



Hôpital Universitaire
des Enfants Reine Fabiola

Universitair Kinderziekenhuis
Koningin Fabiola

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La hanche douloureuse en pédiatrie : quelle imagerie ?

Grammatina Boitsios, MD

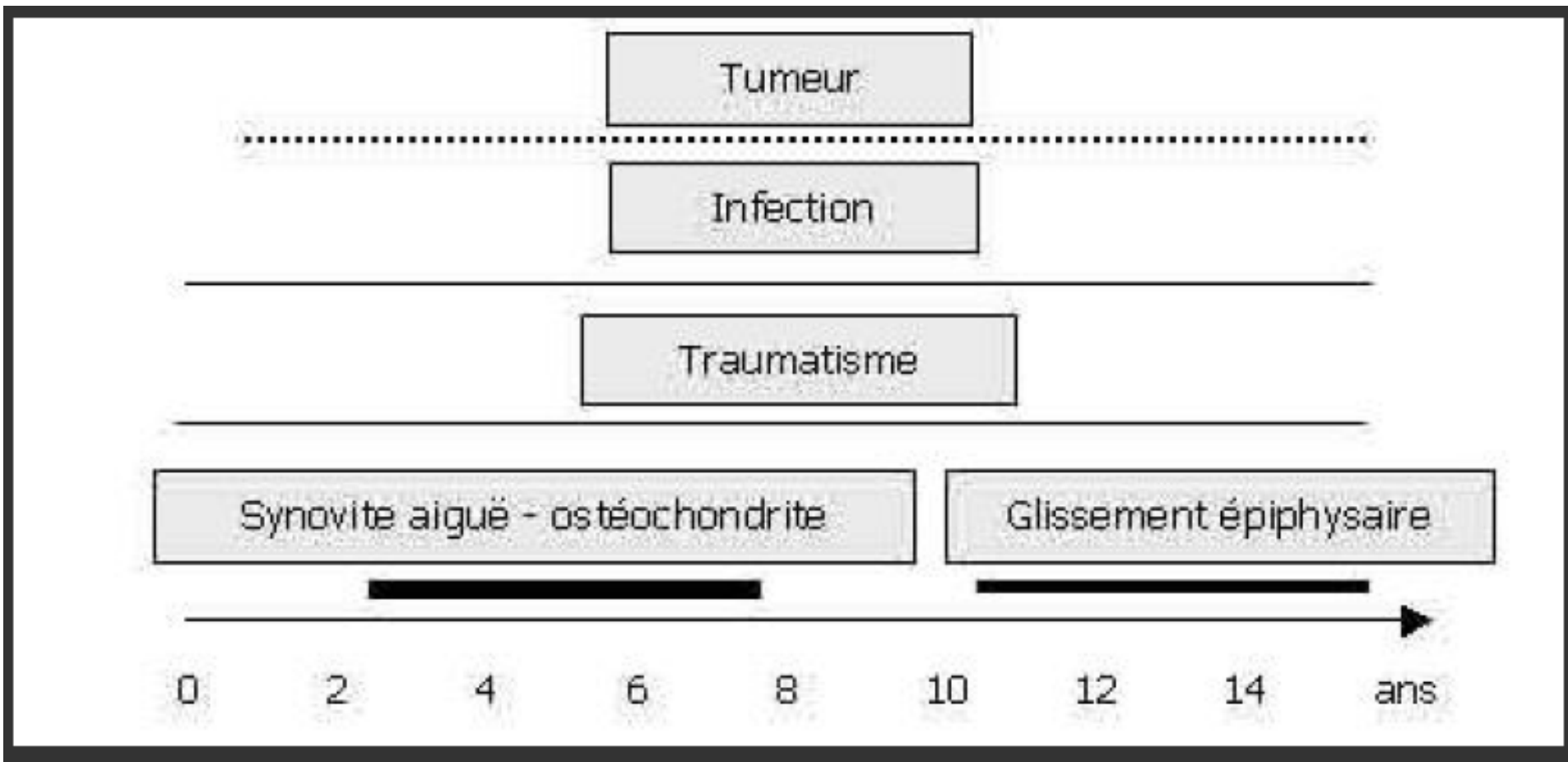
Paolo Simoni, MD, PhD, MBA

Service d'Imagerie Pédiatrique

Hôpital universitaire des Enfants "Reine Fabiola"

Université Libre de Bruxelles

Age... Clinique...



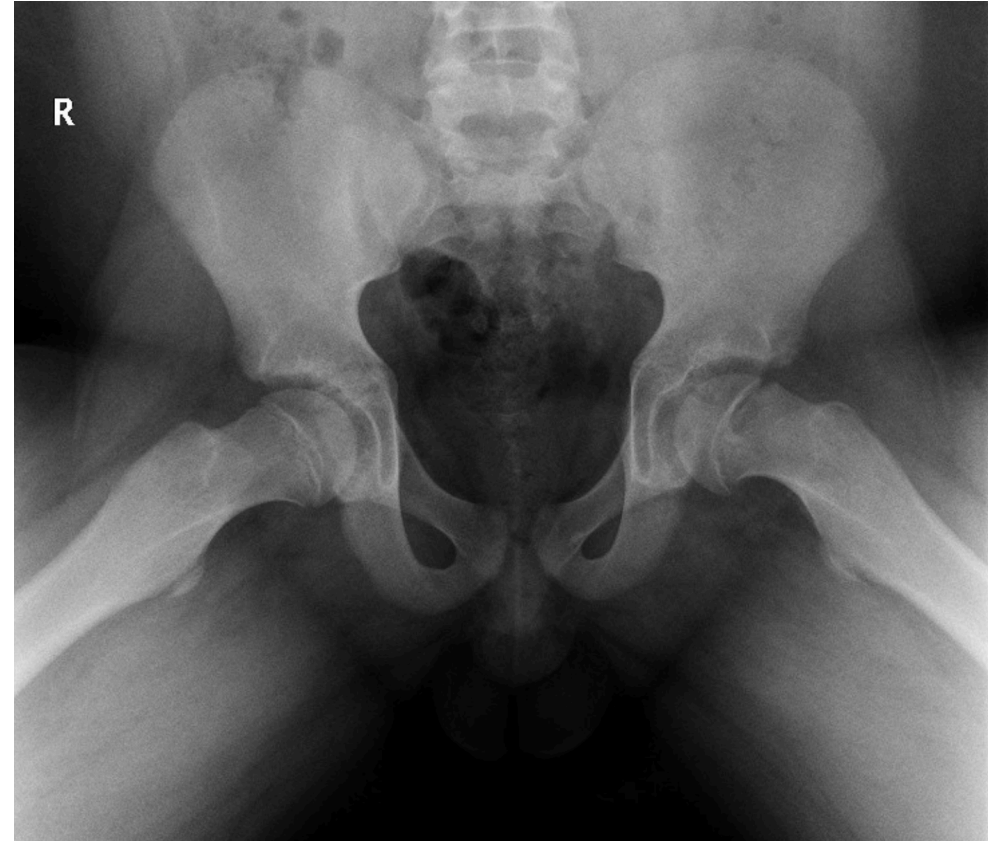
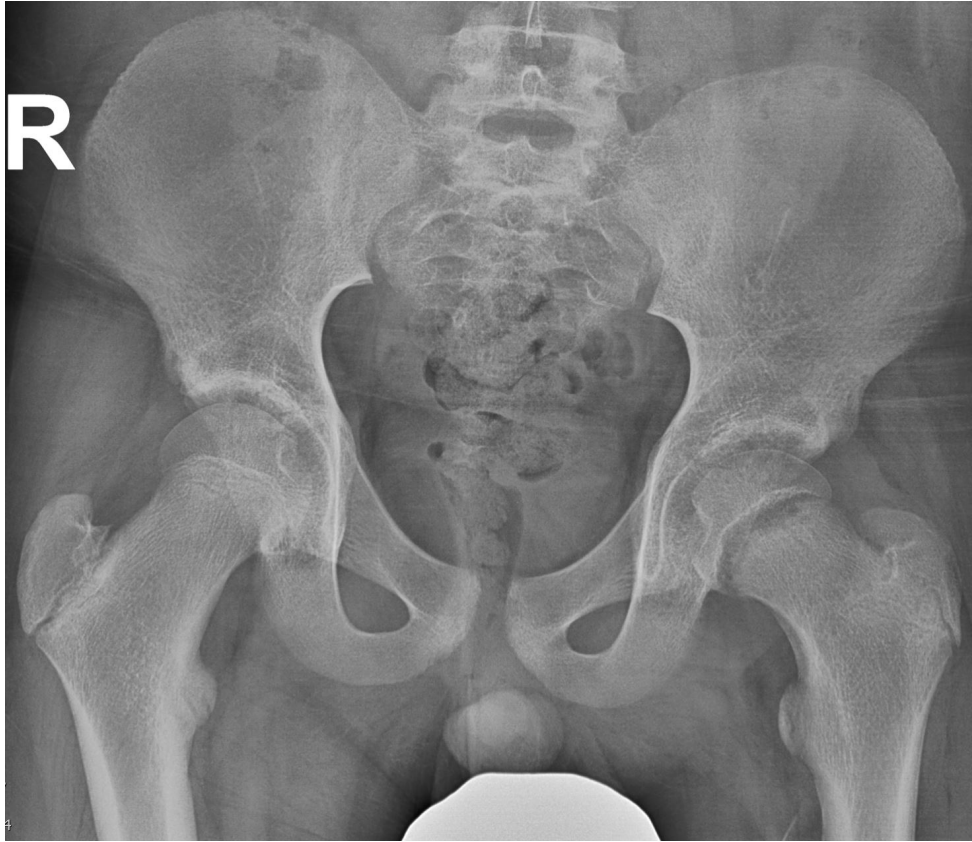
Radiographie standard - nourrisson et enfant



Radiographie standard - enfant - complément



Radiographie standard



Radiographie standard - adolescent complément



Abstract

Objective To re-evaluate gonad shielding in paediatric pelvic radiography in terms of attainable radiation risk reduction and associated loss of diagnostic information.

Methods A study on patient dose and the quality of gonad shielding was performed retrospectively using 500 pelvic radiographs of children from 0 to 15 years old. In a subsequent study, 195 radiographs without gonad shielding were included. Patient doses and detriment adjusted risks for heritable disease and cancer were calculated with and without gonad shielding.

Results For girls, gonad shields were placed incorrectly in 91% of the radiographs; for boys, in 66%. Without gonad shielding, the hereditary detriment adjusted risk for girls ranged between 0.1×10^{-6} and 1.3×10^{-6} and for boys between 0.3×10^{-6} and 3.9×10^{-6} , dependent on age. With shielding, the reduction in hereditary risk for girls was on average $6 \pm 3\%$ of the total risk of the radiograph, for boys $24 \pm 6\%$. Without gonad shielding, the effective dose ranged from 0.008 to 0.098 mSv.

