

First Phantom Zeego Image Acquisition

- **Metal spheres:**

Nine metal spheres are used in the imaging phantom: three titanium grade 5 spheres, three 316 resistant stainless steel spheres, and three tungsten carbide spheres. Sphere diameters are 3.174 mm (1/8 in.), 6.35 mm (1/4 in.) and 12.7 mm (1/2 in.) for each material. The varying diameter and location of the spheres throughout the experiment emulate endovascular coiling treatment of aneurysms near the stella and clivus. The materials used simulate different available materials for coils, stents and clips.

Material of metal spheres	Simulated metal object	Color coding
Titanium	Clips / nitinol stents	Red
316 Stainless Steel	Coils	Green
Tungsten Carbide	Platinum coils	Blue

First Phantom Zeego Image Acquisition

- Plastic spheres:

12 plastic spheres, 2 of each available material, were distributed throughout the phantom. Their HU units provide a range of relevant contrasts in neurovascular imaging. The plastic spheres are not repositioned throughout the experiment.

Material	HU units (approximations)	Simulated neurovascular tissue
Polypropylene	-100	Fat
Low-density polyethylene	+10	CSF
High-density polyethylene	+40	Grey/white matter
Acrylic	+100	High-contrast agent
Nylon	> 100	High-contrast agent
Acetal	> 100	High-contrast agent

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- **Image acquisition parameters:** standard DynaCT
20s DCT, 70kV, 284 mA, 3 frames/s

- **Methods:**

The following slide shows the total number of images taken and its description. Note that images 1 – 13 showed data truncation and were repeated after a FOV correction.

Image Number	Metal Components	Notes
1	No metal spheres	Control (v.1): 12 plastic spheres in various locations.
2	3.174 mm, steel (small green)	
3	3.174 mm, tungsten (small blue)	
4	3.174 mm, titanium (small red)	
5	6.35 mm, steel (medium green)	
6	6.35 mm, tungsten (medium blue)	
7	6.35 mm, titanium (medium red)	
8	12.7 mm steel (large green)	
9	12.7 mm tungsten (large blue)	Sphere detached from plastic insertion rod, was inserted further into phantom.
10	12.7 mm titanium (large red)	Includes the 12.7 mm tungsten positioned in frontal lobe.
11	No metal spheres	Control (v.2): 12 plastic spheres in various locations and 12.7 mm tungsten in frontal lobe
12	3.174 mm, titanium (small red) & 3.174 mm, steel (small green)	Patient right & patient left, respectively.
13	3.174 mm, steel (small green)	Image acquisition aborted. Data truncation was noted on all previous images. FOV corrections were made.
14	3.174 mm, steel (small green)	
15	3.174 mm, tungsten (small blue)	
16	3.174 mm, titanium (small red)	
17	6.35 mm, steel (medium green)	
18	No metal spheres	Control (v.2): 12 plastic spheres in various locations and 12.7 mm tungsten in frontal lobe.
19	6.35 mm, tungsten (medium blue)	
20	6.35 mm, titanium (medium red)	
21	12.7 mm steel (large green)	
22	12.7 mm titanium (large red)	
23	3.174 mm, titanium (small red) & 3.174 mm, steel (small green)	Patient right & patient left, respectively.
24	3.174 mm, titanium (small red) & 3.174 mm, steel (small green)	3.174 mm, steel (small green) adjusted ~5mm to position both spheres in same plane.
25	3.174 mm, tungsten (small blue) & 3.174 mm, steel (small green)	Patient right & patient left, respectively.
26	3.174 mm, tungsten (small blue) & 3.174 mm, steel (small green)	Adjusted to position both spheres in same plane.
27	3.174 mm, tungsten (small blue) & 3.174 mm, titanium (small red)	Patient right & patient left, respectively. Spheres noted to be slightly out of plane.
28	3.174 mm, tungsten (small blue) & 3.174 mm, titanium (small red)	Adjusted to position both spheres in same plane.
29	3.174 mm, tungsten (small blue) & 3.174 mm, titanium (small red)	Adjusted to position both spheres highly out of plane.

