

XXIII CONGRESSO
AIRO

Giardini Naxos - Taormina, 26 - 29 ottobre

Regione Siciliana - Assessorato Regionale dei Beni Culturali e dell'Identità Siciliana.
Dipartimento dei Beni Culturali e dell'Identità Siciliana.
Servizio Museo Interdisciplinare Regionale "A. Pepoli" Trapani.



LAB CONTOURING
Mammella

CASO CLINICO

- 69 aa
- **Mammografia-Ecografia:** Nel QSI sn si osserva opacità circoscritta a margini irregolari di 2x1 cm con calcificazioni ecografiche spesse ed irregolari, Linfonodi densi e rotondeggianti si osservano in sede ascellare sn, come per metastasi.
- **Esami di stadiazione** (Rx torace - Eco epatica - Scintig. Ossea): Negativi per lesioni secondarie.
- Intervento chirurgico di **Quadrantectomia SI sn + linfadenectomia ascellare sn.**
- **E.I.:** Ca Duttale Infiltrante di 2.3 cm 14⁺/23 LNF asportati
 - ER: 98% PgR: 20% MIB1/Ki67: 5% p53: 0 HER2/NEU: Neg.

pT2 pN3a M0 G2

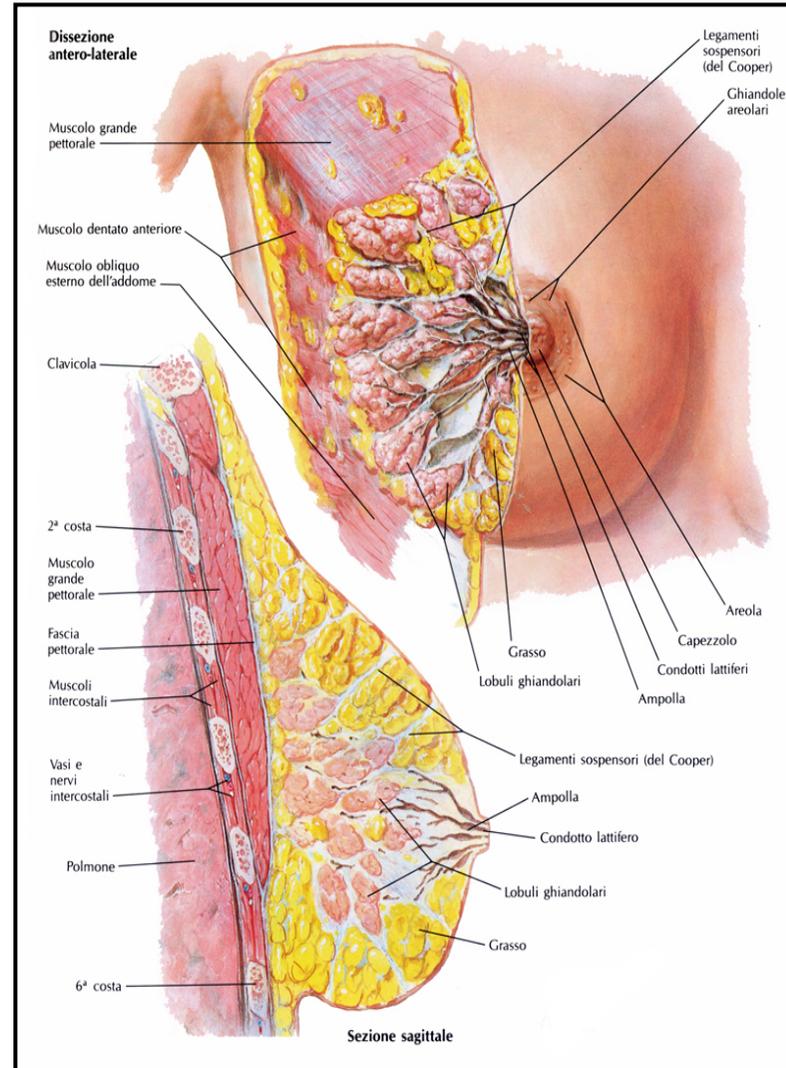
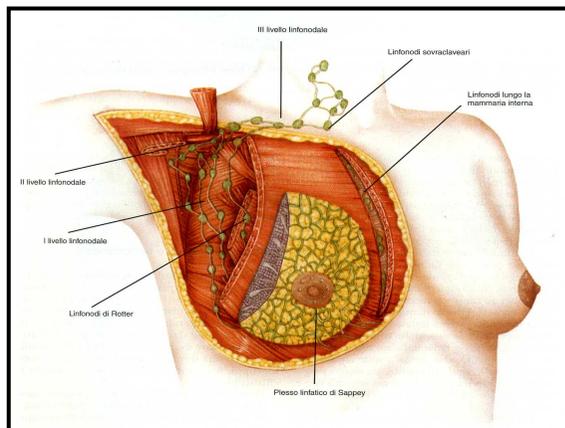
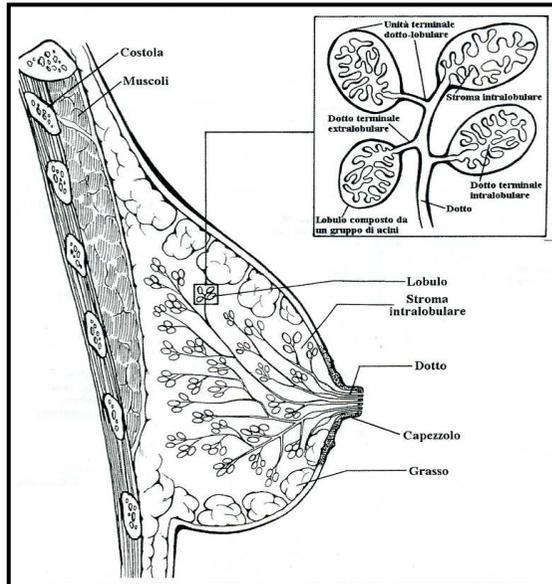
Prescrizione Volumi

- CTV1: ghiandola mammaria sn residua
- CTV2: linfonodi reg. claveare sn

- OARs
 - Plesso brachiale sn

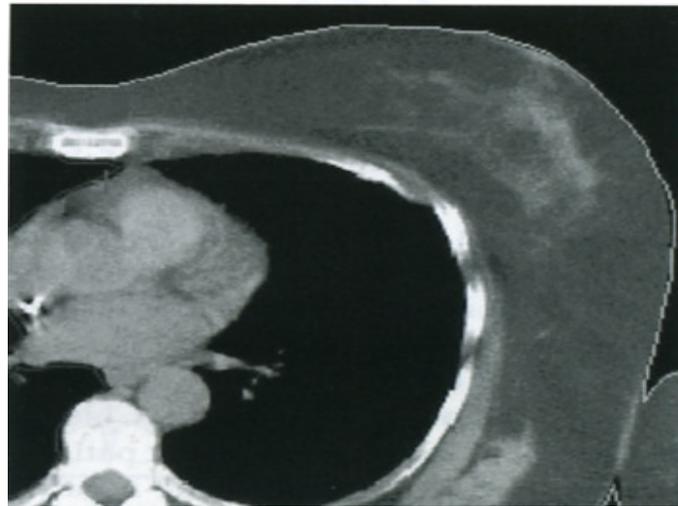
Ghiandola mammaria

LA GHIANDOLA MAMMARIA



CTV: ghiandola mammaria

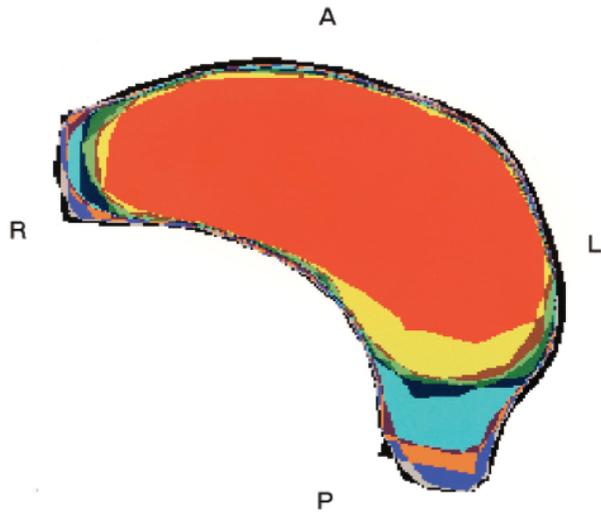
Variabile evidenza di tessuto ghiandolare in TC



CTV: gh. mammaria

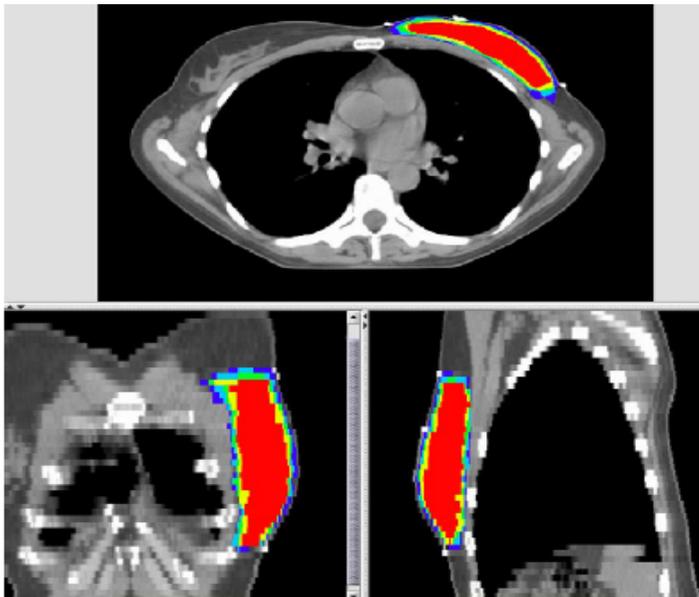
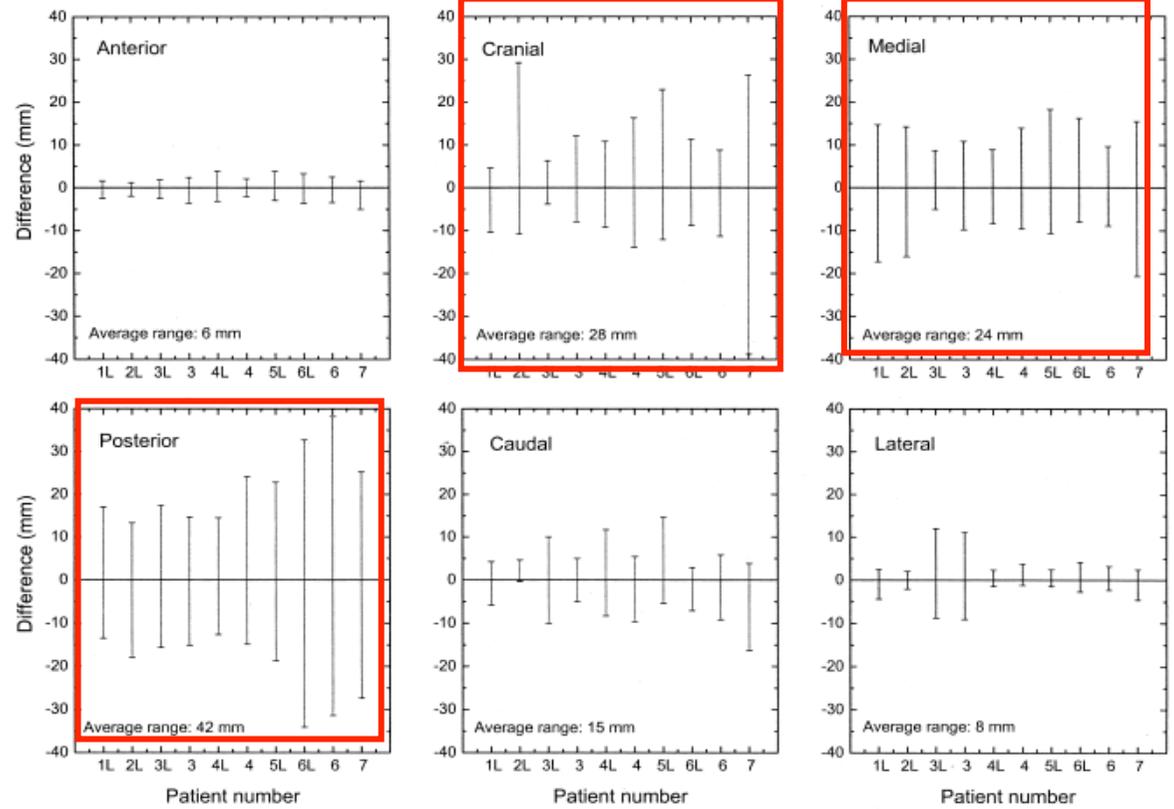
Problematiche

- Difficoltà ad identificare il tessuto ghiandolare sulla TC
- La quantità di tessuto ghiandolare è variabile tra le pazienti
- Il tessuto ghiandolare evidenziabile in TC non rappresenta la totale estensione della ghiandola
- Difficoltà nel discriminare “fatty (involted) breast tissue” e “non fatty breast tissue”



COEN W. HURKMANS,

Int. J. Radiation Oncology Biol. Phys., Vol. 50, No. 5, pp. 1366-1372, 2001



**IL PROBLEMA DELLA
VARIABILITA'
INTEROSSERVATORE !!!!!!!!!!!!!!!**

Henk Struikmans
Radiotherapy and Oncology 76 (2005) 293-299
www.thegreenjournal.com

Hurkmans' DELINEATION PROTOCOL:

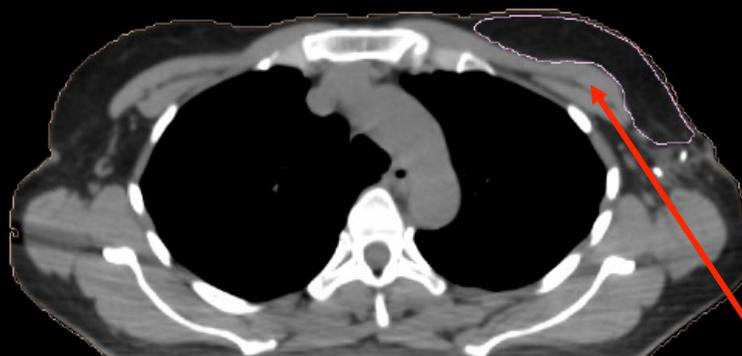
- **Finestra** contrastografica: livello(0) e ampiezza (500)
- **Repere** possibilmente posizionato dallo stesso medico che esegue la contornazione
- Utilizzare la visualizzazione simultanea della contornazione su **piani assiali, coronale, sagittale e 3D view**
- Superficie del CTV "smooth"
- Il CTV inizia 5 mm sotto la cute.

Breast Cancer Atlas for Radiation Therapy Planning: Consensus Definitions



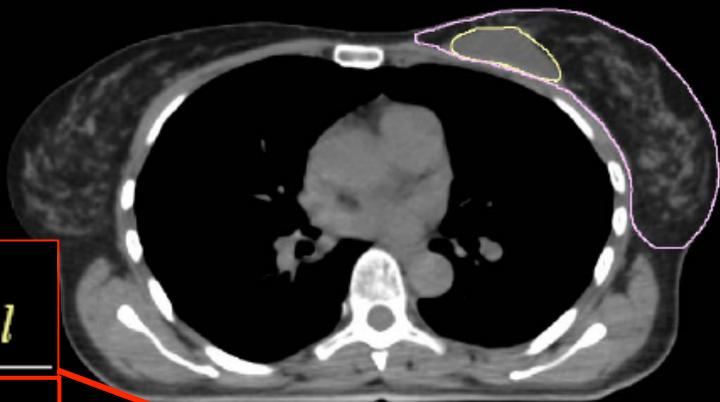
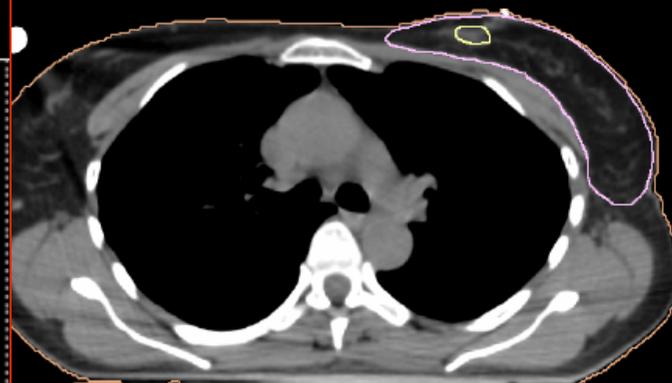
Breast CTV:

- Considers referenced **clinical breast** at time of CT
- Includes the apparent **CT glandular** breast tissue
- Incorporates consensus definitions of **anatomical borders** (see table)
- Includes the **lumpectomy** CTV



Posterior

Excludes
pectoralis
muscles,
chestwall
muscles, ribs



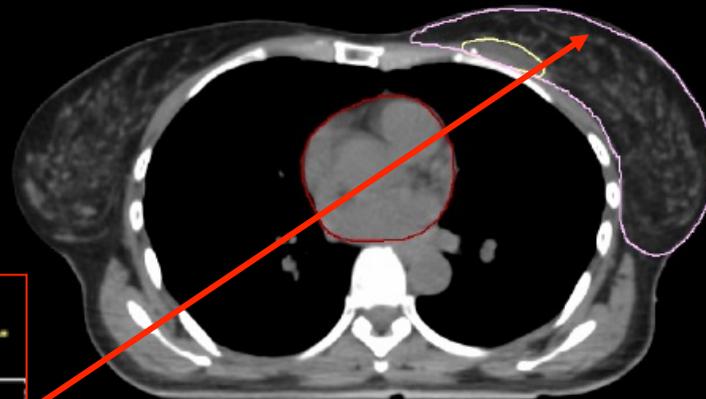
Medial

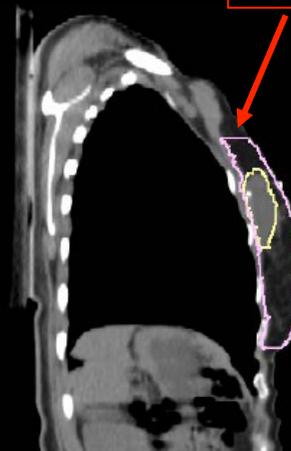
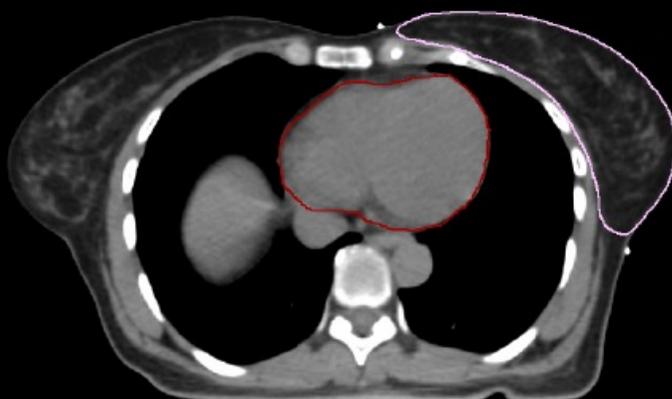
Sternal-
rib
junction^c



Anterior

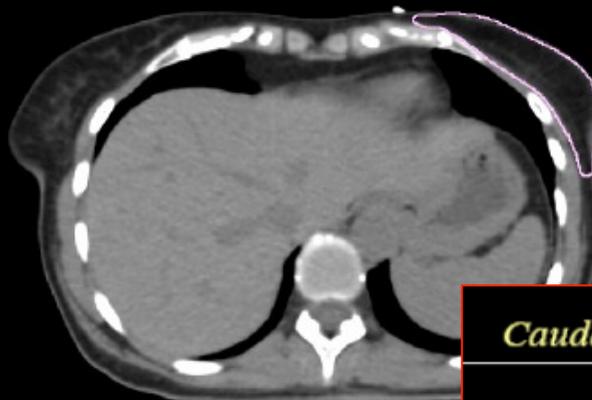
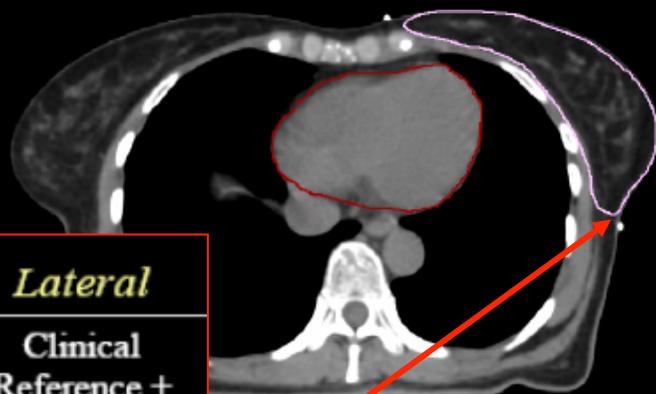
Skin





