

Experience at APMH with CT 160 mm

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Pediatric Radiology, La Timone, Marseille

56th Annual Meeting &
42nd Post Graduate Course

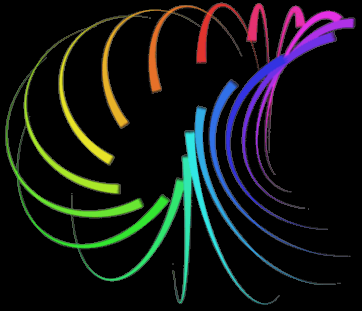
JUNE 06-10 2022
MARSEILLE, FRANCE

Palais du Pharo

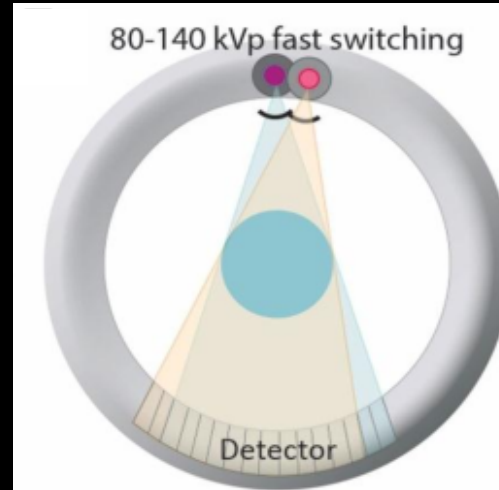


La Timone Hospital, Marseille, France - European Society of Paediatric Radiology - ESPR 2022 June 10,2022

Fast kVp switching delivers perfect energy registration to minimize motion artifacts



FAST !



Pulsatile

Respiration

Peristaltism

Decreased susceptibility to motion

Sub mSec
kVp Switching

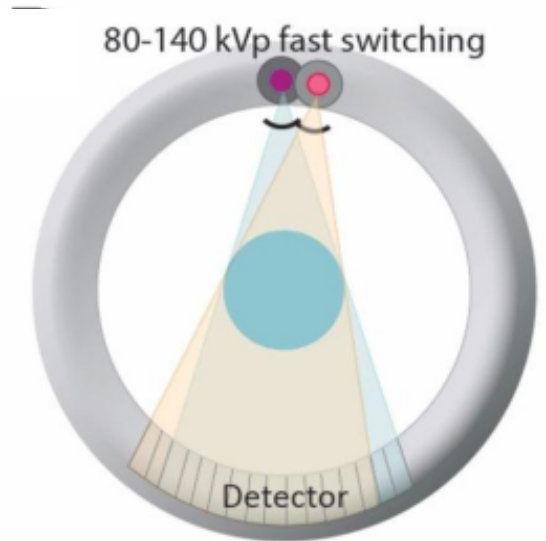
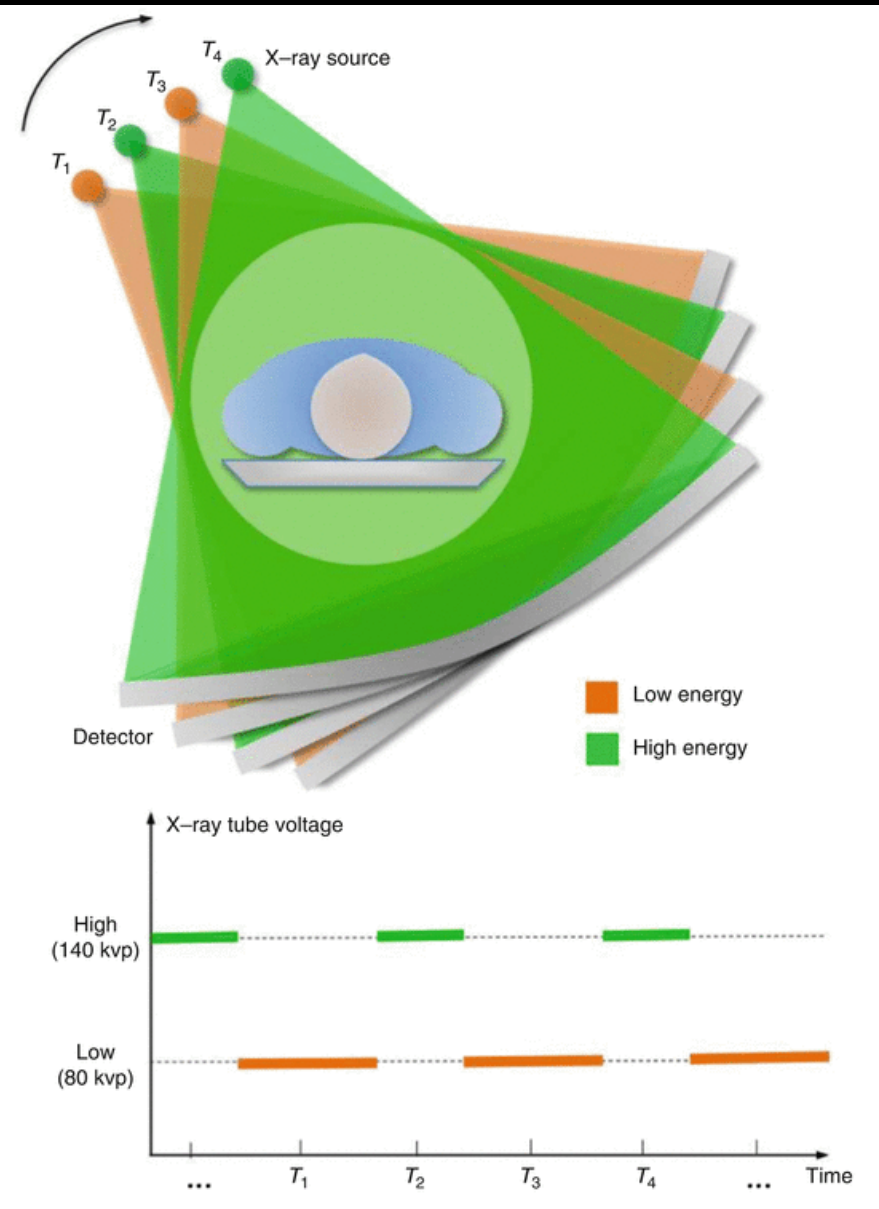


Garnet Detector
Gemstone Clarity

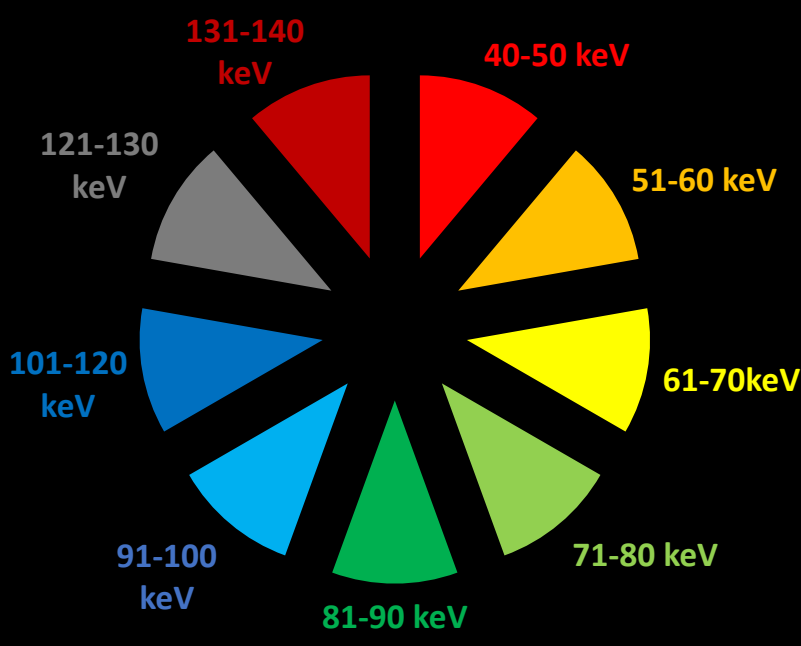
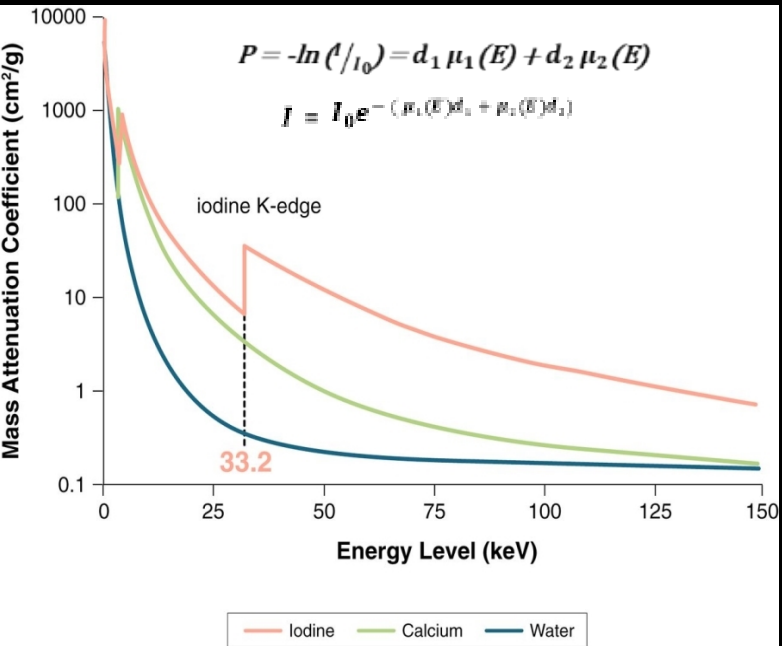


