RADIATION THERAPY

w/ Elekta Unity
(MRL)

- Presented by:
- Katherine Reyes RT(T) (MR)

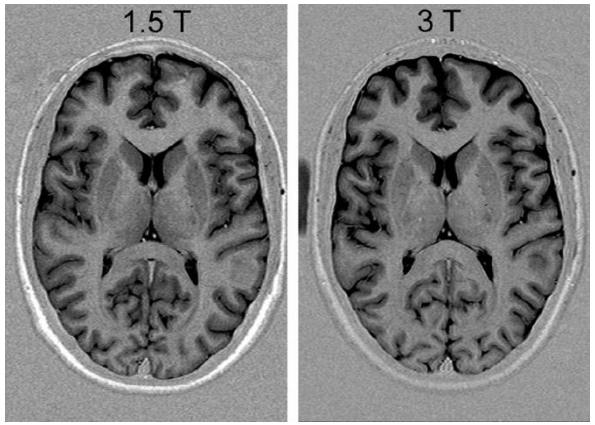


Elekta Unity MR- Linac System

Hybrid system combining high resolution MRI with Radiation Therapy

Features:

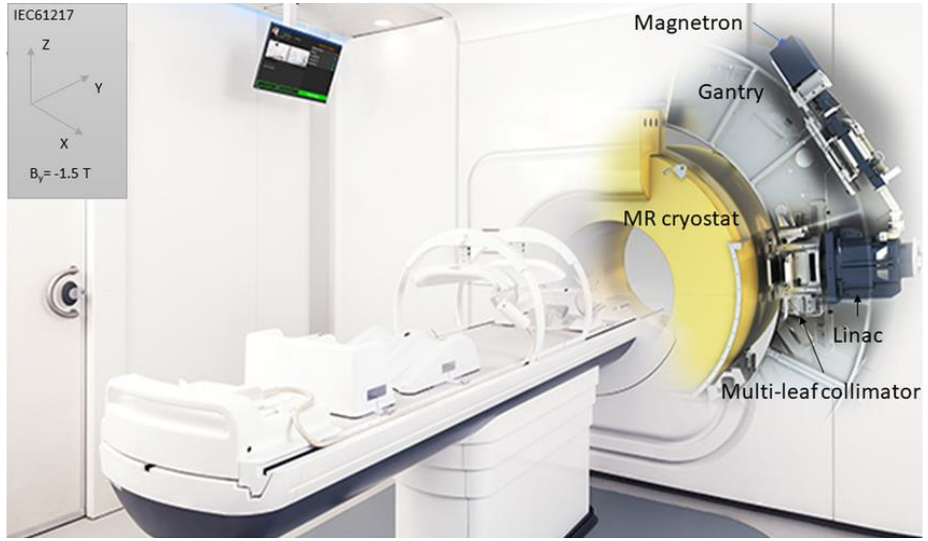
- **1.5 Tesla MRI**
- **Integrated Treatment Delivery** : RT delivered with real time imaging, allowing for precise targeting of tumors.
- **Adaptive Radiation Therapy** : Adjusts treatment in real-time based on the patient's anatomy or tumor movement.