Cranial

Clinical
Reference
+ Second
rib
insertion^a



Caudal

Clinical
reference +
loss of CT
apparent
breast

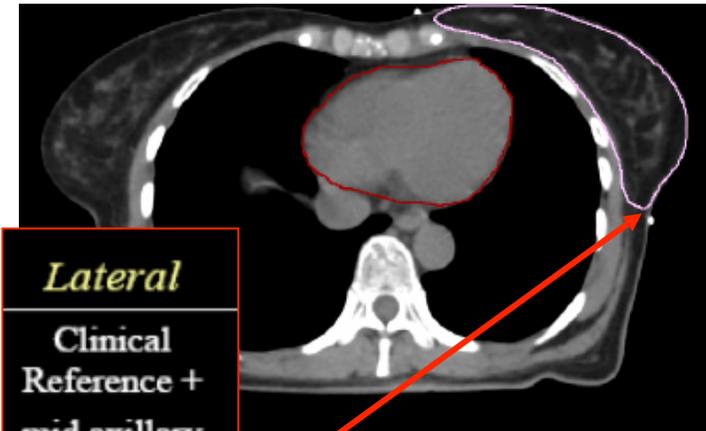
Lateral

Clinical
Reference +
mid axillary
line typically,
excludes
latissimus
(Lat.) dorsi m.
b

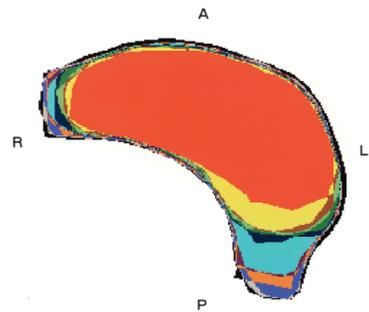
Contouring



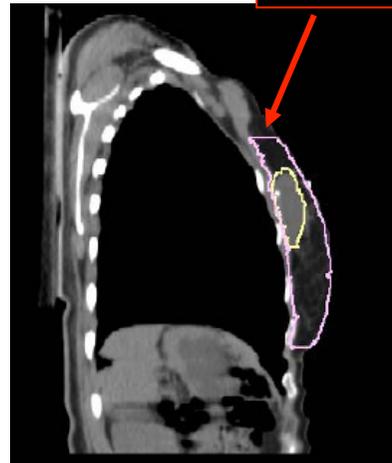
Medial
Sternal-
rib
junction ^c



Lateral
Clinical
Reference +
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Cranial
Clinical
Reference
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rib
insertion ^a





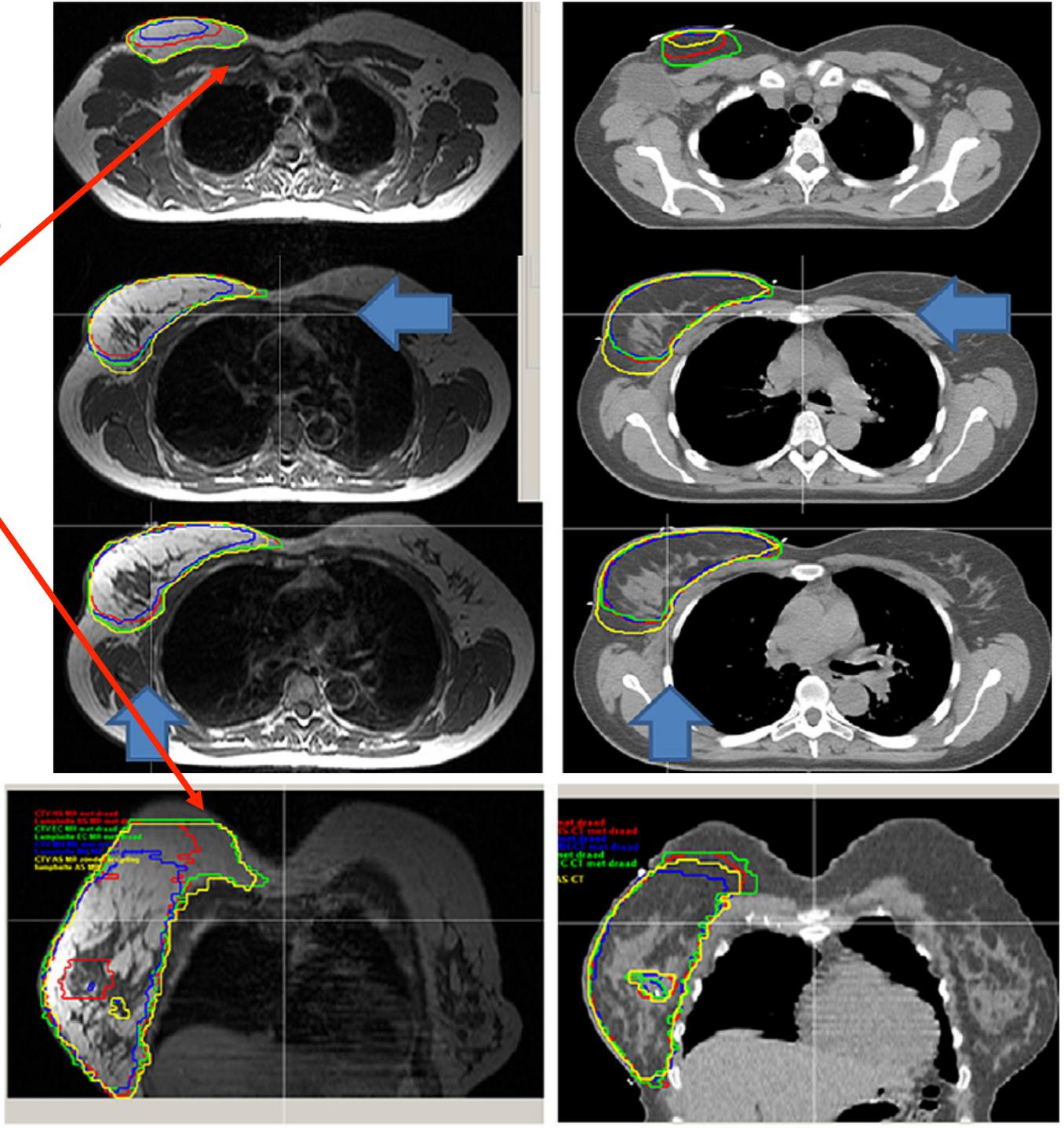
CLINICAL INVESTIGATION

Breast

**MAGNETIC RESONANCE IMAGING—VERSUS COMPUTED TOMOGRAPHY—BASED
TARGET VOLUME DELINEATION OF THE GLANDULAR BREAST TISSUE (CLINICAL
TARGET VOLUME BREAST) IN BREAST-CONSERVING THERAPY:
AN EXPLORATORY STUDY**

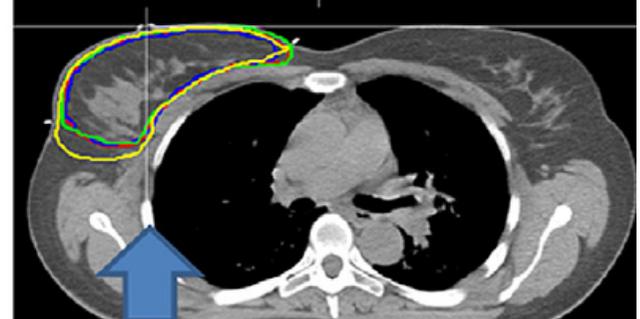
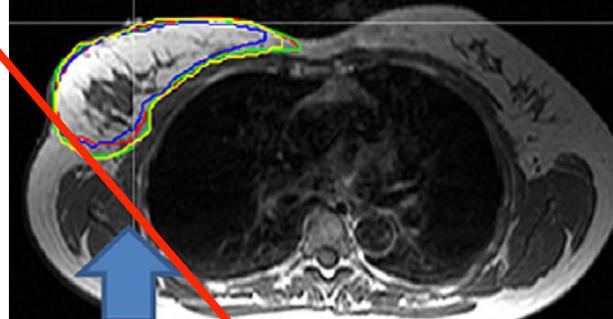
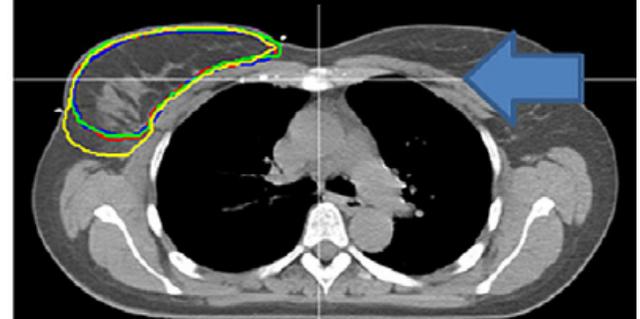
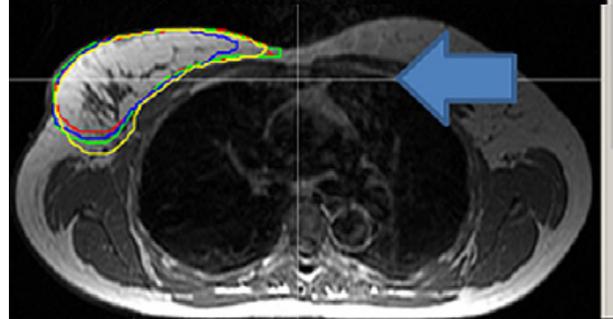
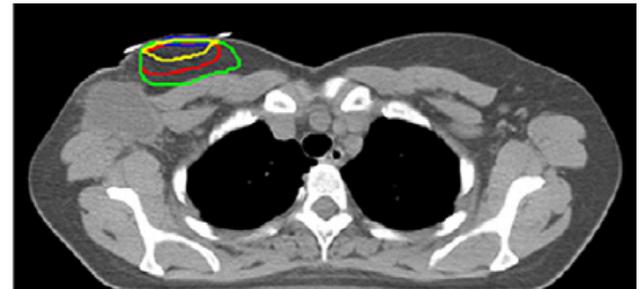
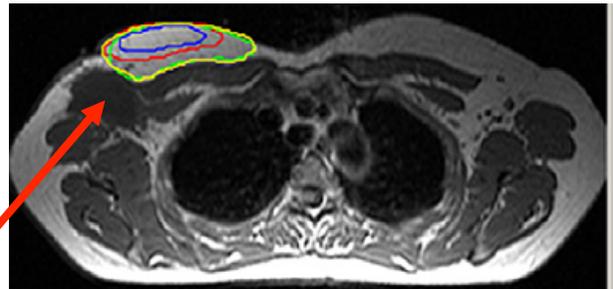
MARINA GIEZEN, DRS., IR.,* ERIK KOUWENHOVEN, PH.D.,* ASTRID N. SCHOLTEN, M.D., PH.D.,†
EMILE G. COERKAMP, M.D.,‡ MARK HEIJENBROK, M.D.,‡ WIM P. A. JANSEN, PH.D.,†
MIRJAM E. MAST, M.Sc.,* ANNA L. PETOUKHOVA, PH.D.,* AND HENK STRUIKMANS, M.D., PH.D.*†

RM vs TC:
Aumentata estensione
del CTV in direzione
cranio-mediale

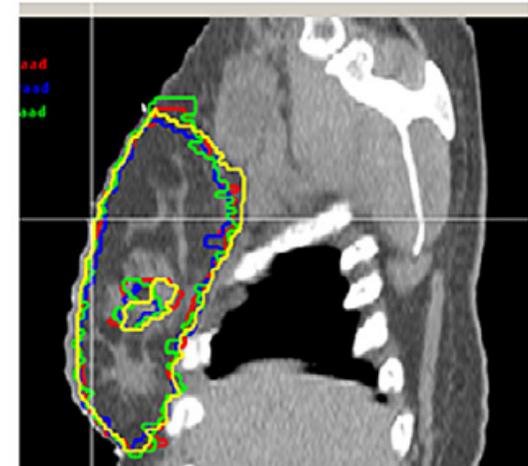
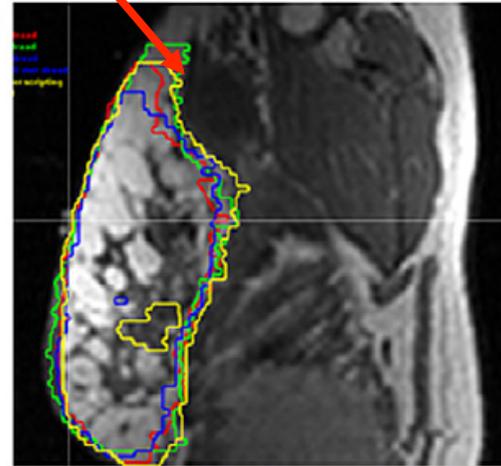


RM vs TC:

e
cranio-laterale

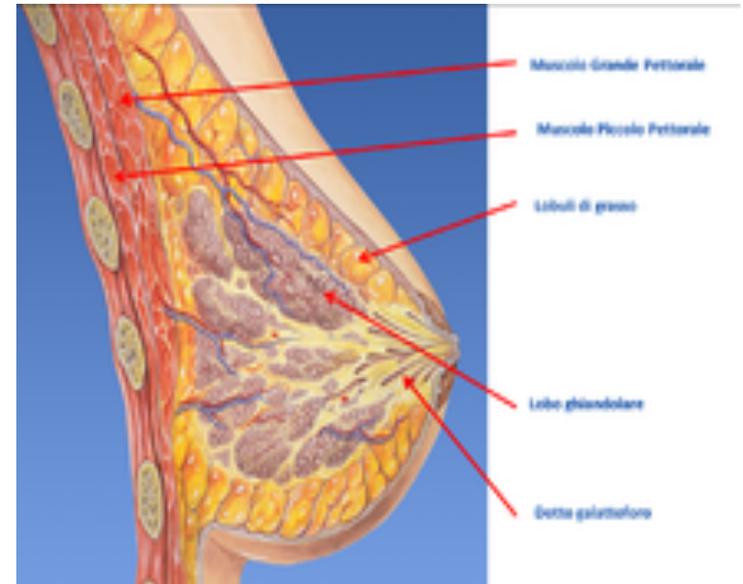


(c)



Take home messages

- Finestra TC (0-500 HU)
- Includere tutto il seno: clinica con repere
- Utilizzare anche altre proiezioni (alternative all'assiale) in corso di contornazione
- Informazioni anamnestiche con mammografia pre-operatoria
- Atlante di contornazione

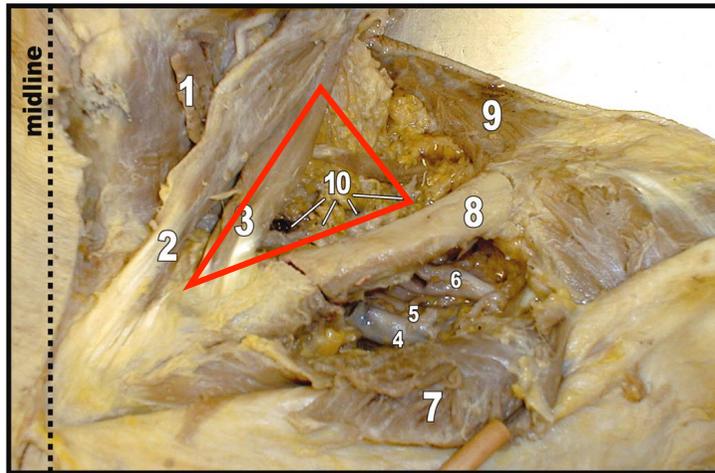


Breast Cancer Atlas for Radiation
Therapy Planning:
Consensus Definitions

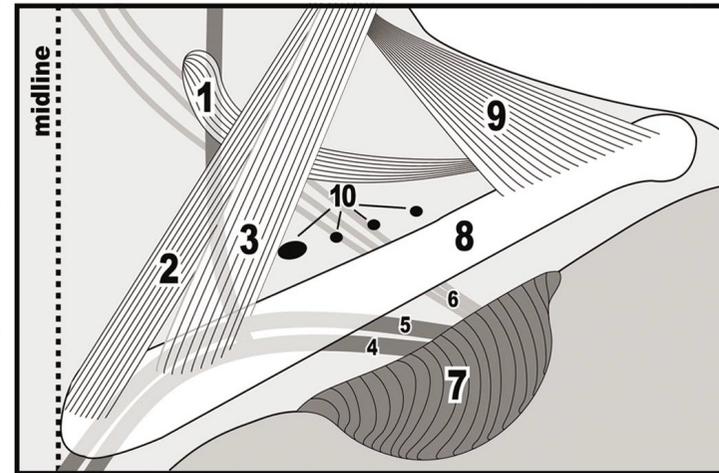
RTOG
RADIATION THERAPY
ONCOLOGY GROUP

Regione chiave

FOSSA SOVRACLAVEARE

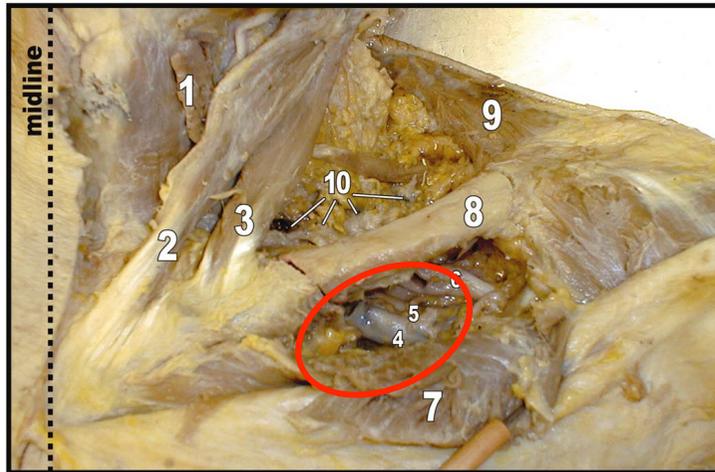


a.

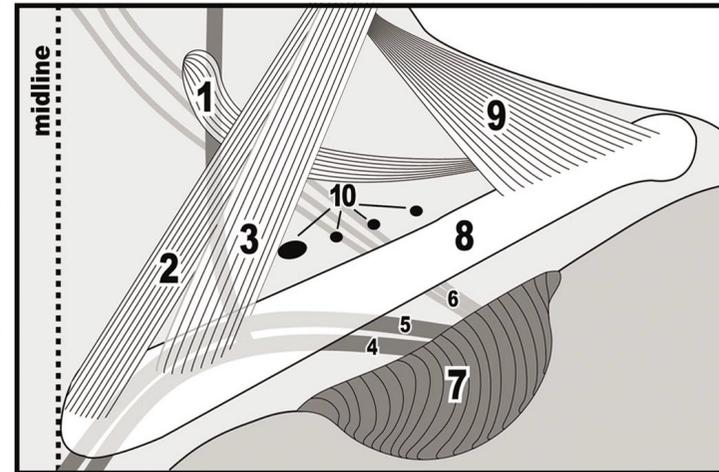


b.

FOSSA INFRACLAVEARE



a.



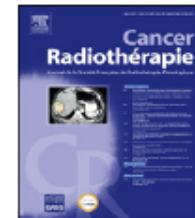
b.

1 = omohyoid muscle, 2 = sternocleidomastoid muscle (sternal head), 3 = sternocleidomastoid muscle (clavicular head), 4 = subclavian vein, 5 = subclavian artery, 6 = brachial plexus, 7 = pectoralis major muscle (reflected), 8 = clavicle, 9 = trapezius muscle, 10 = supraclavicular lymph nodes.



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Mise au point

Volumes de délinéation dans le traitement des cancers du sein : volumes cibles et organes à risque

Organs at risk and target volumes: Definition for conformal radiation therapy in breast cancer

I. Atean^{a,*}, Y. Pointreau^{a,c,d,e}, I. Barillot^{a,c}, Y.-M. Kirova^f

Regione sovraclaveare

Limites du volume cible anatomoclinique (CTV) de la région sus-claviculaire.

