



ASL LANCIANO VASTO CHIETI - UNIVERSITÀ G. D'ANNUNZIO
U.O. di Radioterapia – Istituto di Radioterapia
Direttore: Prof. G. Ausili Cefaro



CONFRONTO DELLE CONTORNAZIONI DI GTV, CTVS E OARS PRIMA E DOPO L'UTILIZZO DELLE LINEE GUIDA DI TECNICA E ATLANTE OARS

Angelo Di Pilla

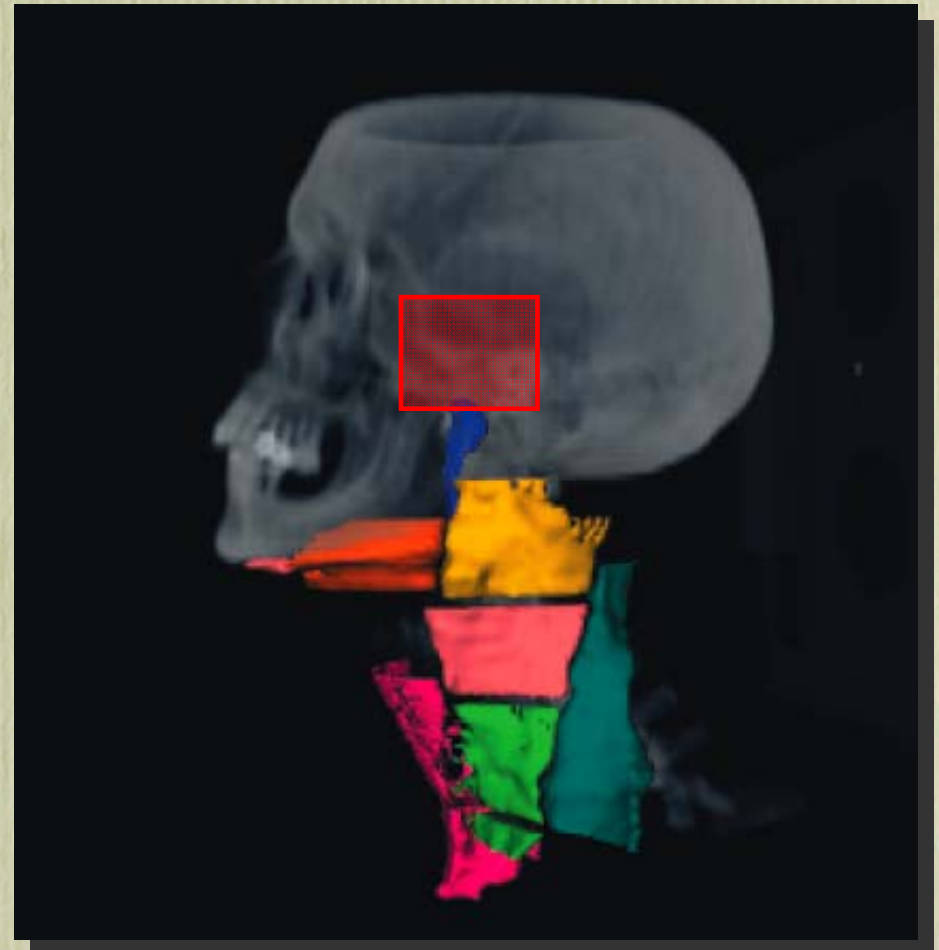
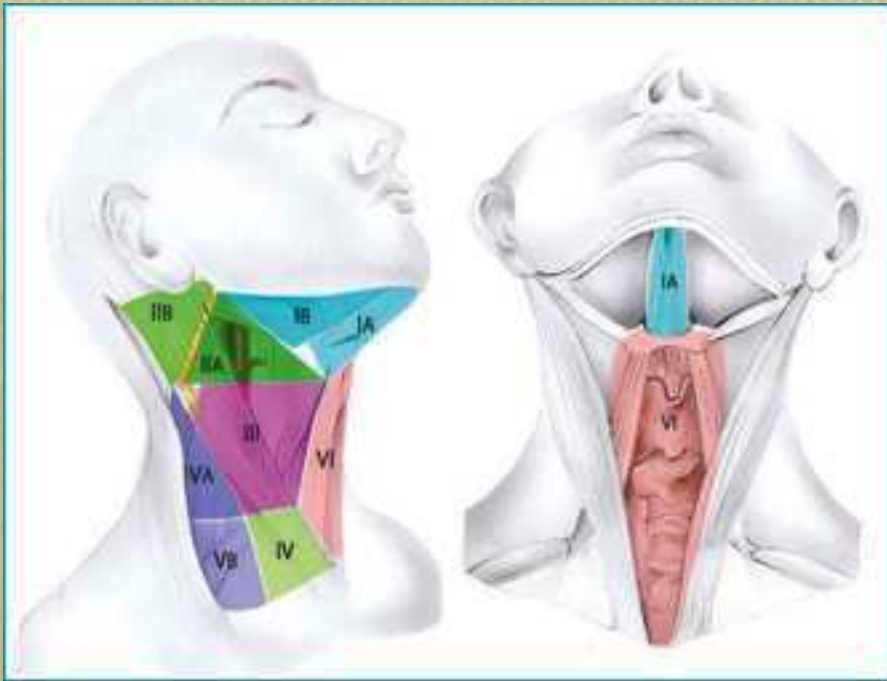


A.I.R.O. GRUPPO DI STUDIO TESTA COLLO

27 maggio 2013, Isola Tiberina

RINOFARINGE

- GTV
- CTV
- PTV
- OAR



MATERIALI E METODI

- Casi di neoplasia del rinofaringe
 - *(a cura di S. Tonoli Istituto del Radio - Brescia)*
1. Stadio iniziale
 2. Stadio avanzato

MATERIALI E METODI

- Contornazione secondo la propria esperienza
 - *(GTV, CTV, OAR)*
- Atlante OAR (Chieti) e Linee Guida di tecnica (AIRO)
- Nuova contornazione alla luce dei suggerimenti dei “tools” precedenti
 - *(GTV, CTV, OAR)*

STRUMENTI PER LA CONTORNAZIONE DEL CTV

CT-based delineation of lymph node levels in the N0 neck: DAHANCA, EORTC, GORTEC, RTOG consensus guidelines.

Vincent Grégoire, Radiation Oncology

Peter Levendag*, Radiation Oncology

UCT, St-Luc University Hospital, Brussels, Belgium and *Erasmus Medical Center, Rotterdam, The Netherlands

2004

Nasopharynx

(da Bozza Gruppo di lavoro AIRO testa collo)

Target definition remarks

CTV-HD or high dose volume that encompasses the GTV with a margin; both CT and MRI should be used to identify the primary tumor location;

CTV-HR that typically includes the tissue around the gross tumor volume and/or the neck nodal stations that have high risk of cancer involvement and/or lymph nodes that look suspicious on imaging; given the high rate of subclinical disease in the nasopharynx the whole nasopharynx should be included within this volume (N. Lee et al. 2009)(Orlandi et al. 2011)

CTV-LR includes the lymph nodal stations which have relatively lower risk (5-15%) of cancer involvement (i.e. the lower neck) and do not look suspicious at imaging.

Standard treatment of nasopharyngeal carcinoma is definitive radiotherapy + chemotherapy.

Pathology remarks

Histological subtypes: the old WHO classification of nasopharyngeal carcinomas (Shanmugaratnam and Sobin 1978), yet widely used in literature, should be replaced by the new one (J. Chan et al. 2005) for not generating confounding factors:

- WHO type 1= keratinizing carcinoma
- WHO type 2, 1= non keratinizing differentiated carcinoma
- WHO type 2, 2= non keratinizing undifferentiated carcinoma (with lymphoepitelioma variants)
- WHO type 3= basaloid squamous cell carcinoma (a rarity)

While subtype per se is not a predictor of treatment outcome, histological subtypes are strongly variables by race and strongly influence prognosis:

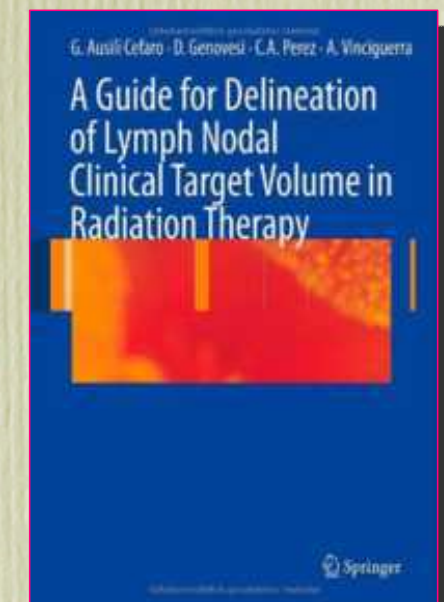
- a) Asians have a greater proportion of non keratinizing tumors up to 90% (Tse et al. 2006) while white caucasian race have a 60-70% of non keratinizing tumours (Rockerstein 2004)(Patilsumathan et al. 1995). WHO Type 1, ii differentiated, and ii undifferentiated lesions have 41%, 56.1% and 68.5% 5-year survival rates, respectively (J. T. Lee and Ka 2005).
- b) Also, WHO subtypes influence risk of nodal and distant metastases: Type 1 and 2 have 60% and 90% N+ respectively at diagnosis; Type 1 and 2 have 5-8% and 30-40% distant metastases respectively at diagnosis (Raddy et al. 1995).
- c) Of note, the same radiation dose is prescribed for all variants.

Dose/fractionation remarks

Commonly used fractionation regimens:



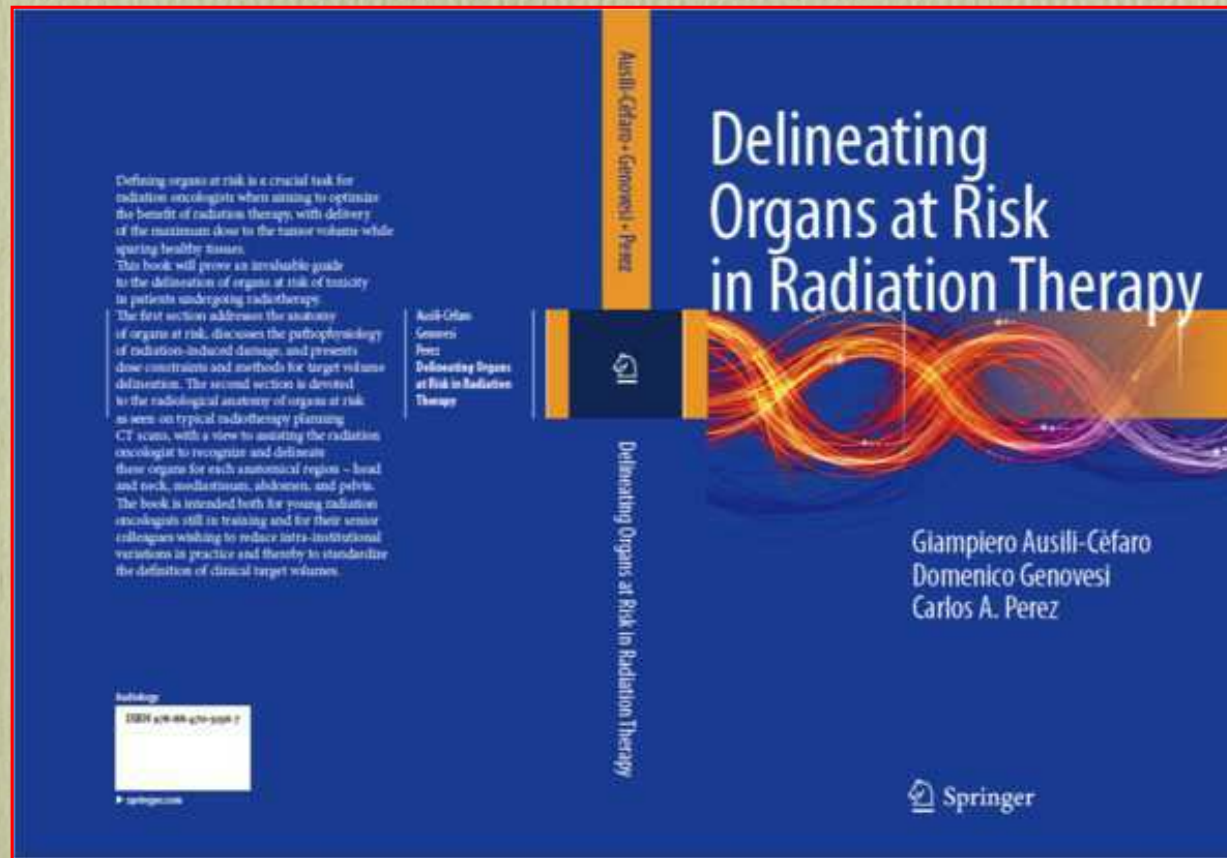
2006



2009

In press

STRUMENTI PER LA CONTORNAZIONE DEGLI OAR



In press: ASTRO 2013

MATERIALI E METODI

- Area forum del sito AIRO
- Valutazioni contornazioni con TPS Oncentra 3.3
- Elaborazione al TPS di *Monica Di Tommaso* – Istituto di Radioterapia Chieti

