Cancer
UT MD Anderson

From Clicks to Consistency

Automating Optimization Contours in RayStation

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1

What are "Optimization Contours"

Dosimetrist-created structures built on top of physician-drawn targets and OARs

- Smaller focus area for optimizer
- Avoid conflicting objectives in optimization
- Conform higher dose around target (rings)
- Conform lower dose in normal tissue (NT)

2

Advantages

SPEED

- Fast Initial Plan
- Adapt Plans Quickly
- Fast Replans
- Contour Names Match Objective Templates

Disclaimer

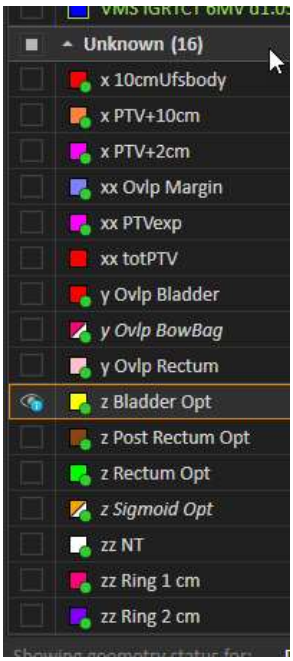
- One template accommodates multiple planners' styles
- Consistency is the goal – avoid cluttering templates

Example: Contour Template for Prostate Planning

Contour Definitions using Prostate Example

Definitions of contours - Prefixes

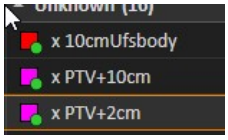
- Keeps ROIs in order
- Easier to identify



Definitions of contours – Prefixes x & xx

Prefix:

x & xx: these contours are intermediary structures used to create the actual opt structures.

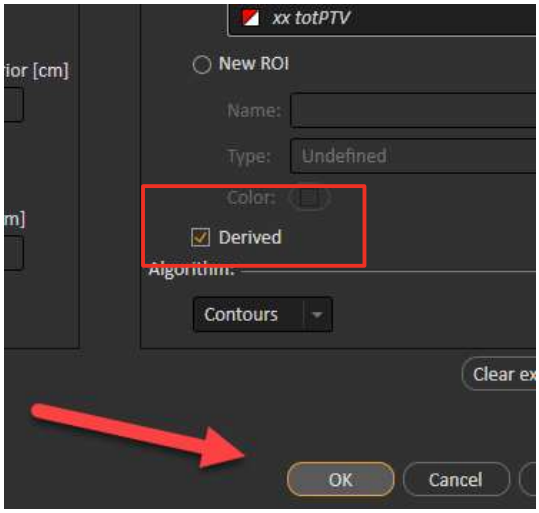


It is wise to keep these intermediary structures because if the physician changes target contours or you are doing an adapt plan, you want to have these available and unchanged

Definitions of Contours

VERY IMPORTANT:

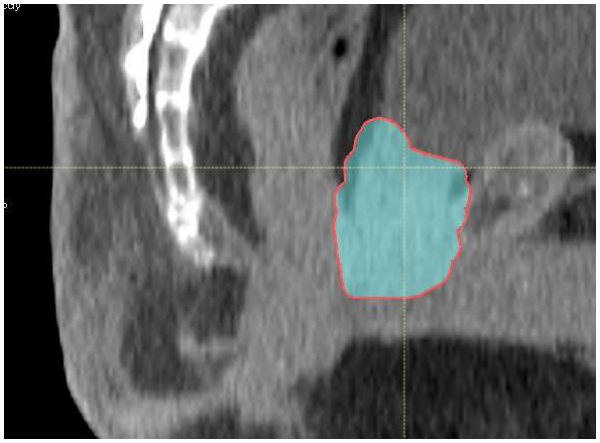
Keep the contours you create derived. All the power is in the derivation



Definitions of contours – Prefixes x & xx

xx totPTV:

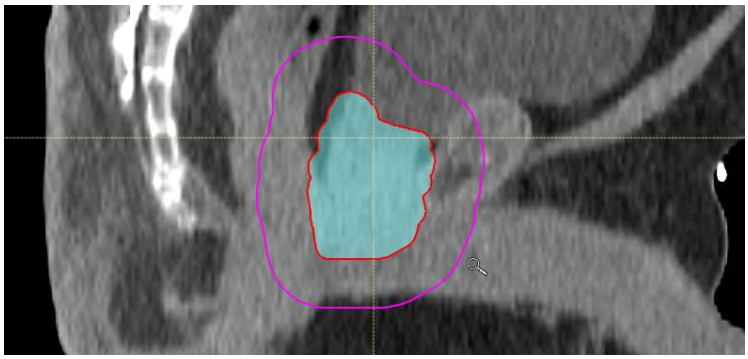
All PTVs combined



Definitions of contours – Prefixes x & xx

x PTV+2cm:

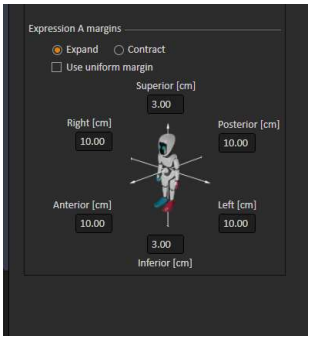
xx totptv + 2 cm all around

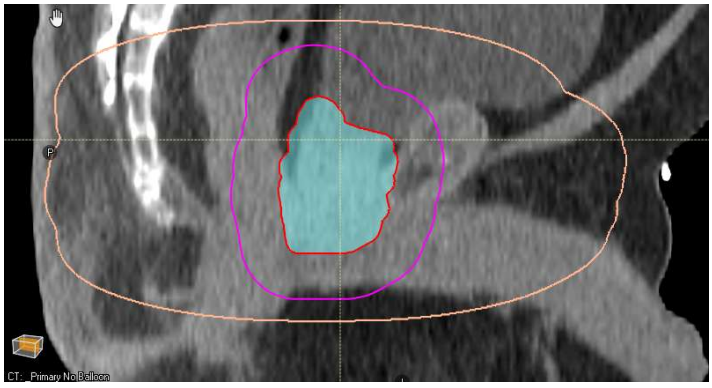


Definitions of contours – Prefixes x & xx

x PTV+10cm:

