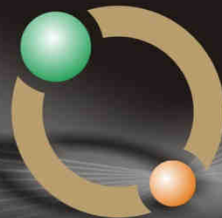


Responsabilidad médica en control de sistema de planificación, de registro y verificación de datos y equipos de simulación

Diego Fernandez

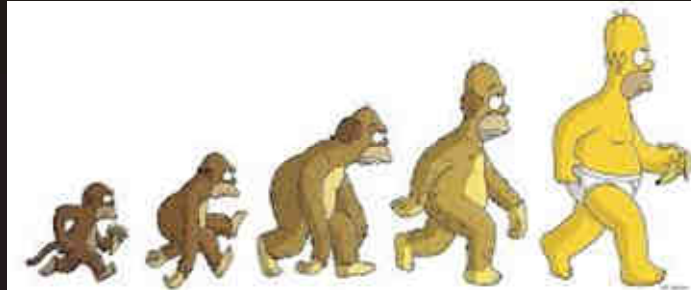
22-11-2013

Córdoba, Argentina



INSTITUTO DE RADIOTERAPIA
FUNDACIÓN MARIE CURIE

Evolución de la radioterapia



1D

2D

3D
(TAC)

IMRT

PET

IGRT

SRS

SBRT



Secuencia desde simulación hasta tratamiento...

Simulación virtual con TAC

efilm

TPS (eclipse, iplan,
Oncentra, Konrad, PCRT...)

Contornos,
planificación,
aceptación

Lantis, Aria, Oncentra... R&V

Equipo Tratamiento (Novalis
TX, Primus, Elekta...)



TAC para simulación virtual



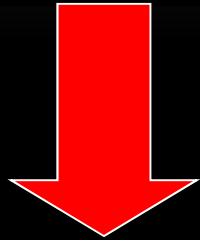
Etapas de simulación/TAC

- 1- Posicionamiento
- 2- Accesorios de inmovilización
- 3- Alineamiento
- 4- Espesor de cortes, medio de contraste o no
- 5- Marcación de isos y/o límites de campo
- 6- TAC
- 7- Transferencia de imágenes a planificador

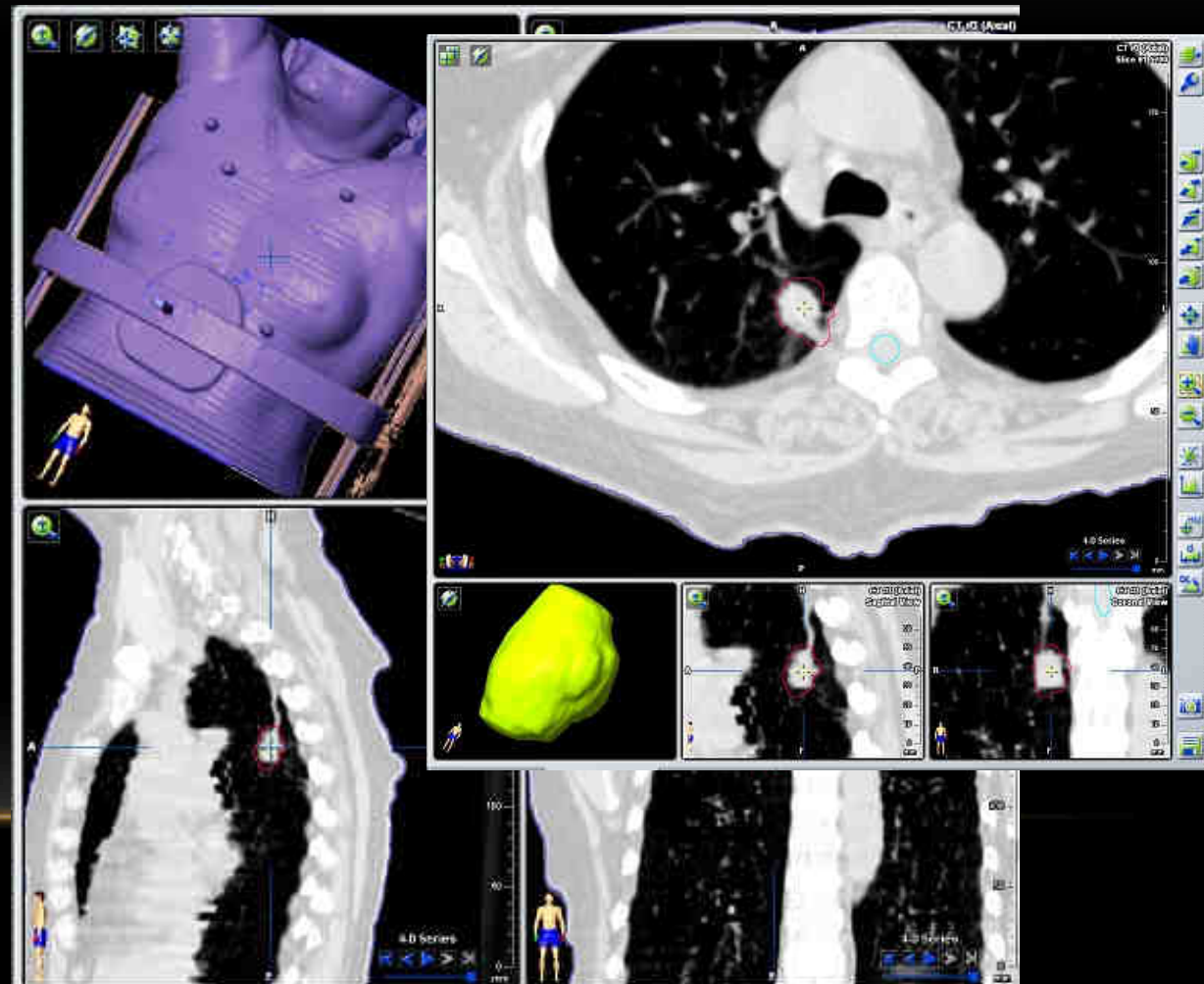
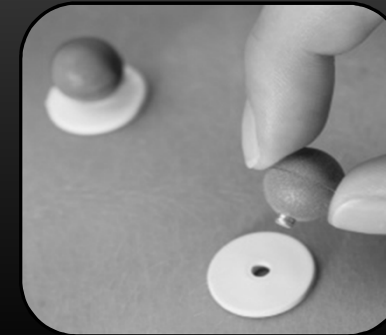
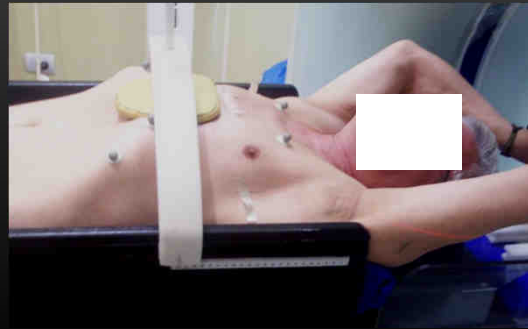
Iguales condiciones en las que será tratado en el equipo de tratamiento !!!