Motion Artifacts :

Cardiac	<50ms
Pulsatile	~50-300 msec
Peristalsism	~100 -1000 msec
Respiration	~1000 msec



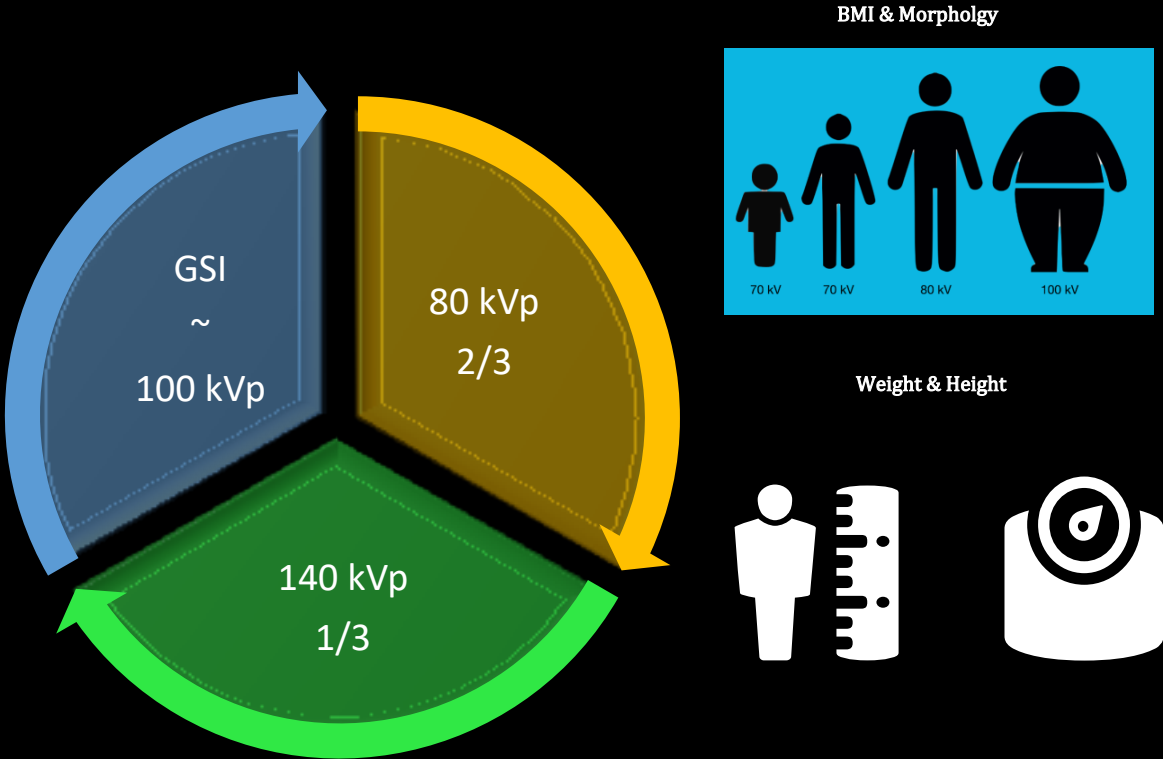
1 11A 1A																	18 VIIIA 8A						
1 H Hydrogen 1.008	2 He Helium 4.003																	2 He Helium 4.003					
3 Li Lithium 6.941	4 Be Beryllium 9.012																	5 B Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.007	8 O Oxygen 15.999	9 F Fluorine 18.998	10 Ne Neon 20.180
11 Na Sodium 22.990	12 Mg Magnesium 24.305	3 IIIB 3B	4 IVB 4B	5 VB 5B	6 VIB 6B	7 VIIB 7B	8 VIII 8	9 VIII 9	10 VIII 10	11 IB 1B	12 IIB 2B	13 IIIB 3B	14 IVB 4B	15 VB 5A	16 VIB 6A	17 VIIA 7A	18 VIIIA 8A						
19 K Potassium 39.098	20 Ca Calcium 40.078	21 Sc Scandium 44.956	22 Ti Titanium 47.88	23 V Vanadium 50.942	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.845	27 Co Cobalt 58.933	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.38	31 Ga Gallium 69.723	32 Ge Germanium 72.63	33 As Arsenic 74.922	34 Se Selenium 78.96	35 Br Bromine 79.904	36 Kr Krypton 83.8						
37 Rb Rubidium 85.468	38 Sr Strontium 87.62	39 Y Yttrium 88.906	40 Zr Zirconium 91.224	41 Nb Niobium 92.906	42 Mo Molybdenum 95.94	43 Tc Technetium 98.906	44 Ru Ruthenium 101.07	45 Rh Rhodium 101.07	46 Pd Palladium 106.905	47 Ag Silver 107.868	48 Cd Cadmium 112.411	49 In Indium 114.818	50 Sn Tin 118.71	51 Sb Antimony 121.757	52 Te Tellurium 127.6	53 I Iodine 126.905	54 Xe Xenon 131.29						
55 Cs Cesium 132.905	56 Ba Barium 137.327	57-71 Lanthanide Series	72 Hf Hafnium 178.49	73 Ta Tantalum 180.948	74 W Tungsten 183.84	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.22	78 Pt Platinum 195.084	79 Au Gold 196.967	80 Hg Mercury 200.59	81 Tl Thallium 204.383	82 Pb Lead 207.2	83 Bi Bismuth 208.980	84 Po Polonium 209	85 At Astatine 210	86 Rn Radon 222						
87 Fr Francium 223	88 Ra Radium 226	89-103 Actinide Series	104 Rf Rutherfordium 261	105 Db Dubnium 262	106 Sg Seaborgium 266	107 Bh Bohrium 264	108 Hs Hassium 277	109 Mt Meitnerium 268	110 Ds Darmstadtium 271	111 Rg Roentgenium 272	112 Cn Copernicium 285	113 Nh Nihonium 286	114 Fl Flerovium 289	115 Mc Moscovium 288	116 Lv Livermorium 293	117 Ts Tennessine 294	118 Og Oganesson 294						
Lanthanide Series			57 La Lanthanum 138.905	58 Ce Cerium 140.12	59 Pr Praseodymium 140.908	60 Nd Neodymium 144.24	61 Pm Promethium 144.913	62 Sm Samarium 150.36	63 Eu Europium 151.965	64 Gd Gadolinium 157.25	65 Tb Terbium 158.925	66 Dy Dysprosium 162.50	67 Ho Holmium 164.930	68 Er Erbium 167.26	69 Tm Thulium 168.934	70 Yb Ytterbium 173.054	71 Lu Lutetium 174.967						
Actinide Series			89 Ac Actinium 227.028	90 Th Thorium 232.038	91 Pa Protactinium 231.036	92 U Uranium 238.029	93 Np Neptunium 237.048	94 Pu Plutonium 244.064	95 Am Americium 243.061	96 Cm Curium 247.065	97 Bk Berkelium 247.067	98 Cf Californium 251.083	99 Es Einsteinium 252.083	100 Fm Fermium 257.10	101 Md Mendelevium 261.10	102 No Nobelium 262.109	103 Lr Lawrencium 260.105						
			Alkali Metal	Alkaline Earth	Transition Metal			Base Metal	Transition Metal	Base Metal	Transition Metal	Base Metal	Transition Metal	Base Metal	Transition Metal	Base Metal	Transition Metal						



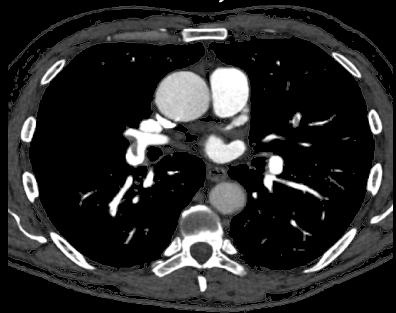
	Valeur Guide Diagnostique		NRD		Effective Dose NRD
Examen	CTDI _{vol} mGy	DLP mGy-cm	CTDI _{vol} mGy	DLP mGy-cm	mSv 10 Years Old
Cérébral	40	725	46	850	2.720
Thorax	7.5	275	9.5	350	4.900
TAP	9.5	650	11	750	10.500
Thorax-Abdomen	9.5	475	11	550	8.250
Abdo Pelvis	11	525	13	625	9.375
Rachis Lombar	23	625	28	725	10.875
Cœur (Prospectif)	18	325	26	375	4.875
Cœur (Rétrospectif)	30	550	44	875	11.375
Sinus	-	-	14	250	0.800

Arrêté du 23 mai 2019 - JORF n°0125 du 30 Mai 2019 - Décision n° 2019-DC-0667 de l'ASN du 18 Avril 2019

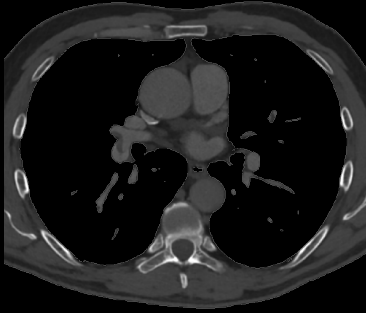
Les valeurs indiquées correspondent à un fantôme de 16 cm de diamètre pour les examens de l'encéphale, et de 32 cm pour les autres examens.