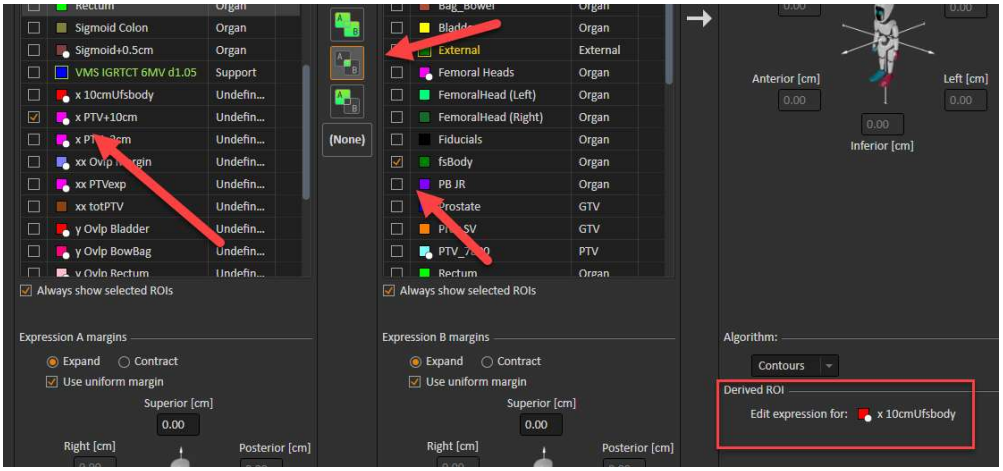
(x PTV+2cm) expanded





Definitions of contours – Prefixes x & xx

x 10cmUfsbody: Clips area that is outside of the patient external



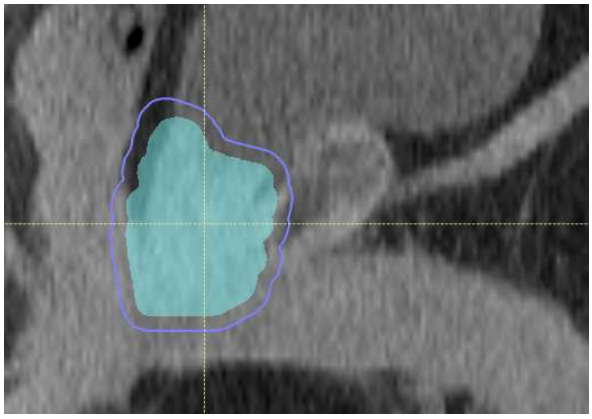
Definitions of contours – Prefixes x & xx

x Ovlp Margin:

xx totPTV + 0.5 cm

Creates an expansion on the PTV to be used when creating overlap regions.

0.5 – 1 cm is typically a good margin



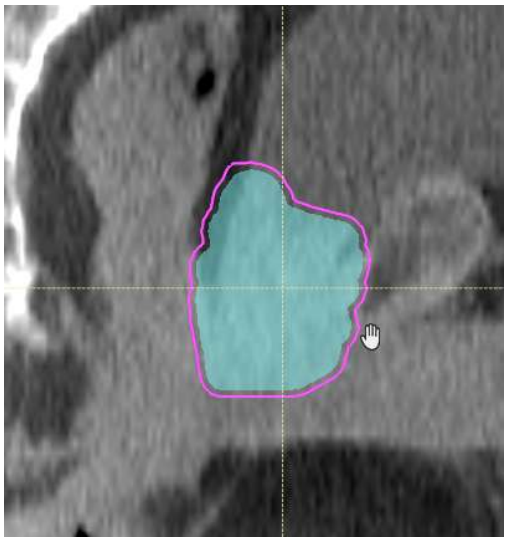
Definitions of contours – Prefixes x & xx

xx PTVexp:

xx totPTV + 0.2 cm

Creates an expansion on the PTV to be used as a gap when creating OAR optimization structures (gap between OAR and PTV)

0.2 – 0.5 cm is typically a good margin



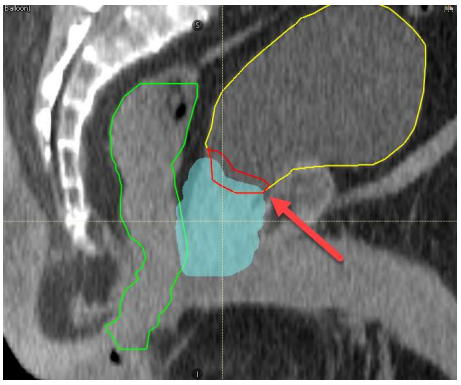
Definitions of contours – Prefix y

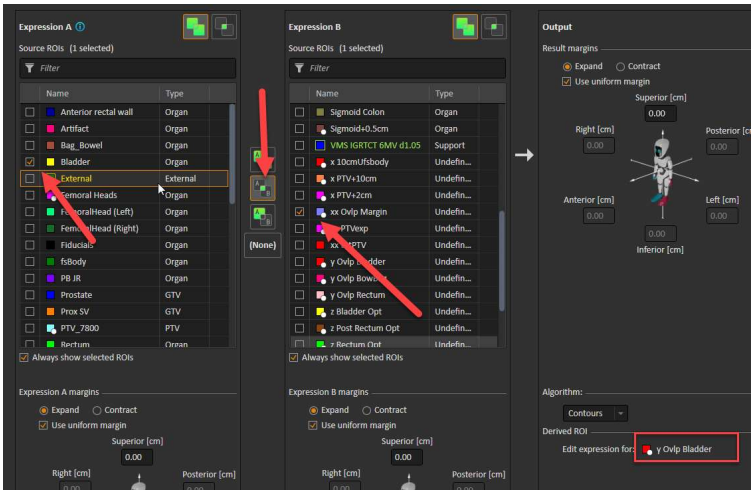
Prefix y:

these contours are overlaps of oar with ptv + margin. This creates a smaller ROI for the optimizer to focus on.