CENTRI PARTECIPANTI

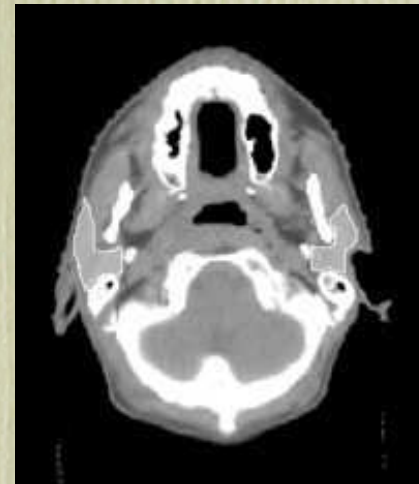
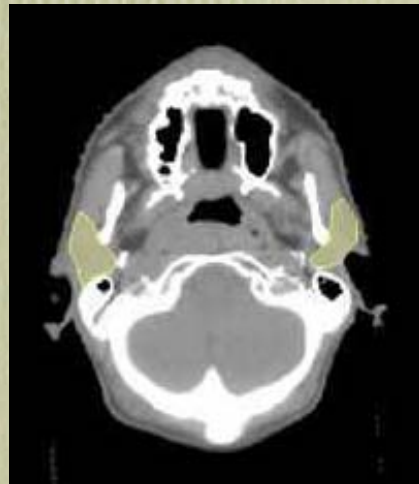
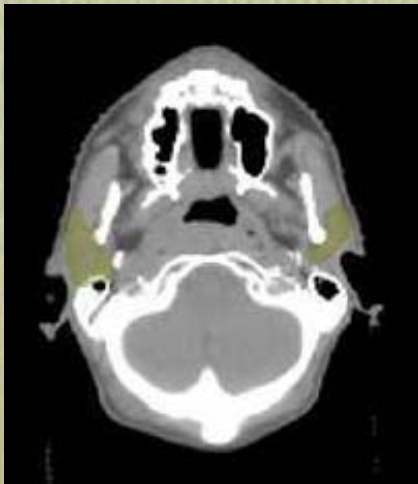
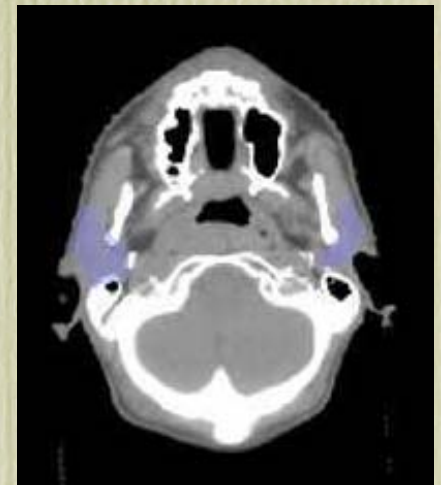
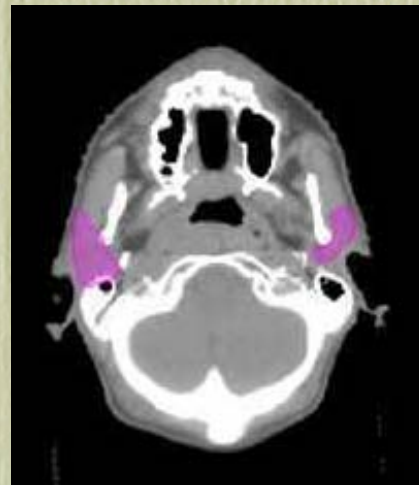
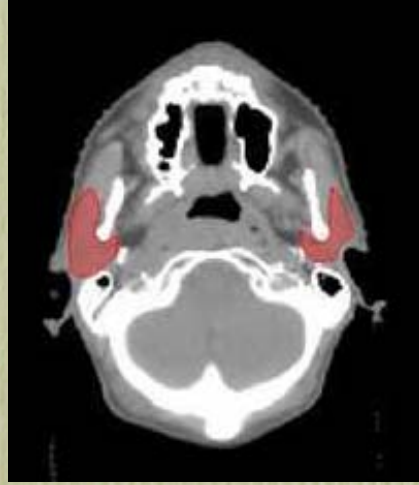
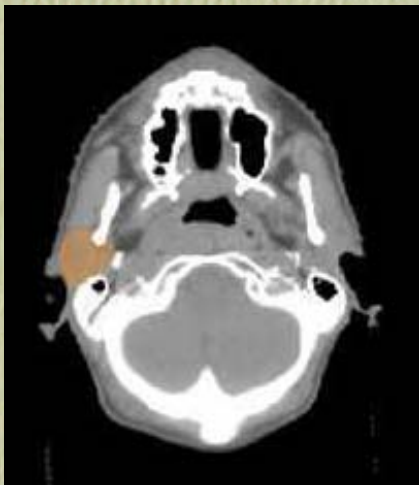
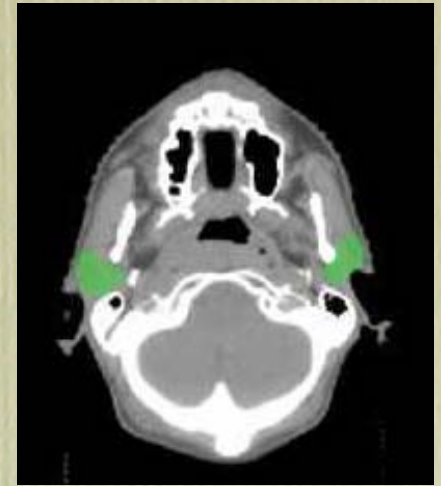
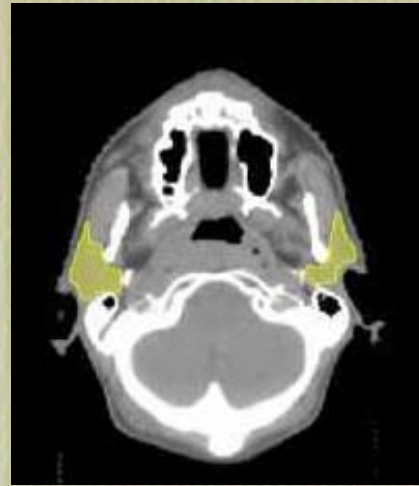
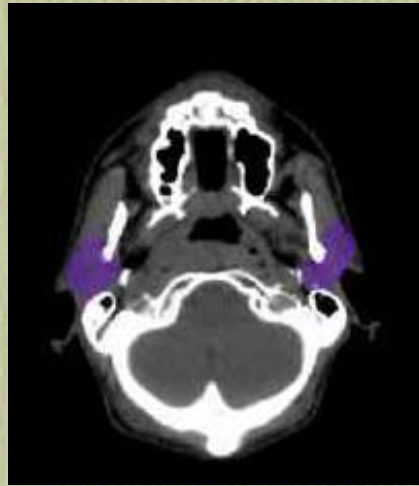
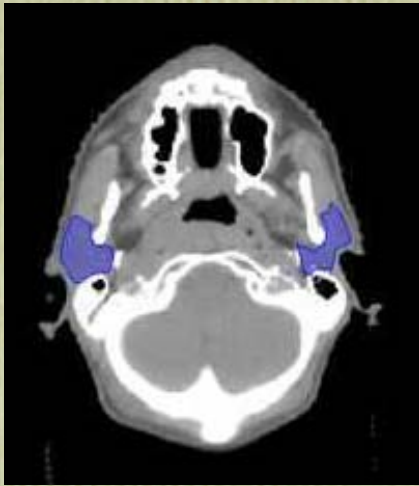


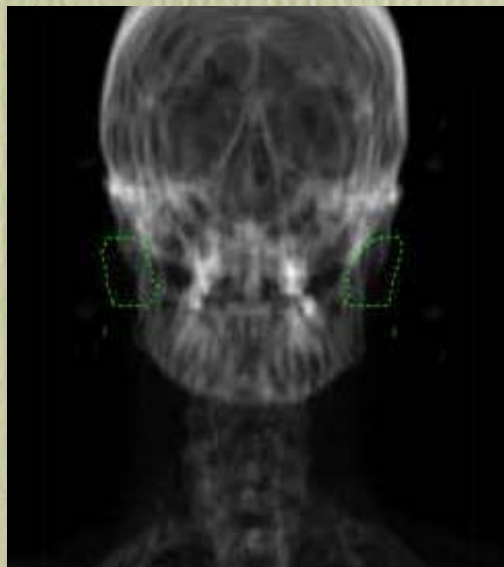
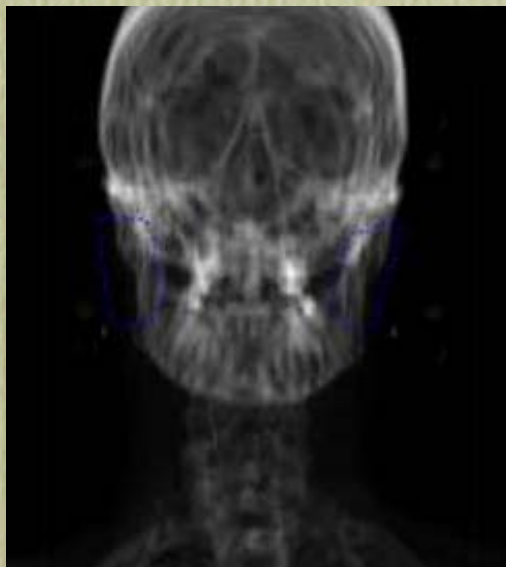
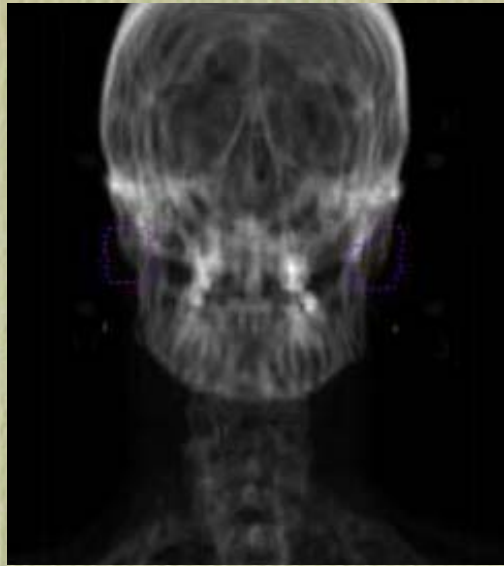
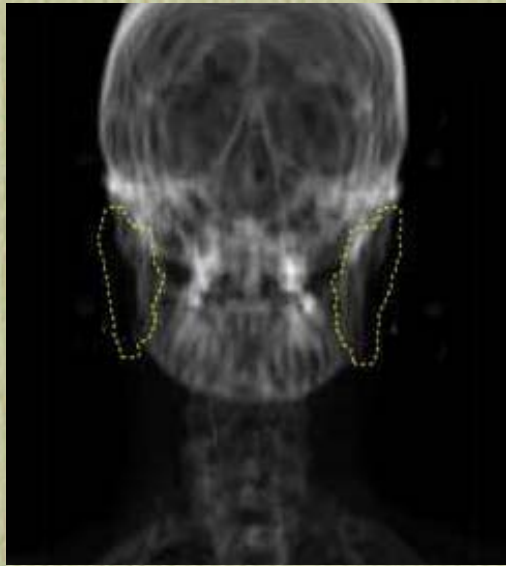


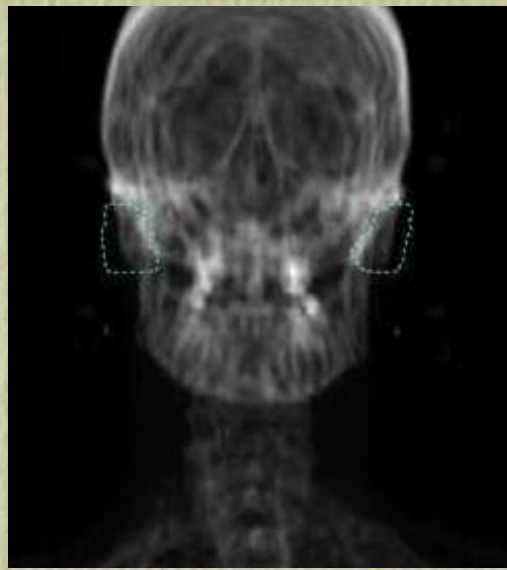
Abruzzo, 2013

OARs

PAROTIDE







ANALISI QUANTITATIVA

PAROTIDE dx
VOLUME cc
20,4
21,6
8,02
8,02
8,7
23,6
20
23,2
20,1
16,7
13
8,3
17
19,2
8,8
19,3

VOLUME MEDIO: 16,44

PAROTIDE sx
VOLUME cc
15,1
19,1
7,05
7,05
5,4
14,7
15,7
15,9
15,8
12,7
11,3
6,7
10,8
17,8
8,1
15,6