Image #14:
3.174 mm 316 stainless steel sphere

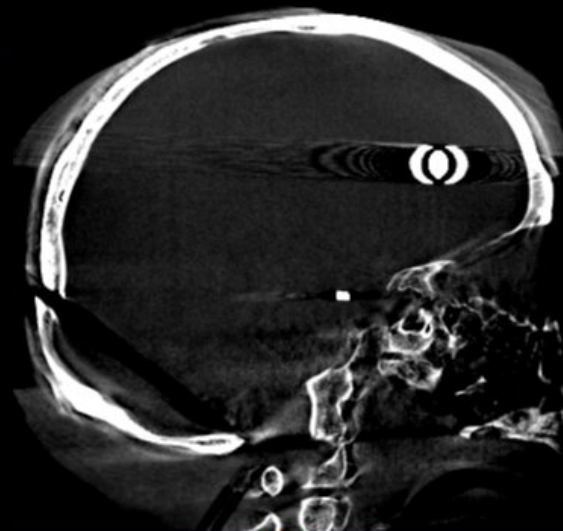
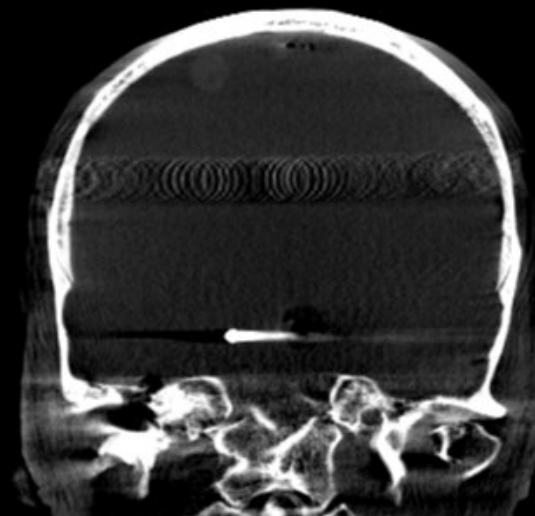


Image #15:
3.174 mm tungsten sphere

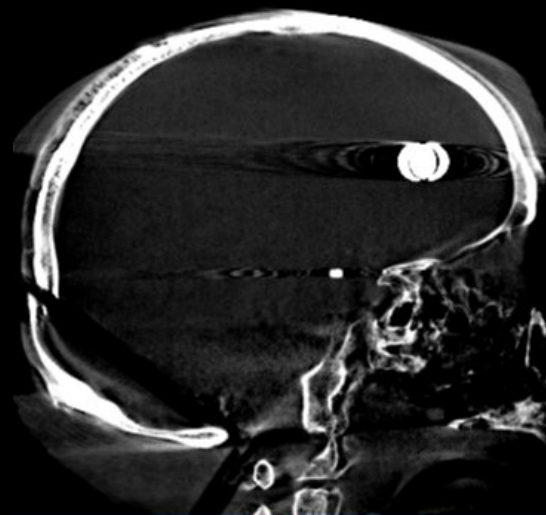
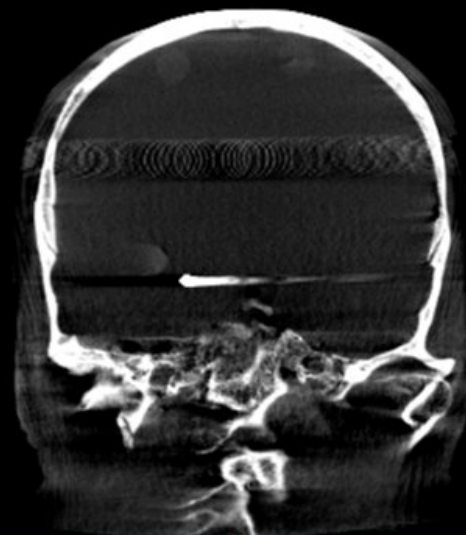
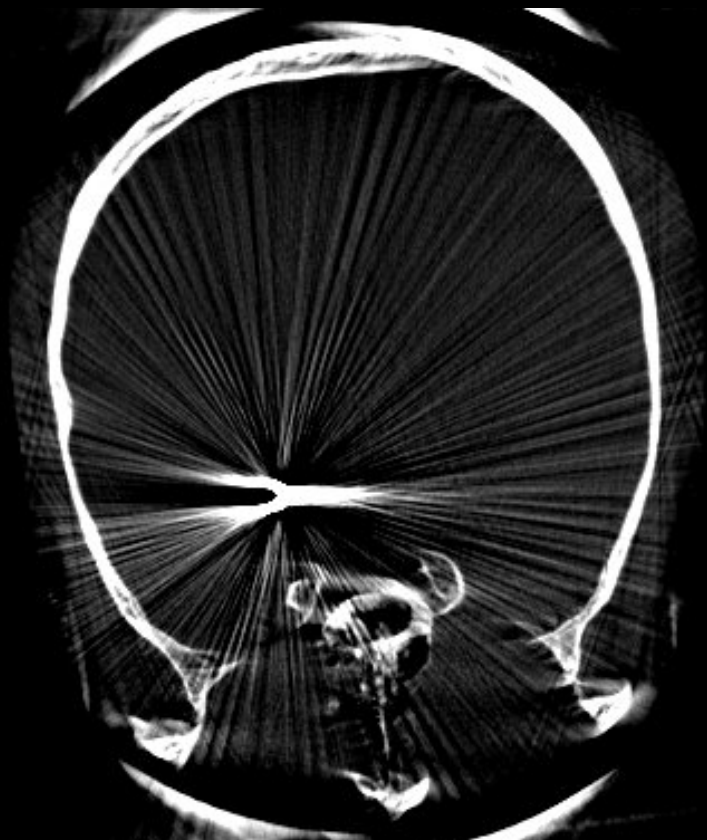