Conclusions With modern optimised X-ray systems, the reduction of the detriment adjusted risk by gonad shielding is negligibly small. Given the potential consequences of loss of diagnostic information, of retakes, and of shielding

Gonad shielding in paediatric pelvic radiography: disadvantages prevail over benefit

Marij J. Frantzen · Simon Robben · Alida A. Postma · Johannes Zoetelief · Joachim E. Wildberger · Gerrit J. Kemerink

Table 5 Gonad shield positioning in pelvic radiography according to various studies

Ref.	Number of radiographs with shielding			Percentage with incorrectly placed shields		
	Boys	Girls	Total	Boys (%)	Girls (%)	Average ^a (%)
Kenny and Hill [14]	102	107	209	44	60	52
Wainwright [15]	76	40	116	38	59	45
McCarty et al. [16]	82	57	139	63	72	67
Sikand et al. [17]			110			26
Gul et al. [18]			678			31
Masud et al. [19]			100			78
Fawcett and Barter[20]	611	550	1161	26	48	36
McManus and Davis [21]	618	741	1359	59	71	66
This study	193	307	500	66	91	81

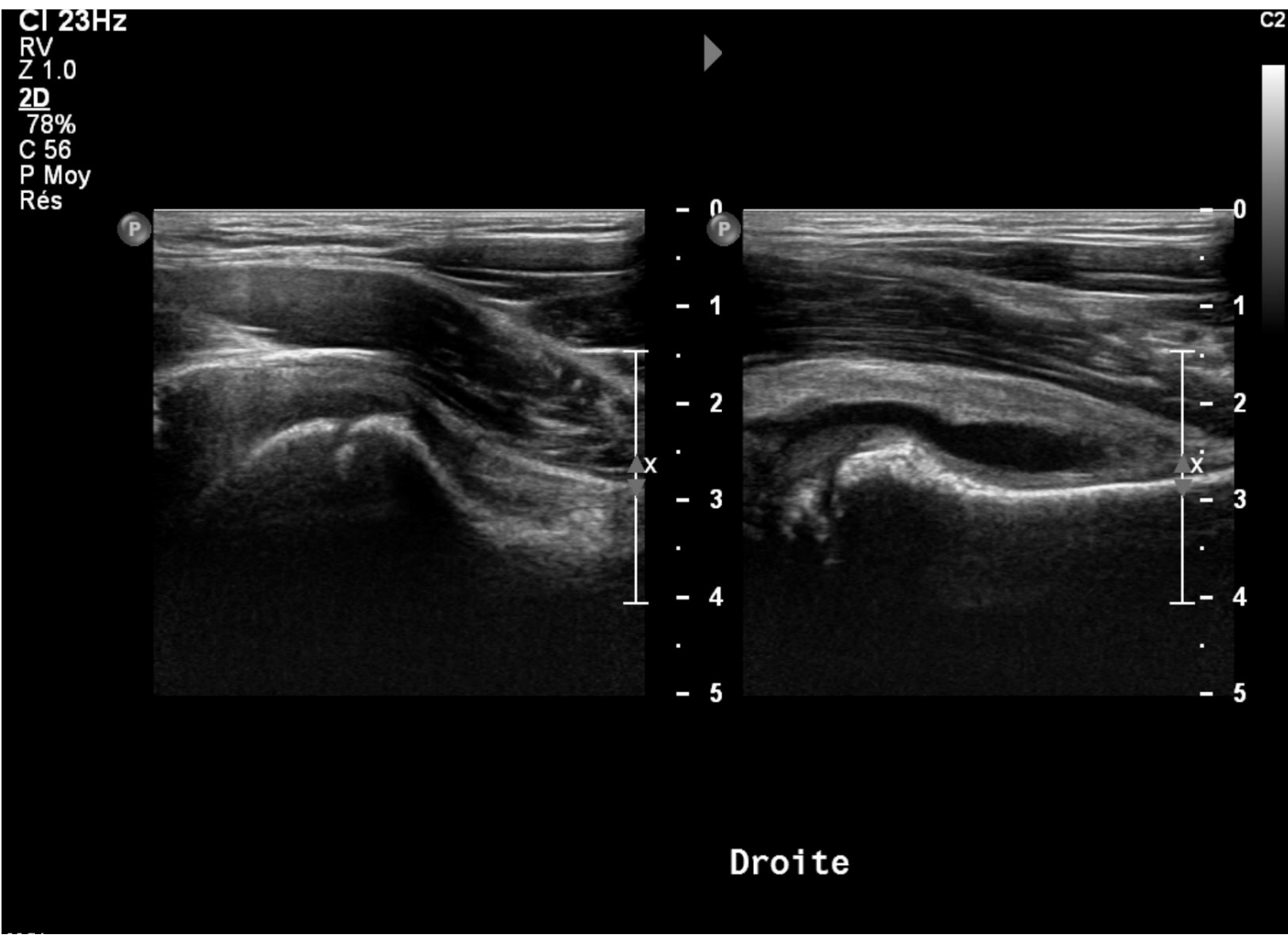
^a Taking the number of each sex into account

Table 2. Mean equivalent doses (μSv) to ICRP organs for skull, sinus, abdominal, and chest examinations

Examination	Skull						Sinus				Abdomen						Chest												
	0		5		15		0		5		15		0		5		15		0		5		15		0		5		15
Age group, years	AP	AP	AP	LAT	LAT	LAT	PA	PA	PA	PA	AP	AP	AP	LAT	LAT	LAT	PA	PA	AP	AP	AP	LAT	LAT	LAT	PA	PA	PA		
Projection	AP	AP	AP	LAT	LAT	LAT	PA	PA	PA	PA	AP	AP	AP	LAT	LAT	LAT	PA	PA	AP	AP	AP	LAT	LAT	LAT	PA	PA	PA		
Organ dose, μSv																													
Ovaries	–	–	–	–	–	–	–	–	–	–	42	97	241	100	134	934	61	126	1	–	–	2	–	–	2	–	1		
Testes	–	–	–	–	–	–	–	–	–	–	9	36	73	21	24	127	8	18	–	–	–	–	–	–	–	–	–		
Active bone marrow	45	36	10	37	25	11	23	26	12	19	7	18	53	15	39	376	27	85	4	5	10	9	11	36	4	7	31		
Skeleton	136	204	55	115	141	68	131	151	63	95	30	54	128	63	70	414	58	133	21	13	21	40	31	72	19	20	63		
Lungs	2	1	–	2	1	–	1	–	2	2	8	15	38	15	20	128	8	17	32	33	58	52	69	166	19	37	105		
Lower large intestine	–	–	–	–	–	–	–	–	–	–	37	103	246	53	50	302	52	108	1	–	–	1	1	–	–	–	–		
Stomach	–	–	–	–	–	–	–	–	–	–	53	174	390	52	52	242	35	79	22	19	22	16	11	13	8	8	18		
Liver	–	–	–	–	–	–	–	–	–	–	47	133	296	137	280	2010	50	118	23	20	28	46	38	85	9	13	38		
Thyroid	23	15	8	16	8	7	10	9	16	30	1	–	1	1	–	1	–	1	45	38	33	41	46	31	6	9	18		
Esophagus	7	4	1	5	3	1	4	3	9	19	5	7	13	10	12	66	5	8	19	19	27	46	52	94	12	24	66		
Breasts	–	–	–	–	–	–	–	–	–	–	1	3	9	2	5	26	2	4	48	47	87	46	53	169	6	15	25		
Urinary bladder	–	–	–	–	–	–	–	–	–	–	55	174	424	88	132	736	35	72	–	–	–	1	–	–	–	–	–		
Skin	51	53	17	37	33	20	39	59	9	27	14	45	96	34	64	437	25	65	9	7	13	16	16	42	4	7	19		
Adrenals	1	–	–	–	–	–	–	–	–	–	15	34	71	64	85	634	86	225	13	11	17	32	33	49	19	37	107		
Brain	146	173	84	84	137	149	124	169	77	174	–	–	–	–	–	–	–	–	–	–	1	1	1	2	–	–	1		
Kidneys	–	–	–	–	–	–	–	–	–	–	17	34	83	90	146	933	138	347	6	5	4	22	8	11	14	5	12		
Pancreas	–	–	–	–	–	–	–	–	–	–	34	86	201	63	73	405	53	114	24	20	21	28	20	25	11	17	37		
Small intestine	–	–	–	–	–	–	–	–	–	–	44	119	290	95	147	921	55	124	2	1	1	4	2	2	1	1	2		
Upper large intestine	–	–	–	–	–	–	–	–	–	–	48	142	340	121	224	1466	47	104	2	2	1	5	2	3	1	1	2		
Spleen	–	–	–	–	–	–	–	–	–	–	25	56	133	37	30	137	97	230	16	13	14	14	9	12	18	20	50		
Thymus	6	2	–	4	1	–	2	–	2	2	1	2	5	2	5	30	1	2	48	53	105	39	49	105	5	11	23		
Uterus	–	–	–	–	–	–	–	–	–	–	41	115	286	91	135	685	52	113	1	–	–	2	–	–	1	–	1		
Remainder (muscle)	25	14	3	23	13	5	19	15	21	19	18	50	119	38	63	424	31	74	10	8	14	15	15	34	6	8	23		
Gall bladder	–	–	–	–	–	–	–	–	–	–	46	142	366	89	149	1433	37	96	13	8	7	25	9	16	5	4	7		
Heart	2	–	–	1	–	–	–	–	1	–	8	19	48	16	19	121	7	15	39	39	71	40	48	90	10	18	42		

For X-ray radiation, the equivalent dose in Sv equals the absorbed dose in Gy. A complete summary of the doses (with age groups of 1 and 10 years) is presented in the online version of the paper. AP: anteroposterior; LAT: lateral; PA: posteroanterior.

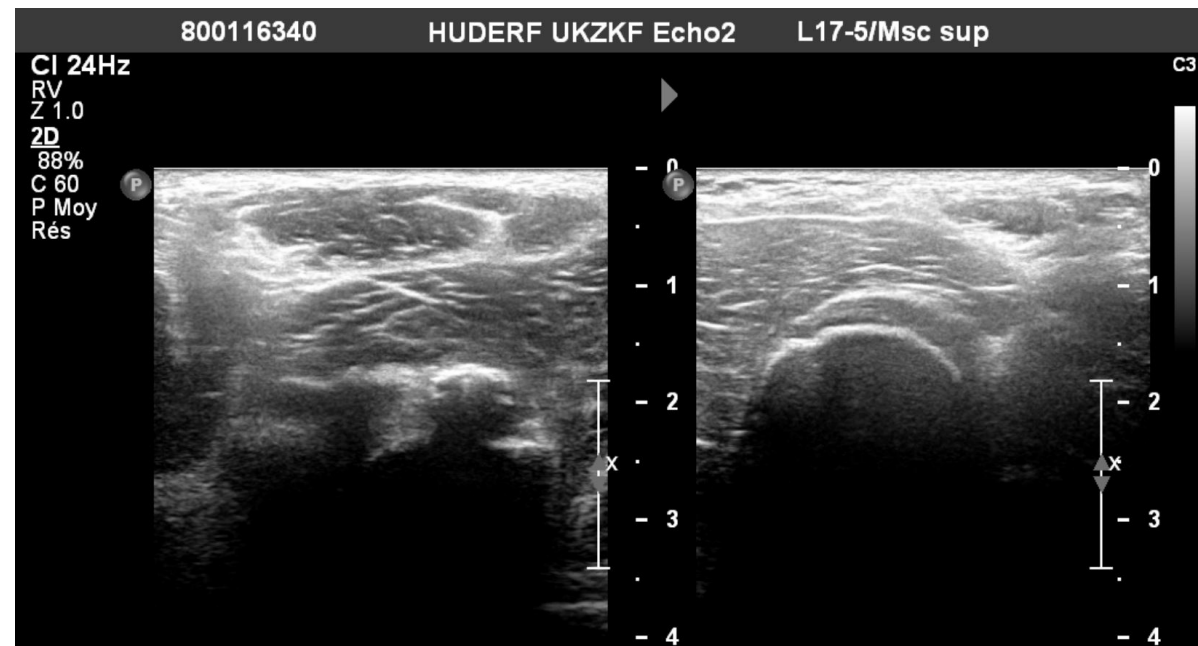
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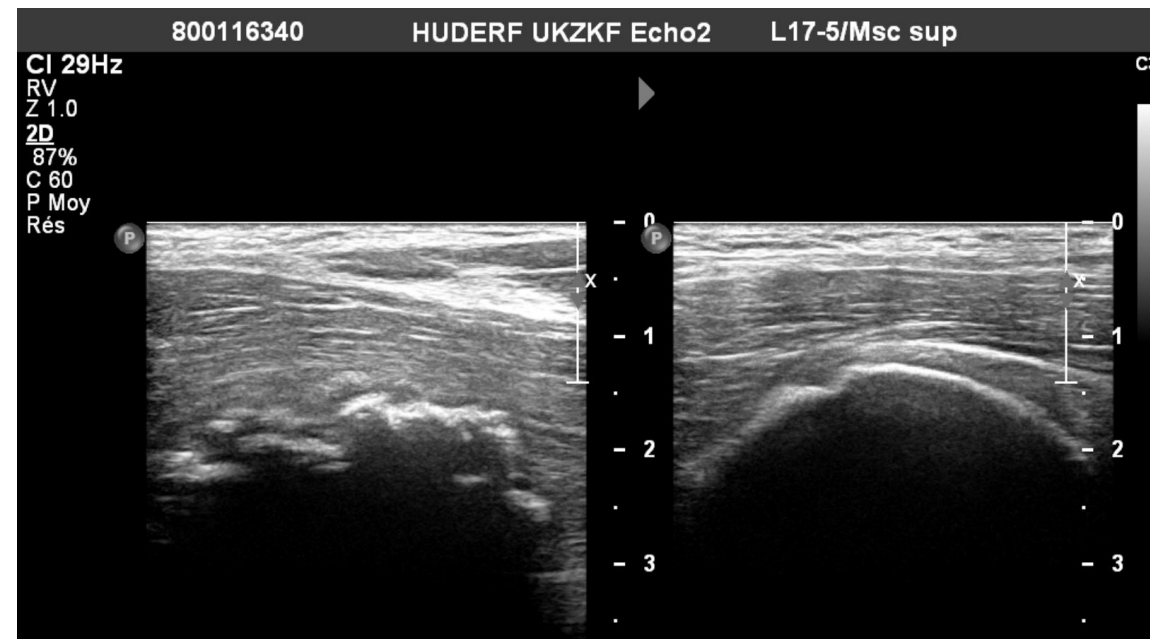
Echographie