	En haut	En bas	En avant	En arrière	En dehors	En dedans
RTOG [32]	Cartilage cricoïde	Jonction entre le tronc brachiocéphalique - veine axillaire/bord inférieur de la tête claviculaire	Muscle sternocléidomastoïdien	Muscle scalène antérieur	Crânial : bord latéral du muscle sternocléidomastoïdien Caudal : jonction entre la 1ère côte et la clavicule	Exclure la thyroïde et la trachée
Madu et al. [29]		Artère sous-clavière	Muscle sternocléidomastoïdien	Postérolatéral : artère carotidienne et veine jugulaire interne	Postéromédial : bord antérieur et médial du muscle scalène antérieur	Bord latéral de la trachée ; à l'exclusion de la thyroïde
Dijkema et al. [30]						
Médial	Cartilage cricoïde	Confluent jugulo-sous-clavier Caudal : veine jugulaire externe	Muscle sternocléidomastoïdien	Bord postérieur de l'artère carotide interne Face antérieure du muscle scalène	Bord latéral du muscle sternocléidomastoïdien et scalène antérieur	Bord médial de l'artère carotide interne et veine jugulaire
Latéral	Muscle omohyoïdien	Veine jugulaire externe, vaisseaux cervicaux transverses	Clavicule, peau	Surface ventrale du muscle omohyoïdien, muscle élévateur de la scapula, muscle scalène moyen	Clavicule, muscle trapèze	Bord latéral du muscle sternocléidomastoïdien et muscle scalène antérieur
Kirova et al. [5]	Cartilage thyroïdien	Artère sous-clavière	Muscle sternocléidomastoïdien	Artère carotidienne et veine jugulaire interne	Muscle scalène antérieur	Bord latéral de la trachée
Bourgier et al. [33]	Plan parallèle à la clavicule, dont la limite supérieure correspond à l'articulation acromioclaviculaire	Plan parallèle à la clavicule à hauteur du bord de l'articulation sternoclaviculaire	Ligne située à 5 mm en dessous du contour cutané	Apophyses vertébrales latérales et pèvre	Jonction des deux tiers internes et du tiers externe de la clavicule	Tendon du muscle sternocléidomastoïdien, bord externe du lobe thyroïdien, trachée et œsophage

Regione infraclaveare

Limites du volume cible anatomoclinique (CTV) de la région sous-claviculaire.

	En haut	En bas	En avant	En arrière	En dehors	En dedans
RTOG [32]	Au niveau de l'insertion du muscle petit pectoral au cartilage cricoïde	Vaisseaux axillaires croisant le bord médial du muscle petit pectoral	Face postérieure du muscle grand pectoral	Côtes et les muscles intercostaux	Bord médial du muscle petit pectoral	Paroi thoracique
Madu et al. [29]	Coupes scanographiques caudales au muscle deltoïde	Coupes scanographiques caudales au processus coracoïde	Grand pectoral et peau	Clavicule, muscle sous-clavier	Bord médial du processus coracoïde, muscle petit pectoral et muscle coracobrachial	Peau, insertion du grand pectoral à la clavicule
Dijkema et al. [30]	Muscle petit pectoral (bord supérieur)	Au niveau de l'insertion de la clavicule au manubrium	Surface profonde du grand pectoral	Artère sous-clavière et artère axillaire	Muscle petit pectoral (bord médian)	Bord latéral de la clavicule
Kirova et al. [5]	Muscle petit pectoral (bord supérieur)	Articulation sternoclaviculaire	Surface profonde du muscle grand pectoral	Artère sous-clavière et artère axillaire	Muscle petit pectoral (bord médian)	Bord latéral de la clavicule
Bourgier et al. [33]	Bord inférieur de la clavicule	Limite supérieure du curage axillaire repéré par des clips chirurgicaux	Muscle pectoral	Muscle de la fosse antérieure de l'omoplate	Aire ganglionnaire axillaire	Paroi thoracique



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Original article

A simplified CT-based definition of the supraclavicular and infraclavicular nodal volumes in breast cancer

Règles de délimitation simplifiées des volumes ganglionnaires sus- et sous-claviculaires dans le traitement des cancers du sein

I. Atean^{a,*}, Y. Pointreau^{a,c}, L. Ouldamer^{c,d}, C. Monghal^e, A. Bougnoux^a, G. Bera^a, I. Barillot^{a,c}

Utilizzano TC senza mdc

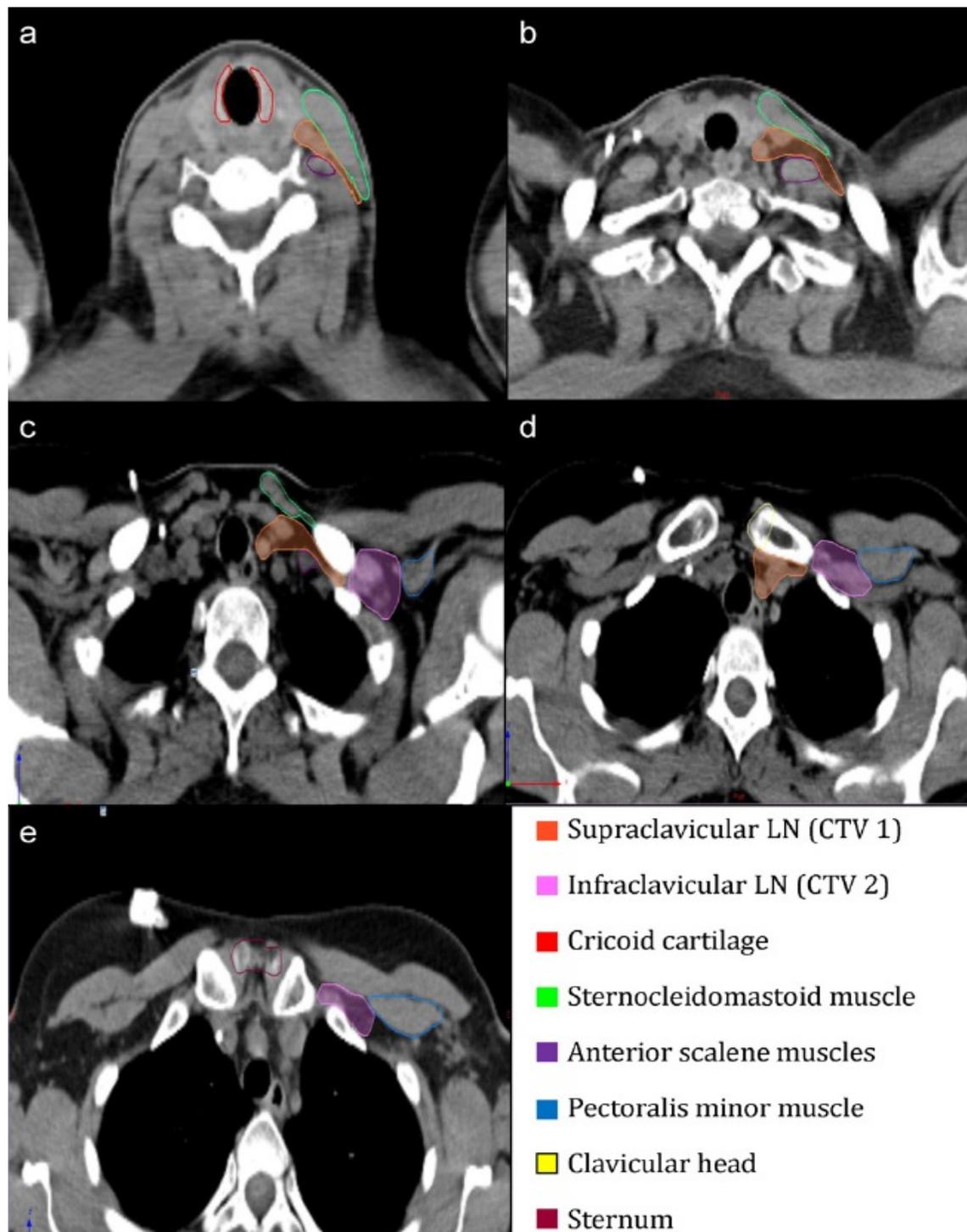
Guidelines for delineating the anatomical boundaries of supra- and infraclavicular lymph node clinical target volumes, for breast cancer patients in treatment position, on non-enhanced transverse computed tomography (CT) slices.

Recommandations pour la délimitation des volumes cibles des régions sus- et sous-claviculaire établies au moyen de scanographies sans injection de produit de contraste, dans le cadre du traitement du cancer du sein.

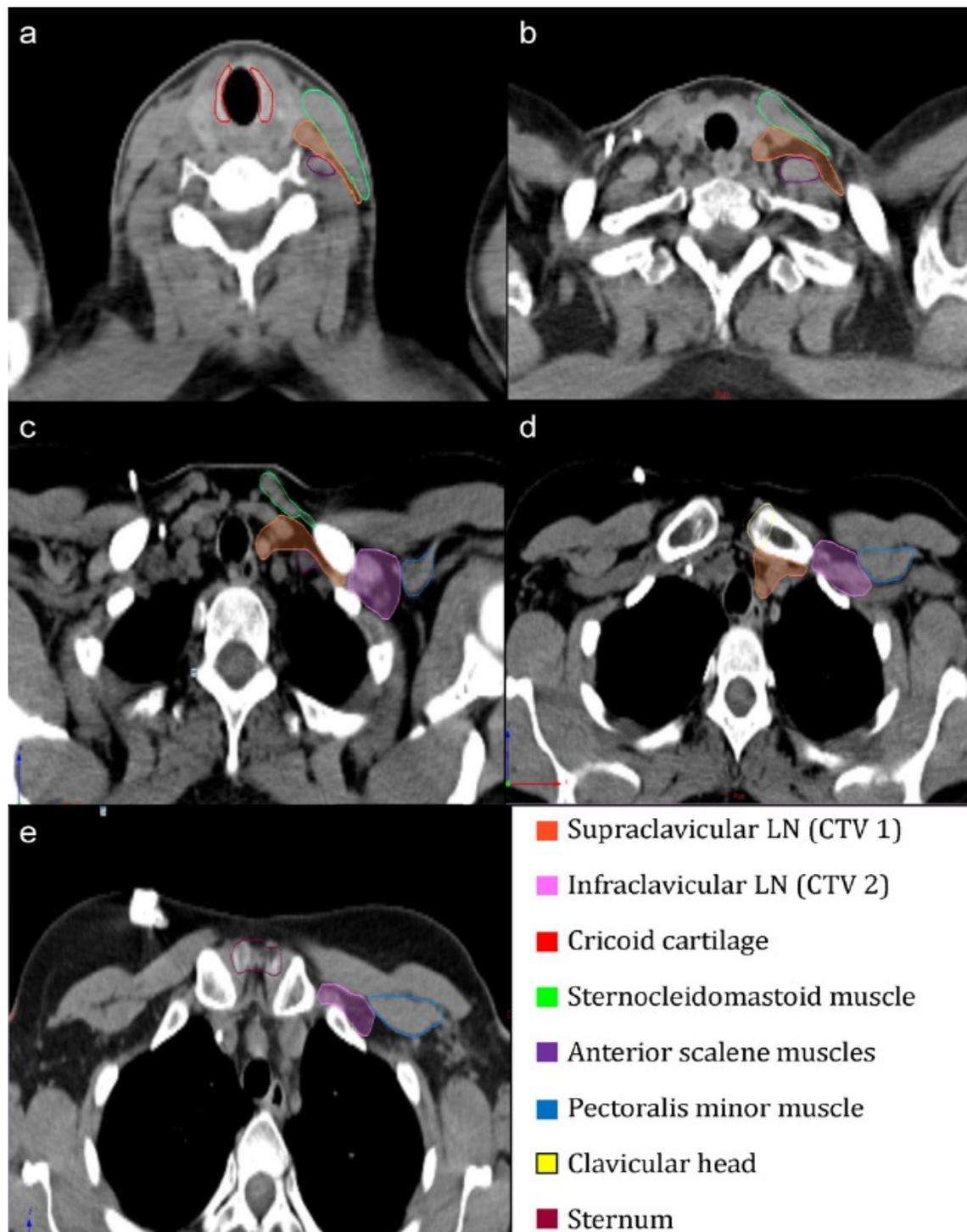
	Cranial	Caudal	Anterior	Posterior	Lateral	Medial
Supraclavicular lymph nodes	Caudal edge of cricoid cartilage	Cranial edge of clavicular head	Sternocleidomastoid muscle	Anterior aspect of the scalene muscle	Cranial: lateral edge of sternocleidomastoid muscle Caudal: ^a clavicle	Carotid artery and internal jugular vein (excluding thyroid and trachea)
Infraclavicular lymph nodes	Superior border of the pectoralis minor muscle	Superior edge of sternum	Pectoralis major muscle	Ribs and intercostal muscles	Medial border of pectoralis Minor muscle	Lateral edge of the clavicle

^a For CT-slices, where nodal regions approach the clavicle.

- Il CTV dei **linfonodi sovraclaveari** si estende dalla cartilagine cricoide al margine craniale della testa della clavicola
- Sono dorsali al muscolo sternocleidomastoideo e si estendono lateralmente verso la clavicola
- Il margine postero-mediale si estende medialmente alla arteria carotide e alla vena giugulare interna.
- Posteriormente è delimitato dal muscolo scaleno anteriore.



- Il CTV dei **linfonodi infraclaveari** si estende dal margine superiore del muscolo pettorale minore al limite superiore dello sterno.
- Si estende lateralmente fino al bordo mediale del muscolo piccolo pettorale e medialmente fino al limite laterale della clavicola.
- Il margine anteriore è rappresentato dal muscolo grande pettorale e il margine posteriore dalle coste e dai muscoli intercostali.



Contouring



2001

Radiation Oncology

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Robin B. Marsh, CMD
Edwin Y. Wang, MD
Lori J. Pierce, MD

Index terms:
Breast neoplasms, 00.22
Breast neoplasms, therapeutic
radiology, 00.125
Lymphatic system, CT, 007.12012,
997.92
Lymphatic system, therapeutic
radiology, 997.13, 997.92
Treatment planning

Definition of the Supraclavicular and Infraclavicular Nodes: Implications for Three-dimensional CT-based Conformal Radiation Therapy¹



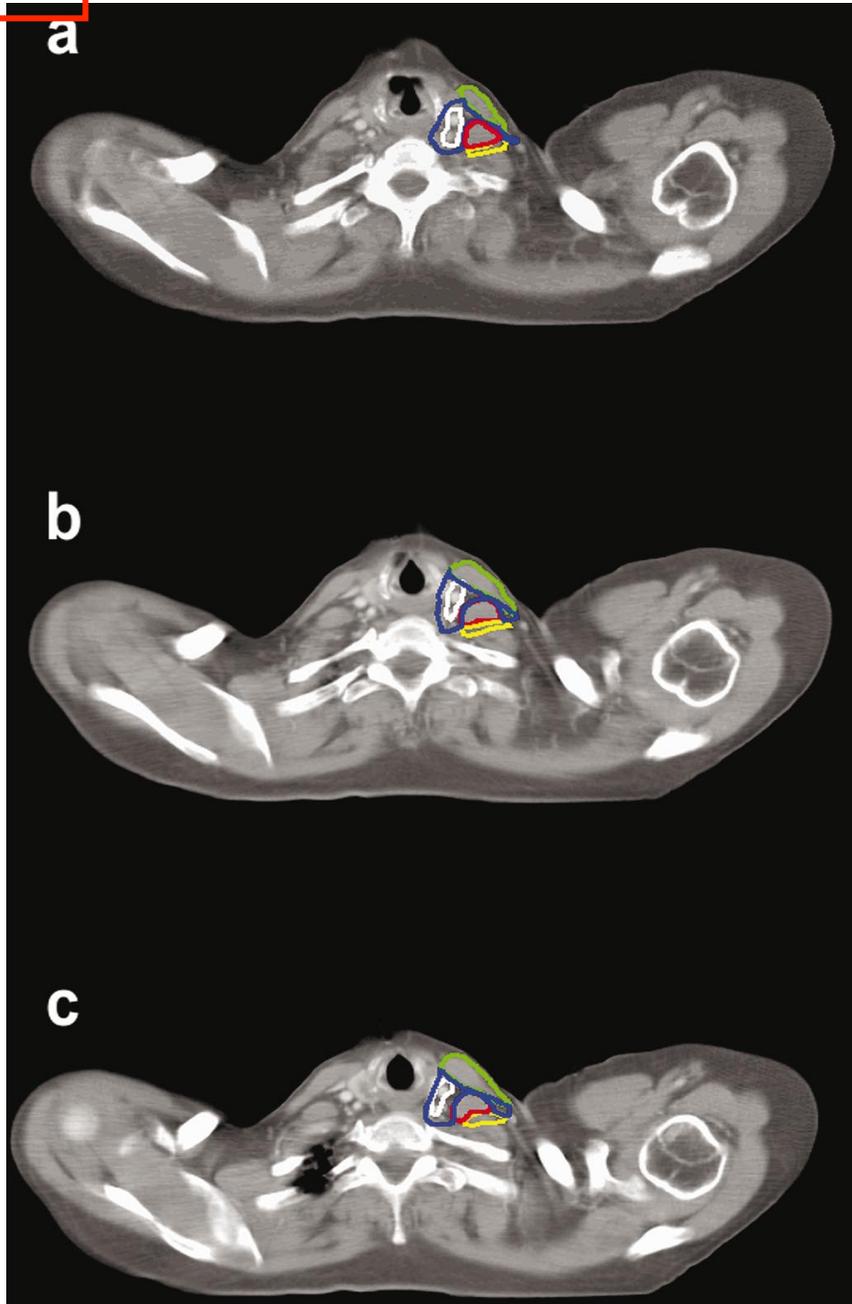
2004

Radiation Oncology 71 (2004) 287–295

**RADIOTHERAPY
& ONCOLOGY**
JOURNAL OF THE EUROPEAN SOCIETY FOR
THERAPEUTIC RADIOLOGY AND ONCOLOGY
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Loco-regional conformal radiotherapy of the breast: delineation of the regional lymph node clinical target volumes in treatment position

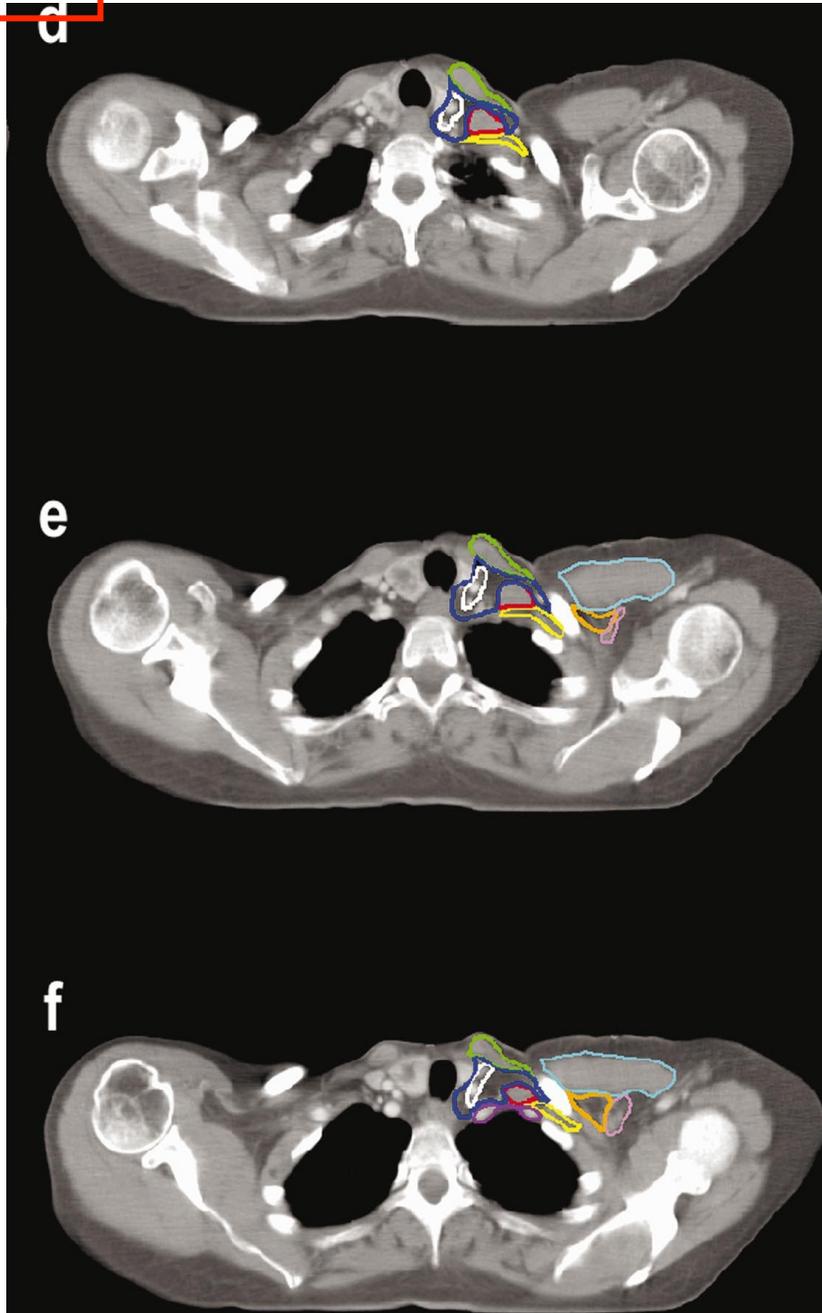
Ivessa M. Dijkema^{a,*}, Pieter Hofman^a, Cornelis P.J. Raaijmakers^a, Jan J. Lagendijk^a,
Jan J. Battermann^a, Berend Hillen^b



