Implementing Mark-less Workflow at Community Hospital

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# Presentation Goals

Background:

In general, community hospitals tend to delay implementation of advance treatment techniques due to limited resources and staffing.

However, our community clinic has successfully implemented mark-less workflow, and mark-less setup is used for all sites. This also includes advanced cases such SRS, SBRT,

Presentation Goal:

The presentation aims to demonstrate to audience that with efficient preparation, planning and teamwork mark-less setup workflow can be successfully implemented in setting with limited resources
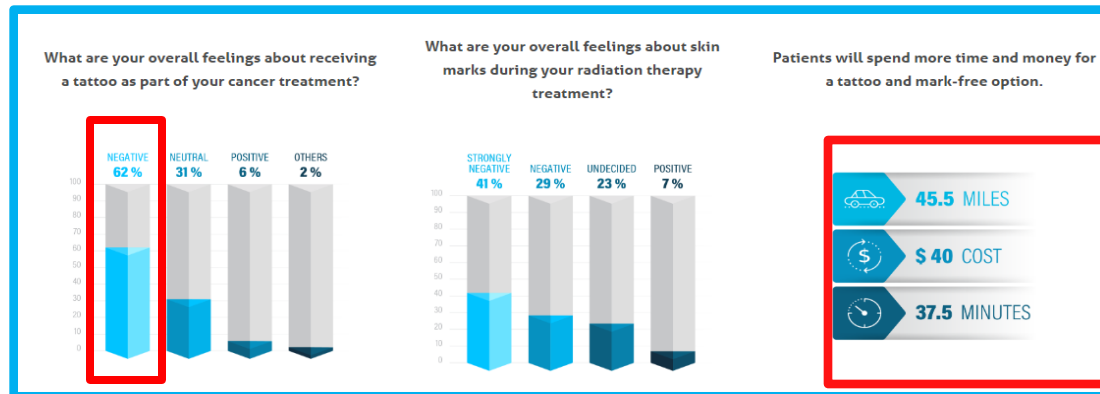
Key Steps in Successful Project Implementation-a Big Picture
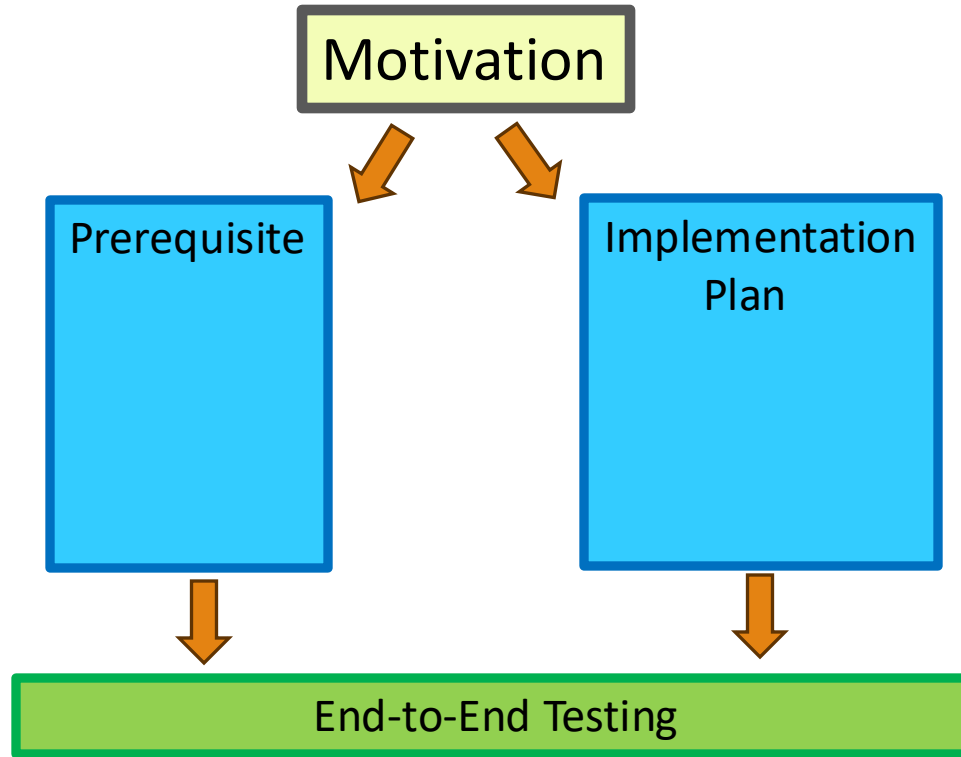
Why Mark-less Treatments? (Motivation)