Echographie



Echographie

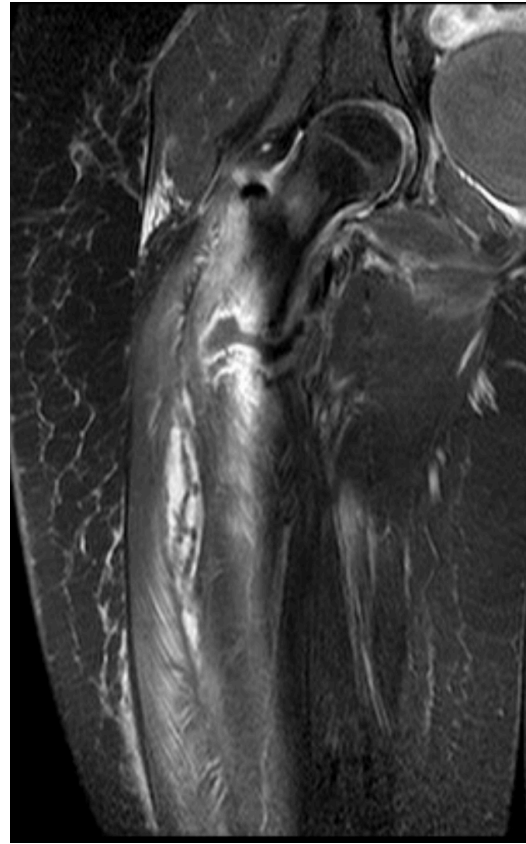


Scanner



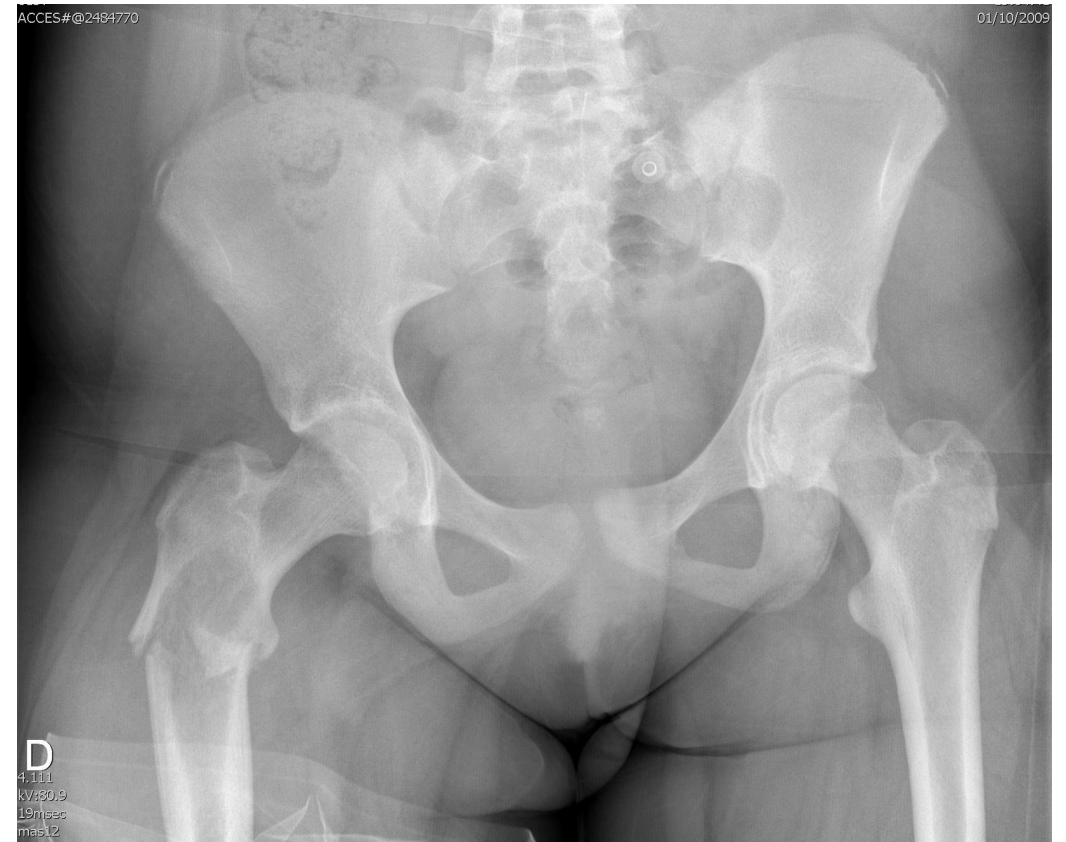
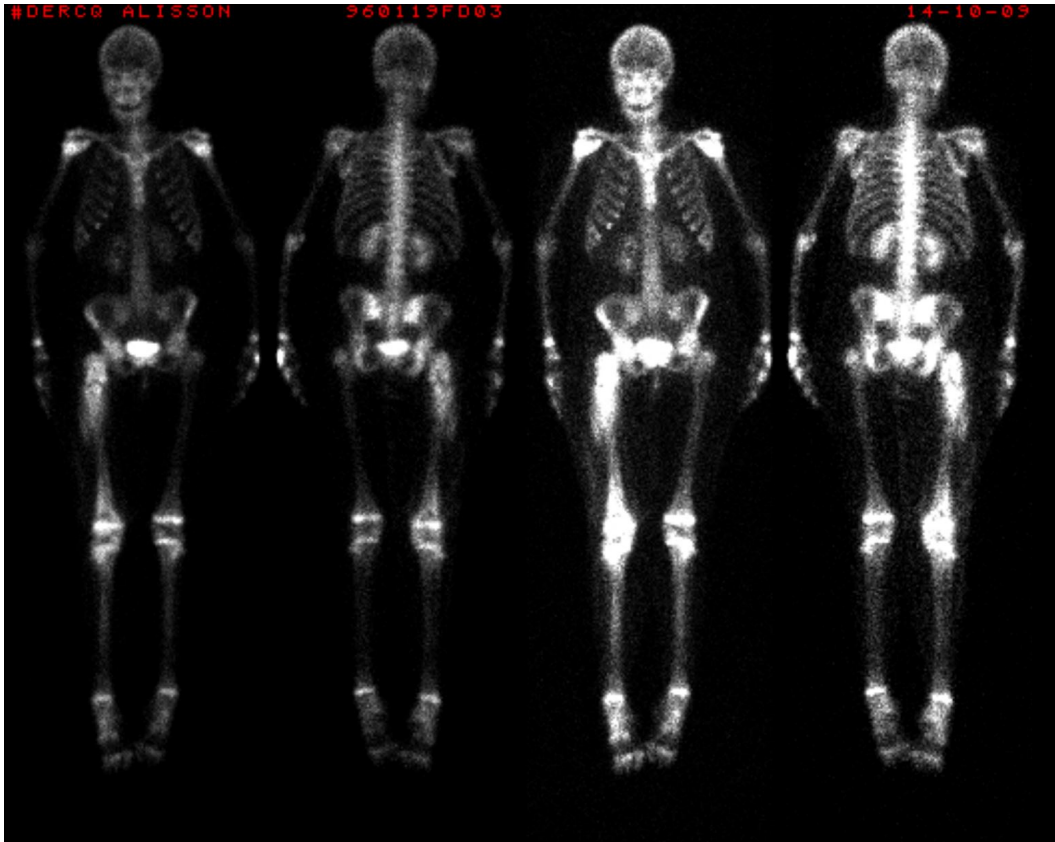
Scanner vs échographie



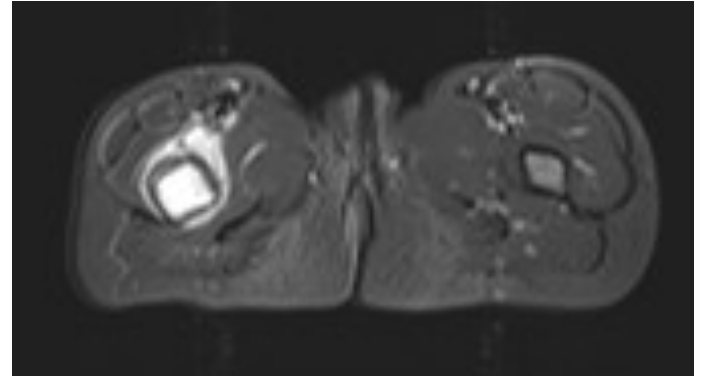
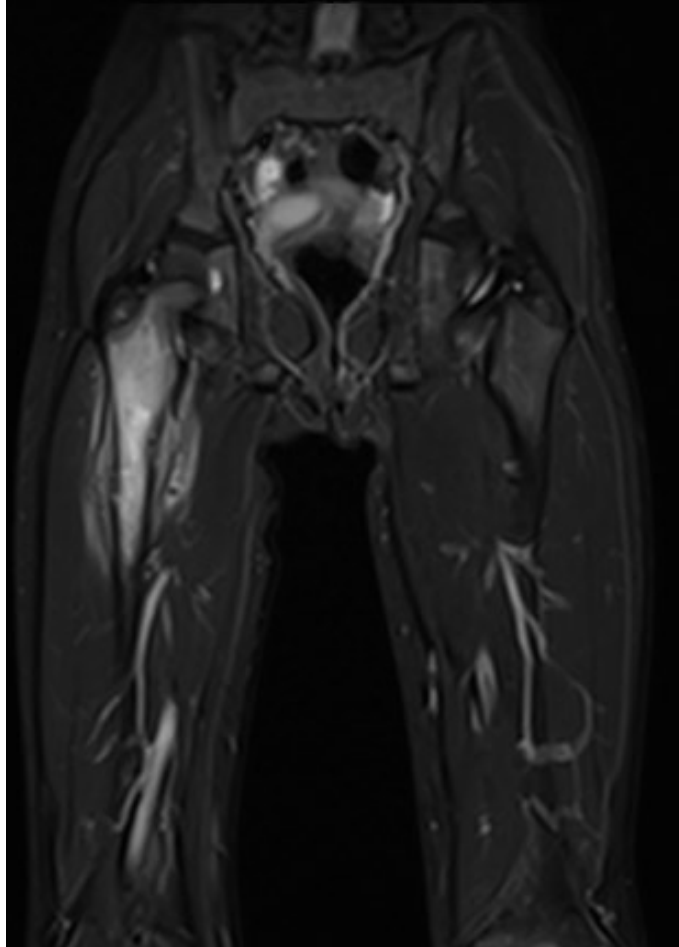