FOSSA SOVRACLAVEARE

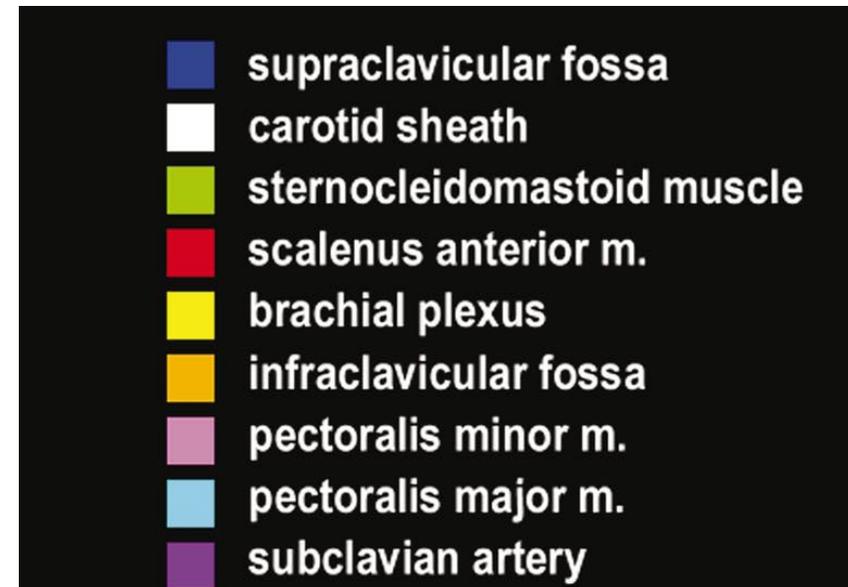
- **Mediale:** margine trachea (escludendo tiroide e cart. tiroidea)
- **Anteriore:** sternocleiomastoideo e fascia cervicale profonda
- **Posterolaterale:** margine mediale e anteriore dello scaleno anteriore
- **Posteromediale:** a. carotide e v. giugulare interna
- **Inferiore:** a. succlavia

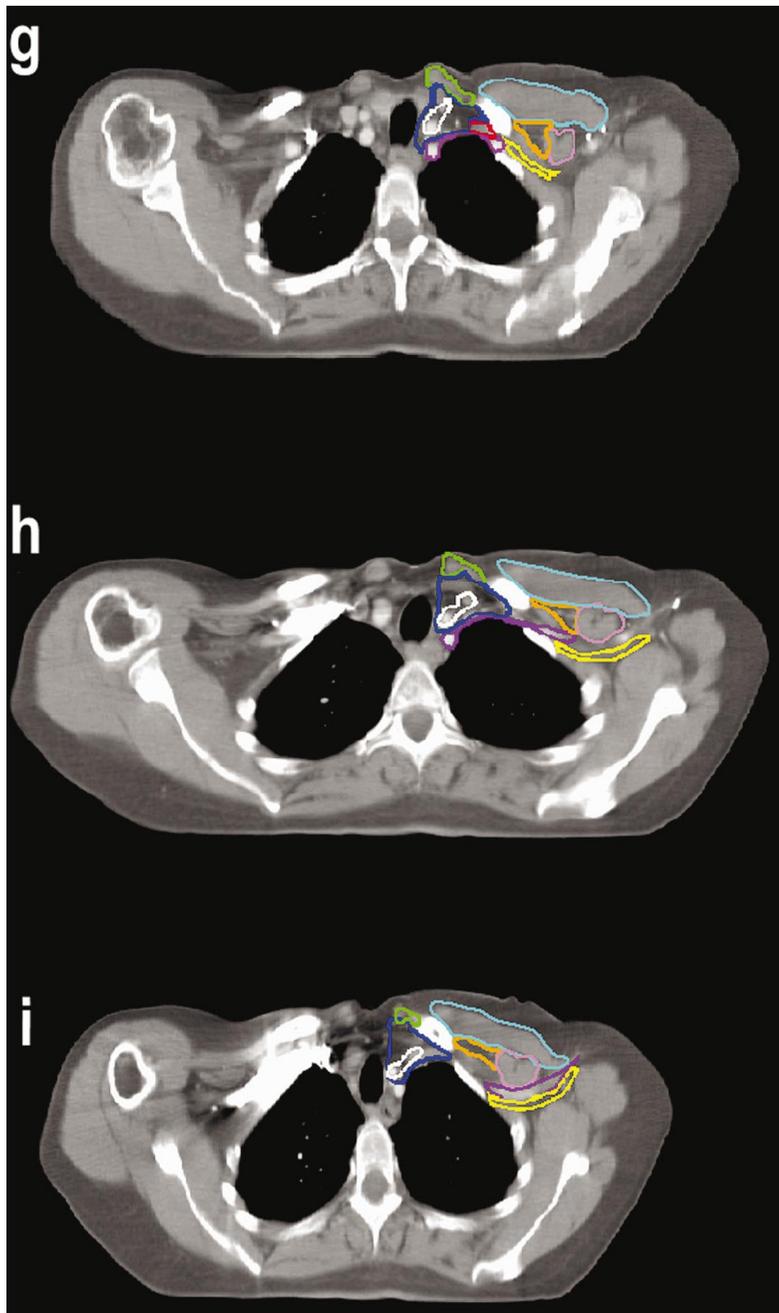
■	supraclavicular fossa
■	carotid sheath
■	sternocleidomastoid muscle
■	scalenus anterior m.
■	brachial plexus
■	infraclavicular fossa
■	pectoralis minor m.
■	pectoralis major m.
■	subclavian artery



FOSSA INFRACLAVEARE

- **Superiore:** margine sup. del piccolo pettorale
- **Inferiore:** inserzione della clavicola nel manubrio sternale
- **Laterale:** margine mediale del piccolo pettorale
- **Mediale:** margine laterale della clavicola
- **Anteriore:** superficie profonda del grande pettorale
- **Posteriore:** art. sottoclaveare-ascellare





Radiology • November 2001

Radiation Oncology

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Definition of the Supraclavicular and Infraclavicular Nodes: Implications for Three-dimensional CT-based Conformal Radiation Therapy¹

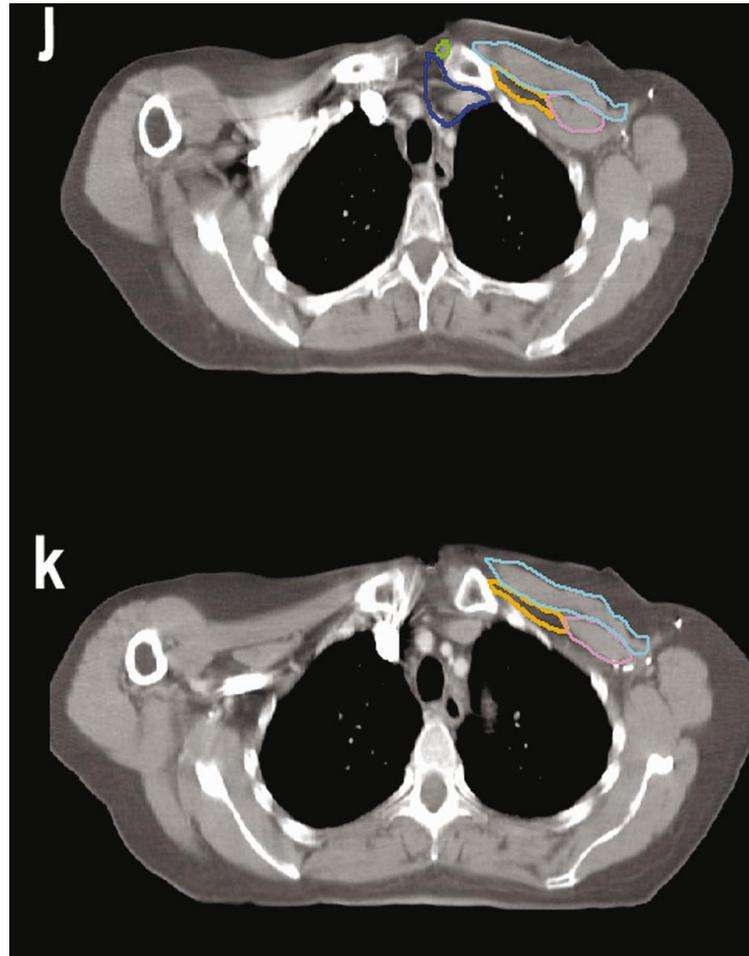
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- carotid sheath
- sternocleidomastoid muscle
- scalenus anterior m.
- brachial plexus
- infraclavicular fossa
- pectoralis minor m.
- pectoralis major m.
- subclavian artery

Radiation Oncology

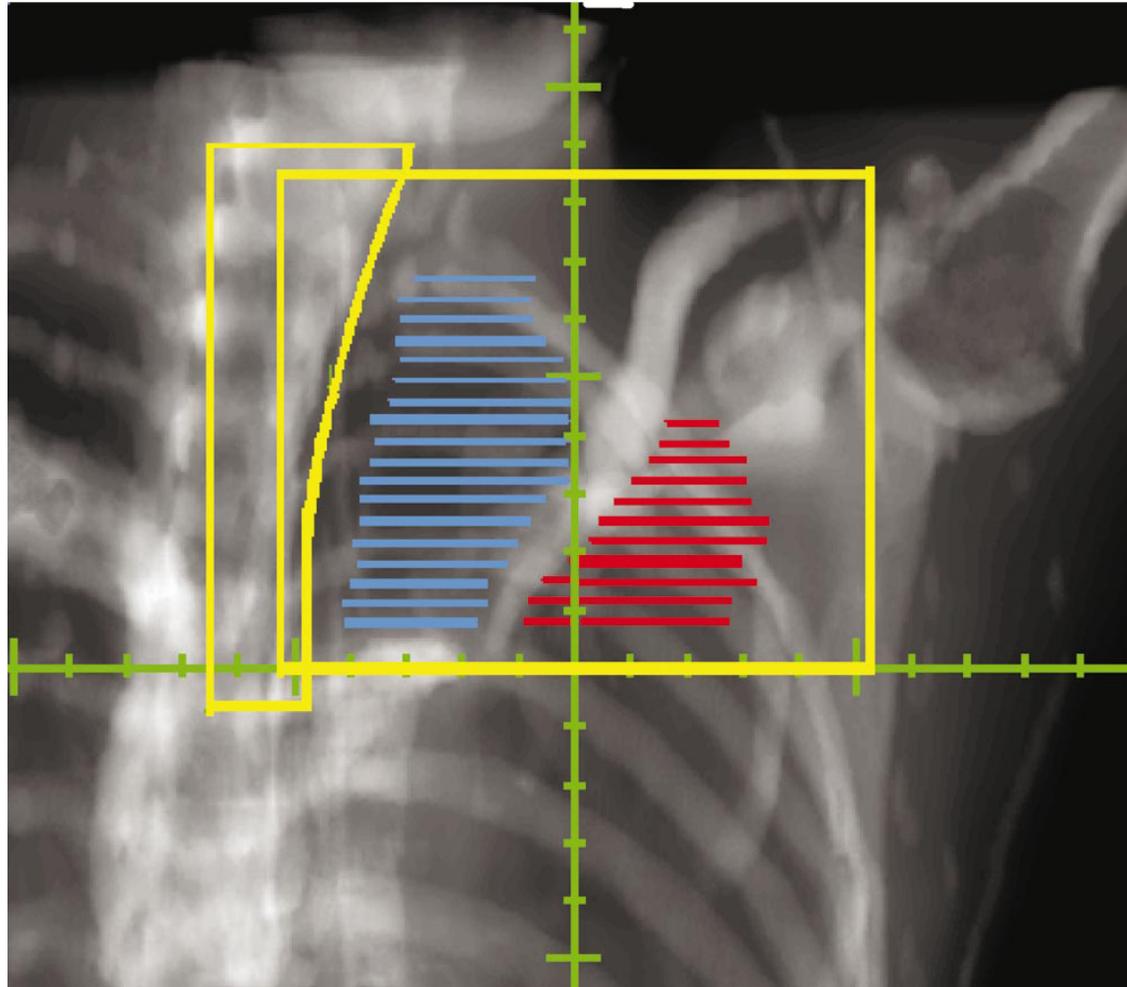
Chika N. Madu, BS
Douglas J. Quint, MD
Daniel P. Normolle, PhD
Robin B. Marsh, CMD
Edwin Y. Wang, MD
Lori J. Plocco, MD

Index terms:
Breast neoplasms, 00.12
Breast neoplasms, therapeutic
radiology, 00.125
Lymphatic system, CT, 007.12912,
007.02
Lymphatic system, therapeutic
radiology, 007.13, 007.02
Treatment planning

**Definition of the
Supraclavicular and
Infraclavicular Nodes:
Implications for
Three-dimensional CT-based
Conformal Radiation
Therapy¹**



- supraclavicular fossa
- carotid sheath
- sternocleidomastoid muscle
- scalenus anterior m.
- brachial plexus
- infraclavicular fossa
- pectoralis minor m.
- pectoralis major m.
- subclavian artery



Registration of the SCV nodal volume (in blue) and the infraclavicular nodal volume (in red) on the standard clinical anterior SCV radiation therapy field.
Madu, Radiology 2001



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Radiotherapy and Oncology 71 (2004) 287–295

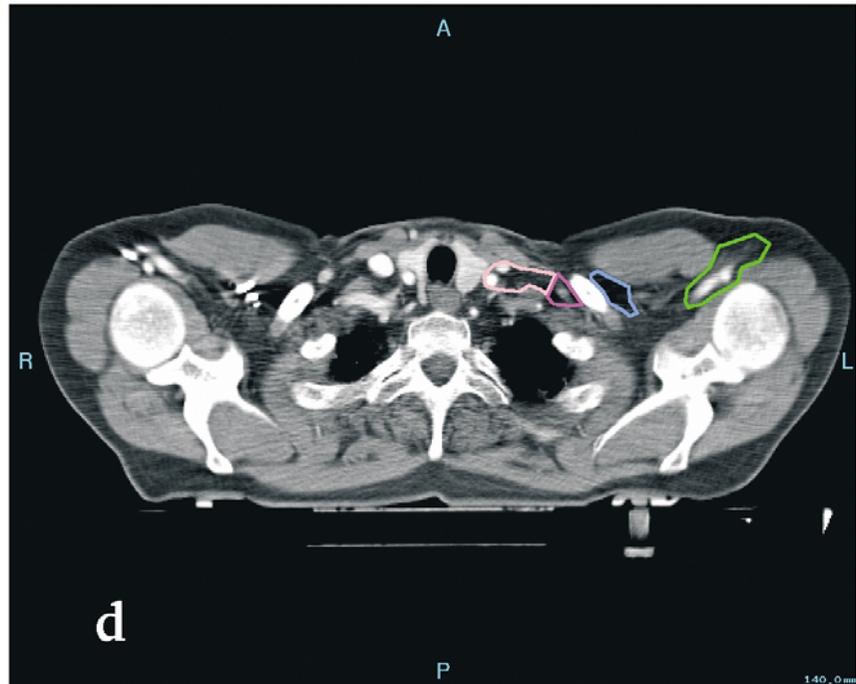
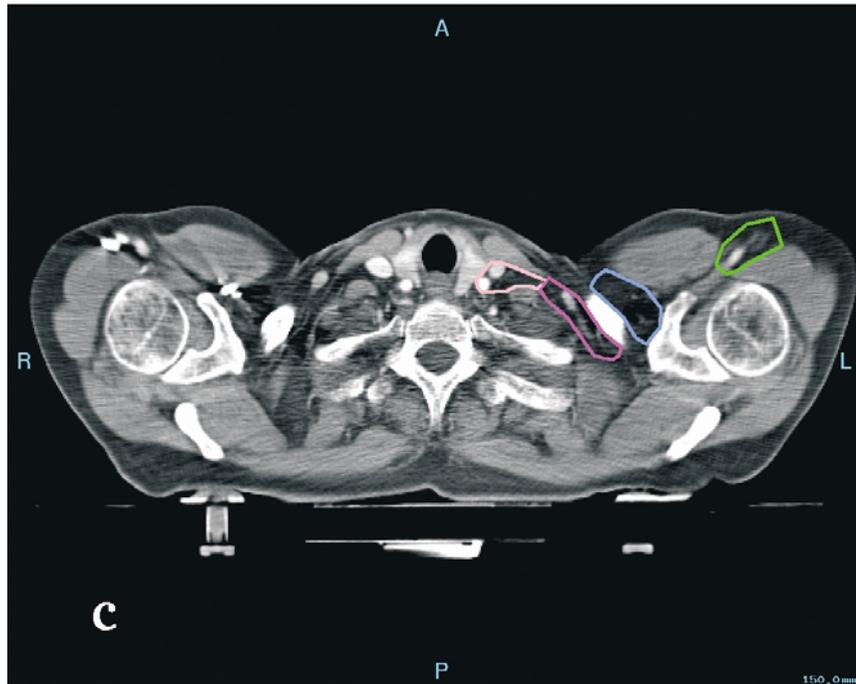
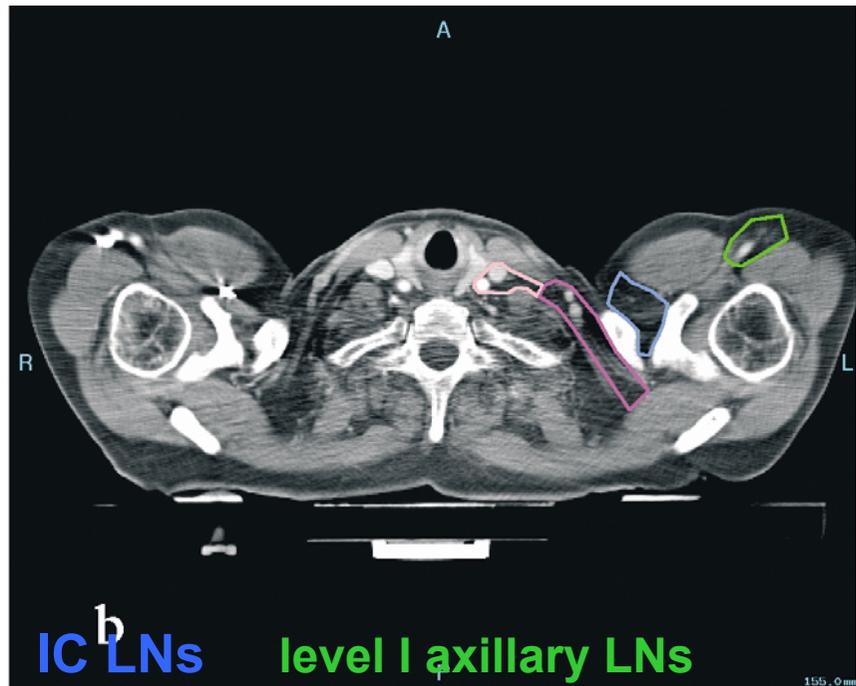
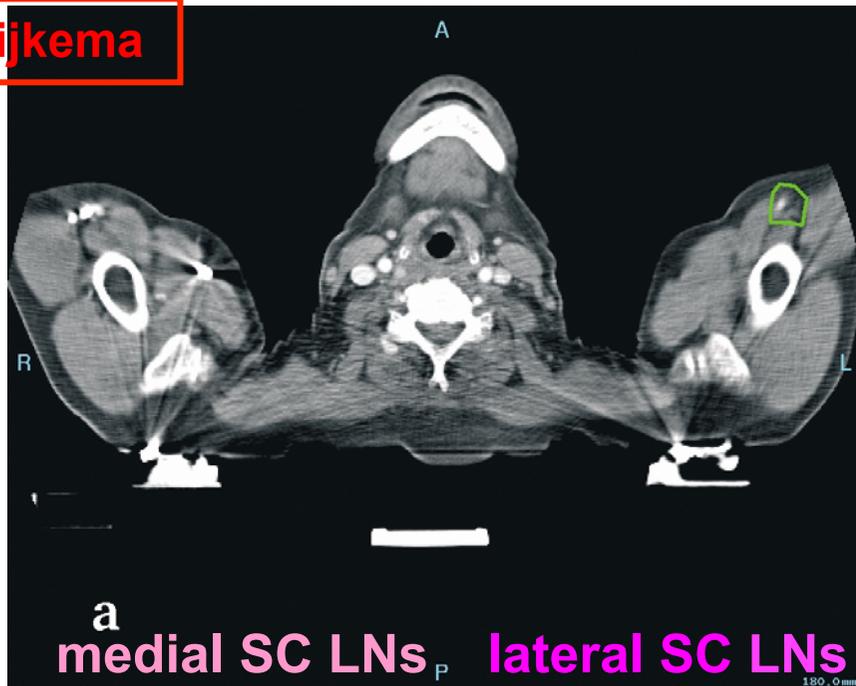
RADIOTHERAPY
& ONCOLOGY
JOURNAL OF THE EUROPEAN SOCIETY FOR
THERAPEUTIC RADIOLOGY AND ONCOLOGY

