# Harrison2007 - Validation of a computer analysis to determine 3-D rotations and translations of the rib cage in upright posture from three 2-D digital images:

* Placed external surface markers on mannequin in various postures and captured photographs to assess PosturePrintTM ability to measure thoracic posture
* PosturePrintTM assessed on the basis of the difference between its computed values, and the mannequin’s actual postures, for RL and AP translation, and all 3 rotations
  + SI translations “is difficult to discern without an X-ray”, not included in study
* PosturePrintTM required 13 physical markers, and 16 additional “click-on” markers
* Postural deviations were measured relative to “plumb lines”
* Average rotation errors were <1.3o + <1o; translation errors were <1.7mm + <1mm.
* Since these average errors are <5o and <5mm, they conclude the system is sufficiently accurate for clinical use

# McApline2009 - Computerized back postural assessment in physiotherapy practice: Intra-rater and inter-rater reliability of the MIDAS system:

* Mentions the need for standardized, objective, accurate posture assessment, displayed quantitatively and *visually*
* A useful tool must be suitable to the range of patients physiotherapists encounter [think, our patient-specific ultrasound-based visualization]
* Existing orthopedic methods are concerned with finding the Cobb angle from surface deformation, and are criticized for being complex to operate, un-portable, and costly
* The principal researcher placed 15 markers on the 25 subjects’ anatomic landmarks for 3 testers each to measure 2 times
* ICCs were above 0.96 for all testers, the bottoms of 95% CIs still above 0.91, p<0.05; inter-rater ICCs (? – intra x, intra y, intra z - ?) were similar in value
* Variation in x and y directions could be due to postural sway, or “*the* *inability to display the results in a user friendly format”*

# Ferreira2010 - POSTURAL ASSESSMENT SOFTWARE (PAS/SAPO): VALIDATION AND RELIABILIY:

* Captured 88 photos from 22 patients each with 32 styrofoam surface markers on anatomic landmarks for 5 physical therapists to measure 29 postural quantities (including some right-left repetition)
* Inter-rater reliability (ICC 2,1): 41% of quantities excellent (0.90<ICC), 35% good (0.80<ICC<0.89), 10% acceptable (0.70<ICC<0.79), and 14% non-acceptable (ICC<0.70)
* Intra-rater reliability (ICC 3,1) was quite variable, rater to rater. Non-acceptable quantitiy percentages ranged from 3% to 45%, acceptable from 0 to 25, very good from 14 to 31, and excellent from 28 to 62.
* Average errors (standard deviations) were 0.11o (0.32o) and 1.8mm (0.9mm)
* Inter-rater (reproducibility): Vertical plumb line calibration used for some measurements may have contributed to error, although 8 of the 11 quantities classified as excellent required no calibration
* Intra-rater (repeatability): The worst raters were the oldest, and said to have less exposure to computer science

# Aroeira2016 - Non-invasive methods of computer vision in the posture evaluation of adolescent idiopathic scoliosis:

* 15 articles were found matching the criteria for this review,
* Consideration was given to the type of method used for postural assessment, and the quality of the study was assessed based on the Quality Assessment of Diagnostic Accuracy Studies (QUADAS) scale
* Postural evaluation should be used for scoliosis assessment because patients with similar Cobb angles can exhibit different postural asymmetries, and larger asymmetries can be present despite small Cobb angles
* Of the 15 suitable articles, 2 used methods involving physical contact with the patient, [Kowalski2014, Cheung2015]; 4 used 2D photogrammetry; 4 used lasers; 3 used structured light; and 2 used Moiré projection.
* 14/15 studies described as being limited to the torso and topology of posterior back, and requiring measurement of each anatomic reference