Definitions of contours – Prefix y

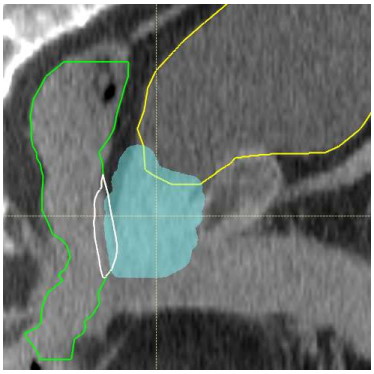
y Ovlp Bladder

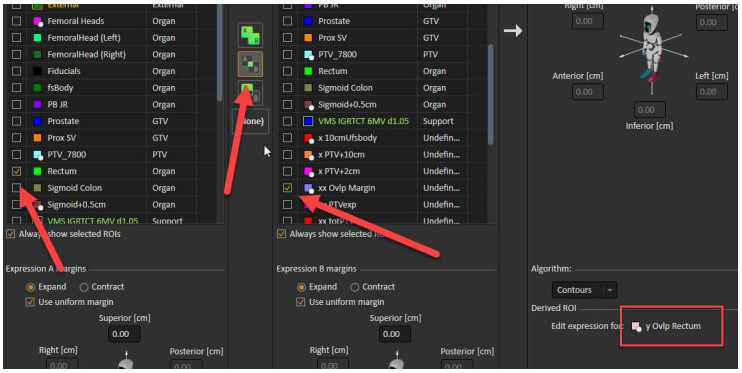




Definitions of contours – Prefix y

y Ovlp Rectum

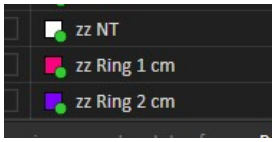




Definitions of contours – Prefixes z & zz

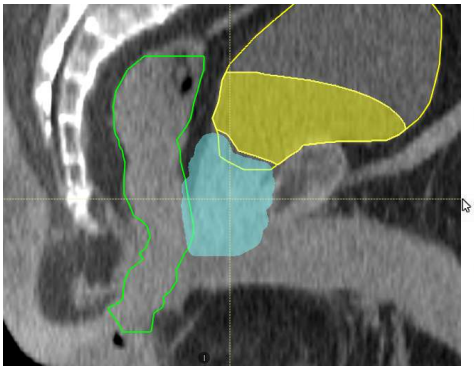
z: these contours are OAR opt structures.

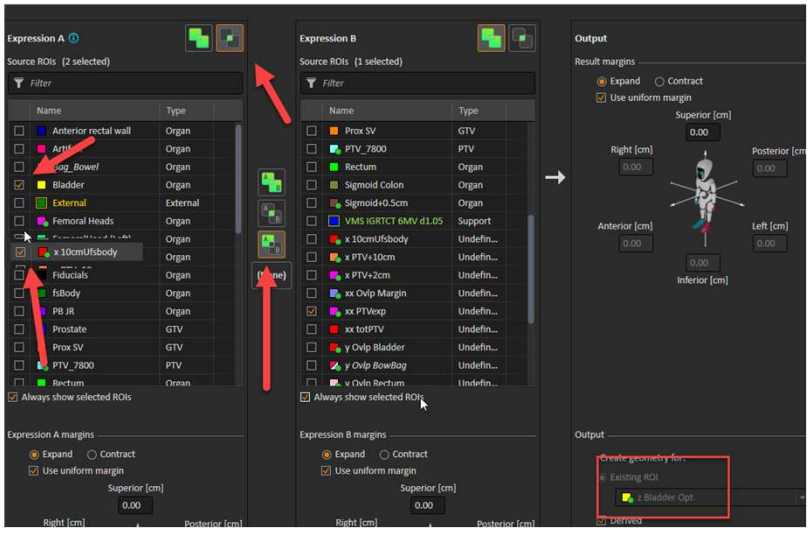
zz: these contours conform dose. NTs and rings



