Imaging

A Method for Sizing the Pinhole Thyroid Image

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We report use of a frog-shaped thumbsplint, to which Co-57 sources have been attached, to aid in imaging thyroid glands. Properly placed in a camera's field of view, the device projects a scale from which a full-sized, one-to-one image is produced and from which direct measurements can be made.

Anger camera imaging of the thyroid gland using a pinhole collimator has rapidly replaced rectilinear scanning because of the former's marked superiority in image quality and lesion detectability (*1*). The principal drawback to pinhole imaging has been the lack of a direct relationship between image size and actual thyroid size. By attaching two Co-57 markers to the legs of a frog-shaped finger splint, placing this device on the patient's neck so that the markers are in the same plane as the thyroid gland (*2*), and then imaging the thyroid and markers together, we are able to acquire a full-sized image of the thyroid gland. [Editor's note: Figs. 1–6B are on following page.]

Method

Two Co-57 point sources were glued to the legs of a frog-shaped finger splint (Fig. 1). With the pinhole collimator and Co-57 disk flood source in place, the width of the field of view was measured on film using a format that would produce a 6–7.5 cm wide field (Fig. 2A). The legs of the frog-shaped splint were then adjusted to this same width (Fig. 2B).

When this device is positioned on a patient's neck (Fig. 3A), the sources lie in the thyroidal plane lateral to the gland margins (Fig. 3B) Attenuation by the splint (lying between the gland and camera) is less than 2% because of the splint's design. Removal of the splint's head and arms will further minimize attenuation. The pinhole collomator is positioned so that the two sources appear at the edges of the field of view on the persistance scope. This results in a one-to-one, full-sized thyroid image.

Discussion

Three examples are demonstrated: a normal scan (Fig. 4), a scan showing Graves' disease (Fig. 5), and a cold nodule scan (Fig. 6A). The nodule (cystic) in this last scan measures 2.5 cm in length as further documented by ultrasound (Fig. 6B).

We use this splint routinely in our clinic for thyroid scans. It establishes a method for sizing the thyroid gland that is relatively accurate and is reproducible, easy to perform, and requires only a single image. If for technical reasons a full-sized image cannot be produced, the markers still provide an excellent sizing reference.

Disclaimer

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References

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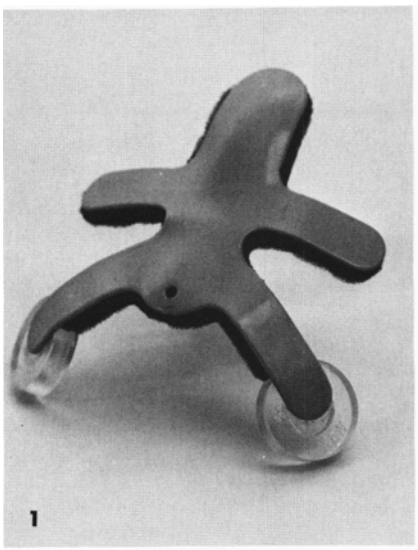