Simulación
virtual con
esferas
reflectoras



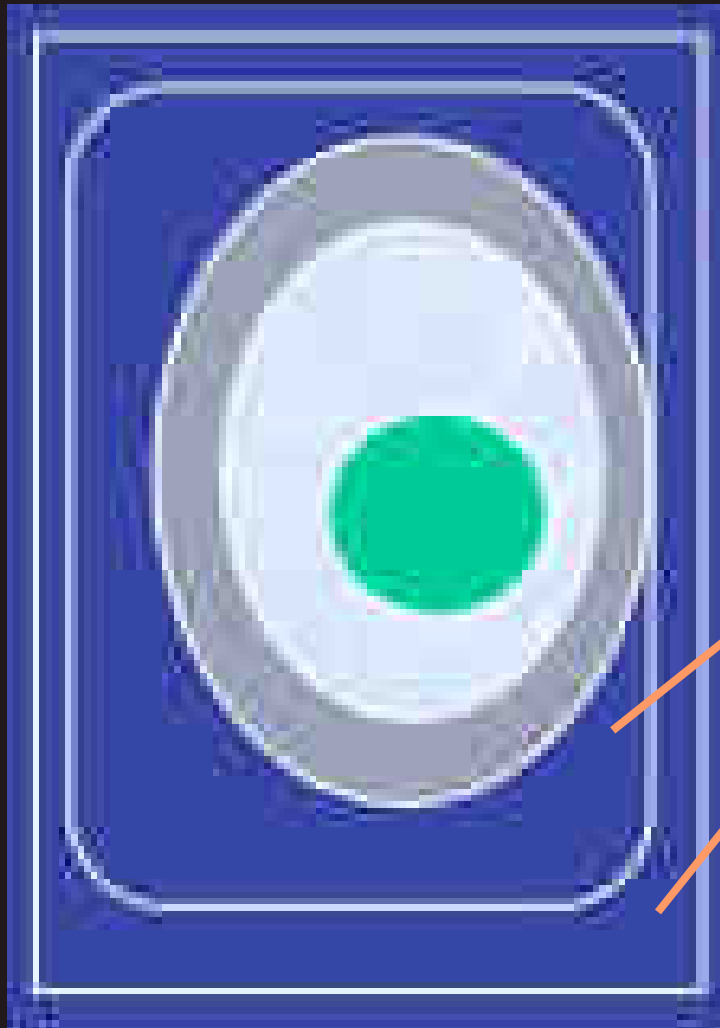
Definición
de
volúmenes



Dibujo de Volúmenes para planificación



Volúmenes tumorales: definiciones



■ GTV

■ CTV

■ PTV

Clínico anatómico

Geométrico

● Volumen tratado

● Volumen irradiado

ICRU Report 50 & 62



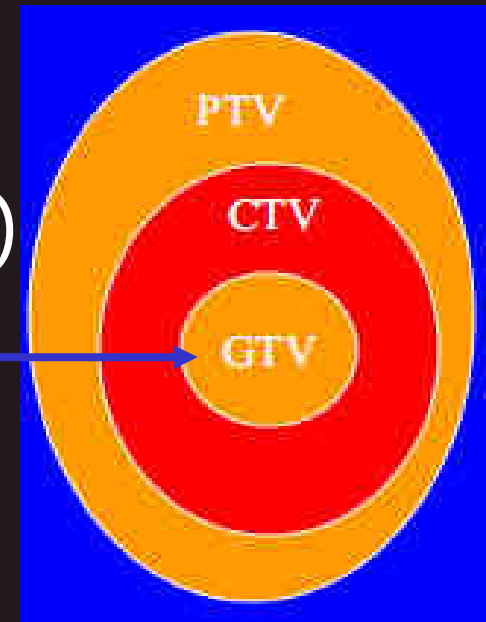
GTV:

Volumen tumoral macroscópico

Extensión y localización expresa,
palpable o visible / demostrable
del crecimiento maligno

Varios GTV (= o $\neq$ niveles de dosis)

- Tumor primario
- Adenopatías metastásicas
- Otras metástasis



GTV

- Fibroscopía
- Examen físico
- TAC
- IRM
- PET



CTV:

Volumen de enfermedad subclínica

• CTV

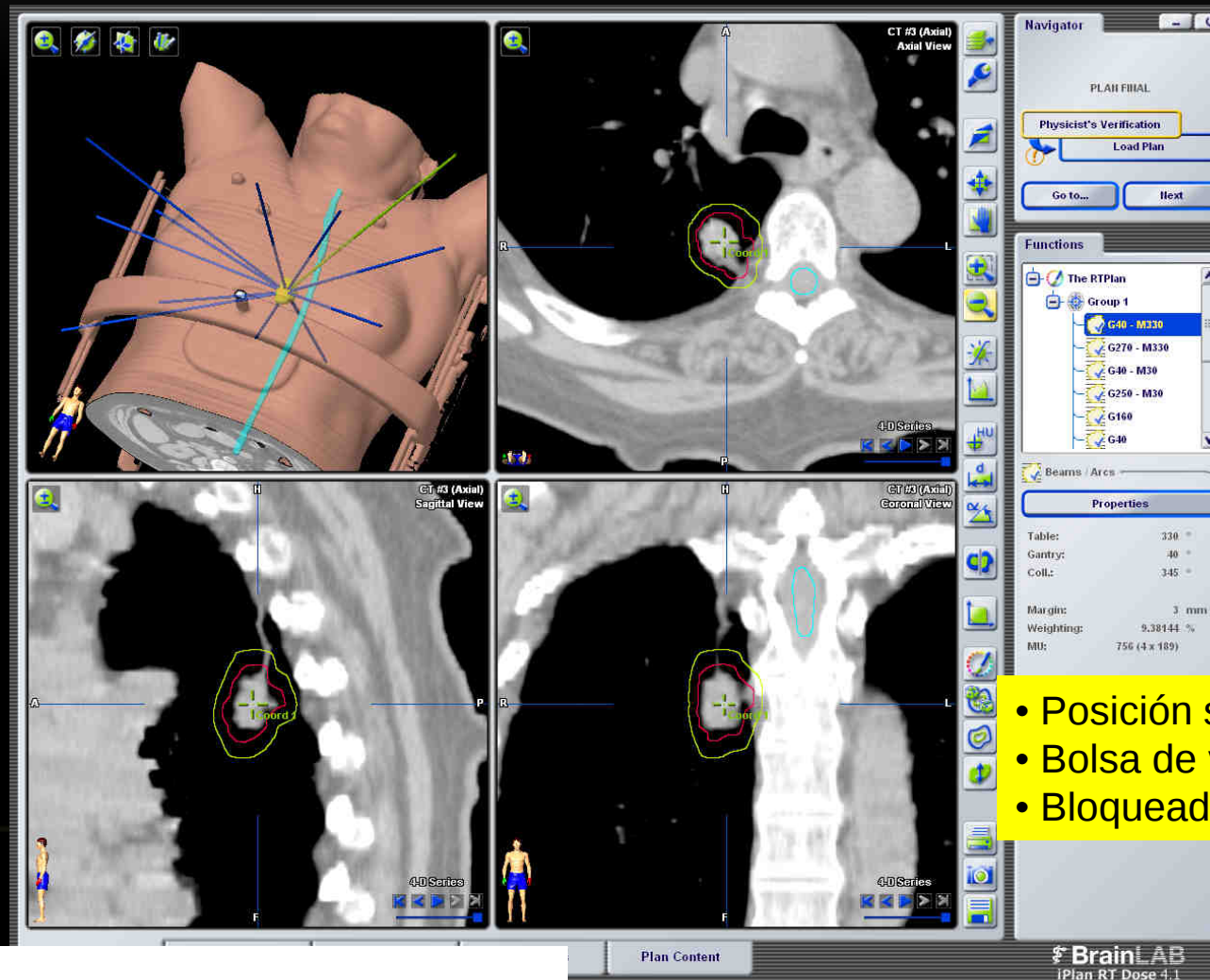
Expansión geométrica

Expansión anatómica

- Vías de diseminación
- Barreras naturales