Definitions of Contours – Prefixes z & zz

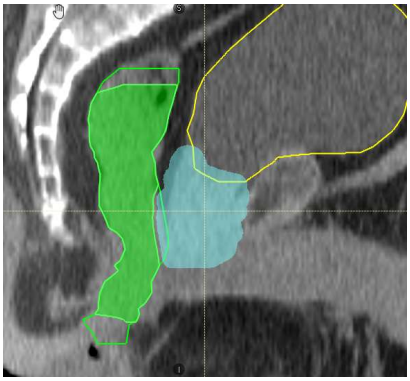
z Bladder Opt

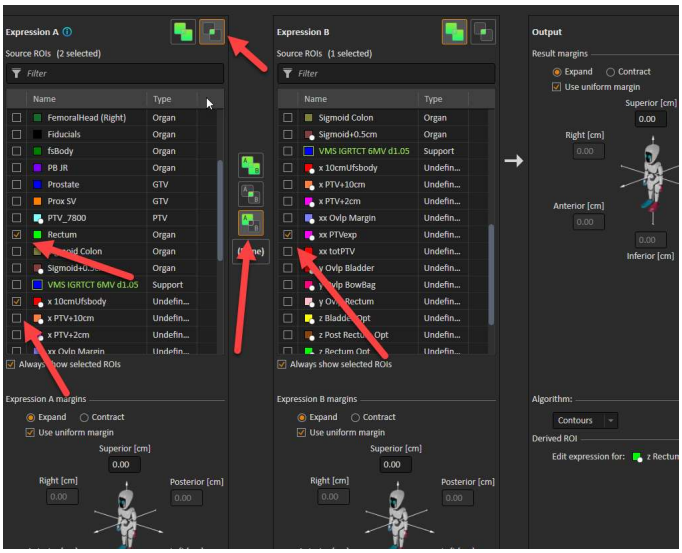




Definitions of Contours – Prefixes z & zz

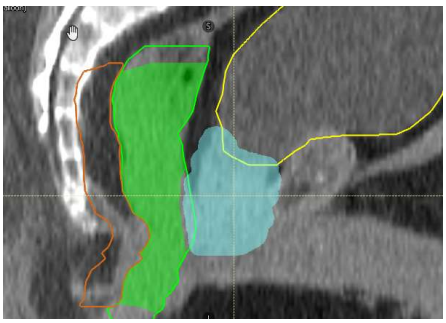
z Rectum Opt

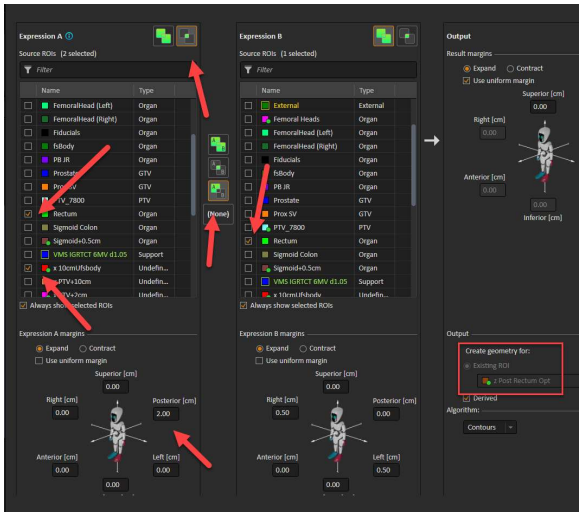




Definitions of Contours – Prefixes z & zz

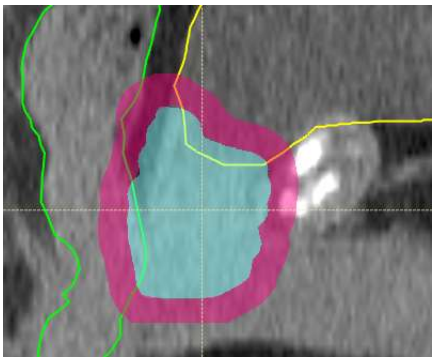
z Post Rectum Opt

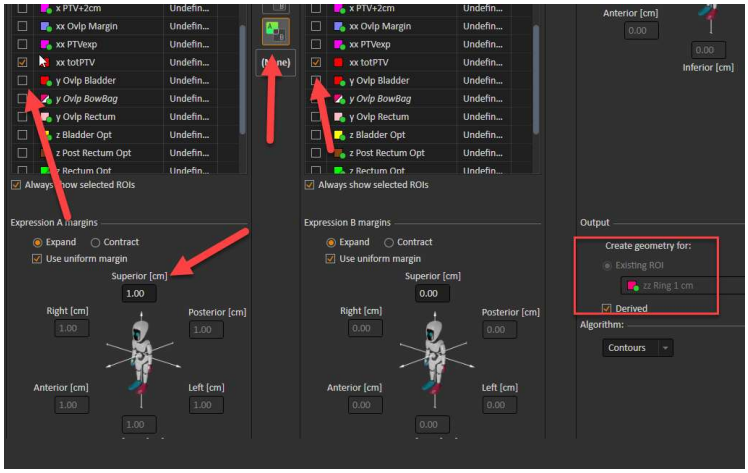




Definitions of Contours – Prefixes z & zz

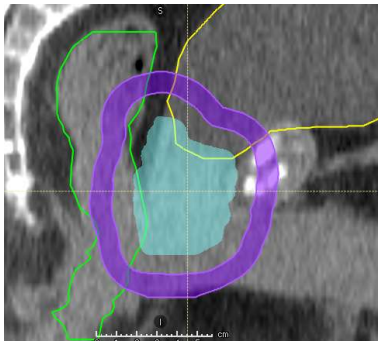
zz Ring 1 cm

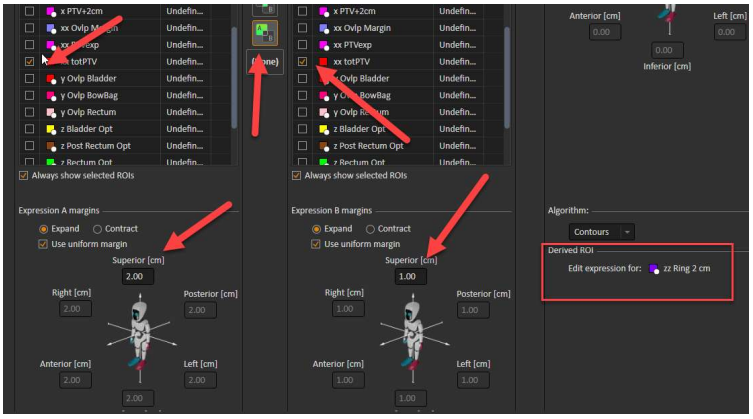




Definitions of Contours – Prefixes z & zz

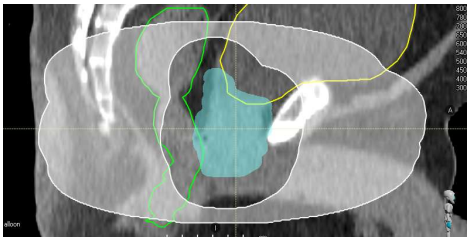
zz Ring 2 cm

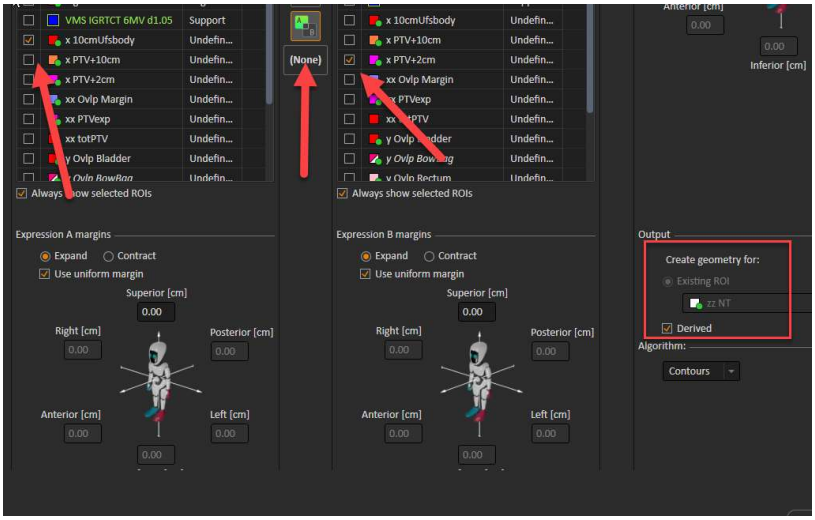




Definitions of Contours – Prefixes z & zz

