

Definitions and delineation of CTV for preoperative rectal cancer

Local guidelines for University Hospital of
Northern Norway

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Indikasjon for preoperativ strålebehandling

- T₄ tumor
- Hvis avstand fra tumor eller patologisk lymfeknute vurdert ut fra MRI, til den mesorectale fascie, er lik eller mindre enn 3 mm. Dette er uavhengig av T-stadium

Strålevolumene

- **GTV**= tumor og patologiske lymfeknuter (LK). Defineres ut fra rectaleksplorasjon, MRI, rectoskopi, anorektal UL og evt cytoskopi. Hele circumferensen inkluderes i de nivåene rectum er affisert.
- **CTV₂** = GTV + 1,0cm. Det legges 1cm margin for subklinisk sykdom til både tumor og sannsynlig patologisk lymfeknute. PTV₂ og ITV₂ som under. ITV₂ er boosten; 2Gy x 2(4), totalt 4-8Gy
- **CTV₁** = CTV₂ + risikoområde for spredning til lymfeknuter
- **ITV₁** = CTV₁ + 0,5 cm margin unntatt fortil/anteriort der det legges en margin på 1,0 cm pga bevegelige strukturer; tarm, blære, vagina, prostata. Middeldosen til ITV er 100% med min.verdi på 95% og max.verdi på 107%. 2Gy x 23, totalt 46Gy
- **PTV₁** = CTV₁ + total margin på 0,8 cm, ventralt 1,1 cm. PTV skal ha en minimumsdekning på 90%.
 - Totalmargin = $(\text{Intern margin}^2 + \text{Setup margin}^2)^{1/2}$. Setup margin = 5 mm

CTV₁

CTV₁ inneholder

1. GTV (primærtumor og patologiske lymfeknuter vurdert ut fra MRI)
2. CTV₂ , dvs GTV + 1 cm for subklinisk mikroskopisk sykdom
3. De locoregionale lymfeknutene, defineres senere

Skjelett, ligamenter og muskulatur skal ikke inkluderes hvis ikke direkte innvekst mistenkes. Dersom CTV₂ inkludere bindevev, skal det ikke beskjæres da dette altså er subklinisk sykdom

Rectum's lymfedrenasje

- De aktuelle lymfeknutene-kjedene i bekkenet er hovedsakelig lokalisert langs blodkarene.
- Lymfe fra rectum dreneres hovedsakelig oppover til LK langs iliaca communis via iliaca interna, og mesenterica inferior via rectalis superior
- Nedre del av rectum har kloakal opprinnelse og dermed lymfedrenasje til de laterale LK. Ved lav tumor, < 5 cm fra anal verge, er det spesielt viktig å dekke de laterale og caudale LK
- Iliaca externa drenerer hovedsakelig underekstremitetene og metastaser fra rectumcancer er svært sjeldent påvist i dette området

De locoregionale lymfeknutene (LK)

- **Cranielle LK;** a. rectalis superior fra a. mesenteria inf. aa. iliaca int fra aa. iliaca com.
- **Mesorectale LK;** mesorectum og mesorectale fascie
- **Posteriore LK;** presakrale, a. rectalis sup
- **Laterale LK;** aa. iliaca int, aa. rectalis media, aa. obturatoria
- **Caudale LK;** ved lav tumor, dvs < 5 cm fra anal verge;
 - Inferiore LK; fossa ischiorectalis med aa. pudenda int og sphincter ani. *aa. pudenda int er knapt synlig på CT*
 - Inguinale LK; vurderes inkludert i CTV dersom tumor ligger veldig lavt, dvs caudalt for linea dentata. *De superficielle inguinale LK følger ingen blodkar.*

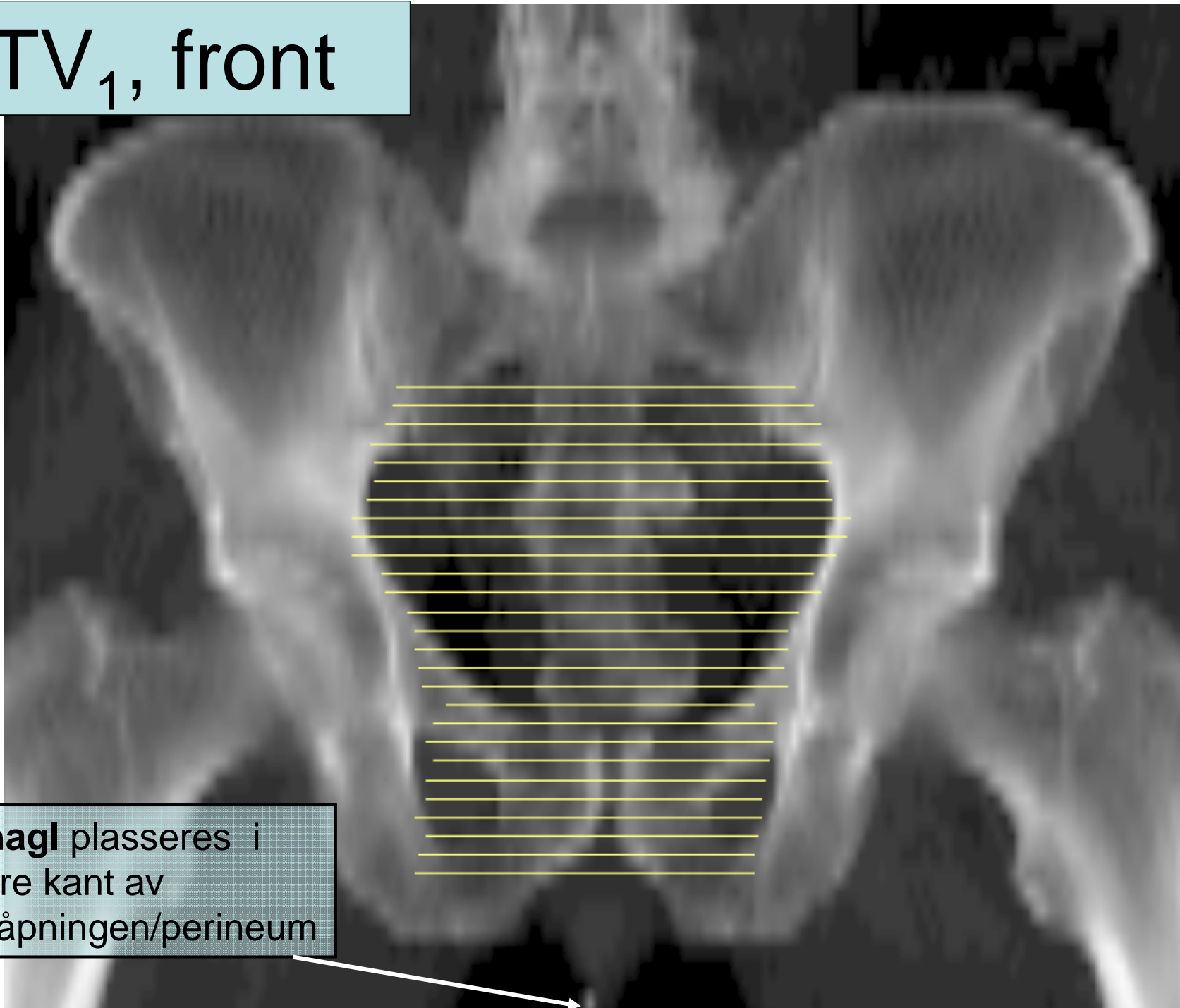
arteria iliaca interna, anatomi

- a. iliaca com. deles i a.iliaca int. og ext.
- a. iliaca int. avgir grener til:
 - a. sacrale lat.
 - a. glutea sup.
 - a. glutea inf
 - a. obturatoria
 - a. rectalis media
 - a. pudenda int går gjennom "Alcock's canal" i membrana obturatoria og danner deretter
 - a. rectalis inferior

Referanser

1. Syk E. & al. Br J Surg, 2006; 93(4):506-7
2. Roels S. & al. Int J Radiat Oncol Biol Phys, 2006; 65(4):1129-42
3. Canessa C. & al. Dis Colon Rectum, 2004; 47: 297-303
4. Portaluri M & al. Cancer Radiother, 2004; 8(4): 222-9
5. Portaluri M & al. Int J Radiat Oncol Biol Phys, 2005; 63(4):1604-12
6. Taylor A & al. Int J Radiat Oncol Biol Phys, 2005; 63(5):1101- 7
7. Pocket Atlas of Sectional Anatomy, 2.ed, Thieme. Moeller & Reif.
8. Sobotta; Atlas of Human Anatomy

CTV₁, front



Blyhagl plasseres i fremre kant av analåpningen/perineum

CTV₁, sideplan

★ Øvre fremre kant av S1

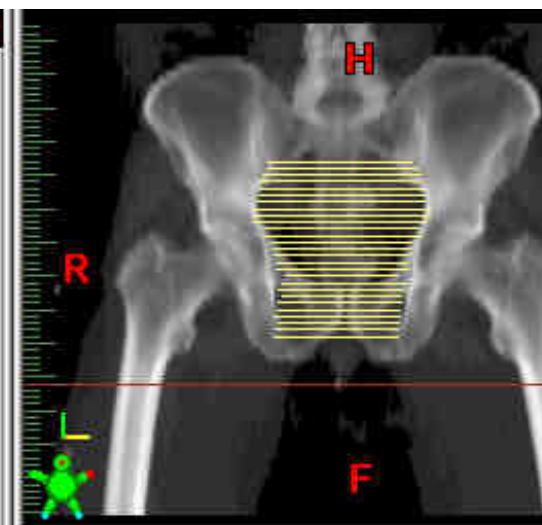
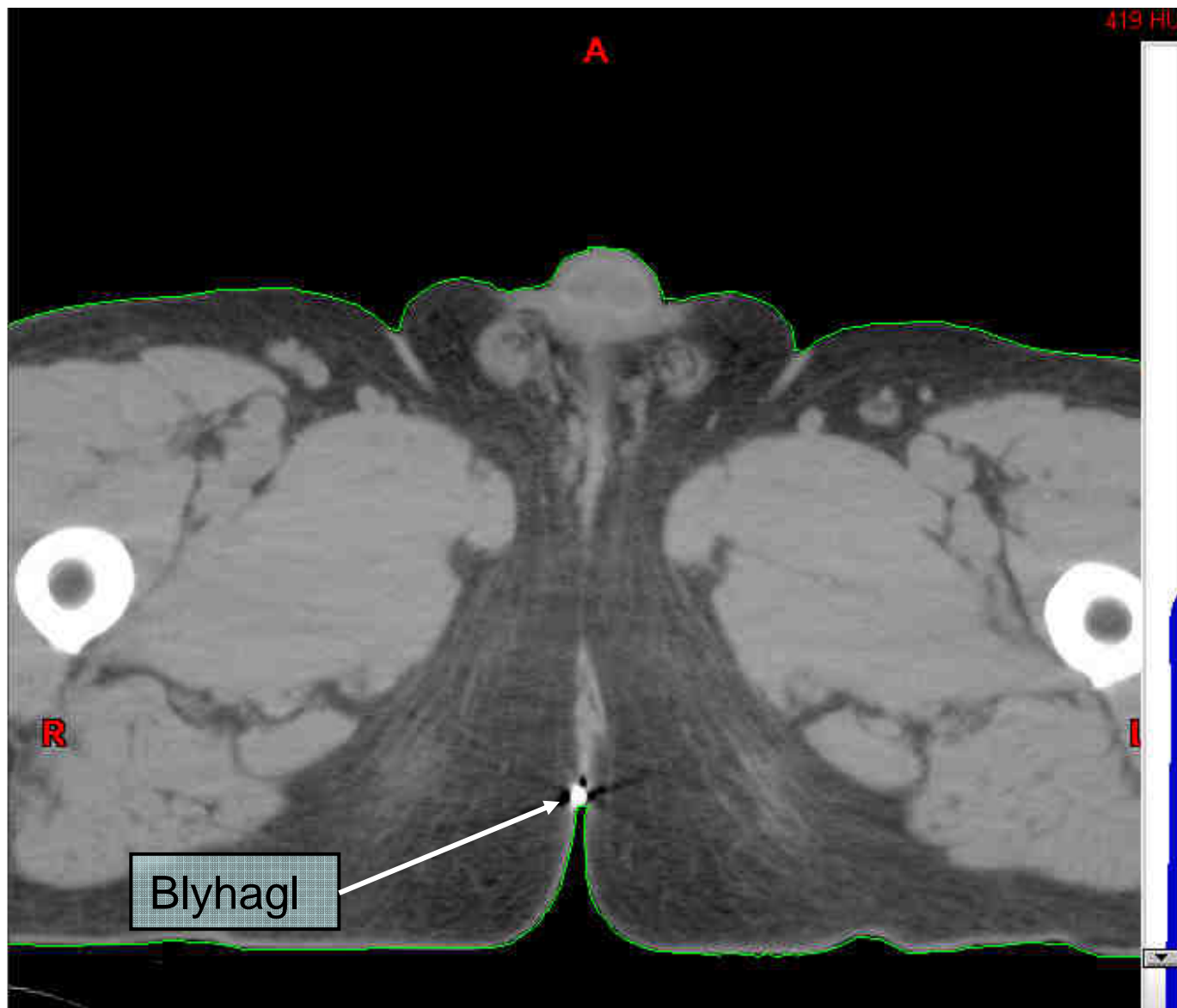


Blyhagl

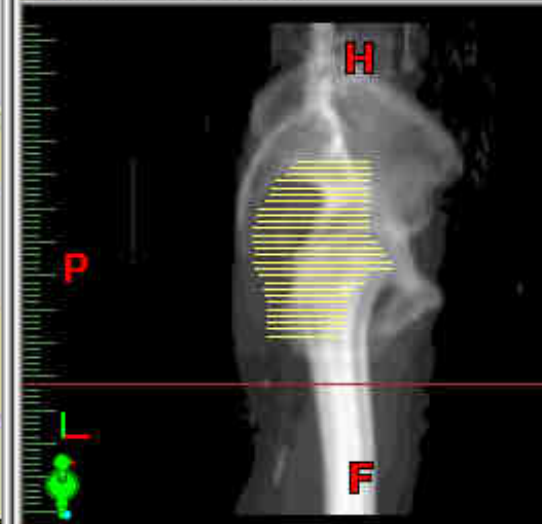
3 cm

Nederste snitt av CTV₁ ligger 3 cm cranielt for blyhaglet ved høysittende tumor; dvs > 5 cm fra anal verge.

Ved lav tumor, tegnes CTV₁ ned til blyhaglet

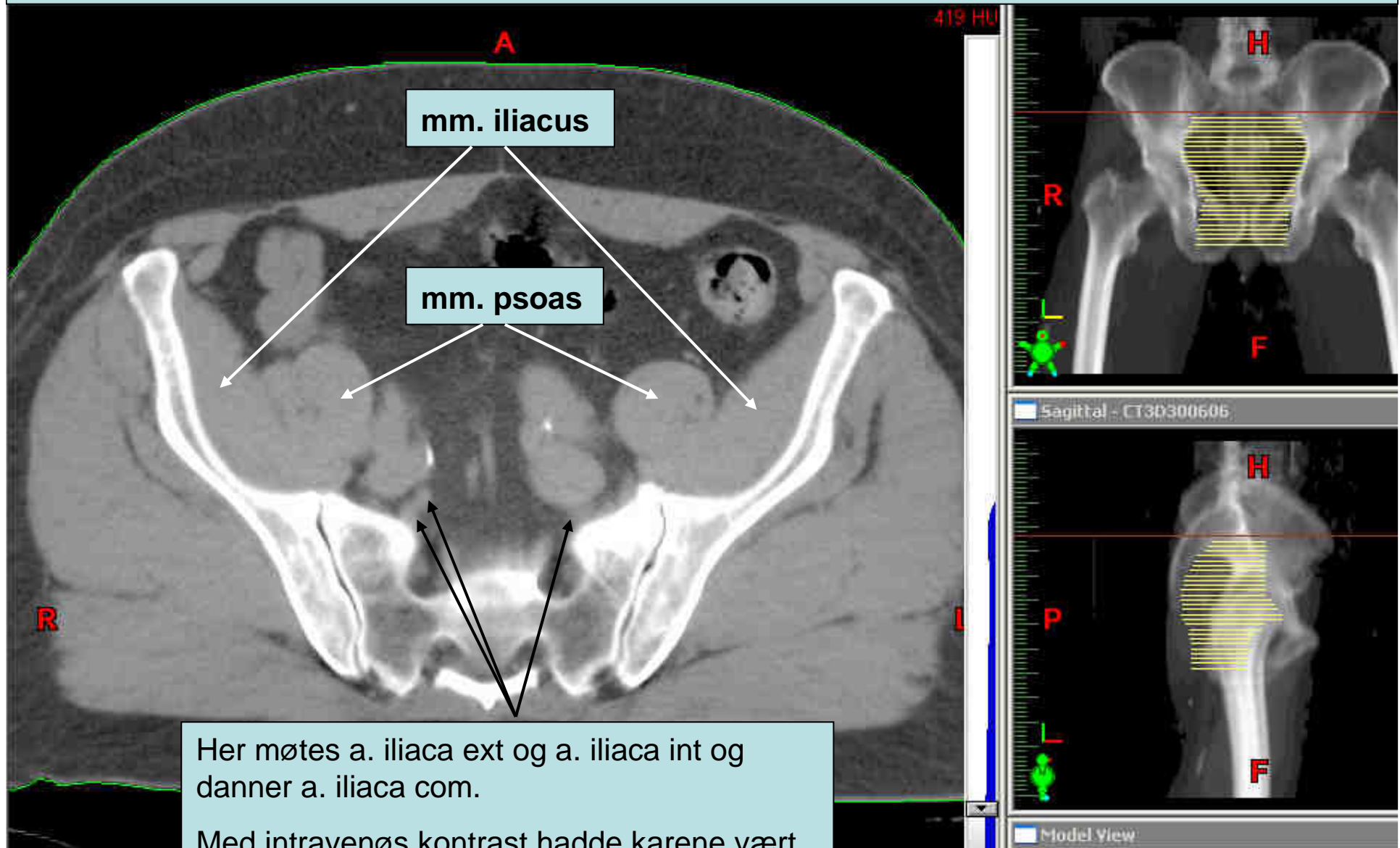


Sagittal - CT30300606



Model View

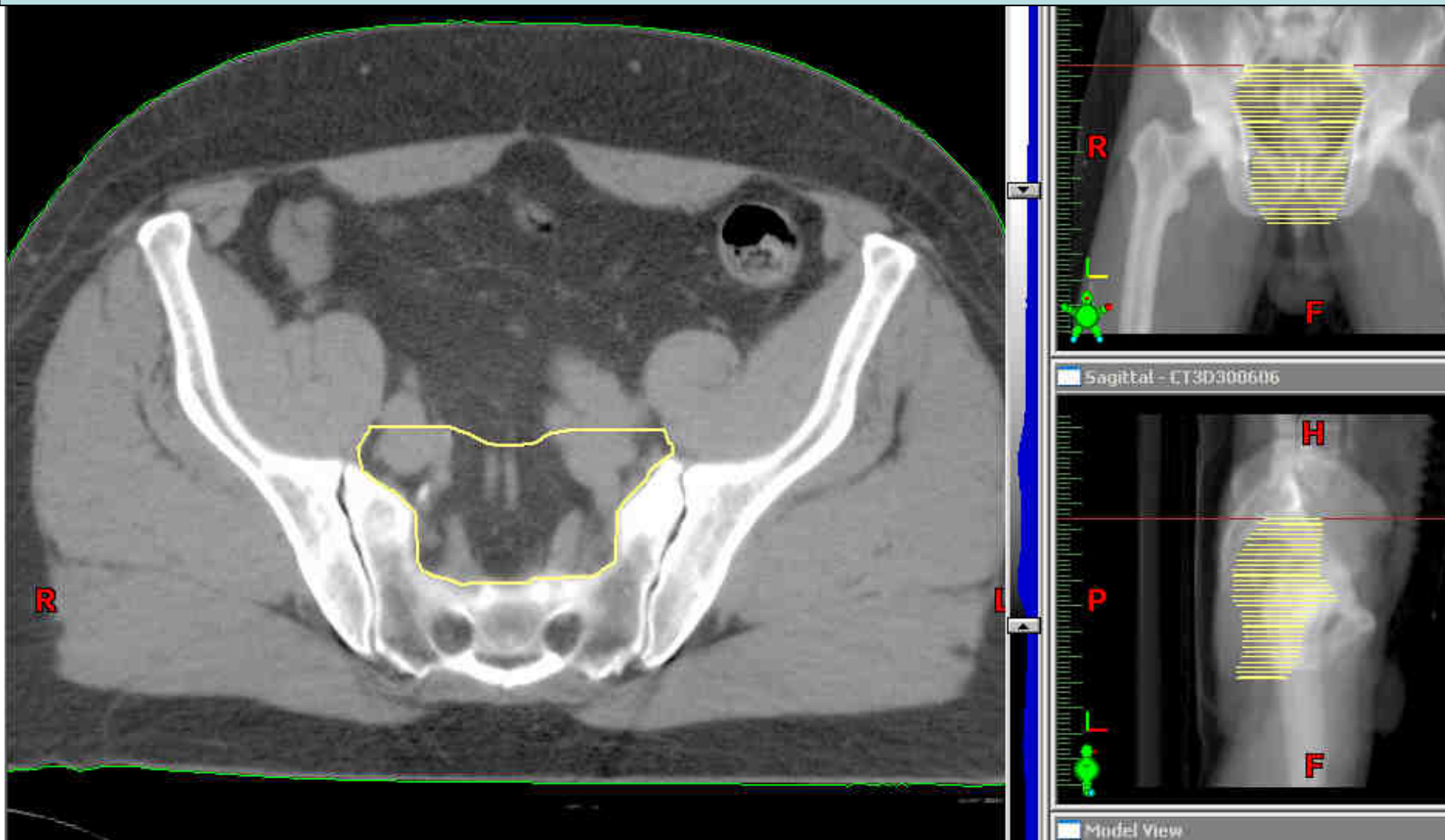
CTV₁'s cranielle grense; a. iliaca-bifurcaturen.