Image #16:
3.174 mm titanium sphere

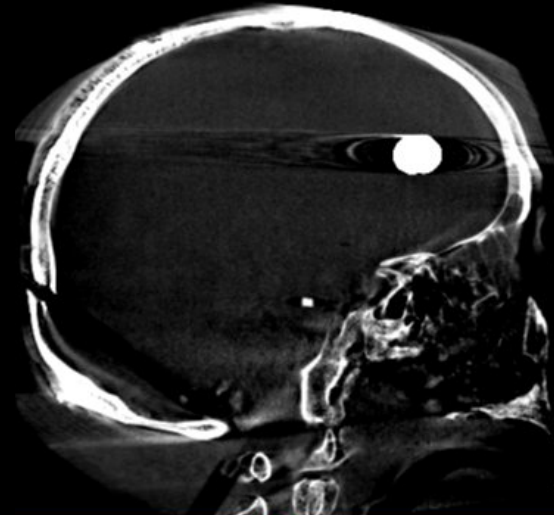
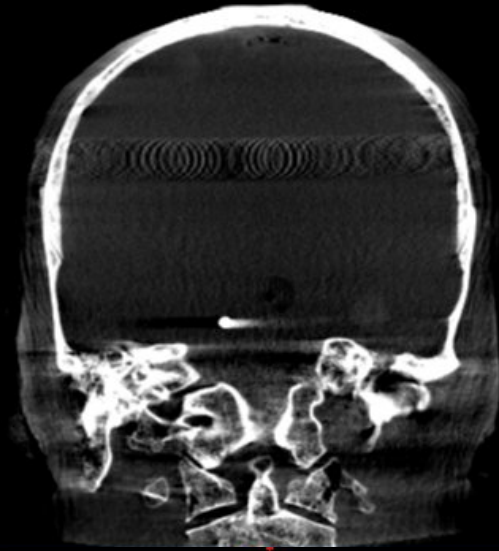