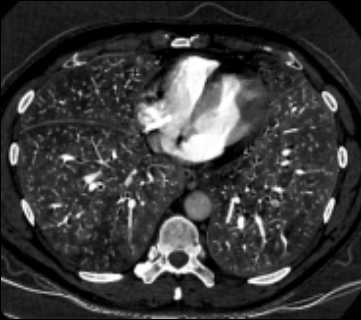
Mono Chromatic 40 keV (K Edge Iodine 33.25 keV)



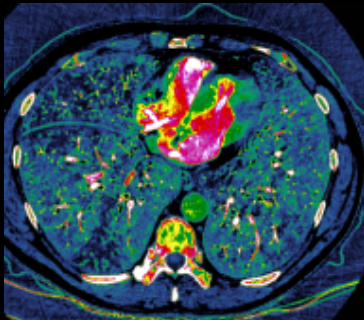
Mono Chromatic 140 keV



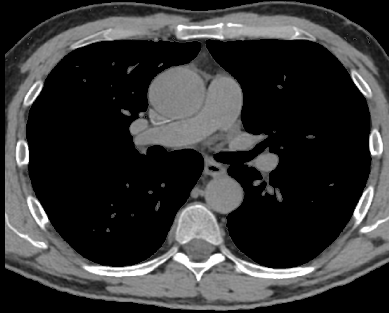
Materials Density (Black & White)



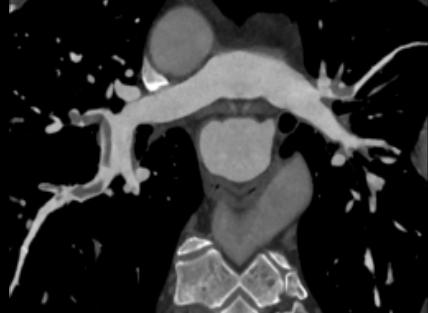
LUT French & Asist & More & Materials Density



VUE HU (Virtual Unenhanced Image)



Cuved Image 55 keV



Revolution Apex™ GE Healthcare

Mode	Sequential/Helical/Spectral Imaging GSI Xstream
Resolution	Hi Resolution / Hi Definition/ Focal Spot/Look Up Table
SFOV	All
IEC	Body Dosimetry 32 cm & Head Dosimetry 16 cm
Coverage	5,40,80,100,120,140,160 mm
Vari Speed, Sec	0.28,0.35,0.5,0.6,0.7,0.8,0.9,1.0
Minimum Speed GSI, Sec	0.5
AEC System	Smart mA & kVp & SSDE Assist
DMPR	1024
kVp Assist	70 / 80 / 100 / 120 / 140
Image Reconstruction	FBP , ASiR-V , DLR FBP Like
Example	12 Years Old
CTDIvol / DLP	1.55 mGy / 53 mGy*cm / 242.501 mm



DLR-Low



DLR-Med



FBP



LUT



ASiR-V 70 %

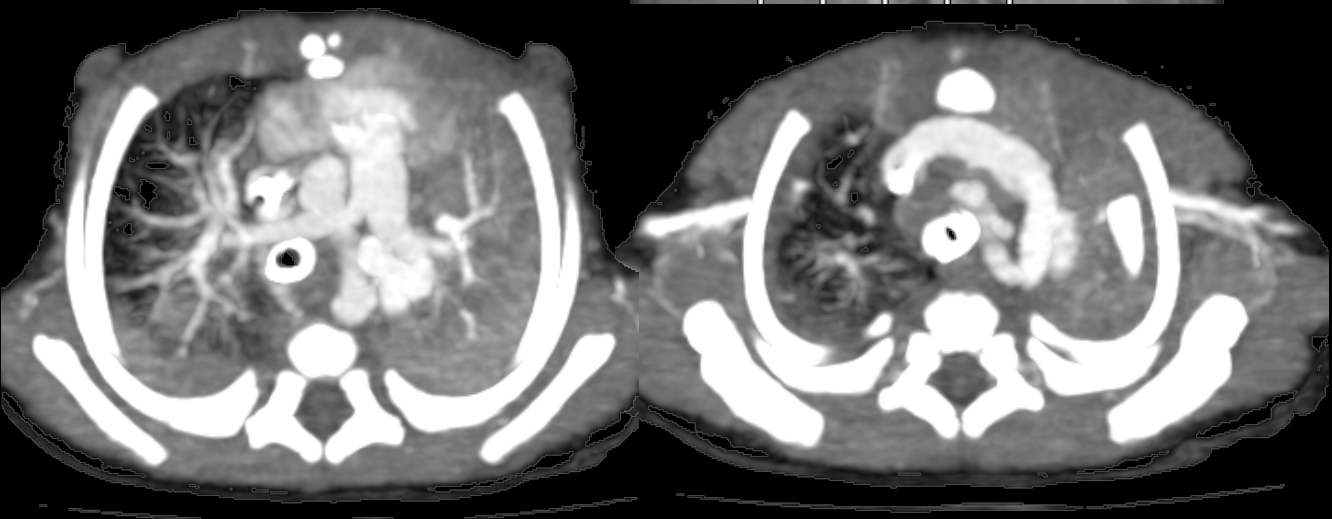


DLR-High

5 Day Old – TAPVR

Mode	Helical
SFOV	Small Body
kVp	80
Noise Index	20
mA	~ 200
Pitch	1.531:1
DLR	High
DFOV, cm	16
Slice, mm	0.625
Rotation Time, Sec	0.35
Kernel Filter	Standard
CTDI vol, mGy	0.95
DLP, mGy -cm	20.08

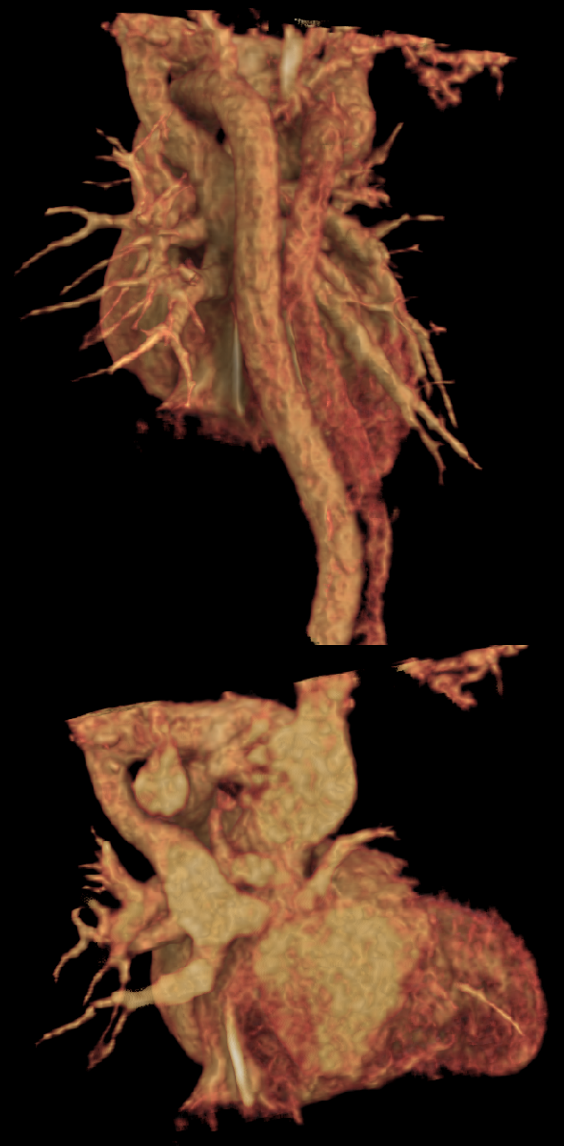
IEC Body Dosimetry 32 cm



1 Month Old – Complex cardiopathy

Mode	Sequential
SFOV	Small Body
kVp	80
Noise Index	20
mA	~221
DLR	High
DFOV, cm	10
Slice, mm	0.625
Rotation Time, Sec	0.28
Kernel Filter	Standard
CTDI vol, mGy	1.44
DLP, mGy -cm	14.38