Young Survival Coalition (YSC)

conducted a study between February and August 2018. Data were collected from members of the women who are diagnosed with breast cancer under the age of 40.

Study Summary

What are your overall feelings about receiving a tattoo as part of your cancer treatment?

NEGATIVE 62 % | NEUTRAL 31 % | POSITIVE 6 % | OTHERS 2 %

What are your overall feelings about skin marks during your radiation therapy treatment?

STRONGLY NEGATIVE 41 % | NEGATIVE 29 % | UNDECIDED 23 % | POSITIVE 7 %

Patients will spend more time and money for a tattoo and mark-free option.

45.5 MILES
$ 40 COST
37.5 MINUTES

Survey Question: What are your overall feelings about receiving tattoo as part of your cancer treatment?
62 % strong negative response

Patients are willing to travel further distance, bear the extra cost of the travel, and experience longer travel times just to received markless treatments

Patients prefer to chose treatment facility that not only addresses their medical needs but also emotional needs. A facility that provides a patient centric treatment.

Markl-ess or Tattoo-less? (Definition)

Question: Is tattoo-free and Mark-less treatments mean the same thing?......

Answer: Not necessarily

patient might not have tattoos placed at the time of SIM, however temporary marks can be placed on the patients during the simulation procedure and treatment (PointGuard-mark covers)


Definition:

Mark-less treatment workflow is one where there are no marking of any kind on the patient's skin during the entire treatment process

Follow up Question:

What if there are no tattoos or marks on the patient, but marks or BB's are placed on the immobilization device (breast boards or mold). Is this considered to be Mark-less treatment?
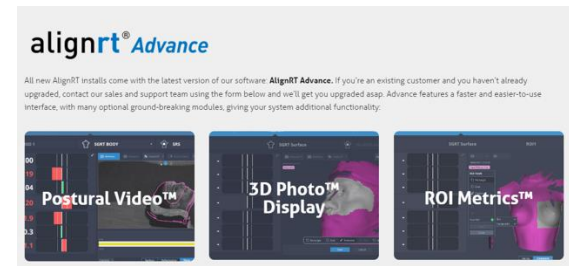
Answer: Yes, There are NO marks on the patient's skin. BB and Marks can be placed on immobilization to assist with setup.