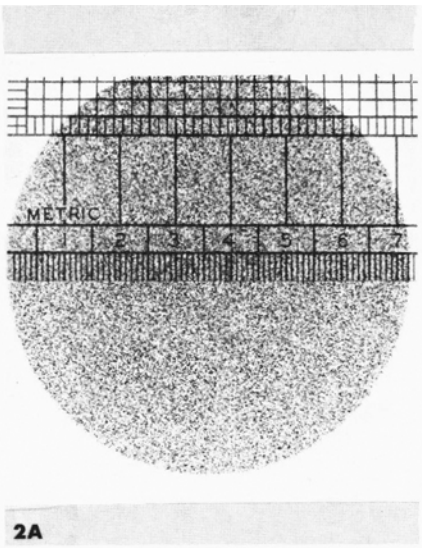

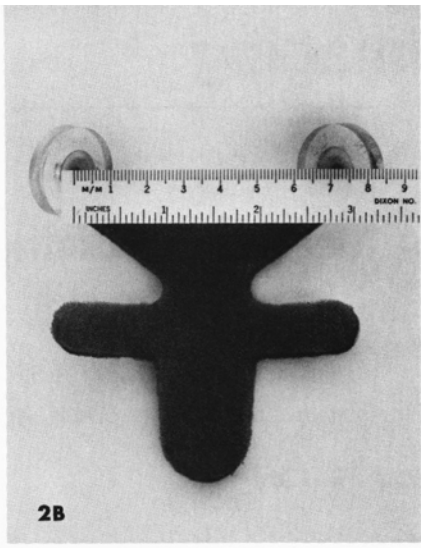

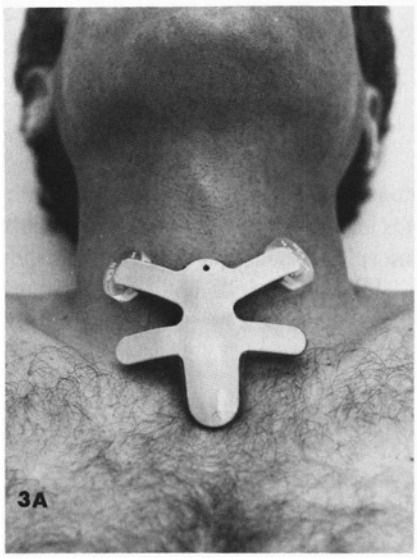

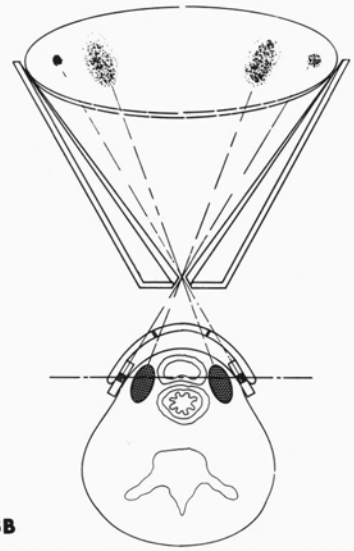

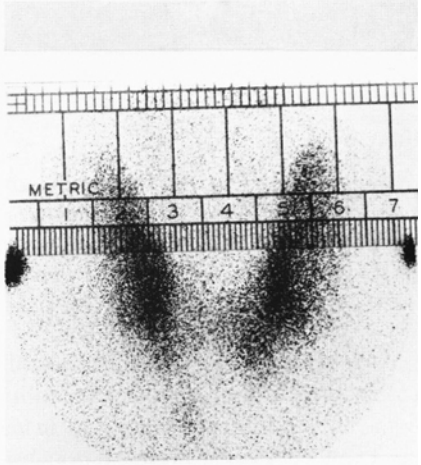

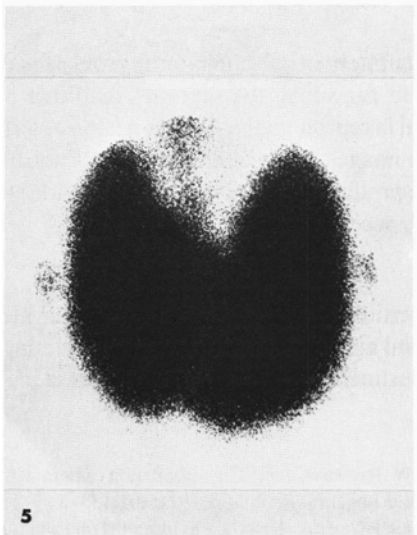

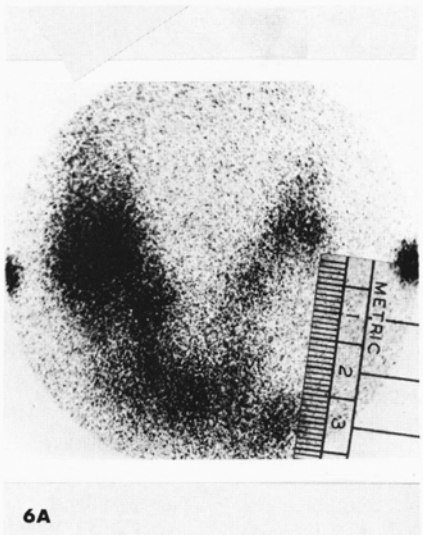

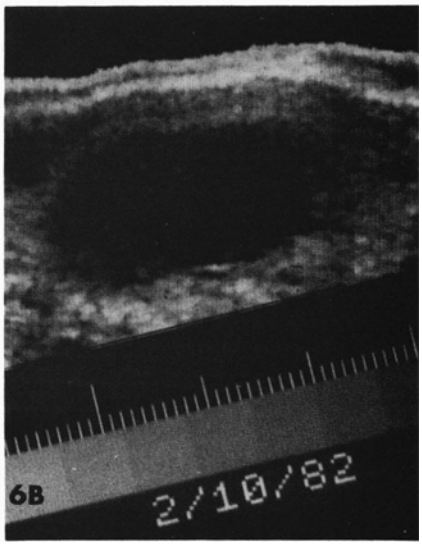

FIG. 1. Thumbsplint with Co-57 point source markers attached. **FIG. 2.** Setting width of the Co-57 markers: (A) Flood image measures 7.2 cm across. (B) Distance between centers of Co-57 markers adjusted to 7.2 cm. **FIG. 3.** (A) Thumbsplint in situ. (B) Cross-sectional representation of splint showing Co-57 markers and thyroid gland in same plane, essential for undistorted measurement. **FIG. 4.** Normal thyroid scan. **FIG. 5.** Graves' disease thyroid scan. **FIG. 6.** Dominant cold cystic nodule in a multinodular gland measuring 2.5 cm in length by (A) pinhole Anger camera scanning and (B) ultrasound.