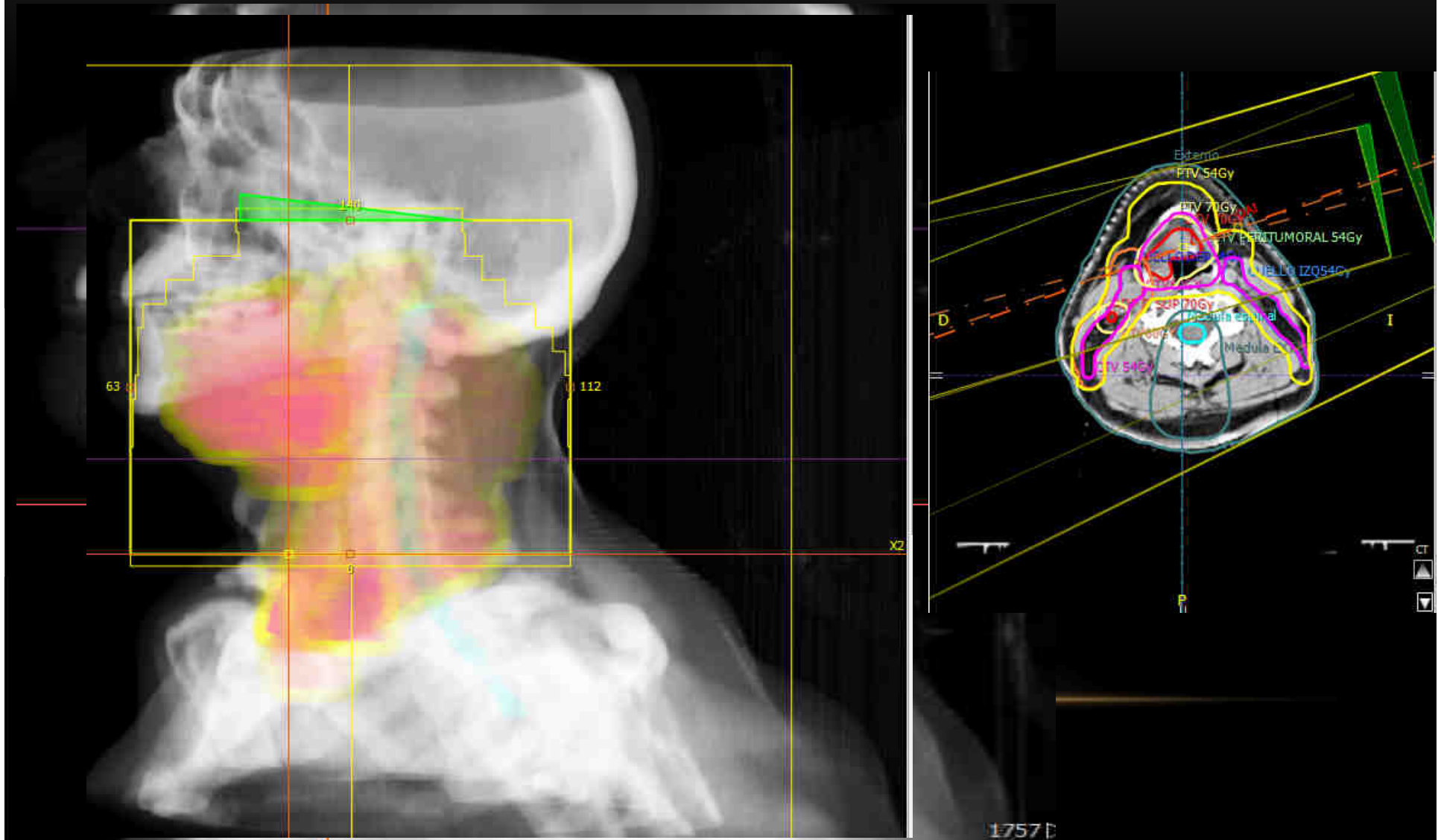


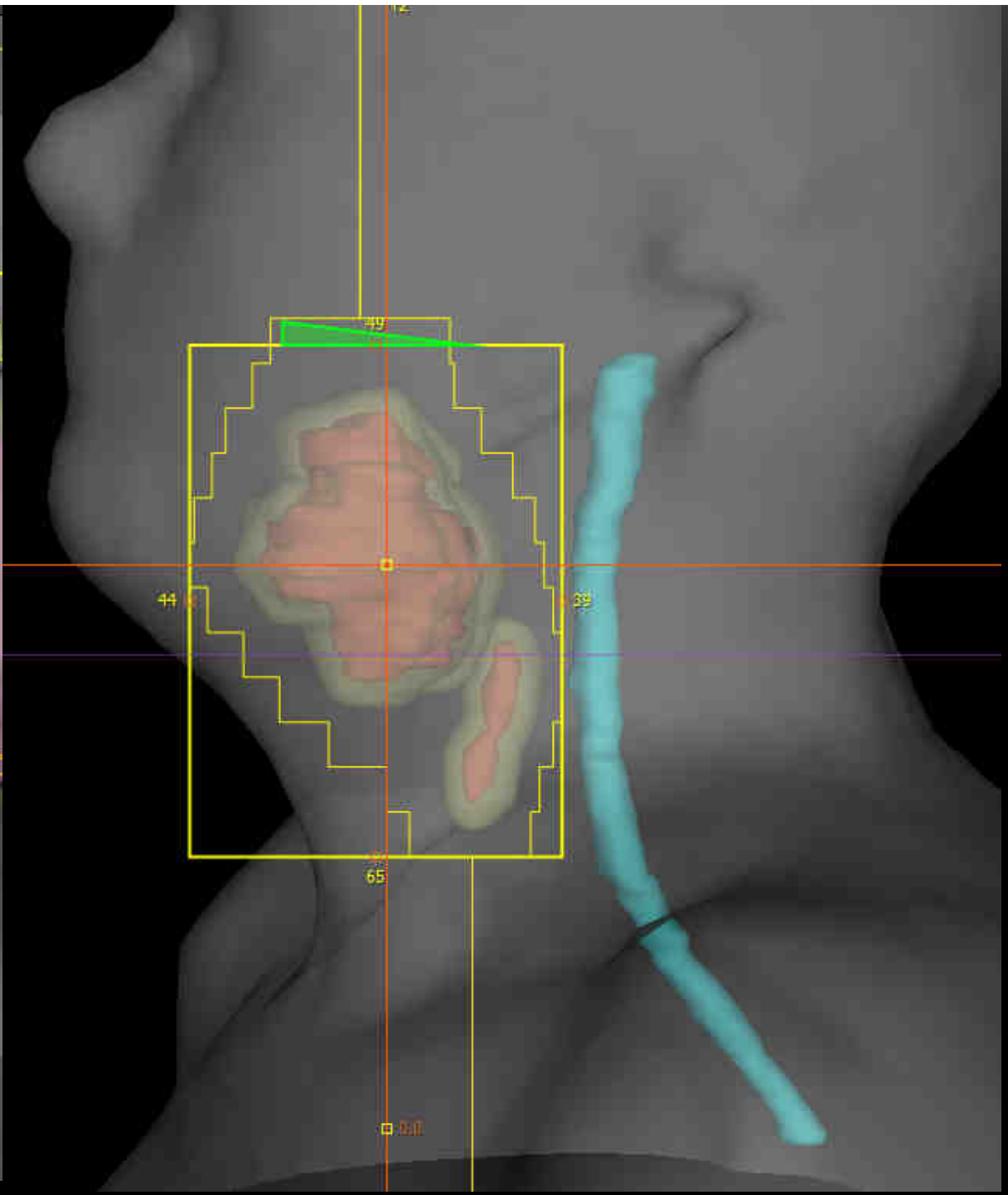
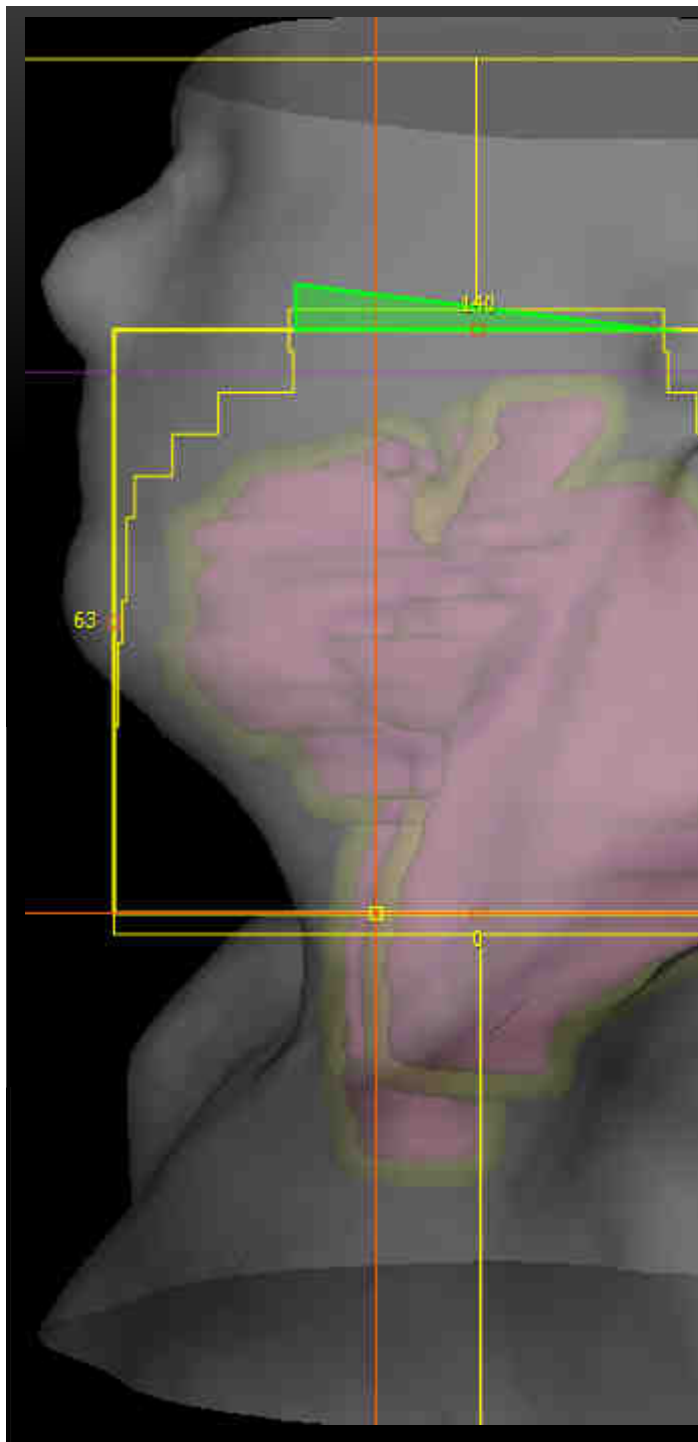
Dibujo de volúmenes en TPS