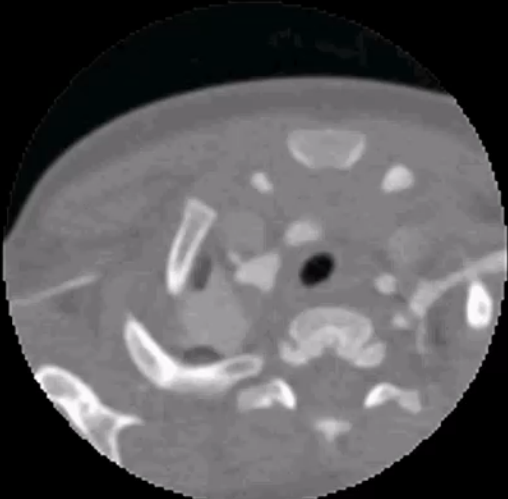
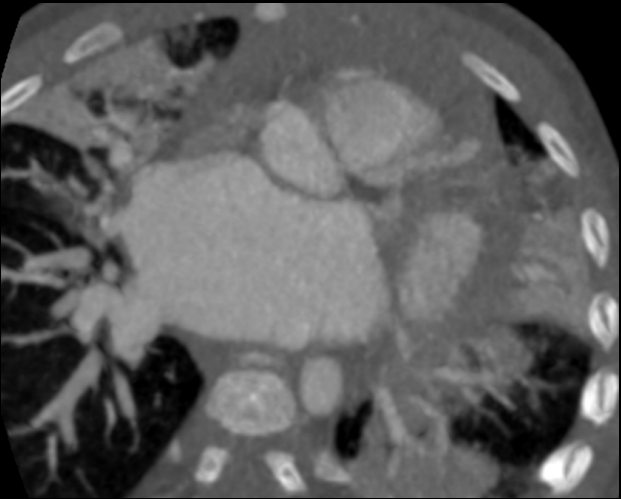
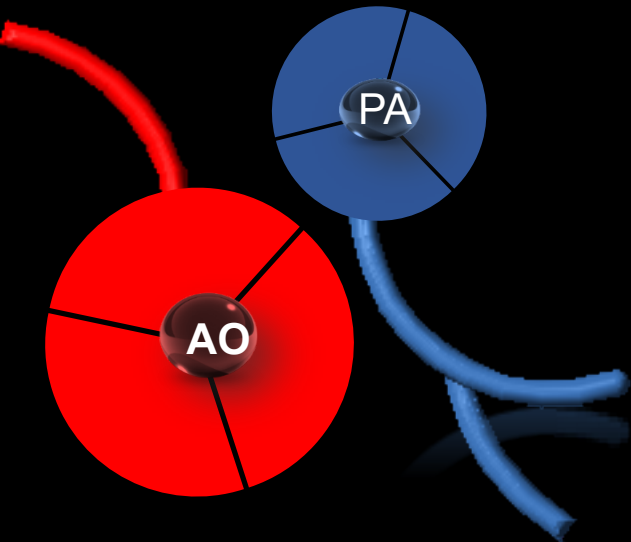
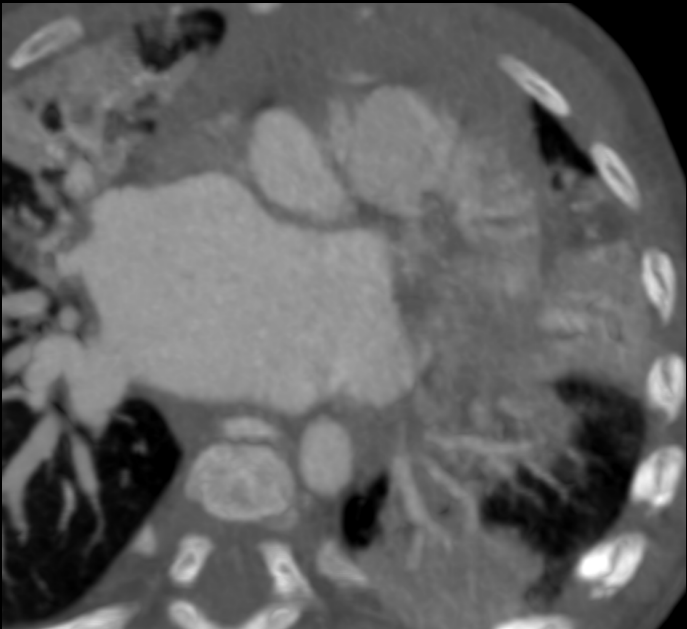
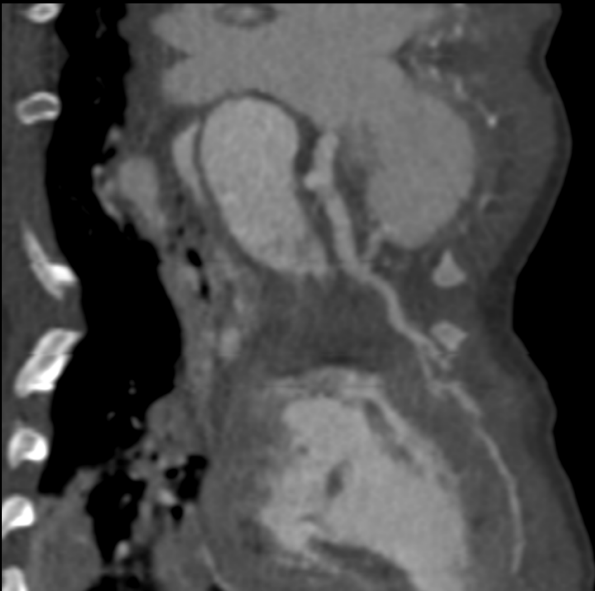
IEC Body Dosimetry 32 cm



8 Month Old – ALCAPA

Mode	Sequential
SFOV	Small Cardiac
kVp	80
Noise Index	20
mA	~ 200
One Shot X-Ray, mm	100
DLR	High
DFOV, cm	30
Slice, mm	0.625
Rotation Time, Sec	0.28
Kernel Filter	Standard
CTDI vol, mGy	1.47
DLP, mGy -cm	14.72