VOLUME MEDIO: 12,55

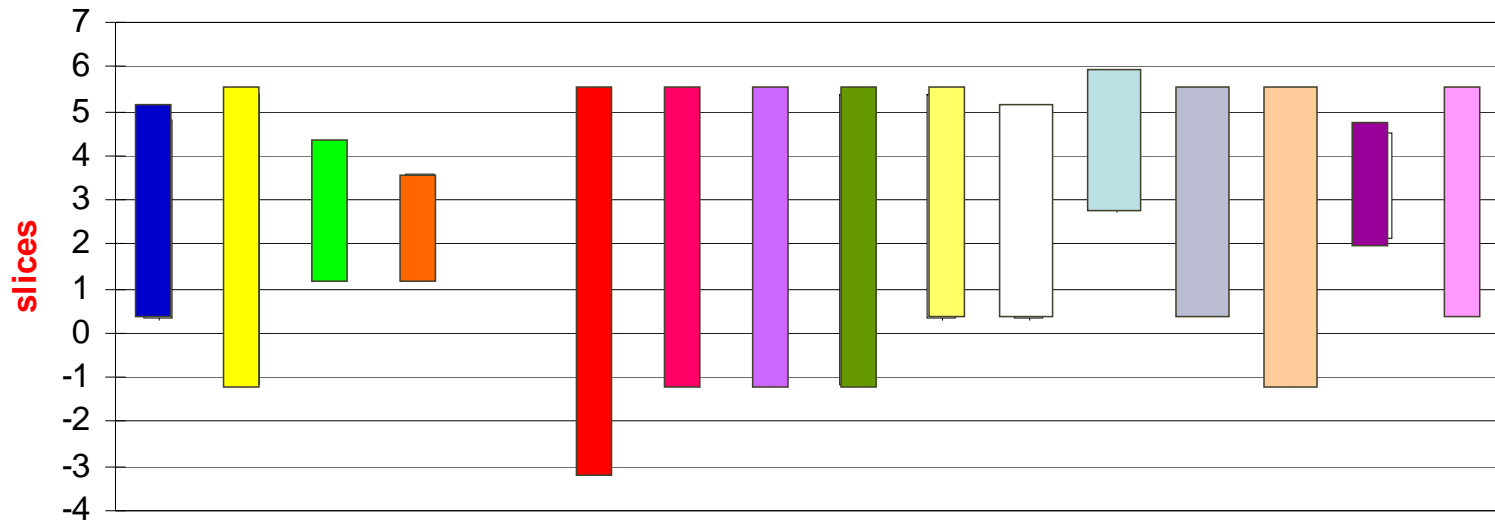
ANALISI QUANTITATIVA

PAROTIDE DX	
ESTENSIONE LATERO-LATERALE (cm)	ESTENSIONE ANTERO-POSTERIORE (cm)
3,22	4,92
3,16	4,74
2,63	3,63
2,82	3,1
3,46	7,61
3,86	5,98
2,92	4,47
3,99	5,93
3,56	4,98
4,78	6,97
4,52	3,41
3,23	5,12
6,43	7,81
3,02	3,83
4,35	3,67
MEDIA	
3,628125	5,141764706

PAROTIDE SX	
ESTENSIONE LATERO-LATERALE (cm)	ESTENSIONE ANTERO-POSTERIORE (cm)
3,58	5,04
3,28	5,23
3,38	3,08
3,67	3,8
4,83	4,71
6,11	4,29
4,29	5,22
4,17	5,01
4,67	5,23
3,45	5,89
4,16	4,19
3,14	5,49
7,4	4,11
3,02	3,96
4,56	3,78
MEDIA	
4,230588235	4,518823529

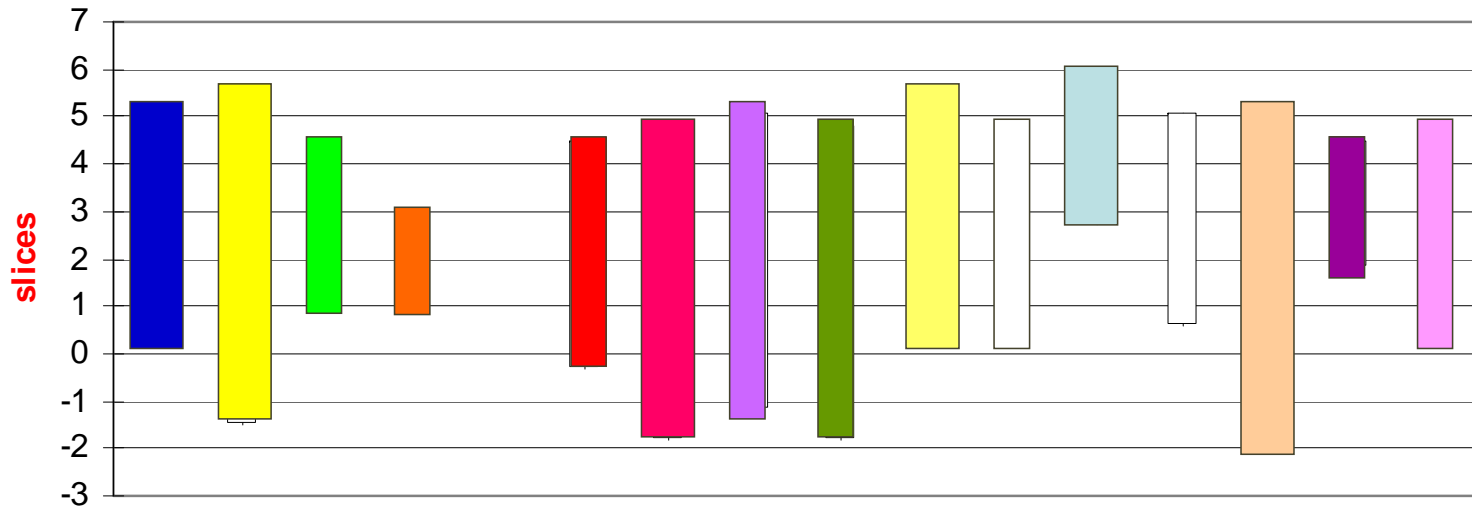
ANALISI QUANTITATIVA

ESTENSIONE CRANIO-CAUDALE



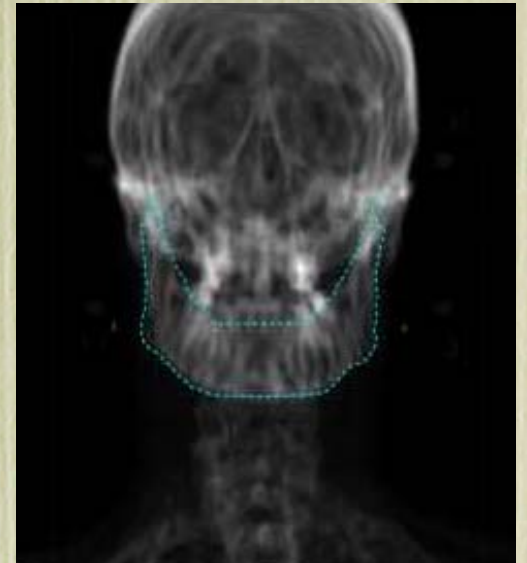
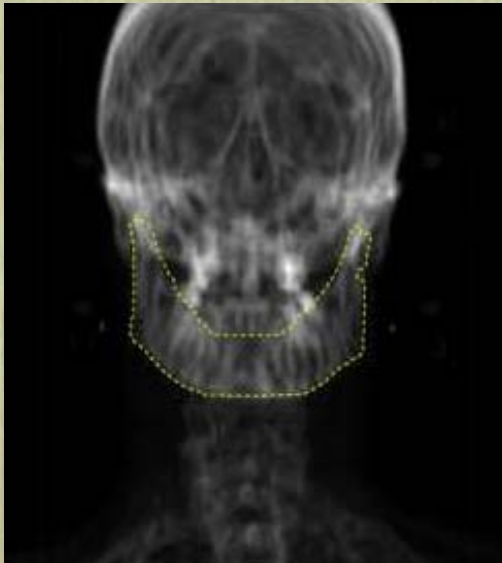
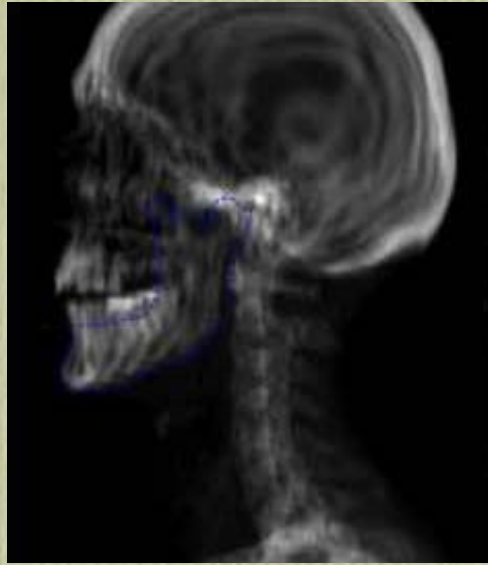
**PAROTIDE
DX**

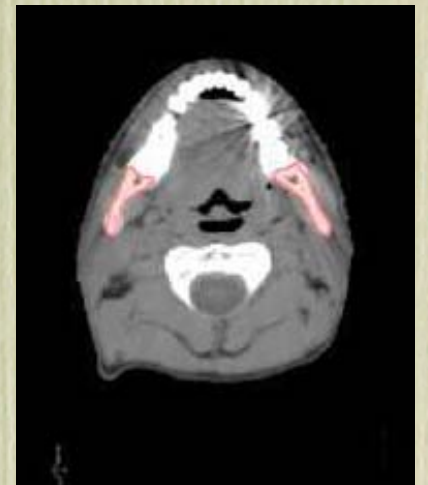
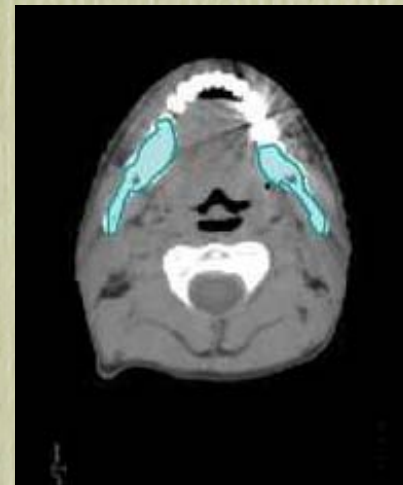
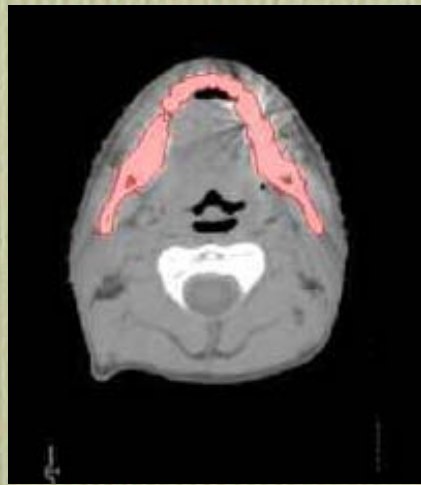
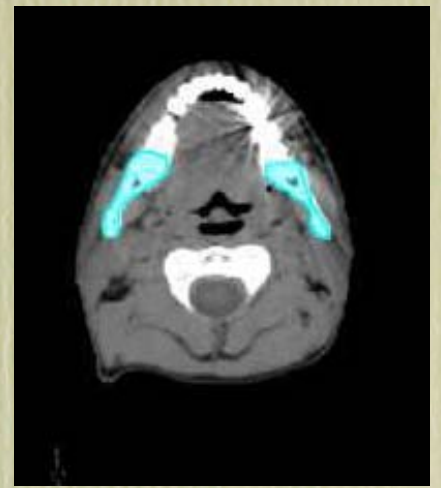
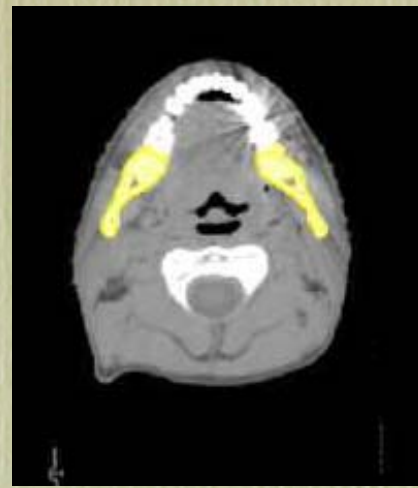
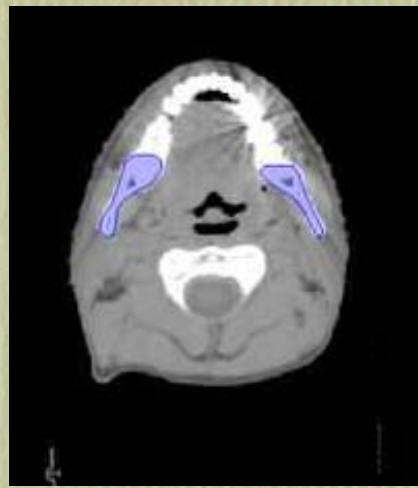
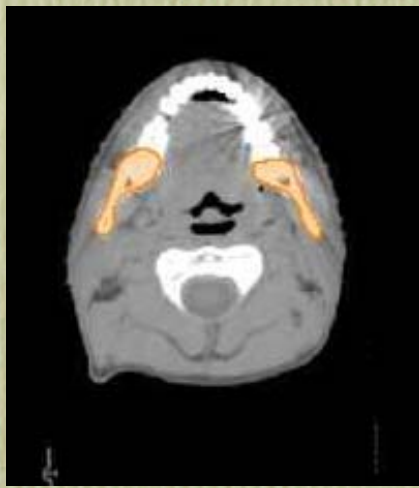
ESTENSIONE CRANIO-CAUDALE