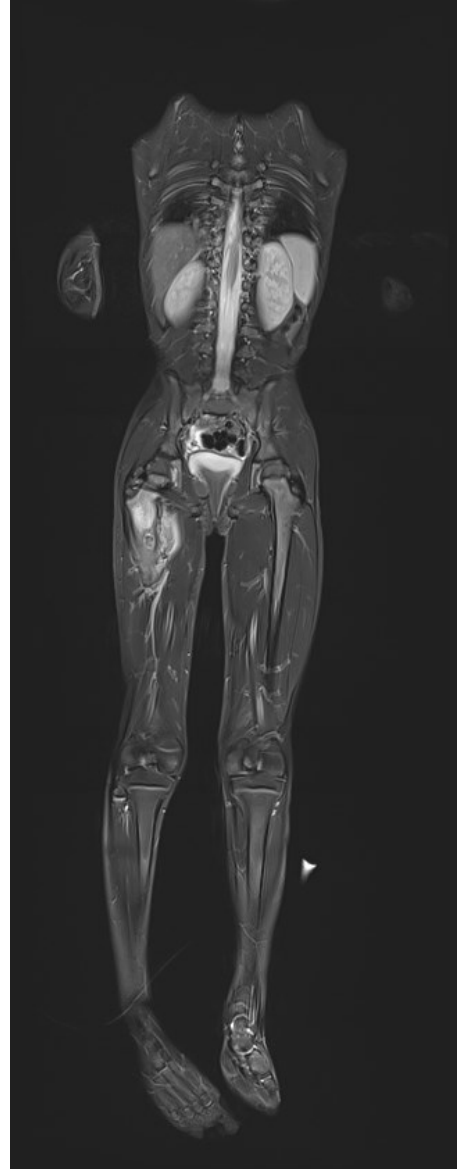
Scanner vs IRM

Scintigraphie alias «bone scan»

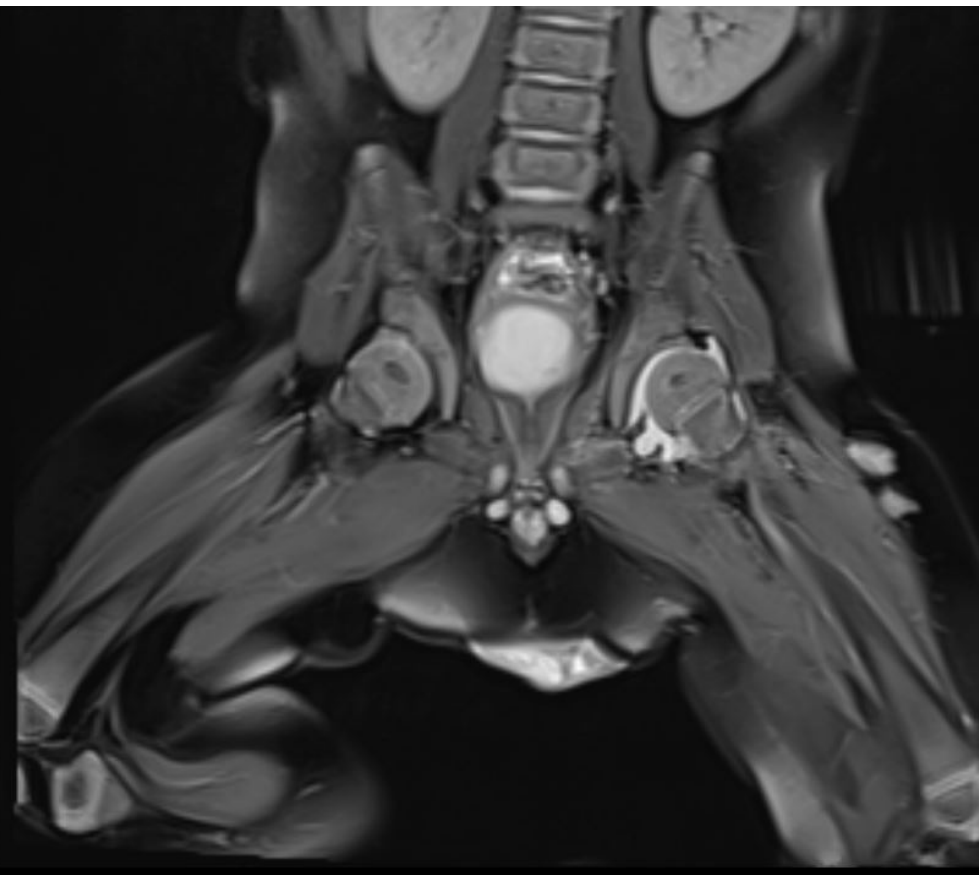
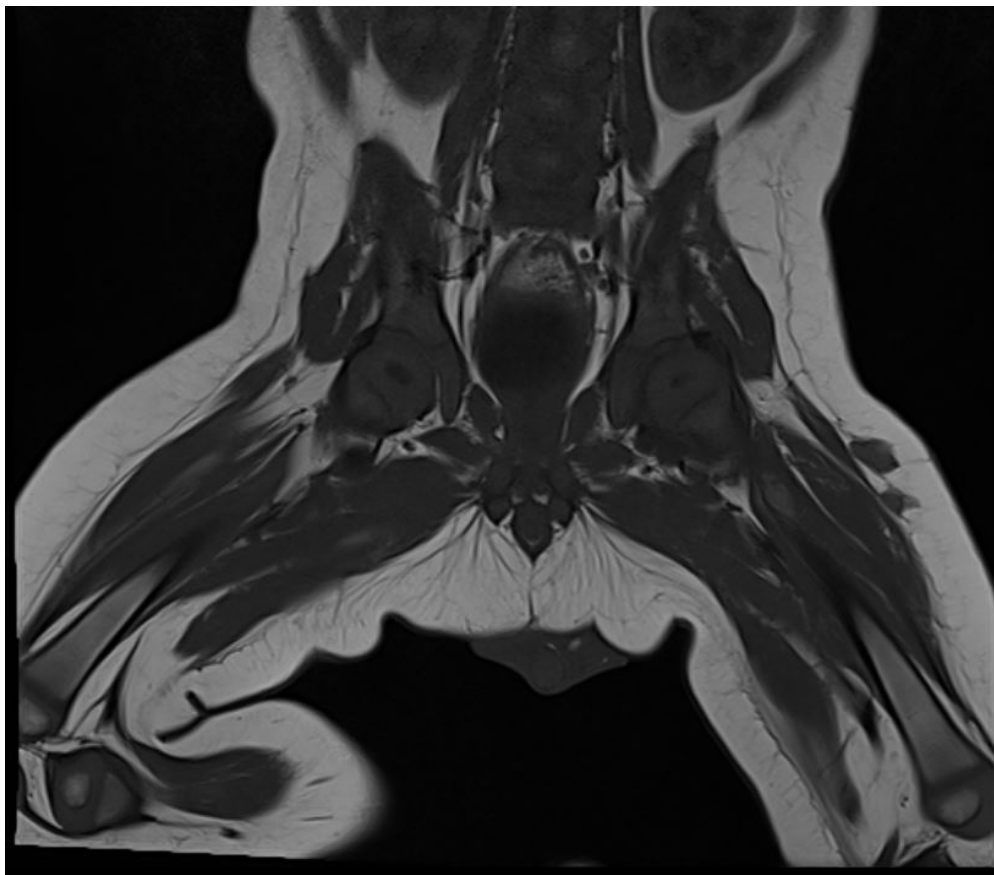








