

# Manual Compression Device for Fluoroscopy<sup>1</sup>

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**A device for manual compression and palpation during supine fluoroscopy has been designed. It enables effective use of the physiologic grasping and lever force potentials of the hand and wrist. The device permits optimal fluoroscopic palpation and compression techniques and prevents direct exposure to the lead-gloved hand.**

**Index term:** Fluoroscopy, technology

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**P**ROPER fluoroscopy, whether it is performed with single- or double-contrast techniques, requires judicious use of both palpation and compression to achieve optimal diagnostic results (1-5). Palpation permits the examiner to determine the pliability and mobility of the organ being imaged, to move loops of bowel that lie over and obscure the organ of interest, and to straighten and visualize redundant loops of bowel. Compression permits the examiner to vary the amount of barium in a hollow viscus, enabling subtle mucosal and mural details to become evident. Occasionally, compression is helpful in limiting respiratory excursion in patients unable to cooper-

ate in the examination. Obese patients may be "thinned" by compression just enough to improve the radiographic detail on crucial spot images.

Although no one disputes the value of compression and palpation, little attention has been given to the mechanism of performing these techniques. This lack of description may exist because many older radiologists used the lead-gloved hand to accomplish compression and palpation and were comfortable with this method. Modern textbooks discourage this practice (6). Many devices have been developed to permit palpation while keeping the gloved hand out of the primary beam.

With the exception of modern remote-control fluoroscopy units, fluoroscopy units with compression devices mounted to the fluoroscopy carriage are usually coupled with the four-on-one imaging modality. Thus, the entire fluoroscopic carriage is moved for palpation, thereby eliminating the subtle "feeling" aspect of palpation. Compression can be applied only at the center of the imaging field, and the application of compression may not be possible in some patients in the steep oblique position. Experienced fluoroscopists know that certain lesions are depicted only when tangential oblique pressure is exerted on a viscus; this is not possible with devices mounted on conventional non-remote-control fluoroscopic units.

Because of the fear of minimal radiation exposure, even to the hand covered with a lead glove, many specially designed and impromptu hand-held devices have been used to permit palpation and compression while the

gloved hand is kept out of the field of the primary beam. To my knowledge, all of these devices must be grasped by the examiner; the more force applied by the examiner, the more stressed and fatigued the fingers become. The large, cumbersome balloon paddle, well designed for prone compression, is poorly applicable to supine fluoroscopy.

## Materials and Methods

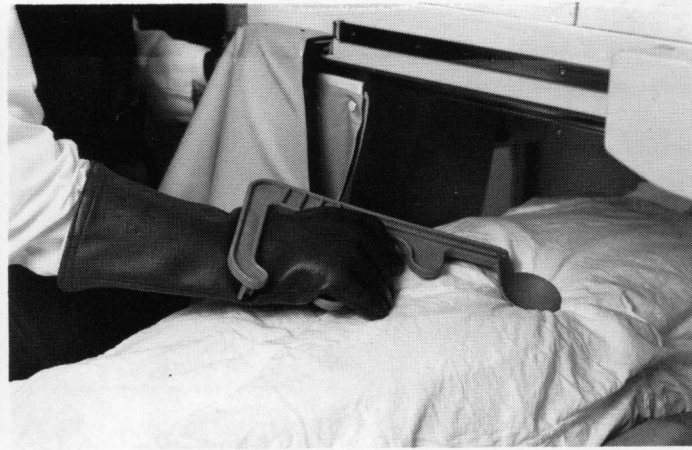
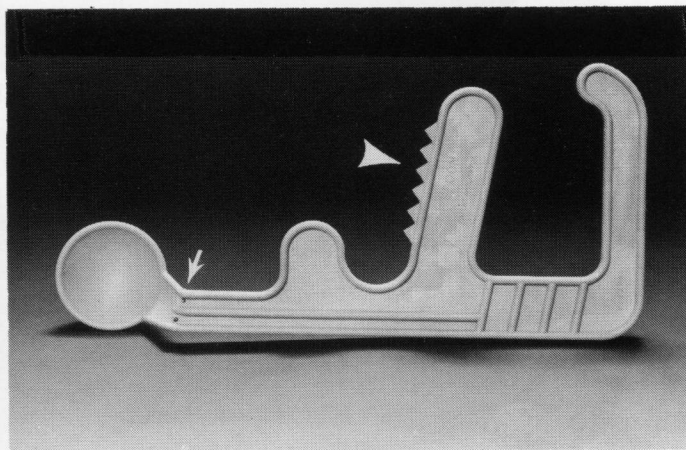
*Device.*—A new compression spoon (F Spoon, Dover, Mass) was designed with a handle that permits maximal physiologic grasping and pressure application during supine fluoroscopy with conventional units (Fig 1). One plastic projection attached at approximately a right angle to the handle of the spoon fits into the palm of the hand, and the device can be grasped by the hand. A second projection fits over the dorsum of the wrist (Fig 2) and serves as the second lever point. These two projections form the shape of an F.

The device is made of radiolucent, durable plastic with two small lead markers placed 1 cm apart to permit estimation of the size of the lesion (Fig 3).

*Method of use.*—Downward pressure by the palm with fixation or upward pressure by the wrist will exert a lever force on the compression spoon. The peak momentary pressure that can be applied with this device varies according to the strength of the user and ranges between 15 and 35 lb (6.75 and 15.75 kg) of pressure. This pressure not only exceeds that achieved with all other current hand-held compression de-

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**Figures 1, 2.** (1) Compression device. Arrow points to 2-mm lead markers placed 1 cm apart, adjacent to the compression spoon. Arrowhead points to the serrated projection, which is gripped in the palm of the hand. (2) The device in use with the projection over the wrist permitting leveraged compression. The fluoroscopy carriage has been raised to permit photography.