Image #17:
6.35 mm, 316 stainless steel sphere

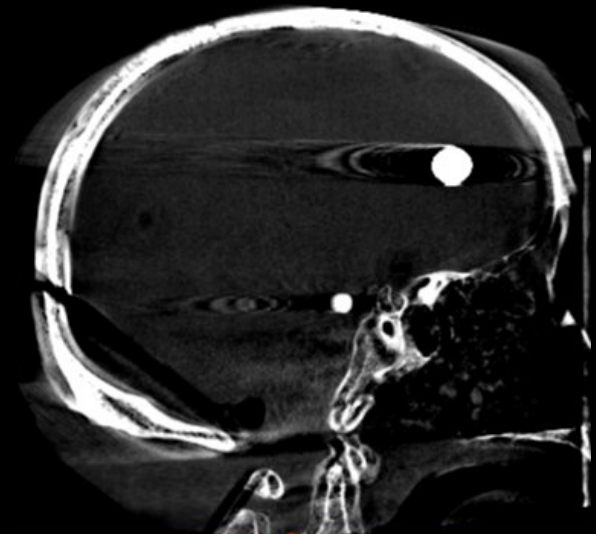
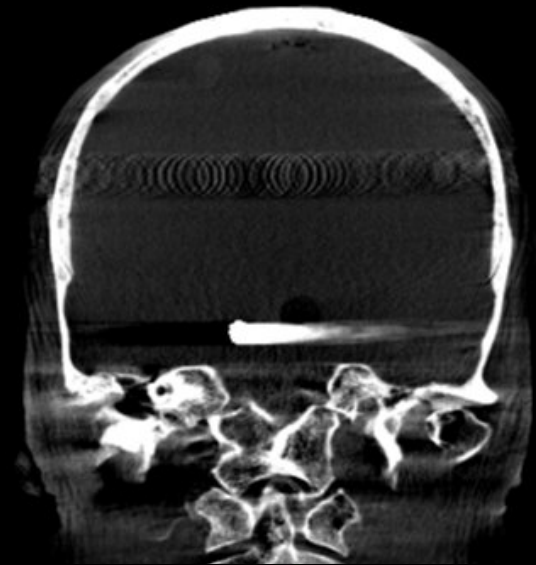


Image #19:
6.35 mm, tungsten sphere

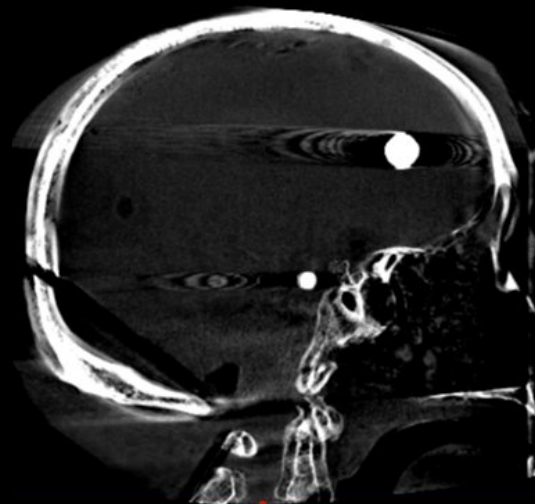
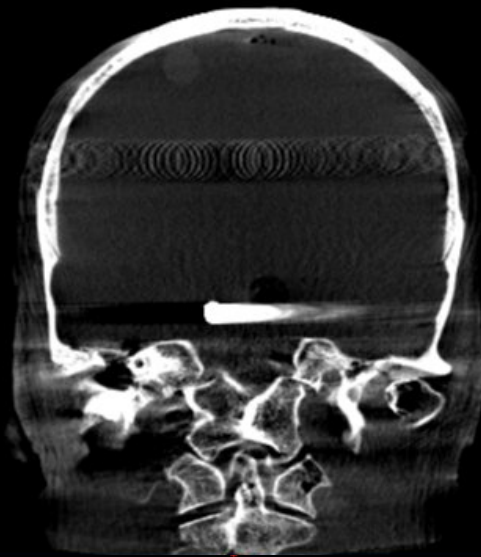