**PAROTIDE
SX**

MANDIBOLA

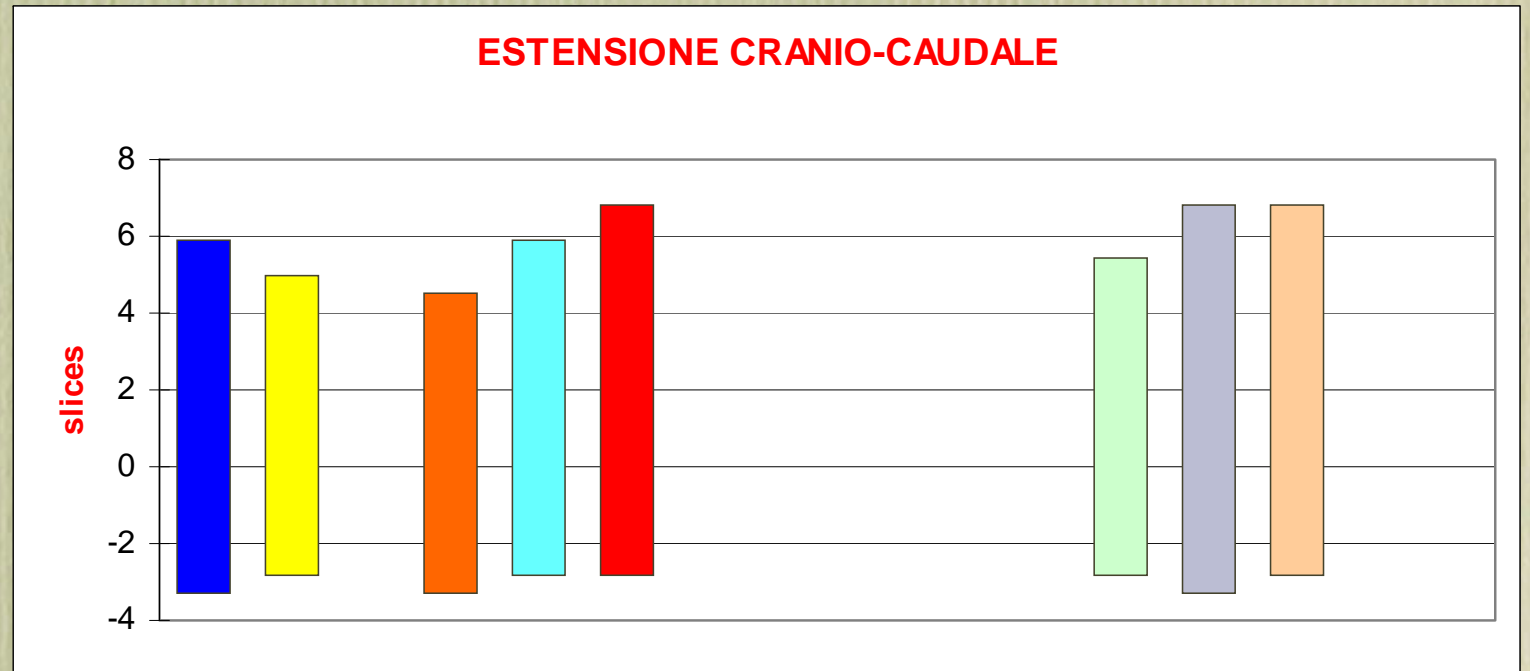




ANALISI QUANTITATIVA

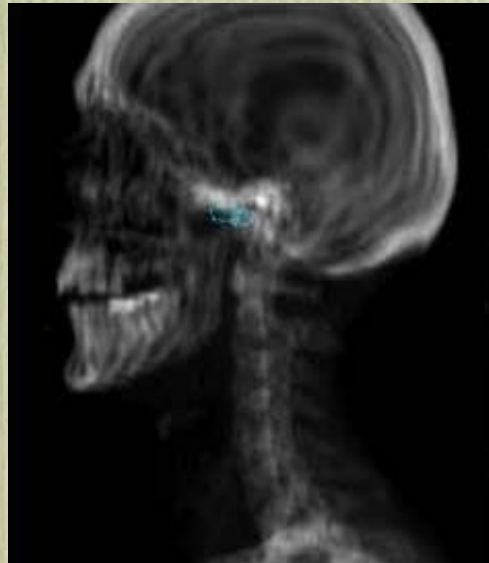
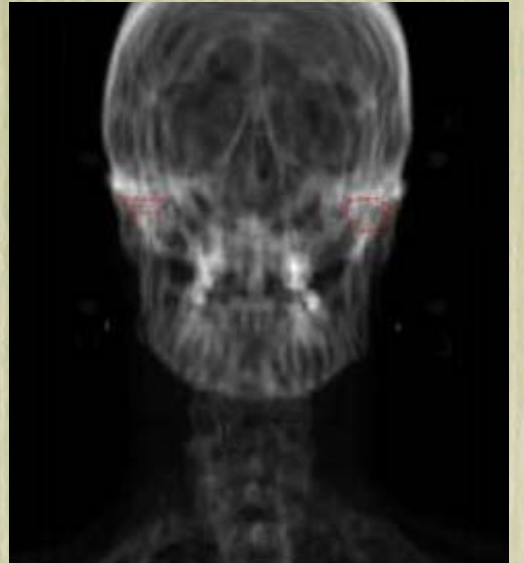
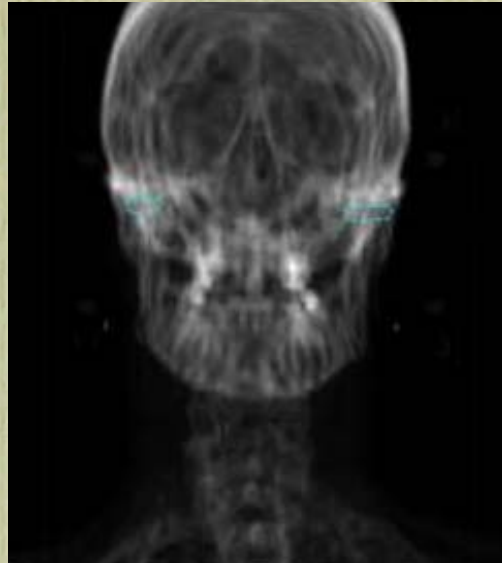
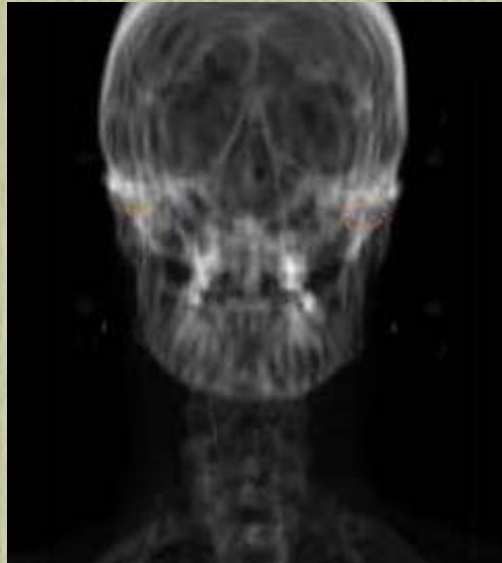
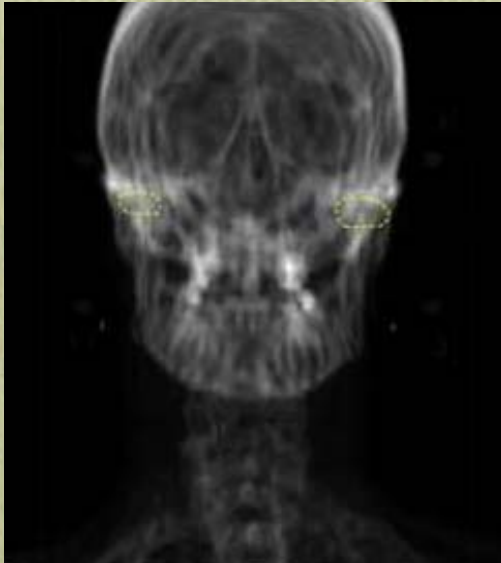
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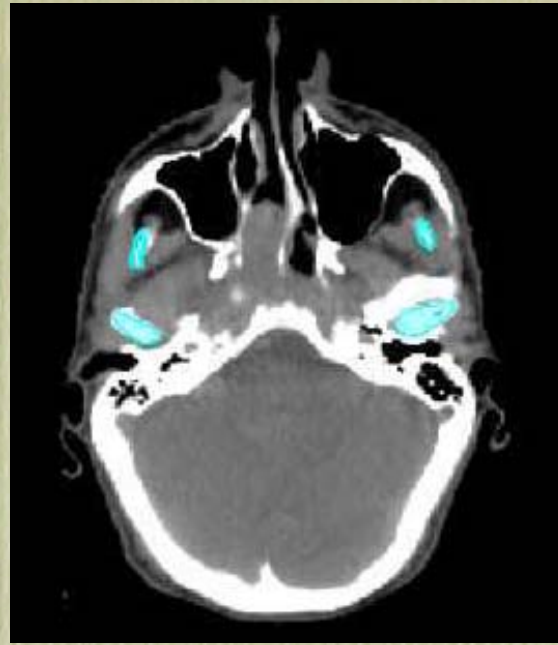
VOLUME cc
52,3
45,9
53,8
52,3
59,1
55,8
56,2
44,7



VALORE MEDIO: 53,15

ART. TEMPORO-MANDIBOLARE





ANALISI QUANTITATIVA

ARTICOLAZIONE TEMPORO-MANDIBOLARE dx

Volume cc

1,2

0,3

0,5

0,6

ARTICOLAZIONE TEMPORO-MANDIBOLARE sx

Volume cc

1,9

1,3

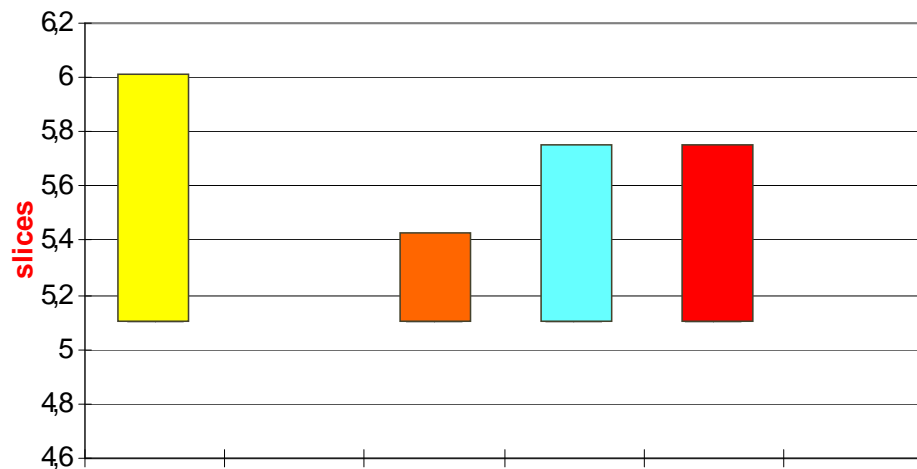
0,7

1,4

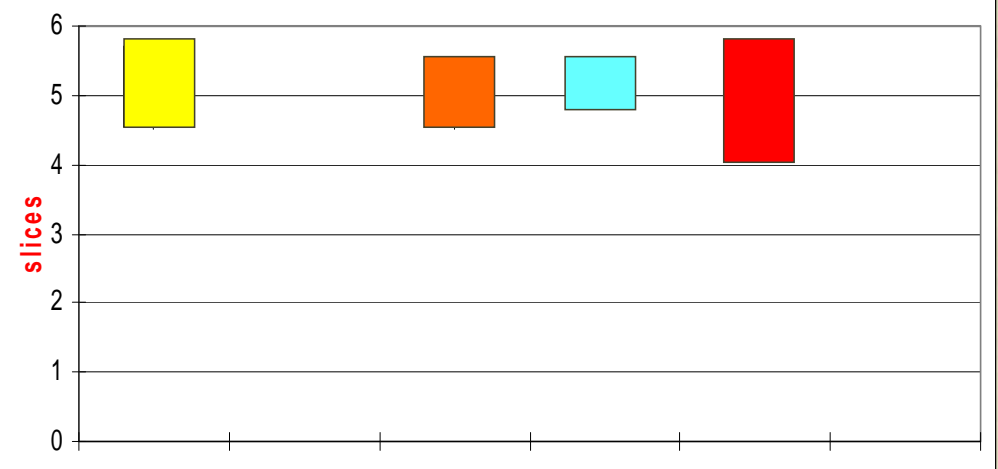
VALORE MEDIO: 0,61

VALORE MEDIO: 1,23

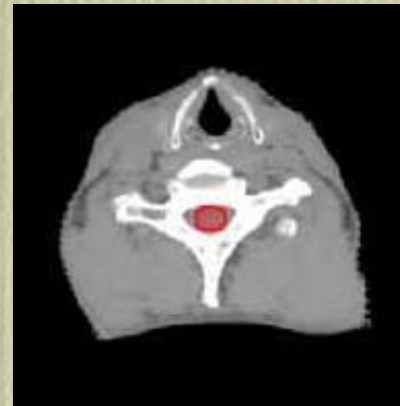
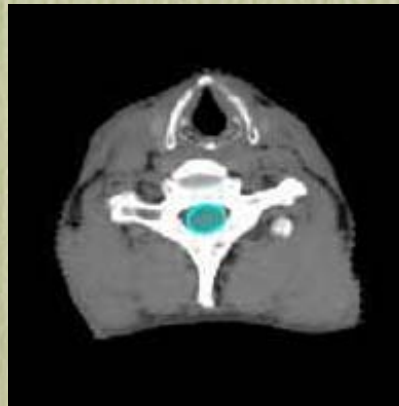
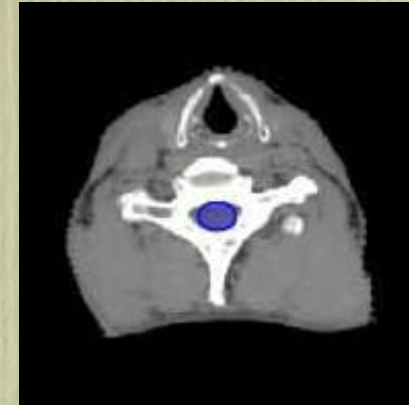
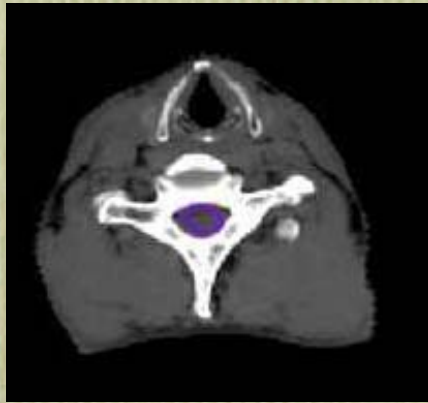
ESTENSIONE CRANIOCAUDALE