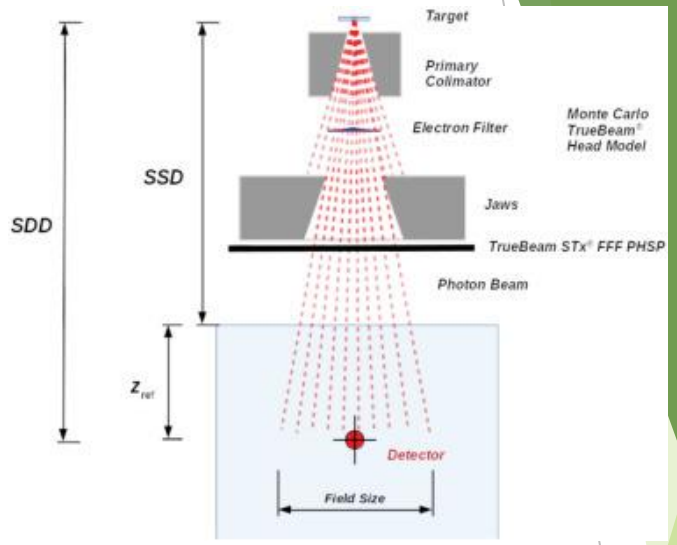


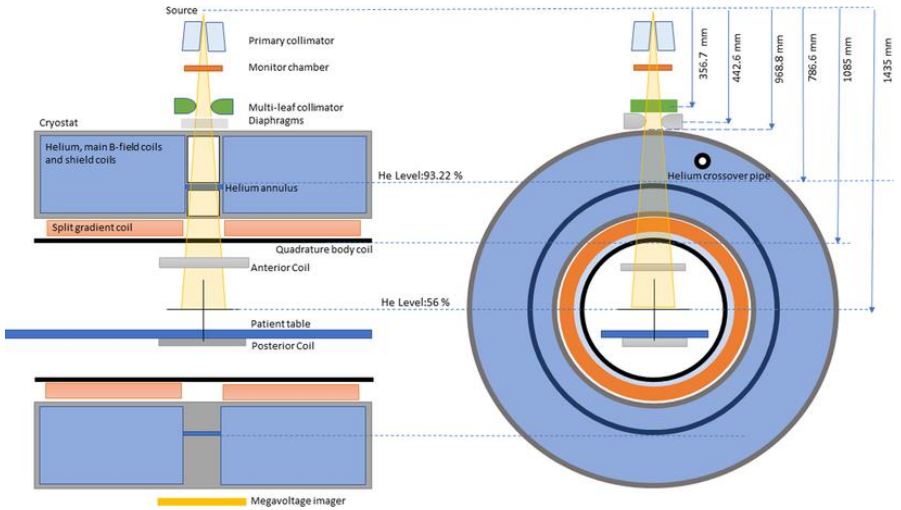


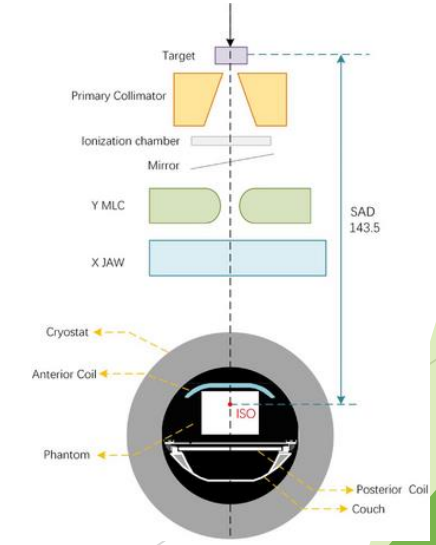
Why MR in Radiation ???

- Provides high resolution soft tissue contrast .
- Helps in accurate tumor delineation
- Improves treatment precision and minimizes radiation exposure to healthy tissues


IEC61217
Z
Y
X
B_y= -1.5 T
Magnetron
Gantry
MR cryostat
Linac
Multi-leaf collimator


Target
Primary Collimator
Electron Filter
Monte Carlo TrueBeam® Head Model
SSD
SDD
Jaws
TrueBeam STx® FFF PHSP
Photon Beam
Z_{ref}
Detector
Field Size


Source
Primary collimator
Monitor chamber
Multi-leaf collimator Diaphragms
Cryostat
Helium, main B-field coils and shield coils
Helium annulus
Split gradient coil
Quadrature body coil
Anterior Coil
Patient table
Posterior Coil
Megavoltage imager
He Level:93.22 %
He Level:56 %
Helium crossover pipe
356.7 mm
442.6 mm
968.8 mm
786.6 mm
1085 mm
1435 mm


Target
Primary Collimator
Ionization chamber
Mirror
Y MLC
X JAW
SAD 143.5
Cryostat
Anterior Coil
ISO
Phantom
Posterior Coil
Couch

QUICK REVIEW!