zz NT



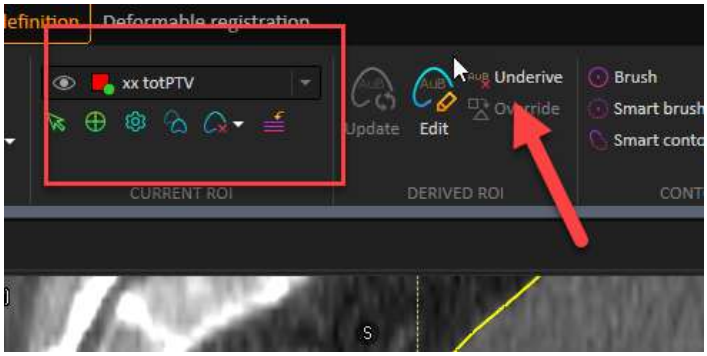


Create your own Template
1. Create a Base Template

Create a Base Template

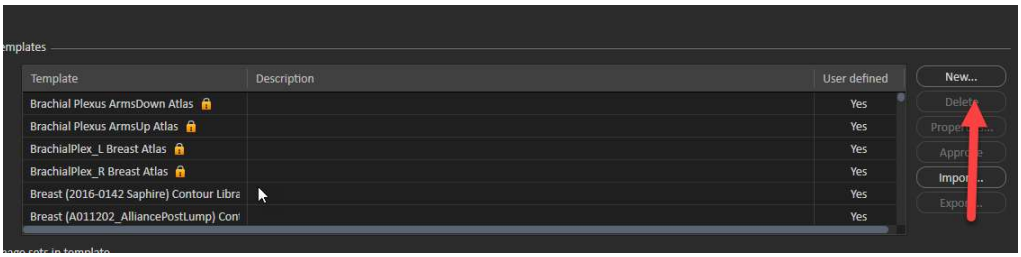
Make a basic template

1. Very important: underive xx totPTV



Make a base template

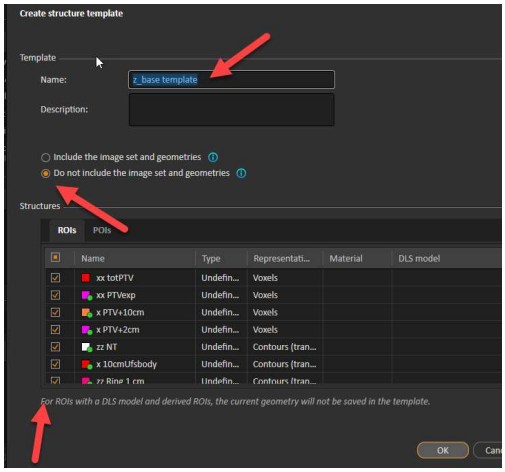
2. New roi geometry > structure template management > new…



Make a base template

3. Rois to check:

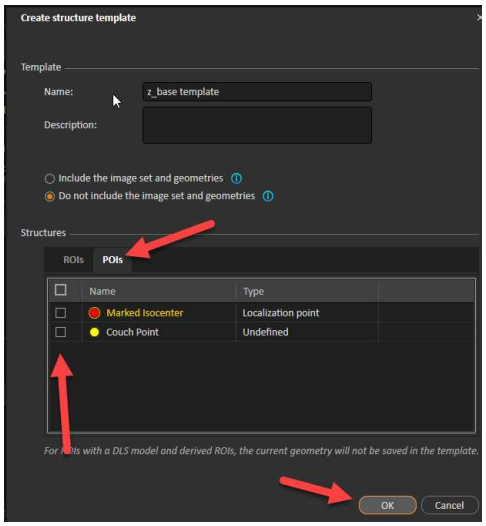
External	x PTV+2cm
fsBody	zz NT
xx totPTV	zz Ring 1 cm
xx PTVexp	zz Ring 2 cm
x PTV+10cm	xx Ovlp Margin



Make a base template

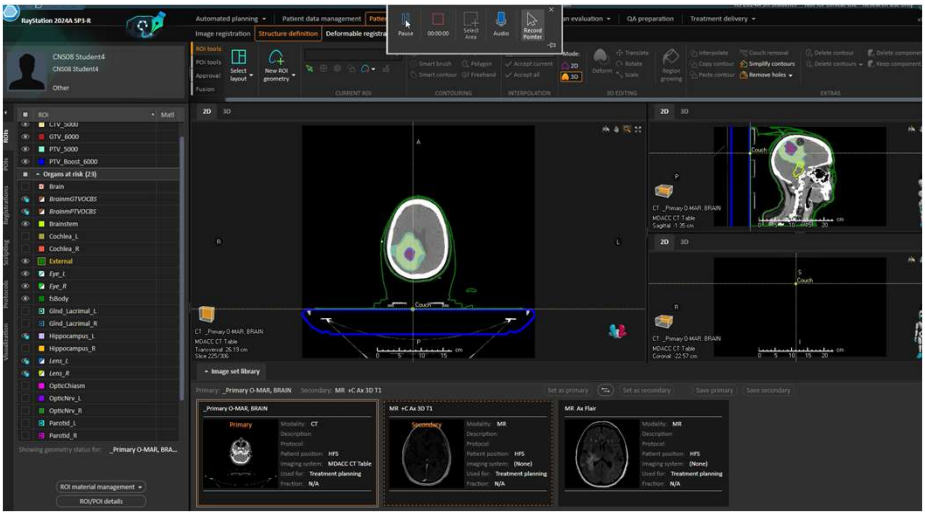
4. Uncheck POIs

5. OK



Create your Own Template
2. Load Base Template

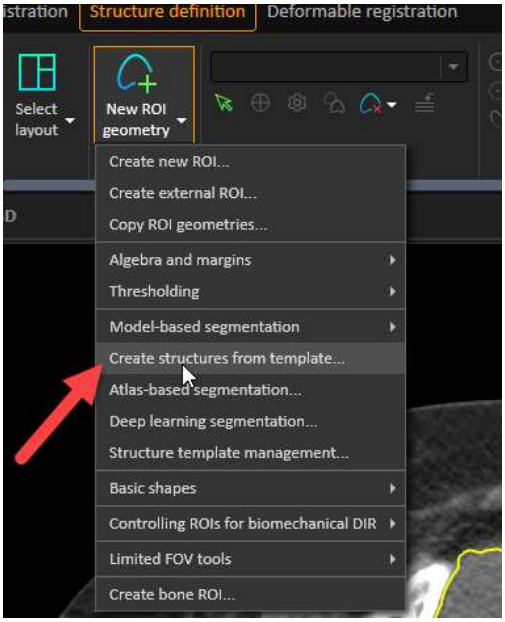
Create a brain template. Load Base Template



