Illustrated in Fig. 41–1 is a brainstem (pontine) glioma, in a 14-year-old, on (A) axial T2-weighted and postcontrast (B to D) axial, sagittal, and coronal T1-weighted images at 3 T. The patient has been treated with both radiation and chemotherapy. Scan times are 1:56, 1:05, 1:15, and 1:05 min:sec, with all scans 3 mm in thickness. The pixel (in plane) resolution is $0.6 \times 0.4$ mm$^2$ (T2) and $0.9 \times 0.9$ mm$^2$ (T1). The lack of pulsation artifacts postcontrast is due to use of the short TE 2D GRE technique.

There is a TE threshold for arterial and venous pulsation artifacts, with the choice of TE = 2.4 msec being in-phase at 3 T and at or just below the limit for such ghosting—thus the efficacy of the GRE scan. It has been suggested that a T1-weighted FLAIR scan is a suitable alternative to SE imaging at 3 T, with this scan implemented at some sites.
for routine clinical use. Disadvantages of the T1-weighted FLAIR scan, published in the scientific literature, include substantial arterial and venous ghosting, SAR limitations, and a long scan time. Use of this sequence is not advocated.

Sagittal T1-weighted scans (A, C) pre- and (B, D) postcontrast in the same patient are compared from (A, B) a 1.5 T and (C, D) a 3 T scanner in Fig. 41–2. Scan times were 1:52 and 2:32 at 1.5 T versus 1:15 and 1:15 min:sec at 3 T. A 5-mm slice thickness was used at 1.5 T compared with 3 mm at 3 T. The pixel dimensions were 1.0 to 1.1 × 0.9 mm² at 1.5 T versus 0.8 × 0.8 mm² at 3 T. Ghosting (arrows) from the superior sagittal sinus is evident on the SE images acquired at 1.5 T, both pre- and postcontrast, and absent on the short TE GRE images acquired at 3 T. Soft tissue (examine closely the cerebellum) and vascular detail is also improved on the 3 T images, likely due to the smaller voxel volume and reduced overall motion artifact.

Concern has been raised in regard to possible differences in tissue contrast on scans at 3 T as compared with 1.5 T, and the possible effect on image interpretation. Fortunately, for the brain, although pulse sequences may differ substantially, the resulting images are remarkably similar. Minor differences include greater T2* effects and on the 2D T1-weighted GRE scan the depiction of marrow (which appears with lower signal intensity).