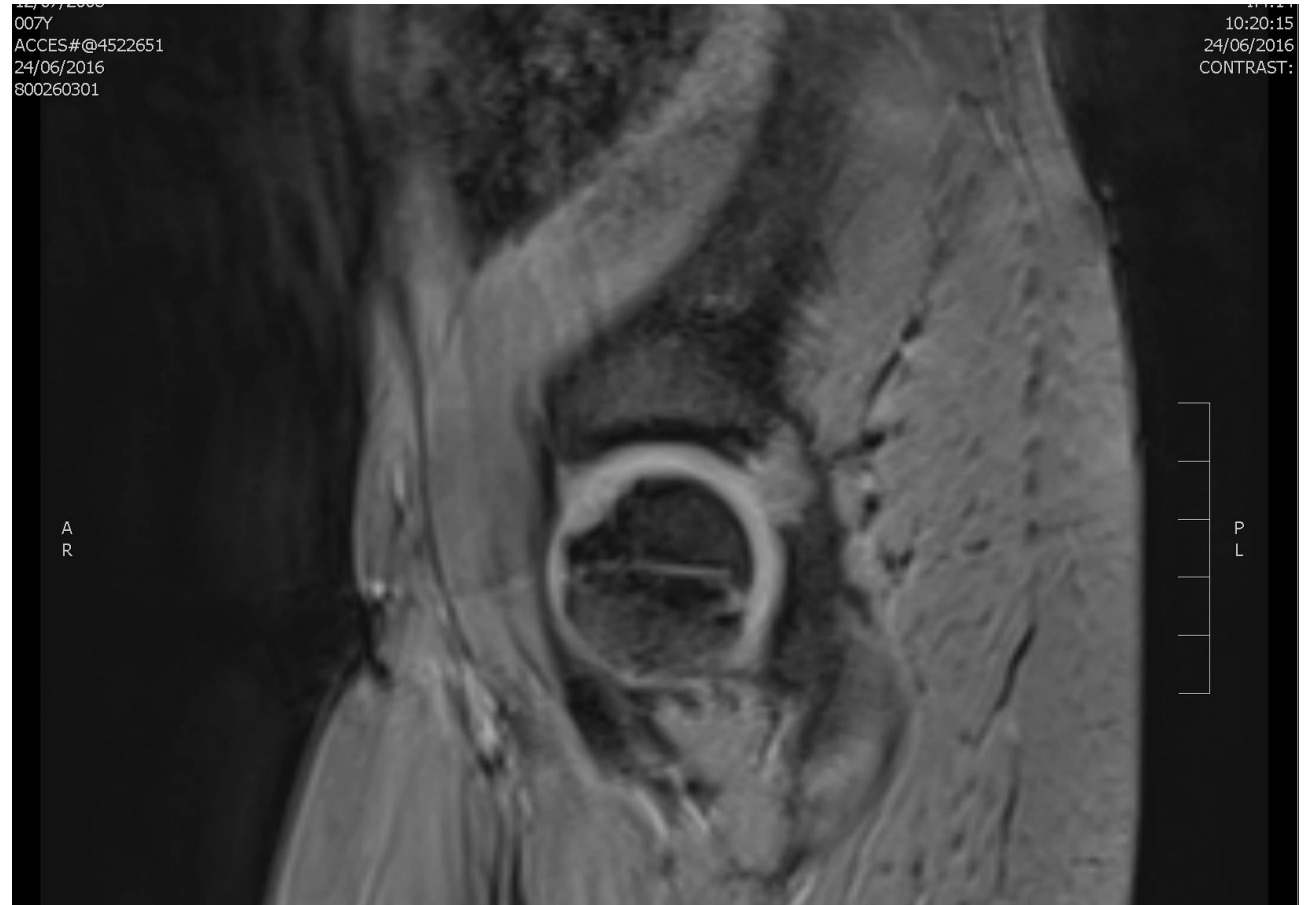
IRM



IRM



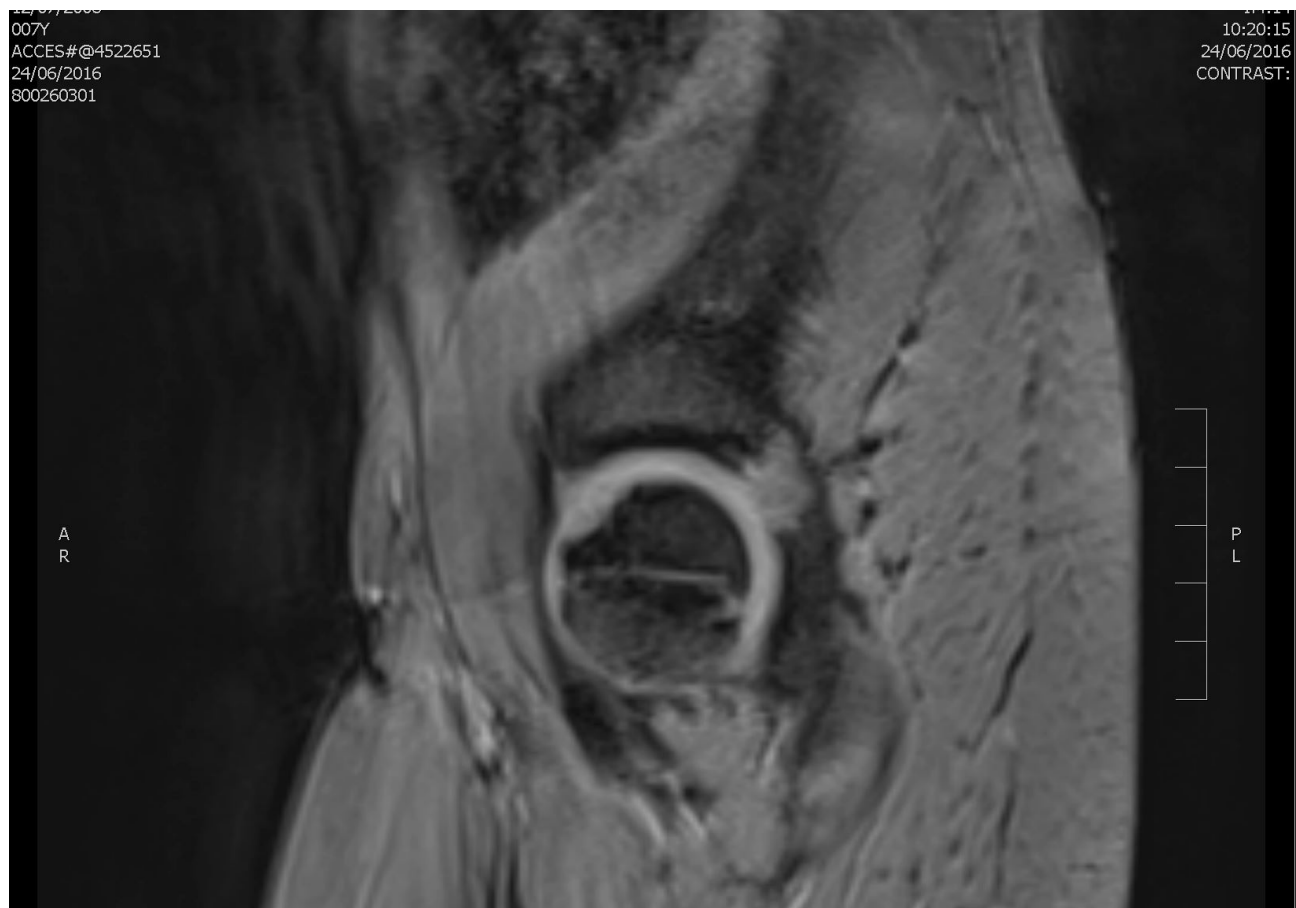
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IRM



IRM: “epiphyseal notch”



IRM: “epiphyseal notch”



LCP: cas 1

LCP
cas 1

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15:11:49
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CONTRAST:



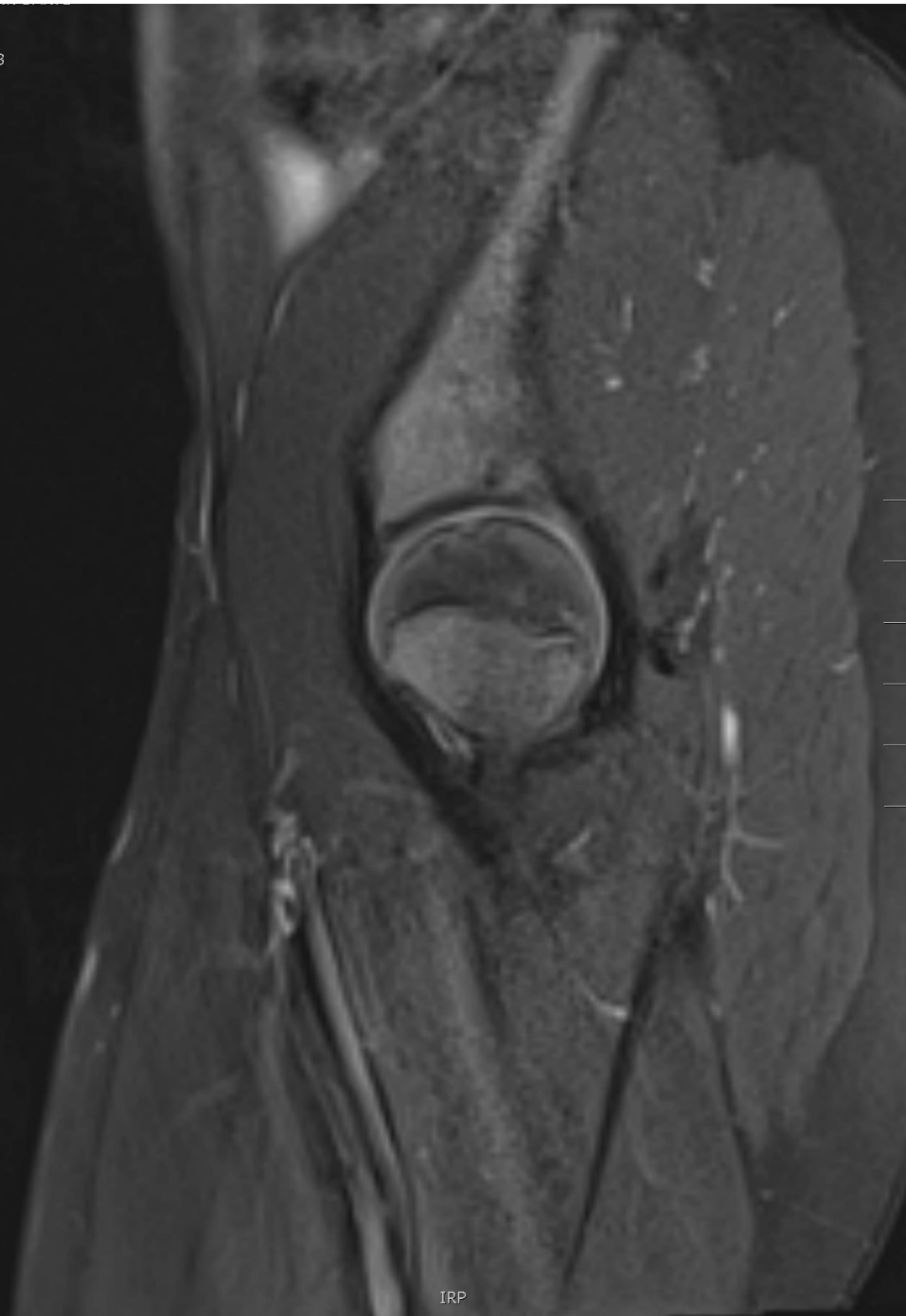
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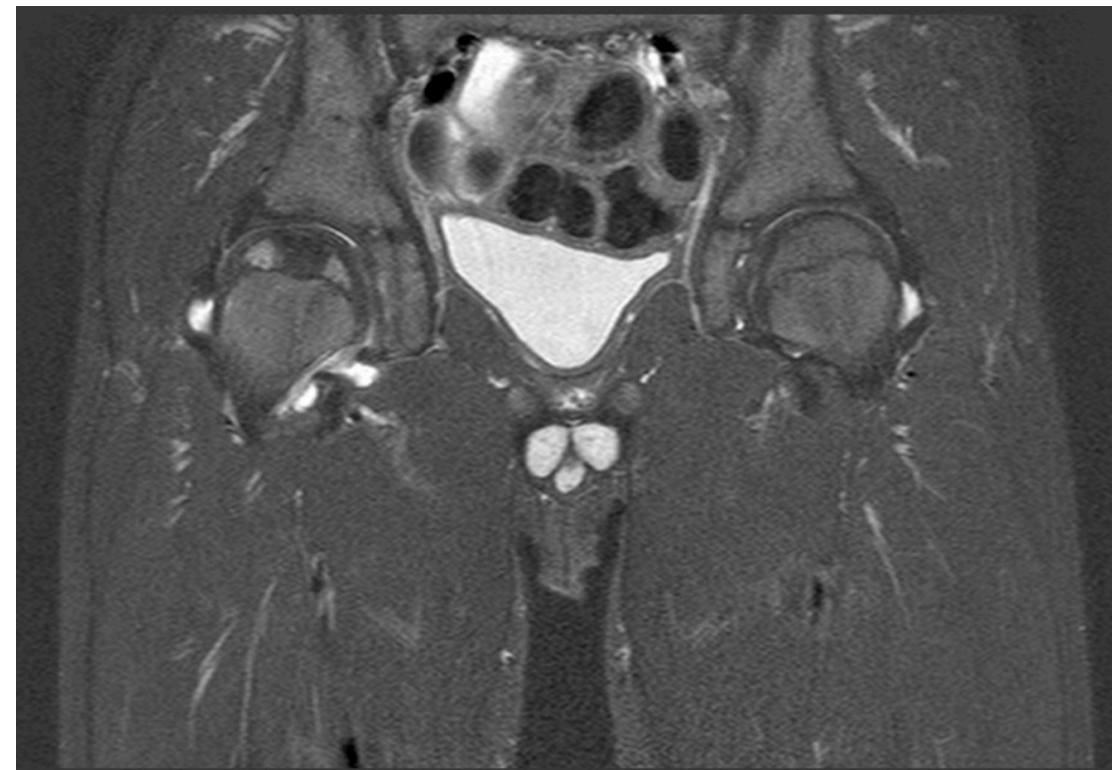
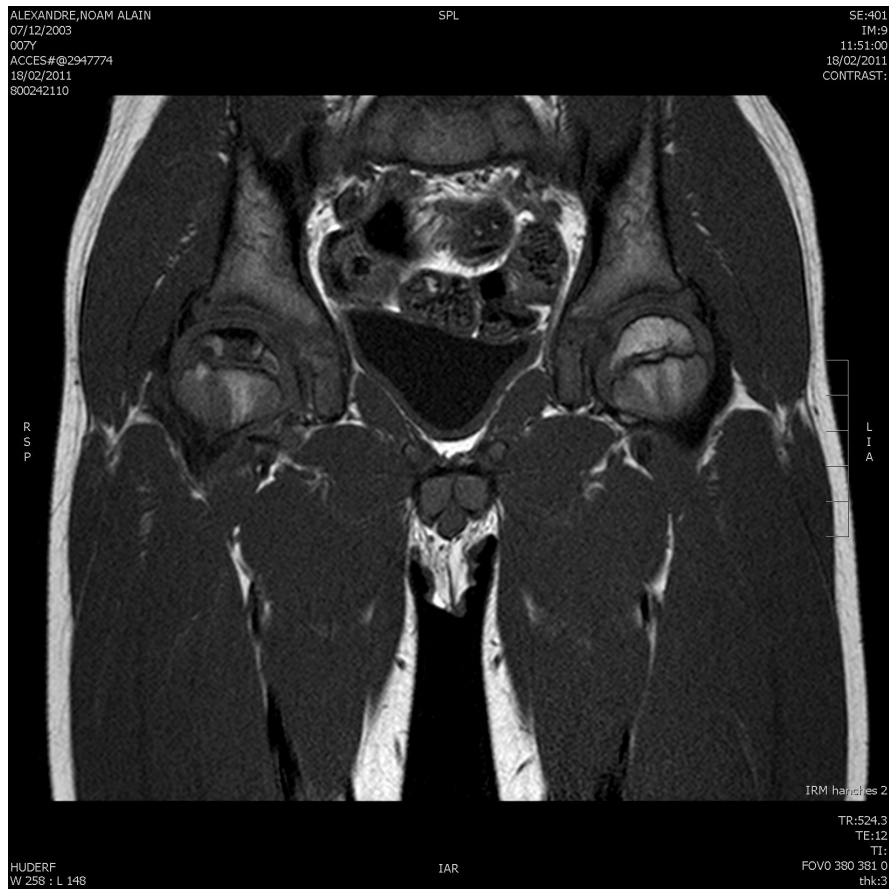
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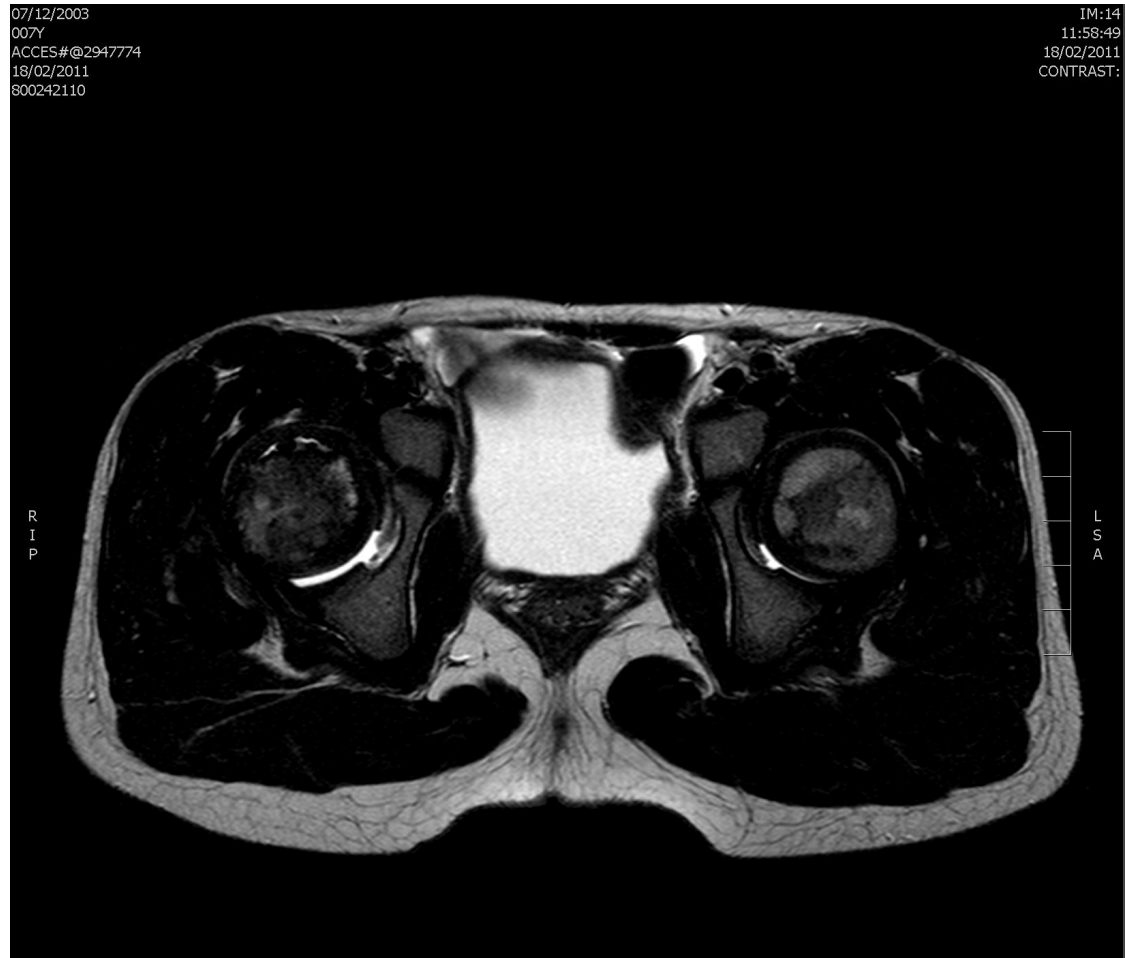
LCP:
Cas 2