TrueBeam with AlignRT

Camera 2
Camera 3
Camera 1
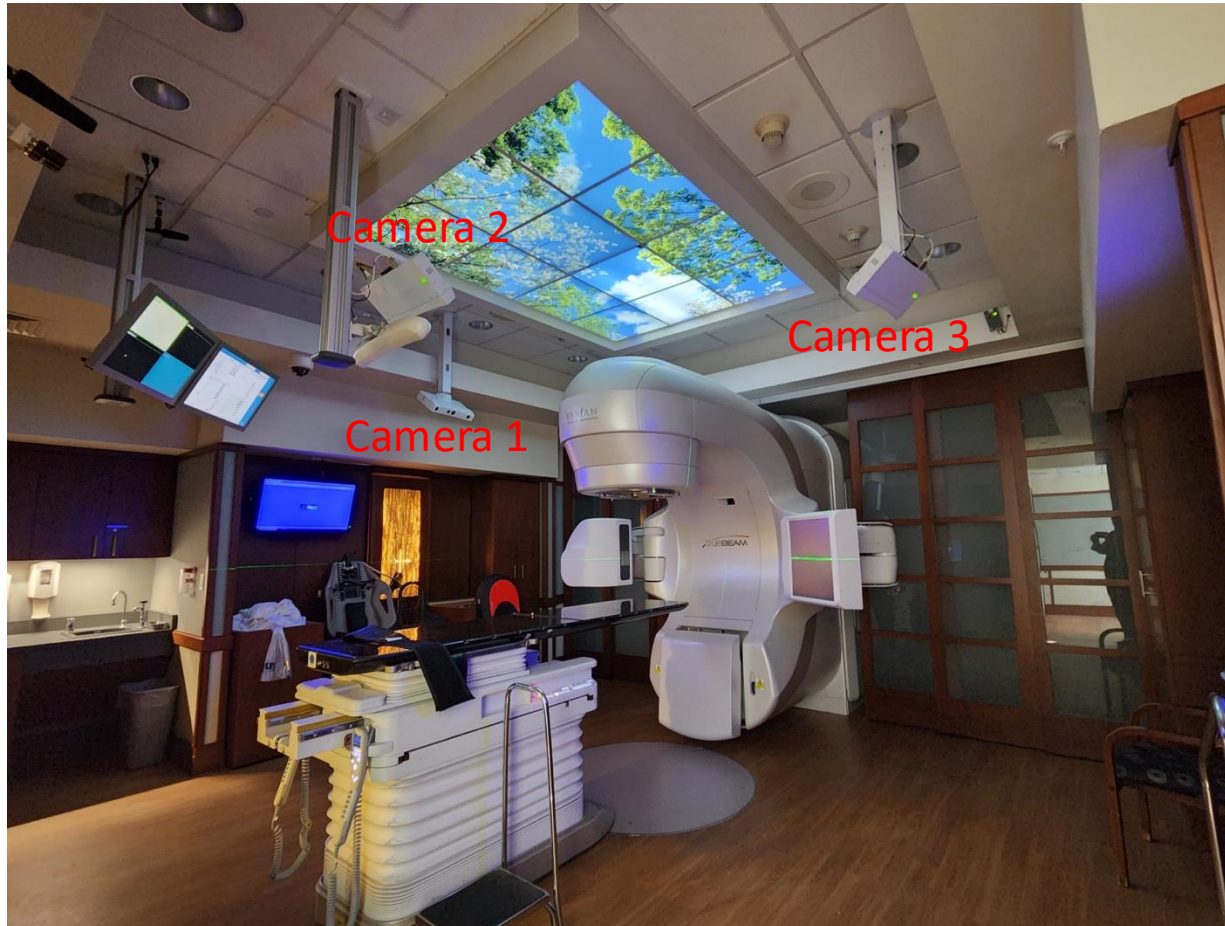
April 2016 TrueBeam with 6D couch
+OSMS (AlignRT) Installation
AlignRT – Version 5 of the software

Nov 2021-Version 6, AlignRT Advance Software
(Postural Video, 3D Photo, ROI Metrics)

Mark-less Treatments-March/April 2022

Prerequisites

1. **All members** of Radiation Oncology team should be onboard with implementing mark-less workflow

 (Physicians, Physics, Therapists)

2. **Equipment**:

 a) Check for latest hardware and software versions of the SGRT

 b) Additional Vendor Offerings -**AdvanceRT Package**

 (*Postritual Video, 3D Photo, ROI Metric*)
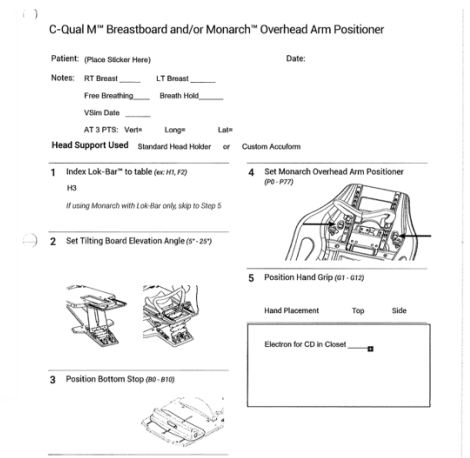
 c) LINAC-VISIONRT System Connectivity

3. **Trained and Experience Staff** that have been using SGRT

4. **Immobilization Equipment**

5. **SIM procedure**

 (well documented and recently updated procedure)

