

Examiner Reliability in Analysis of Orthogonal Radiographs

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Introduction: Before-after intervention orthogonal radiographic analysis procedures used by the National Upper Cervical Chiropractic Association (NUCCA) and others, lack evidence of suitable inter-examiner reliability. Significant reliability must be demonstrated to justify risk in patient exposure for obtaining after-correction films. Achieving a 90% examiner agreement in side of Atlas laterality and rotation, with an intraclass correlation (ICC) of 0.9 is this study's goal.

Methods: A four phase study design reduces inherent variability in procedural analysis, intending to end investigation early for conservation of research resources. Phase one trains examiners in fine tuning marking and measuring procedures for orthogonal radiographic analysis, conducting trial runs, while troubleshooting study protocol. Phase two collects data from examiners maintaining data integrity by using a data manager. Data analysis occurred after 100 film sets to determine if needed reliability was achieved. Phase Three completes analysis using a sample size, 254 film sets, with the power to demonstrate statistical significance in the results.

Results and Discussion: For the first 100 sets of films, percentage agreement for side of atlas laterality is 98%, 76% for rotation. ICC for laterality is 0.606 (95% CI: 0.465, 0.717), for rotation 0.716 (95% CI: 0.599, 0.802). Analysis of the final dataset is ongoing.

Conclusion: The first 100 set ICCs represent substantial but imperfect agreement between examiners, not achieving needed reliability for Phase Two. Phase three is complete with all 254 film sets analyzed. Early results from initial analysis indicate study goal was achieved. Phase four involves the intra-examiner portion of reliability study. A protocol currently is being protocol for IRB approval. Once completed, evidence will exist in the indexed literature substantiating reliability in analysis of pre-post atlas correction orthogonal radiographs.