ESTENSIONE CRANIO-CAUDALE



MIDOLLO SPINALE

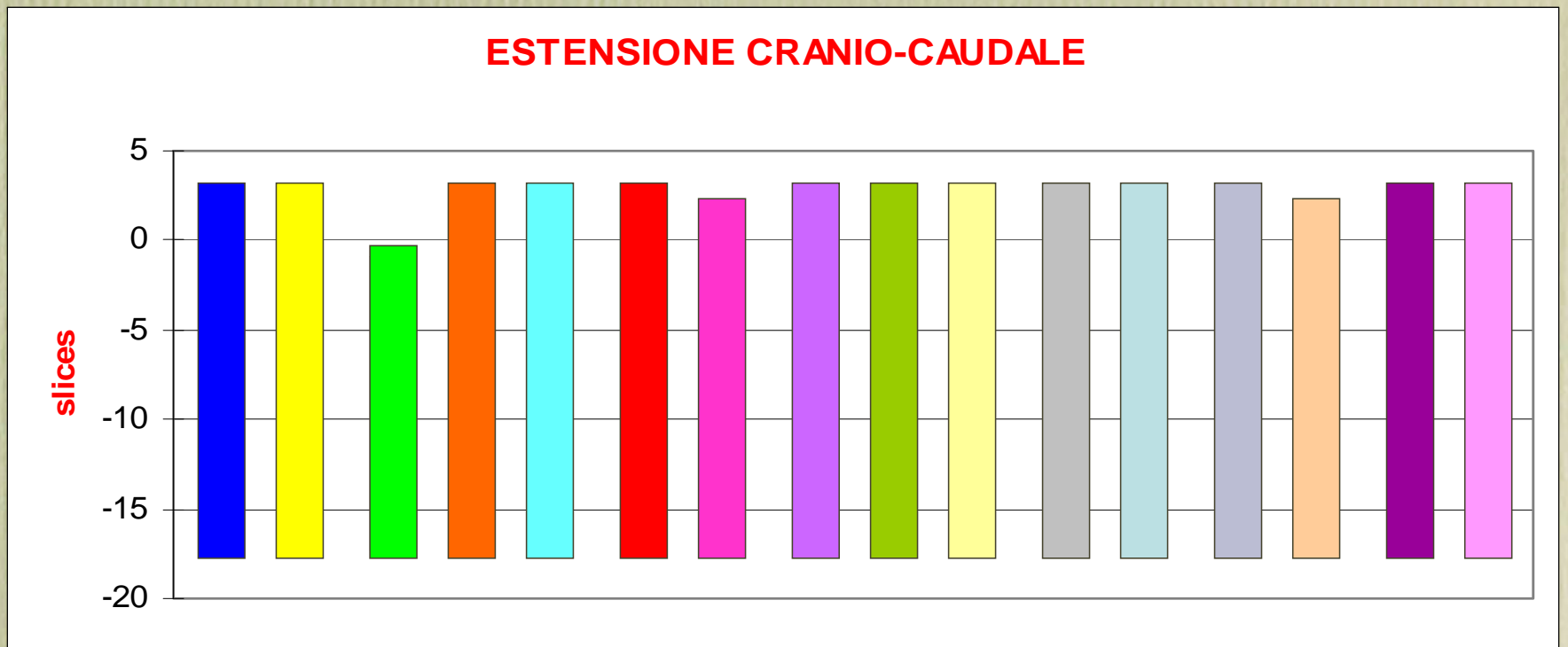




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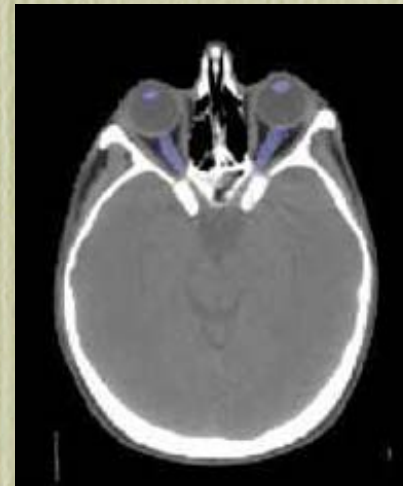
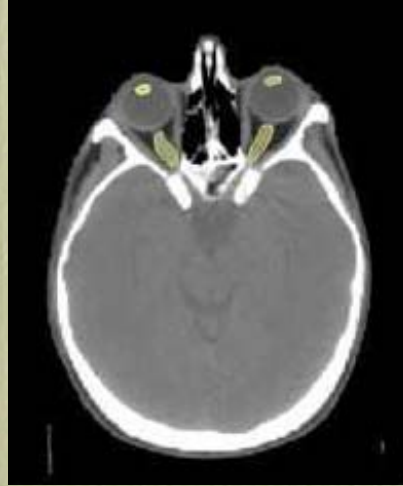
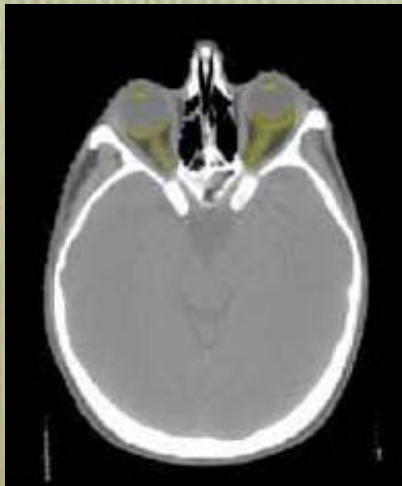
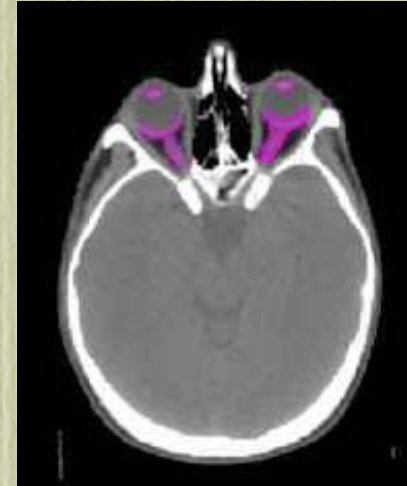
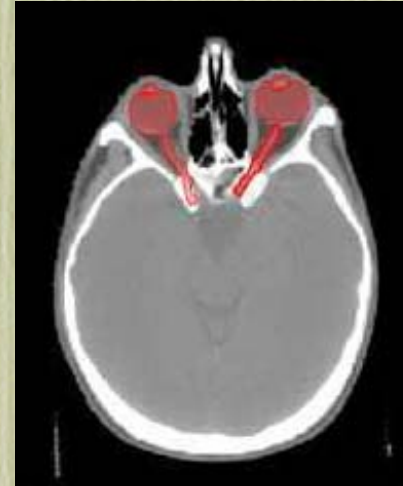
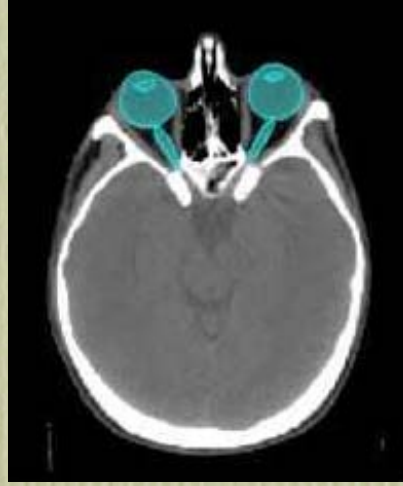
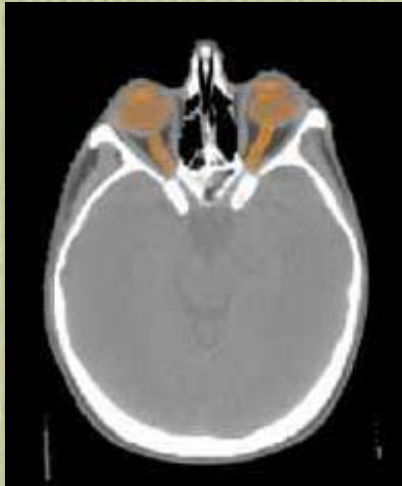
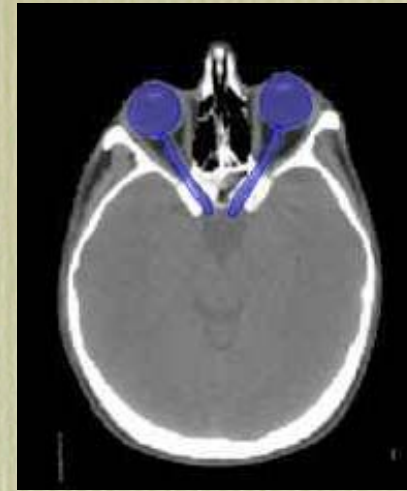
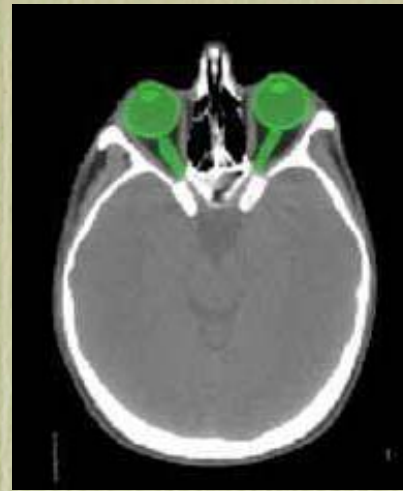
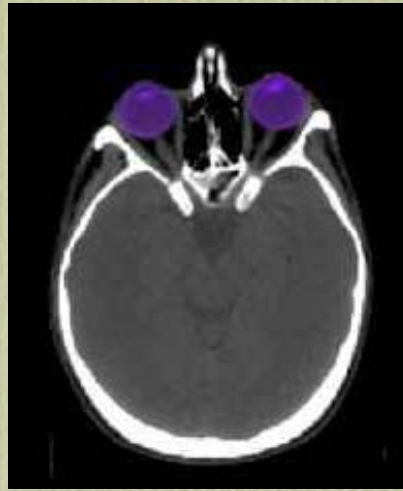
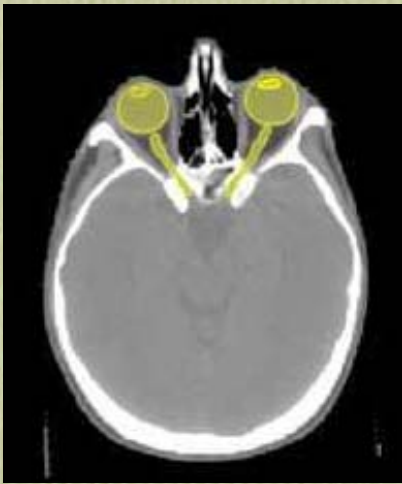
MIDOLLO

Volume cc
33,9
15,6
21
13
27,1
21,5
36
31,8
16,1
40,3
15
30,6
14,5
36,6
22
17,1



VALORE MEDIO: 24,3

OCCHIO, NERVO OTTICO E CRISTALLINO



ANALISI QUANTITATIVA

OCCHIO DX
Volume cc
7,9
6,9
9,1
4,7
7,9
7,7
7,6
8
9
8,3

VALORE MEDIO: 7,8

OCCHIO SX
Volume cc
7,2
7,1
9,3
4,2
8,7
7
8,2
8,4
8,2
8,3

VALORE MEDIO: 7,8

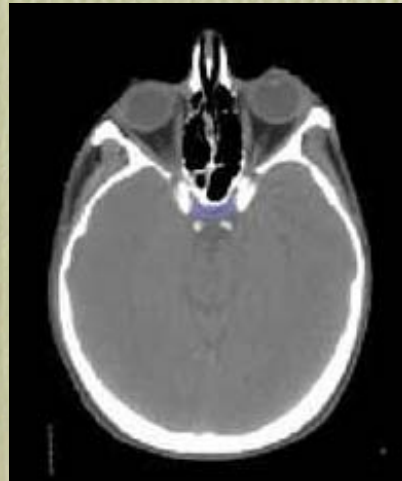
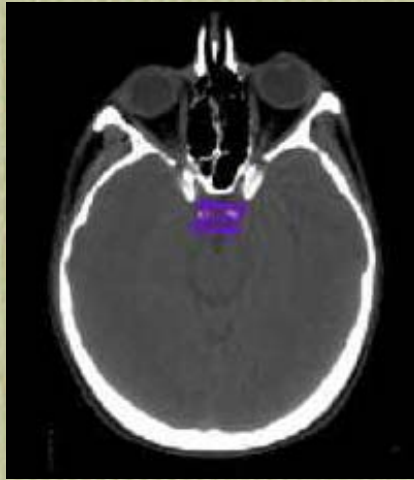
CRISTALLINO dx
Volume cc
0,2
0,1
0,5
0
0,3
0,1
0,1
0,1
0,1
0,1
0,1
0,1
0,1
0,1
0,2
0,2