LCP: cas 2



LCP: cas 2



LCP:
cas 2

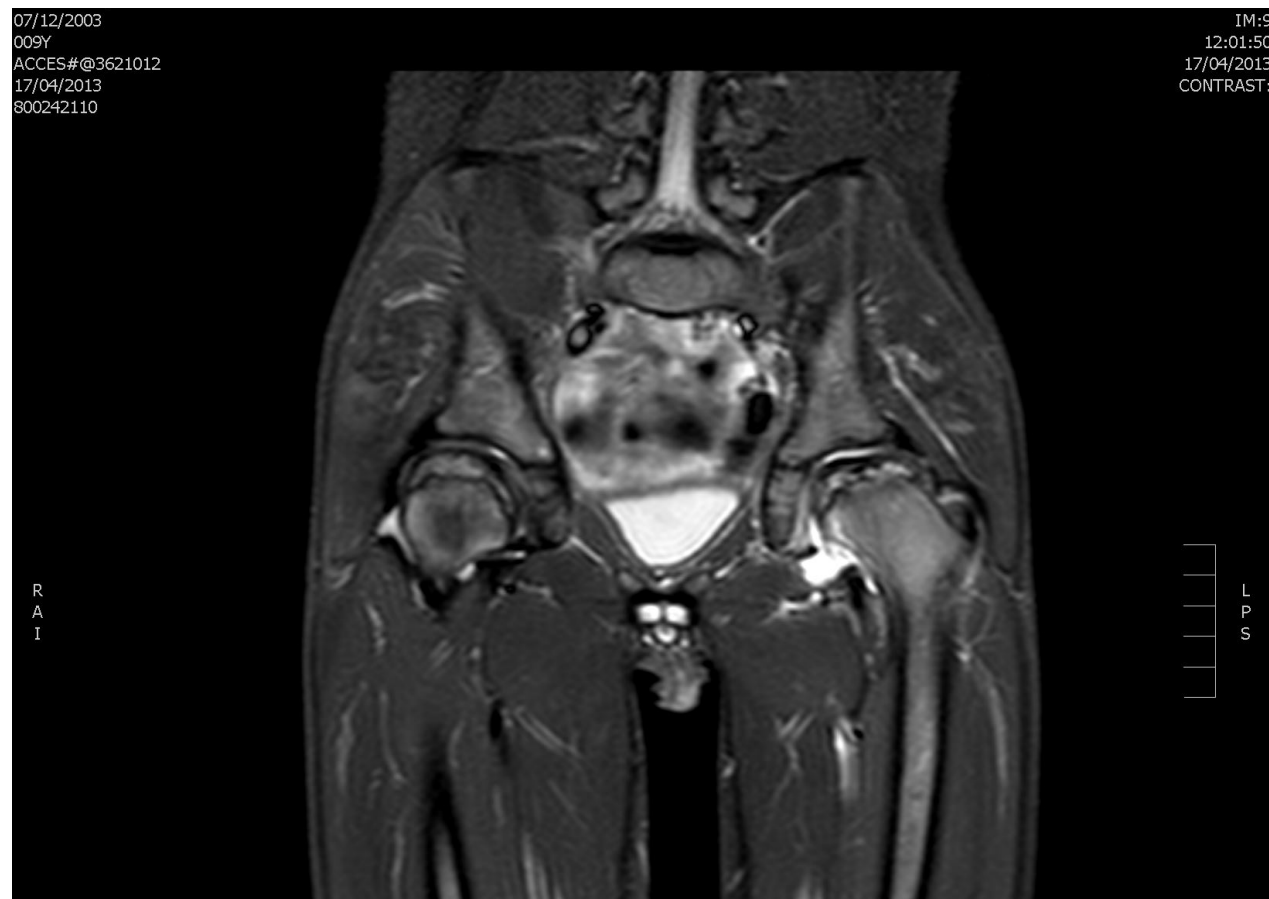
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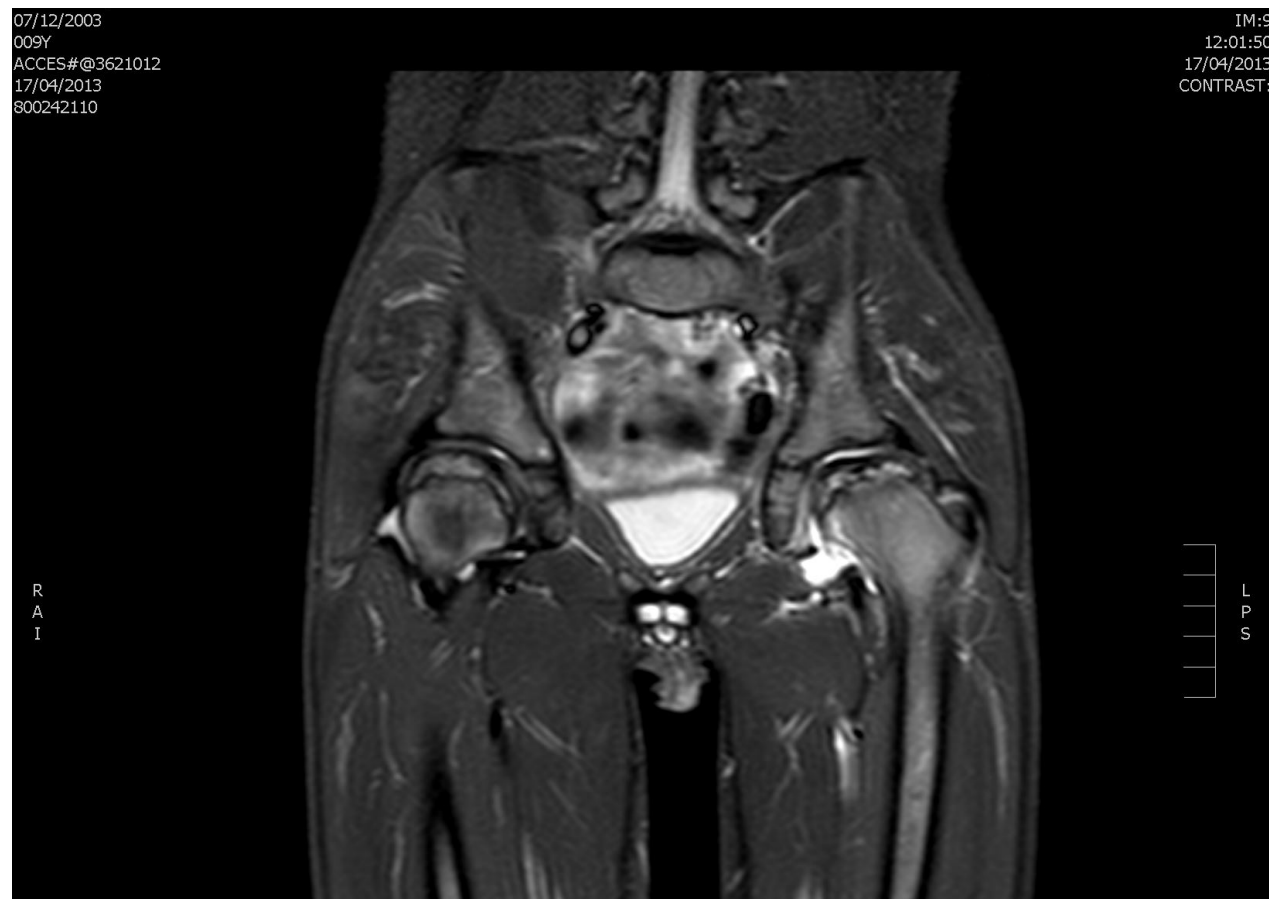
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LCP: cas 2