Load Base Template

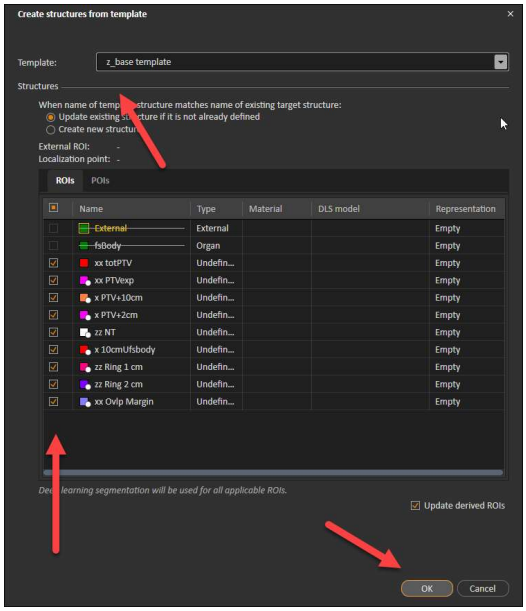
1. New ROI Geometry

2. Create structures from template…



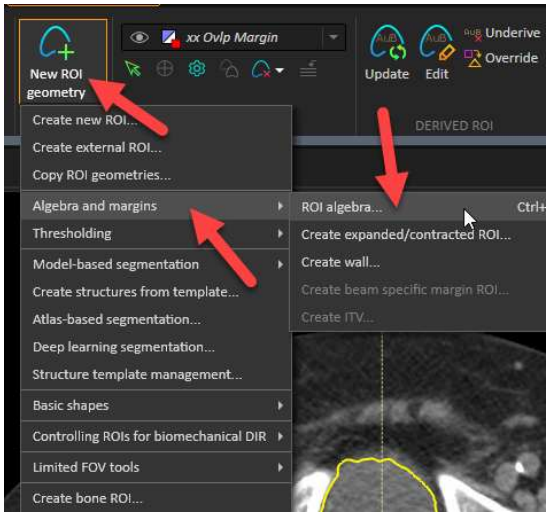
Load Base Template

3. Choose the base template
4. OK



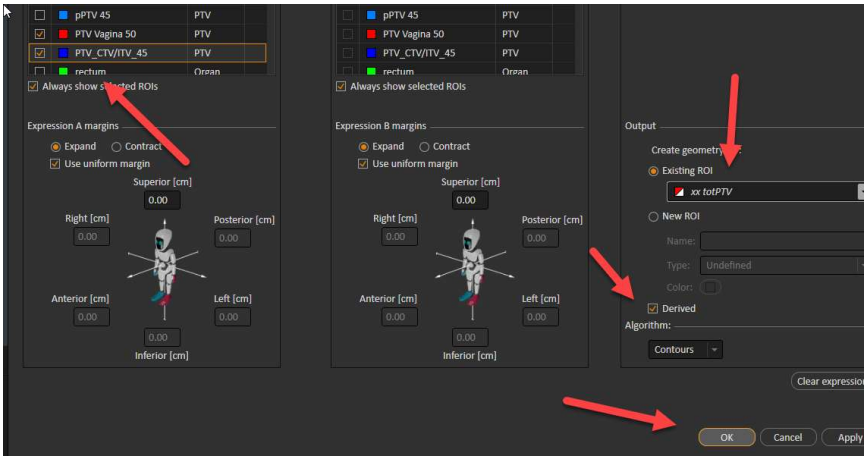
Load Base Template – Create xx totPTV ROI

5. New ROI geometry
6. Algebra and margins
7. ROI algebra



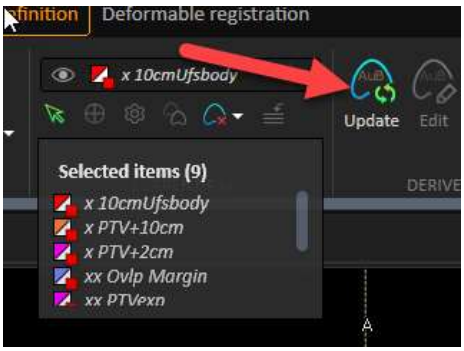
Load Base Template – Create xx totPTV ROI