Image #20:
6.35 mm, titanium sphere

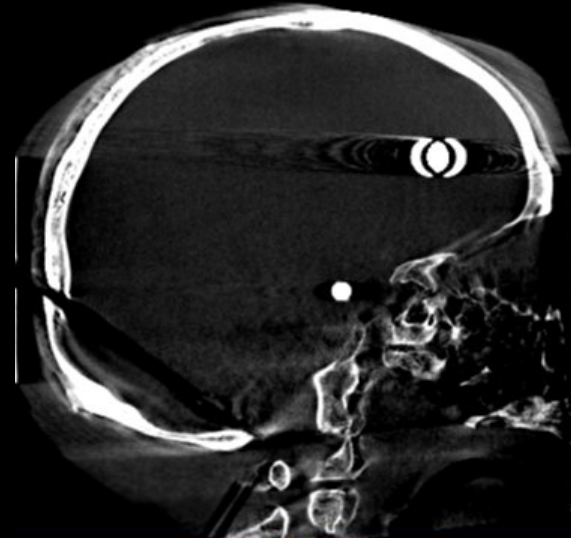
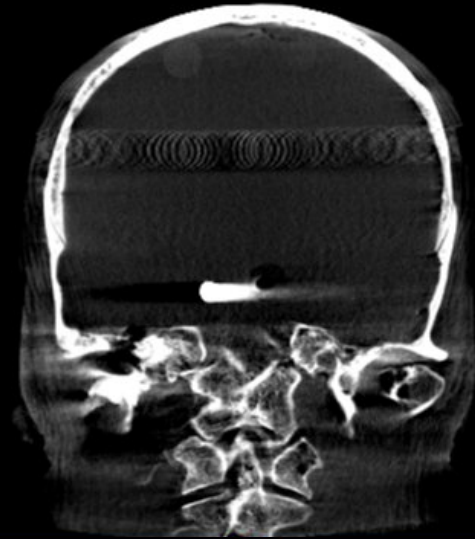