VALORE MEDIO: 0,15

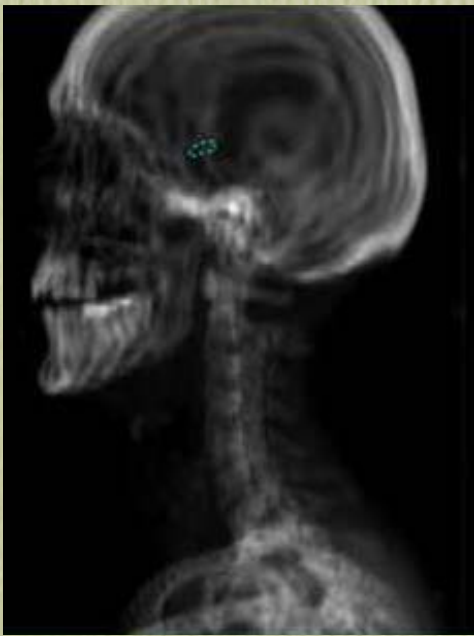
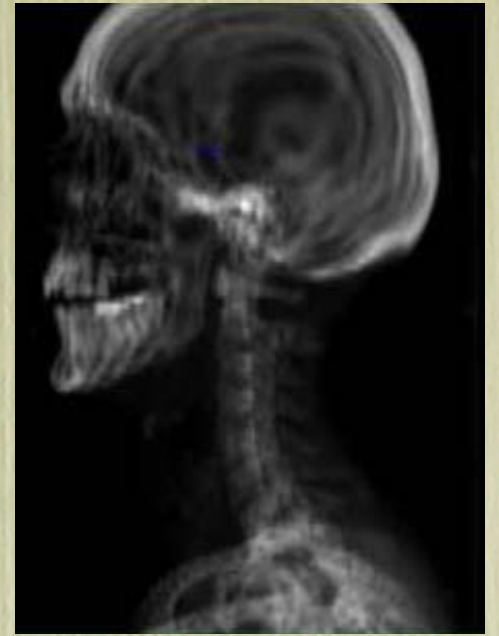
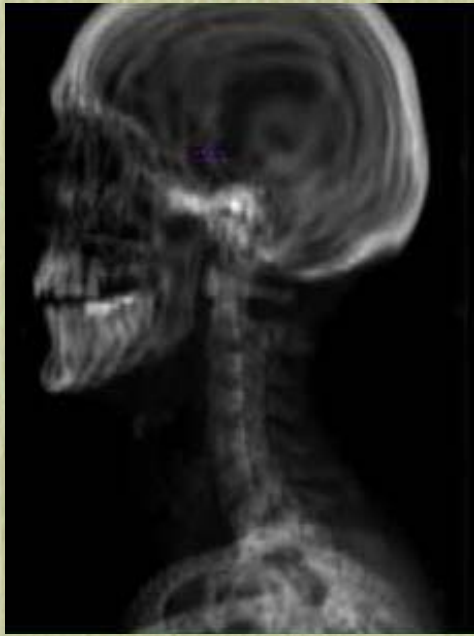
CRISTALLINO sx
Volume cc
0,1
0,1
0,5
0
0,2
0,1
0,1
0,1
0,1
0,1
0,1
0,1
0,1
0,1
0,1
0,1
0,1

VALORE MEDIO: 0,15

CHIASMA



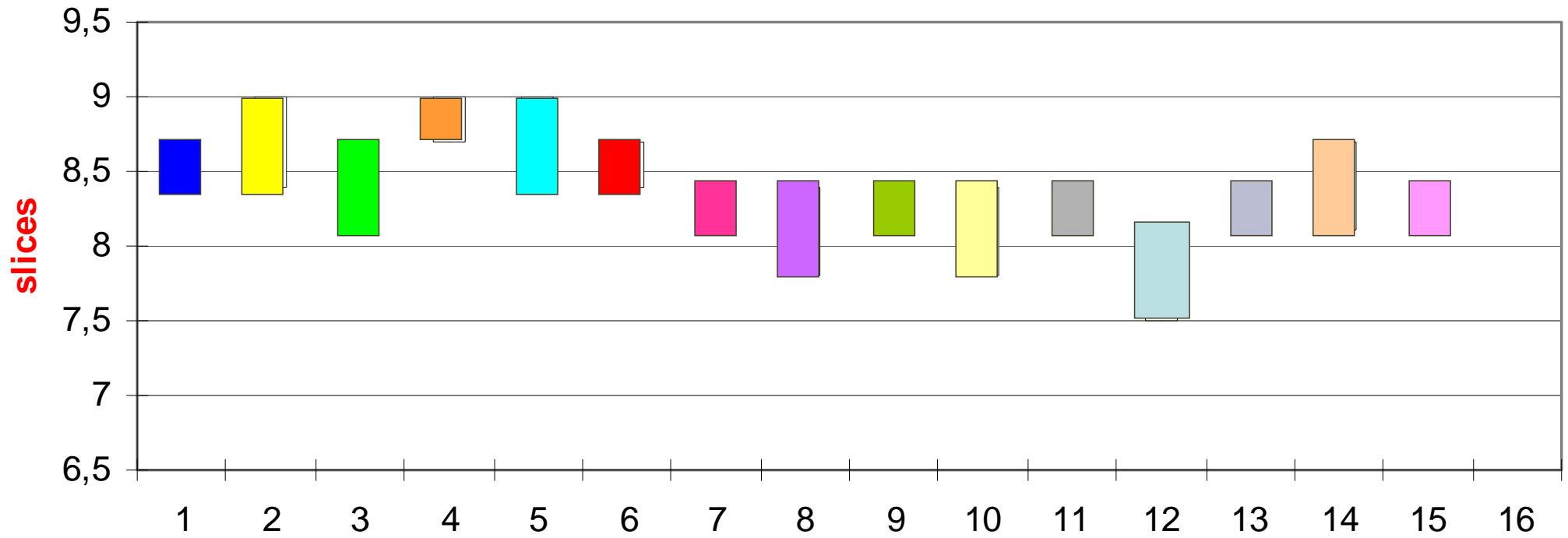
SLICES DIVERSE



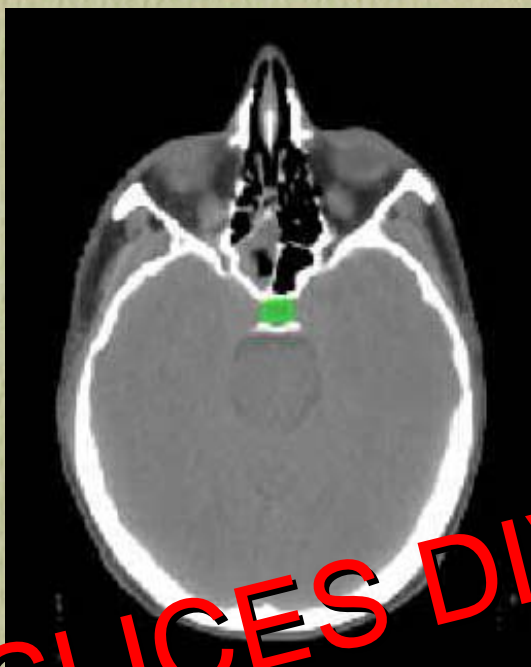
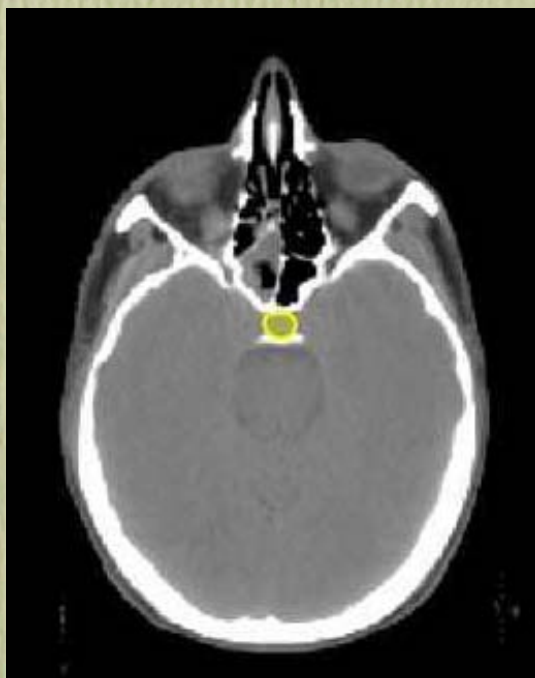
ANALISI QUANTITATIVA

CHIASMA

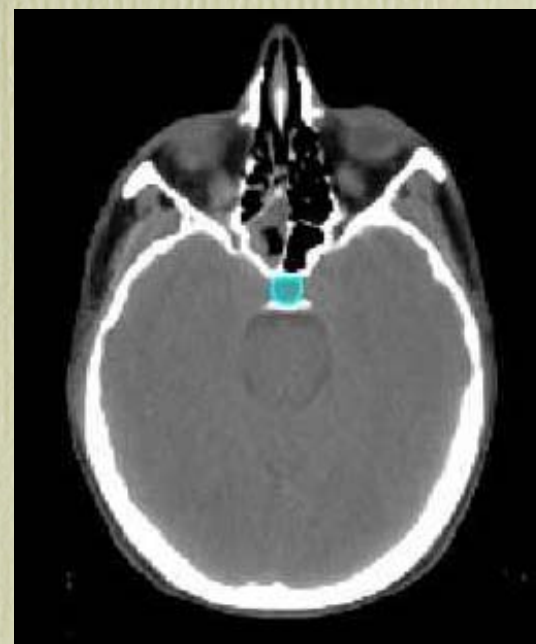
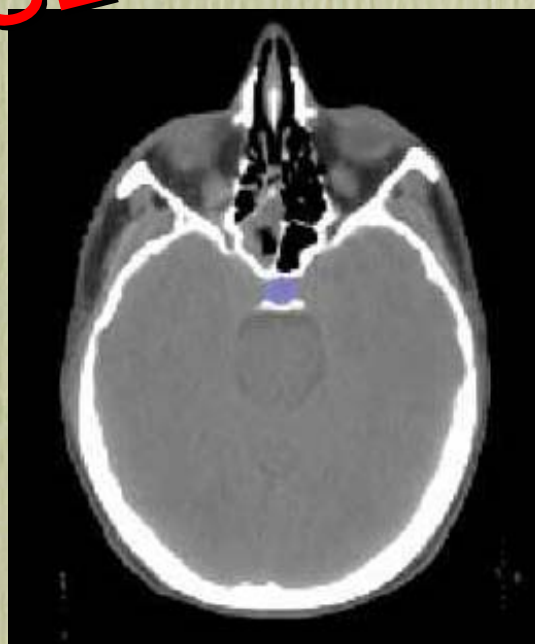
ESTENSIONE CRANIO-CAUDALE



IPOFISI



SLICES DIVERSE

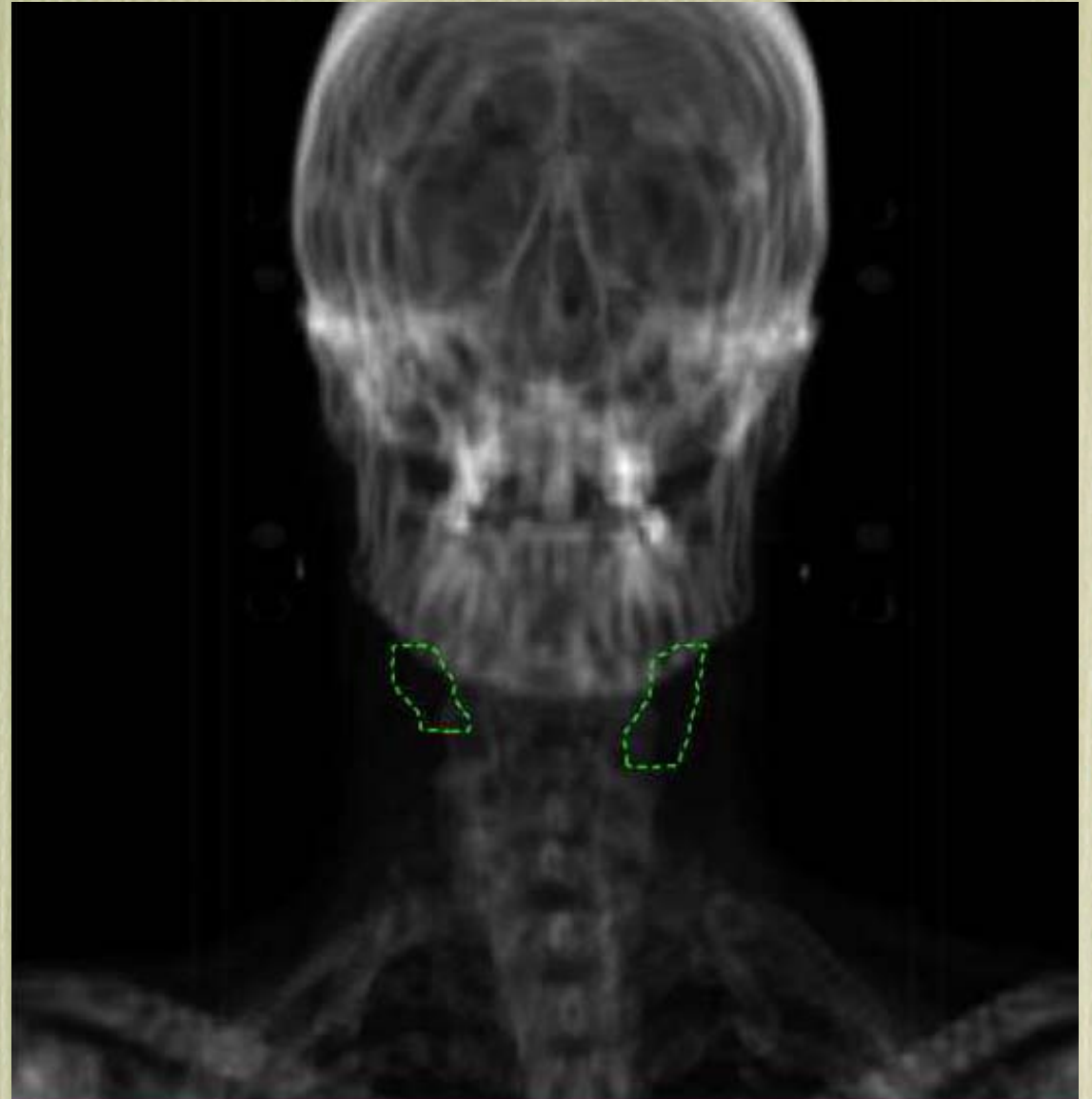
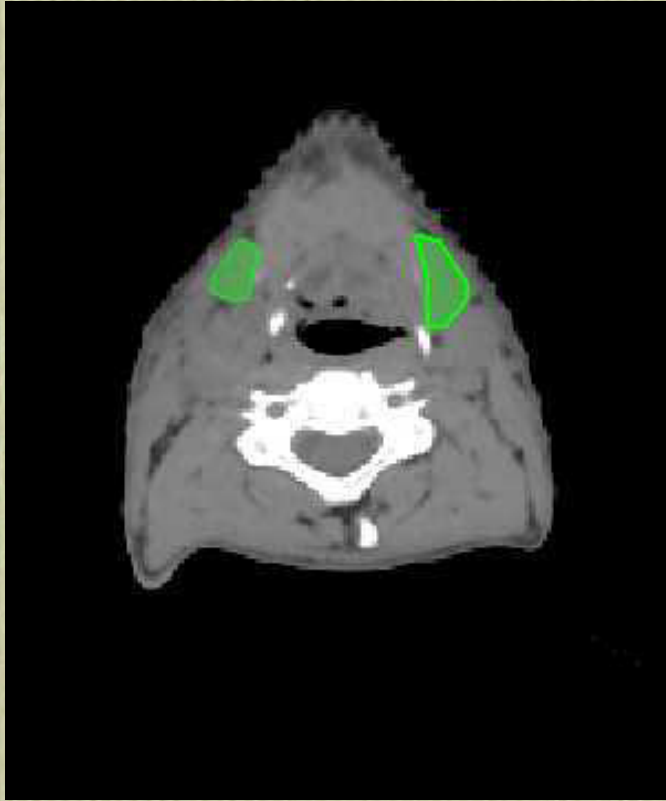


