INTRODUCTORY RADIOGRAPHIC TECHNIQUE

SYLLABUS

A. Status of paraprofessionals performing radiographic procedures
   1. Legislation
   2. Credentialing
   3. State regulations
   4. What the law allows chiropractic assistants to do

B. Healthcare Terminology

C. Anatomy
   1. Skeletal anatomy
   2. Brief survey of joint anatomy/physiology

D. Brief Discussion of the History of X-ray

E. Nature of radiation
   1. Electromagnetic spectrum
   2. Fundamental properties of x-ray
   3. Ionizing vs non-ionizing
   4. Production of x-ray
      a. Tube - basic structure
      b. Generator: ma, S, kV
      c. Single phase vs high-frequency generator
   5. Image formation
      a. What actually occurs to produce a radiograph ("black or lack of black")
      b. Selective absorption
         1) Energy of rays
         2) Density of material
         3) Thickness of material
      c. Tube filtration
      d. Ionizing radiation vs “radioactive”
      e. Primary radiation, remnant radiation, unnecessary radiation (scatter, secondary, leakage)
      f. Radiopaque/radiolucent
      g. Central ray, source-to-image distance, object-to-film distance

F. General Issues Regarding Image Acquisition
   1. Digital
      a. CR: Computed radiography (cassette-based)
      b. DR: Direct digital radiography (no cassettes)
   2. Film and Intensifying Screens
3. Imaging “speed”
4. Image identification

G Film Image Acquisition
1. Things to know about film
2. Intensifying screens
3. Film processing
4. Ensuring quality issues regarding the darkroom
5. Ensuring that safelight is “safe”
6. Ensuring quality issues regarding the processor
7. Artifacts on finished film-based images
8. Processor maintenance

H Digital Imaging Acquisition
1. Methods of image acquisition
   a. True DR/flat panel
      1) Permanently installed
      2) Portable, tethered
      3) Portable, wireless
   b. CCD
   c. CR
2. Grid requirements for digital image acquisition
3. Post-production image manipulation
4. Image storage and sharing
5. How digital and film radiation doses compare
   a. “Dose creep”

I. Improving the Image
1. Collimation
   a. Purposes
   b. Accuracy
2. Heel Effect (the strength of the primary beam is greater toward the cathode end of the tube)
3. Compensating filtration
4. Grids
   a. Lines per inch (reciprocating bucky or fine line stationary grid in grid cabinet)
   c. Depth ratio
d. Focal range

J. Four main components of radiographic quality
1. Radiographic density (lightness/darkness of film)
   a. Controlled largely by mAs
   b. Constant optimum kV technique, varying the mAs according to patient size
2. Scale of contrast (shades of gray)
   a. Controlled by "teeter-totter" relationship of mAs to kV
   b. Values of appropriate gray-scale technique
3. Radiographic Definition (clarity/detail of the image)
   motion, screen speed, film speed, film quality, film/screen contact, grids, collimation, OFD/SID, focal spot size, light fog, chemical fog
4. Distortion (image not accurately representing the anatomy)
   a. Patient placement
   b. Level of central ray
c. Tube angle
d. Conforming tube angle to the anatomy

K. Radiographic equipment and accessories
L. Radiation Safety
   1. Tissue radiosensitivity
      a. Radiography of the pregnant female and children
   2. Units of measurement - R, r, rem
   3. Shielding
   4. Safety procedures
      a. For the patient
      b. For the technician
      c. For others in the vicinity
   5. Dose limits (maximum permissible dose)
   6. Personnel dosimetry
   7. Notices required for posting
   8. Inspection by X-ray Control, Department of Health

M. Technique formulation
   1. Guidelines for formulation of a technique chart (high-standardized-optimum kV chart)
   2. Optimum kV ranges
   3. How to use a Supertech®
   4. Example technique chart
   5. Exposure logging

N. Ethics and Etiquette
   1. Handling of film-based images
   2. Comments on analytical marking of x-rays
   3. Legal requirements for quality
   4. Patient consent for x-ray; special requirements for females
   5. Image ownership, exchange, release, and retention
   6. Disposal of images
   7. Exceptions to patient signature requirements

O. Patient management
   1. "Start-to-finish" outline
   2. Common questions raised by patients
   3. Attitude and professionalism
   4. Boundaries issues

P. Patient Positioning Demonstration (students are required to practice patient positioning in their own office)
   1. Spine
      a. Cervical
      b. Thoracic
      c. Lumbar
      d. Sacrum, coccyx
      e. Full spine (AP only; lateral "sectionals" should accompany the APFS)
   2. Extremities (shoulder, elbow, wrist, hand, hip, knee, ankle, foot)
   3. Chest/Ribs
   4. Brief description of other imaging systems

Q. Quality critique
   1. Organized format
   2. Most common errors in the production of good radiographic studies
   3. Technical problems which inhibit accurate radiologic diagnosis
   4. Visualization of "duds" to determine "what went wrong"

R. Projects
   1. Homework to learn about in-office equipment
   2. Homework to practice demonstrated patient positioning