CT Brain Prescriptions in Talairach Space: a New Clinical Standard?

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Purpose
Head CT prescriptions are currently plagued by intra and intersubject image variance and do not match standardized MR scanning planes. We developed and tested a simple method to improve CT precision and approximate the Talairach reference standard advocated for MR imaging (1, 2).

Materials & Methods
We retrospectively reviewed midline sagittal T2-weighted brain MR images of 126 consecutive patients to determine the mean angle subtended by the Talairach anterior commissure-posterior commissure (AC-PC) line and the hard palate (Fig 1). Based on this data set, a new head CT protocol was instituted with pitch similarly prescribed relative to the hard palate as identified on the lateral CT scout film (Fig 2). We then compared the precision of the new vs old CT protocol; the latter nominally prescribed parallel to the cantho-meatal line but limited to a maximum gantry angle of 22 degrees depending on the particular CT scanner utilized.

Results
For two of the 126 AC-PC measurements and seven of the remaining 124 hard palate measurements a reliable consensus could not be reached due to distorted anatomy, artifact, or limited field of view. Of the remaining 117 patient MR studies, the Talairach AC-PC line was rotated 12.0 +/- 6.1 degrees from the hard palate line and 15.6 +/- 10.1 degrees from the axial plane of the magnet. As hypothesized, the new CT protocol has improved intrapatient CT scan precision and better approximates the Talairach referenced MR images obtained at our institution.
Conclusion
By prescribing CT images angled 12 degrees clockwise from the hard palate, a structure readily identified by technologists, interscan precision can be improved and Talairach-referenced MR studies can be approximated. Along with AC-PC referenced MR studies we advocate this CT protocol as a new clinical standard.

References