Image #21:
12.7 mm 316 stainless steel sphere

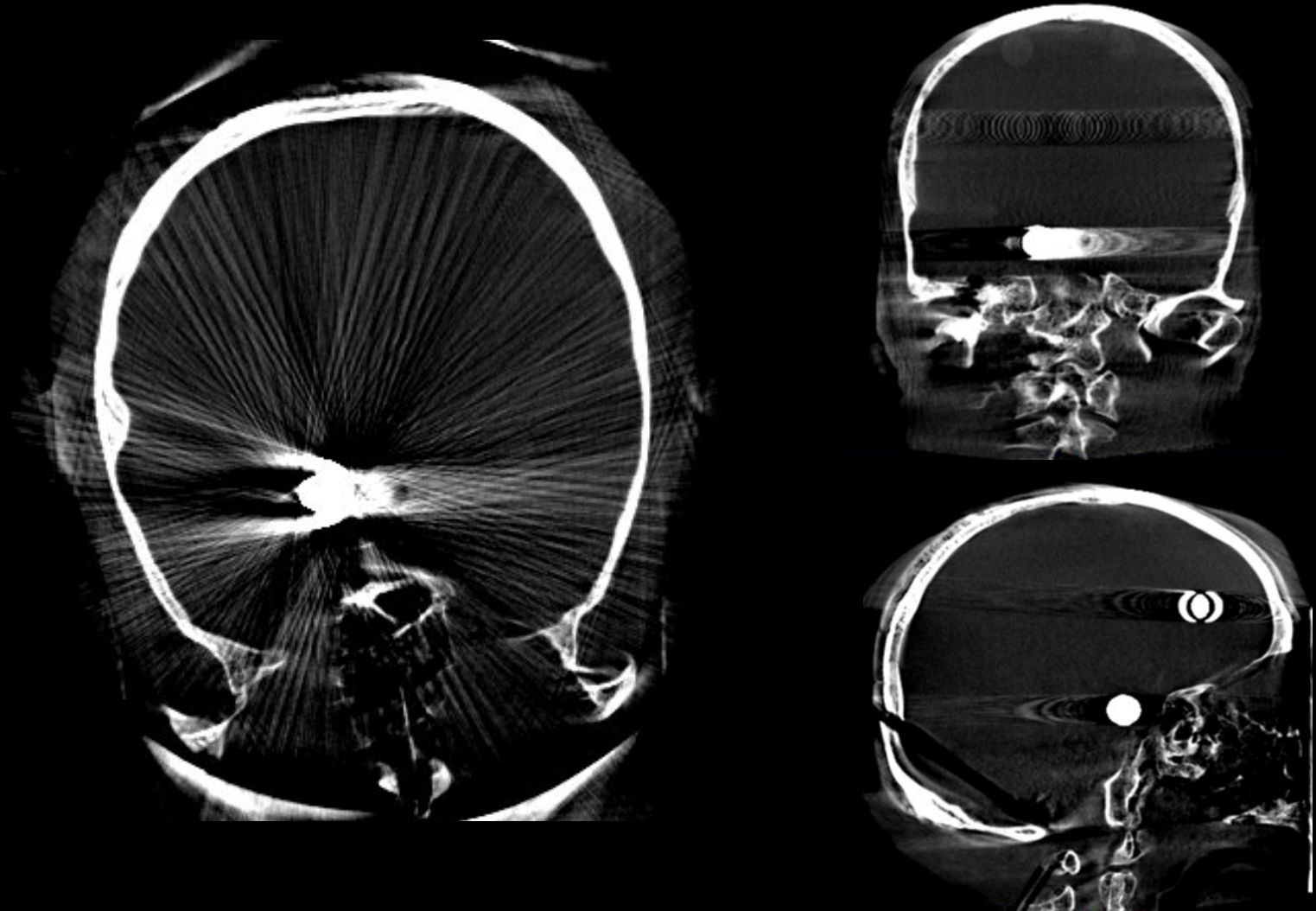


Image #22:
12.7 mm titanium sphere

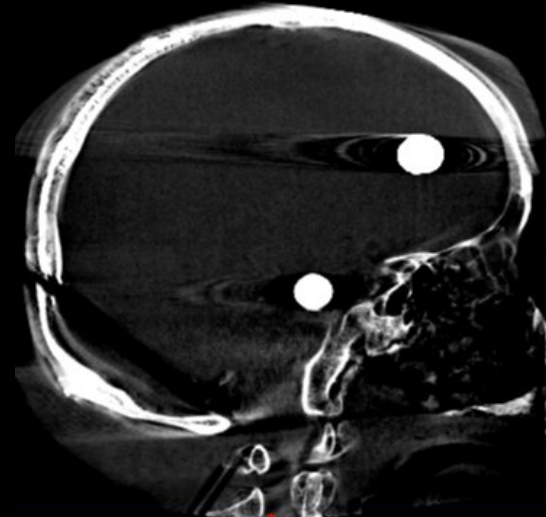
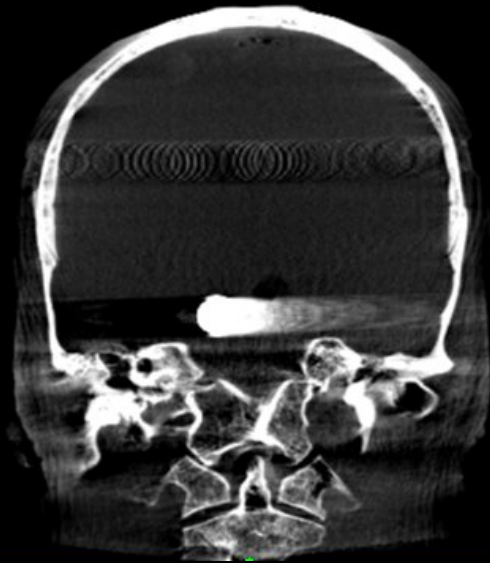
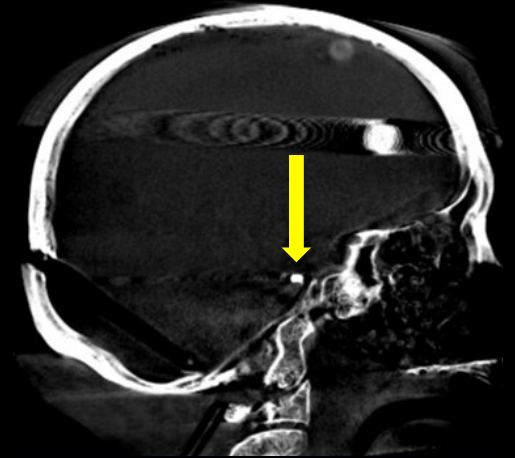
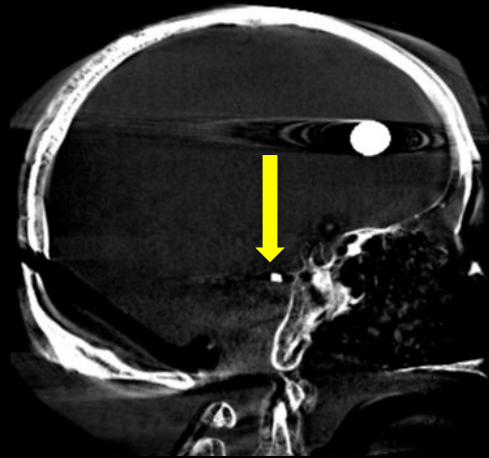
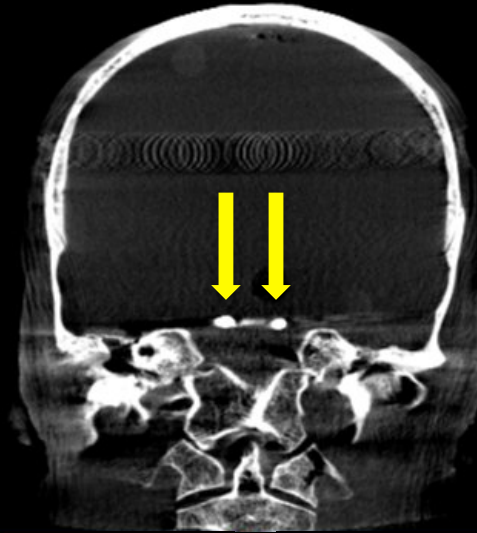