- Posición supina
- Bolsa de vacío
- Bloqueador respiratorio

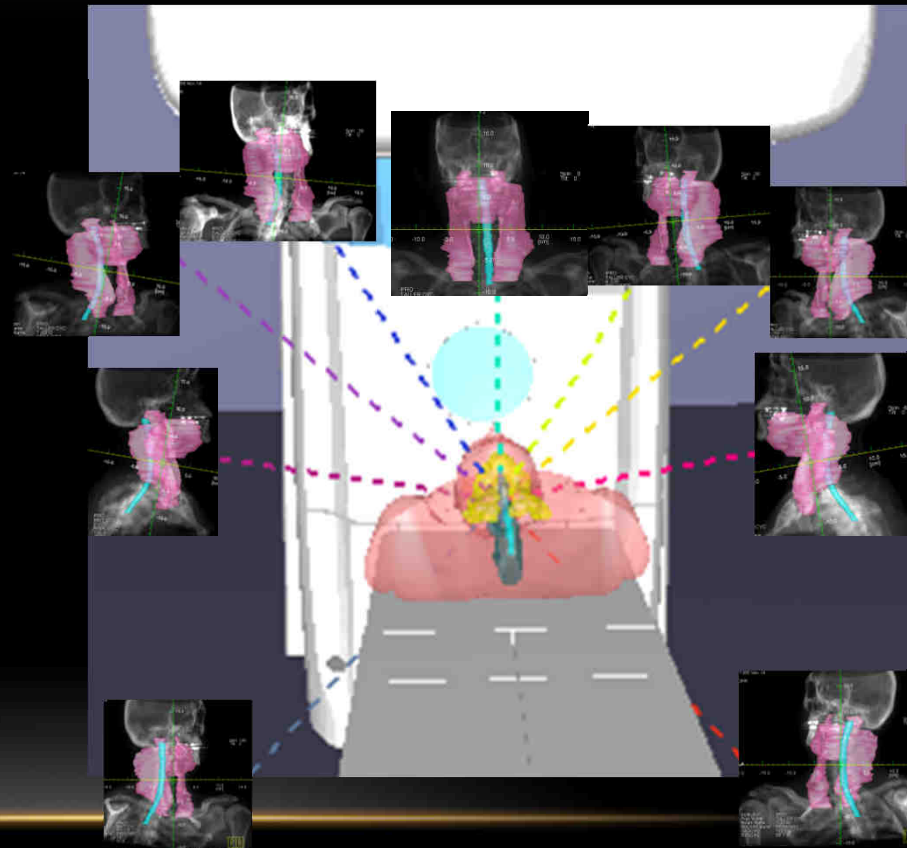
Cambio de concepto: 2D a 3D



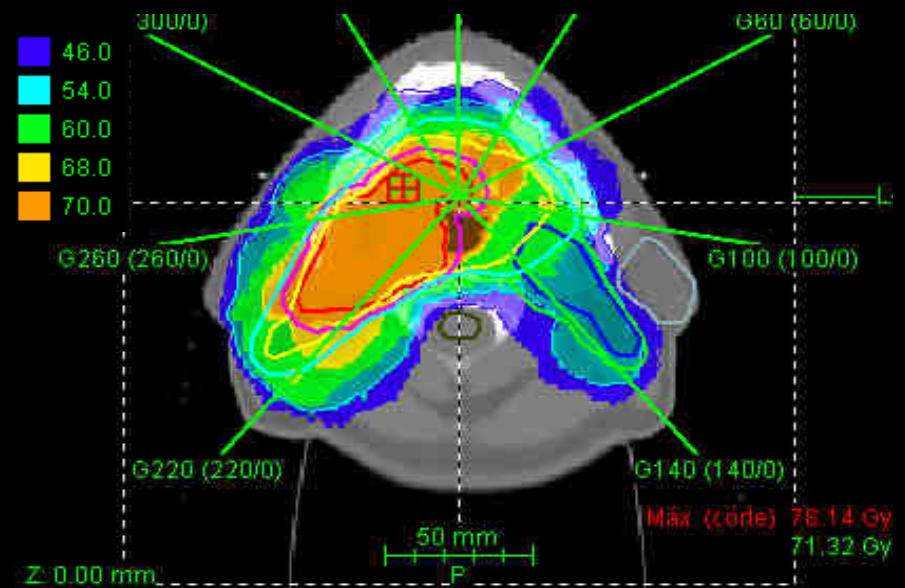
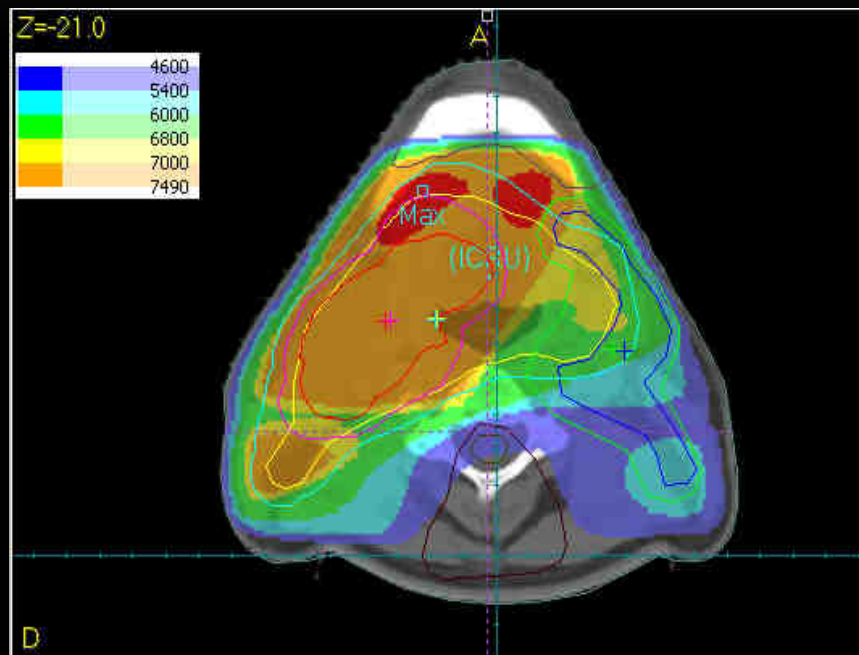


PLANIFICACIÓN IMRT H&N

- Acelerador lineal Primus 6MV
- TPS KonRAD v2.2
- Plan de tratamiento



PLANIFICACIÓN



EJEMPLO EN C&C



• 3DCRT

- Dos campo laterales
- Un campo anterior.
- Protección de Médula.
- Espinales
- Boost

Unión de campos!!

- Dosis OAR

• IMRT

7-9 haces

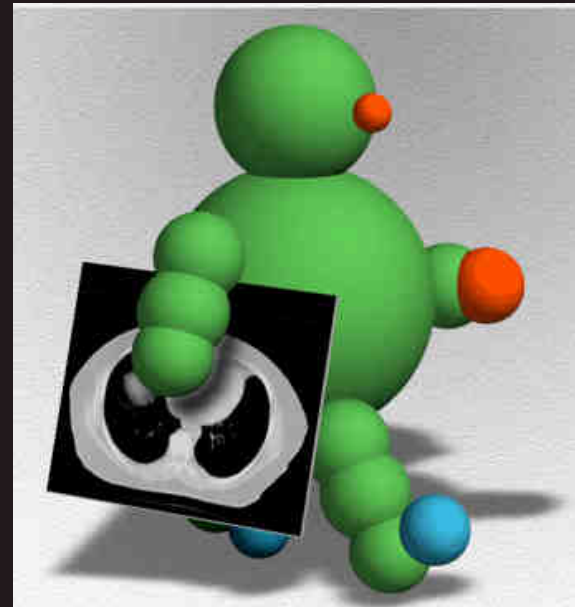
- Boost Simultaneo
- Boost Secuencial

- **Protección de estructuras sanas!!**



R&V ARIA

- Data administration
- DICOM
- EMR
- Patient manager
- Time planner (turnero)
- Imaging



R&V ARIA

- **Data administration**
 - Integrantes del staff, datos de HC, ver si está listo el QA, las Rx verificadoras...
 - Permisos de cada integrante según rango y función
 - Define el equipamiento y técnicas posibles



ARIA - Data Administration

File Quick Links View Tools Help

Save

Refresh

Print Screen

User Admin

Data Update

Reports

Setup Staff & Resources Activities & Codes Care Path Templates Clinical Assessment

System Charge Related Users & Groups

System Setup

Hospitals & Departm...