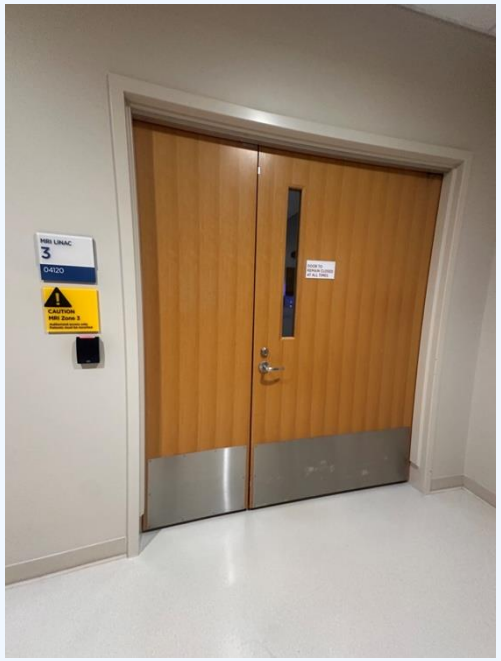
ZONE 1:



ZONE 2:



ZONE 3:



ZONE 4:





Treatment Procedure: PROSTATE

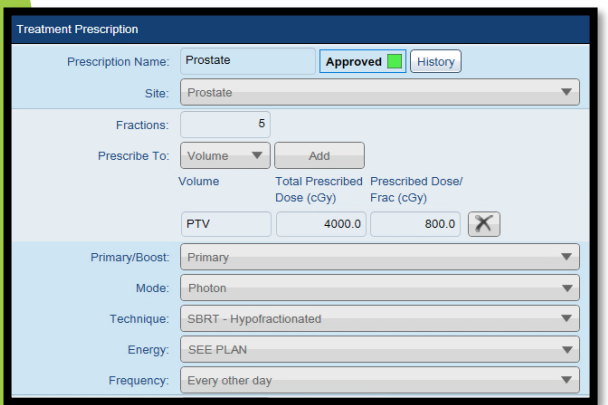
CURRENT WORKFLOW

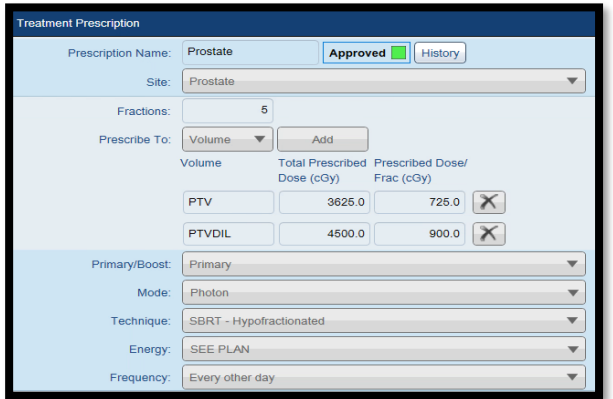


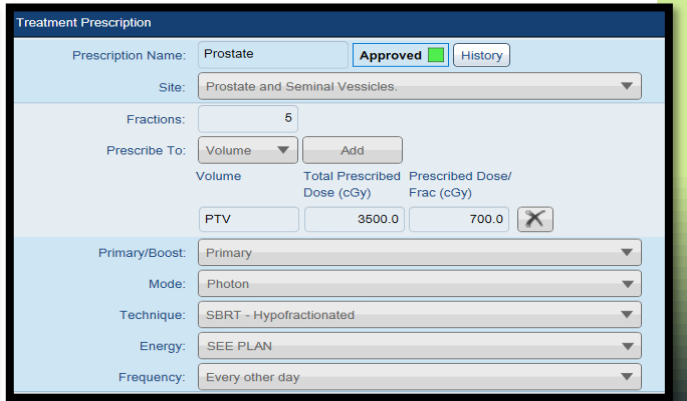
Site	Prostate		
Field #	01-15		
Bladder	Full <4 oz> <30 min>		
Position	Head First Supine		
Headrest	BHH on #1		
Arms	High on chest holding blue ring		
Knees	K3	**Table Index**	F4
Knee Cushion	Knee Cushion + Base		
Feet	F1	**Table Index**	F7
MRL Tabletop	11.2		
MRL Index	19		