ANALISI QUANTITATIVA

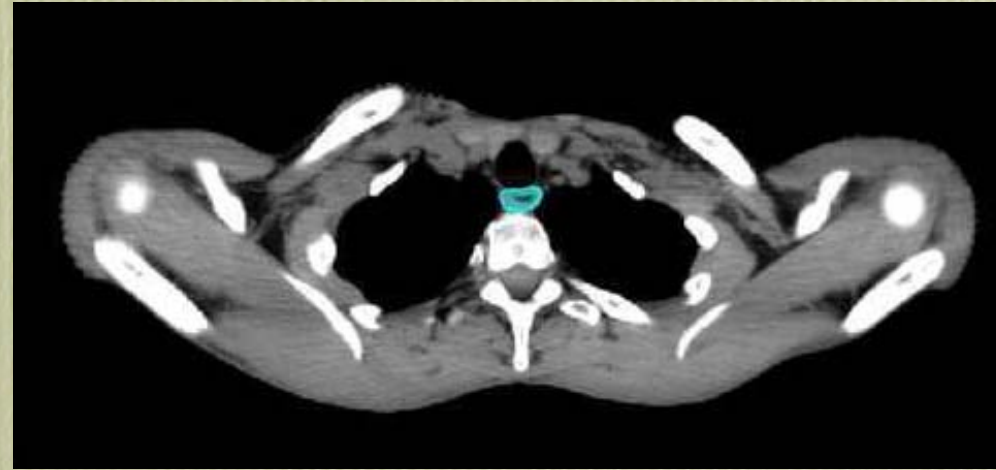
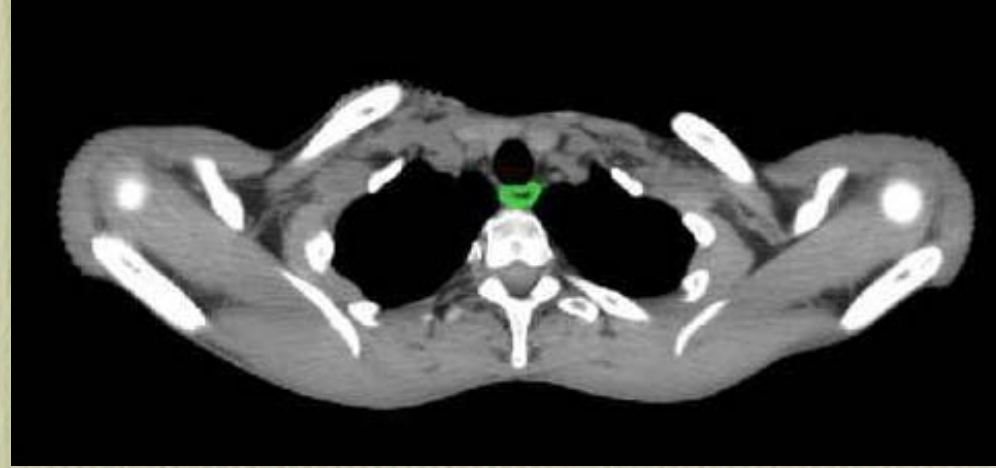
IPOFISI

VOLUMEcc
MEDIA:0,24
0,4
0,3
0,1
0,2
0,2
0,2
0,2

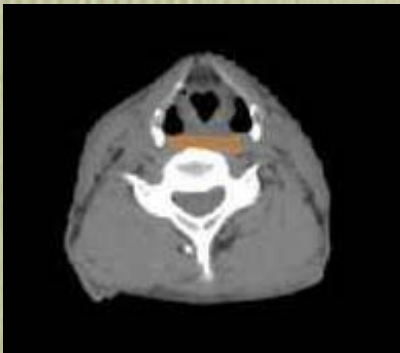
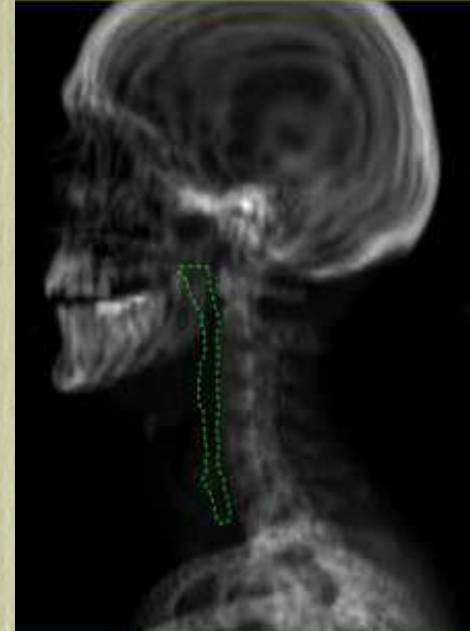
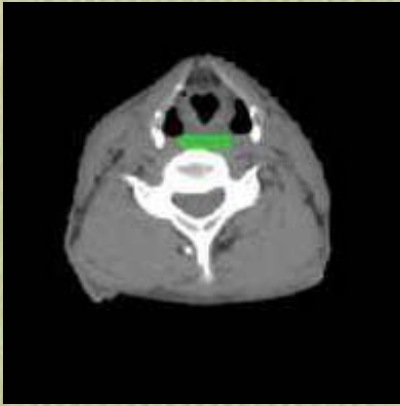
GHIANDOLA SOTTOMANDIBOLARE

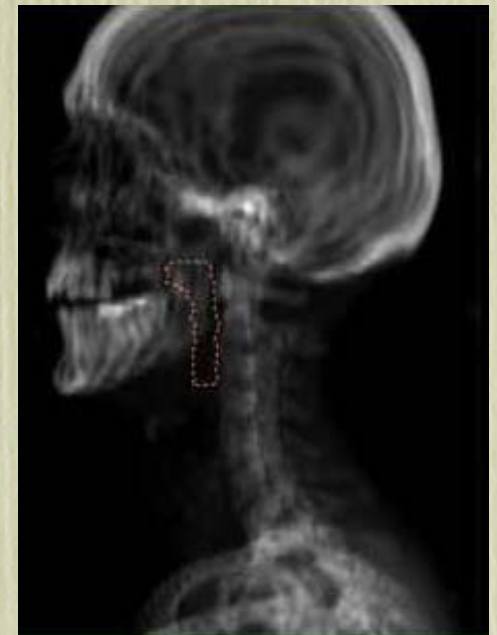
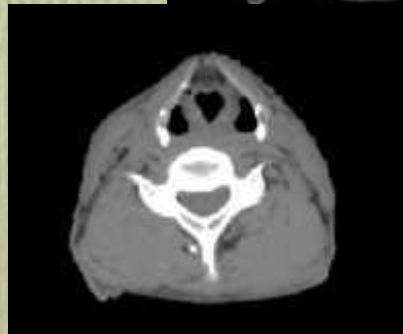
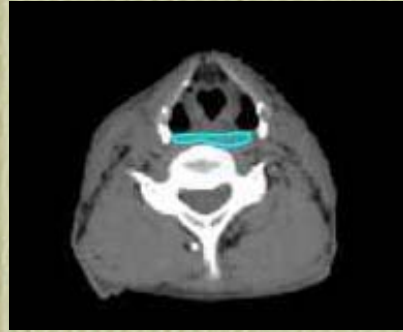


ESOFAGO



MUSCOLI COSTRITTORI DEL FARINGE

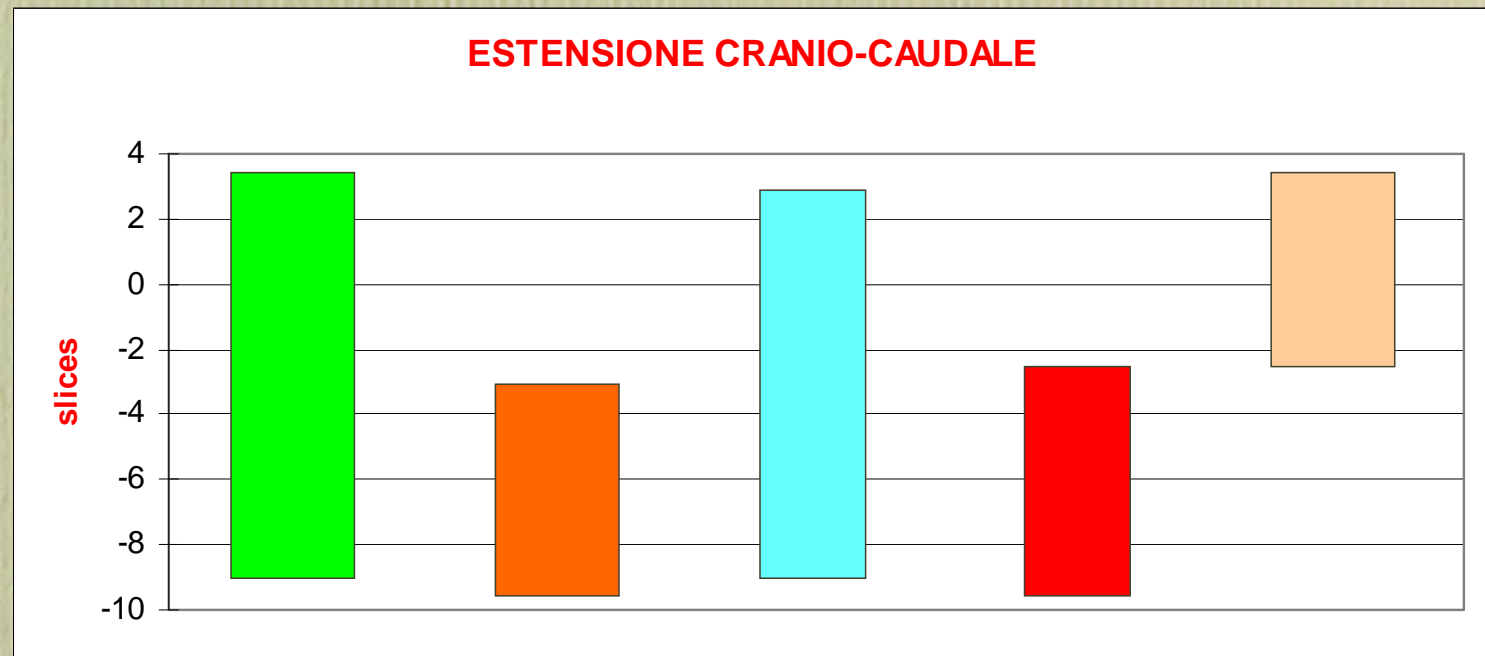




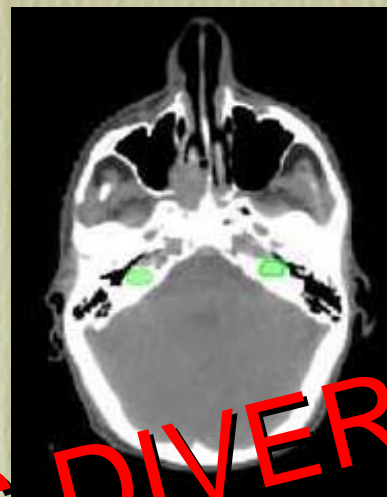
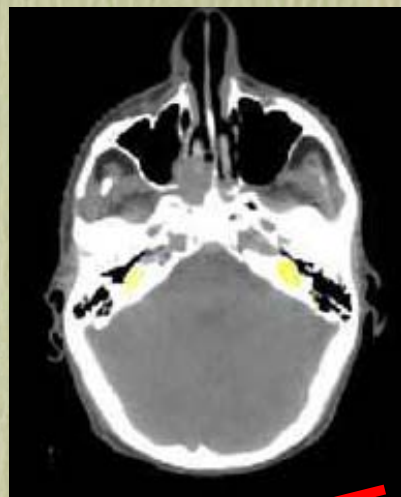
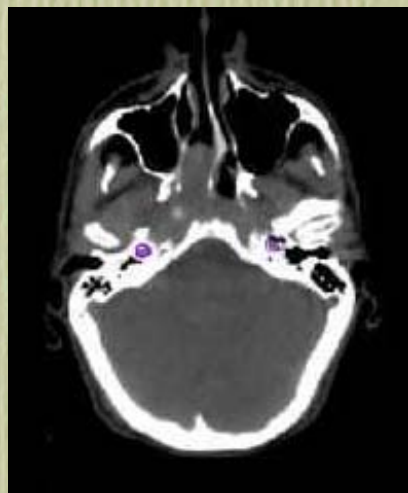
ANALISI QUANTITATIVA