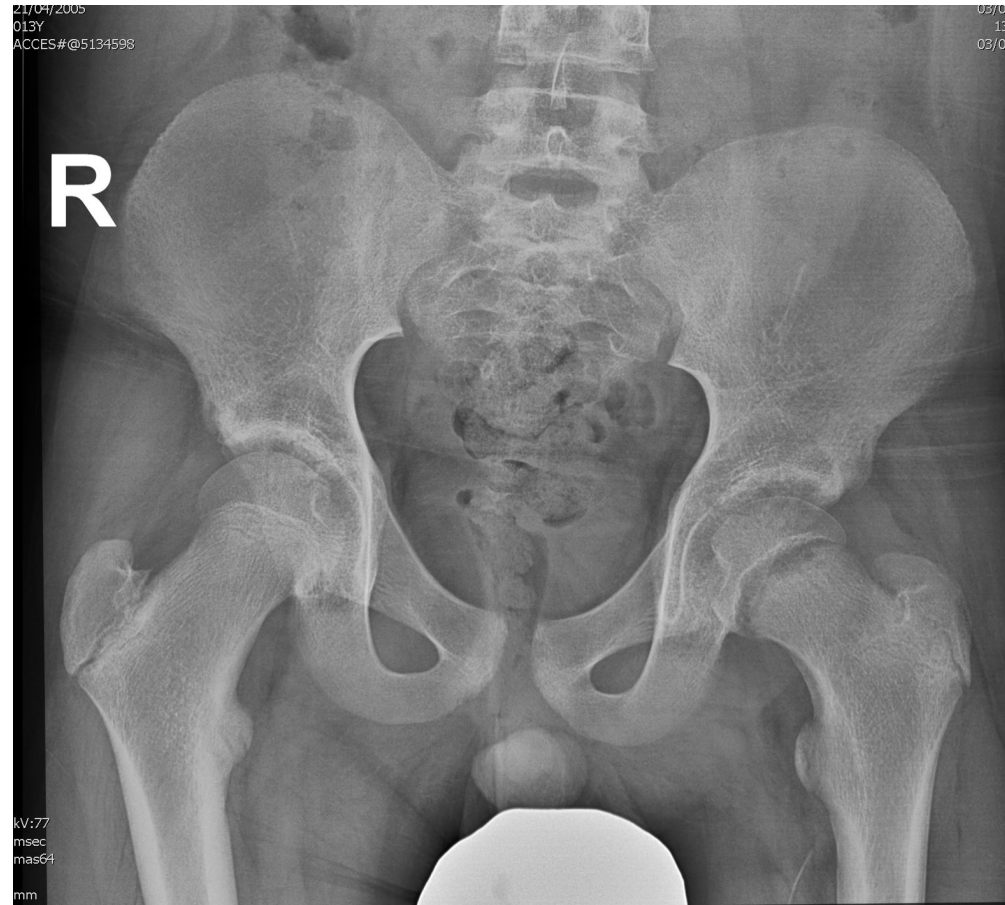
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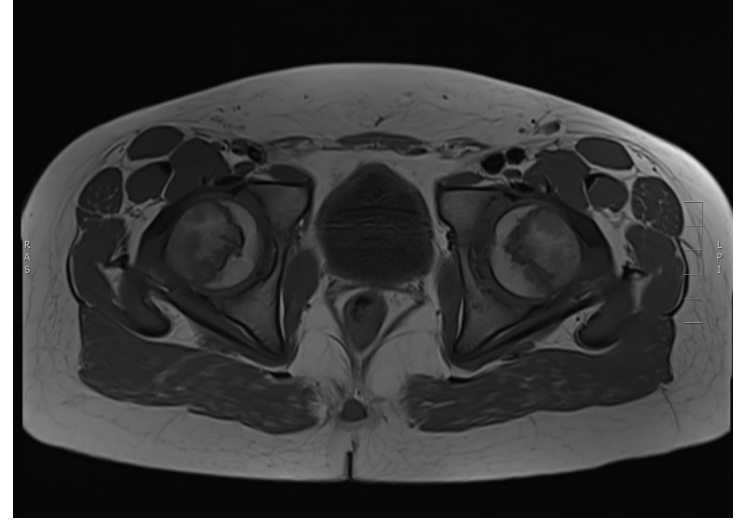
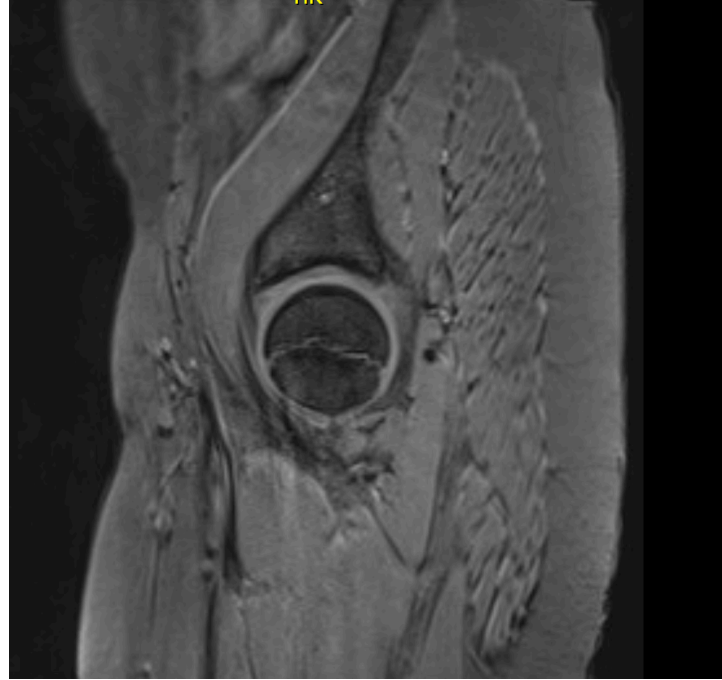


LCP: cas 2



Epiphysiolyse (SCF)





Epiphysiolyse (SCF)

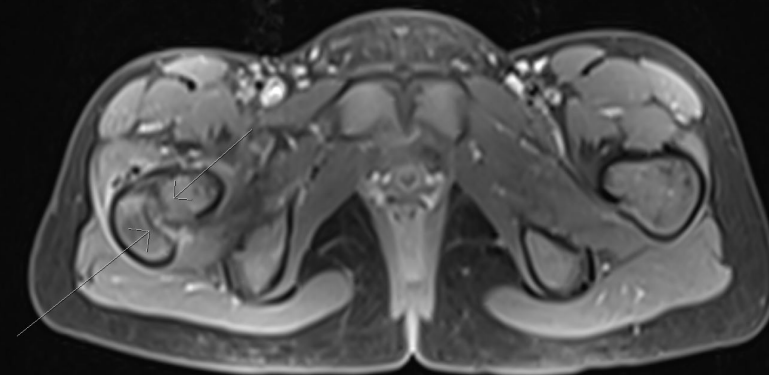


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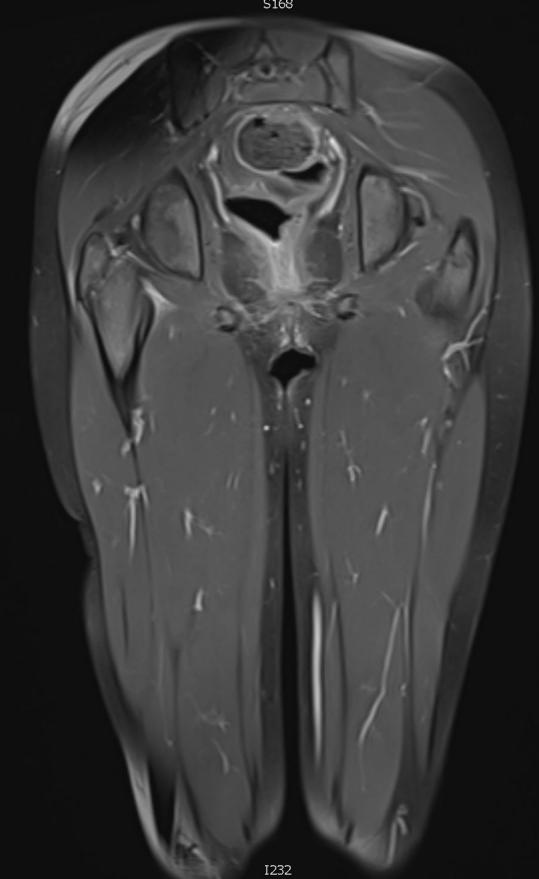
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 TR:67
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PI

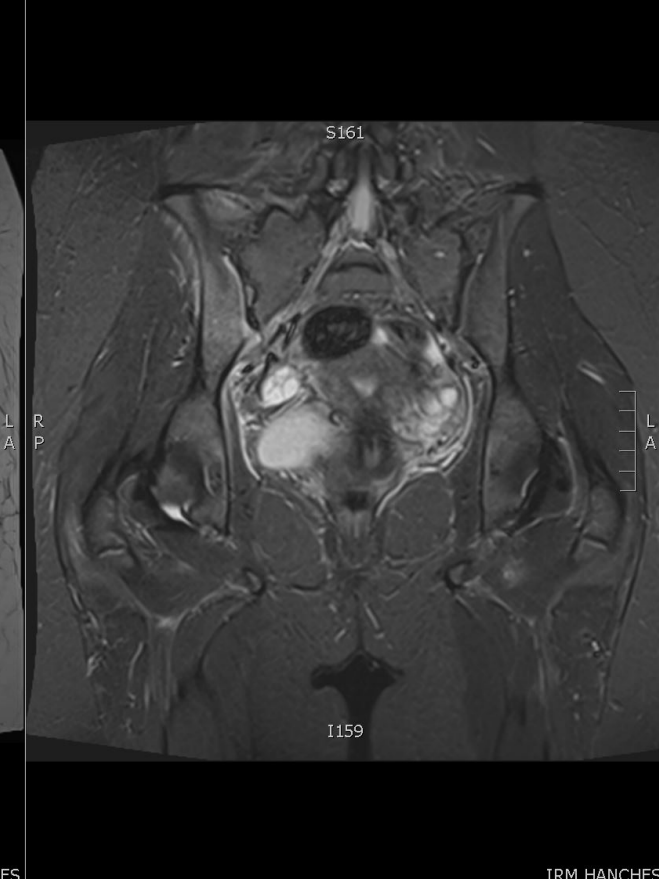
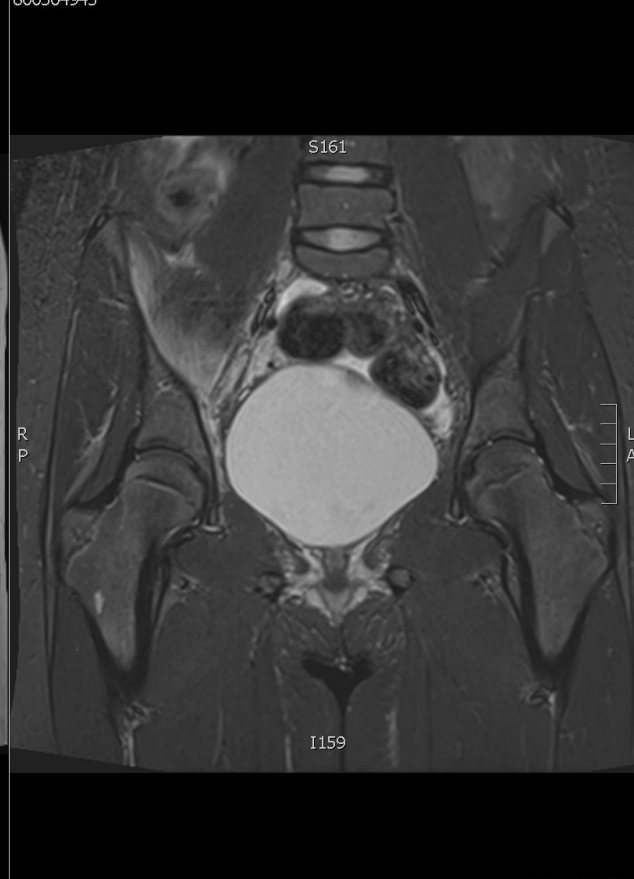
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Lésion apophyse



Articulations sacro-iliaques
(Sacroilite infectieuse)