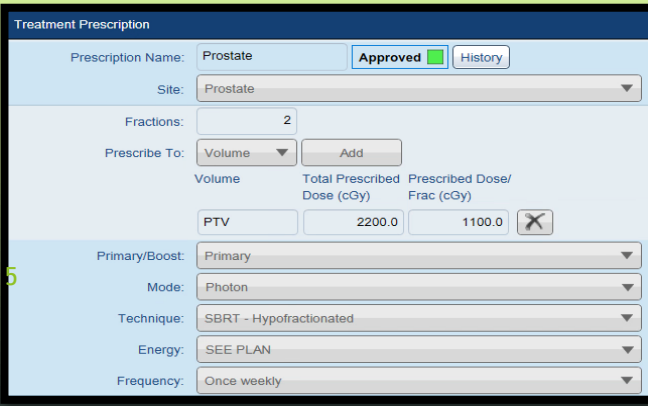
- ATS LITE 1ST FX
- ATP FX 2-5

Typical TX Prescriptions





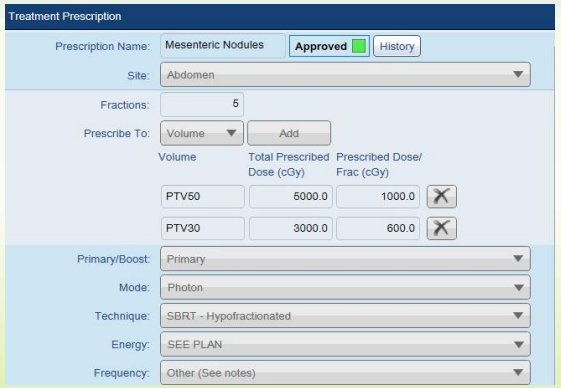


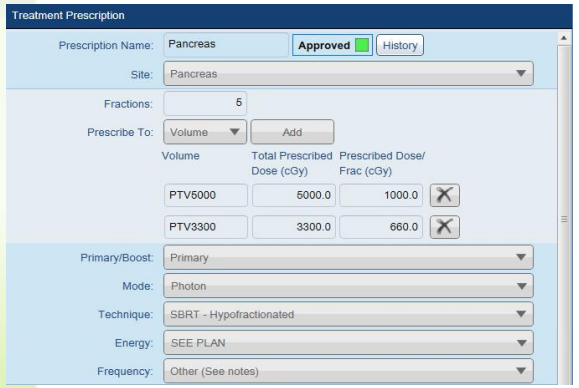


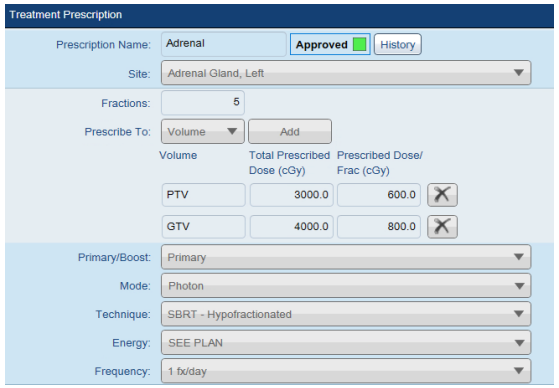
Treatment Procedure: "GI"

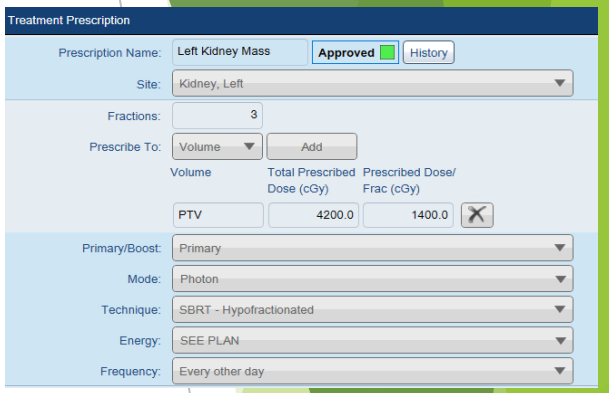
PANCREAS, LIVER, KIDNEY, ADRENAL GLAND, MESENTARIC NODES

Typical TX P









Set up



Implants	☐ Marker ☐ Clips ☐ None
Belt Size	☐ S ☒ M ☐ L
Respiratory motion (no pressure)	0.8 *cm*
Pressure Used	20 *mmHg*
Respiratory Motion (at pressure)	0.5 *cm*
Belt position tattoos placed?	NA
Belt at centerline?	YES
Belt fastening (Centerline scale mark)	23.5 *cm*