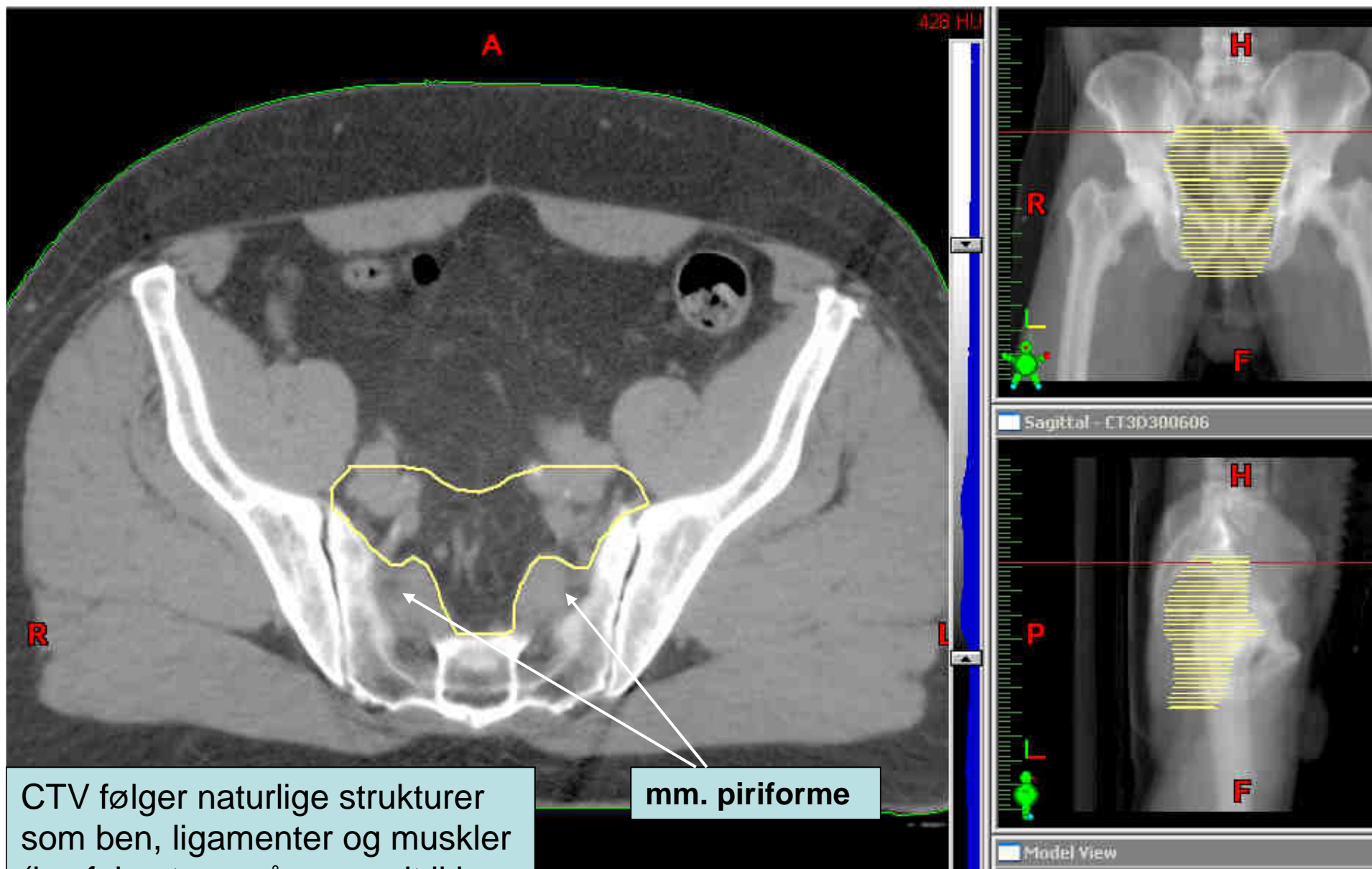


Her møtes a. iliaca ext og a. iliaca int og danner a. iliaca com.

Med intravenøs kontrast hadde karene vært lettere å identifisere, men mange senter har ennå ikke dette som en del av rutinen

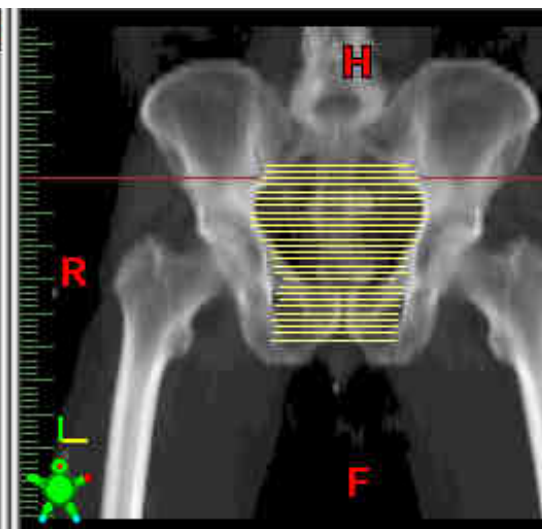
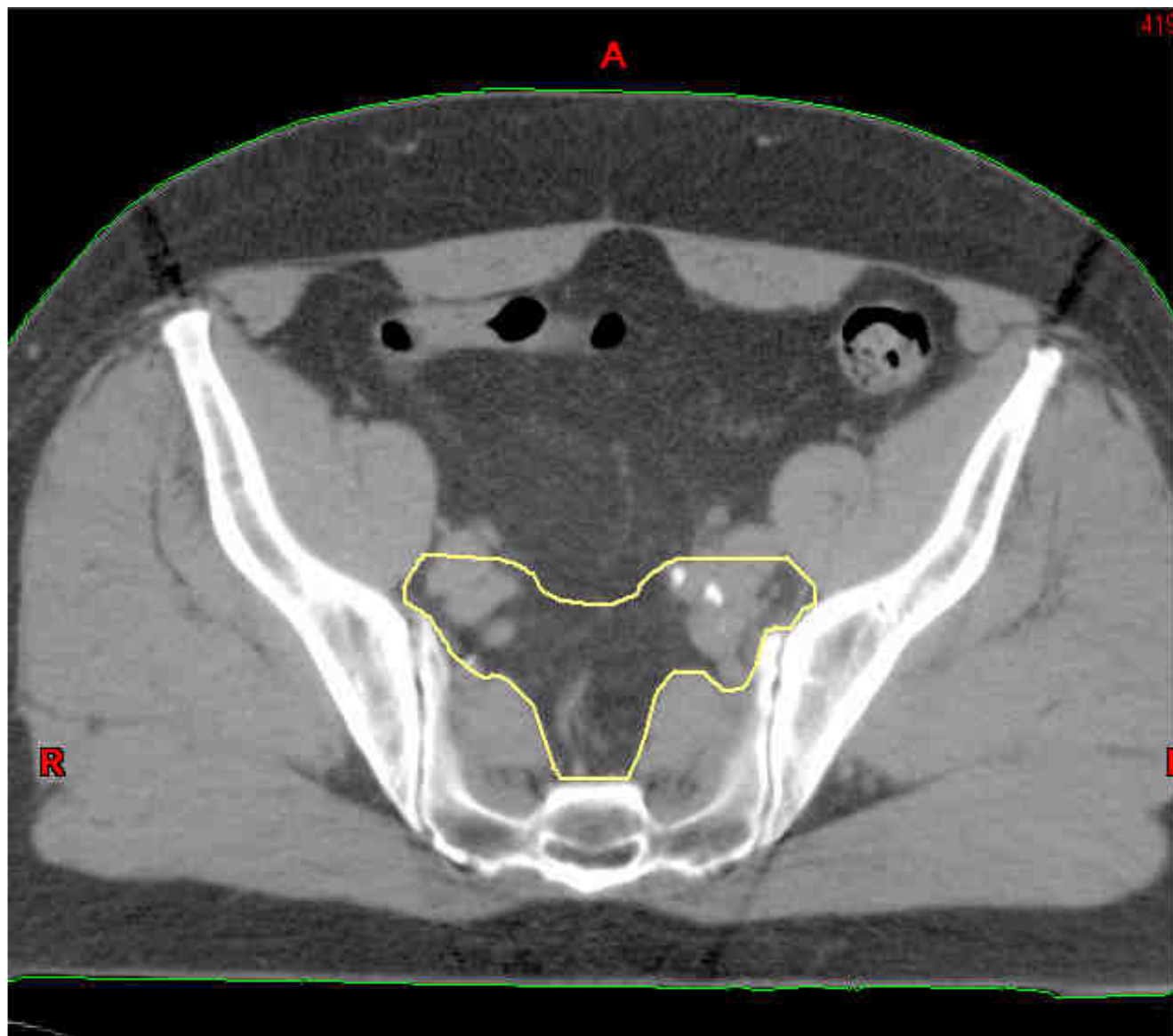
Øverste snitt av CTV₁. Starter ved iliaca-bifurcaturen.
Ofte ligger dette snittet ca 1,5 cm under S1's øvre dekkplate



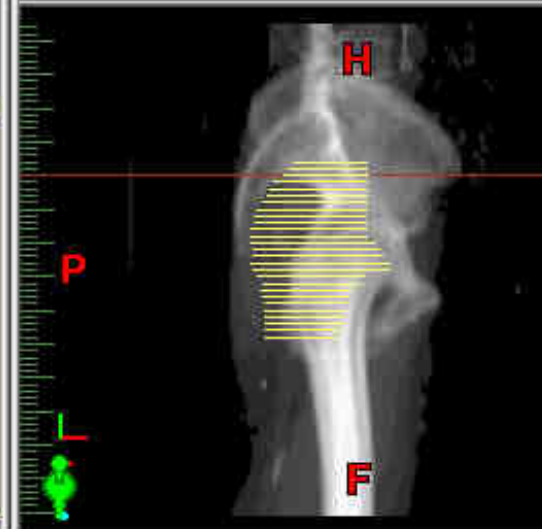


CTV følger naturlige strukturer som ben, ligamenter og muskler (lymfeknutene går normalt ikke inni disse strukturene)

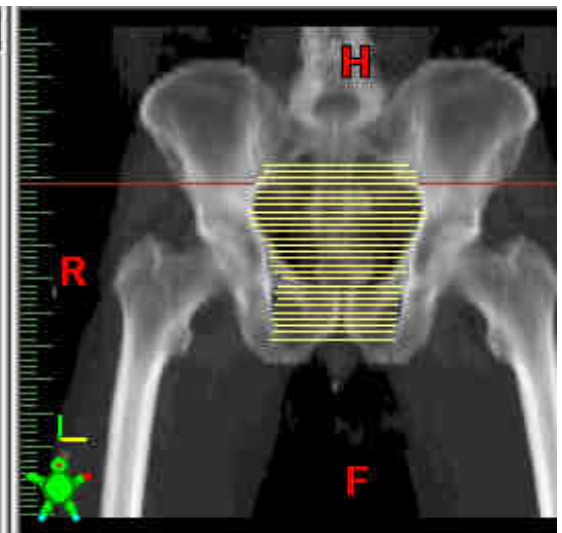
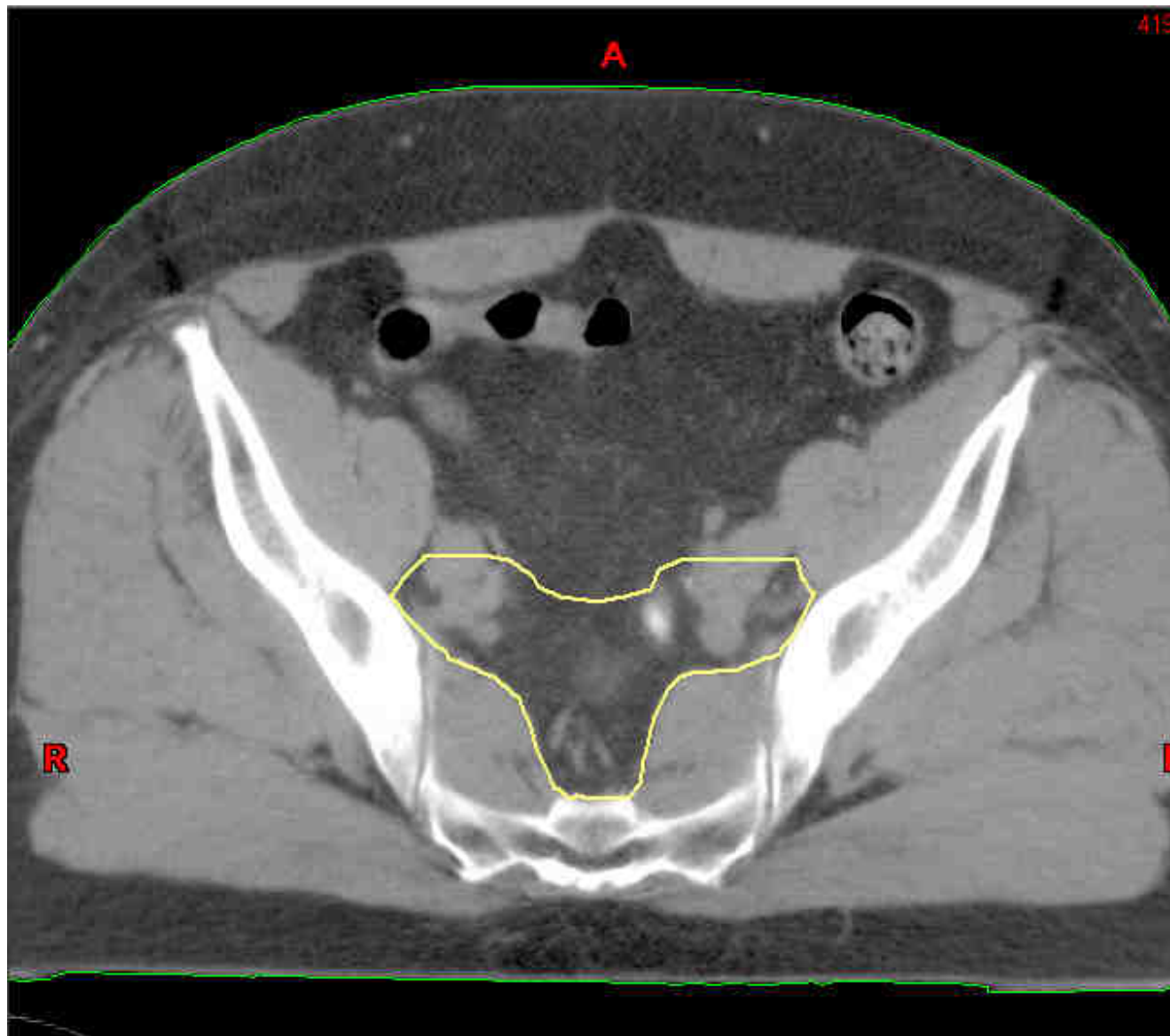
mm. piriforme