From Conventional to Mark-less Setup: Implementation Plan

Conventional SIM (Tattoos)/Treatment

↓

Conventional SIM (tattoos)/Treatment+SGRT (AlignRT)

↓

Tattoo-less SIM but using temporary Marks / Treatment + SGRT(AlignRT)

↓

Mark-less SIM/ Treatment + SGRT(AlignRT)
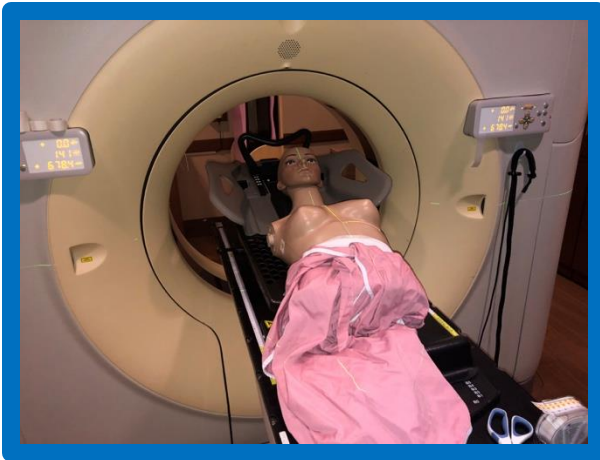
End-to-End Test: Breast Setup Example

Use End-to-End Test to assess Markless SIM setup procedure (documentation and immobilization), and also establish action levels/tolerances.

-Mark-less SIM -Mannequin Phantom

Assessment of initial setup using AlignRT-action levels/tolerances , **maximum delta value (shift) was 1.5 cm.**

CT SIM

Treatment Planning
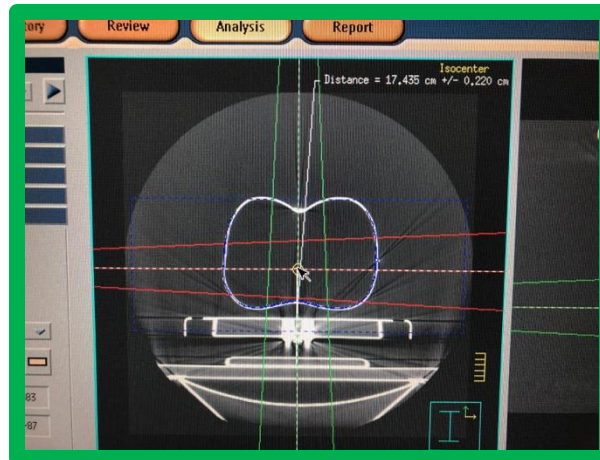
LINAC-TrueBeam

Post Implementation Evaluation

The markless workflow setup accuracy was assessed by examining radiation oncologist approved table shifts after patient was position with markless VisionRT setup on the first day of treatment (or VSIM)