Image #24:

3.174 mm titanium & 3.174 mm steel, patient right & left, respectively.

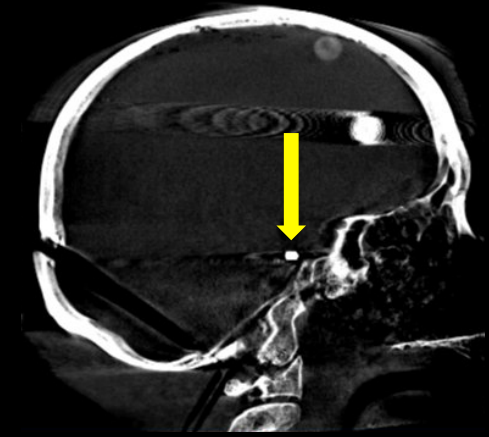
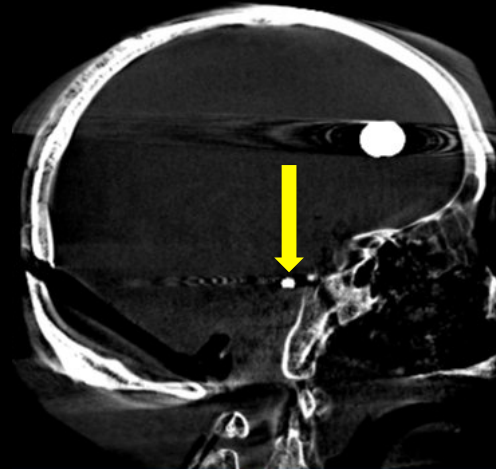
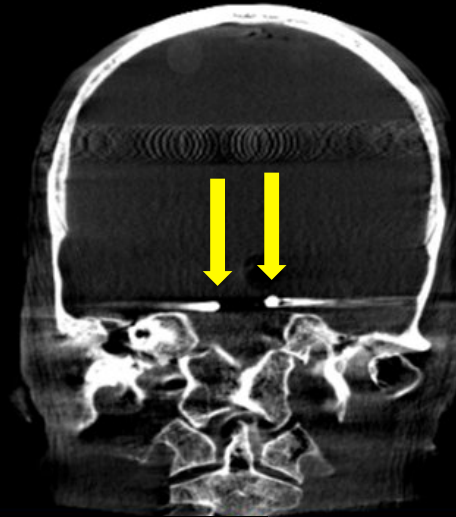


Patient left

Patient right

Image #26:

3.174 mm tungsten & 3.174 mm steel, patient right & left, respectively.