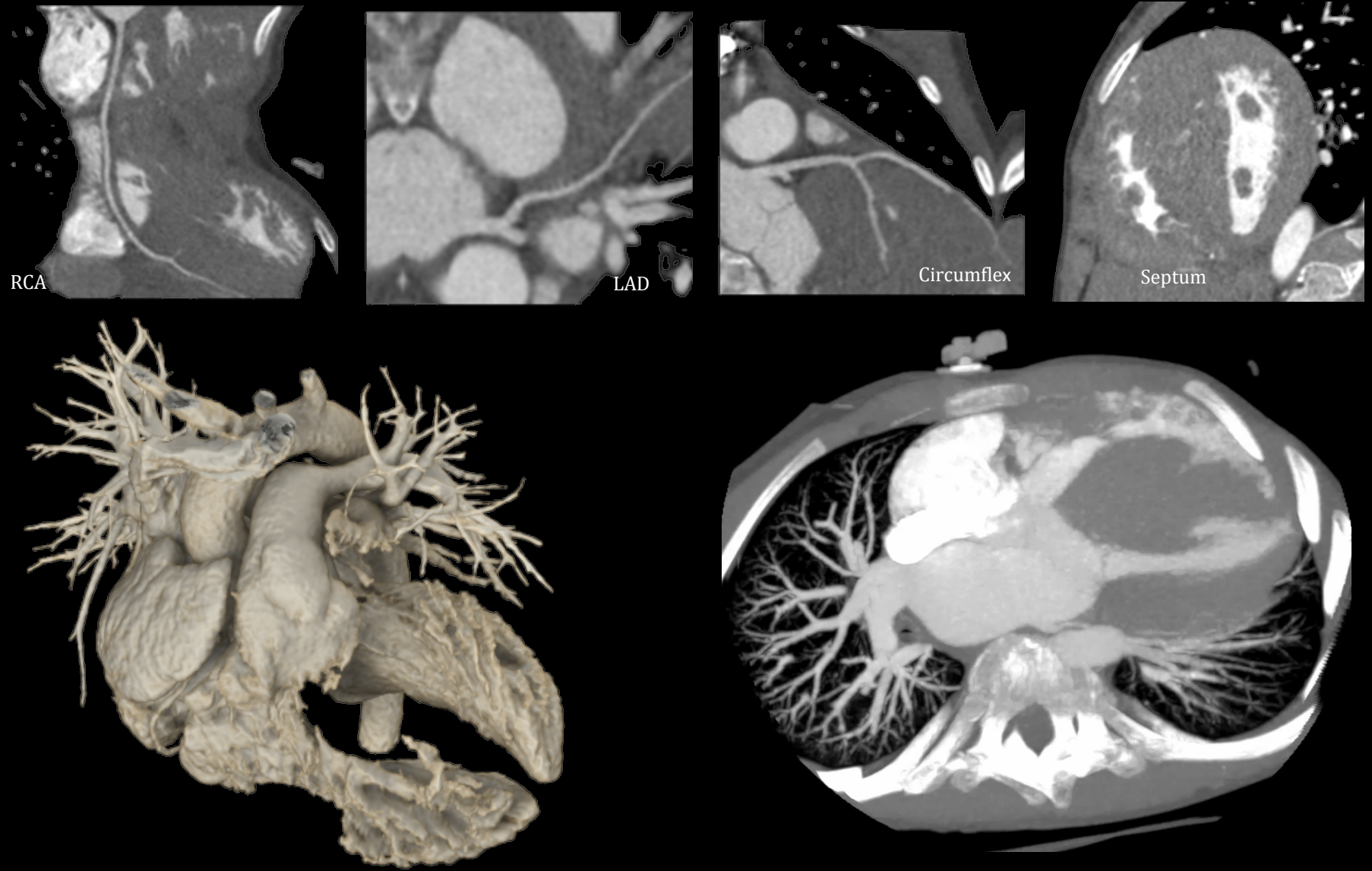
IEC Body Dosimetry 32 cm



4 Year Old – Hypertrophic cardiomyopathy

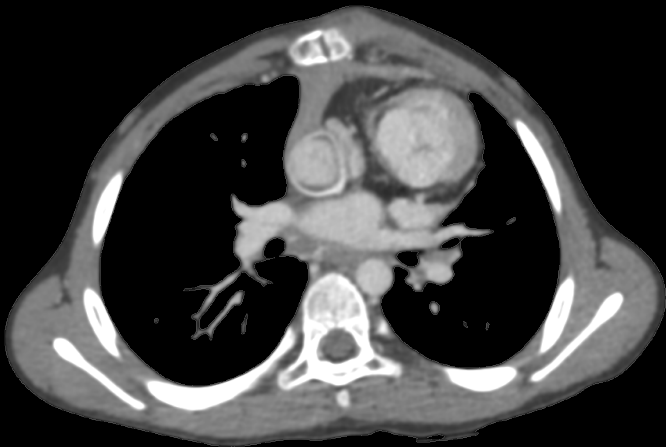
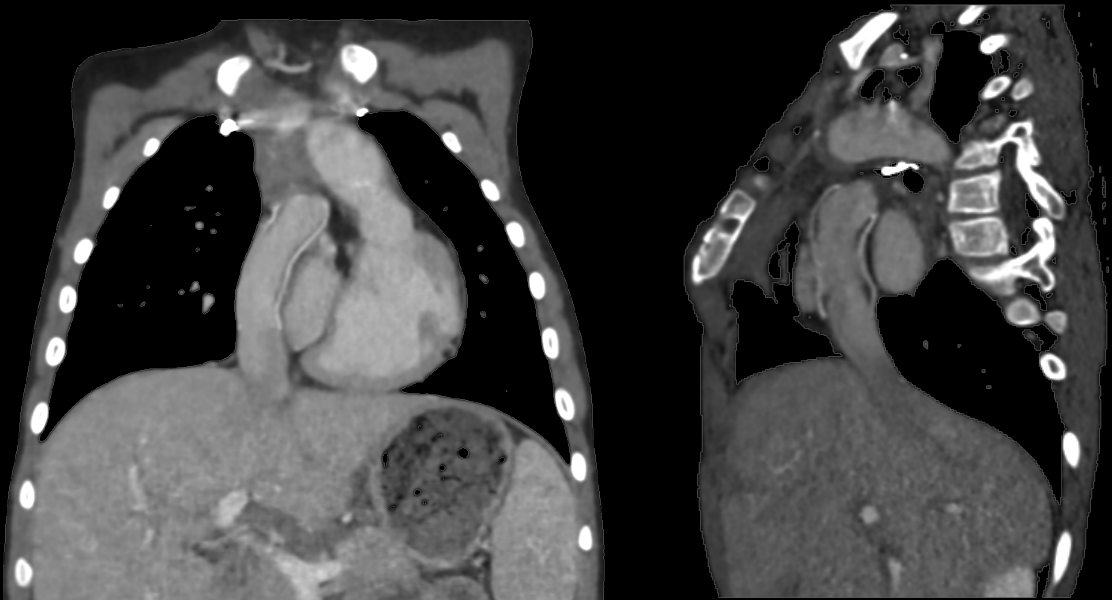
Mode	Sequential
SFOV	Small Cardiac
kVp	80
Smart mA	250-350
Noise Index	10
Gaussian	Smooth 1
One Shoot X Ray	120 mm
Slice, mm	0.625
Rotation Time, Sec	0.28
Kernel	Standard
Deep Learning Level	High
Shoot % R-R	40-50/70-80
CTDIvol, mGy	3.84
DLP, mGy-cm	53.81

IEC Body Dosimetry 32cm



5 Year Old – DORV with Fontan procedure

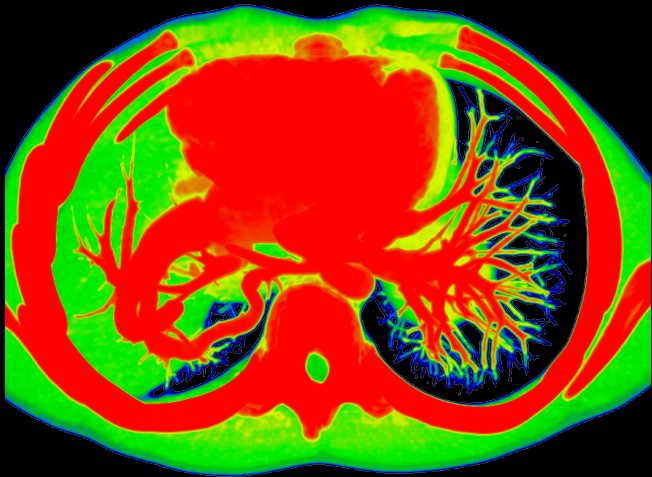
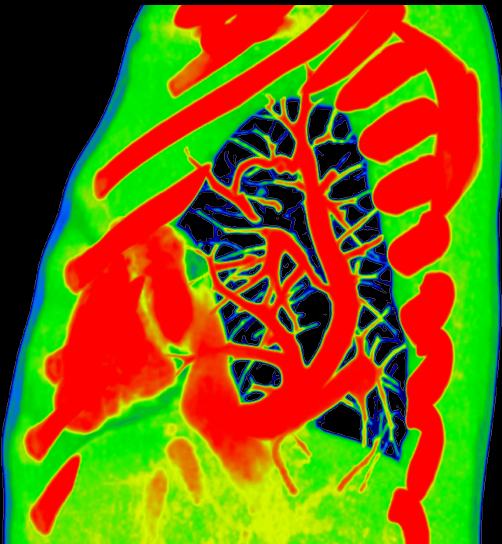
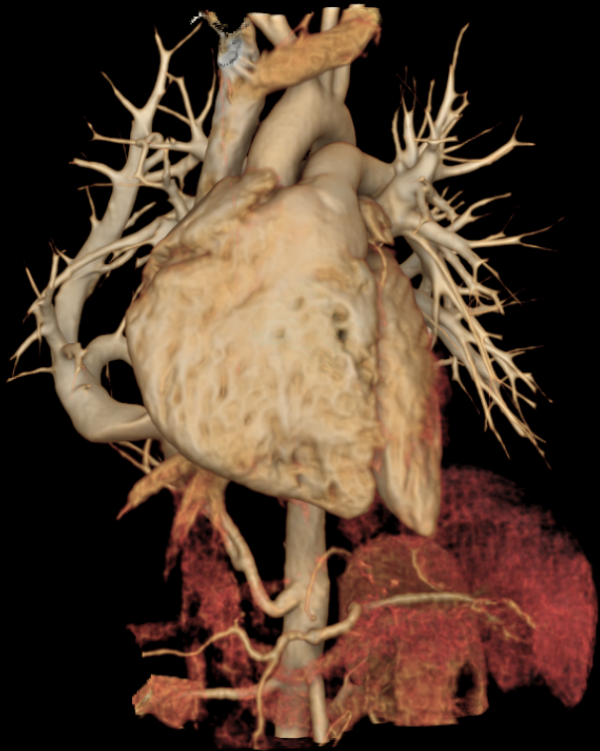
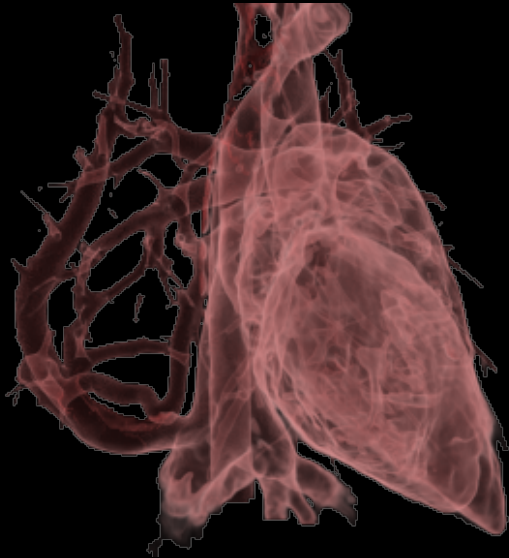
Mode	Helical
SFOV	Small Body
kVp	80
DLR	High
Focal Spot	Small
mA	AEC
Gaussian Filter	Smooth 3
DFOV, cm	24.5
Slice, mm	0.625
Pitch	1.531:1
Rotation Time, Sec	0.35
Kernel Filter	Standard
CTDI vol,mGy	0.95
DLP, mGy - cm	28.35
IEC Body Dosimetry 32 cm	