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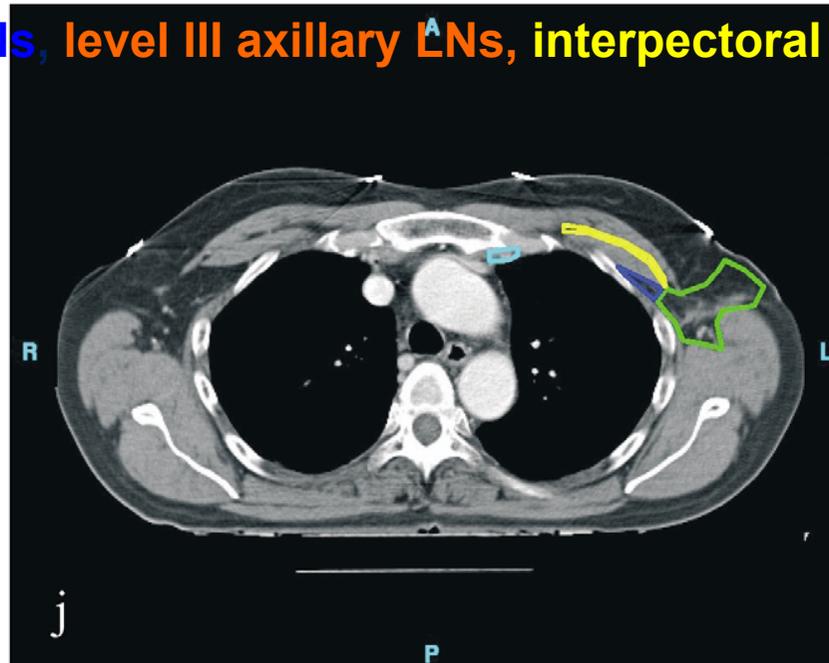
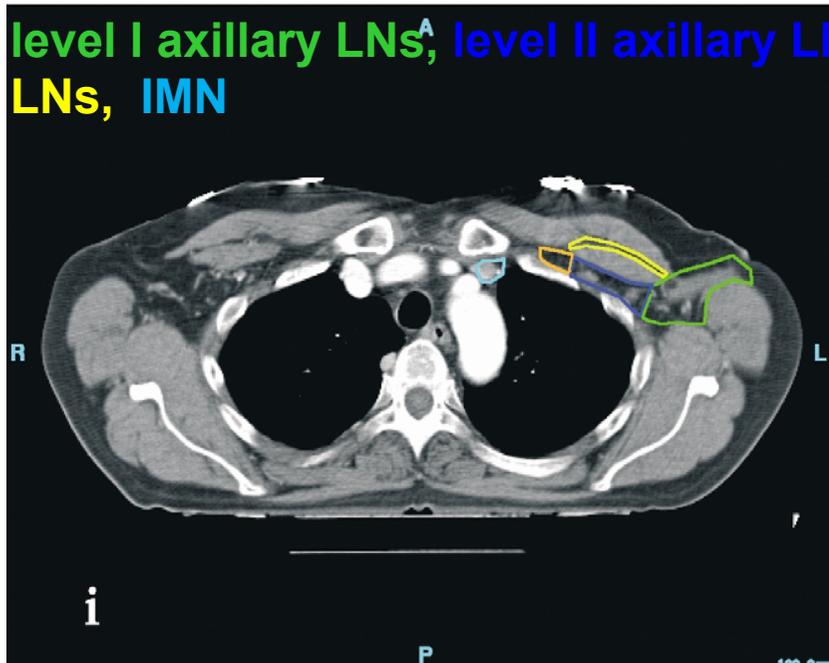
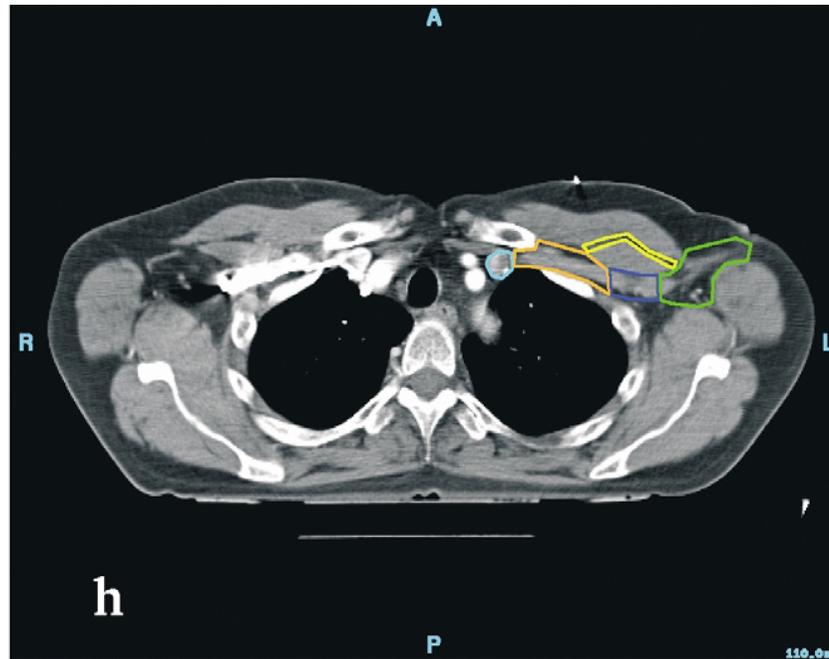
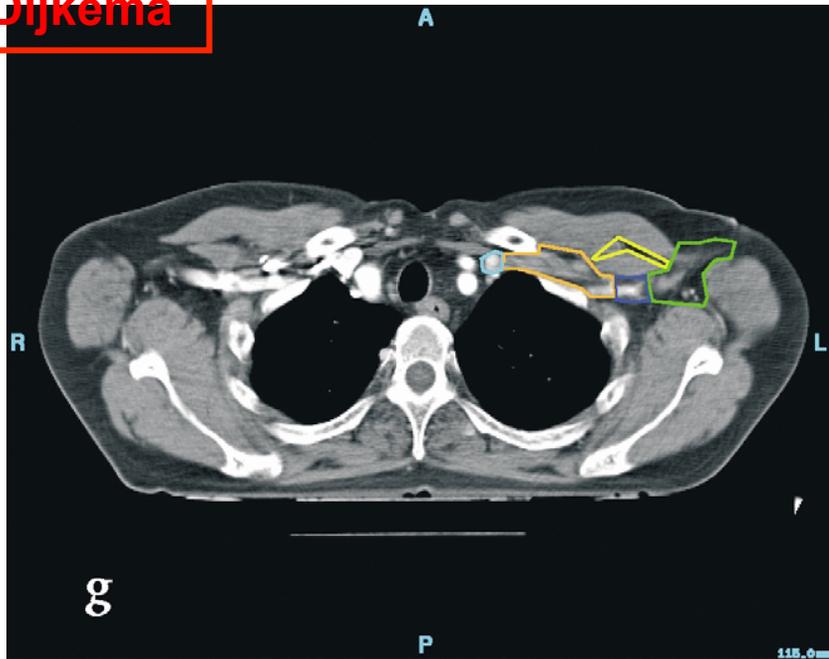
Loco-regional conformal radiotherapy of the breast: delineation of the regional lymph node clinical target volumes in treatment position

Ivessa M. Dijkema^{a,*}, Pieter Hofman^a, Cornelis P.J. Raaijmakers^a, Jan J. Lagendijk^a,
Jan J. Battermann^a, Berend Hillen^b

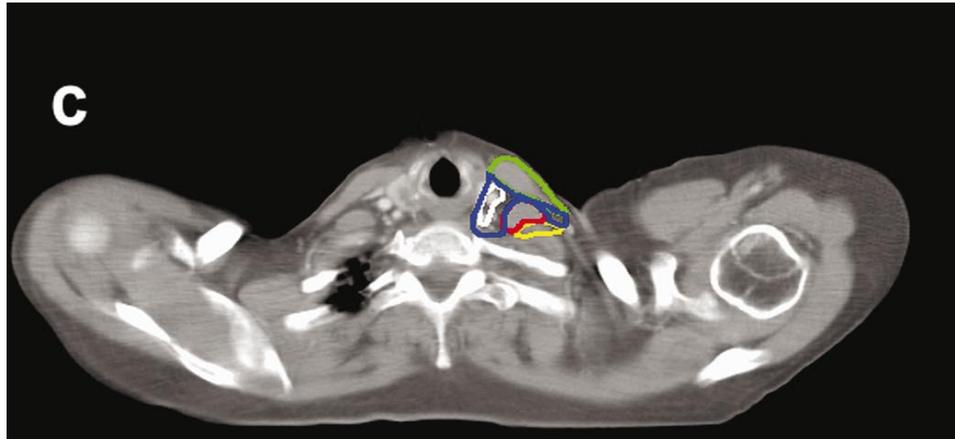
Dijkema



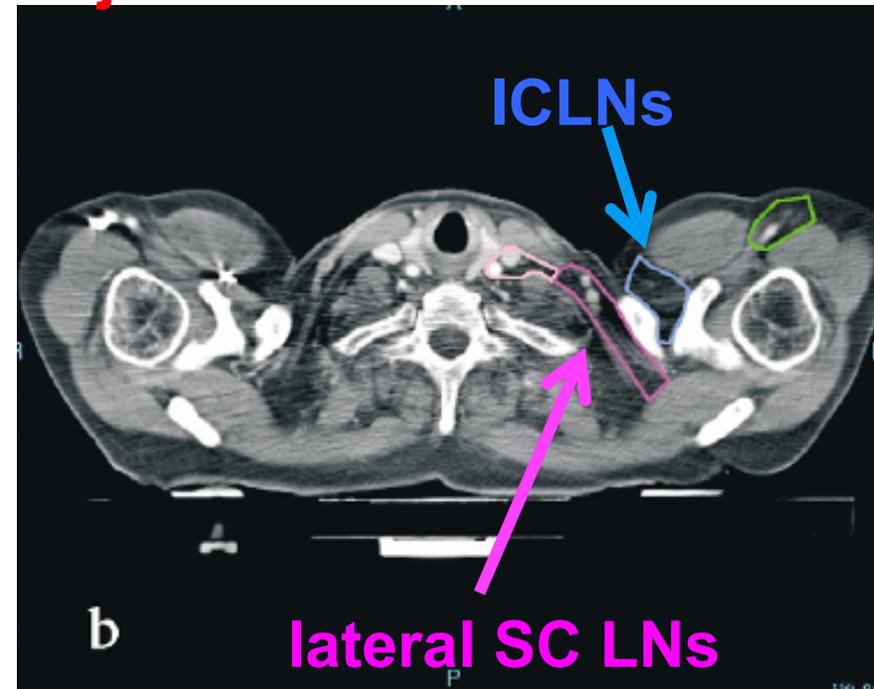
Dijkema



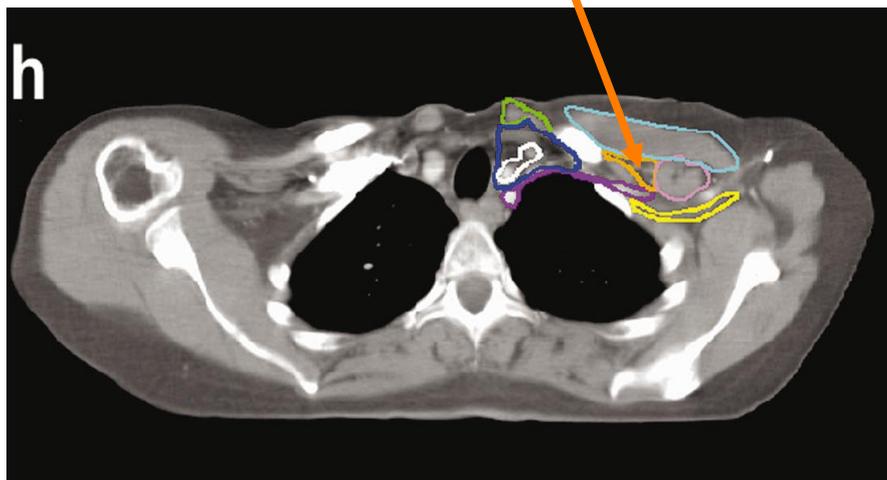
Madu



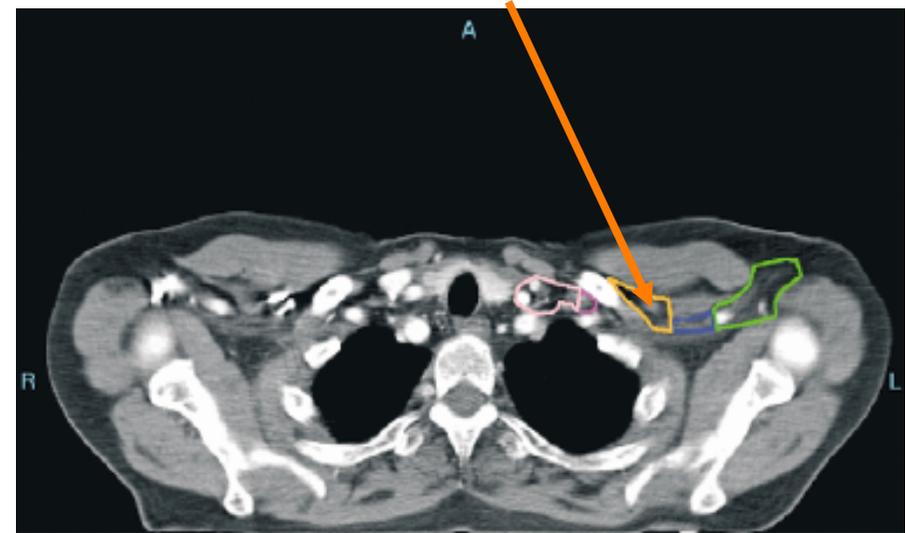
Dijkema



Fossa infraclaveare

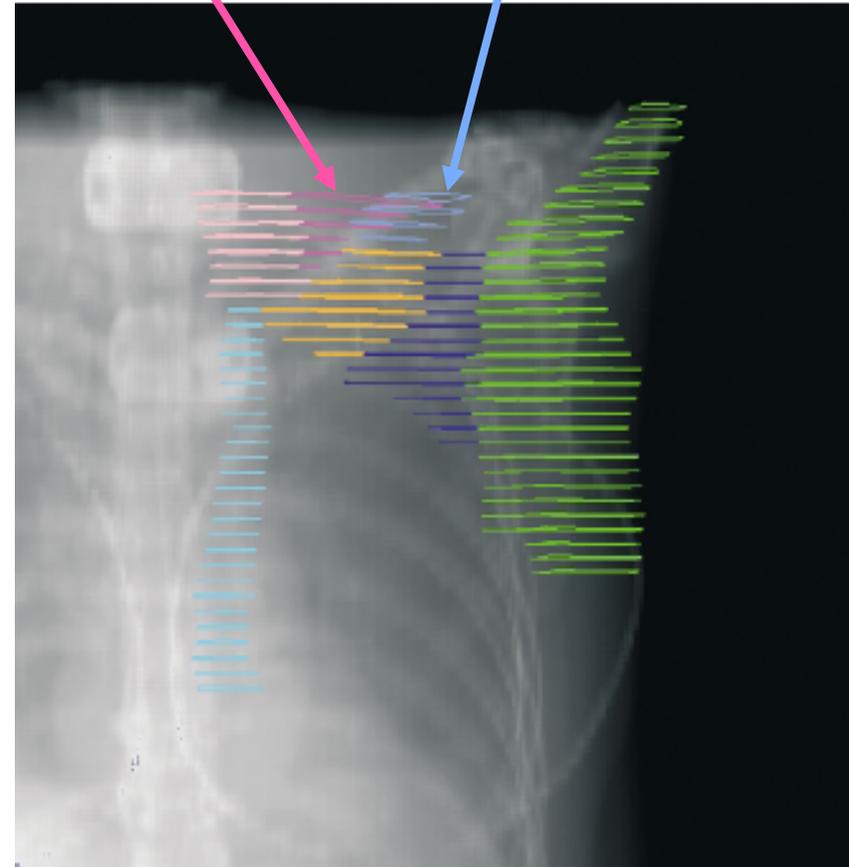
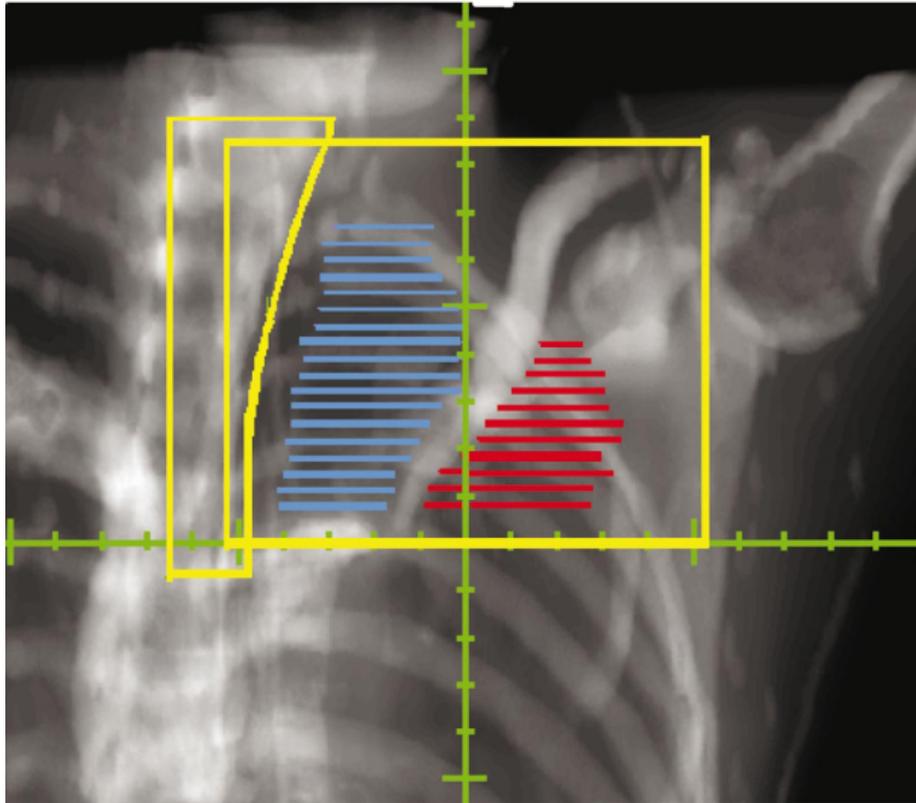