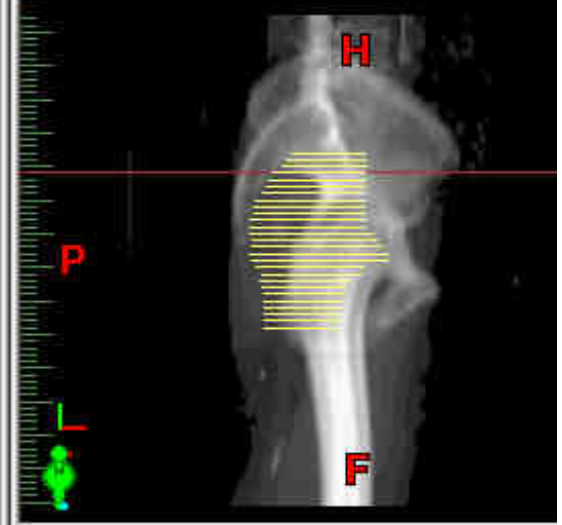
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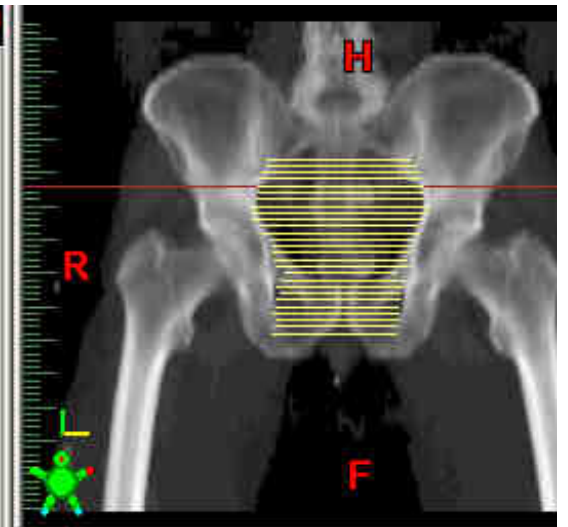
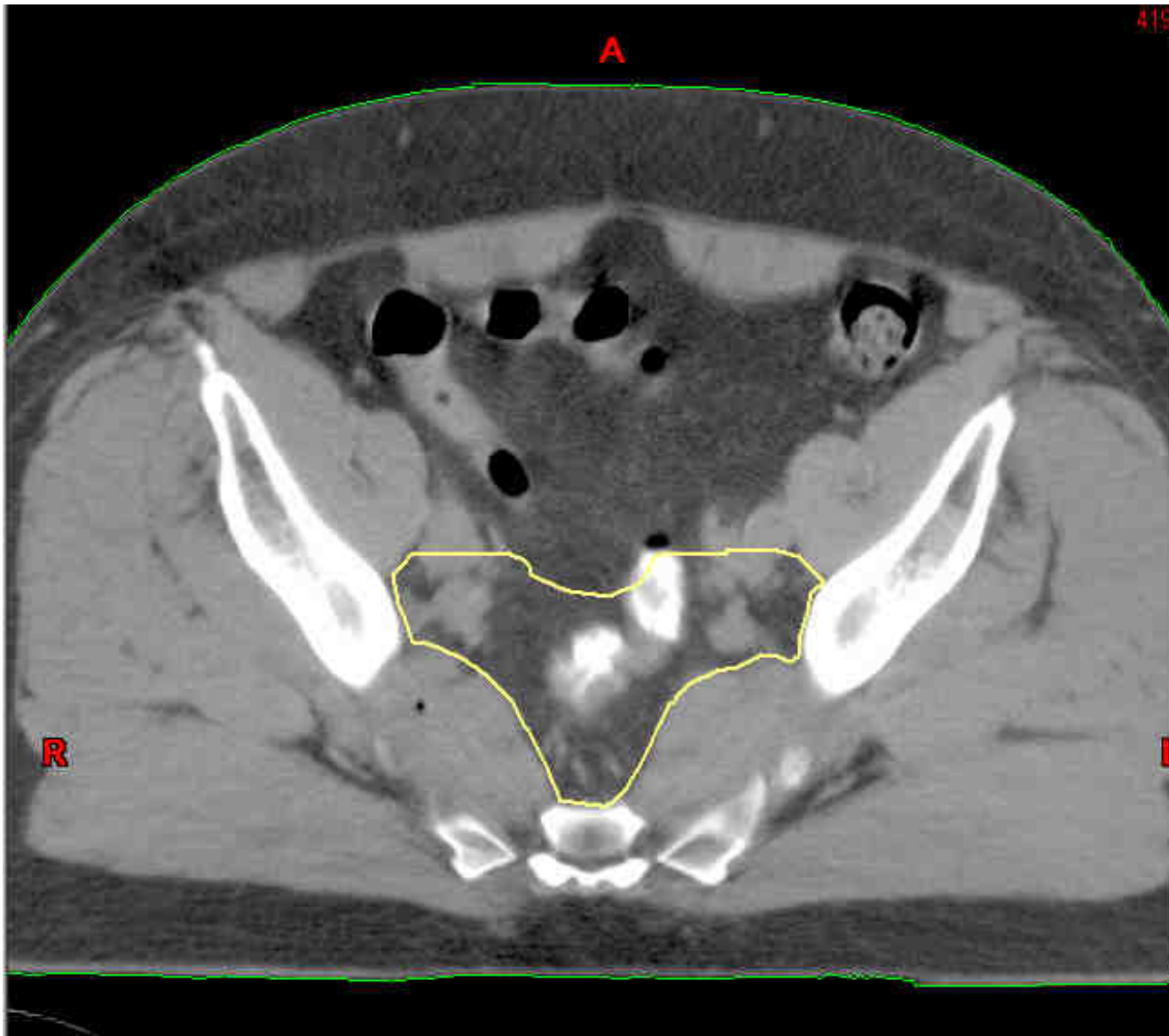
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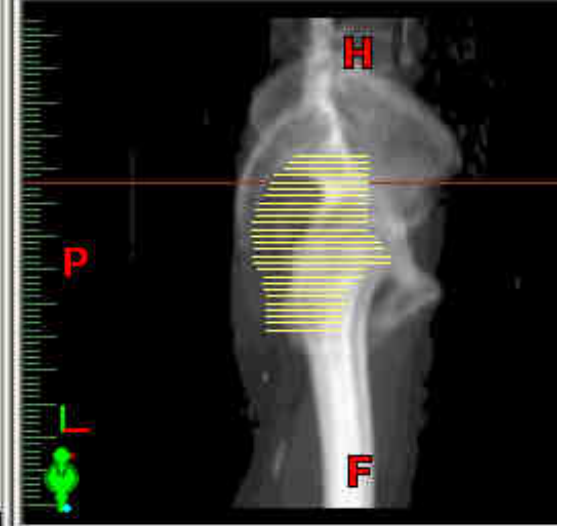
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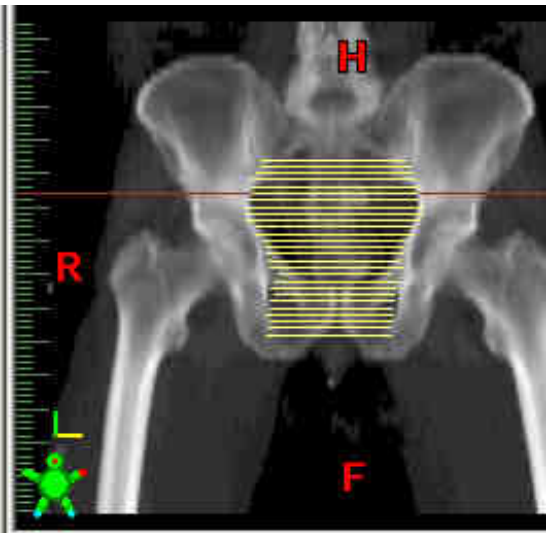
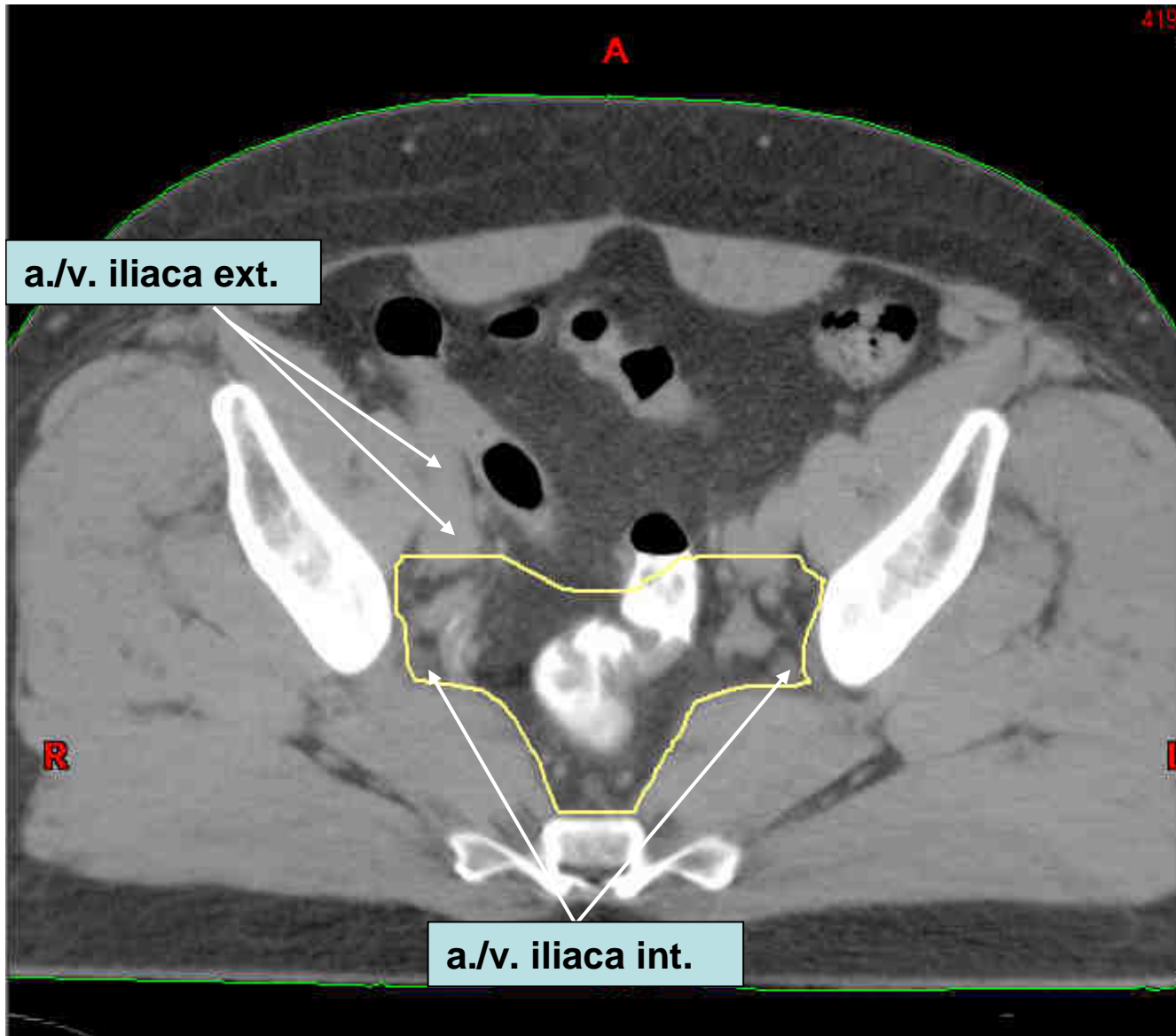
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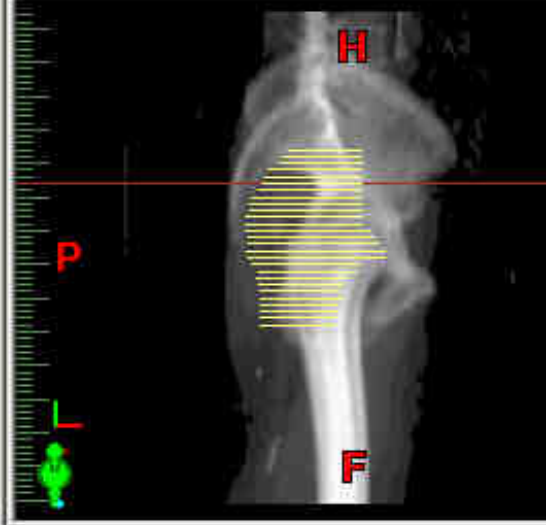
Sagittal - CT30300606



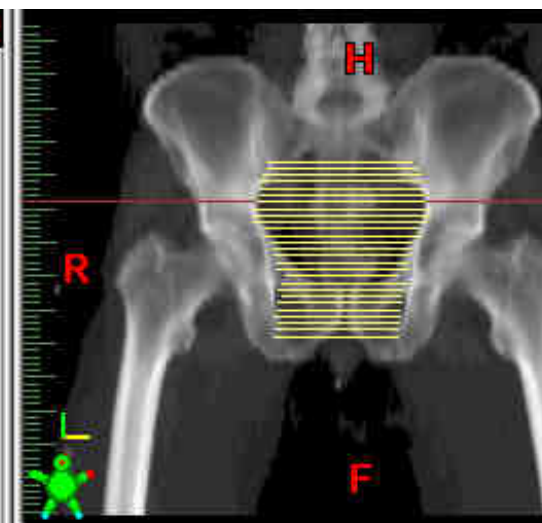
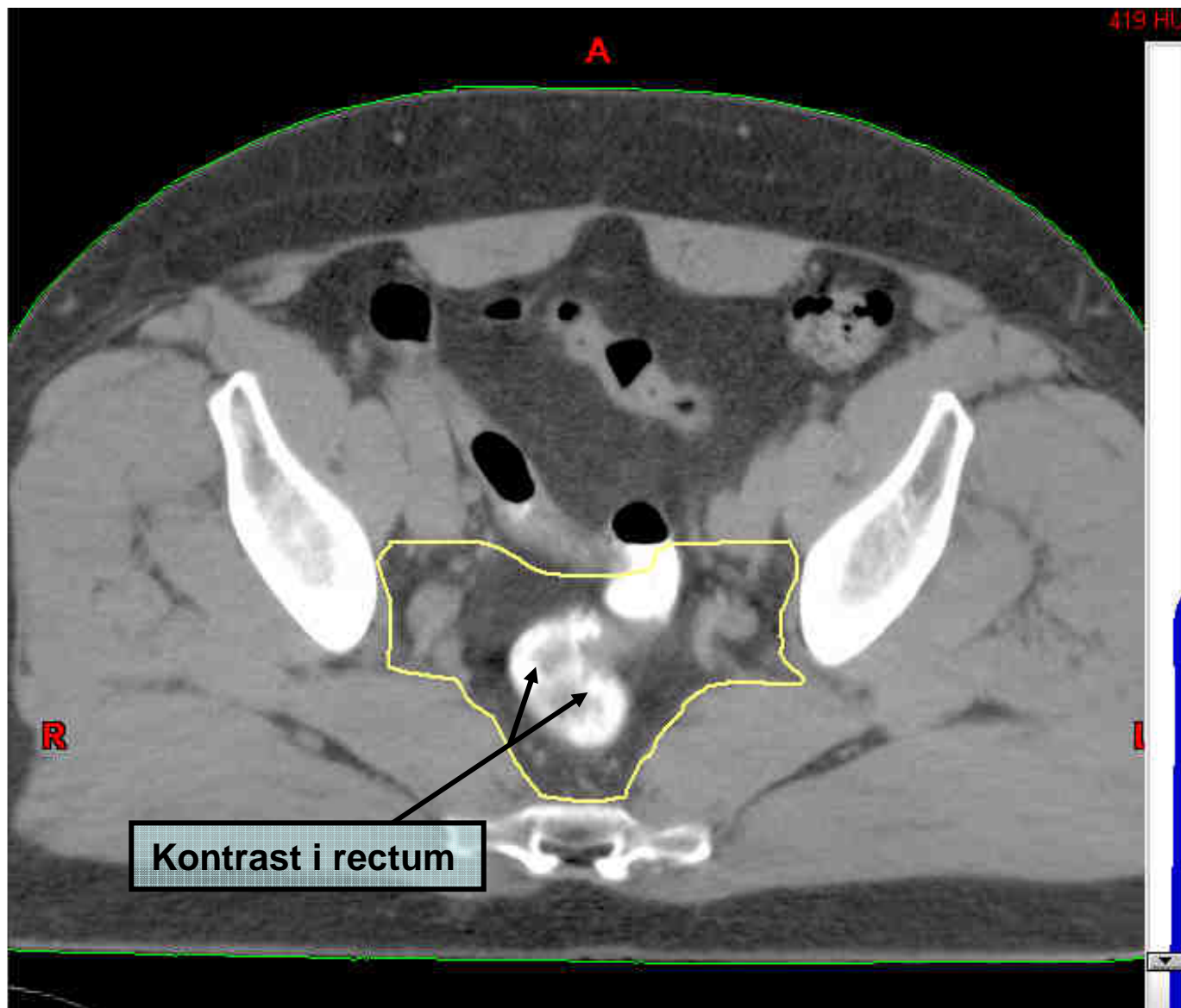
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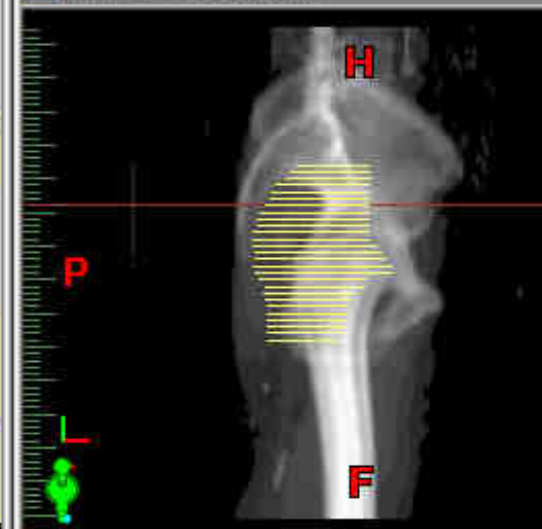
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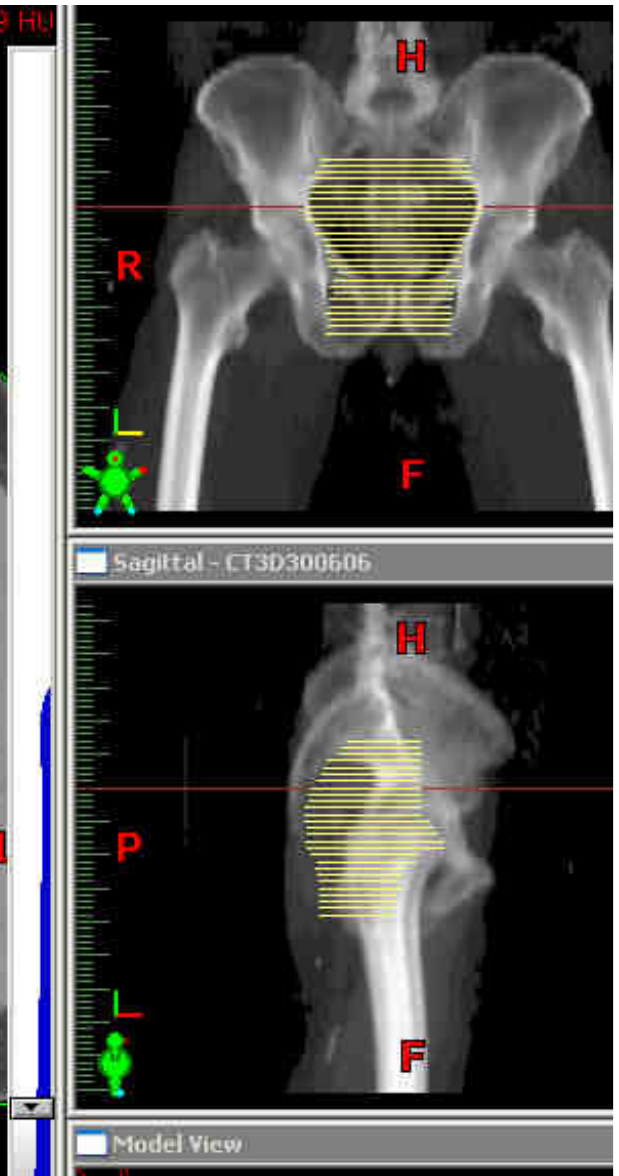
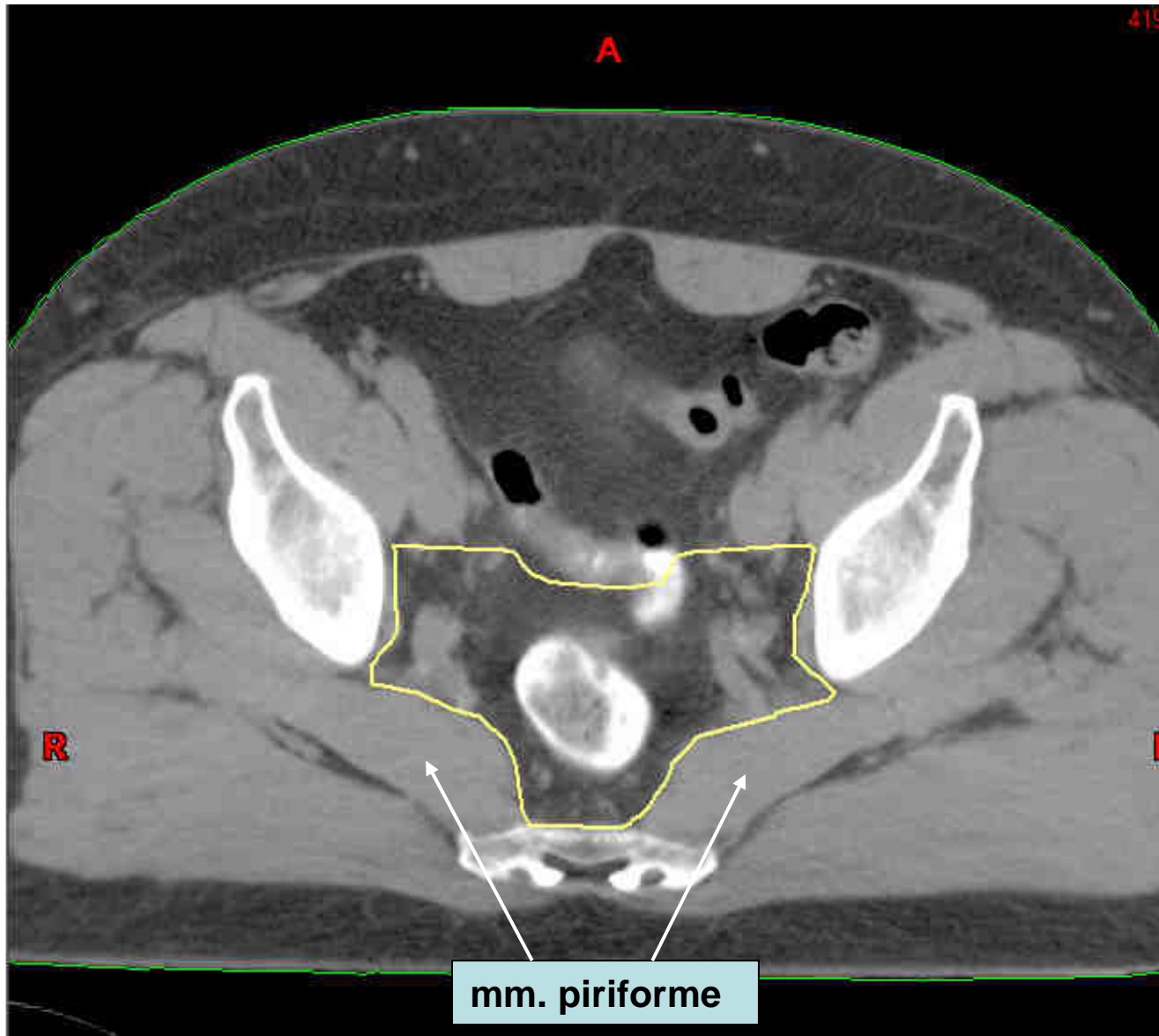
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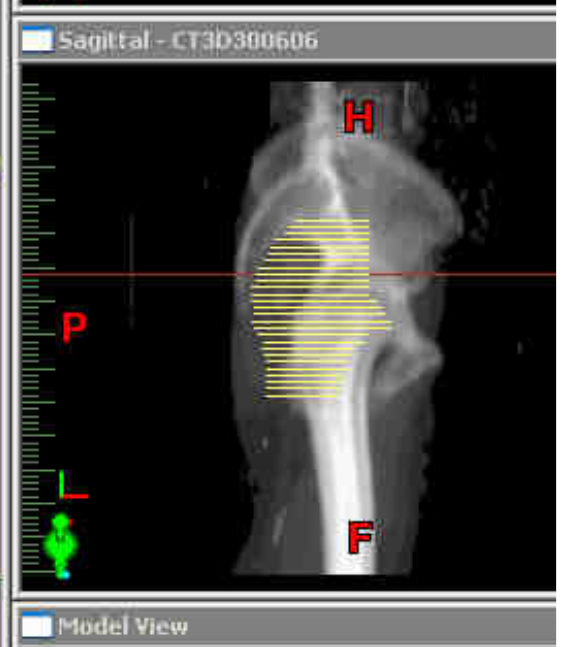
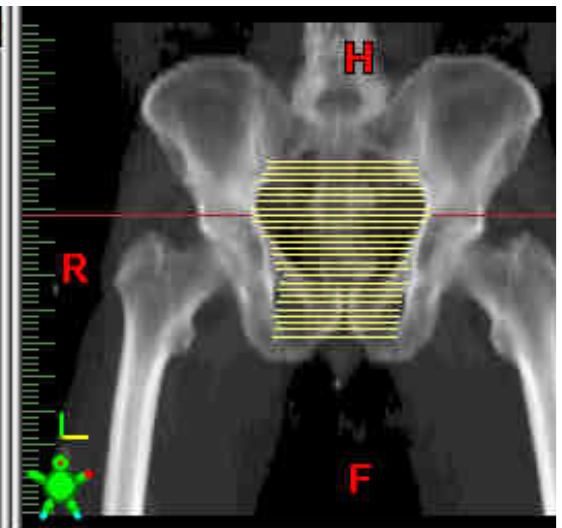
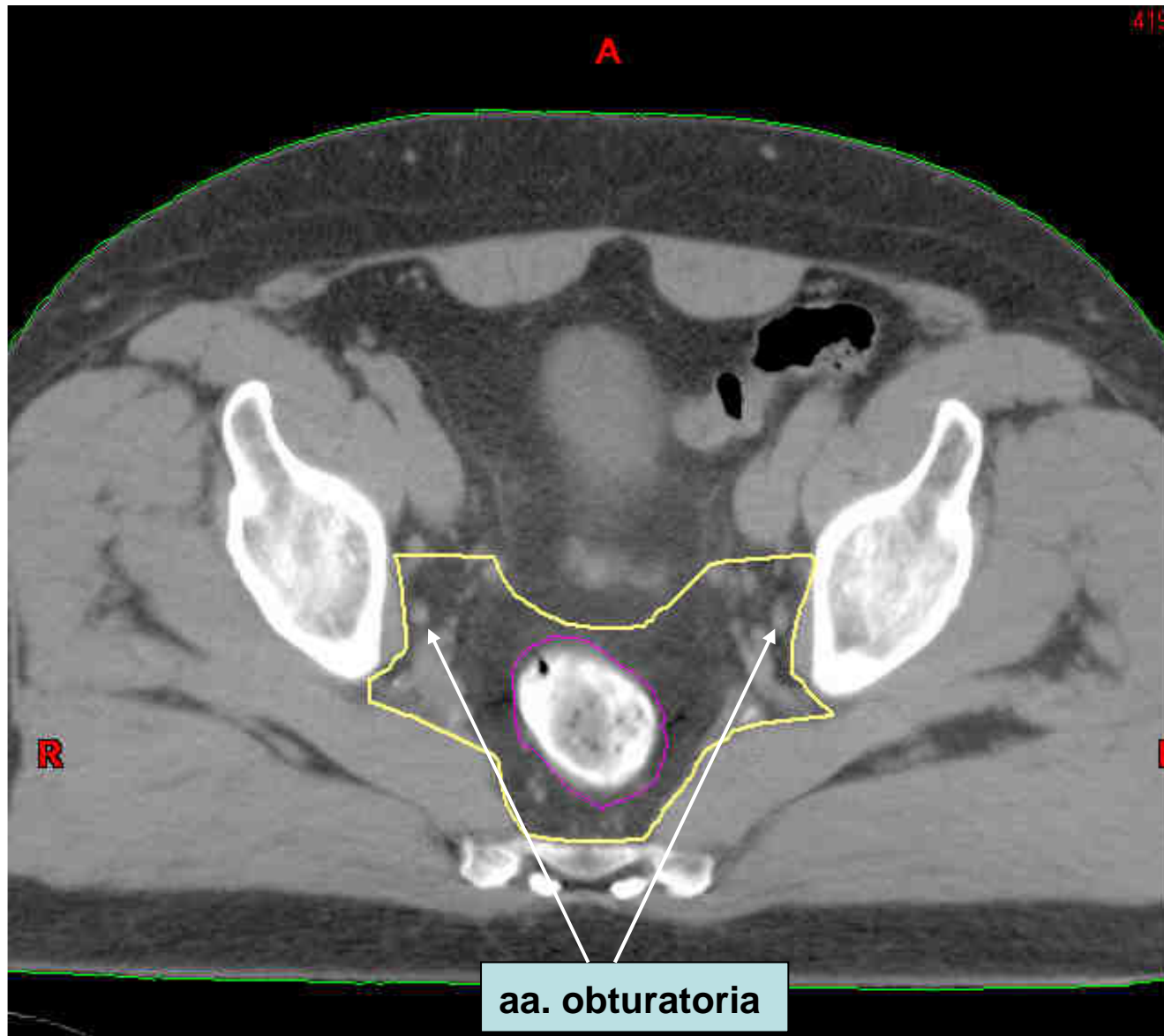


