Interobserver reliability and intraobserver reproducibility of Powers ratio for assessment of atlanto-occipital junction: comparison of plain radiography and computer tomography (Kirkham B. Wood; ESJO-D-08-00378R2)

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Any quantified radiographic evaluation of the spine should be reliable, providing similar values from different evaluators, and should provide similar values on repeat measurements. In addition, measurements should provide useful information to guide clinical management.

This paper reports on the first aspect and compares measurement variability of the Powers ratio obtained from plain radiographs and from CT reformatted images. Overall similar values were obtained from either method, but the CT images provided more reproducible results. In fact, they show that the reliability of plain radiographs is not acceptable, whereas CT images do provide adequate reproducibility. This is important information.

This paper hints at some additional factors that might provide further insight or new understanding, but does not explore them.

1. The criterion for acceptable reproducibility is arbitrary, and not based on, e.g., threshold values that might guide decisions about clinical management.
2. The radiographic image used in the Powers ratio is static, so this measurement does not assess the atlanto-

occipital relative motion either with provocation or voluntary movements of the patient. Also, it may depend on patient positioning and the effects of gravity—here it is not stated whether both images were made with the patient supine. By design, the Powers ratio is intended to be sensitive to translation, but less sensitive to atlanto-occipital rotation.

3. This study only evaluated the repeatability in measurements of specific films—there may be greater variability associated with repeat imaging of the same patient.
4. They suggest that training and learning, and expertise of the evaluators may make a difference to the values obtained. The “Results” section starts by mentioning the ability to identify trauma (vertebral fracture). Although this was not formally investigated, it appears that again CT images are preferable, but there was no ‘gold standard’ for comparison. Ultimately, a radiographic measurement is only useful if it can be shown to lead to improved patient care, but having good reliability is a pre-requisite.

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