Department Details

Lists

User Defined Patient Labels

User Defined Activity Attributes

Global Settings

Patient IDs

Staff & Resource IDs

Code Scheme

Select a hospital to edit the "Details" below.

New... Edit...

Hospital Name	Organization	Logo	Status
			

Departments Charges Control Transportation Preferences

Rules for Erroring:
☐ Ask for a reason when erroring patient data?



R&V ARIA

- **DICOM**

- Para enviar distintas imágenes (de calidad, Rx de control...

- **EMR**

- RT chart: donde se descargan los datos de planificación, se pasan todos los parametros del tto. (tamaño campo, gantry, UM, colimador, energía...)

Ej: el 1er día de ingreso el médico acepta la altura de camilla y no se puede modificar más (sólo el médico)



LOPEZ, MARICEL CARINA (N27022) - RT Chart

File Quick Links Edit View Insert Workspace Parameters Tools Window Help

Planning View

Course C1 - Unknown Volume ptv LA

Plan LA Validate Machine NovalisTX1

Field Graphics Treatment Unit

0.00deg1 - 11/5/2013 3:35 PM

Field Order/Type	1 / Treat	2 / Treat	3 / Treat	4 / Setup	5 / Setup
Field ID	G LA 0	G LA 0 - 1	G LA 180	RX ANT	RX LI
Field Name					
Technique	STATIC	STATIC	STATIC	STATIC	STATIC
Energy	6X	6X	6X	6X	6X
Dose Rate [MU/min]	600	600	600	600	600
MU	95	9	113		
Time [min]	0.21	0.02	0.24		
Tol. Table	T1	T1	T1	T1	T1
SSD [cm]	89.2	89.2	89.3		
Gantry Rtn [deg]	0.0	0.0	180.0	0.0	90.0
Coll Rtn [deg]	0.0	0.0	0.0	0.0	0.0
Field X [cm]	9.7	9.6	9.8	19.0	19.0
X1 [cm]	-4.8	-4.7	-5.0		
X2 [cm]	4.9	4.9	4.8		
Field Y [cm]	12.7	9.7	12.7	19.0	19.0
Y1 [cm]	-5.6	-2.6	-5.6		
Y2 [cm]	7.1	7.1	7.1		
MLC	Static	Static	Static	NONE	NONE
Dynamic Wedge					
Int Mount					
Acc Mount					
Comp Mount					
e - Aperture					
Bolus					
Couch Vrt [cm]	-10.1	-10.1	-10.1	-10.1	-10.1
Couch Lng [cm]	+131.5	+131.5	+131.5	+131.5	+131.5
Couch Lat [cm]	-1.1	-1.1	-1.1	-1.1	-1.1
Couch Rtn [deg]	0.0	0.0	0.0	0.0	0.0
Imager Vrt [cm]				-50.0	-50.0
Imager Lng [cm]				0.0	0.0
Imager Lat [cm]				0.0	0.0
Setup Note	*				

0.00deg1

RX ANT

Ready

User: lamedina Group: Physicist Site: Main NUM

4:28 PM 11/19/2013

R&V ARIA

- **Patient manager**

- Datos de pte, foto, HC, evoluciones, descripción del plan de tto., fracciones realizadas y restantes...

- **Time planner (turnero)**

- Se especifica tipo de turno (ingreso, control, tratamiento..)
- Si corresponde Rx de control, quien lo trató, condiciones de tto, modificaciones



ARIA - Patient Manager
File Quick Links View Tools Help
New Patient Open Patient Save Patient Refresh Print Screen RT Chart Time Planner Document Apr Reports Offline Review

Juan Perez (ID1: N27022)
Summary Registration Care Path Diagnosis Cancer Management Journal

Patient Information

Name: Juan Perez
ID1: N27022
Birth Date: 10/19/1971 (42)
Home Phone: (none)
Work Number: (none)
Patient I/O Status: Outpatient
Room Number: (none)
Admission Date: (none)
Last kV/MV Image: 11/18/2013
Last kV/MV Status: New
Directives: not asked



Attach/Edit Delete

Doctors

Primary Oncologist: (none)
Phone: (none)
Ref. Physician: (none)
Phone: (none)

Contact

Name: (none)
Relationship: (none)
Phone: (none)

Payor

Payor Name: (none)
Plan Number: (none)
Policy Number: (none)
Account Number: (none)

Transportation

Name: (none)
Phone: (none)

Appointments Tasks

Activity Name	Due Date	Start Date	Duration	Note
INGRESO		11/11/2013 10:00:00 AM	24	avisada
Tratamiento		11/13/2013 6:48:00 PM	12	
Tratamiento		11/14/2013 12:48:00 PM	12	
Tratamiento		11/15/2013 5:12:00 PM	12	
Tratamiento		11/18/2013 6:00:00 PM	12	SACAR RXDE pelvis...
Tratamiento		11/19/2013 4:12:00 PM	24	LLAMAR MEDICO Y...
Tratamiento		11/20/2013 2:24:00 PM	12	
Tratamiento		11/21/2013 6:48:00 PM	12	
Tratamiento		11/22/2013 6:48:00 PM	12	
Tratamiento		11/25/2013 6:48:00 PM	12	
Tratamiento		11/26/2013 6:48:00 PM	12	SACAR RXDE pelvis...
Tratamiento		11/27/2013 6:48:00 PM	12	
Tratamiento		11/28/2013 6:48:00 PM	12	
Tratamiento		11/29/2013 6:48:00 PM	12	
Tratamiento		12/2/2013 6:48:00 PM	12	
Tratamiento		12/3/2013 6:48:00 PM	12	

RT Summary MedOnc Summary

Course & Diagnosis
C1

Prescription & Treatment:

Course...	Plan ID	RxDose (G...	Primary RP	Fraction	RxDose/F...	Plan Status	Course Status
C1	PELVIS	49.998	ptv total	5/25	2	Treatment...	ACTIVE
C1	LA	43	ptv LA	5/25	1.72	Treatment...	ACTIVE

C1 Delivered Dose (incl. dose corrections) : 18.6 Gy

Reference Points:

Ref. ID	Planned Dos...	Actual Dose (...)	Total Dose Li...	Daily Dose...	Session Do...	Ref. Point Type
ptv total	49.998	10	50	2	2	Primary
ptv LA	43	8.6	43.01	1.72	1.72	Primary

Patient Alert(s)

Sign Off	Display D...	Patient Alert	Created By	Signed Off By	Signed Off...
----------	--------------	---------------	------------	---------------	---------------



ARIA - Time Planner

File Quick Links View Tools Actions Help

New Appointment New Task Day View Work Week Week View Month View Go to Today CheckIn Complete Refresh Reports

NOVALIS II Patient Agenda: CALIBRACION FIL... Patient Agenda: GAGNOLO, PASC... Patient Agenda: ALABI, ALEJANDR...