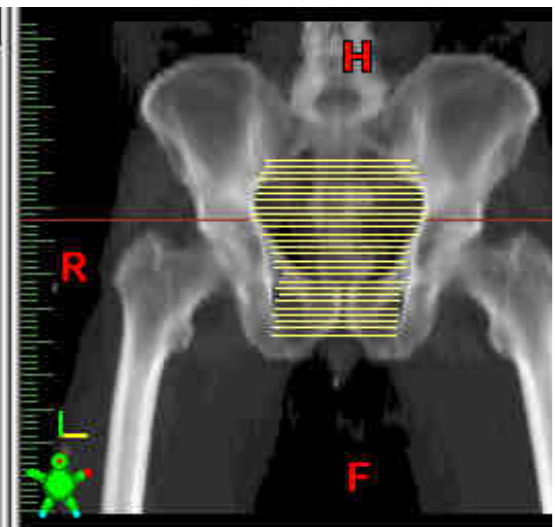
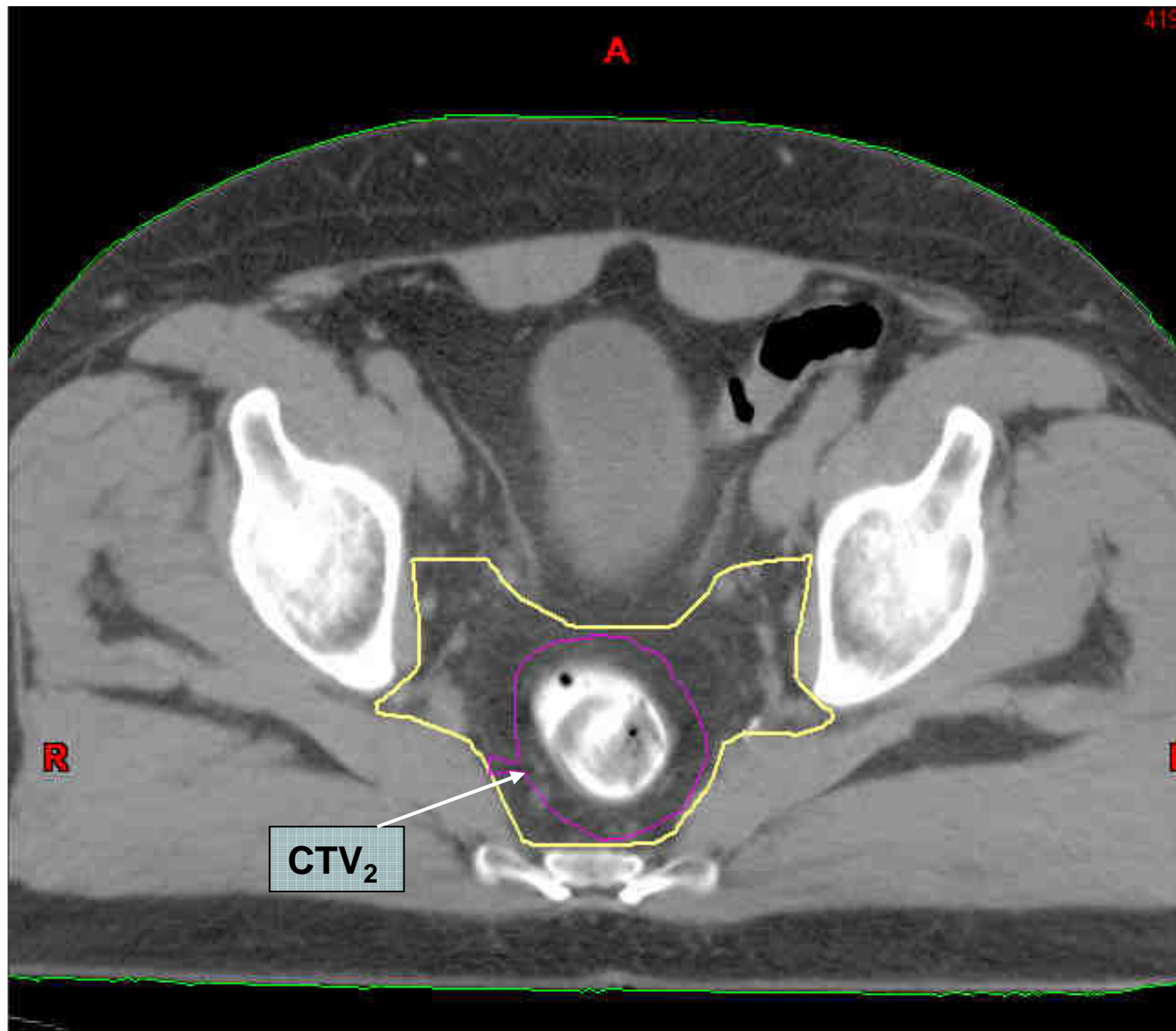
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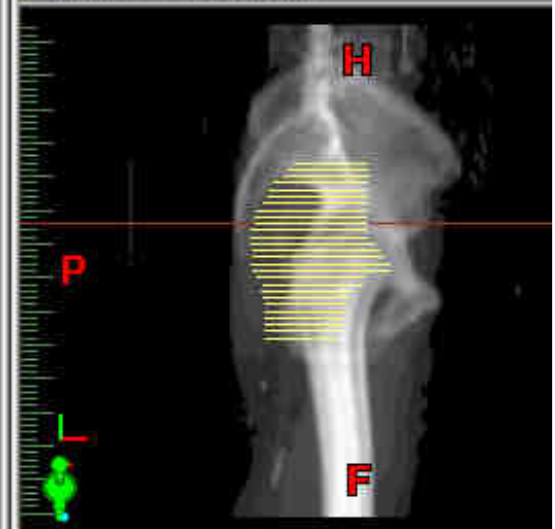
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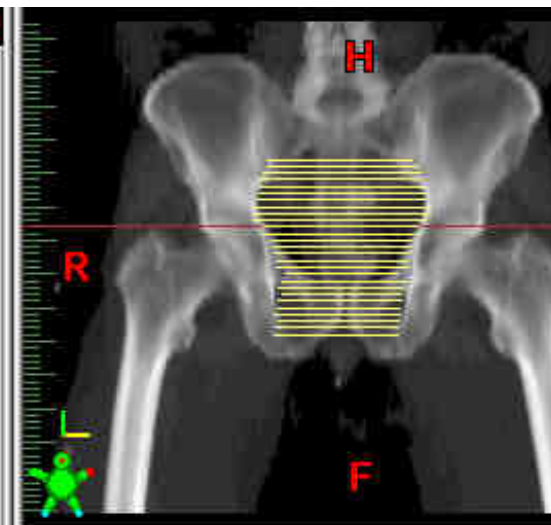
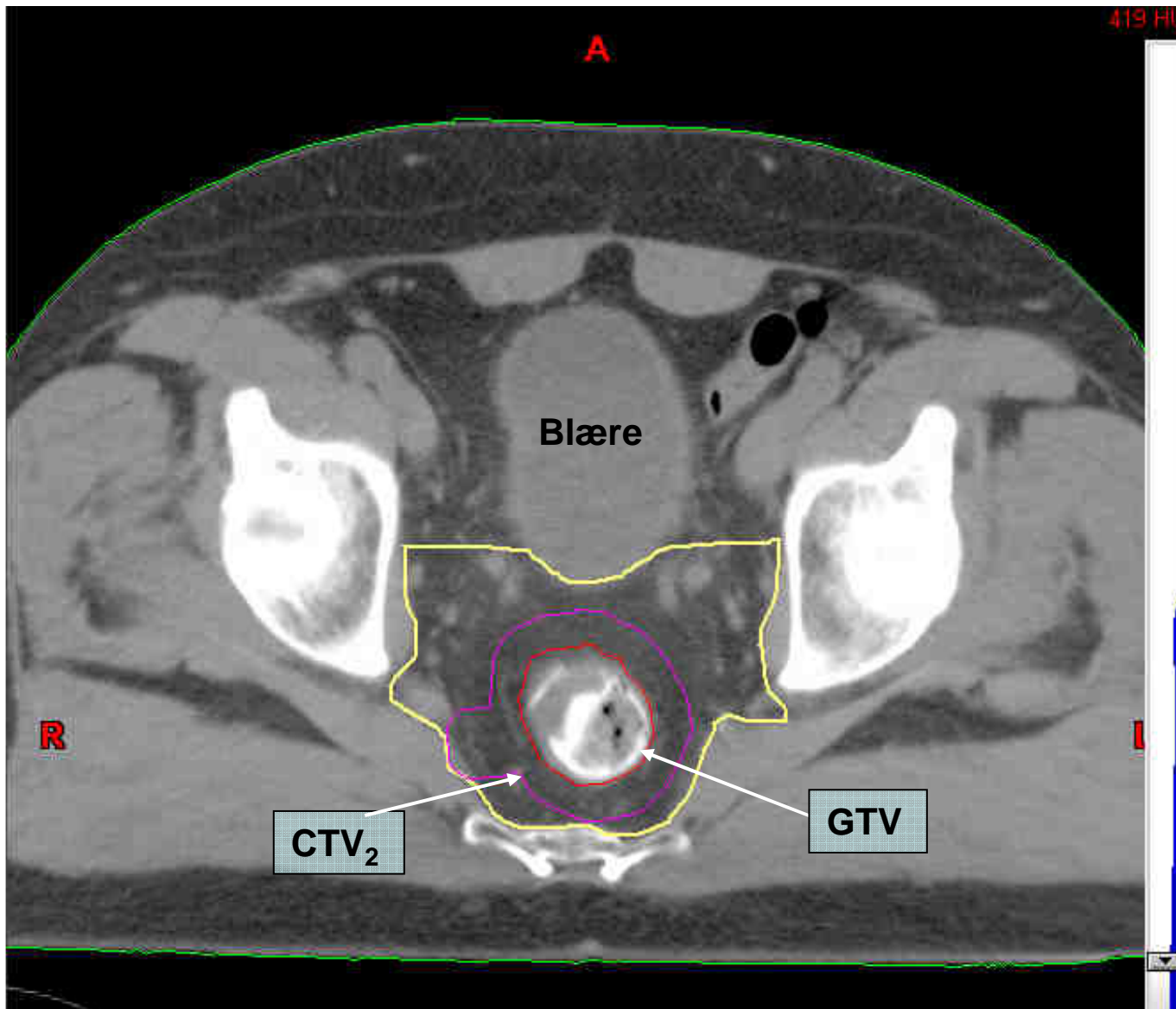