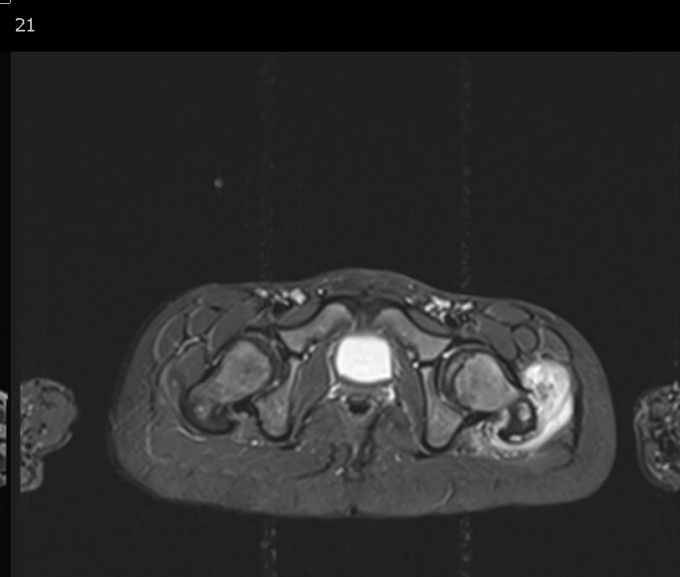
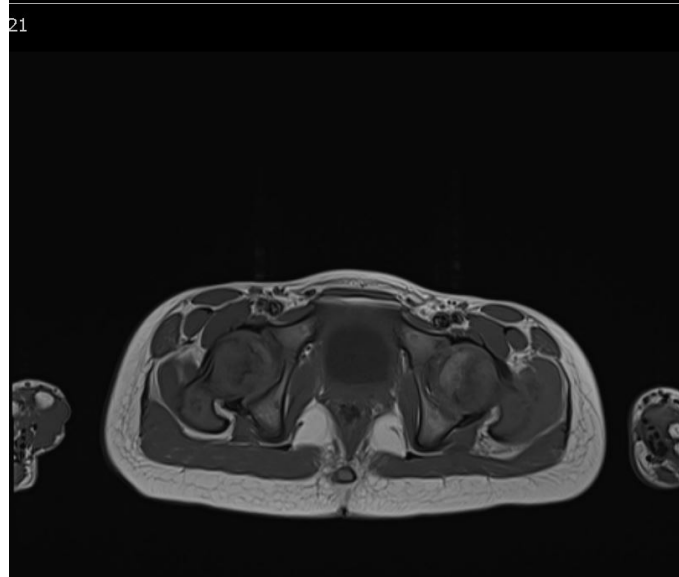
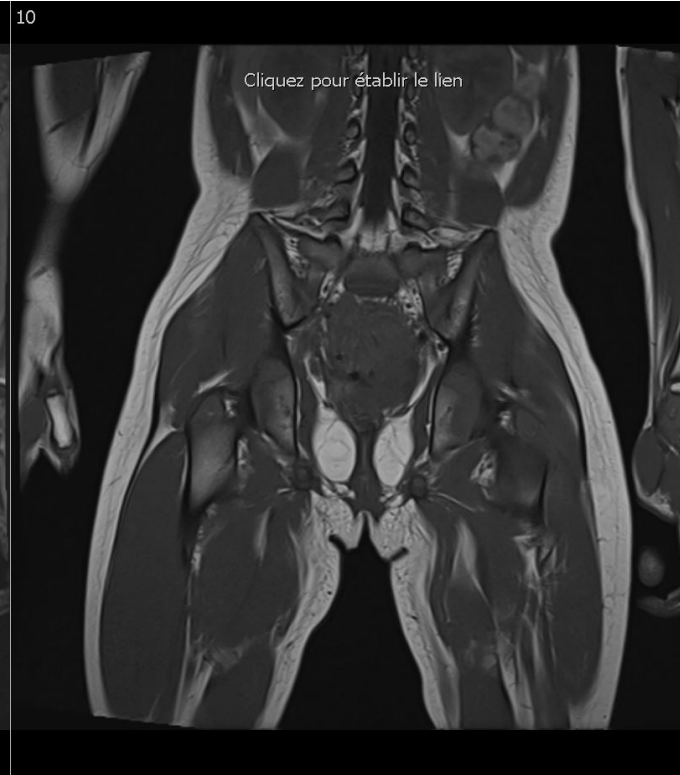
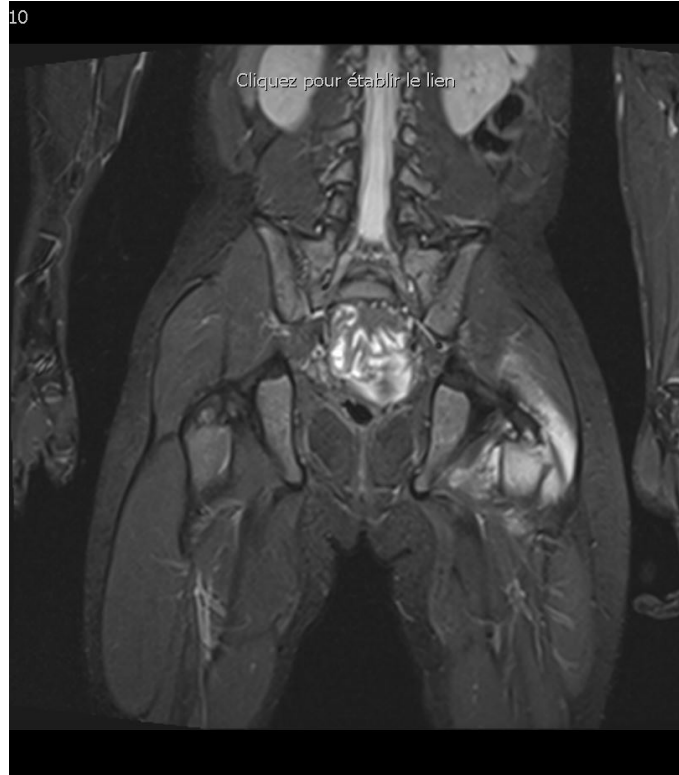


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TBC

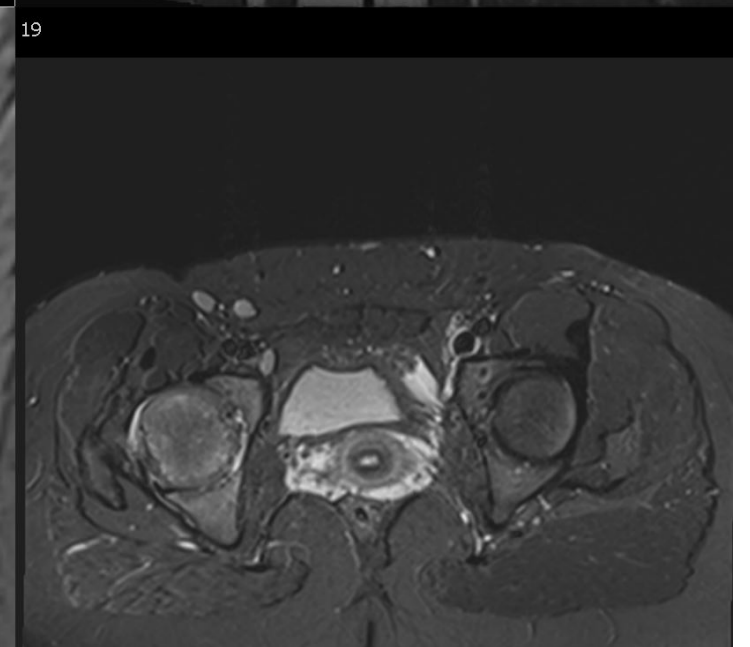
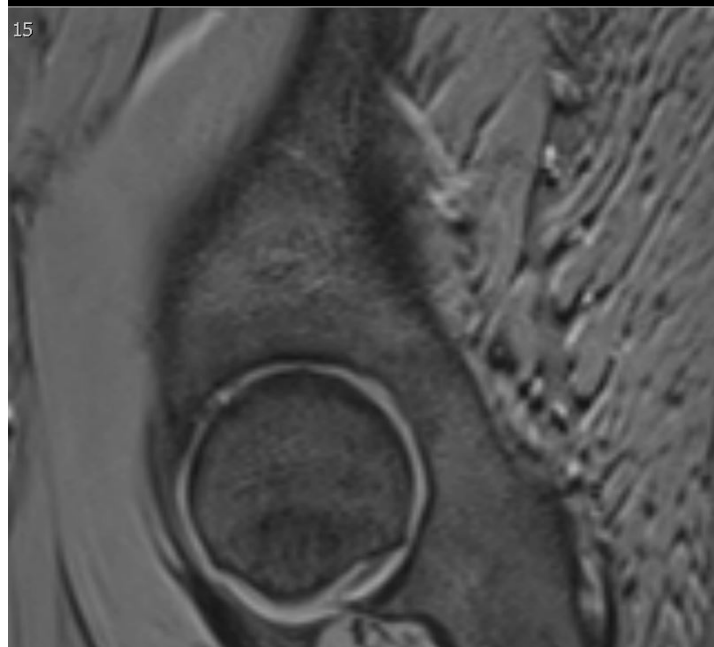
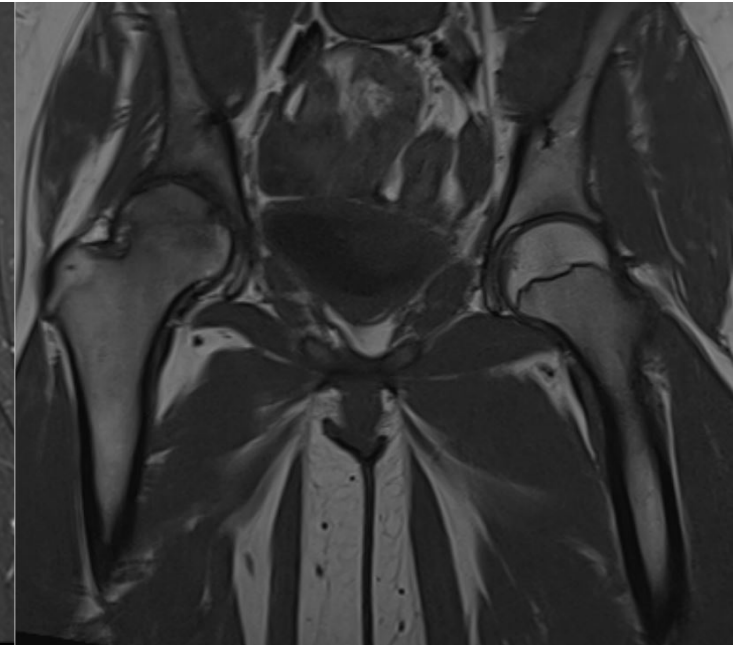
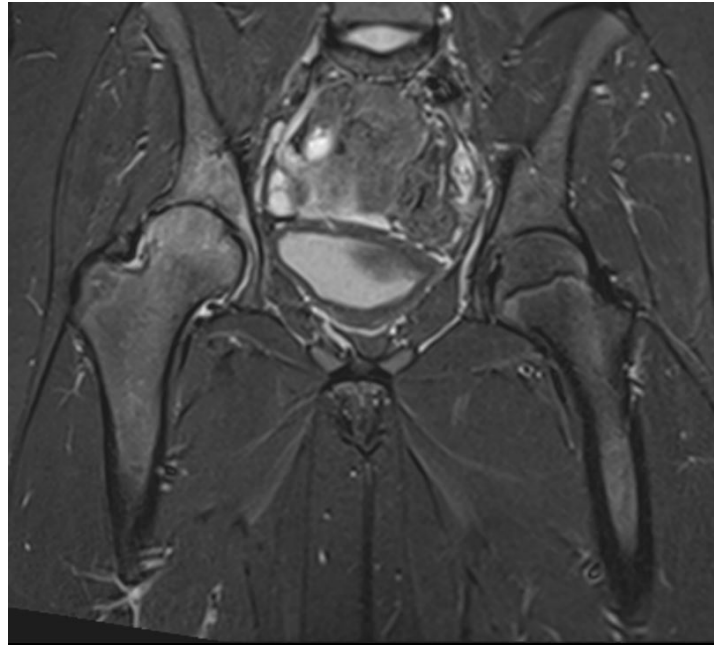
TBC





Arthropathie inflammatoire (JIA)

Arthropathie inflammatoire (JIA)



En résumé

Age, clinique (douleurs référées), laboratoire

Adapter technique à l'âge (complément d'examen)

ALARA mais avec les vrais notions de réduction de dose

CT lésions évolutives

Echographie outil fondamental

Place de l'IRM (lésions occultes et pronostique)

En dehors de la MAP de la DDH, l'échographie et l'IRM toujours avec l'exploration radiographique