	Monday, November 18, 2013	Tuesday, November 19, 2013	Wednesday, November 20, 2013
	NovalisTX2 (5479) - IPR AGUERO, CELINA DEL CARMEN (N26852), Tratamiento, NovalisTX2 (5479), Fisica Medica, Medium, Outpatient, 7:24 AM - 7:36 AM TORANZO, INES ISABEL (N26974), Tratamiento, NovalisTX2 (5479), Sala de Espera, Medium, Outpatient, 7:36 AM - 7:48 AM MALDONADO, CARLOS (N27030), Tratamiento, NovalisTX2 (5479), Sala de Espera, Medium, Outpatient, 7:48 AM - 8:00 AM CALCAGNI, BENITO DOMINGO (N26930), Tratamiento + IGRT Exac Trac, NovalisTX2 (5479), Sala de Espera, Medium, Outpatient, 8:00 AM - 8:12 AM GOROSO, ELADIA DELIA (N26986), Tratamiento, NovalisTX2 (5479), Fisica Medica, Medium, Outpatient, 8:12 AM - 8:36 AM TOSCANO, JOSE SALVADOR (D04329), Tratamiento + IGRT Exac Trac, NovalisTX2 (5479), Fisica Medica, Medium, Outpatient, 8:36 AM - 8:48 AM LEVROTTO, HUMBERTO JOSE (N26866), Tratamiento, NovalisTX2 (5479), Sala de Espera, Medium, Outpatient, 8:48 AM - 9:12 AM BUSTAMANTE, ANA JUDITH (N26660), Tratamiento, NovalisTX2 (5479), Sala de Espera, Medium, Outpatient, 9:12 AM - 9:24 AM CABALIA, FRANCISCO ARMANDO (N26994), Tratamiento, NovalisTX2 (5479), Sala de Espera, Medium, Outpatient, 9:24 AM - 9:48 AM ZUPPA, DANIELA ALEJANDRA (N26906), Tratamiento, NovalisTX2 (5479), Sala de Espera, Medium, Outpatient, 10:00 AM - 10:12 AM RACCA, LILIANA MARGARITA (N26917), Tratamiento, NovalisTX2 (5479), Sala de Espera, Medium, Outpatient, 10:12 AM - 10:24 AM CACCIAVILLANI, ALICIA ZULEMA (N26886), Tratamiento, NovalisTX2 (5479), Fisica Medica, Medium, Outpatient, 10:24 AM - 10:36 AM	NovalisTX2 (5479) - IPR LUÑIZ, MARTA GRACIELA (N26910), Tratamiento, NovalisTX2 (5479), Sala de Espera, Medium, Outpatient, 7:24 AM - 7:36 AM TORANZO, INES ISABEL (N26974), Tratamiento, NovalisTX2 (5479), Sala de Espera, SACAR RX DE CONTROL, Medium, Outpatient, 7:36 AM - 7:48 AM MALDONADO, CARLOS (N27030), Tratamiento, NovalisTX2 (5479), Sala de Espera, Medium, Outpatient, 7:48 AM - 8:00 AM CALCAGNI, BENITO DOMINGO (N26930), Tratamiento + IGRT Exac Trac, NovalisTX2 (5479), Sala de Espera, Medium, Outpatient, 8:00 AM - 8:12 AM RACCA, LILIANA MARGARITA (N26917), Tratamiento, NovalisTX2 (5479), Sala de Espera, QUE AVISE EN MESA DE ENTRADA QUE LE CAMBIAMOS EL HOR... TOSCANO, JOSE SALVADOR (D04329), Tratamiento + IGRT Exac Trac, NovalisTX2 (5479), Sala de Espera, Medium, Outpatient, 9:12 AM - 9:24 AM CABALIA, FRANCISCO ARMANDO (N26994), Tratamiento, NovalisTX2 (5479), Sala de Espera, Medium, Outpatient, 9:24 AM - 9:48 AM GOROSO, ELADIA DELIA (N26986), Tratamiento, NovalisTX2 (5479), Fisica Medica, Medium, Outpatient, 9:48 AM - 10:12 AM LEVROTTO, HUMBERTO JOSE (N26866), Tratamiento, NovalisTX2 (5479), Medium, Outpatient, 10:12 AM - 10:36 AM ZUPPA, DANIELA ALEJANDRA (N26906), Tratamiento, NovalisTX2 (5479), Sala de Espera, Medium, Outpatient, 10:36 AM - 10:48 AM BUSTAMANTE, ANA JUDITH (N26660), Tratamiento, NovalisTX2 (5479), Sala de Espera, Medium, Outpatient, 10:48 AM - 11:00 AM	NovalisTX2 (5479) - IPR TORANZO, INES ISABEL (N26974), Tratamiento, NovalisTX2 (5479), Medium, Outpatient, 7:24 AM - 7:36 AM SAMMARTINO, LUIS GUSTAVO (N26888), Tratamiento + IGRT Exac Trac, NovalisTX2 (5479), Medium, Outpatient, 7:36 AM - 8:00 AM CALCAGNI, BENITO DOMINGO (N26930), Tratamiento + IGRT Exac Trac, NovalisTX2 (5479), Medium, Outpatient, 8:00 AM - 8:12 AM CHANAMPA, ANASTACIA DELIA (D02785), INGRESO, NovalisTX2 (5479), AVISADA, Medium, Outpatient, 8:12 AM - 9:48 AM CEBALLOS, LUIS HECTOR (N26698), INGRESO, NovalisTX2 (5479), PASA A PTV 2, Medium, Outpatient, 9:48 AM - 10:12 AM MALDONADO, CARLOS (N27030), Tratamiento, NovalisTX2 (5479), Medium, Outpatient, 10:12 AM - 10:24 AM CABALIA, FRANCISCO ARMANDO (N26994), Tratamiento, NovalisTX2 (5479), Medium, Outpatient, 10:24 AM - 10:48 AM GOROSO, ELADIA DELIA (N26986), Tratamiento, NovalisTX2 (5479), Medium, Outpatient, 10:48 AM - 11:12 AM

November 2013

S	M	T	W	T	F	S
27	28	29	30	31	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
1	2	3	4	5	6	7

Task Pad

Du...	Pati..	Task...	Qu
		Click here to...	

icmedina

11/19/2013 4:26 PM

4:26 PM 11/19/2013

R&V ARIA

- Imaging
 - On-line y off-line review
 - Portal dosimetry



Offline Review - NOVILLO CORVALAN, MARÍA JULIA ID: N27029

File Quick Links Edit View Insert Measure Matching Review Tools Help

Optimized

90.00deg - RX LI-6_1_1 - 11/6/2013 11:25 - 90 deg

Field edge: Planned
Isocenter: Planned
Isocenter: Acquisition

90.00deg - 11/5/2013 14:45 - 90 deg

Field edge: Planned
Isocenter: Planned

RX LI-6_1_1 - 11/6/2013 11:25 - 90 deg

Isocenter: Acquisition

Wed 11/6/2013	Thu 11/7/2013	Fri 11/8/2013	Mon 11/11/2013	Tue 11/12/2013	Wed 11/13/2013	Thu 11/14/2013
11:25	18:30	15:47	16:08	16:05	18:19	14:27

Manual anatomy match

Match the two blended images manually by dragging and rotating the image with the mouse.
Press the "Finish" button when the images match.