CURRENT WORKFLOW

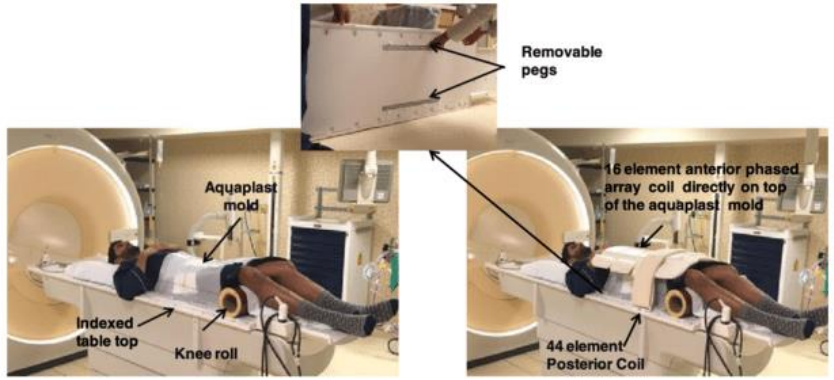
- ATS only
- Exception: Kidney w/ contrast

Treatment Procedure: Rectum/GYN

CURRENT WORKFLOW

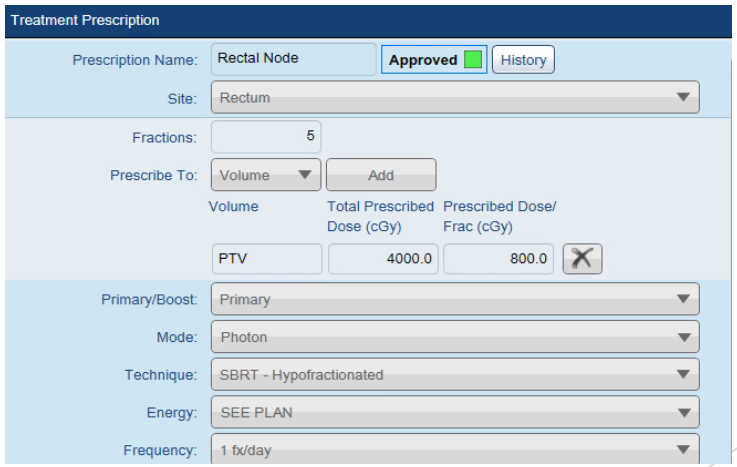
- ATS 1ST FX, THEN WEEKLY
- ATP FX 2-5

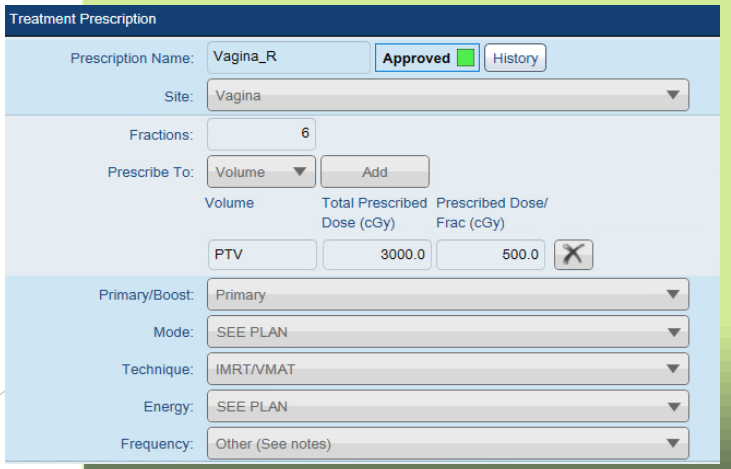
Set up



Site	MRL Rectum	
Field #		
Bladder	Empty	
Position	Head First Supine	
Pelvic Board	Narrow	
Board Level	10.1	cm
Mold	Aquaplast	
Headrest	BHH on #1	
Arms	High on chest holding blue ring	
Legs/Ankles	#3	
MRL Tabletop	5.5	
MRL Index	22.5	
Setup Instructions		
• Triangulate on ISO/LAT tattoos • Align SUP tattoo		
Tattoos	At Depth	
Field #		cm