Lgh ascellari del III livello



Sovraclaveari laterali

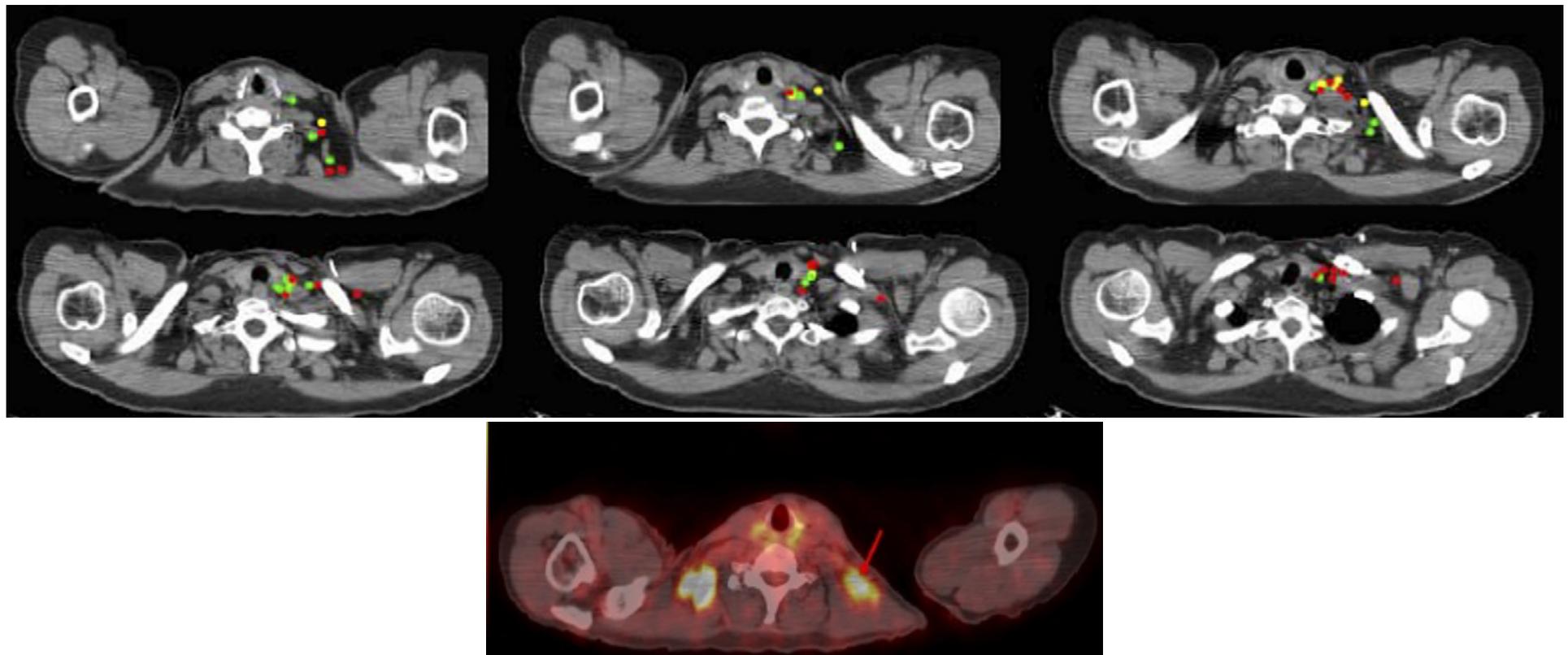
Infraclaveari



**RISK OF SUBCLINICAL MICROMETASTATIC DISEASE IN THE SUPRACLAVICULAR
NODAL BED ACCORDING TO THE ANATOMIC DISTRIBUTION IN PATIENTS
WITH ADVANCED BREAST CANCER**

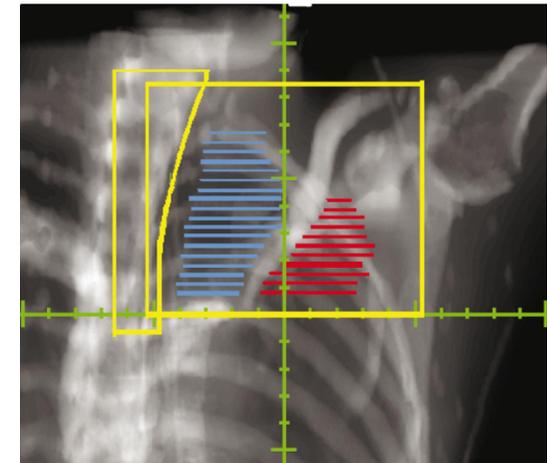
VALERIE K. REED, M.D.,* JOSE L. CAVALCANTI, M.D.,[†] ERIC A. STROM, M.D.,*
GEORGE H. PERKINS, M.D.,* JULIA L. OH, M.D.,* WELELA TEREFFE, M.D.,*
TSE-KUAN YU, M.D., PH.D.,* HENRY YEUNG, M.D.,[†] GARY J. WHITMAN, M.D.,[‡]
ISABELLE BEDROSIAN, M.D.,[§] HOMER A. MACAPINLAC, M.D.,[†] THOMAS A. BUCHHOLZ, M.D.,*
AND WENDY A. WOODWARD, M.D., PH.D.*

Departments of *Radiation Oncology, [†]Nuclear Medicine, [‡]Diagnostic Imaging, and [§]Surgical Oncology,
The University of Texas M. D. Anderson Cancer Center, Houston, TX



Take home messages

- Identificare i reperi anatomici principali
- Atlante di contornazione
- Estensione del CTV anche in base al rischio clinico

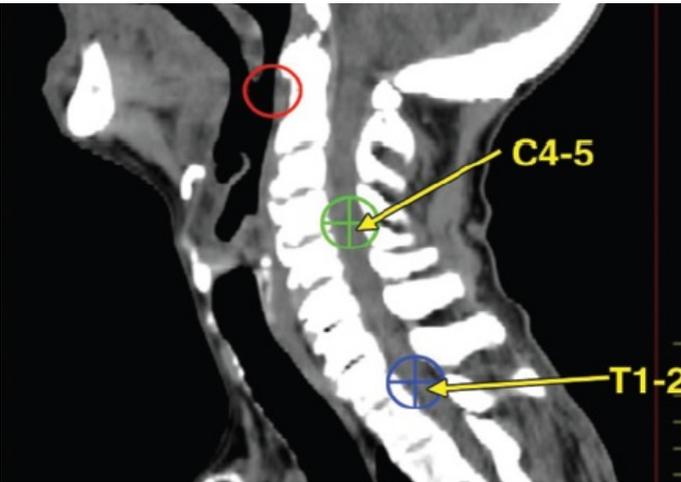
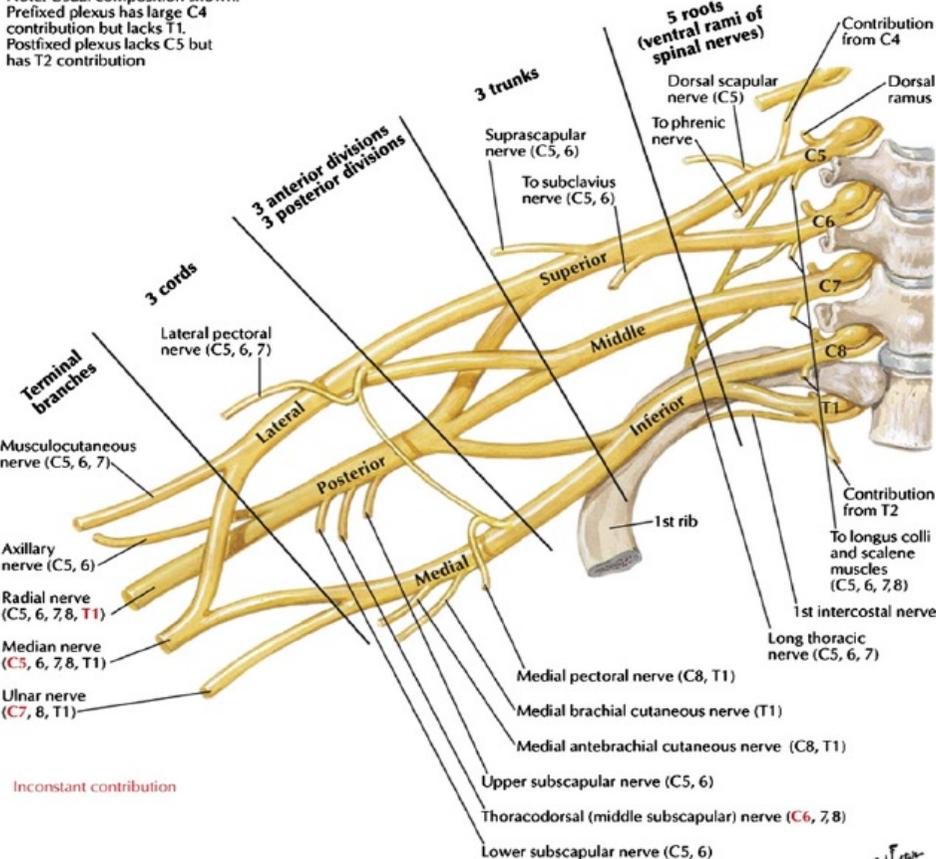


Plesso brachiale

- La plessopatia brachiale si può verificare nelle pazienti con neoplasia della mammella che ricevono dosi totali di 45-60 Gy con una prevalenza di circa l'1-6% a 5 anni, sebbene le nuove tecniche possono condurre ad una riduzione di tale prevalenza.

Il plesso brachiale comprende le radici nervose cervicali da C5 fino alla radice del forame vertebrale di D1.

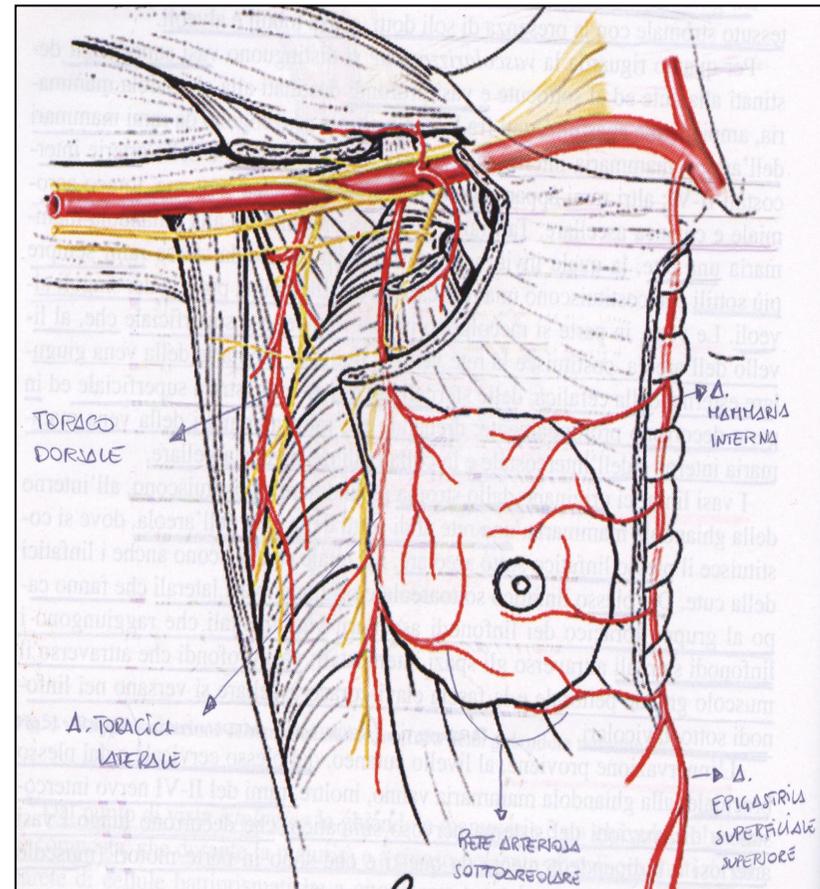
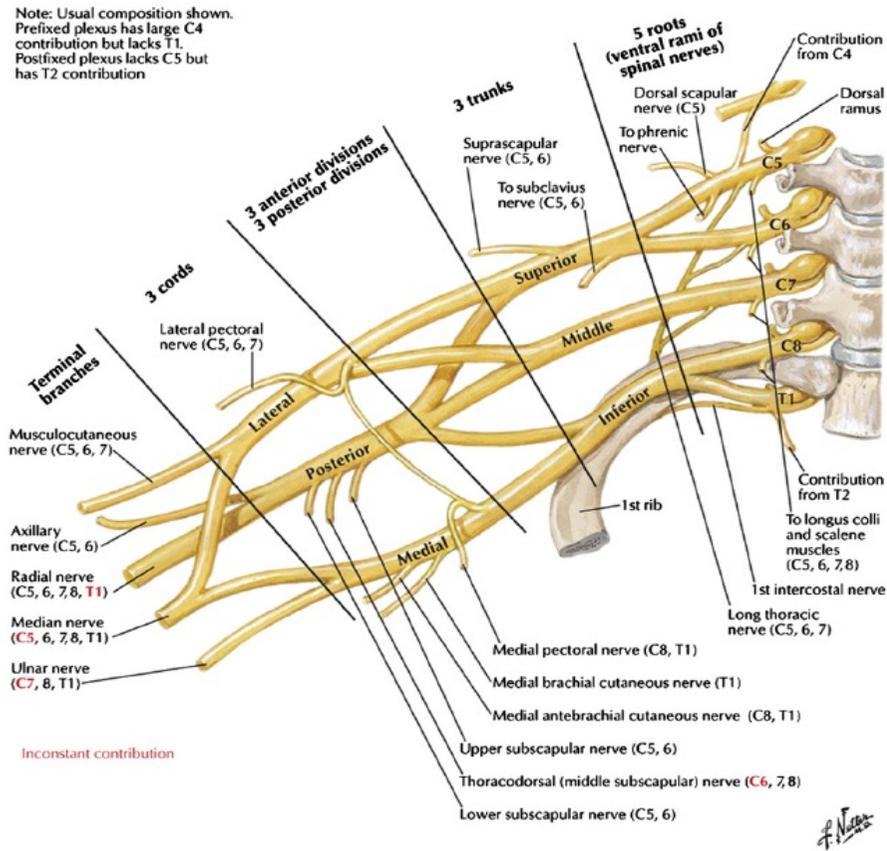
Note: Usual composition shown.
 Prefixed plexus has large C4 contribution but lacks T1.
 Postfixed plexus lacks C5 but has T2 contribution



F. Netter

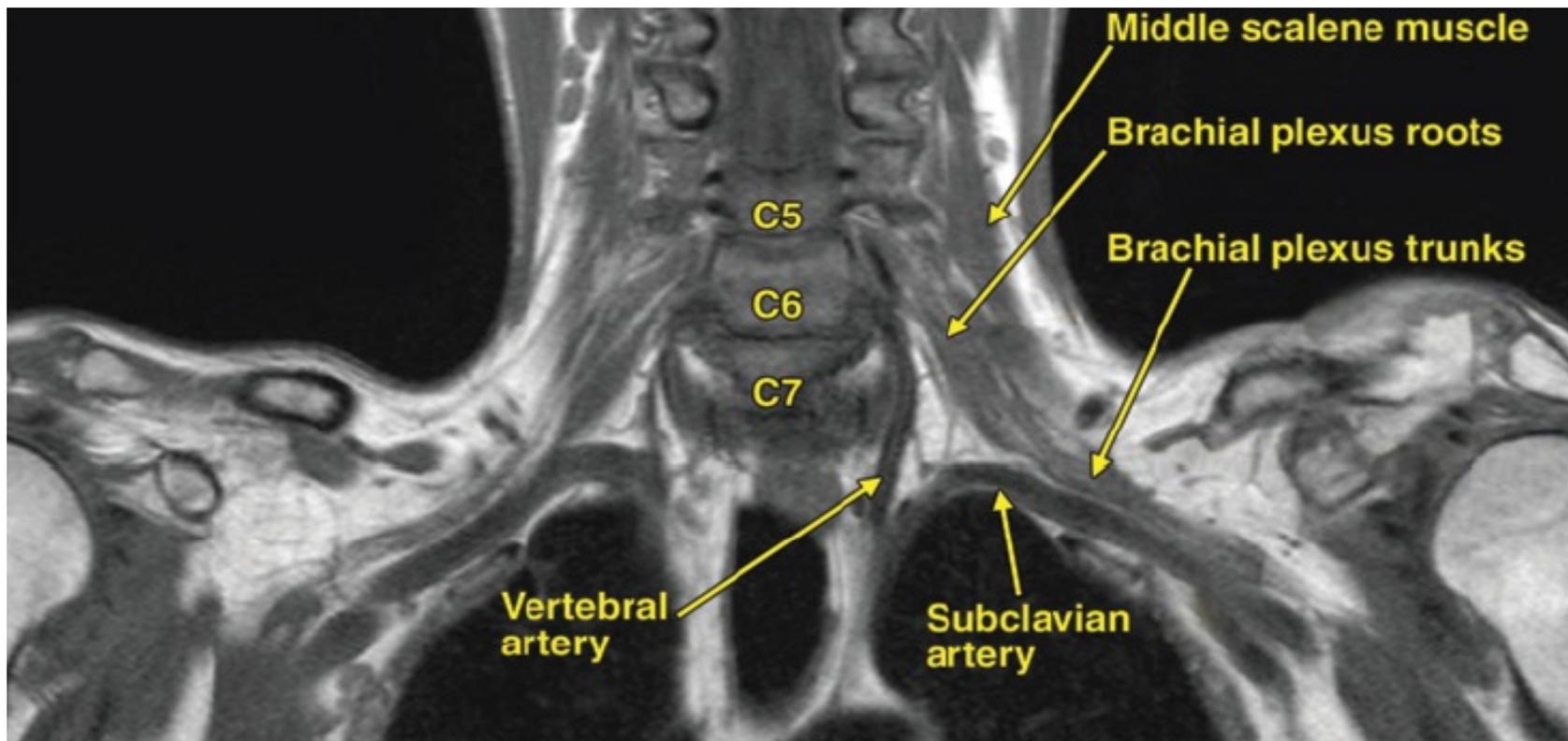
Il plesso brachiale comprende le radici nervose cervicali da C5 fino alla radice del forame vertebrale di D1.

Successivamente si muove infero-lateralmente tra i muscoli scaleni anteriore e medio, segue l'arteria succlavia, all'inizio si colloca davanti ad essa e successivamente si muove lateralmente e nel passare al di sotto della clavicola per andare nell'ascella si fa posteriore e parallelo all'a. succlavia.



