RAD 309 Calvarium

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Facial Bones

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Facial bone injuries will range from the simple (black eye, broken nose) to the more complex (tri-malar fracture, infra orbital blow-out fracture, bi-lateral facial bone compression fractures). Regardless of the type and degree of complexity, all facial injuries have one thing in common and that is there is usually copious hemorrhage. So, prepare yourself to face unpleasant patient appearances often in the most simple fractures. I recommend two thoughts to keep in mind: (1) do not panic – just follow the routine position requirements and be prepared to improvise. (2) above all, do not communicate your shock when you view the soft tissue damage. The patient must not interpret the degree of their injury based on your facial expression. The next slide is solely intended as examples of superficial appearances.
Is this picture similar to a Caldwell?
Demonstrates a lot of facial bone anatomy!
SMV and/or VSM?
The Waters position demonstrates more facial bone anatomy than any other position.
Waters/Parietoacanthial: MSP ⊥, OML 37° to the plane of the table
Water’s View

Key structures
1 = Frontal sinus
2 = Maxillary sinus
3 = Frontal process of Zygoma
4 = Body of Zygoma (malar eminence)
5 = Temporal process of Zygoma

Dotted line = zygomatico-frontal suture

Dolan’s lines of reference
Line A, B, C

Rule:
smooth, non-disrupted, same contour on both sides

Imaging of Facial Trauma
Part 2: Introduction and Anatomy

Rathachai Kaewlai, MD
Plan B

A reverse Waters: MSP ⊥, Mentomeatal line ⊥, CR ⊥
Note: Plan B image is very similar to Plan A, but does a difference exist?
Plan C

Reverse Waters:

MSP ⊥, IOML ⊥ and CR angled 30° Cephalic.

CR is || with the mentomeatal line.

Note: Cervical Collar
Plan C provides an obvious distorted projection. However, this position does show the major facial anatomical structures without endangering the patient with possible C-spine injuries.
Plan A – CR ⊥

Plan C: CR
\[ \angle 30^\circ \text{ cephalic} \]

When to use?
Modified Caldwell – MSP ⊥, OML ⊥ and CR angled 15° Caudal

Bontrager
Lesser Wing
Greater Wing
Lateral Rim
SOM
Frontal sinuses
Ethmoid sinus
Maxillary sinus
Nasal septum (bony)
Caldwell view
Lesser Wing
Greater Wing
Ethmoid Cells
Mastoid Tip
Frontal Sinus
Frontal Process of zygomatic bone
Nasal Conchae
Floor of Maxillary sinus
Calcification of Falx Cerebri

Name of this position?
1 maxillary sinus
2 orbit
3 hard palate
8 posterior part of floor of orbit
10. Nasal floor
11. roof of oral cavity
15. anterior nasal spine
Plan A

SMV for zygomatic arches: MSP ⊥; CR ⊥ to IOML
The position is the same as in a SMV, but the technical factors must change. Zygomatic arches should be performed table-top, non-grid. . .ALARA.
Maintaining the MSP ⊥ and the CR ⊥ to the IOML are essential to producing a great image as demonstrated above.
Plan B

Townes for zygomatic arches

Bontrager
Alternate, but less frequently used approach.

Head rotation to the **affected side** **no more** than $10^0$ with CR $\perp$ to IOML/Zygomatic Arch.

Bontrager
Common Depressed Zygomatic Arch Fractures
What do you see?
The right arch is not plainly visible. Why?
MANDIBLE

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The architecture of the mandible is such that an external force applied to one side of the mandible may result in a fracture to the side receiving the impact as well as the opposite side. Alternately, the side receiving the external blow may not fracture, while the other side may. It is not uncommon to see evidence of a patient who complains of a pain to the symphysis, but the symphysis is not fractured, while the ramus or neck on one side is fractured. Thus, it is important to assure that the entire mandible is visible on all radiographs appropriate to the various positions responsible for demonstrating specific anatomic parts of the mandible.
Common Fracture Sites
CR ⊥ for AP or PA

Note: mandible is slightly foreshortened and the mandibular neck is not visible.
Pt. PA; CR 15-20° Cephalic

or

Pt. AP; CR 15-20° Caudal

Note: elongation of mandible with radiographic visibility including all of the ramus and neck. The condyles are obscured by the mastoid processes. Compare appearance to CR ⊥.

Note: edentulous patient
Degree CR Angulation?

- Condyle
- Coronoid Process
- Ramus
- Body
- Symphysis
Open Mouth Townes demonstrating the mandibular condyles

This is the best method to demonstrate the mandibular condyles
Oblique

Pt. Supine;
CR 15-20°
Cephalic;
Pt’s. head turned to his/her right with the mandibular body near to plane of table.
Oblique

Pt. Supine;
CR 15-20°
Cephalic

Symphysis
Menti

Body Away from IR

Coronoid Process

Condyle

Body

Angle
Neck
A Method for Cross-Table Oblique of the Mandible
Is the CR angled on this image?