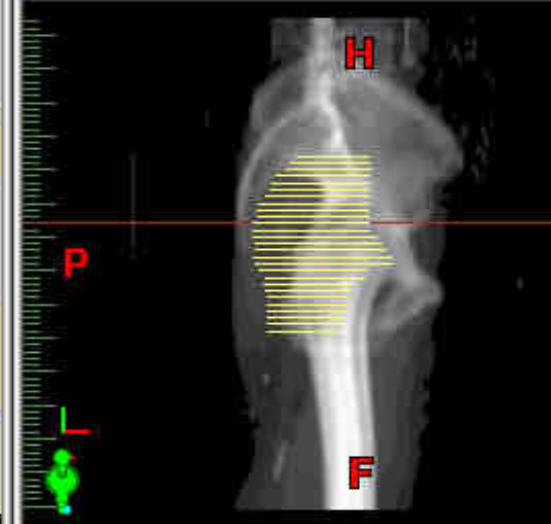
Sagittal - CT3D300606



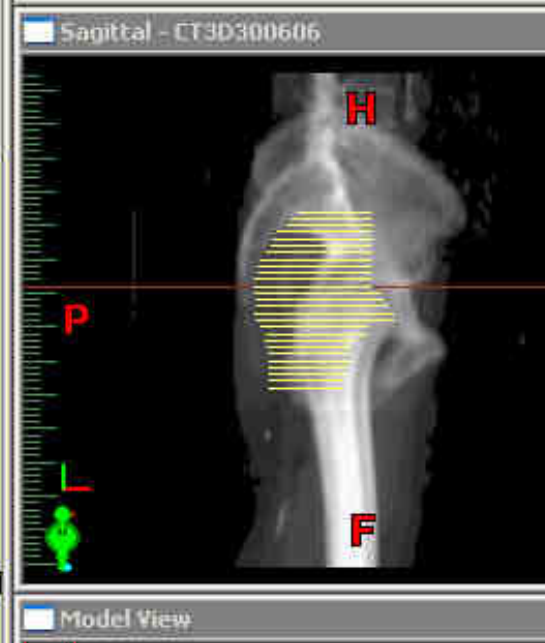
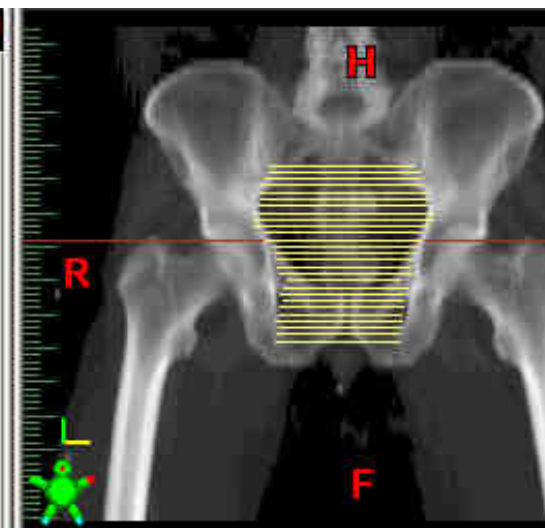
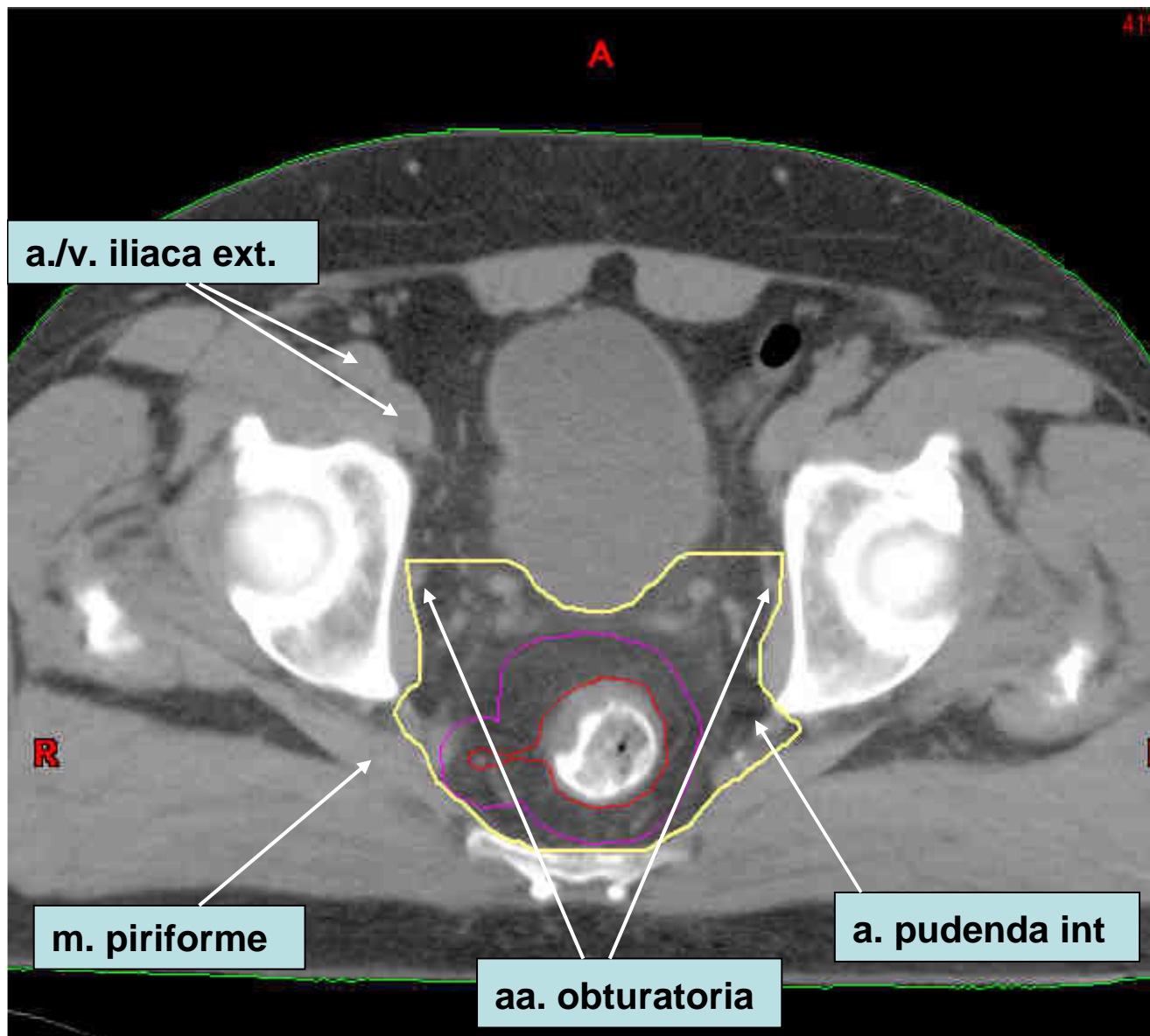
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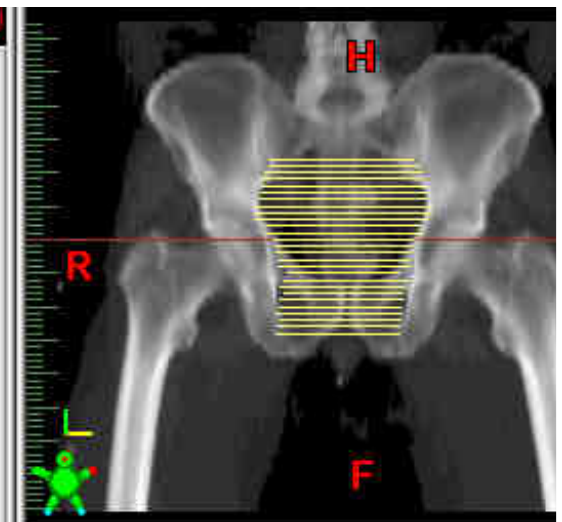
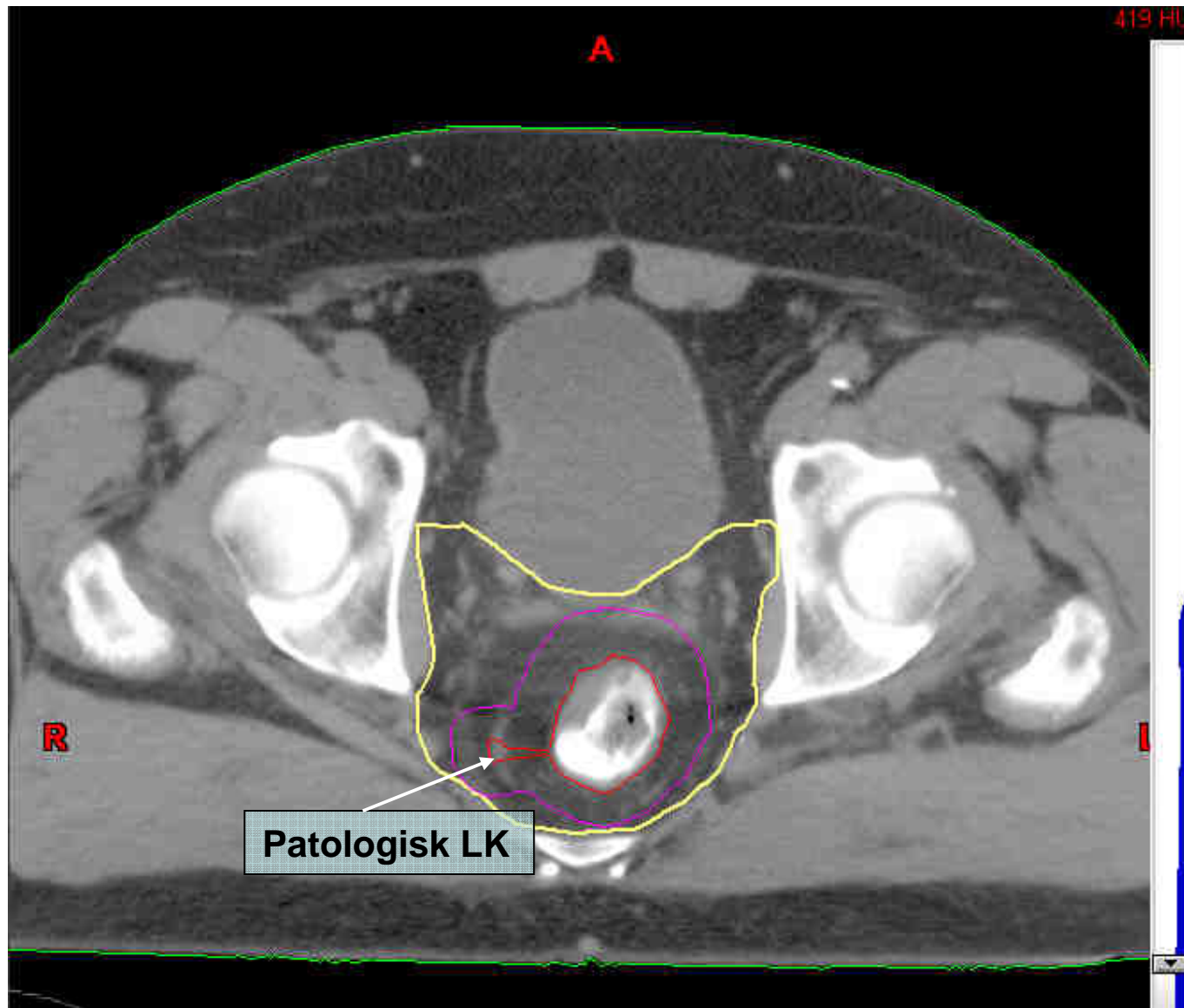


Sagittal - CT30300606

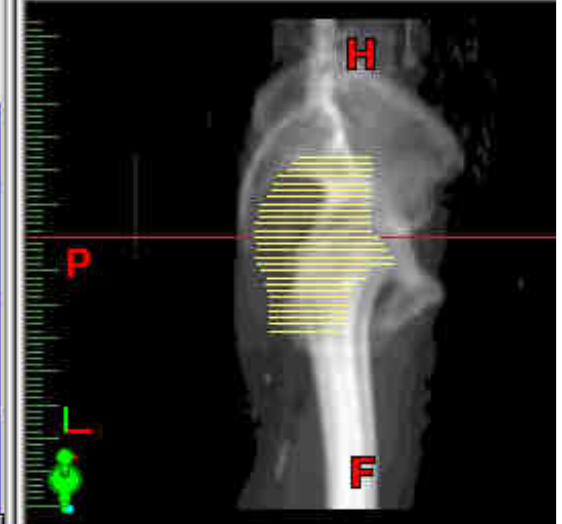


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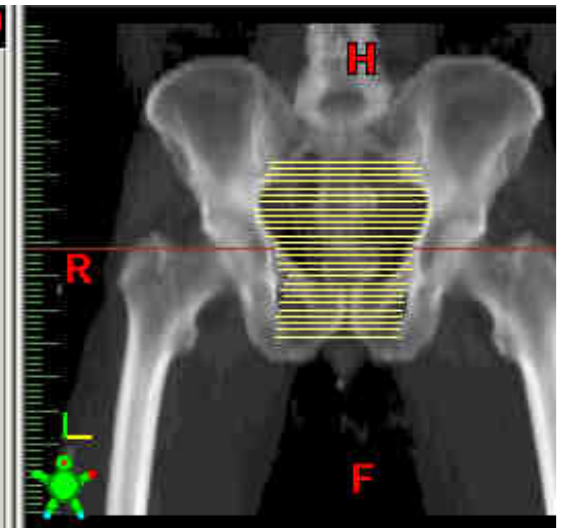
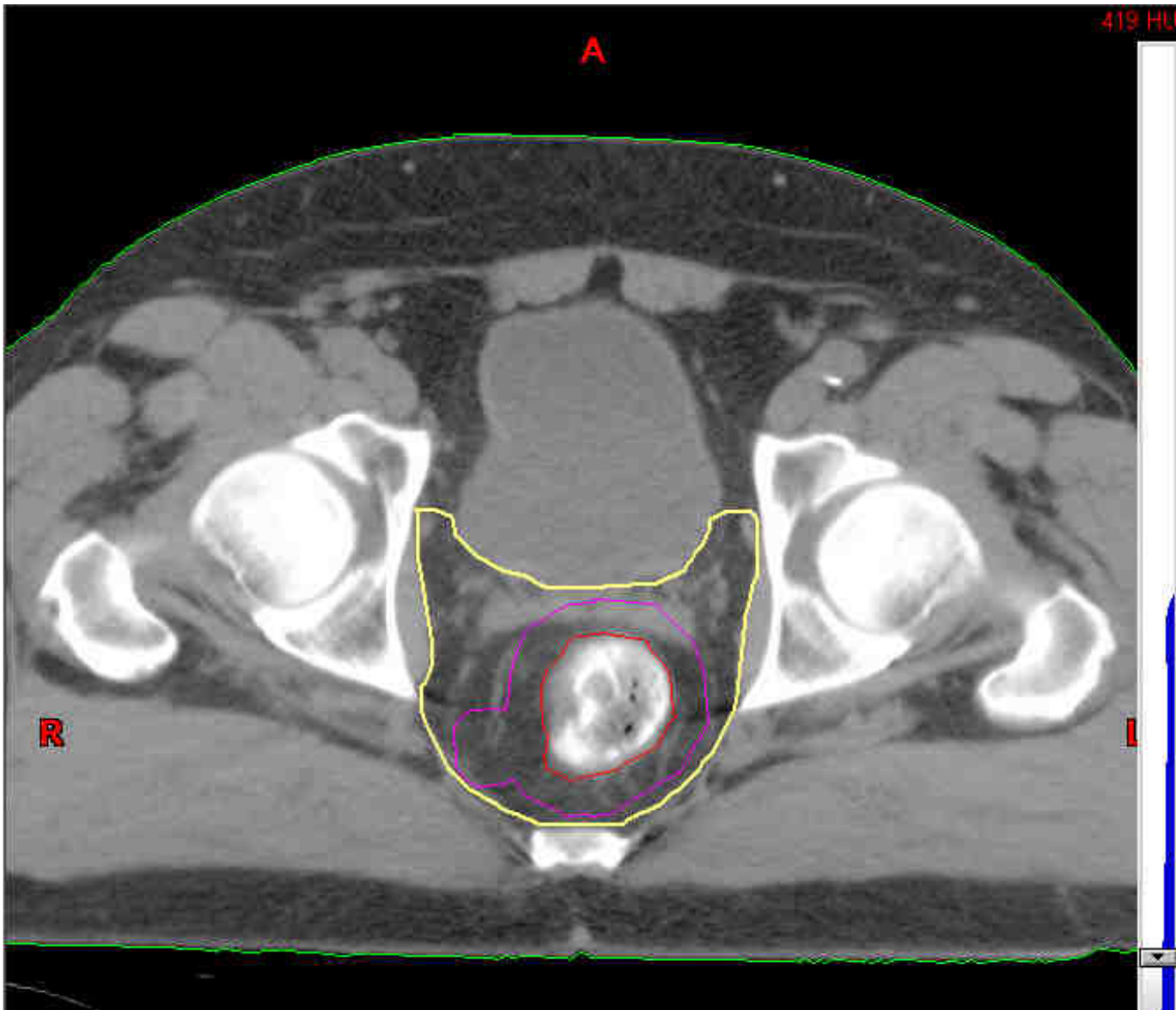




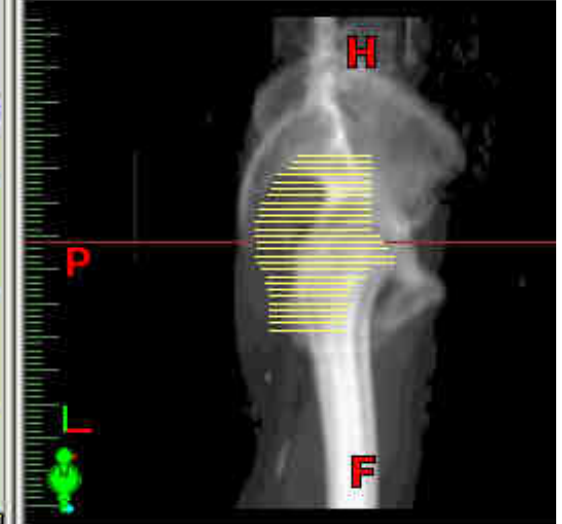
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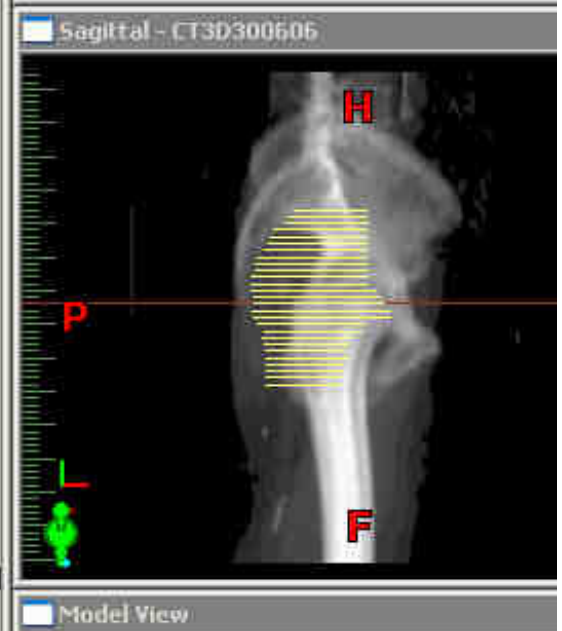
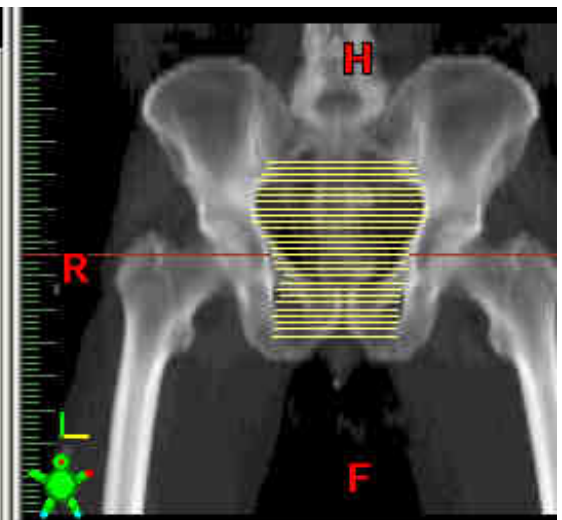
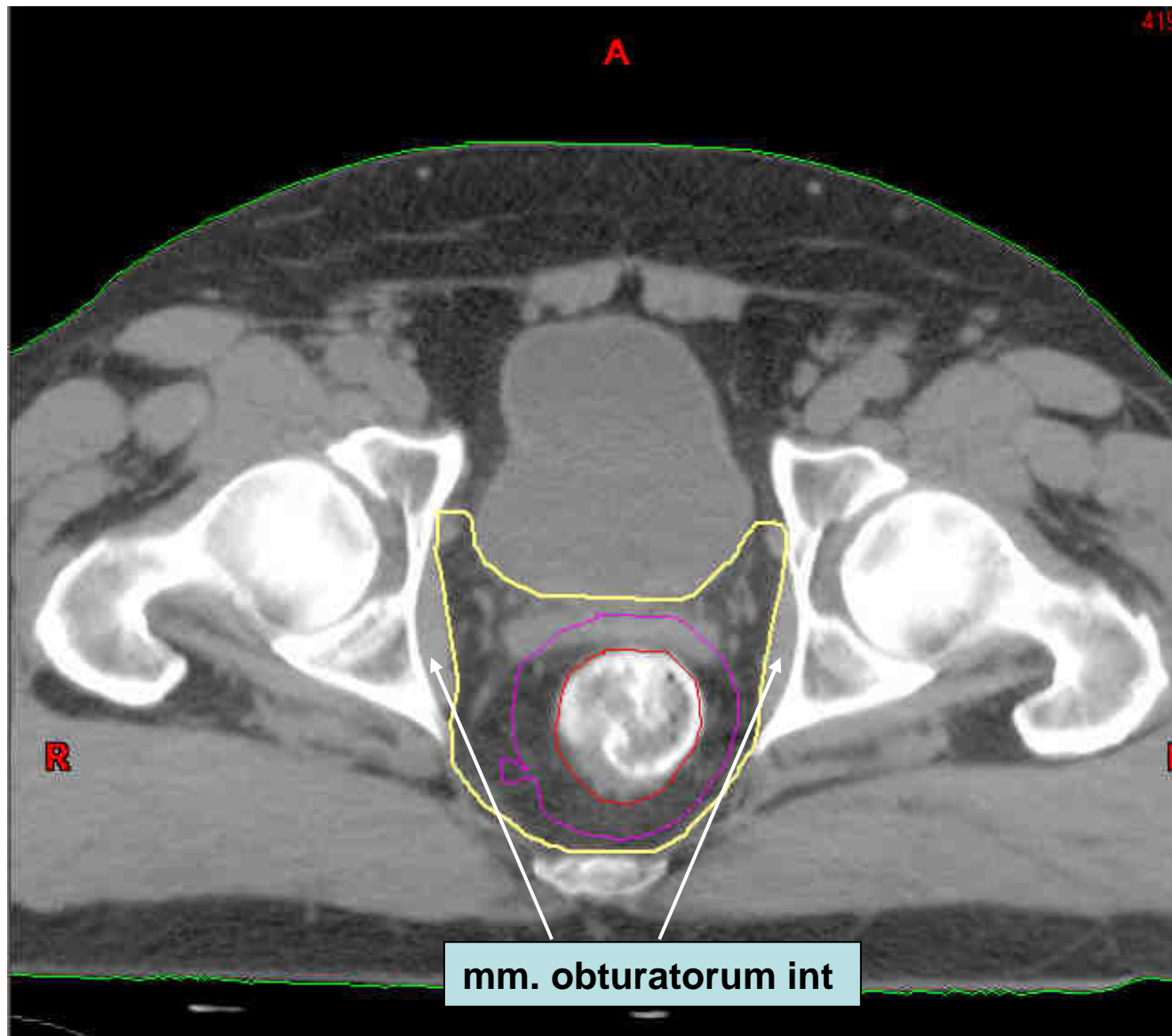
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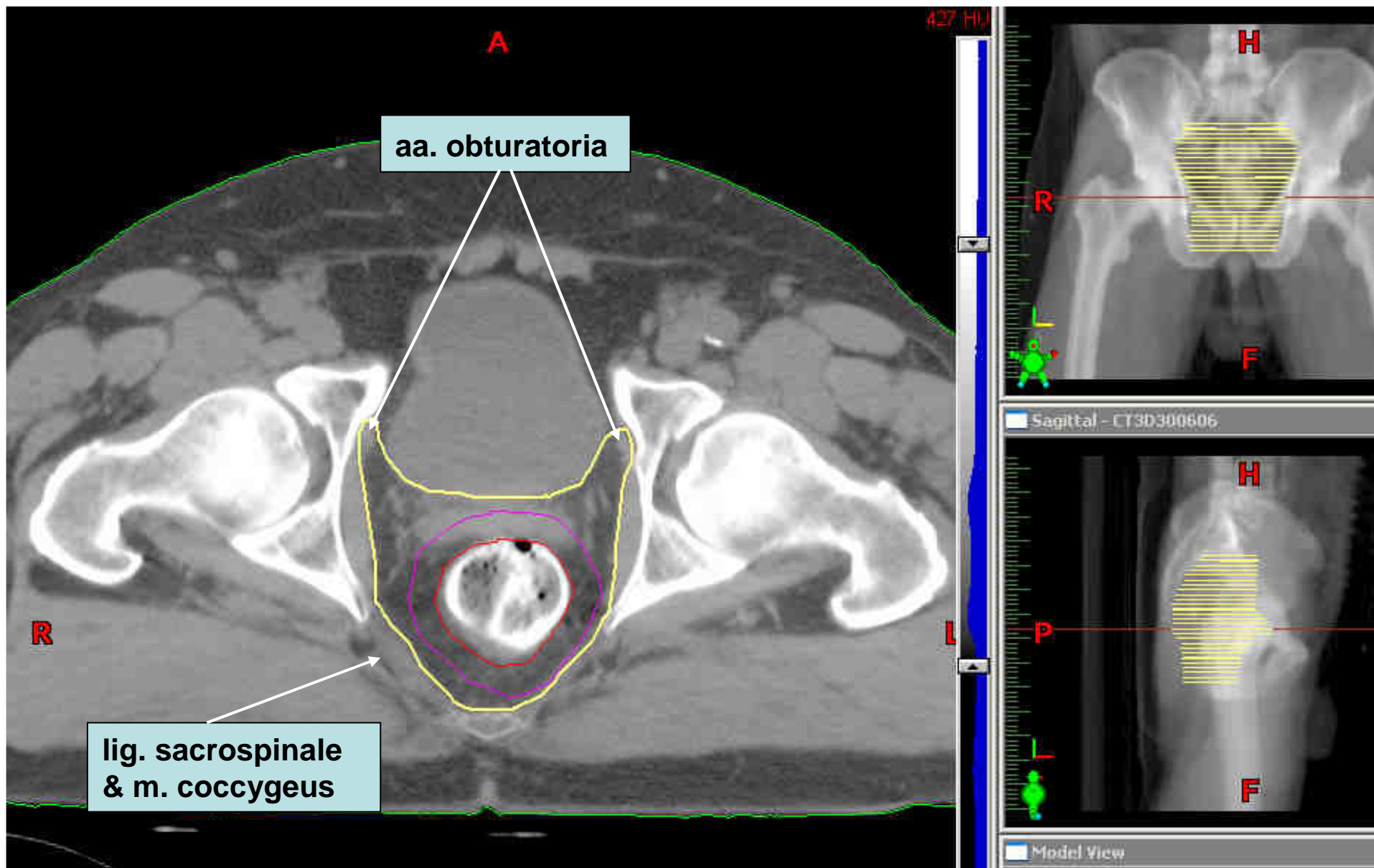