12 Year Old - Pulmonary Sequestration / Cimeterre

Mode	Helical
SFOV	Large Body
kVp	100
Pitch	1.531:1
mA	~ 117
One Shot X-Ray, mm	100
DLR	High
DFOV, cm	30
Slice, mm	1.25
Rotation Time, Sec	0.28
Kernel Filter	Standard
CTDI vol, mGy	5.20
DLP, mGy -cm	166.42

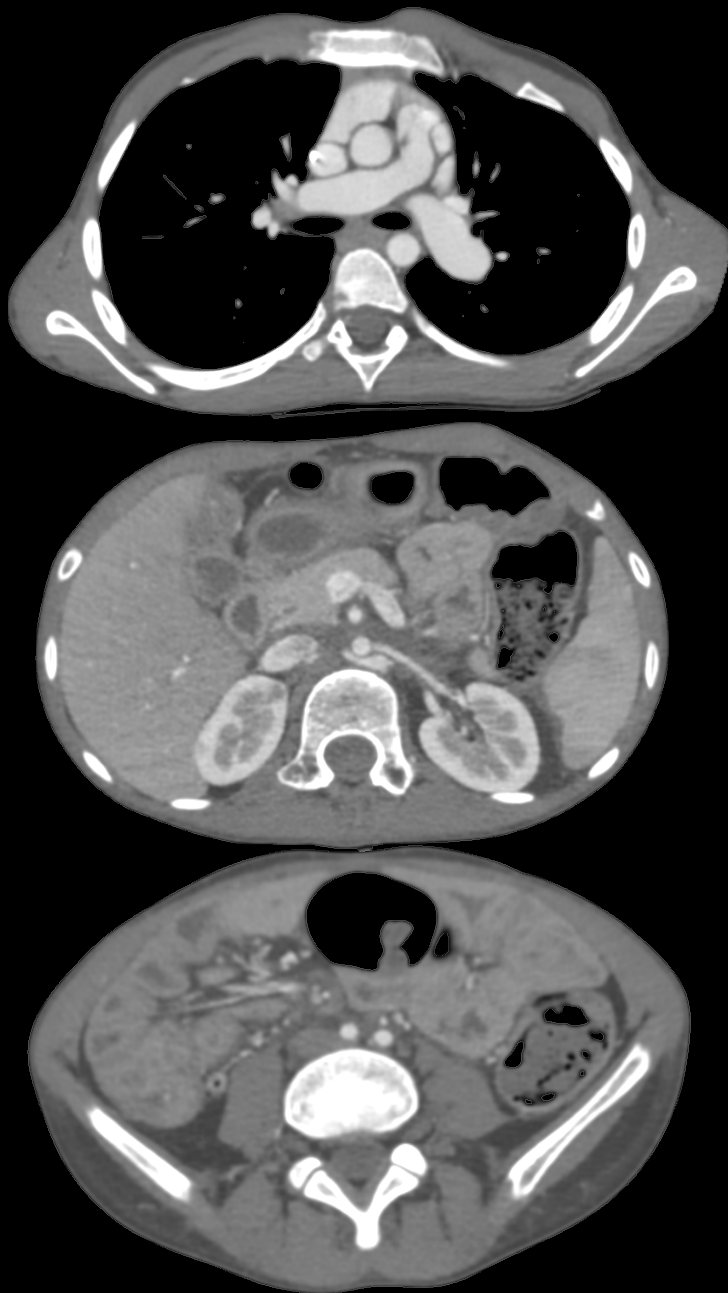
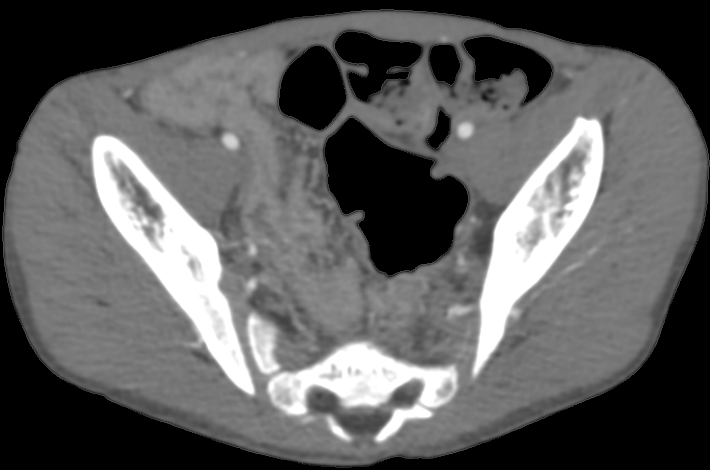
IEC Body Dosimetry 32 cm



7 Year Old - Lymphoma Follow Up

Mode	Helical
SFOV	Small Body
kVp	80
Auto mA & Smart mA	~400
Coverage	80 mm
Pitch	1.531:1
DFOV, cm	26
Slice, mm	1.25
Rotation Time, Sec	0.28
Kernel Filter	Standard
IQE	Y
Mode	Plus
DLIR	High
CTDI vol, mGy	1.53
DLP, mGy -cm	81.04

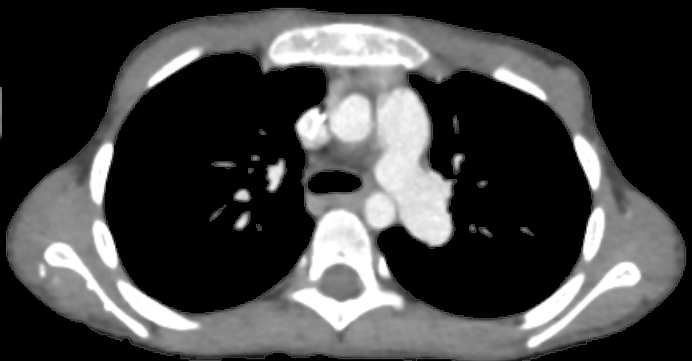
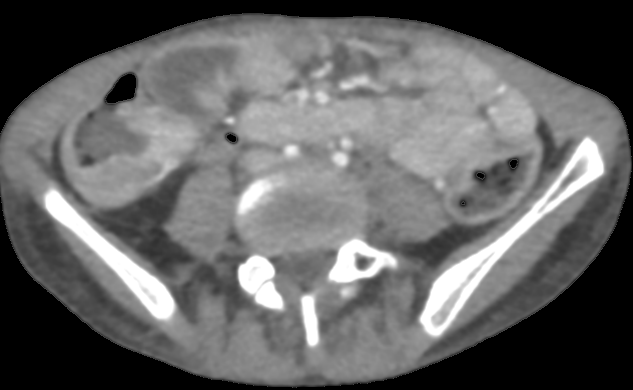
IEC Body Dosimetry 32 cm



7 Year Old - Lymphoma Follow Up

Mode	Helical
SFOV	Large Body
kVp	100
Auto mA & Smart mA	~112
Coverage	80 mm
Pitch	1.531:1
DFOV, cm	26
Slice, mm	1.25
Rotation Time, Sec	0.35
Kernel Filter	Standard
IQE	Y
Mode	Plus
DLIR	High
CTDI vol, mGy	1.88
DLP, mGy -cm	45.83