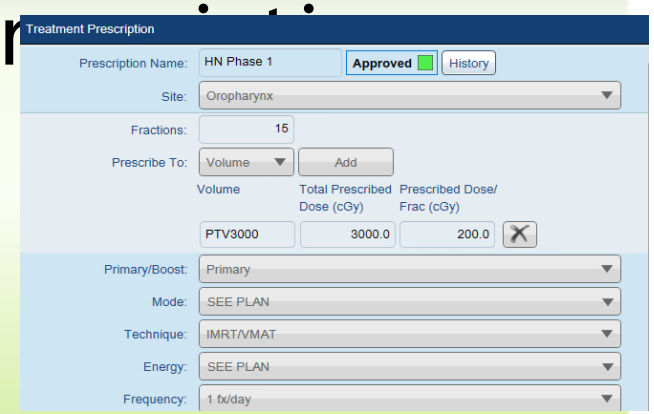
Typical TX Prescriptions

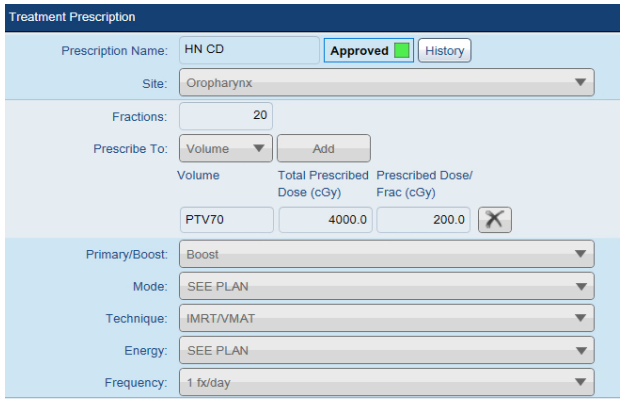


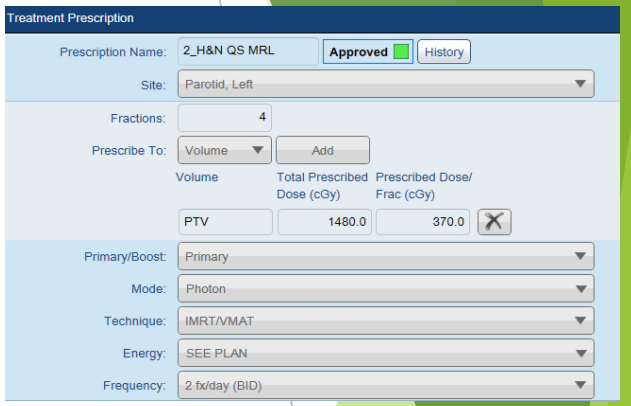


Treatment Procedure: H&N

Typical TX Pr





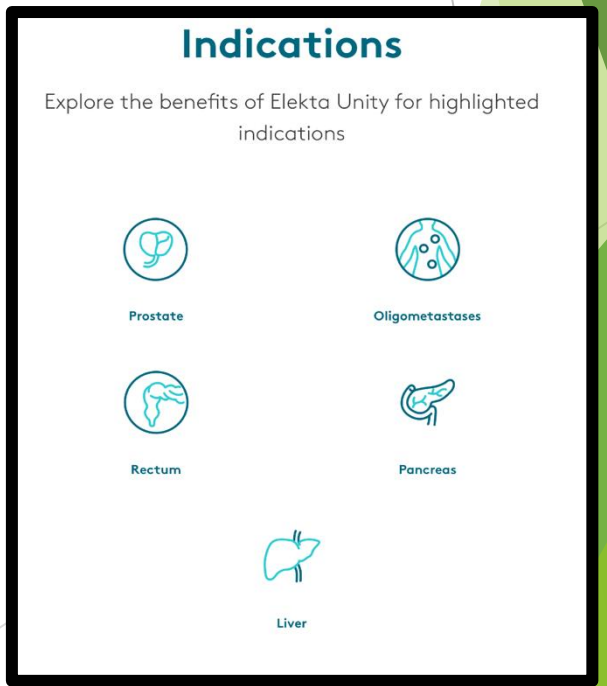


Workflows Available:

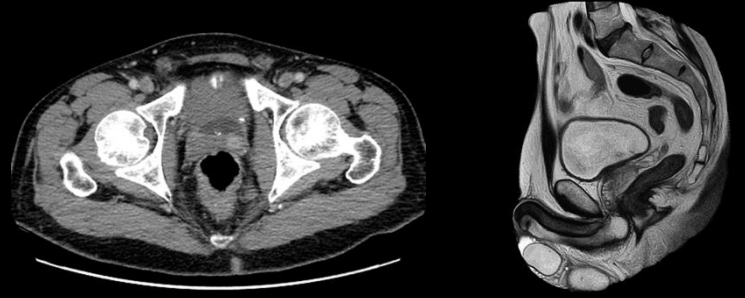
- ATS only 1ST FX & WEEKLY
- ATP DAILY

Set up

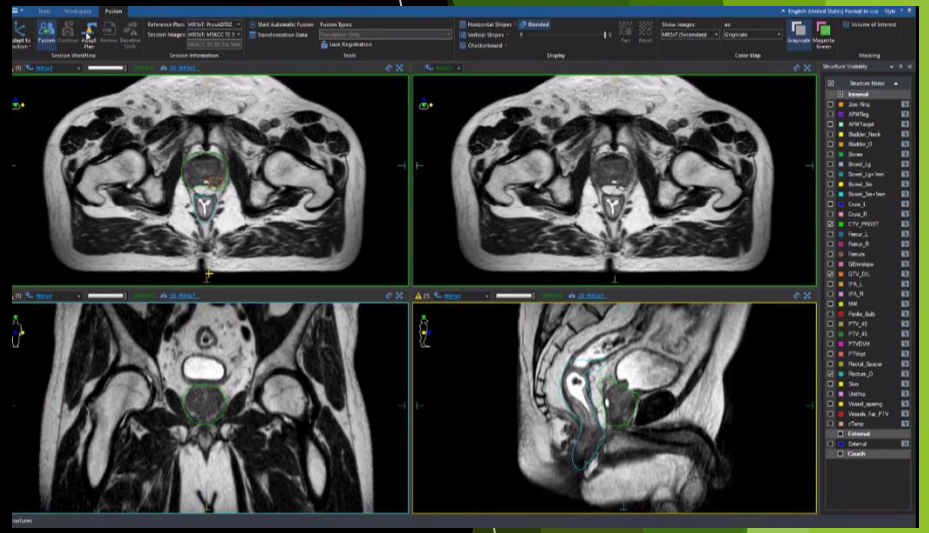




TX PLANNING



- START w/INITIAL IMAGING
- SCAN TO PLAN : ATS vs ATP



ATS

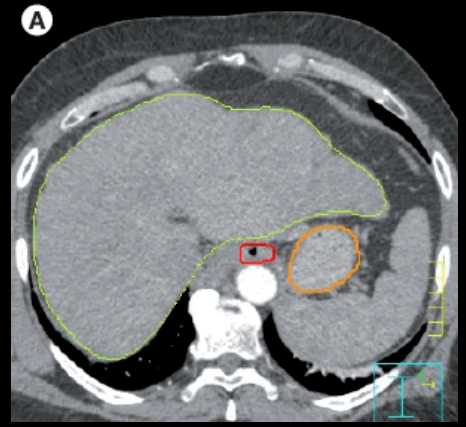
"Adapt to Shape"