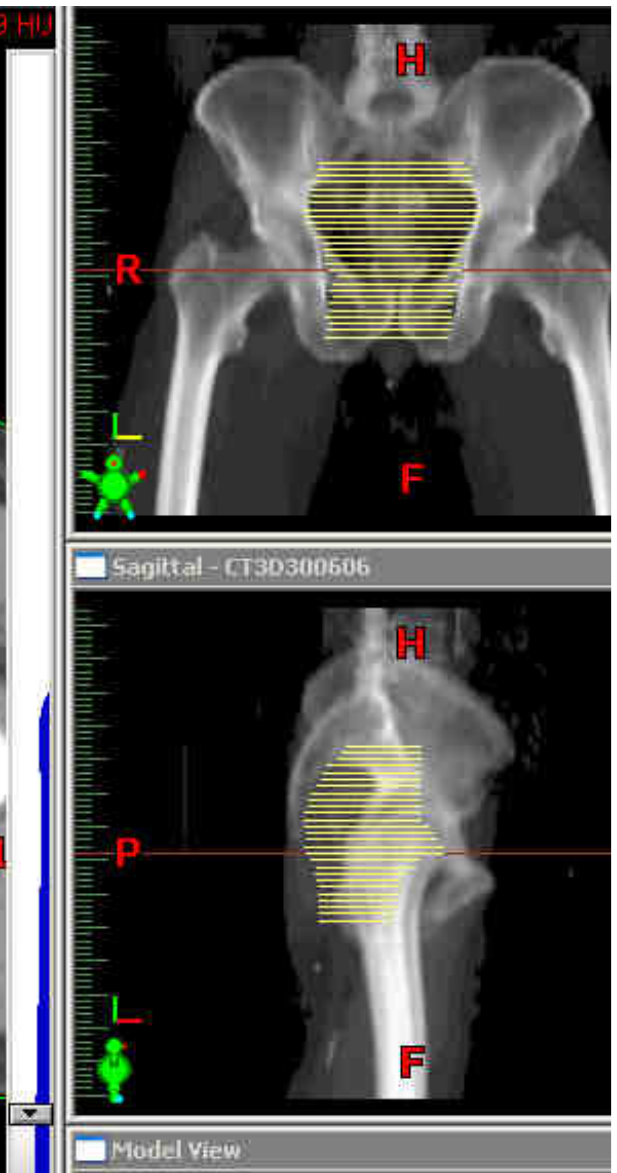
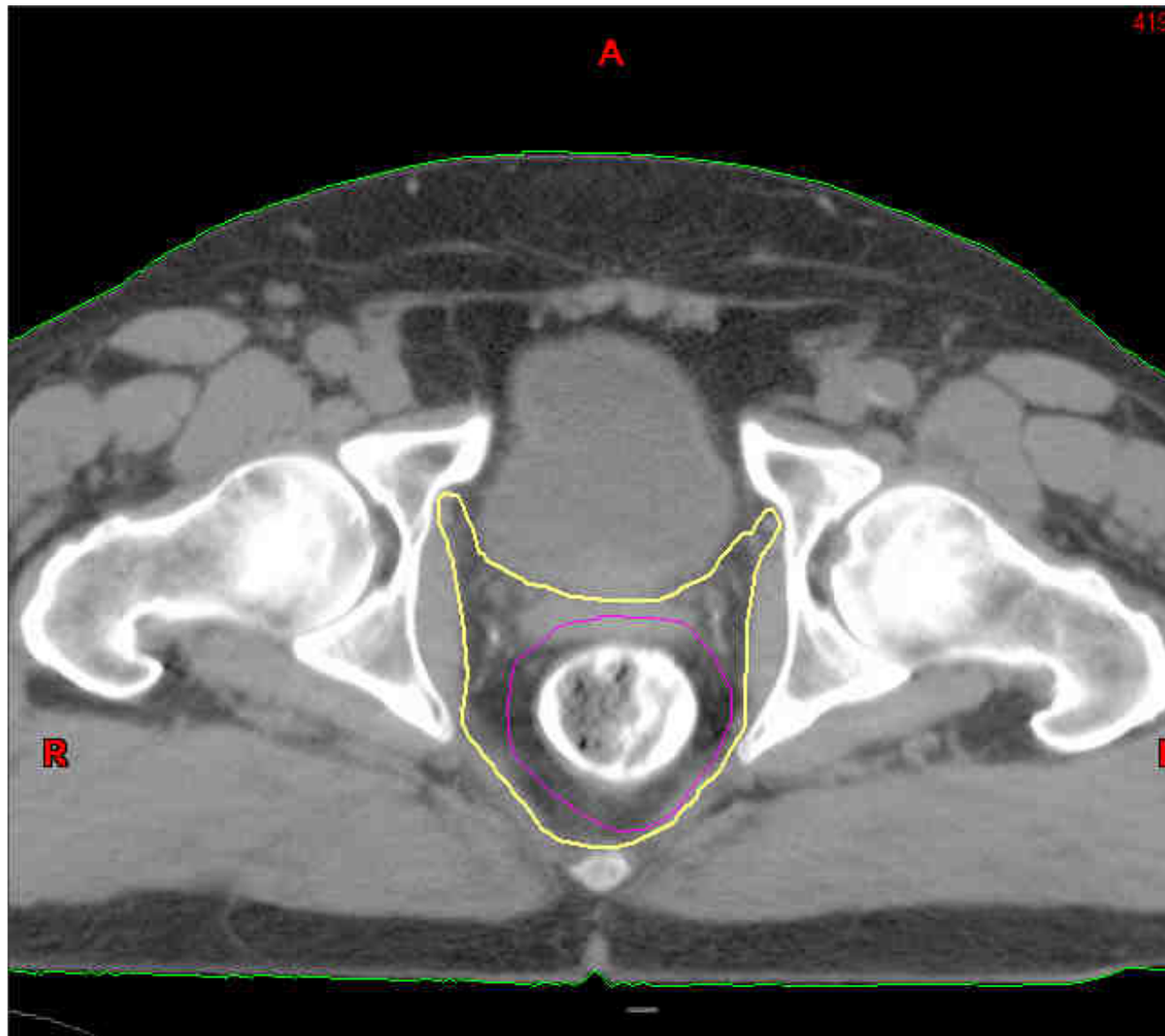
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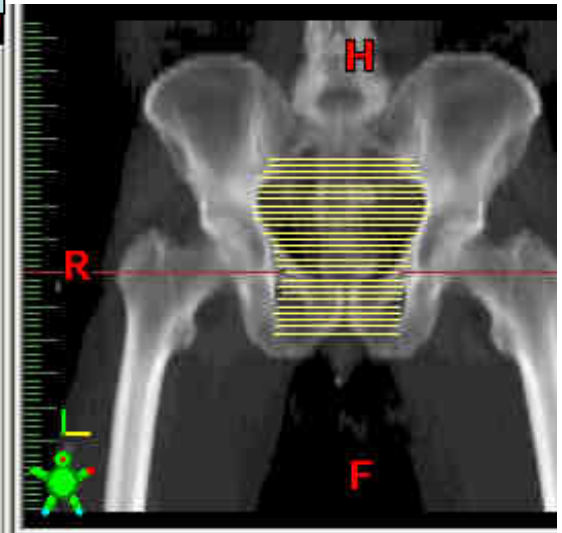
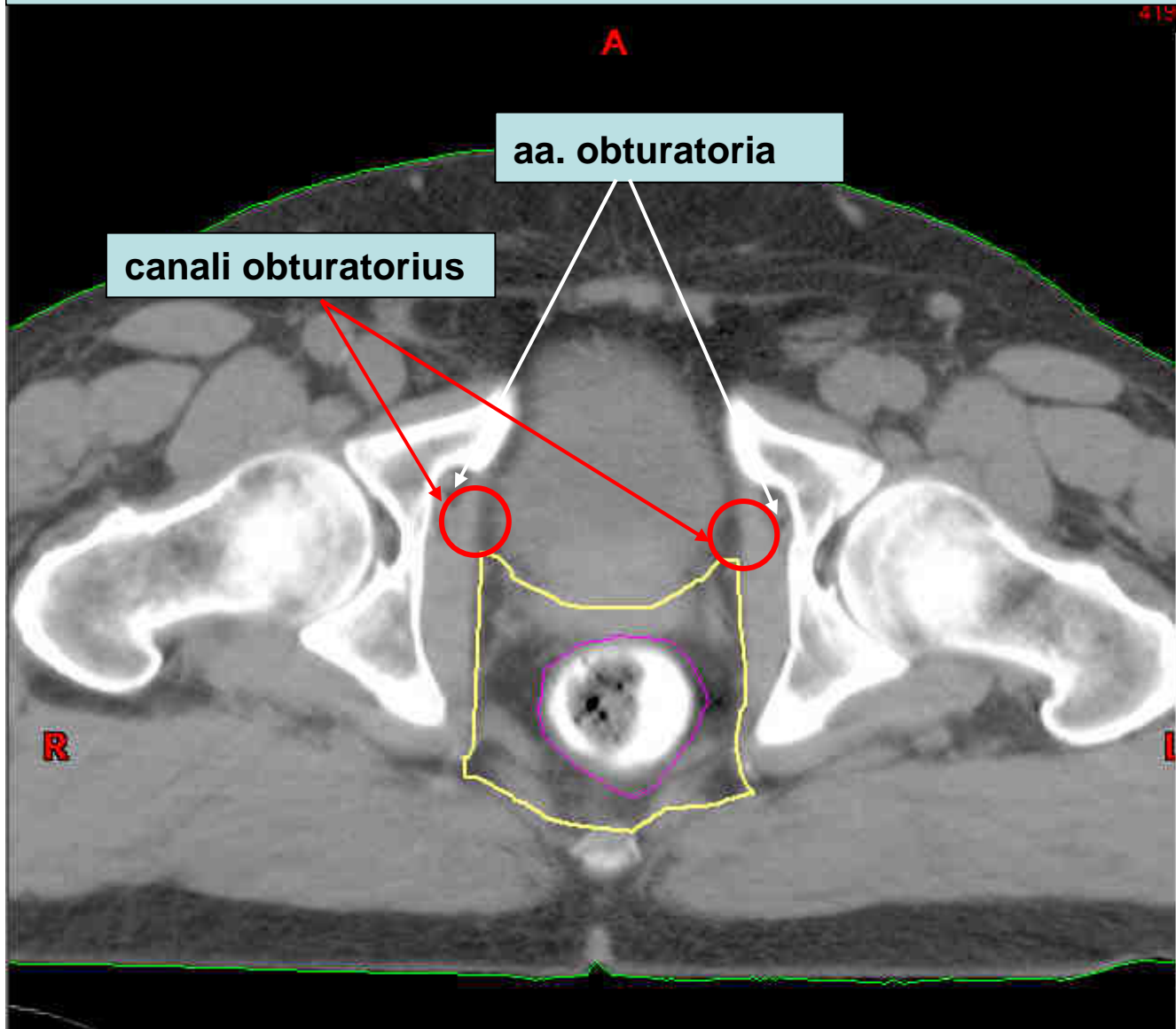
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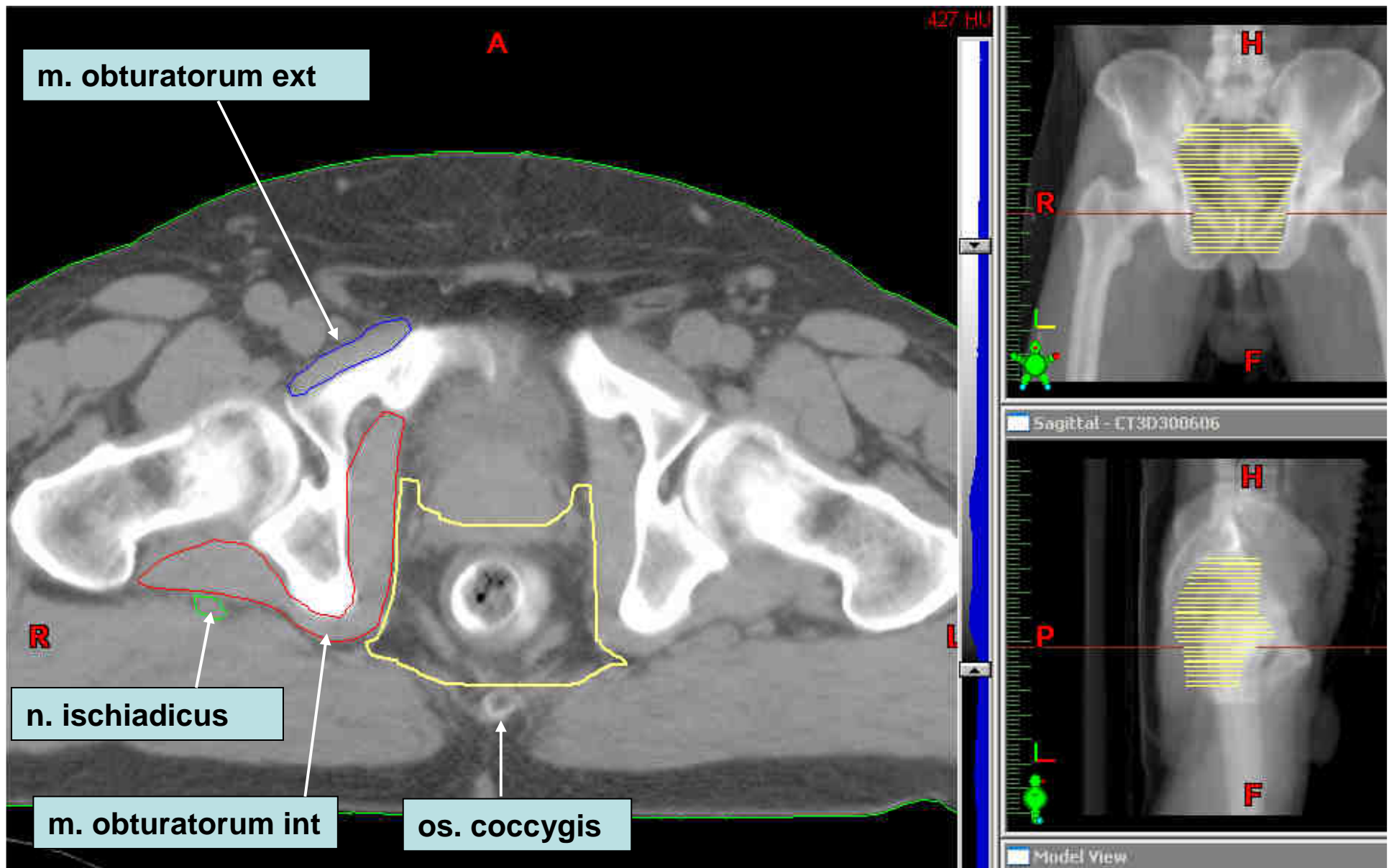