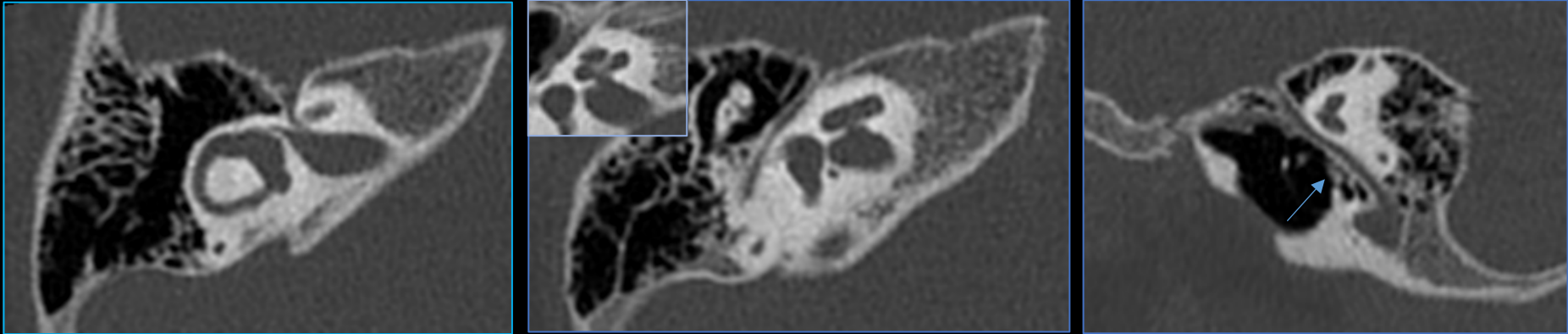
IEC Body Dosimetry 32 cm



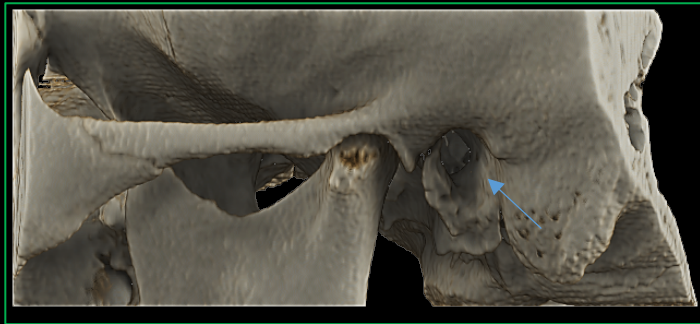
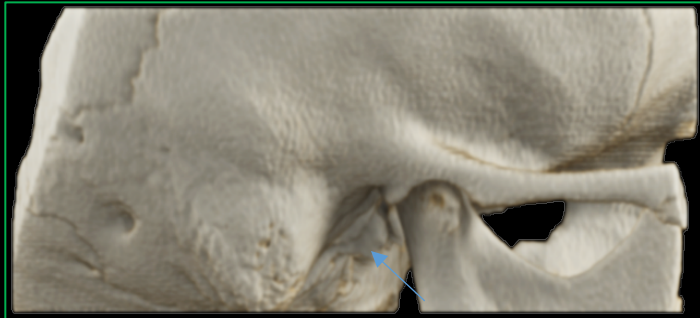
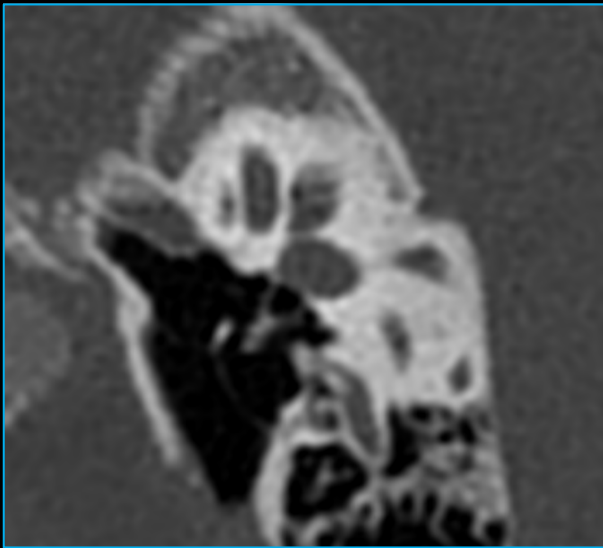
15 Month Old With General Anesthesia Bilateral Deafness & 4 Year Old Without General Anesthesia Inner Right Deafness

Mode	Sequential / HR
SFOV	Small Head
Focal Spot	Small
kVp	120
mA	290
Fine Z	Yes
Gaussian Filter	Edge 2
DFOV, cm	11
One Shoot X Ray	40 mm
Slice, mm	0.625 Z
Rotation Time, Sec	1
Kernel Filter	HD Bone
Smart Coverage	40 mm
CTDI vol, mGy	39.23
DLP, mGy -cm	156.94

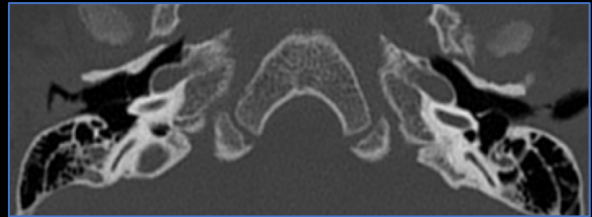
IEC Head Dosimetry 16 cm



VII

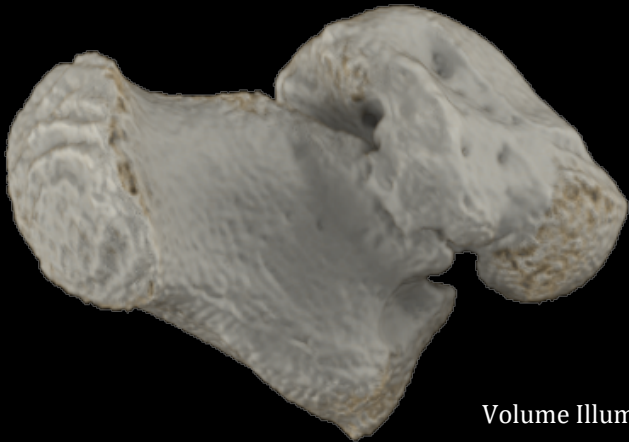
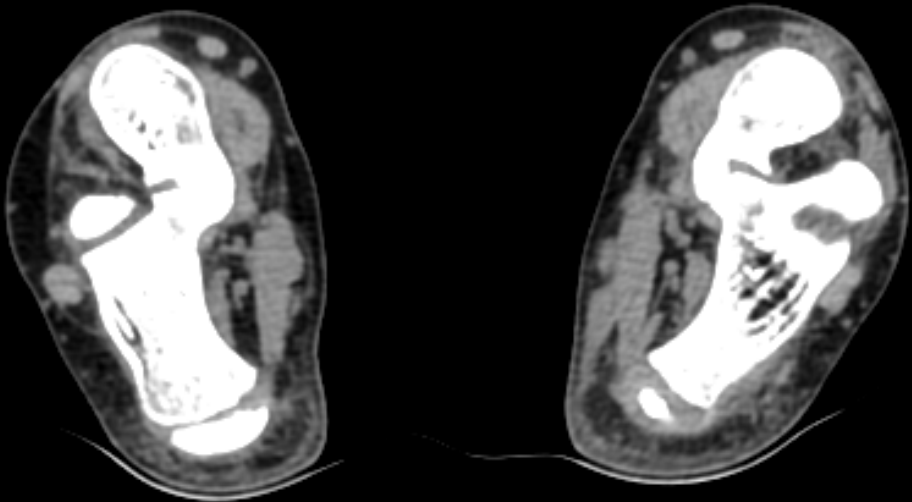


W EAC



7 Year Old - Synostosis

Mode	Sequential/HR
SFOV	Small Body
kVp	80
Focal Spot	Small
mA	380
One Shot X-Ray, mm	120
Gaussian Filter	Edge 1
DFOV, cm	20
Slice, mm	0.625 Z
Rotation Time, Sec	0.28
Kernel Filter	Bone Plus
CTDI vol, mGy	2.19
DLP, mGy -cm	26.22
IEC Body Dosimetry 32 cm	



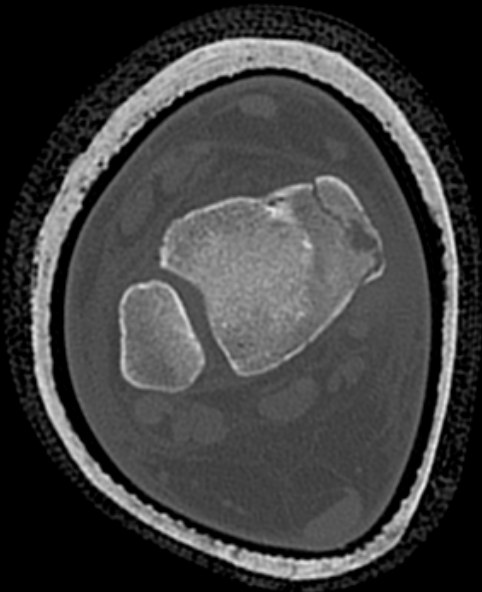
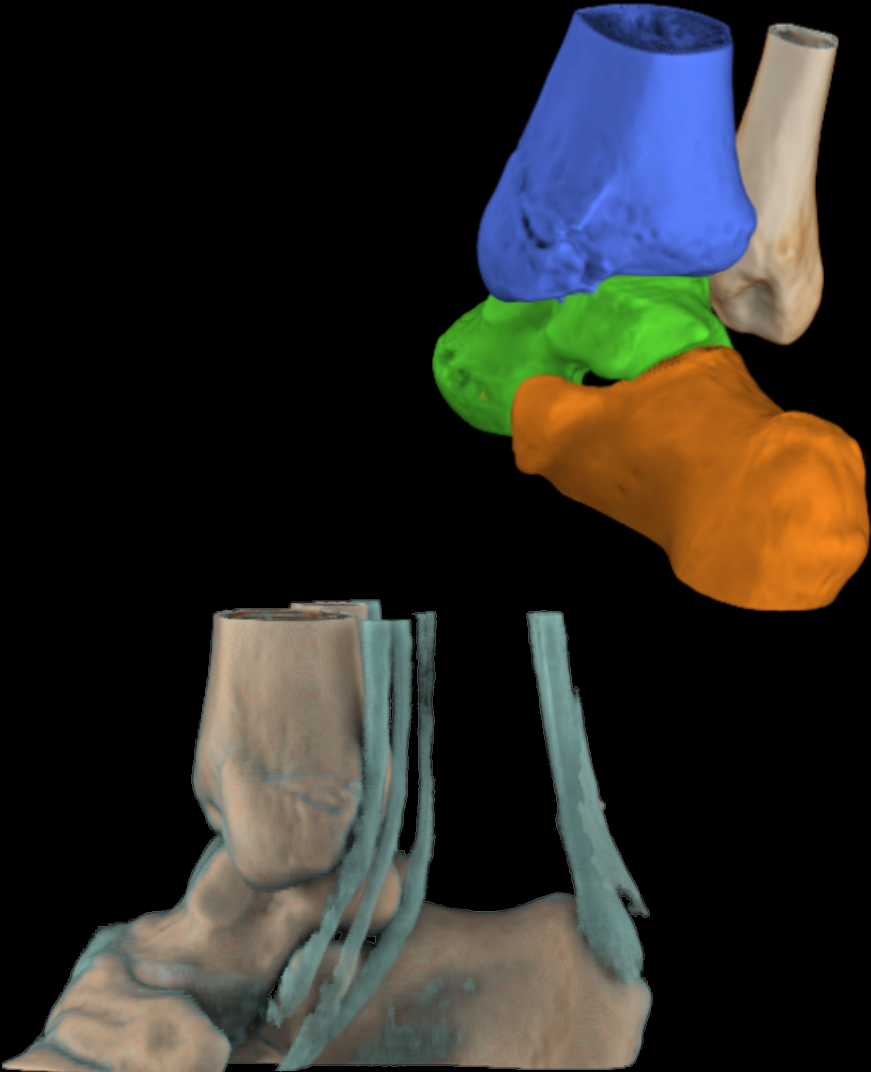
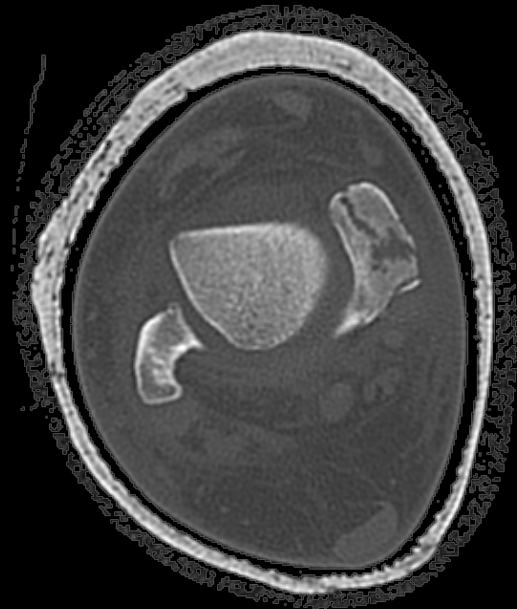
Volume Illumination