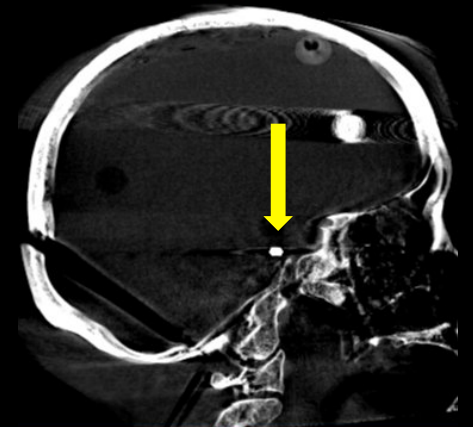
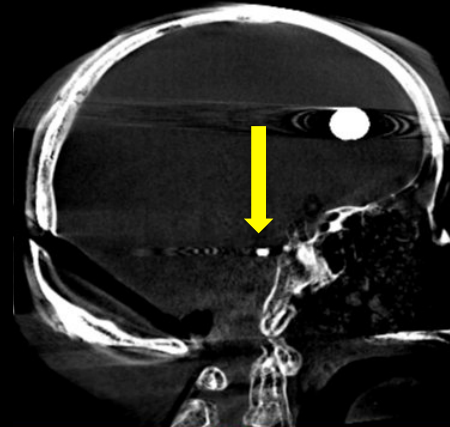
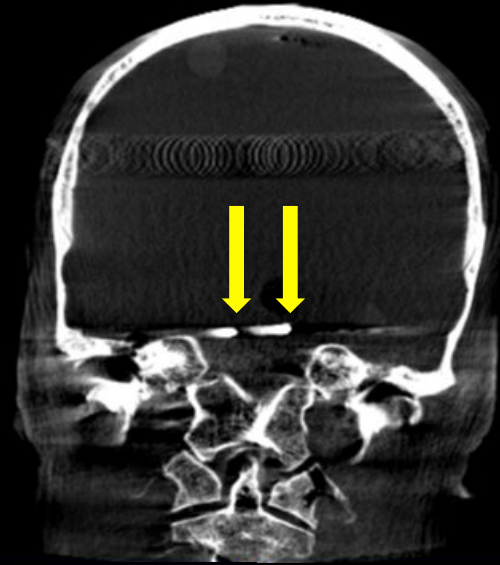
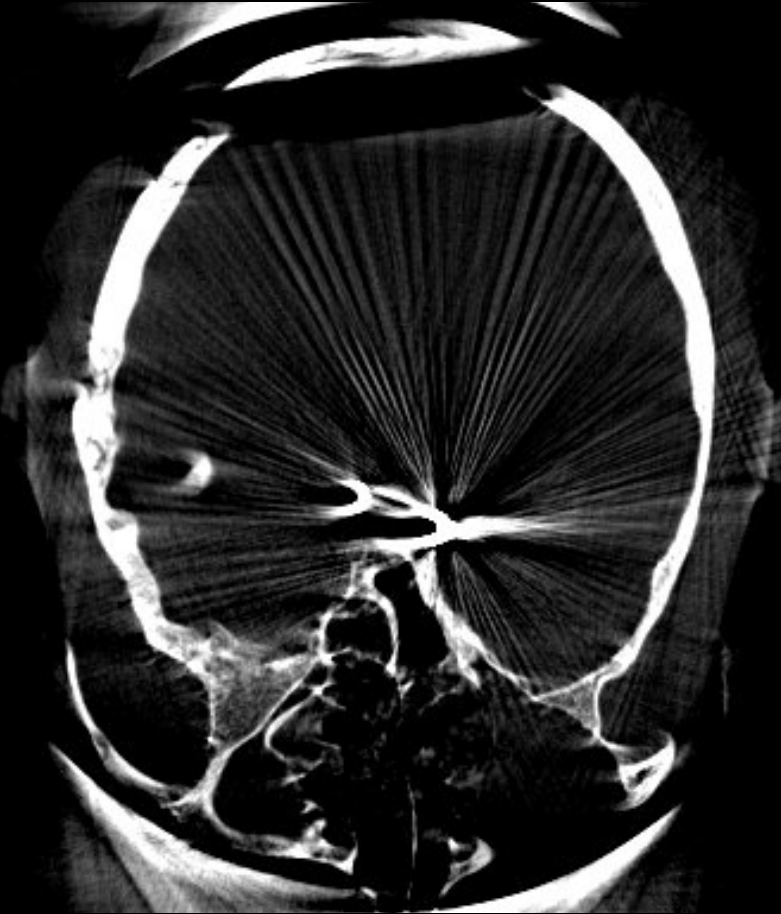


Patient left

Patient right

Image #28:

3.174 mm tungsten & 3.174 mm titanium, patient right & left, respectively.



Patient left

Patient right

Image #18:

Control (v.2): plastic spheres and 12.7 mm tungsten pushed into frontal lobe
(after it detached)