Mark-less VRT Seup

Physician Approved Port Films

R&V-Table Shifts

Evaluation of Mark-less Setup-Breast Study
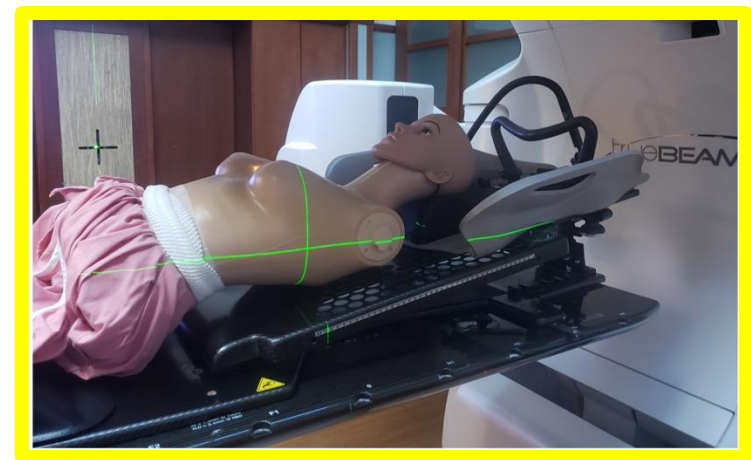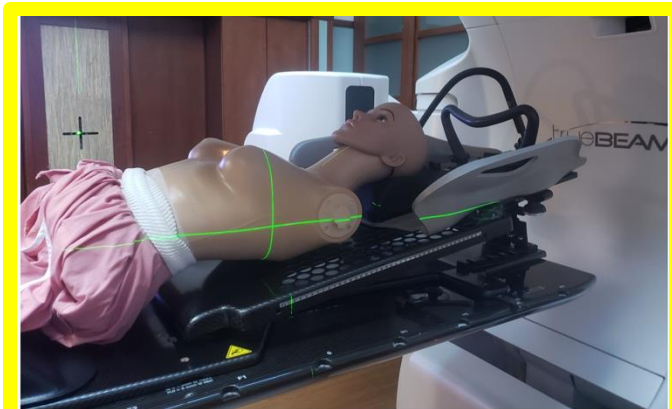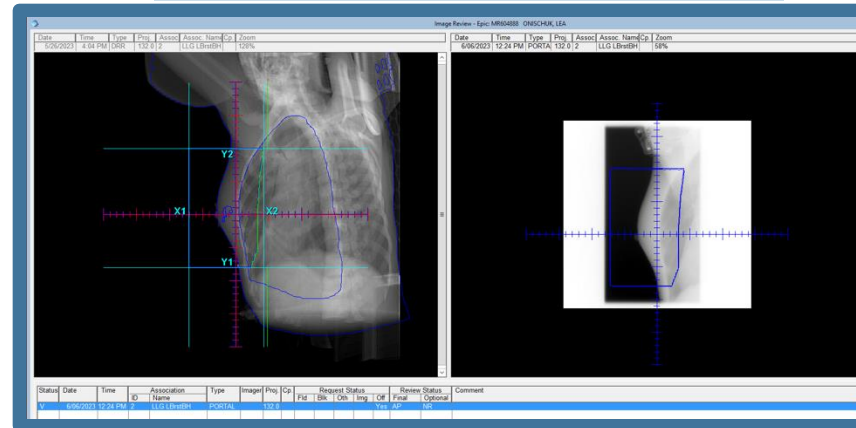
AlignRT Markless Workflow (cm)

	NAME	Laterality	Treatment Type	SUP	LAT	ANT	MAG
1		Right	BH/FAST	0	0	0	0
2		Right	FB	0	0	0	0
3		Left	BH	-0.3	0	0.2	0.4
4		Left	BH	0	0	0	0
5		Left	BH	-0.2	-0.7	-0.1	0.7
6		Right	FB	0	0	0	0
7		Right	FB	0	0	0	0
8		Right	BH	0	0	0	0
9		Left	BH	0	0	0	0
10		Left	BH	0	0	0	0
11		Right	FB	0	0	0	0
12		Right	FB	0.1	-0.3	-0.4	0.5
13		Right	FB/FAST	0	-0.2	-0.3	0.4
14		Left	BH	0	0	0	0
15		Right	BH	0	0	0	0
16		Right	BH	0	0	0	0
17		Left	BH	0	0	0	0
18		Right	FB	0	0	0	0
19		Left	BH	0	0	0	0
20		Right	BH	0	0	0	0

AlignRT + Tattoo Workflow (cm)

	NAME	Laterality	Treatment Type	SUP	LAT	ANT	MAG
1		Left	BH	0	0	0	0
2		Left	BH	0	0	0	0
3		Left	BH	0	0	0	0
4		Left	BH	0	0	0	0
5		Left	BH	-0.1	-0.3	0.2	0.4
6		Left	BH	0	0	0	0
7		Left	BH	-0.4	0.1	-0.1	0.4
8		Left	BH	0	0	0	0
9		Left	BH	0	0	0	0
10		Left	BH	0	0	0	0
11		Left	BH	0	0	0	0
12		Left	BH	0.4	0	0	0.4
13		Left	BH	0	0	0	0
14		Left	BH	0	0	0	0
15		Left	BH	0	0	0	0
16		Left	BH	0	0	0	0
17		Left	BH	0	0	0	0
18		Left	BH	0	0	0	0
19		Left	BH	0	0.2	-0.2	0.3
20		Left	BH	0	0.2	-0.2	0.3

