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The Clinonasal Line as a Reproducible Reference Guide for Optic Canal Imaging

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Detailed imaging of the optic canals is essential in the evaluation of traumatic optic neuropathy and selected prechiasmal and post-chiasmal optic nerve abnormality. Computed tomography provides the necessary osseous definition, but current reference lines used to align the scanner lack precise reproducibility. Scanning precision is necessary because of the small size of the canals.

Reid's baseline, or the Frankfurt-Virchow line, and the orbitomeatal line are the planes most often used as primary references for the imaging of the optic canals.[1] Reid's baseline extends from the inferior orbital rim to the external auditory canal. Imaging an angle of −30 degrees to Reid's baseline is typically chosen to visualize the optic canals.[2] Sections obtained at an angle of +40 degrees to the orbitomeatal line, which runs from the lateral canthus to the external auditory canal, have been described as equally effective in producing images of the optic canal.[3]

Both reference planes, Reid's baseline and the orbitomeatal line, possess a significant subjective element in their definitions. For example, no precise demarcation points define the inferior orbital rim or the external auditory canals. Variability is therefore introduced in the selection of both the anterior and posterior reference points of Reid's baseline. Reference landmarks are even more subjective for the orbitomeatal line inasmuch as the lateral canthus has no osseous marker. This lack of objec-

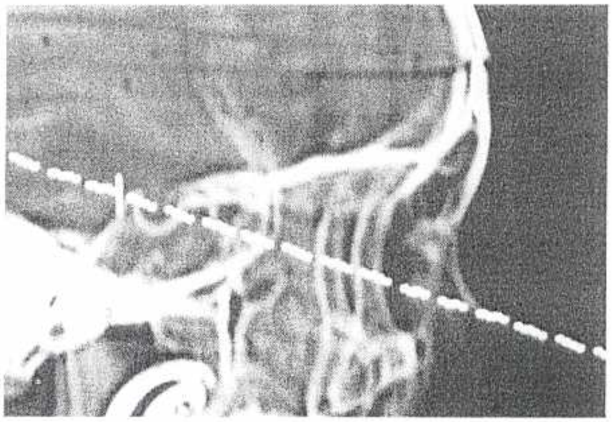

Fig. 1 (Gossman and associates). Alignment of the scanner on a straight line between the posterior clinoid and the tip of the nasal bone produces axial images that parallel the long axis of the optic canals.

tive reference landmarks may lead to imprecise scanner alignment in the axial imaging plane, which will result in incomplete delineation of the optic canals.

We sought more precise anatomic landmarks to predictably orient axial computed tomographic images with the long axis of the optic canals. A straight line between the superior aspect of the posterior clinoid process and the tip of the nasal bone (clinonasal line) achieves scanner alignment with the canals on a lateral scout film (Fig. 1). The axial imaging sequence is initiated on this reference line. Two images are initially obtained 1.0 mm apart progressing superiorly from the clinonasal line. Other variables such as head tilt or rotation are corrected after the initial scanning sequence. Additional

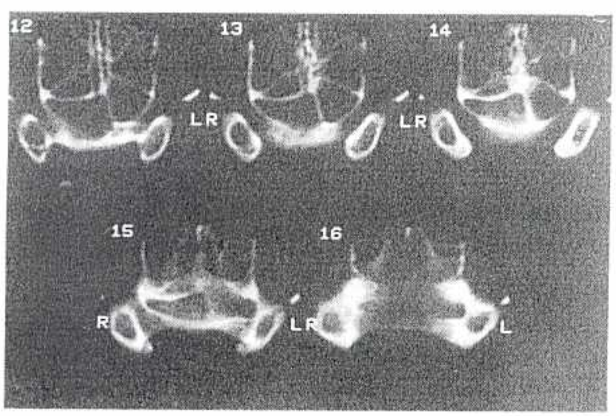

Fig. 2 (Gossman and associates). A complete imaging sequence can typically be achieved with four consecutive images at 1.0-mm intervals. Image 12 demonstrates the inferior portion of the canals, 13 and 14 their midsection, and 15 and 16 their superior aspect.

images are obtained in order to provide a complete depiction of the canals, including their orbital and cranial apertures (Fig. 2). Four of five images are typically required.

This method has been used successfully in 25 consecutive patients, including 20 adults and five children, undergoing computed optic canal tomography. The most frequent indication for studying the optic canals was traumatic optic neuropathy. Other indications for the study included Paget's disease with visual loss (one of 25), craniofacial syndromes (two of 25), and optic nerve glioma (two of 25). The clinonasal line provides correct scanner orientation that is reproducible because its skeletal landmarks are easily identified.

References

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