Volume Illumination

13 Year Old – Pre operative CT

Mode	Sequential/HR
SFOV	Small Body
kVp	120
Focal Spot	Small
mA	400
One Shot X-Ray, mm	160
Gaussian Filter	Edge 1
DFOV, cm	20
Slice, mm	0.625 Z
Rotation Time, Sec	0.28
Kernel Filter	Bone Plus
CTDI vol, mGy	12.52
DLP, mGy -cm	102.51
IEC Body Dosimetry 32 cm	



Volume Illumination

12 Year Old – Post-op evaluation

Mode	GSI Assist
SFOV	Large Body
kVp	Switching
Focal Spot	Small
mA	~ 200
One Shot X-Ray, mm	120
ASiR-V,%	30
DFOV, cm	20
Slice, mm	1.25
Rotation Time, Sec	0.5
Kernel Filter	Bone Plus
CTDI vol, mGy	5.20
DLP, mGy -cm	166.42

IEC Body Dosimetry 32 cm

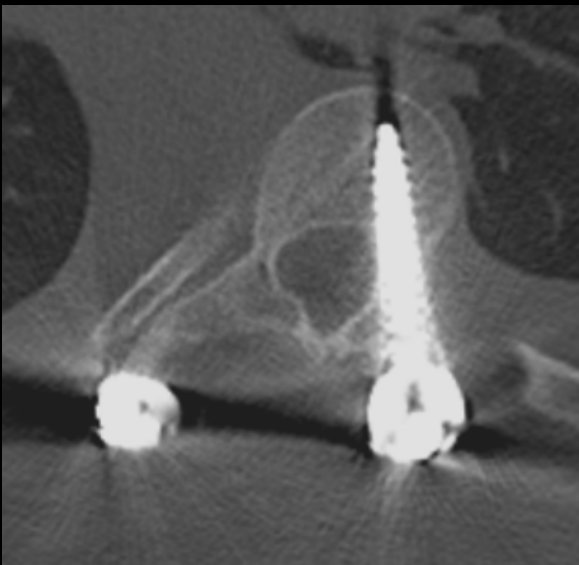
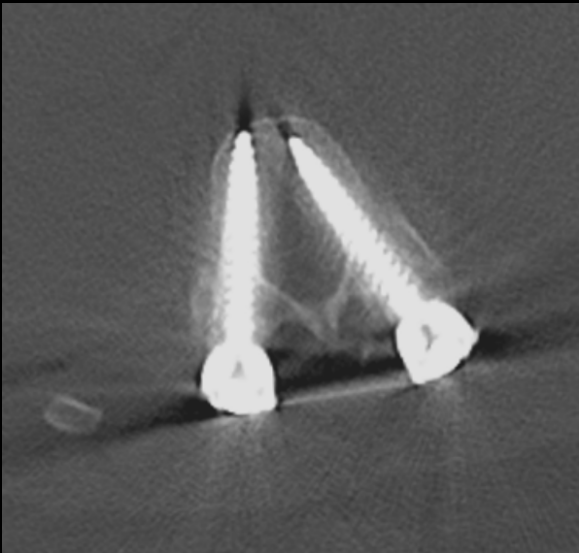


Volume Illumination



12 Year Old – Post-op evaluation

Mode	Helical
SFOV	Large Body
kVp	100
Focal Spot	Small
mA	~ 100-120
ASiR-V, %	40
DFOV, cm	25
Slice, mm	1.25
Rotation Time, Sec	0.5
Pitch	0.531:1
Kernel Filter	Bone Plus
CTDI vol, mGy	7.41
DLP, mGy -cm	292.01
IEC Body Dosimetry 32 cm	

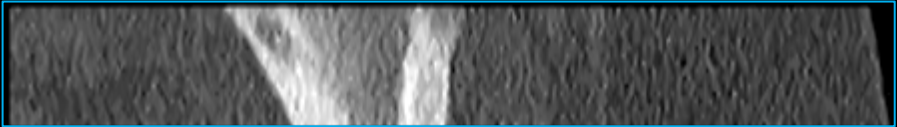


Volume Illumination



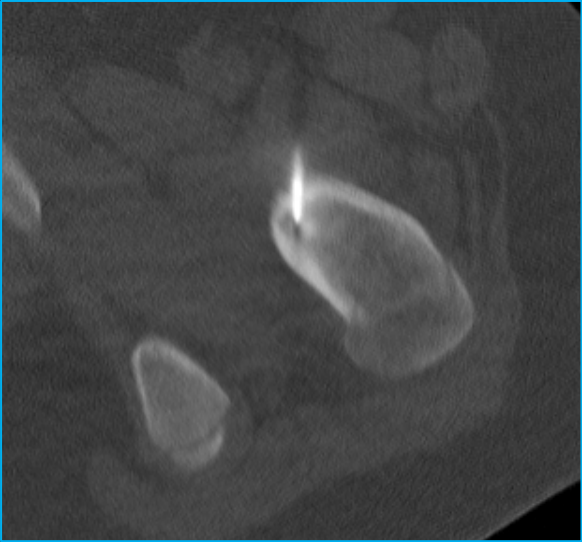
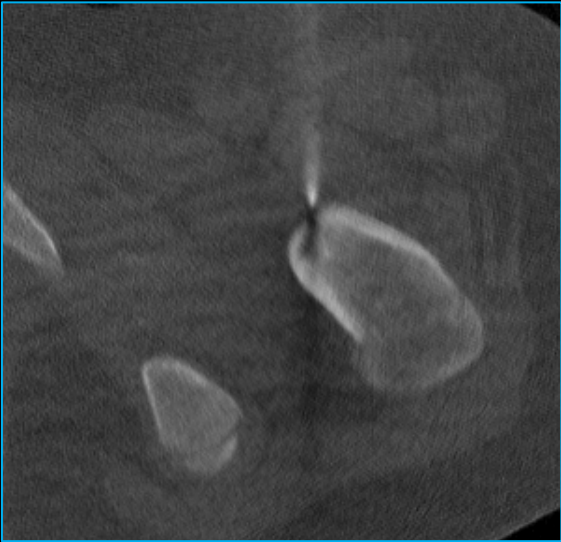
7 Year Old – Osteoid osteoma

Mode	Smart Step 2D
SFOV	Large Body
kVp	80
mA	100
One Shot X-Ray, mm	20 mm
Gaussian Filter	Edge 2
DFOV, cm	11
Slice, mm	0.625
Rotation Time, Sec	0.5
Kernel Filter	Bone
CTDI vol, mGy	1.60
DLP, mGy -cm	156.94
Effective Dose mSV	0.487
Exposure Time, Sec	19.4
IEC Body Dosimetry 32 cm	



Radio Frequency

Helical Repair ULD



37 Shots X Ray Smart Step 2.0



Thank you !
alexia.dabadie@ap-hm.fr

**56th Annual Meeting &
42nd Post Graduate Course**

**JUNE 06-10 2022
MARSEILLE, FRANCE**

Palais du Pharo

Thierry Tran Van and the GE team



La Timone Hospital, Marseille, France - European Society of Paediatric Radiology - ESPR 2022 June 10,2022