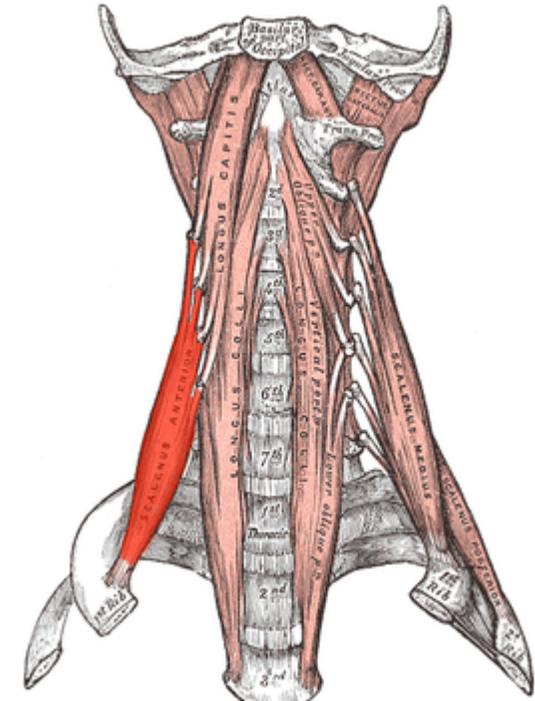
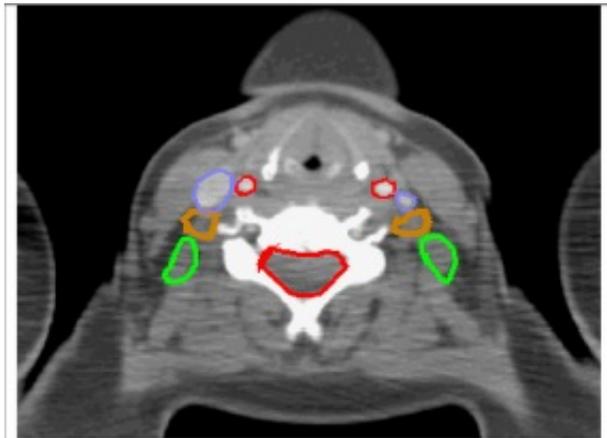
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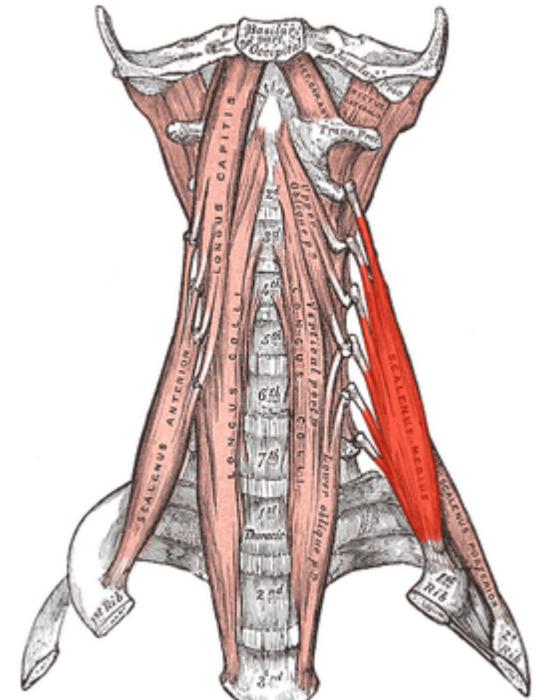
- M. Scaleno anteriore

- Si tratta di uno dei tre muscoli scaleni, ed è il più breve di essi. Ha origine dai tubercoli anteriori dei processi trasversi delle vertebre cervicali da C3 a C6, e si porta in basso e lateralmente per inserirsi sulla faccia superiore della prima costa, in corrispondenza del tubercolo per il muscolo scaleno



- M. scaleno medio

- Si tratta di uno dei tre muscoli scaleni, ed è il più largo e più lungo di essi. Origina tra il tubercolo anteriore e quello posteriore dei processi trasversi delle vertebre cervicali (dalla seconda alla settima, ma talvolta anche dall'atlante) e si inserisce sulla faccia superiore della prima costa, dietro l'incisura per l'arteria succlavia.



RTOG

CLINICAL INVESTIGATION

Head and Neck

DEVELOPMENT AND VALIDATION OF A STANDARDIZED METHOD FOR CONTOURING THE BRACHIAL PLEXUS: PRELIMINARY DOSIMETRIC ANALYSIS AMONG PATIENTS TREATED WITH IMRT FOR HEAD-AND-NECK CANCER

Spessore della contornazione del plesso: 5mm

Nella regione da C5 a D1:

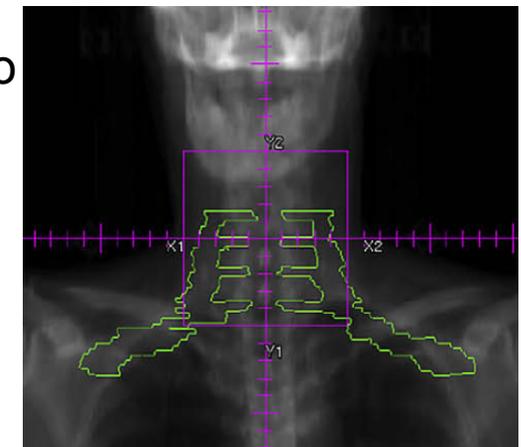
Contornare il plesso dai forami intervertebrali C5-D1 allo spazio tra gli scaleni anteriore e medio (dal bordo laterale dei forami alla porzione laterale degli scaleni)

Nelle slices intermedie dove non c'è il forame contornare solo lo spazio tra gli scaleni

gli scaleni si estendono da C5 all'inserzione della prima costa dove lo scaleno medio termina (a livello della regione del fascioneurovascolare sottoclaveare che comprende arterie e vene sottoclaveari e ascellari)

Nella regione sotto a D1:

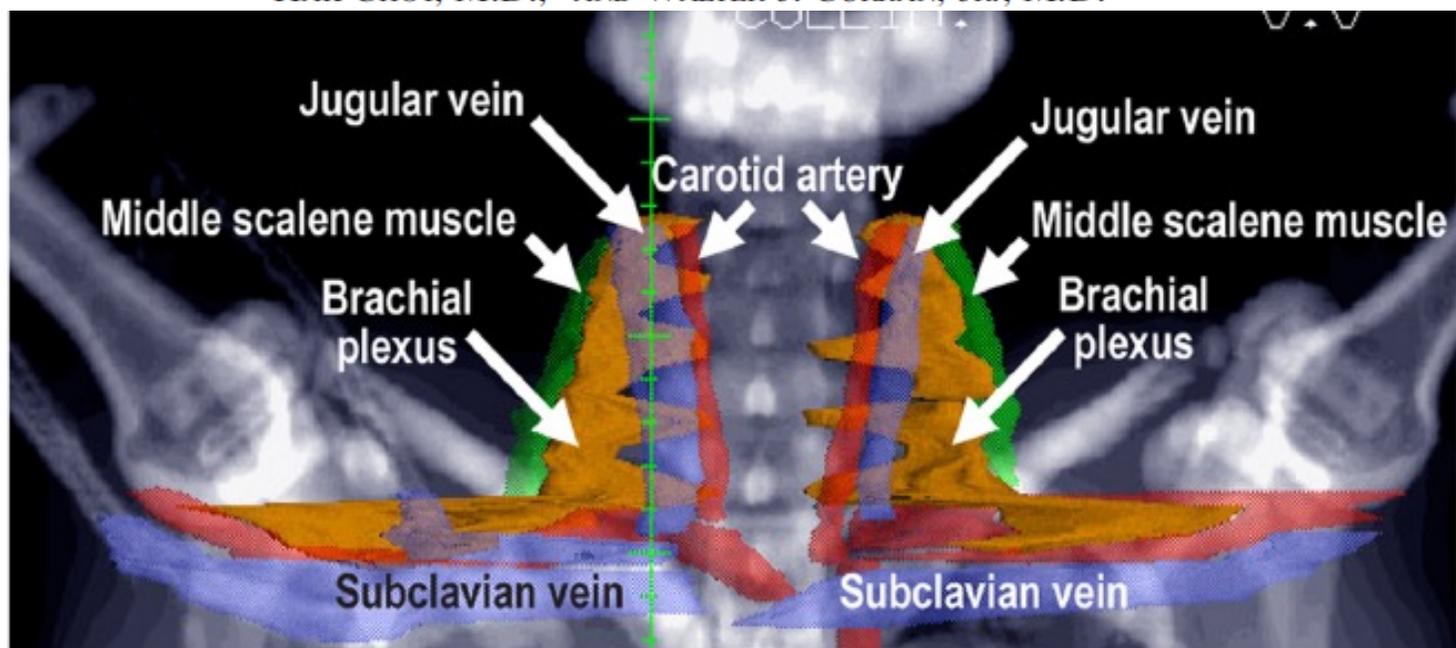
Contornare il plesso posteriormente al fascio neuro vascolare per 1-2 slices sotto la testa della clavicola e considerare come limite mediale la prima e la seconda costa.

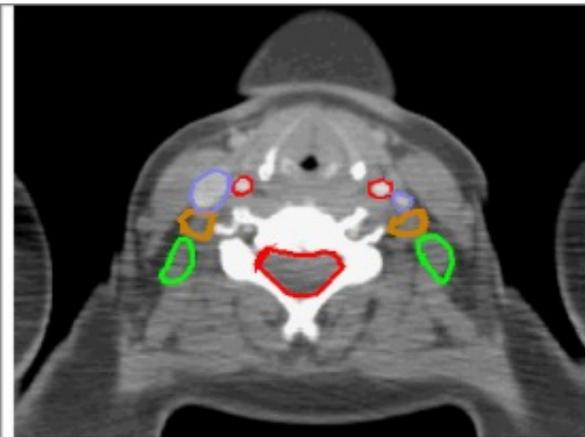
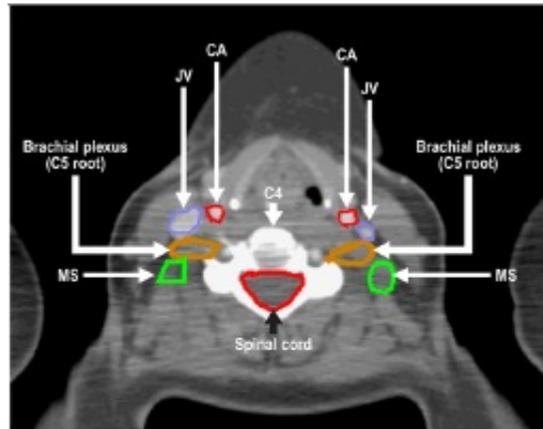


CLINICAL INVESTIGATION

CONSIDERATION OF DOSE LIMITS FOR ORGANS AT RISK OF THORACIC RADIOTHERAPY: ATLAS FOR LUNG, PROXIMAL BRONCHIAL TREE, ESOPHAGUS, SPINAL CORD, RIBS, AND BRACHIAL PLEXUS

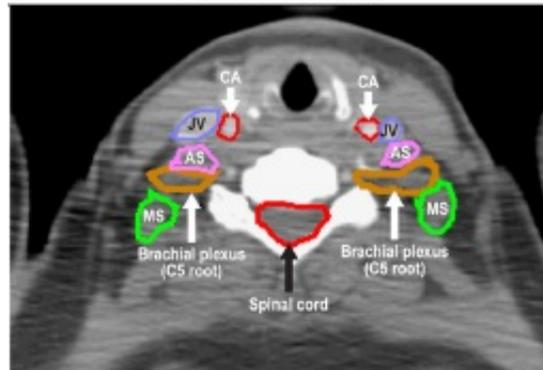
FENG-MING (SPRING) KONG, M.D., PH.D.,* TIMOTHY RITTER, PH.D.,* DOUGLAS J. QUINT, M.D.,[†]
SURESH SENAN, M.D.,[‡] LAURIE E. GASPARD, M.D.,[§] RITSUKO U. KOMAKI, M.D.,[¶]
COEN W. HURKMANS, PH.D.,^{||} ROBERT TIMMERMAN, M.D.,[#] ANDREA BEZJAK, M.D.,^{**}
JEFFREY D. BRADLEY, M.D.,^{††} BENJAMIN MOVSAS, M.D.,^{‡‡} LON MARSH, C.M.D.,* PAUL OKUNIEFF, M.D.,^{§§}
HAK CHOY, M.D.,[#] AND WALTER J. CURRAN, JR., M.D.,^{¶¶}





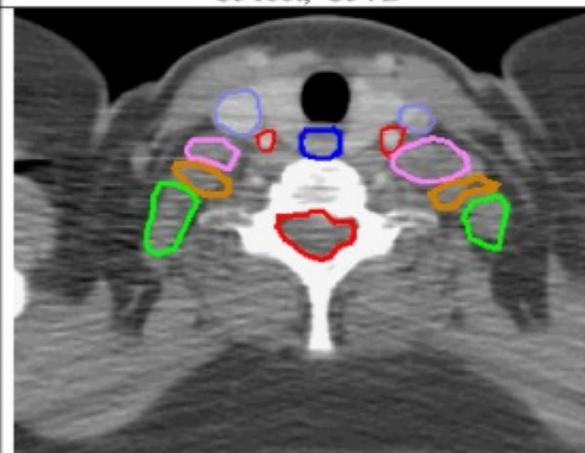
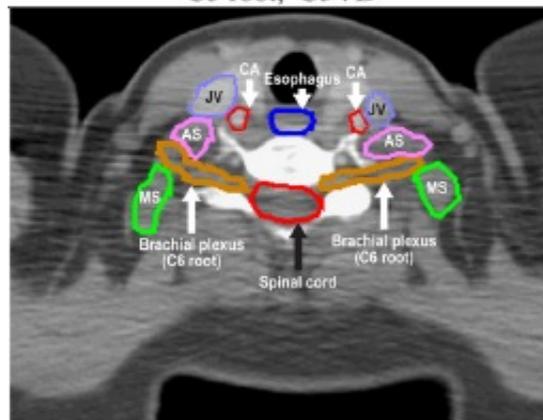
C5 root, C4 VB

C5 root, C4-C5 disk



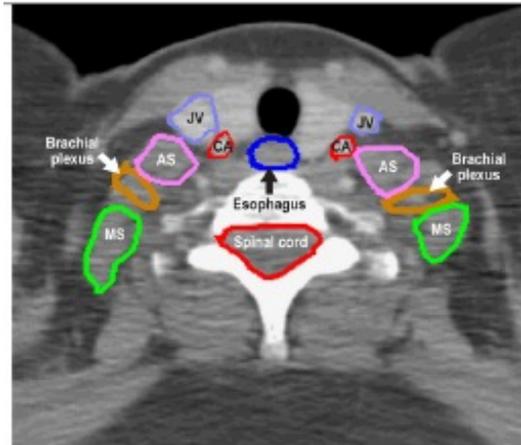
C5 root, C5VB

C5 root, C5VB

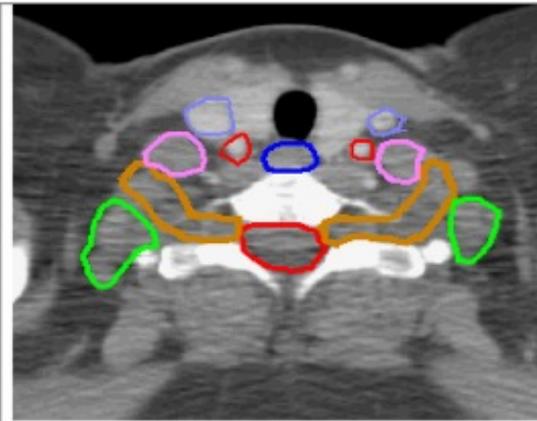


Superior (C5,C6) trunk, C6 root, C5 /C6 disk

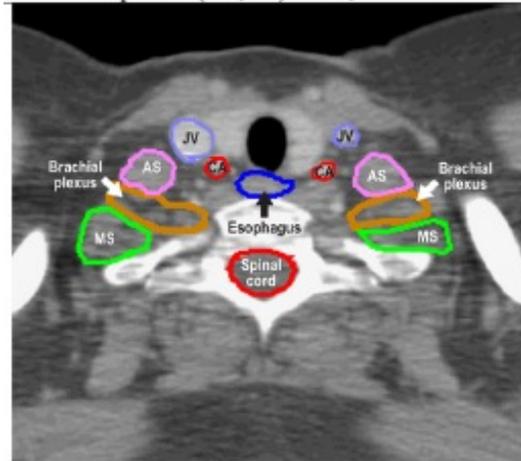
Superior (C5,C6) trunk, C6 VB



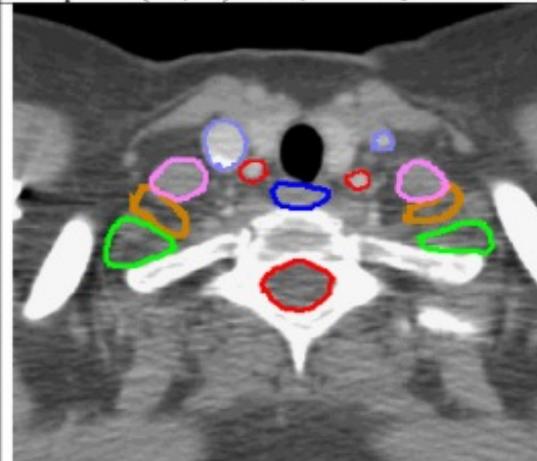
Superior (C5,C6)trunk, C6VB



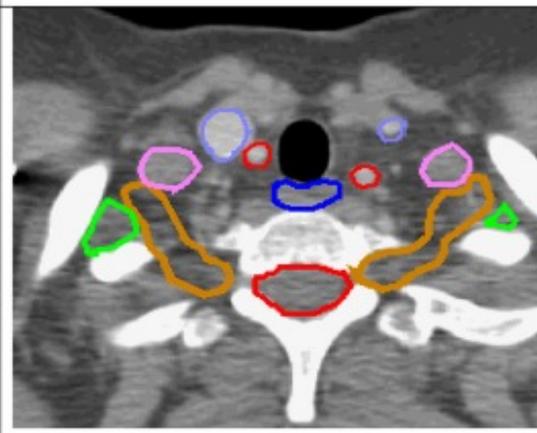
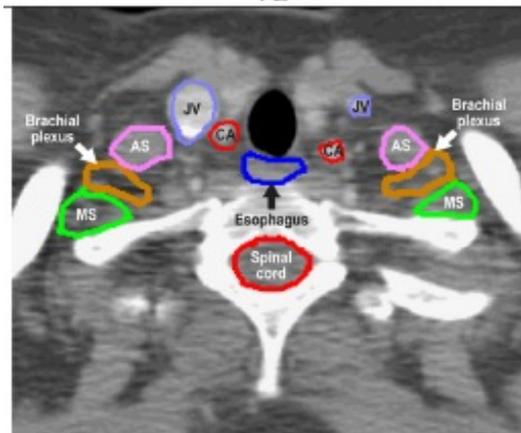
Superior (C5,C6) trunk, C7 root, C6/C7 disk



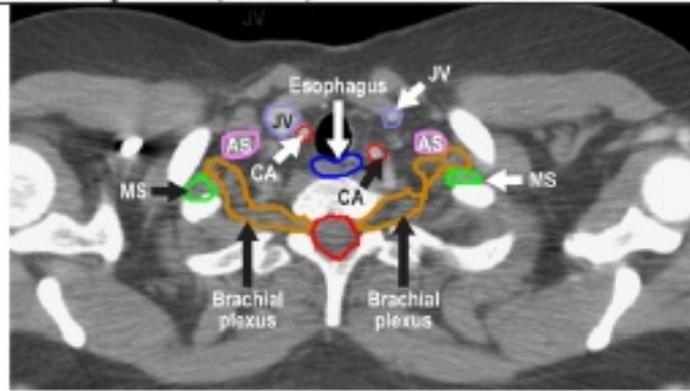
Superior (C5, C6) and middle (C7) trunks C7
VB



