

Computed Tomography: Head

Image quality in the multicenter setting can be greatly influenced by variances in acquisition protocols. These variances may be related not only to equipment manufacturer and model, but also technique.

The study may permit imaging per institutional standard-of-care. However, aligning image acquisition to established standards is essential for robust quality data.

The table, below, is provided as a guideline and overview for routine head CT exams. Please refer to your site's specific CT manufacturer's imaging protocols and physicist recommendations for the optimal scanning protocol.

The Head CT examination should contain, at a minimum, the following series:

1. Localization scan
2. Non-contrast acquired slice thickness at 2 mm or less, reconstructed in 5 mm or less in:
 - a. standard algorithm
 - b. bone algorithm

Exam and Patient Preparation

Scan Type	Axial (recommended) or Helical*	*Helical scan mode may be utilized if recommended by scanner manufacturer or if patient condition requires (due to patient involuntary motion or declining condition)
SFOV	HEAD or 25 cm FOV	Not to exceed 30 mm
DFOV	To match SFOV	
Patient Position	<ul style="list-style-type: none">• Supine, head-first into the gantry with the head in the head-holder whenever possible• Patient's chin tilted towards the chest to reduce or avoid ocular lens exposure• Center Table height to the external auditory meatus	Scan angle should be parallel to a line created by the supraorbital ridge and the inner table of the posterior margin of the foramen magnum. Some scanners may allow tilting of the gantry to achieve this.
IV Contrast Injection	<ul style="list-style-type: none">• Non-contrast unless otherwise indicated• Dose and rate per institutional standard• Dual head power injector recommended• Delay of 4 minutes between contrast injection and the start of scanning is typical	Insertion of intravenous catheter in upper extremity prior to the start of imaging. Only if indicated in trial protocol. Not typical in routine Head CT examinations
Oral Contrast	None	

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Image Acquisition

Localization Scan	Lateral	Range: S150 – I150
Scan Direction	Inferior to Superior	Base of skull to top of head
Scan Range	Top of C1 lamina through top calvarium	
Non-contrast	Slice thickness = 5 mm contiguous	Reconstructions in: <ul style="list-style-type: none">• Standard 5 mm• Bone 5 mm
Post-contrast (only if indicated in trial protocol)	Slice thickness = 5 mm contiguous	Reconstructions in: <ul style="list-style-type: none">• Standard 5 mm• Bone 5 mm IV contrast should be performed per supervising radiologist. Typical delay is 4 minutes between contrast injection and start of scanning
Radiation Dose	Per ALARA	Use iterative reconstruction technique if possible

References

1. ACR–ASNR–SPR Practice Parameter for the Performance of Computed Tomography (CT) of the Head, Res. 44 – 2020. <https://www.acr.org/-/media/ACR/Files/Practice-Parameters/CT-Head.pdf>, accessed June 10, 2021.
2. AAPM Alliance for Quality Computed Tomography Working Group, reference CT Protocols: Routine Adult Head CT. <https://www.aapm.org/pubs/CTProtocols/documents/AdultRoutineHeadCT.pdf>, accessed February 13, 2021.