Tattoos Only Workflow (cm)

	NAME	Laterality	Treatment Type	SUP	LAT	ANT	MAG
1		Right	FB	0	0.2	0.3	0
2		Left	FB	0	0	0.1	0
3		Right	FB	-0.4	-0.6	-0.9	1.2
4		Left	FB	0	0.2	-0.4	0.4
5		Left	FB	-0.2	-0.4	0	0.4
6		Left	FB	0	0	0	0.1
7		Left	FB	0	-0.4	0.7	0.8
8		Left	FB	-0.1	-0.3	1.2	1.2
9		Left	FB	0.1	-0.7	0.2	0.7
10		Left	FB	0	-0.3	0.4	0.5
11		Right	FB	0	0	0	0.3
12		Left	FB	0	0	0	0
13		Right	FB	0	0.1	0.4	0.4
14		Right	FB	0.7	0.1	0.3	0.8
15		Left	FB	-0.6	-0.1	0.2	0.6
16		Left	FB	0	0	0	0
17		Left	FB	-0.2	0.2	0.4	0.5
18		Left	FB	0.9	0.1	-0.2	0.9
19		Left	FB	0	0.3	-0.1	0
20		Left	FB	-0.4	0.7	0.8	

Maximum shifts in SUP, LAT ANT and MAG (cm)

	SUP	LAT	ANT	MAG	MAG (Ave)	MAG (STD)
Markless	0.3	0.7	0.4	0.7	0.1	0.21
Tattoo+VRT	0.4	0.3	0.2	0.4	0.09	0.16
Conventional	0.9	0.7	1.2	1.2	0.48	0.39

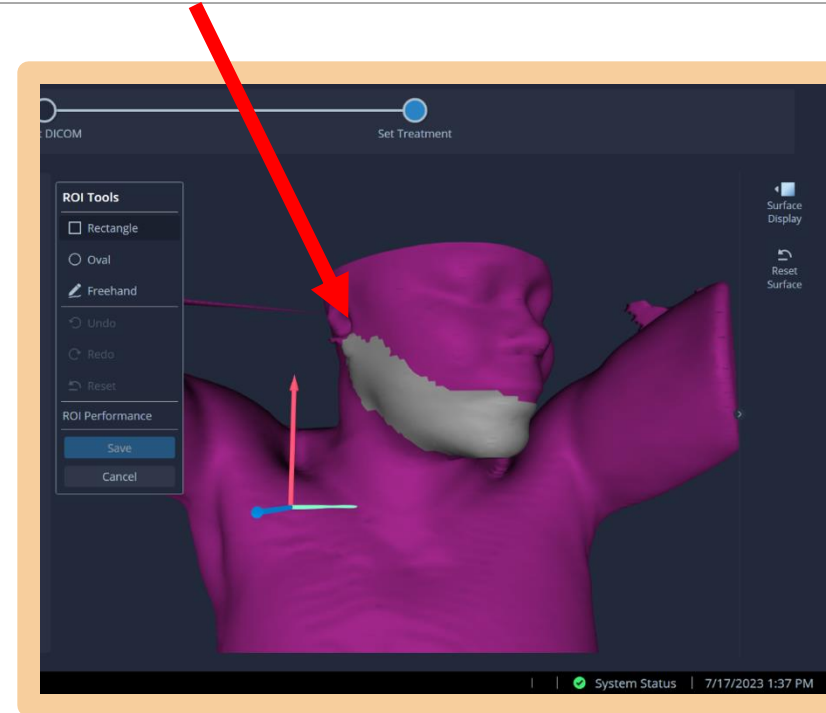| Statistics TTEST		P value
Markless vs	Tattoo+VRT	0.87
Markless vs	Conventional	0.0005

VisionRT (SGRT) is not only Setup, and Efficiency tool but additional Safety tool!