Type of match:
Manual anatomy match

Online Matched Position

Acquisition Position

Imager position correction

Define match anatomy

Cancel Finish Finish & Next

4:22 PM 11/19/2013

Offline Review - LOPEZ, MARICEL CARINA ID: N27022

File Quick Links Edit View Insert Measure Matching Review Tools Help

Contrast PV high

0.00deg - RX ANT-10_5_3 - 11/18/2013 18:59 - 0 deg

Field edge: Planned
Isocenter: Planned
Isocenter: Acquisition

90.00deg - RX LI-11_5_4 - 11/18/2013 19:00 - 90 deg

Field edge: Planned
Isocenter: Planned
Isocenter: Acquisition

0.00deg - 11/5/2013 15:35 - 0 deg

RX ANT-10_5_3 - 11/18/2013 18:59 - 0 deg

90.00deg - 11/5/2013 15:35 - 90 deg

RX LI-11_5_4 - 11/18/2013 19:00 - 90 deg

Field edge: Planned
Isocenter: Planned

Isocenter: Acquisition

Field edge: Planned
Isocenter: Planned

Isocenter: Acquisition

Mon 11/11/2013 10:29

Tue 11/12/2013 11:25

Wed 11/13/2013 19:40

Thu 11/14/2013 13:12

Fri 11/15/2013 17:42

Mon 11/18/2013 18:59

Manual anatomy match

Match the two blended images manually by dragging and rotating the image with the mouse.
Press the "Finish" button when the images match.

Type of match:
Manual anatomy match

Online Matched Position

Acquisition Position

Define match anatomy

Cancel

Finish

Finish & Next

4:24 PM 11/19/2013

Offline Review - GUZMAN, OLGA DEL TRANSITO ID: N26911

File Quick Links Edit View Insert Measure Matching Review Tools Help

Optimized

TI1 - RX TI-11_1_10 - 11/5/2013 11:24 - 63 deg

Field edge: Planned
Isocenter: Planned
Isocenter: Acquisition

TI1 - 11/1/2013 08:49 - 63 deg

Field edge: Planned
Isocenter: Planned

RX TI-11_1_10 - 11/5/2013 11:24 - 63 deg

Isocenter: Acquisition

0:00 4:28 min:sec

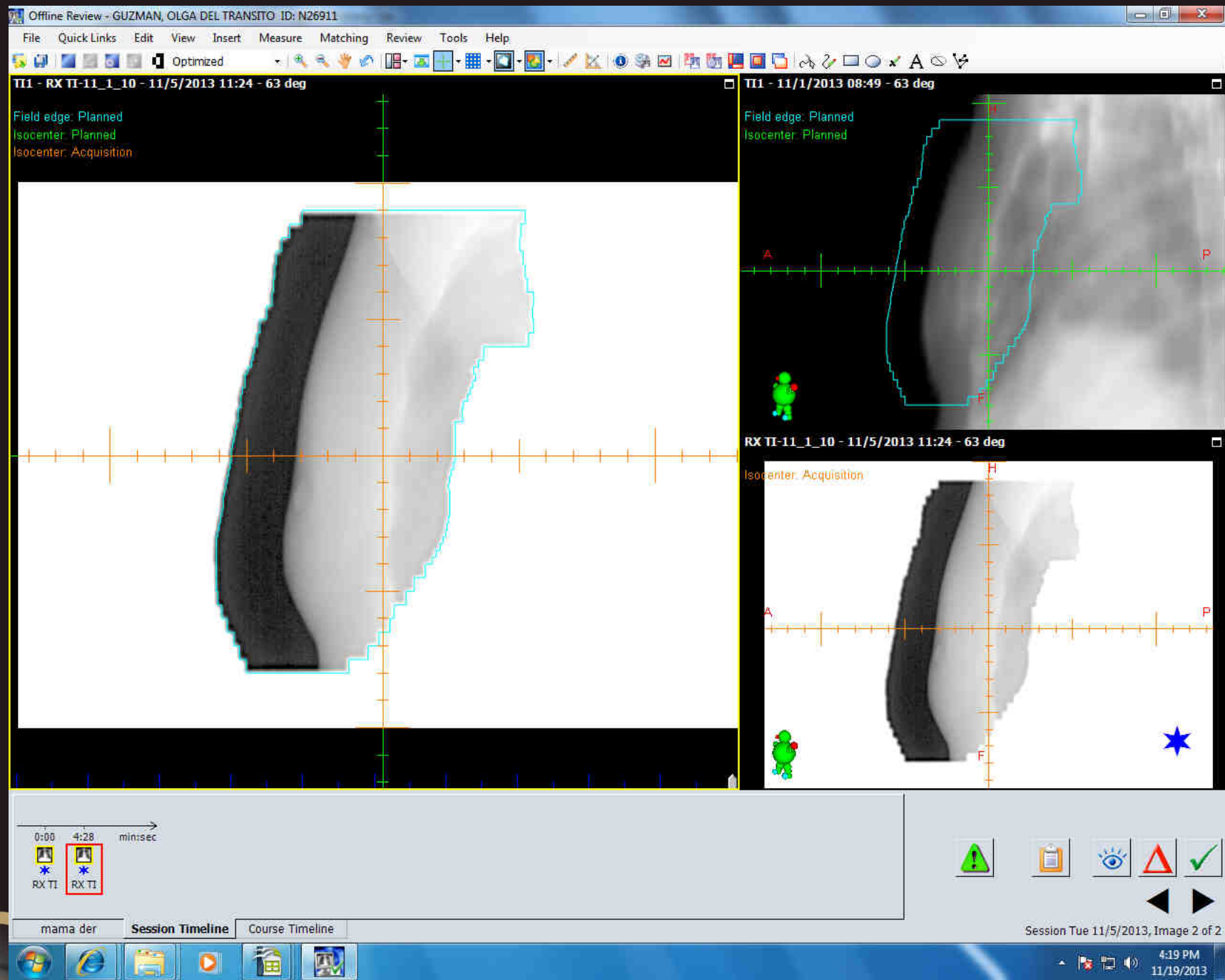
RX TI RX TI

mama der Session Timeline Course Timeline

Session Tue 11/5/2013, Image 2 of 2

4:19 PM 11/19/2013

FONDACION MARIE CURIE



VERIFICACION CAMPOS INGRESO



TRATAMIENTO



INSTITUTO DE RADIOTERAPIA
FUNDACIÓN MARIE CURIE

GRACIAS
por su atención

dfernandez@radioncologia-zunino.org



INSTITUTO DE RADIOTERAPIA
FUNDACIÓN MARIE CURIE