The Pigg-O-Stat and Pediatric Imaging[1]

Immobilization: Principles and Tools

Perhaps the two most successful tools for pediatric radiography are *effective immobilization* and *good communication skills*. Respected pediatric radiographers approach patients and parents with kindness and take care to maintain patient comfort throughout the procedure.

A willingness to cooperate on the child's part allows for more *passive*, less aggressive immobilization techniques. *Reassurance, praise,* and conversational *distraction* are the three ingredients of successful communication. Reassurance is perhaps second only to sleep as the best passive immobilization technique. A sleeping child who is moved gently, kept comfortable and warm, and not startled by sudden or loud noises often remains asleep throughout the procedure. As previously noted, all chest images must be taken while the child is awake, however, because the rate of respiration is too shallow during sleep to provide full inspiration images.

Despite effective communication, it is often necessary to restrain children during radiography. If immobilization is not handled appropriately, difficulties can arise for the radiographer, patient, and parent. Immobilization should never become a traumatic, torturous event for the child, and no immobilization technique should cause harm to the child. Experienced radiographers should teach novice pediatric radiographers how to immobilize a child *carefully*. A radiographer's lack of experience, coupled with the parent's and child's fear, can often lead to frustration on *everyone's* part. With practice, the radiographer can keep patients comfortable and immobilized with a minimum of frustration.

The radiographer can prevent a great deal of frustration by using the communication strategies described at the beginning of this chapter and applying some *practiced* immobilization techniques. A parent (presuming one is present) can do only one job. A mother who assists with the radiographic examination of her 2-year-old's forearm can help only by holding the humerus and the hand; the radiographer or some other staff member must immobilize the other arm and both legs.

Aside from the regular sponges and sandbags, three tools frequently used in pediatric immobilization warrant mention: the Velcro compression band (sometimes referred to as a Bucky or body band), a strip of reusable Velcro, and a

[1]Eugene D. Frank, Bruce W. Long, and Barbara J. Smith, *Radiographic Positioning & Procedures*, (Elsevier Mosby: St. Louis, MO, 2012), 117-118. This excerpt is taking from Volume I, Chapter 3.

"bookend." These devices are effective for the immobilization of children, although their applications are not limited to pediatric radiography. Other tools, such as the Pigg-o-stat (Modern Way Immobilizers, Clifton, TN) and the octagonal infant immobilization cradle, are described in the following sections.

Common Pediatric Examinations

Chest Radiography

The most common radiographic procedure performed in hospitals and clinics is of the chest. Radiologists agree that for most diagnostic chest radiographs in pediatric patients, upright images yield a great deal more information that supine radiographs. It is important, however, to know the way to achieve diagnostic quality in both positions. Regardless of body position, accurate diagnosis depends on high-quality images made with short exposure times to reduce motion. *Expiratory images can lead to erroneous radiologic interpretations.* Images acquired *on maximal inspiration* are crucial for accurate diagnosis. Well-positioned, nonrotated radiographs are also essential for proper diagnosis because even minor degrees of rotation can significantly distort the normal anatomy.

Upright Radiograph on a Newborn to 3-Year-Old

The many challenges of obtaining upright images include preventing motion and rotation, freeing the lung fields of superimposition of humeri and scapulae, and obtaining a good inspiratory radiograph. Various methods of immobilization are used to achieve these images, often with mixed results. These challenges are easily met with the use of a pediatric positioner and immobilization tool called the *Pigg-o-stat.* Although the Pigg-o-stat is primarily used for chest radiography, other applications include upright abdominal images and radiography of the thoracic and lumbar spine.

The Pigg-o-stat comprises a large support base on wheels, a small adjustable seat, and Plexiglas supports called *sleeves.* These sleeves come in two sizes. The seat, sleeves, and "turntable" base rotate as a unit to facilitate quick positioning from PA to lateral projections. Although some physicians do not favor use of the Pigg-o-stat (for aesthetic reasons and because of the possiblity of sleeve artifacts), the device has been shown to be one of the safest and most versatile restraining methods available for chest and upright abdominal radiography.

Communication with Parents

The Pigg-o-stat requires explanation for parents unfamiliar with its use. The radiographer should offer an explanation similar to this: "Doctors prefer chest x-rays to be performed with the child in the upright position. To help your child remain still, we have the child sit on this little seat. These plastic supports fit snugly around the child's sides and keep the arms raised. Your child will probably cry, but this is usually an expression of frustration about being confined. The crying actually helps to obtain a good x-ray image because at the end of a

cry, your child will take a big gasp of air. At that moment the exposure will be taken."

A complete explanation is worthwhile and essential. The parent can be shown how to help place the child on the seat by guiding in the feet. Then the parent can assist by holding the arms above the child's head.

Radiographers should realize that positioning a child in a Pigg-o-stat is a *two-person job*. Radiographers can safely take children out of the Pigg-o-stat without assistance, but an extra pair of hands is needed in the initial positioning. A properly instructed parent is generally willing and able to assist.

Method

The following steps are observed:

- Have the child undress completely from the waist up, so that after the child is positioned, the ribs are visible on inspiration.
- Choose the appropriate sleeve size. Sleeves should fit snugly, which often requires Velcro strips or adhesive tape wrapped around the base of the sleeves.
- Adjust the seat height to approximately the correct level. The seat is at the correct height if, when the patient is sitting up straight, the face fits in the contours or cutout portions of the sleeves.

This one-step positioning, in which the child is sitting straight on the seat with the arms raised evenly above the head, ensures motionless and nonrotated images. The orientation of the room (i.e., where the chest stand or IR holder is located relative to the control panel) and the image requested determine how well the radiographer can see the child's thorax to ensure that the exposure is made during inspiration. The radiographer can detect inspiration by doing the following (listed in decreasing order of reliability):

1. Waiting for the end of a cry—the child takes a big gasp of air.
2. Watching the abdomen—the child's abdomen extends on inspiration.
3. Watching the chest wall—the ribs are outlined on inspiration.
4. Watching the rise and fall of the sternum.