8. Choose all PTVs as the source



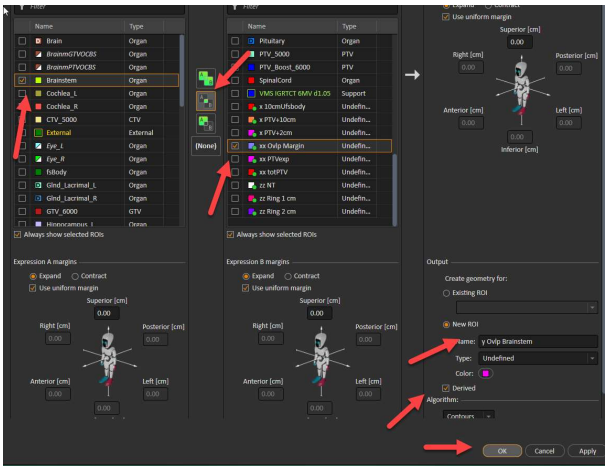
Load Base Template – Update your Base

9. Update your base contours

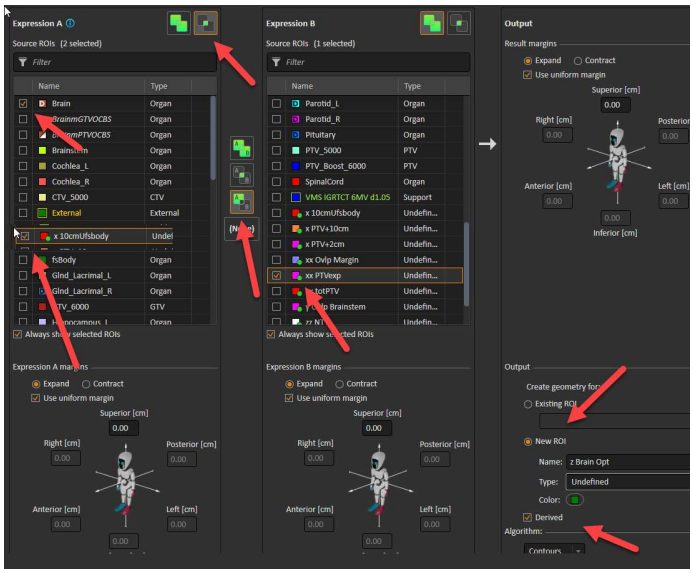


Create your Own Template
3. Create Site Specific Contours

Create Overlap OARs



Create Optimization OARs



Create Site Specific Templates

Create Site Specific Templates

1. Underrive fs totPTV
2. New ROI
3. Structure Template Management…
4. New…

Create Site Specific Templates

*** Do not include the image set and geometries***

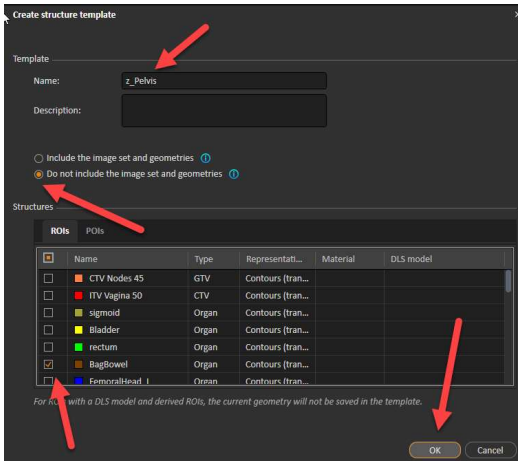
ROIs to leave checked:

OARs that are sources for overlap or opt structures

External

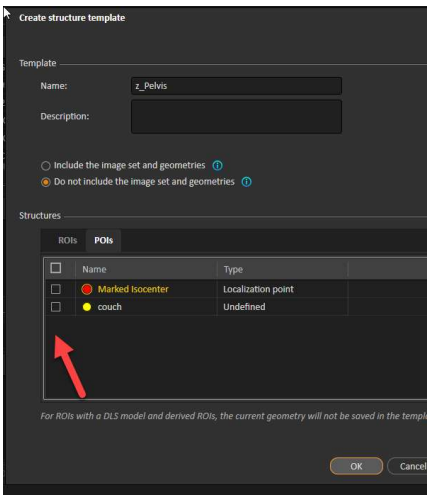
fsbody

x, xx, y, z prefix structures



Create Site Specific Templates

Uncheck POIs

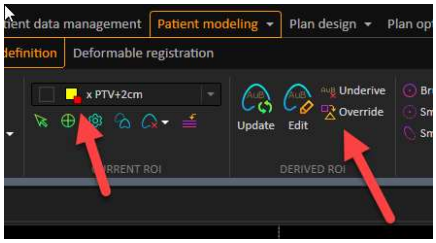


IMPORTANT:

DO: Underrive x totPTV before creating the template

DON'T: underrive contours when processing

When processing, if there is a red box:



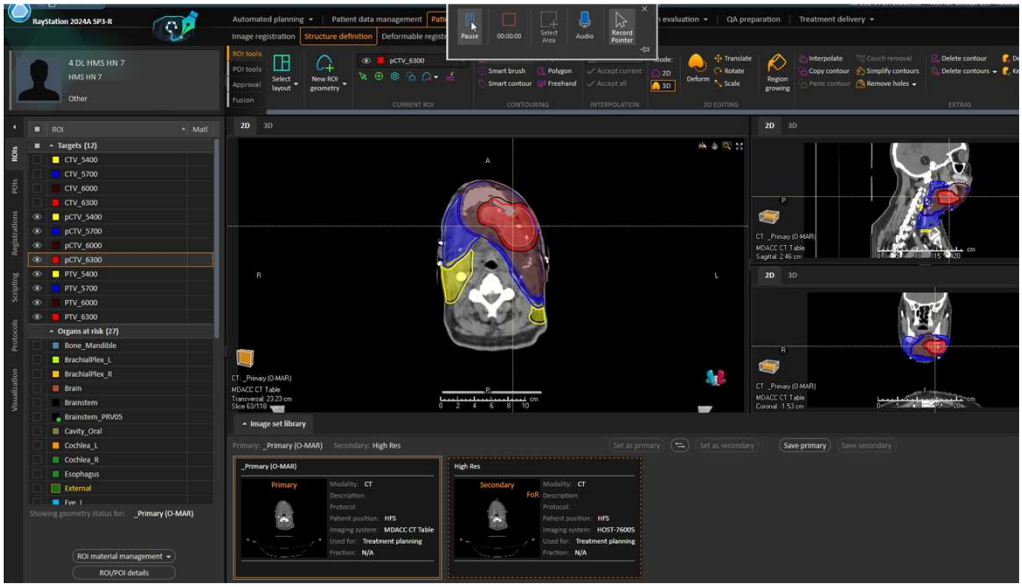
Examples

HN

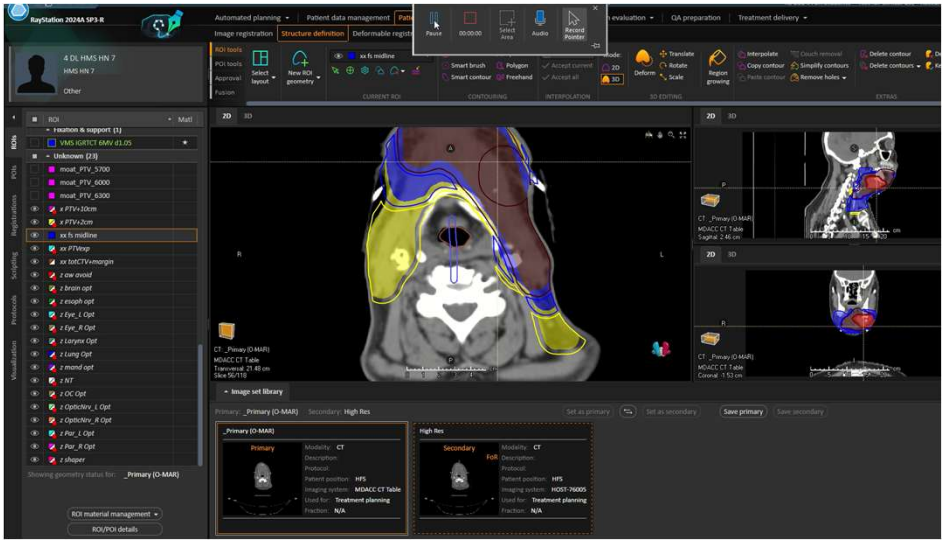
Contour Changes

Adapt Plans

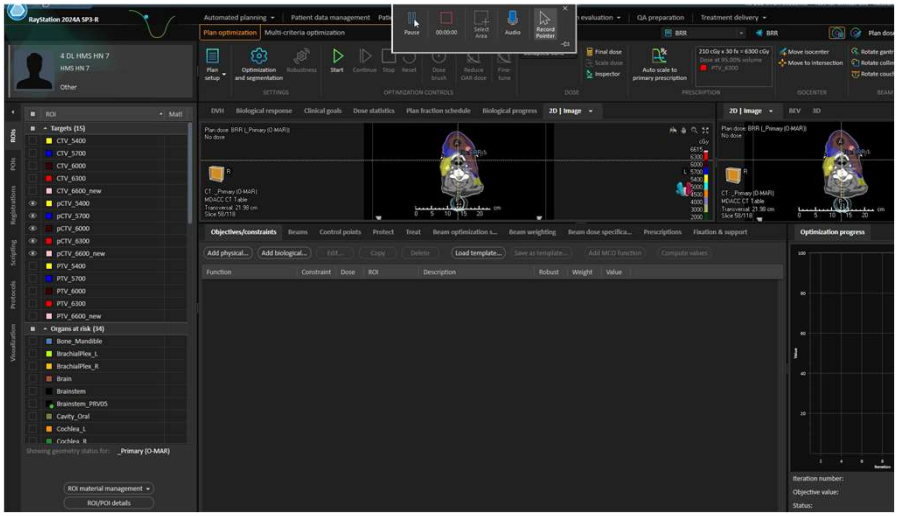
Example – HN Plan



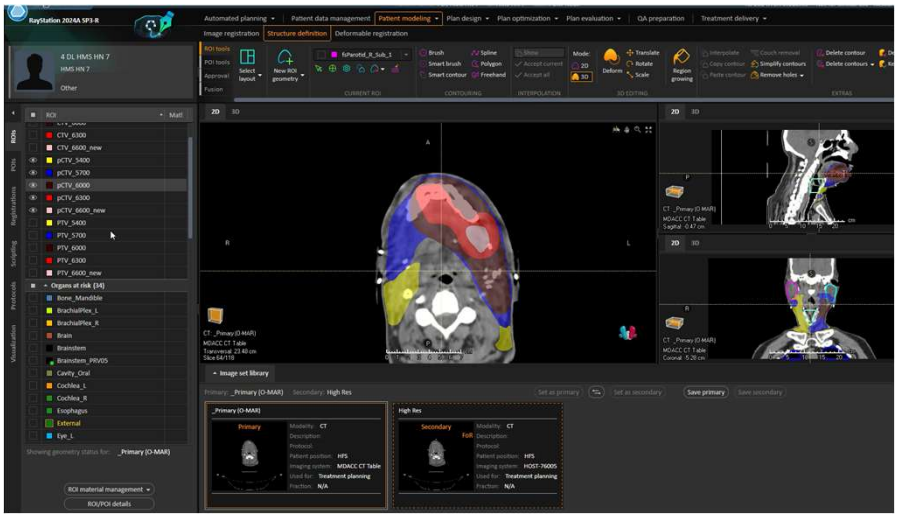
Example - HN Cont.



Example – HN Optimization Template

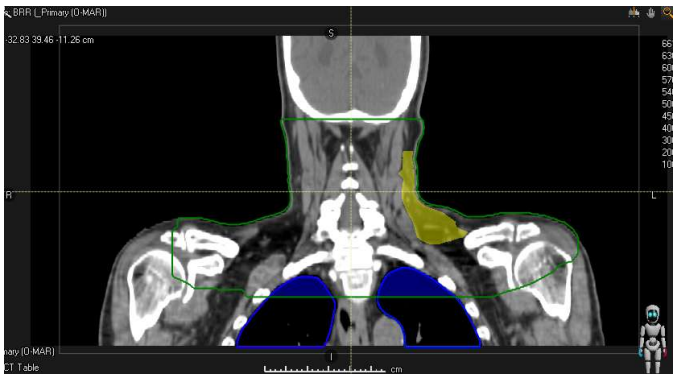


Example – Contour Change/Replan/Adapt

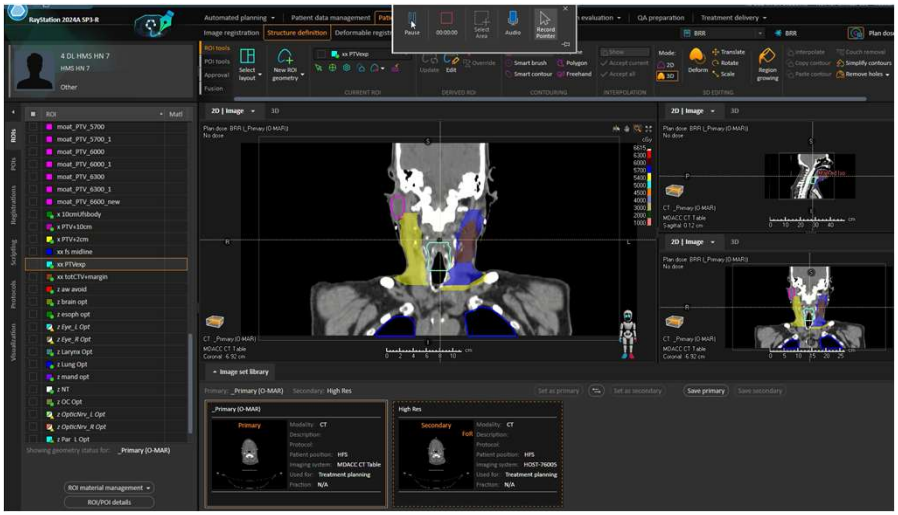


Intermediary Contour Advantages

- Volumetric and mean dose objectives looking at relatively same volume
- Future info for class solutions



Update Template for Different Styles



Questions?

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