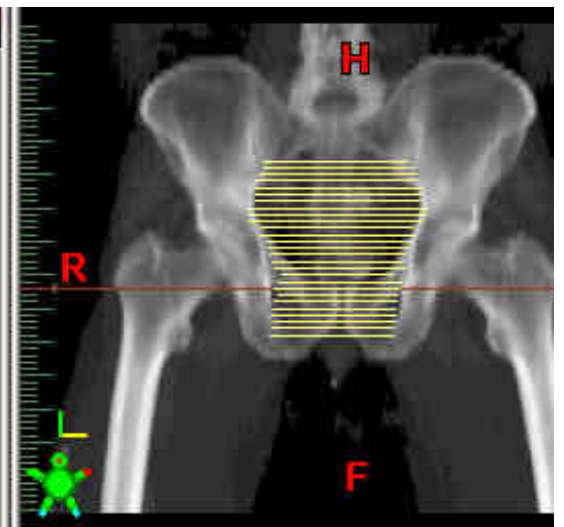
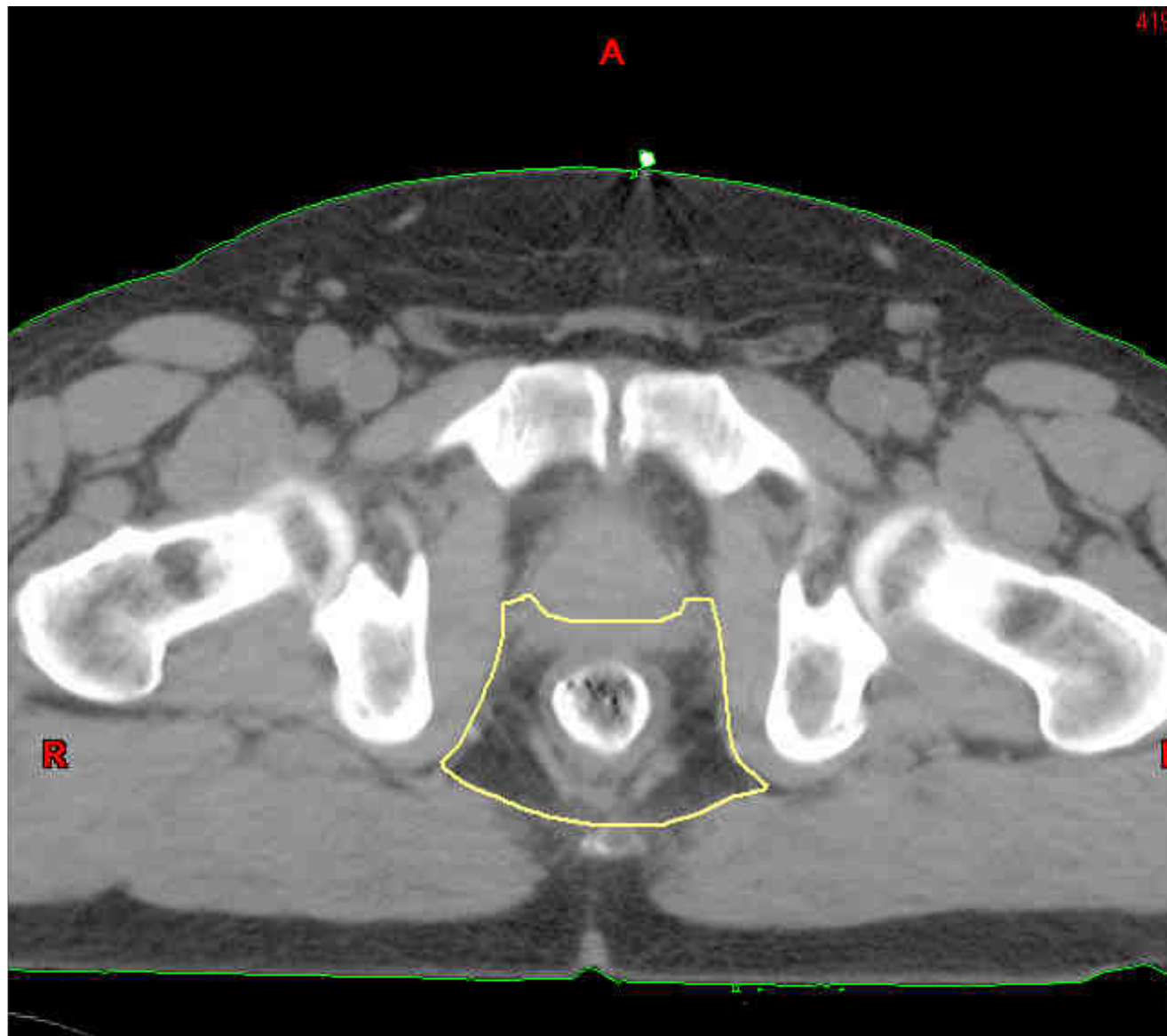




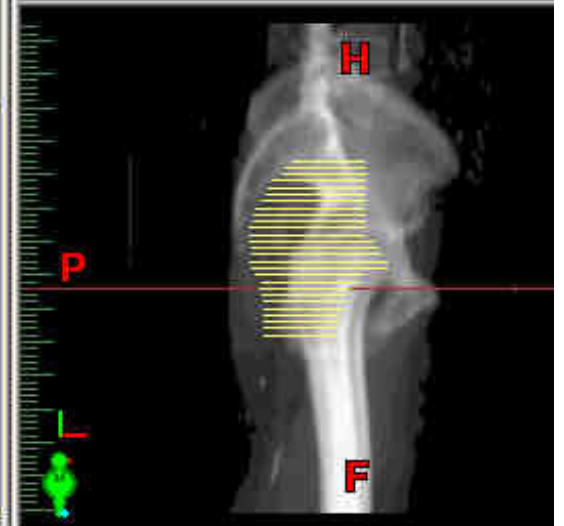
De obturatore kar og LK inkluderes i CTV til de går ut gjennom canalis obturatorius. (Herfra forsyner de hoftebrusk og muskler)



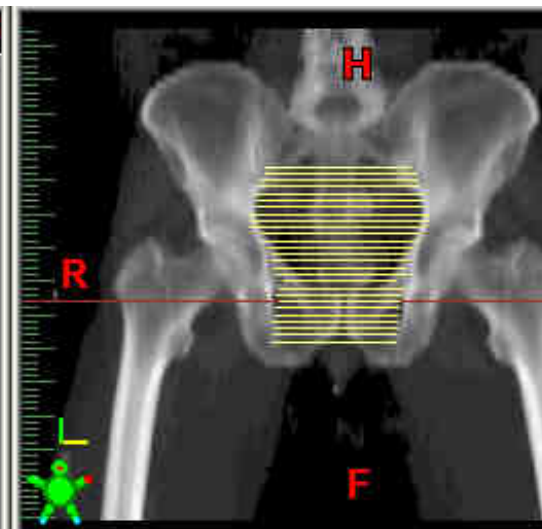
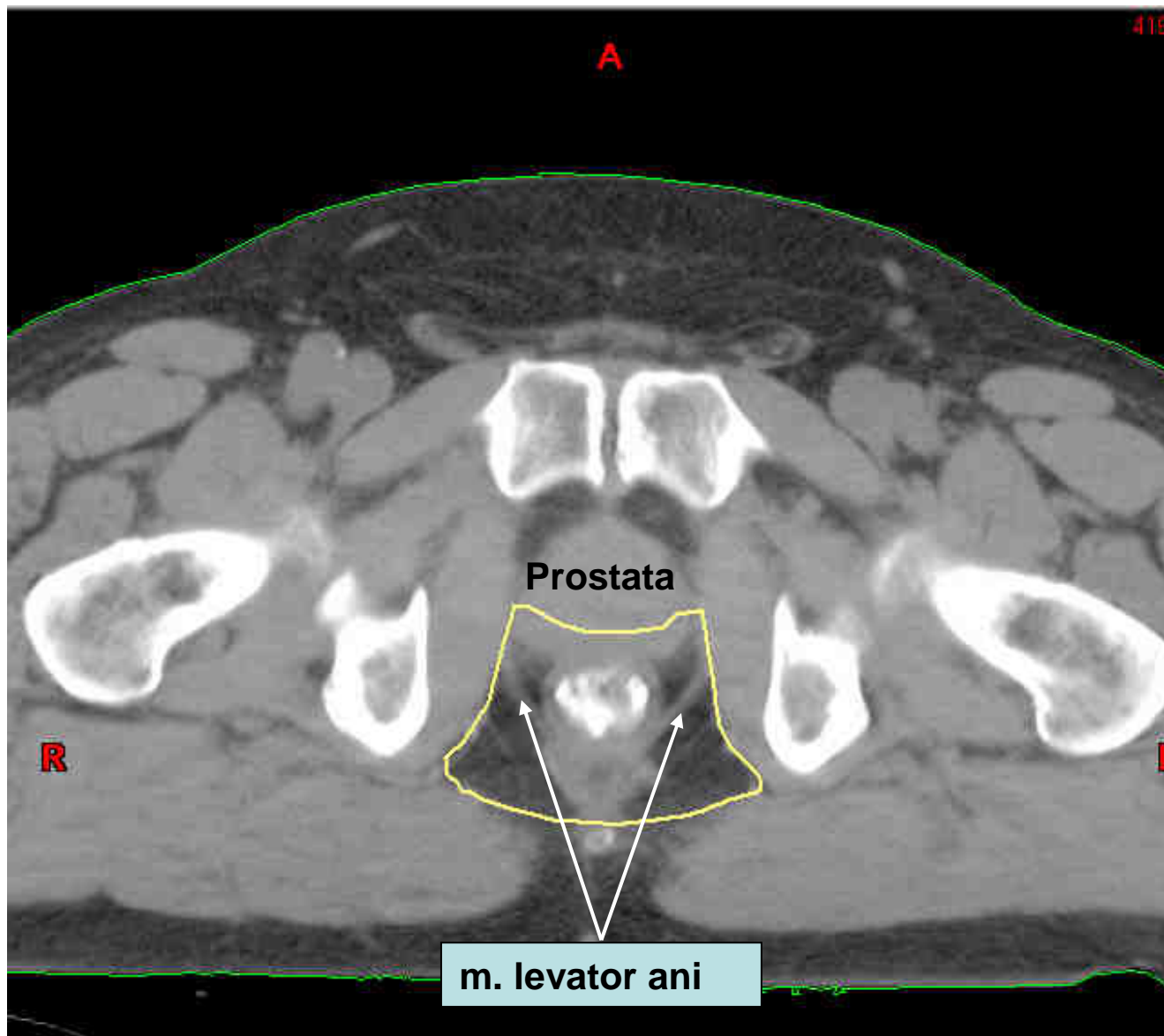




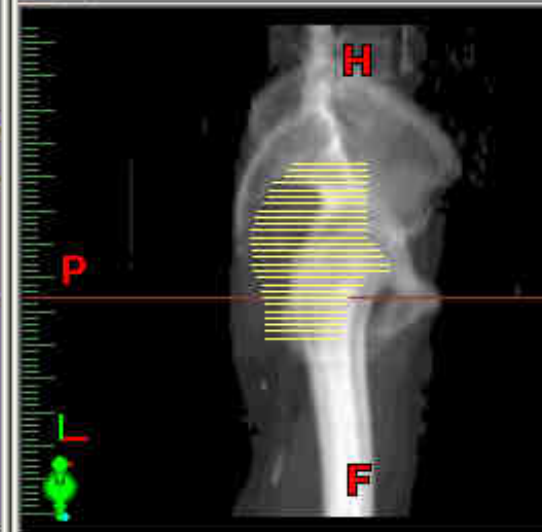
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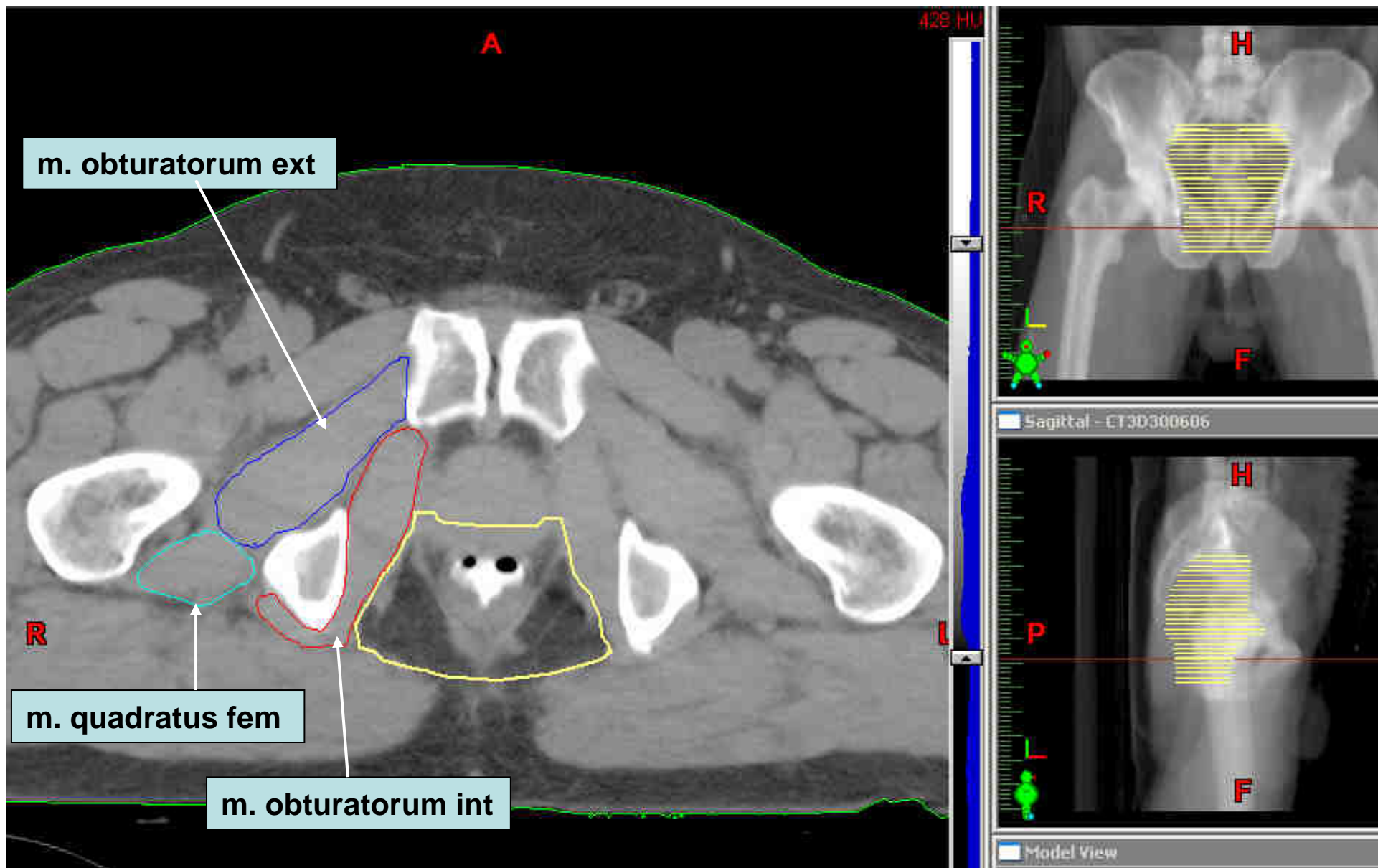
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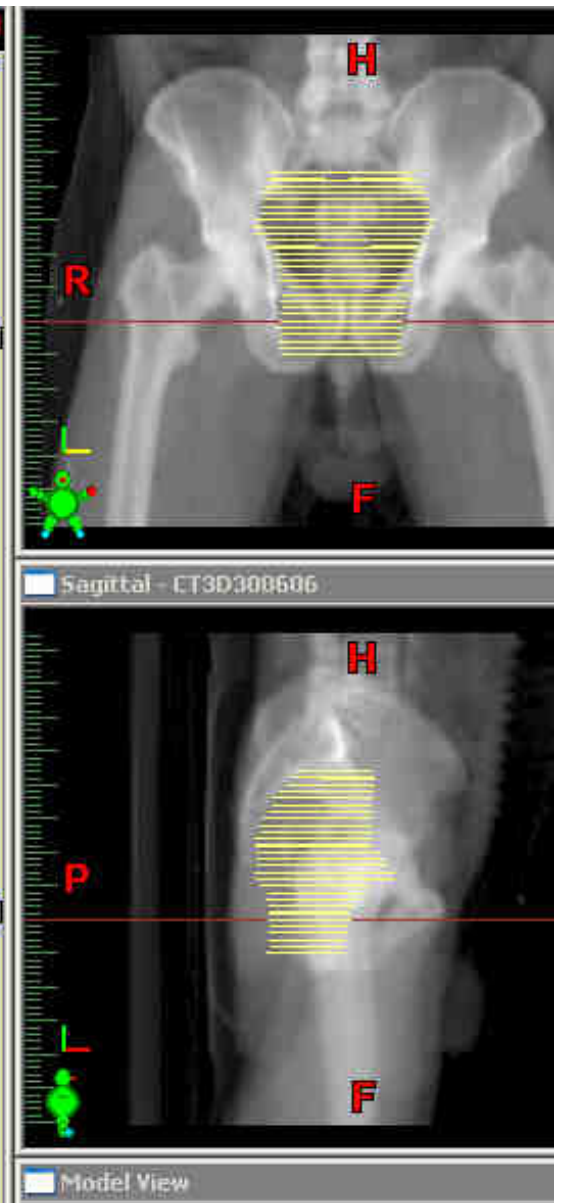
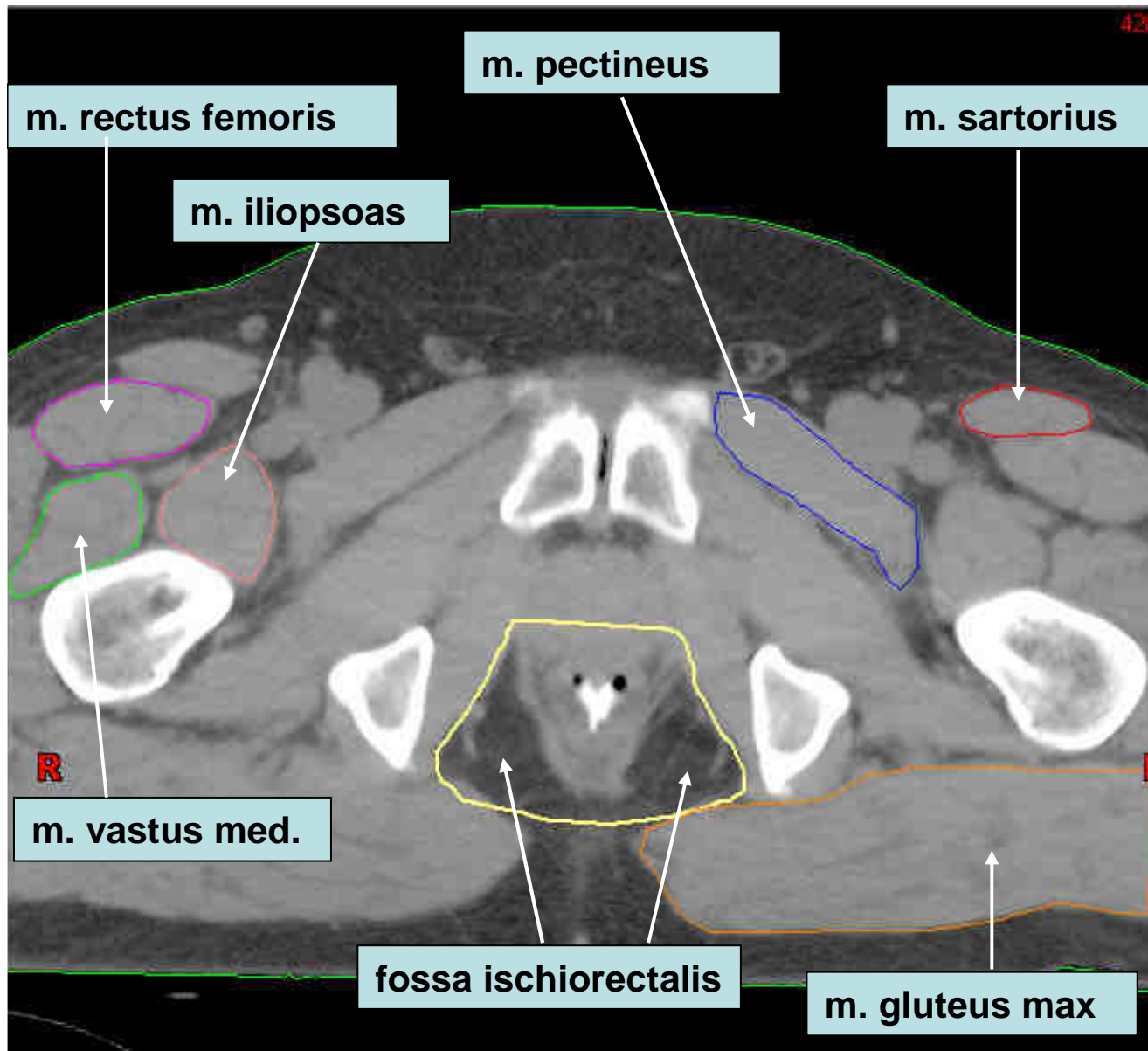