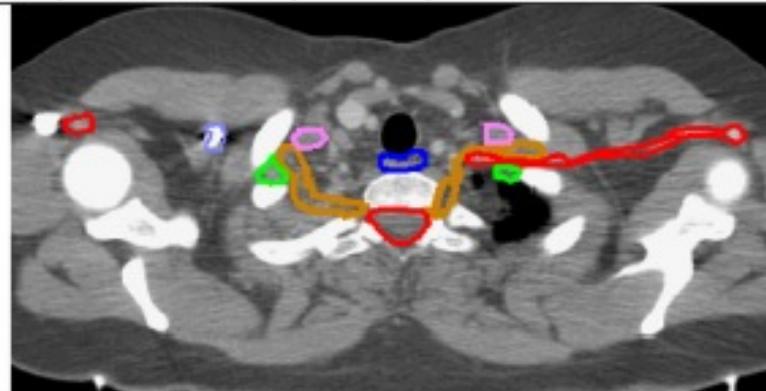
Superior (C5, C6) & C7 trunks, C7 VB



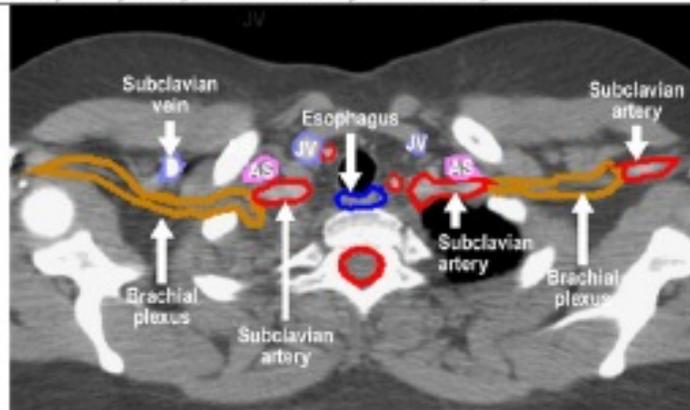
Superior (C5, 6) & C7 trunks, C7 VB



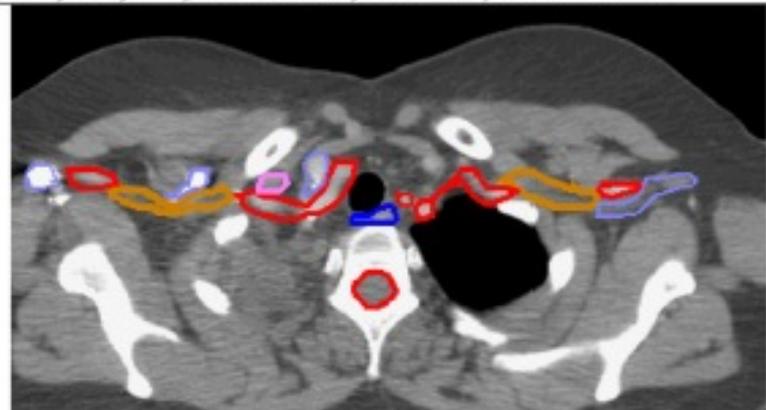
C5, 6 & C7 trunks, C8 root, C7/T1 disk



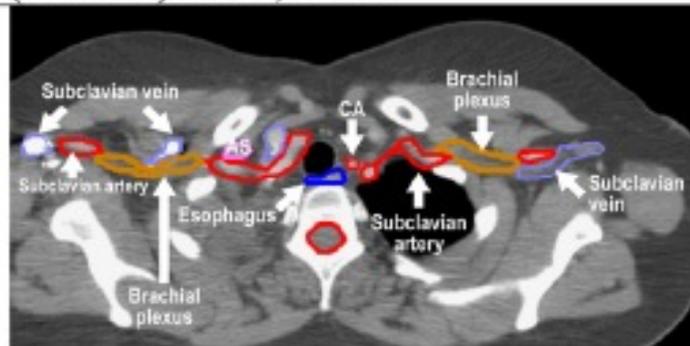
C5, C6, C7, C8 trunks, T1 root, T1VB



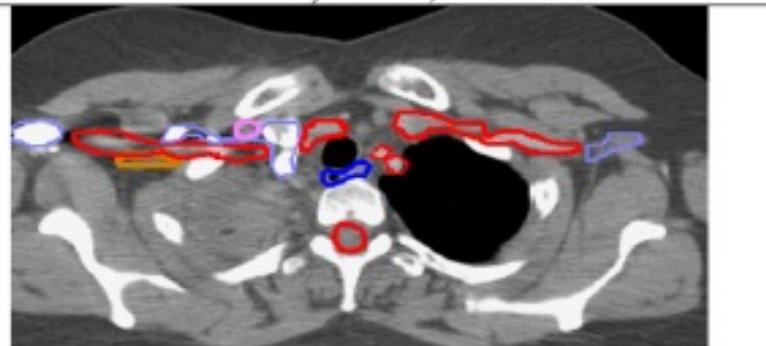
C5, C6, C7, C8 trunks, T1 root, T1/T2 disk



Superior (C5, C6), middle (C7), and inferior (C8 & T1) trunks, T2VB



Superior (C5, C6), middle (C7), and inferior (C8 & T1) trunks, T2VB

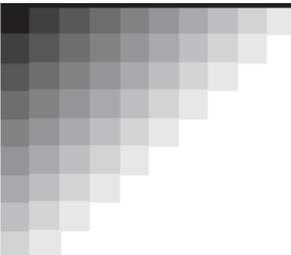


Superior (C5, C6), middle (C7), and inferior (C8 & T1) trunks, T2VB

The most inferior right trunk and vessels, T2/T3 disk

Contouring



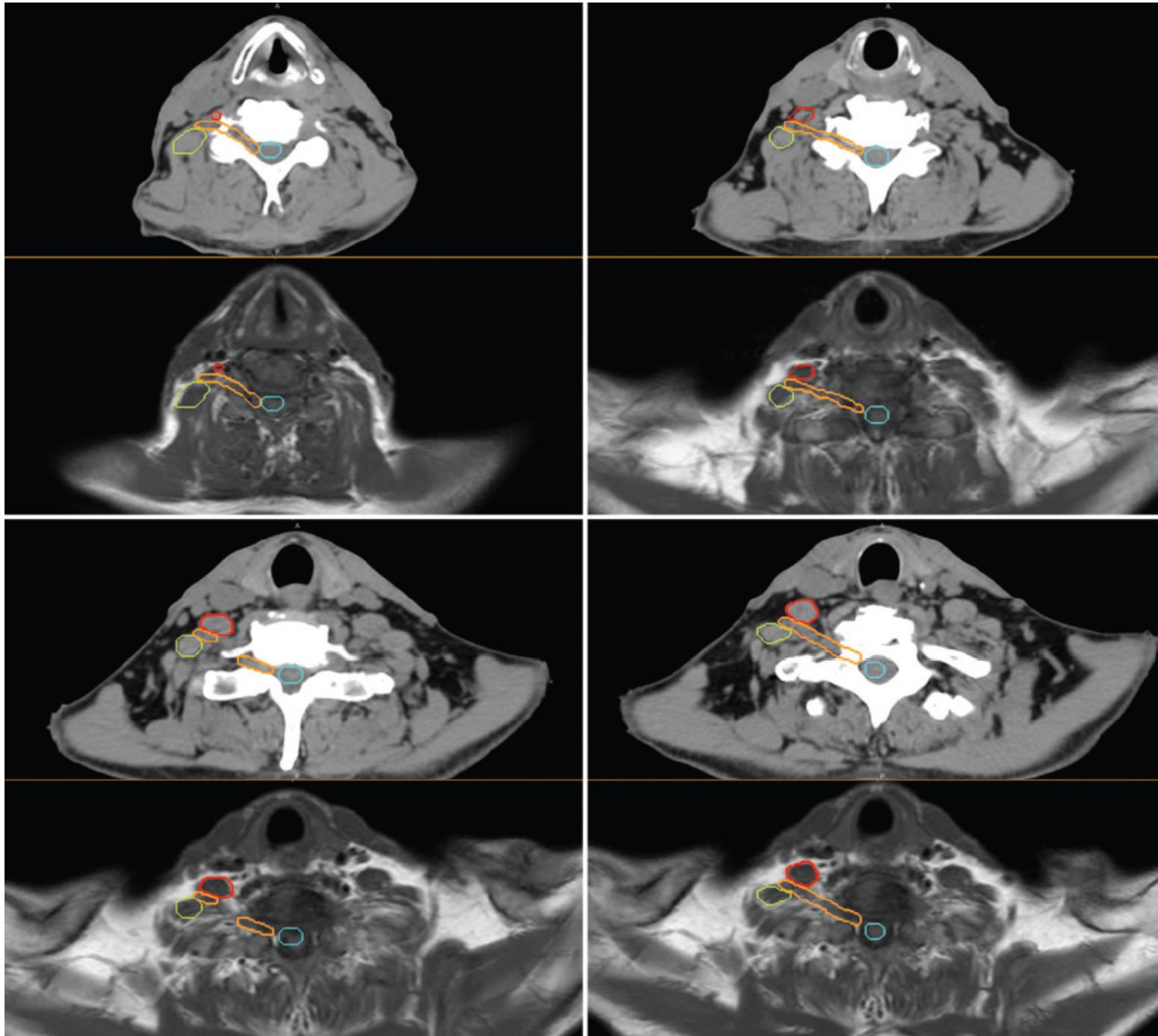


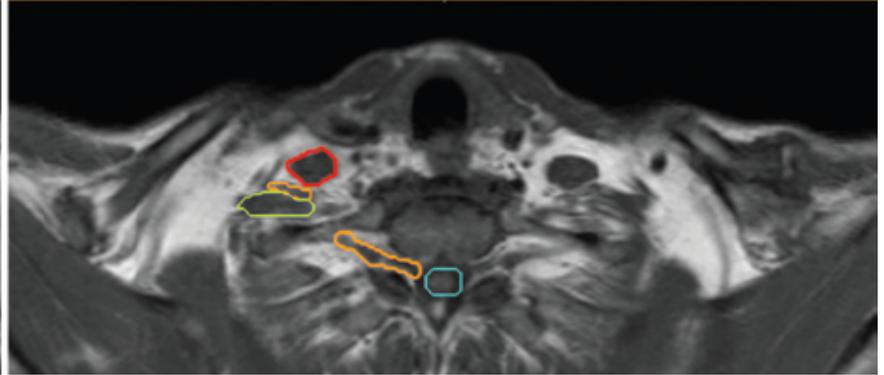
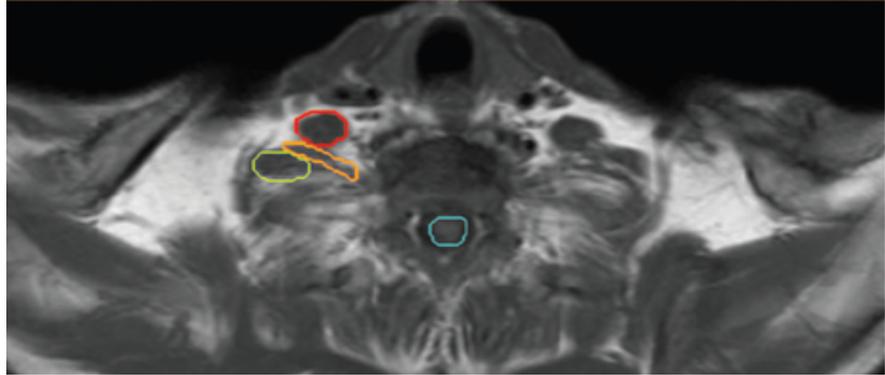
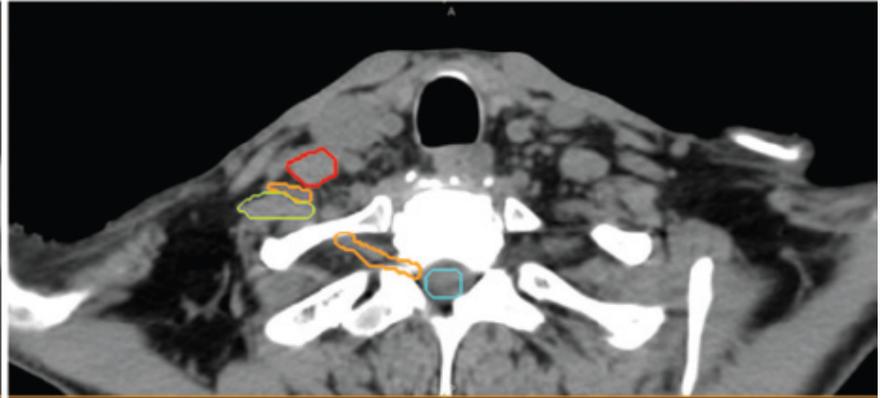
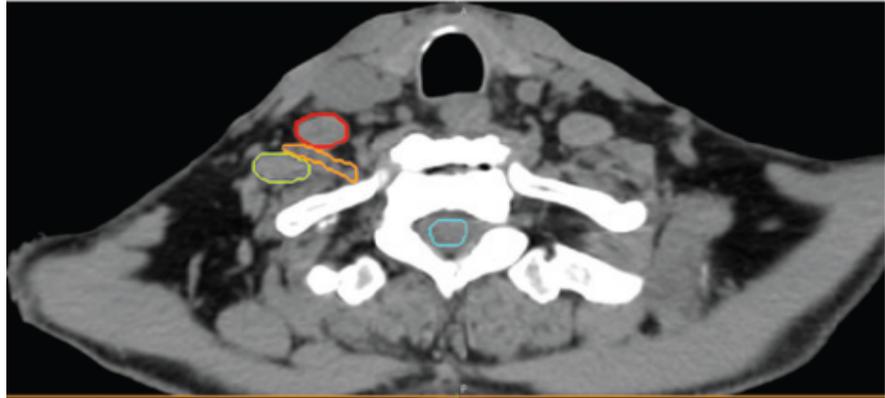
Brachial Plexus Contouring with CT and MR Imaging in Radiation Therapy Planning for Head and Neck Cancer¹

**TEACHING
POINTS**

See last page

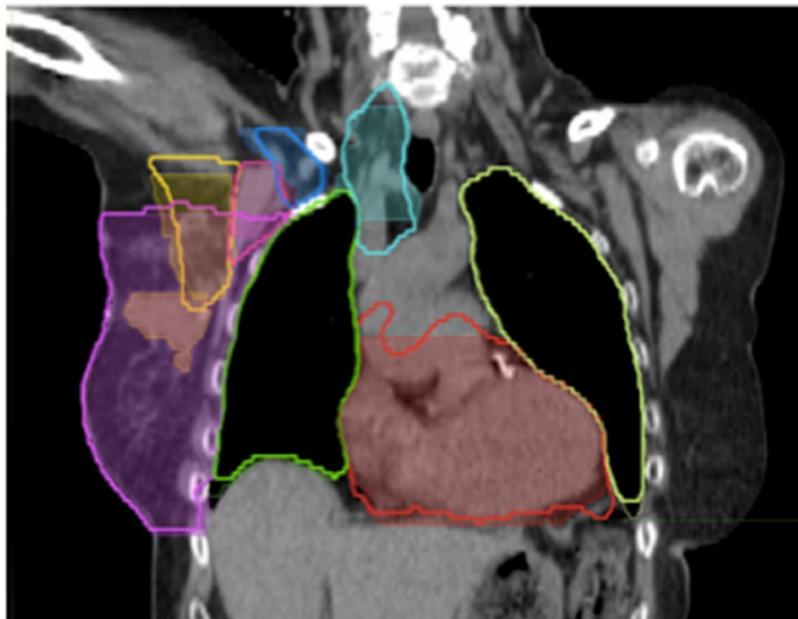
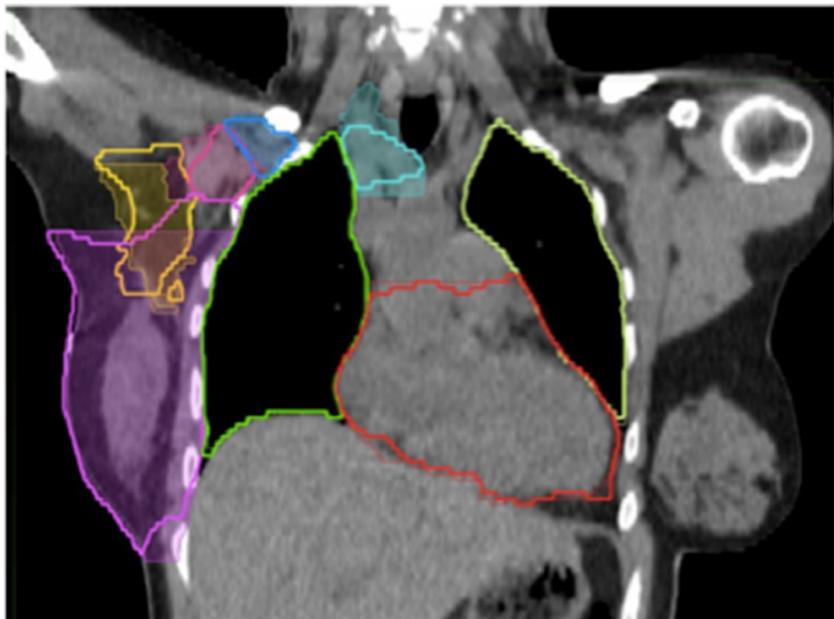
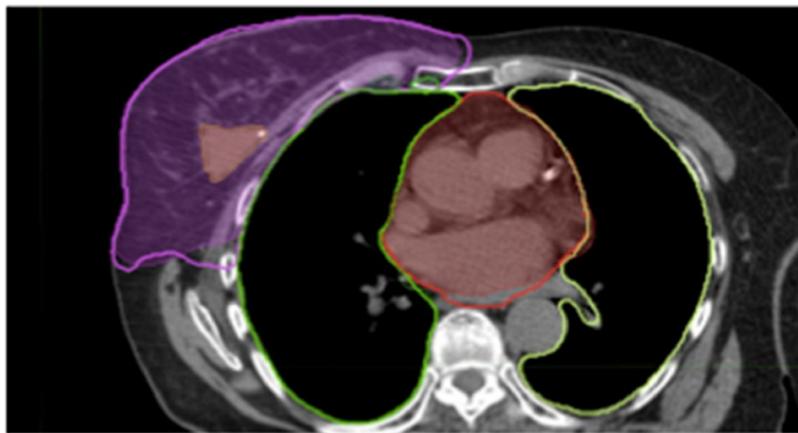
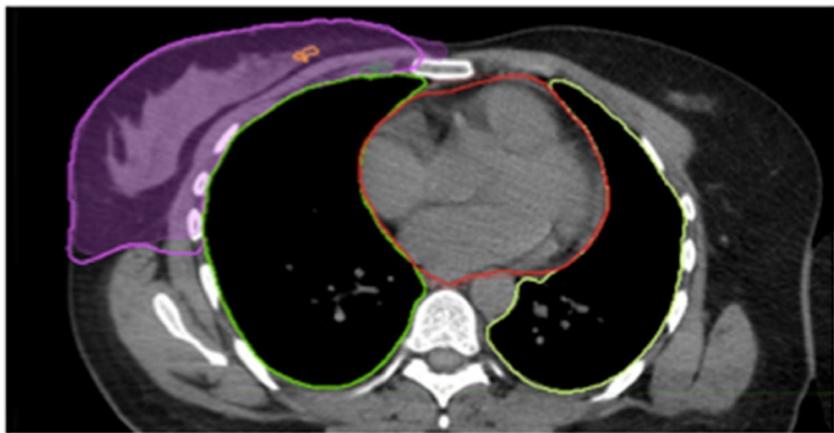
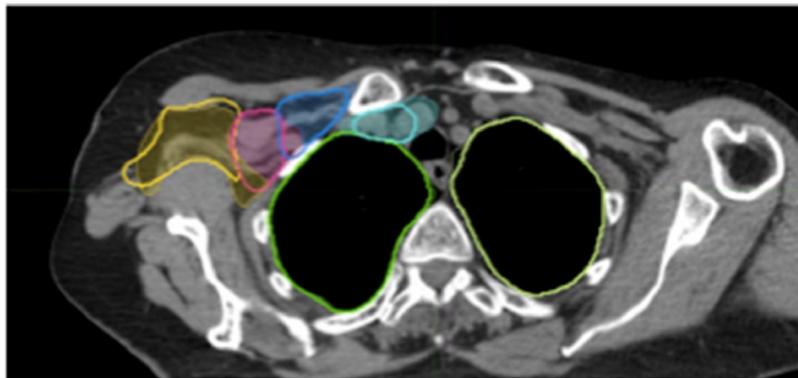
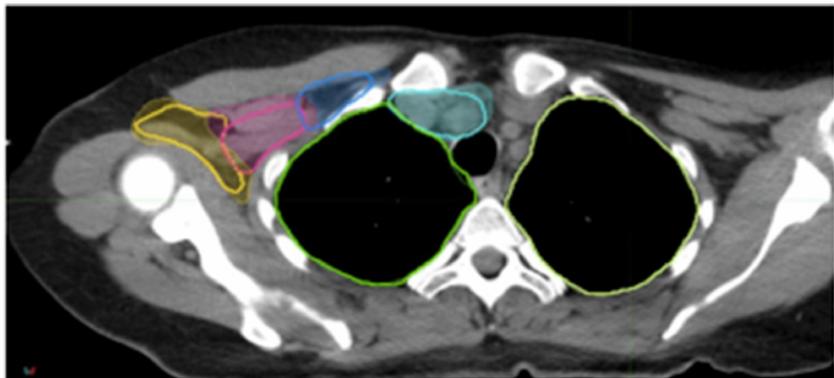
*Minh Tam Truong, MD • Rohini N. Nadgir, MD • Ariel E. Hirsch, MD
Rathan M. Subramaniam, MD, PhD • Jimmy W. Wang, MD • Rebecca
Wu, MD • Melin Khandekar, MD, PhD • A. Omer Nawaz, MS • Osamu
Sakai, MD, PhD*





Take home messages

- Plesso brachiale non visibile in TC
- Importanza dei reperi anatomici:
 - Forami vertebrali da C5 a D1
 - M. scaleni anteriore e medio
 - Vasi succlavi



RESEARCH

Open Access

Creation of RTOG compliant patient CT-atlases for automated atlas based contouring of local regional breast and high-risk prostate cancers

Vikram M Velker^{1,2}, George B Rodrigues^{1,2,3*}, Robert Dinniwell⁴, Jeremiah Hwee³ and Alexander V Louie^{1,2}



**Associazione Italiana
di Radioterapia Oncologica**
Gruppo di lavoro AIRO per la Patologia Mammaria

La Radioterapia dei Tumori della Mammella

Indicazioni e Criteri Guida

2013

