UNIVERSITY OF MICHIGAN
DEPARTMENT OF RADIATION ONCOLOGY

Policy: Defining Anatomy
Date Issued: 9/2010

Purpose: To establish consistency among the physicians and therapists when reviewing images, ensuring that the same anatomical structures are identified/utilized to analyze portal fields, and thereby maintaining set-up reproducibility.

Trouble Shooting:

1. Bony Anatomy is Hard to Define – Lack of Bone Density
   This often appears in children and elderly patients – activate kV fields. Therapists should first inform physician, notify dosimetry, and then contact the Supervisor, as machine schedule changes may be necessary.

2. Anatomy Alignment Appears Grossly Off
   Remove mask and/or patient from treatment position, realign and reimage

3. Orthogonal Set Deviates
   - Deviates up to 0.5 cm: split the difference
   - Deviates 0.5 cm - 1.0 cm: reposition patient
**Brain**

**Lateral: Rotation, in/out, depth positioning**
- Delineate the inner table of the base of skull, inner table of the top region of skull, and frontal or parietal bone & sella turcica region if definable
- **Take the lateral image 1st on H/Ns and brains**
  - Head Rotation
  - Mask Properly Fitting

**Anterior: Left/right positioning**
- Delineate the nasal septum (nasal curves are not useful), medial portions of the orbits, inner table of the skull
\textbf{H/N}

\textbf{Lateral: Rotation, in/out, depth positioning}
- Delineate the back (posterior) cervical spinal bodies
- Delineate the posterior spinous process of C2
- Line drawn from the BOS to the hard palate/teeth – rotation check
- If the hard palate is outside the defined field of view, delineate the inner table of BOS
- \textbf{Take the lateral image 1st on H/Ns and brains}
  - Head Rotation
  - Mask Properly Fitting

\textbf{Anterior: Left/right positioning}
- Line drawn down through the posterior spinous processes
- Delineate 1 or 2 posterior spinous processes (do \textbf{not} delineate above the mandible or the odontoid)
- Delineate the nasal septum (nasal curves are \textbf{not} useful)
**Thorax**

**Anterior:** Left/ right, in/out positioning

- Delineate the carina – including at least 5 cm of the major branch

*The carina only gets you in a ballpark range. The carina is used to determine that you are on the right spinal body, and then refer back to the spinal bodies for specific accuracy.*

- Delineate the lung (lung turned on in TXD)
- Delineate the spine
  - Single spinal body defined within 5 cm of isocenter
  - Line drawn down through the posterior spinous processes, if a spinal body cannot be defined

**Lateral:** In/out & depth positioning

- Delineate a spinal body within 5 cm of isocenter, specifically the same body as on the anterior
- Delineate the length of the anterior spinal edge
- Delineate the chest wall/sternum, manubrium and/or the sternal angle
Breast – Free Breathing or ABC

2 Field Breast

Anterior: Left/right, in/out positioning
- Delineate the carina – including at least 5 cm of the major branch
- Delineate the lung on the treatment side (lung turned on in TXD)

If the lung and carina alignment deviate more than 1 cm contact the physician

Lateral: In/out & depth positioning
- Delineate the entire length of the anterior spine
- Delineate the chest wall/sternum, manubrium and/or the sternal angle

If the alignment between sternum and anterior spine deviates 0.5 cm or less, align to spine. Deviations greater than 0.5 cm should be referred to the physician for review.
**Nodal Breast**

**Anterior:** Left/right, in/out positioning
- Delineate the carina – including at least 5 cm of the major branch
- Delineate the clavicle out to the edge of the lung
- Delineate the lung on the treatment side (lung turned on in TXD)

If the lung and carina alignment deviate more than 1 cm contact the physician

**Lateral:** In/out & depth positioning
- Delineate the length of the anterior spine
- Delineate the chest wall/sternum, manubrium and/or the sternal angle

If the alignment between sternum and anterior spine deviates 0.5 cm or less, align to spine. Deviations greater than 0.5 cm should be referred to the physician for review.

**Photon Boost**
Scar is defined on the DRR for reference and set-up. Match & adjust is not required as the scar will not be defined in image.

11/11/2010 CL
**Abdomen, ABC Pancreas and ABC Adrenal Glands**

**Anterior: Left/right, in/out positioning**
- Line drawn down through the posterior spinous processes
- Delineate a spinal body within 5 cm of isocenter

**One of the following:**
- Delineate carina if within 15 cm of isocenter — including at least 5 cm of the major branch
- Delineate pelvic crest if within 15 cm of isocenter

**Sanity Check:** Delineate the pelvic crest – in/out should remain consistent from the anterior image to the lateral image (tolerance < 0.5 cm)

**Lateral: In/out, depth positioning**
- Delineate a spinal body within 5 cm of isocenter, specifically the same body as on the anterior
- Delineate the entire length of the anterior spinal edge

**Sanity Check:** Delineate the pelvic crest – in/out should remain consistent from the anterior image to the lateral image (tolerance < 0.5 cm)
**ABC Liver**

**Anterior:** Left/right, in/out positioning
- Liver/Diaphragm – in/out (liver turned on in TXD)
  - **Intent:** Delineate dome of liver to include any abdominal fluid (ascites) that will appear as liver while imaging
- Line drawn down through the posterior spinous processes

**Lateral:** Depth positioning
- Delineate the entire length of the anterior spinal edge
- Delineate a spinal body within 5 cm of isocenter

**Sanity Check:** The lateral image is for depth only; do not change in/out based on this image. If in/out deviates > 2cm re-evaluate anterior image for accuracy.

*Note* – The defined spinal body on the lateral image is to be matched specifically to the **entire** spinal body outlined (not just the depth aspect), but **DO NOT** change the in/out unless the anterior image indicates a change.
**Pelvis**

Anterior: Left/right, in/out positioning
- Delineate the markers (Calypso Beacons, gold or carbon seeds)
- No markers – Delineate the lateral planes of the pelvis

**Lateral planes of the pelvis** – Defined to include the “arcuate line of the pelvis” (superiorly) through the *ischial spine* and then into the *obturator foramen* (inferiorly)
Pelvis continued

Lateral: In/out & depth positioning

- Delineate the markers (Calypso Beacons, gold or carbon seeds)
- No markers: Delineate both the pubic symphysis and sacrum

Delineated Markers
**Extremity**

**Anterior:** Left/right, in/out positioning
- Draw in the bony extremity including the closest joint

**Lateral:** In/out & depth positioning
- Draw in the bony extremity including the closest joint

**Thigh/Femur**

**Arm/Elbow**