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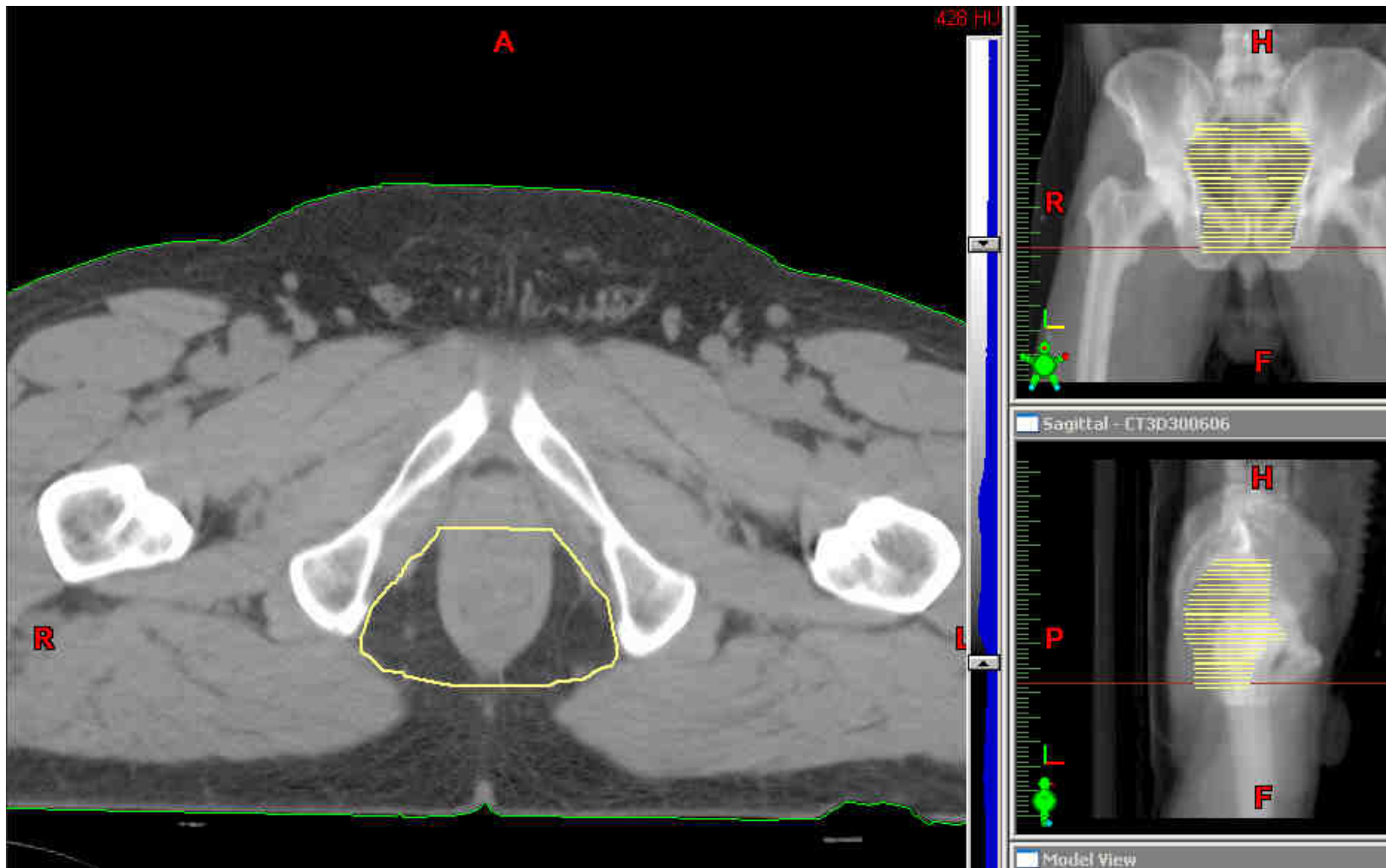
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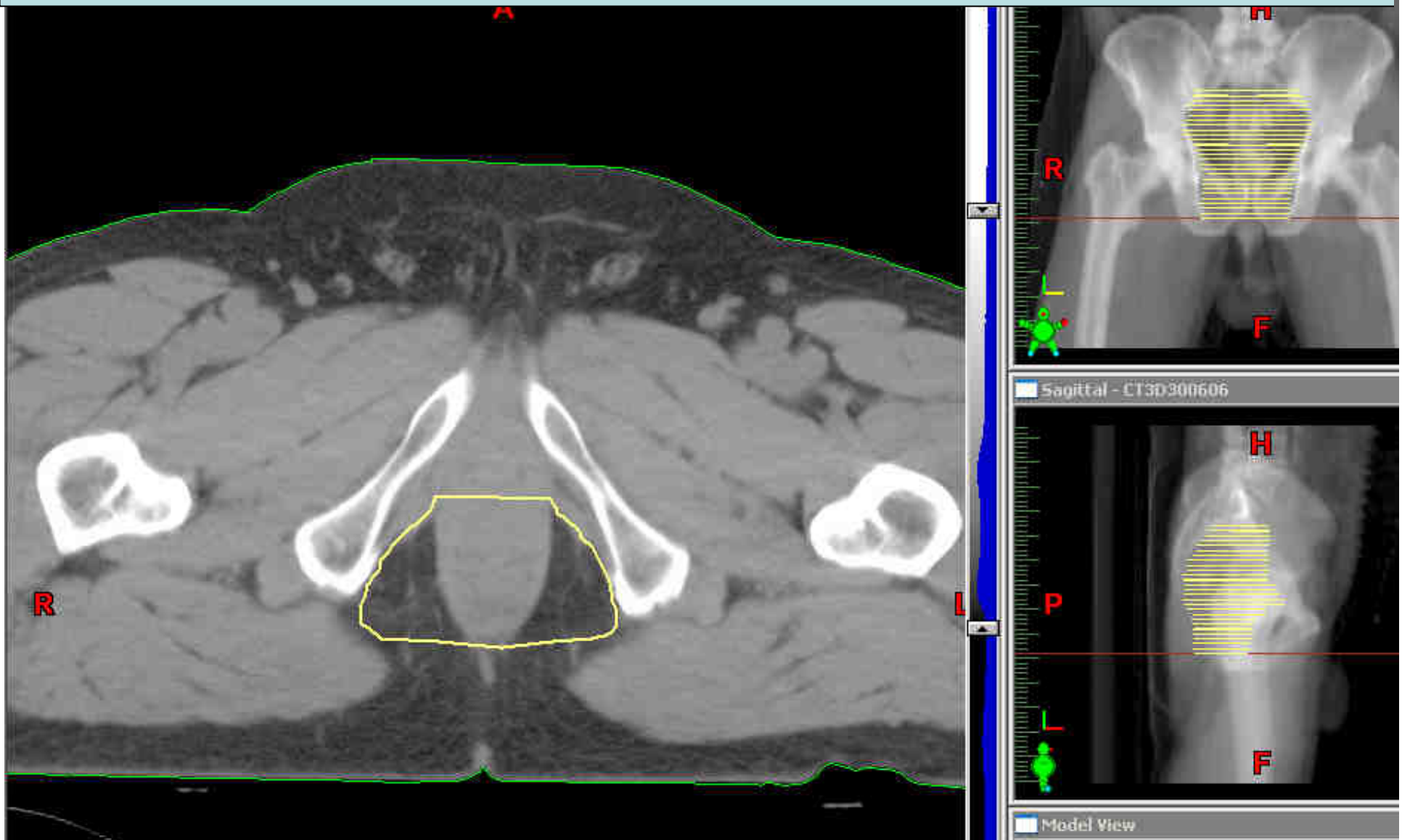




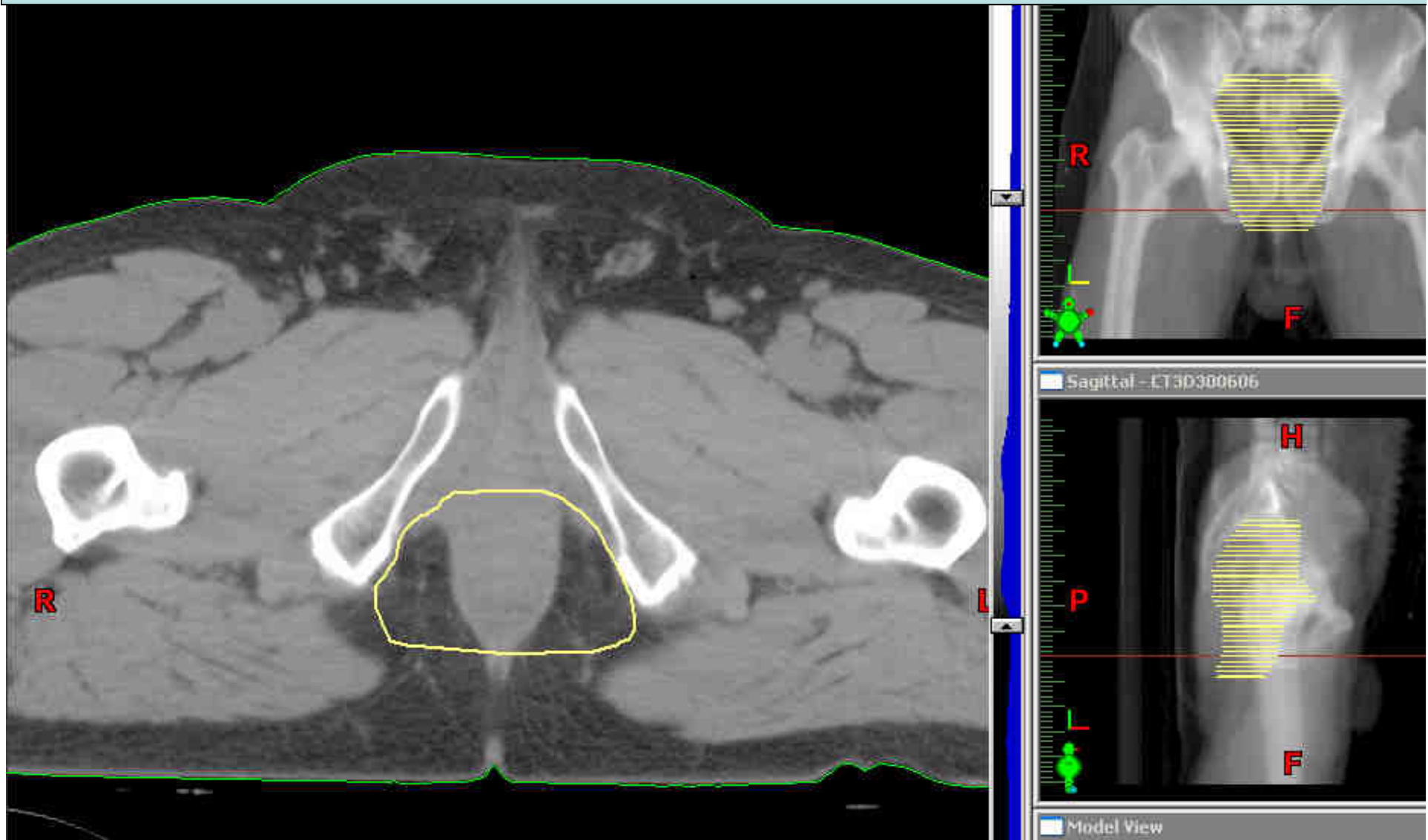




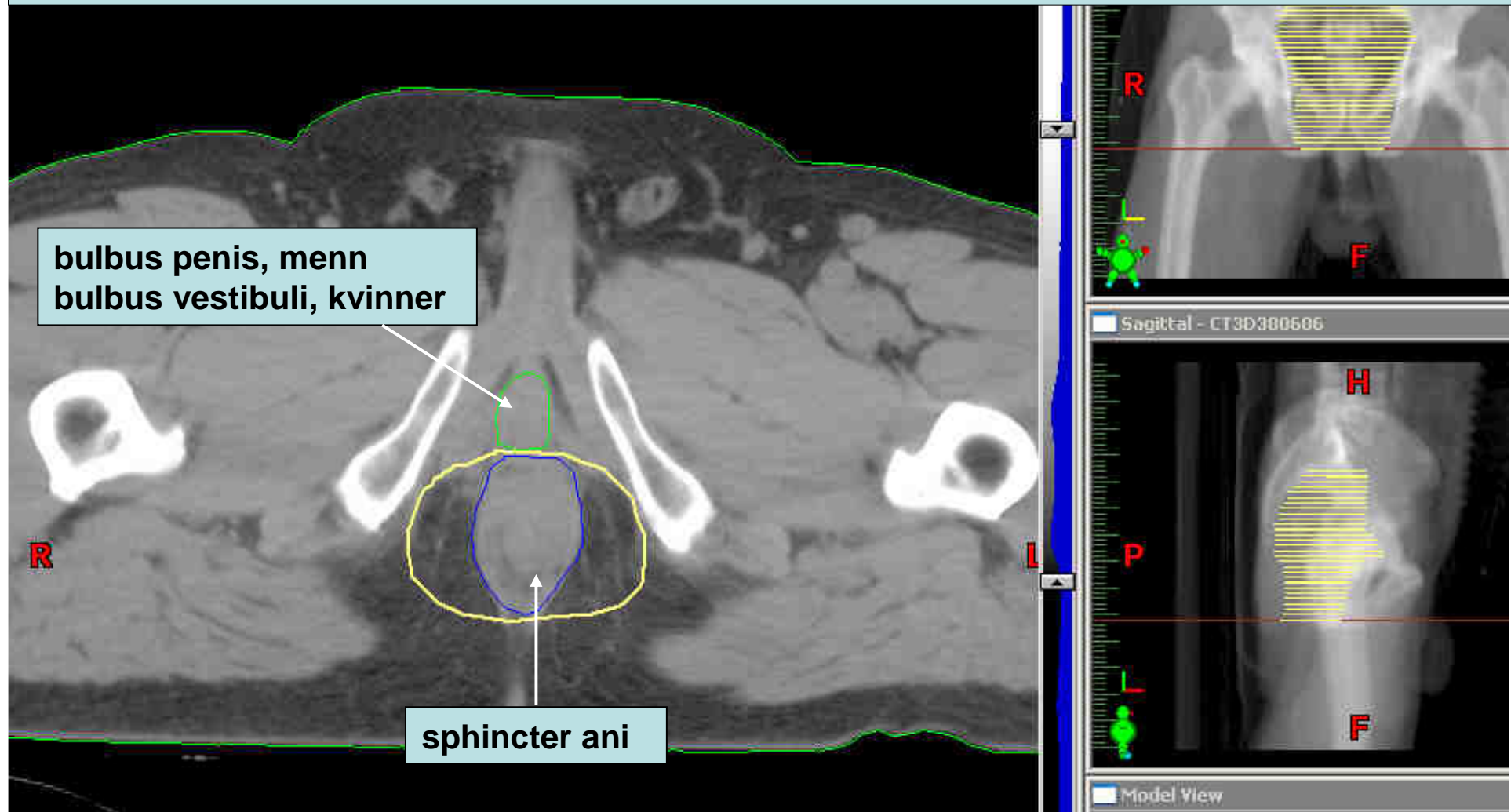
Nederste snitt av CTV1 på denne pas med høysittende tumor. Tumor ligger > 5 cm fra analverge. CTV ender 3 cm proximalt for blyhagl = perineum

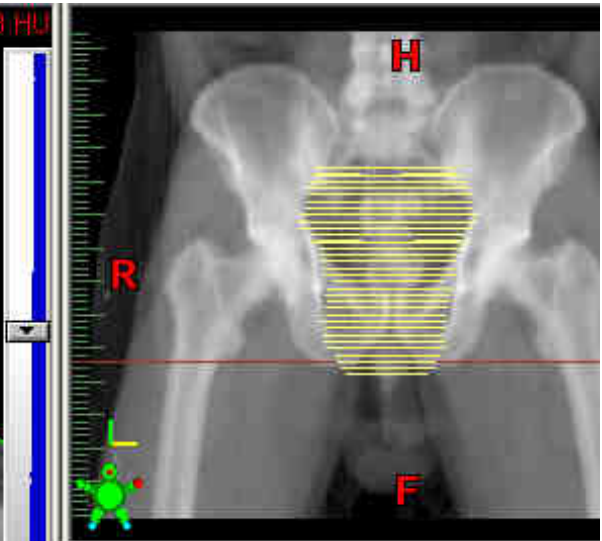
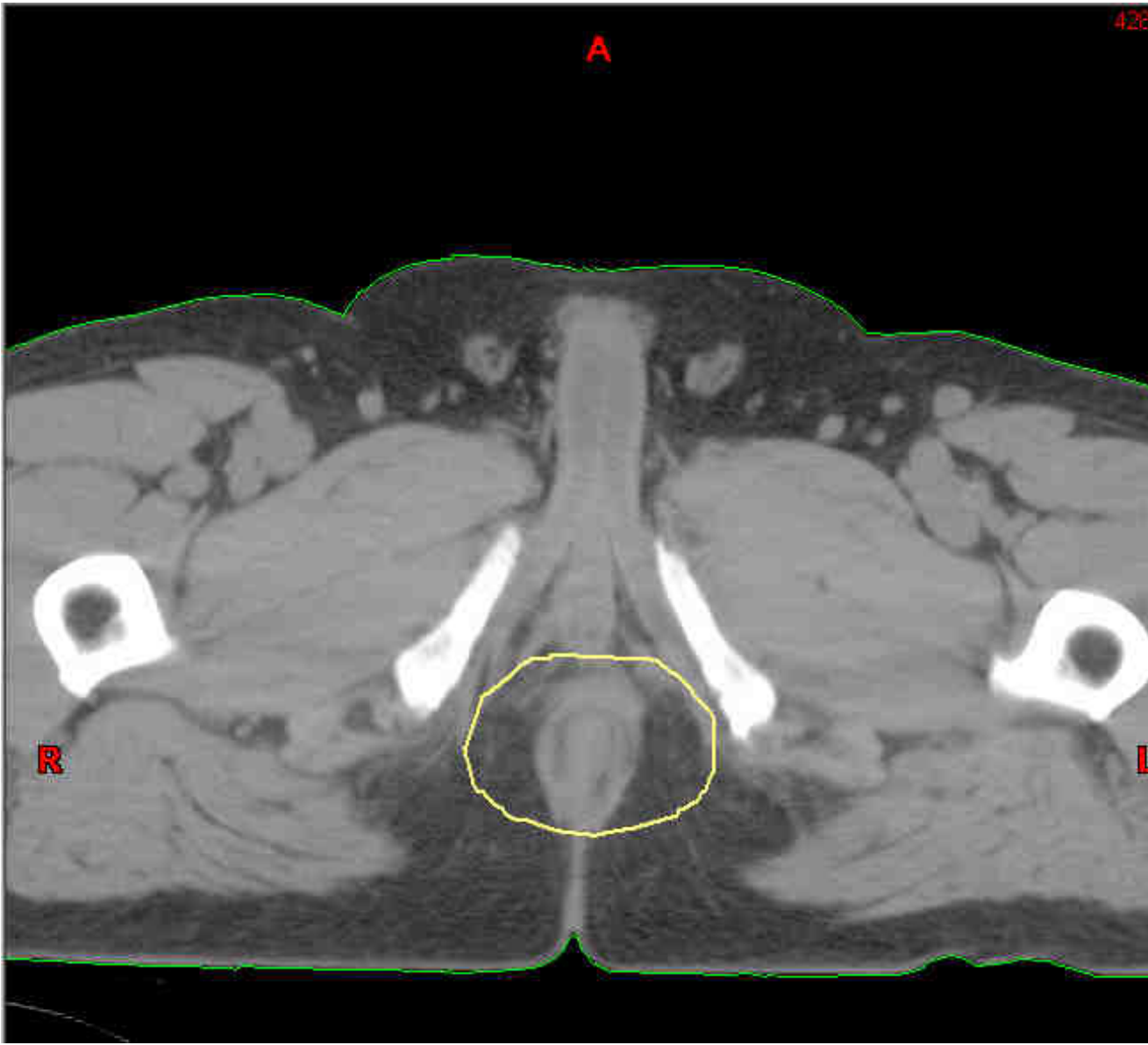


Dersom tumor hadde ligget < 5 cm fra anal verge, ville CTV inkludert caudalt til perineum = blyhagl

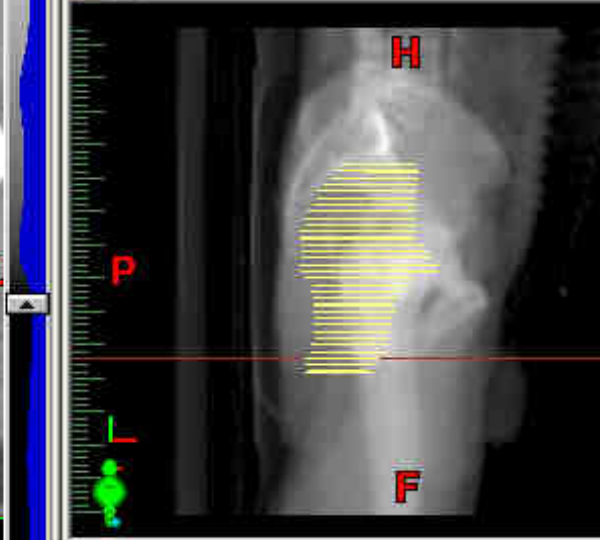


Levator ani går her over i sphincter ani. Vi har dermed kommet caudalt for levatormuskulaturen og dermed fossa ischioirectalis. Herfra snevres CTV inn til å dekke sphinkter (med litt margin) ned til perineum. Anteriore begrensning er bulbus penis/vestibuli





Sagittal - CT30300606



Model View