Patient chin in close
Proximity of SCLAV field
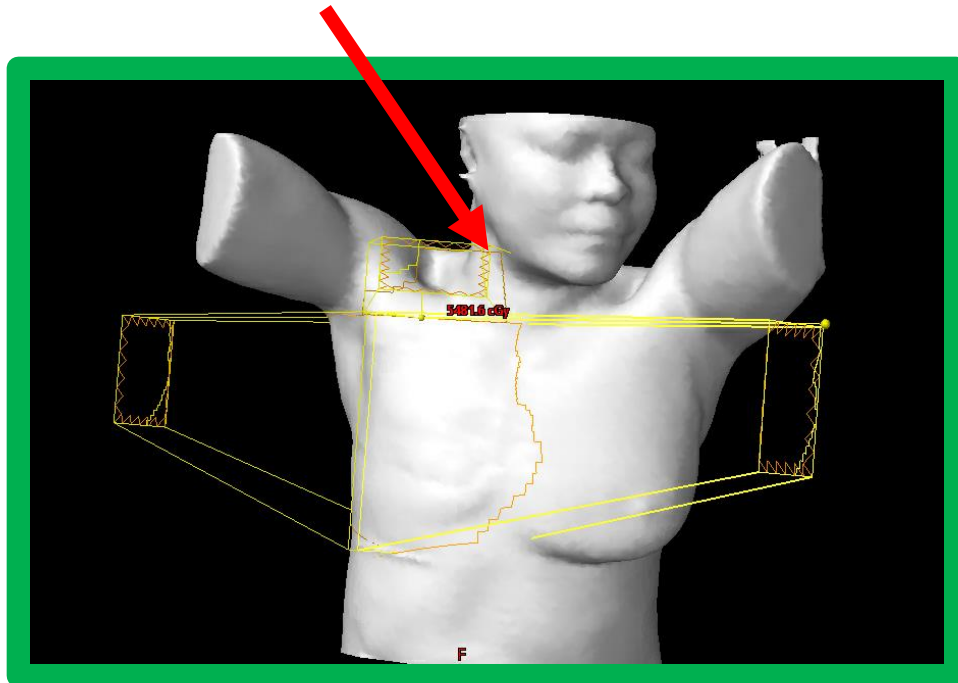
Auxillary Set Up Contour in VRT

Summary

The key to successful implementation of mark-less workflow is efficient preparation, planning and teamwork.

We had successfully implemented mark-less workflow in our department for all sites.

SGRT is not only setup, and efficiency tool but also a safety tool!

We constantly looking for new ways to use SGRT for everyday treatments and quality assurance work.

Acknowledgment

Jonathan Ortiz, Senior Therapist

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Greenwich Hospital Radiation Oncology Team-Therapists and Physicians

VisionRT team for there guidance and help with transitioning to mark-less workflow and organizing Annual SGRT Meeting

1. **According to the study conducted by Young Survival Coalition (YSC) what percentage of surveyed breast cancer patients had a strong negative feeling about receiving tattoo as part of the treatment**
a) 34%
b) 12%
c) 62% (correct answer)
d) 7%

2. **Patient was SIM without tattoos but BBs and marks were placed on the patient's immobilization. According to speaker's definition of mark-less workflow is this still considered to be a mark-less treatment?**
a) Yes. No marks and BB were placed on the patient skin (correct answer)
b) No. Since marks and BB were used it can not be considered a mark-less workflo

3. **Prerequisites for successful implementation of mark-less workflow include**
a) Trained and Experience Staff that have been using SGRT
b) Functional Immobilization Equipment
c) Well Documented and Recently Updated SIM Procedures
d) All of the above (correct answer)

4. **Evaluation of breast setup positioning accuracy has shown that**
a) Mark-less and conventional setup (tattoo only setup) have the same accuracy
b) Conventional setup (tattoo only) and tattoo + VisionRT setup have the same accuracy
c) Mark-less and tattoo + VisionRT setup have the same accuracy (correct answer)
d) Mark-less setup is significantly more accurate than tattoo+VisionRT

5. **VisionRT is**
a) Setup Assistance tool
b) Workflow efficiency tool
c) Safety tool
d) All of the above (correct answer)