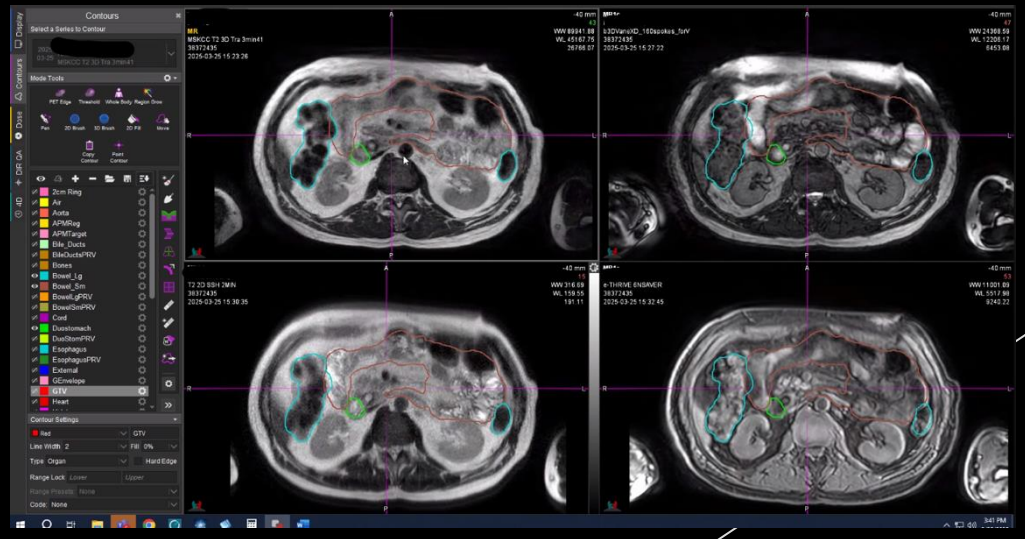
- Used when there are significant changes to anatomy, requiring adjustments to the tx plan itself.
- You re-contour tumor, and nearby critical structures. Then you adjust the radiation dose distribution based on the new anatomy

ATP

"Adapt to Position"

- You compare the patient's current anatomy to original planning images
- Tx plan does not change, tx delivery is adapted to account for anatomical shifts.





ATS Lite

- New Workflow
- Used on fx 1, gives us the opportunity to adapt to any internal anatomy changes while also referencing to an MRI image

Verification Scan (PRE TX)

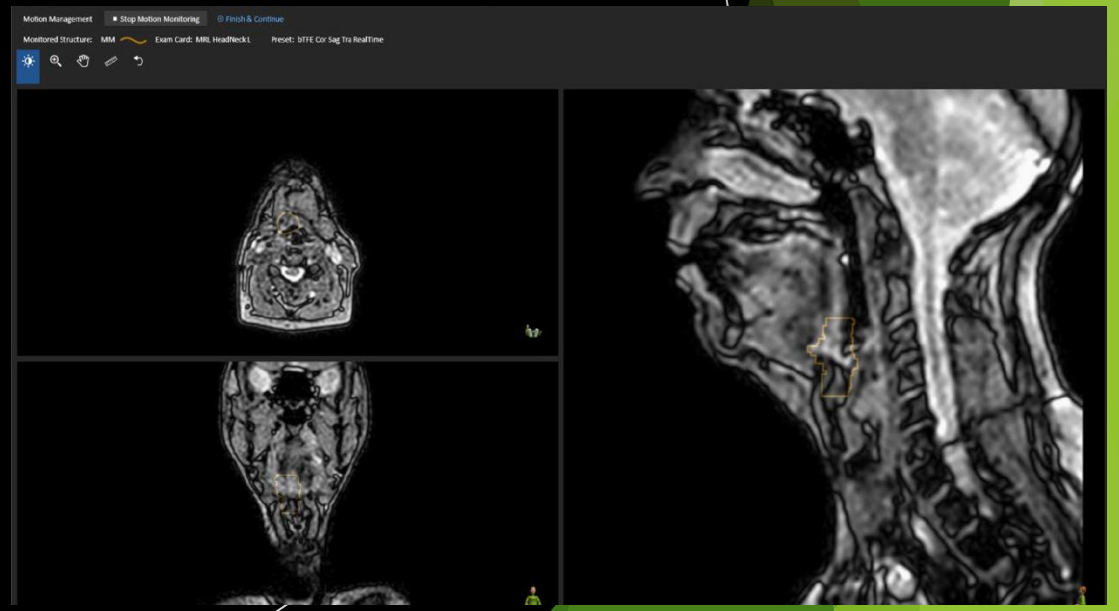
- Only necessary for ATS cases, occurs once the plan has been finalized.
- If there are big shifts, then we continue with ATP and adjust for shifts.
- If no big shifts, we can move forward with treatment.

Verification (Post Beam on)

- Baseline Shift: occurs if shifts on MM are less than 3 mm
- Completion Plan: occurs if we have shifts greater than 3 mm

MRL TRACKING OPTIONS: GATING VS MOTION MONITORING





https://www.elekta.com/products/radiation-therapy/unity/cmm-webinar/

IF ALL GOES WELL…

TREATMENT IS COMPLETE !



ANY QUESTIONS?