You know you would like to stop swearing at the computer after each shot.
Goals of oral radiology

- Achieve diagnostic images of the teeth and surrounding bone.
- Images should reflect the exact size and shape of the tooth in the patient.
- The most important portion of the tooth is the tooth root tip and surrounding bone. Often, the crown is of little or no diagnostic value.
- Remember that there is more tooth below the gum than above.
Indications for radiographs

There are a number of reasons for producing dental radiographs. Anything out of the range of normal deserves a radiograph.

1. Periodontal pocket depths over normal
   - i.e.; Periodontal pockets of dogs greater than 3 mm or cats greater than 2 mm
2. Periodontal disease
3. Resorptive lesions
   - Especially in cats, if you find even one resorptive lesion, obtain full mouth radiographs, you will be amazed at the number of subgingival lesions that you will find.
4. Fractured teeth
   - Shoot radiographs of all fractured teeth, even uncomplicated fractures (crown fractures into enamel or dentin with no pulpal exposure).
5. Missing teeth
   - Congenitally retained teeth or retained tooth roots after a failed extraction are found commonly.
6. Oral enlargements or masses
   - Radiograph all epulsi to evaluate the state of this progressive, dangerous mass.
7. Painful, sensitive teeth
8. Teeth of questionable viability
Indications, continued…wow!

- 97% of discolored teeth (pulpitis) will be non-vital
- 9. Draining tracts on gums, mandible or maxilla
- It is quite common for suborbital swellings and drainage to be the result of periapical pathology.
- 10. Nasal discharge or Epistaxis
- 11. Monitoring prior dental therapy
- 12. Pre and Post extraction
- I cannot count the number of retained tooth roots that I have found. A simple post extraction radiograph would eliminate these. Retained tooth root tips will go on to abscess, cause severe horizontal or vertical bone loss or an oronasal fistula.
- 13. Exotics, birds and even small animal extremities are often best visualized with a dental radiograph due to its greater detail.
- In short, almost all dental cleaning, scaling and polishing cases require some radiography
Normal anatomy

- Enamel
- Dentin
- Root canal system
- Periodontal ligament space
- Alveolar bone and alveolar crest
- Mandibular canal
- Trabecular bone
Crowns, roots... who cares?

- It is imperative to get images of the root tips. Crowns are usually of little diagnostic importance. So always begin the positioning over the tooth root tips, not the crown.
Most problems arise from incorrect positioning

**Tube head moved too far from vertical**

**Sensor misplaced**
Parallel technique

- Used for distal Mandibular premolars and molars
- Place film (sensor) parallel to axis of teeth
- Place tube head at 90 degrees to film and teeth
Mandibular premolars and molars

Parallel positioning for distal mandible
Resulting radiograph
Bisecting angle; a primer
Bisecting angle; a primer

Line of tooth

Line of sensor
Bisecting angle; a primer

Line of tooth

Bisected angle line; half way between the angle of the tooth and the line of sensor

Line of sensor
Bisecting angle; a primer

Tube head angulation; ninety degrees to the bisected angle

Line of tooth

Bisected angle; half way between the angle of tooth and the line of the sensor

Line of sensor
Bisecting angle positions

- Read the description of this in any text; Wiggs and Lobprise, Holstrum, Niemiec, DuPont and DeBowes, Colmery etc.
- Most practitioners use this, however, experience allows simplification.
- Thank you, Dr. Tony Woodward for simple rules to obtain images.
Simple bisecting angle technique

1. Locate tooth root
2. Position tube head 90 degrees to film
Rotation of tube head; This will vary with the tooth type

3. For maxillary canine; rotate tube head 20 degrees rostrally

4. For maxillary canine; incline tube head 20 degrees buccally
Mandibular, maxillary incisors

- Place the sensor on the tongue over the roots of the mandibular incisors.
- Center the tube head over the root tips of the incisors and orient it at 90 degrees to the sensor.
- Incline tube head (without moving opening of columnator) 20 degrees rostrally (forward).
Positioning for mandibular incisors
Resulting radiograph
Maxillary, Mandibular Canine Teeth

- Place sensor on hard palate beneath the tooth root tips of the maxillary or mandibular canine teeth. Remember the root tip is at the level of the rostral root of the second premolar.
- Begin with tube head centered over root tip and oriented at 90 degrees to the sensor.
- Incline tube head 20 degrees buccally and 20 degrees rostrally.
Maxillary canines

Remember, the tooth root tip of the maxillary canine is at the level of the rostral root of the second premolar
Resulting radiograph
Maxillary premolars

- Place sensor on hard palate
- Begin with tube head centered over tooth roots and oriented at 90 degrees to the sensor.
- Incline tube head 45 degrees buccally.
Maxillary premolar positioning

Begin over tooth root tips

Rotate tube head 45 degrees
Resulting radiograph
Maxillary fourth premolars and first molars

- Place film on the hard palate with edge of sensor touching crown.
- Begin with tube head centered over tooth root at 90 degrees to sensor. **The tooth roots of the fourth premolar are under the Zygomatic Arch.**
- Incline tube head 45 degrees buccally.
- To split the mesiobuccal and palatal roots of the fourth premolar, the tube head is often angled 10-20 degrees rostrally or distally. In cats, angle the tube head rostrally to avoid superimposing the Zygomatic Arch on the fourth premolar.
Maxillary fourth premolar, first molar positioning

Begin with tube head centered over the tooth root tips

Side view
Maxillary fourth premolar, first molar positioning

Rotate tube head 45 degrees to buccal (lateral)

Then rotate tube head 20 degrees to distal (rear)
Resulting radiograph

Note distal root is projected off first molar and mesiobuccal and palatal roots are separated
Feline maxillary premolar, molar positioning

Begin with tube head directly over tooth roots
Cats are not little dogs

Rotate tube head 45 degrees to buccal

Then rotate tube head approximately 45 degrees to rostral
Resulting radiograph

- Note that Zygomatic arch is not projected onto upper fourth premolar and first molar.
Open mouth positioning

Lateral recumbent, open mouth

Resulting radiograph; need to note that this was exposed as open mouth as this will affect reading the radiograph.
Cheat sheet for positioning

**Area Imaged**

**Parallel Technique**

- Mandibular PM and M
  - Parallel technique. Film parallel to axis of teeth.

**All other views have film (sensor) on tongue or hard palate**

- Mandibular Incisors
  - Stay on midline, tube inclined 20 degrees rostrally

- Mandibular Canines lateral
  - Same as incisors, may shift tube head 20 degrees lateral

- Maxillary Incisors
  - Stay on midline, tube shifted 20 degrees rostrally

- Maxillary Canines
  - Tube shift 20 degrees rostral and 20 degrees lateral

- Maxillary PM
  - Tube shift 45 degrees laterally (buccally)

- Maxillary PM and M shifted the fourth rostrally to avoid fourth premolar
  - Tube shift 45 degrees laterally. Often the head is rostrally or distally to separate the roots of premolar. In cats, the tube is shifted projecting the zygomatic arch onto the and first molar.
Most common mistakes

Overlong images; the tube head was inclined too far from vertical. Usually, just incline tube head less.
Overlong radiology positioning

Tube head rotated too far to buccal (away from vertical)

Resulting radiograph too long
Too short positioning

Tube head not rotated far enough buccally

Resulting radiograph
Entire tooth is not on image

Tooth root is not on image. Most common fix is to move sensor distally.
Remember:

- The image obtained should look exactly as the tooth in the patient with the entire root structure present.
- If the image is too long or too short, move the tube head.
- If the image does not contain the entire intended tooth, move the sensor.