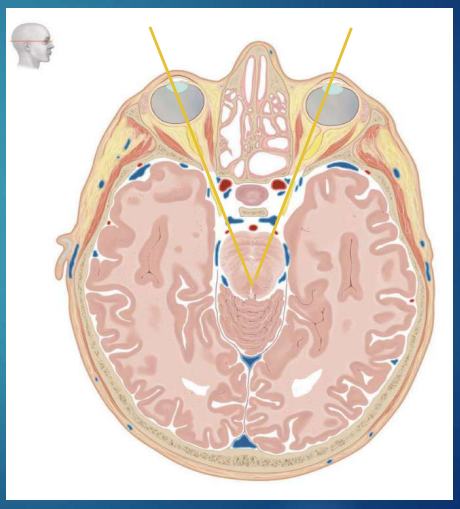
# Sphenoid & Frontal



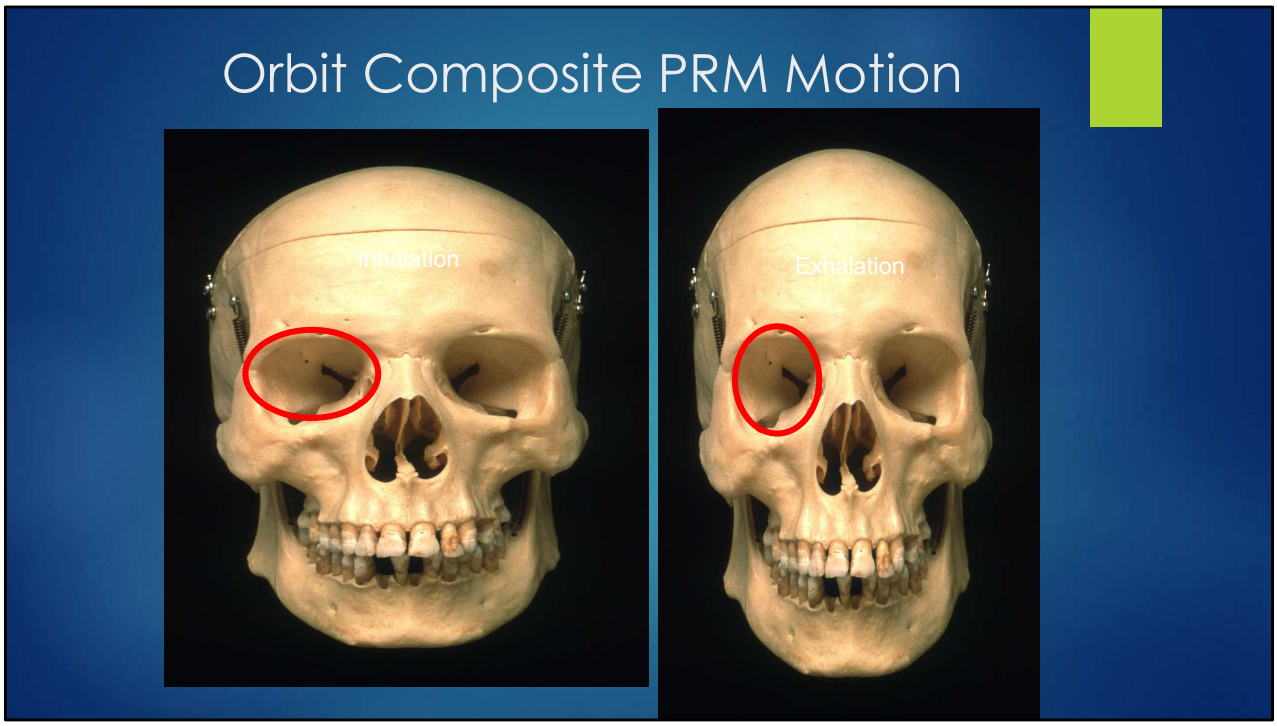
# Orbit Partially Constructed

# Orbital Projections





These are the orbital projections. So remembering that again, if these get altered, it's going to alter function of the eyes and ultimately vision




And then a composite looking at PRM motion. So this is our inhalation over here and our exhalation over here. So you can see that in inhalation we get this widening of the orbit from side to side and a narrowing from top to bottom. And it's the opposite with exhalation, just like the whole head and face are doing as we've learned before, Ernie and bert.

That concludes our lecture on the face and we'll be moving into the vault next. Thank you.