MUSCOLI COSTRITTORI FARINGE

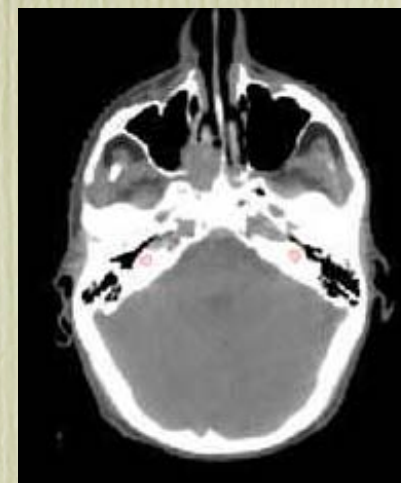
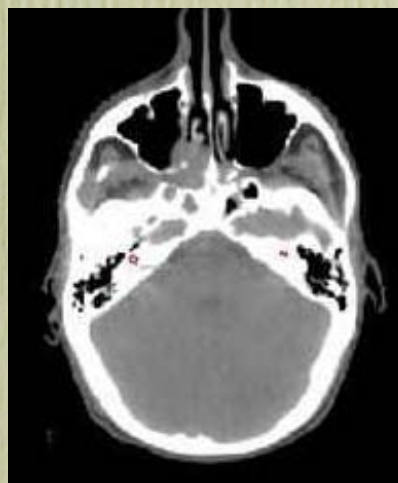
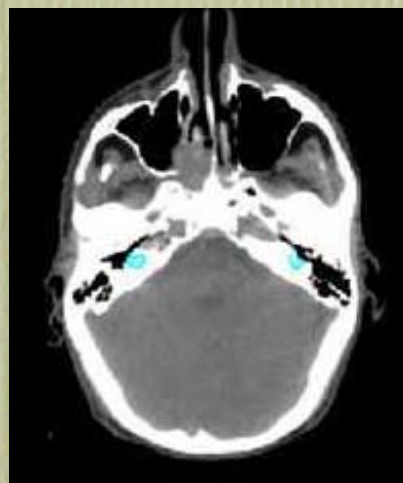
Volume cc
MEDIA: 9,53
12,2
6,8
10,4
9,8
5,8



COCLEA



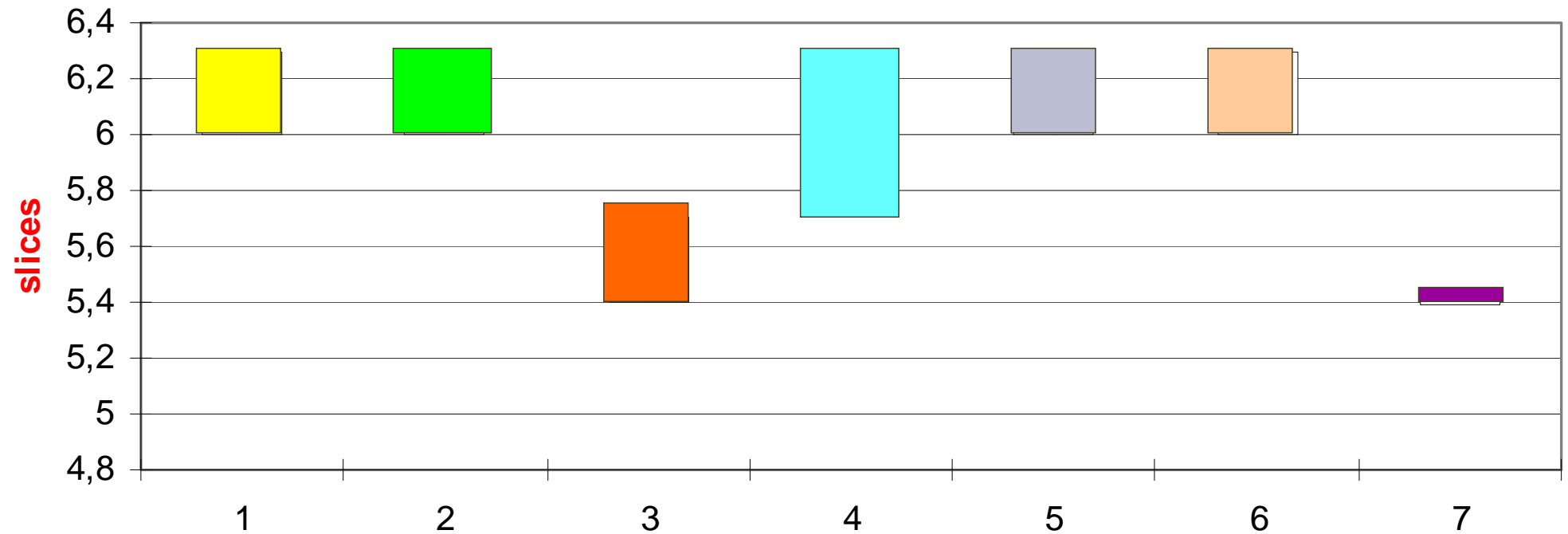
SLICES DIVERSE



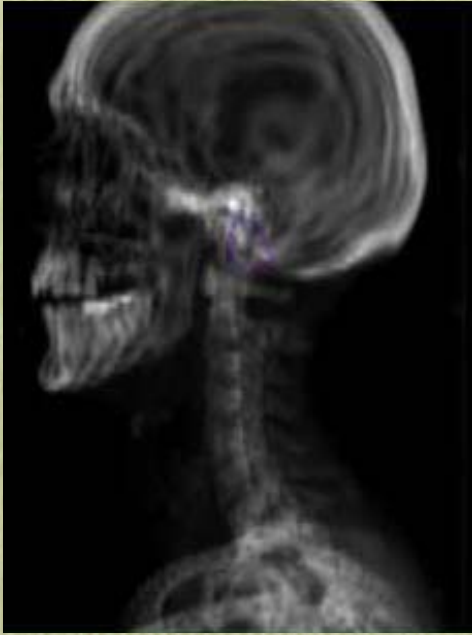
ANALISI QUANTITATIVA

COCLEA

ESTENSIONE CRANIO-CAUDALE



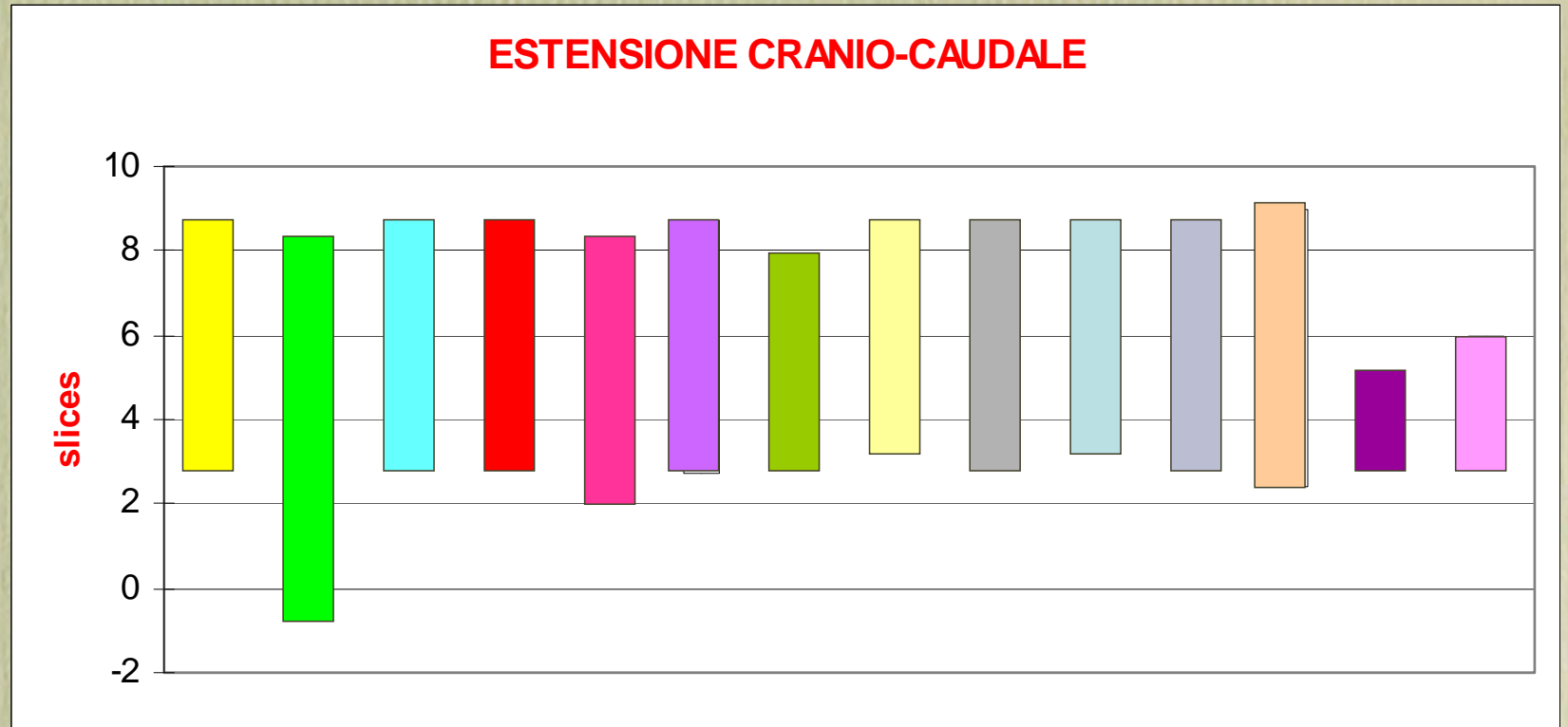
TRONCO ENCEFALICO



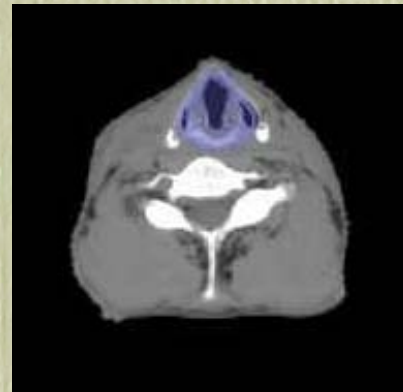
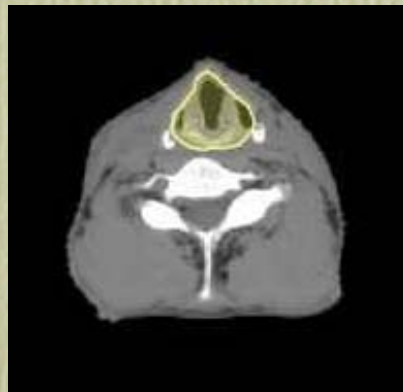
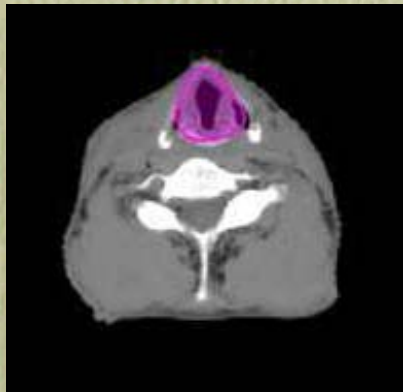
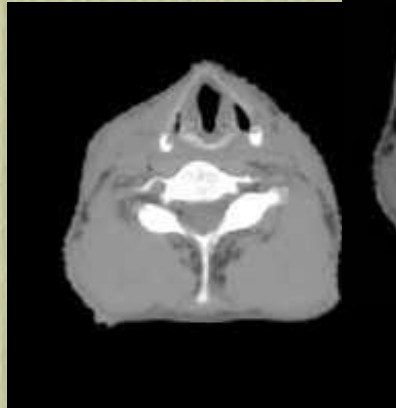
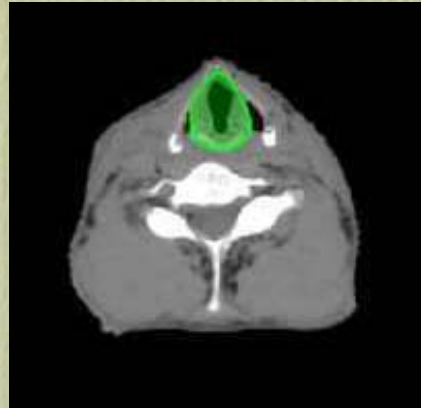
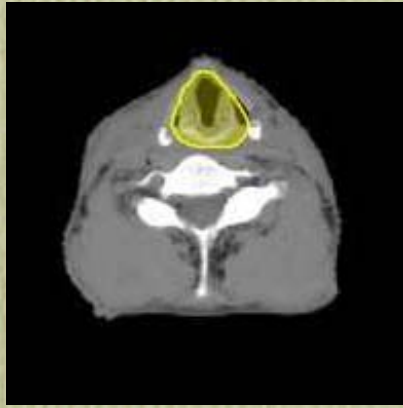
ANALISI QUANTITATIVA

TRONCO ENCEFALICO

TRONCO ENCEFALICO
Volume cc
24,9
22,6
24,9
22,4
30,9
35,1
17,8
28
23,4
21
22,6
24,9
5,2
5,7
MEDIA: 22,13



LARINGE

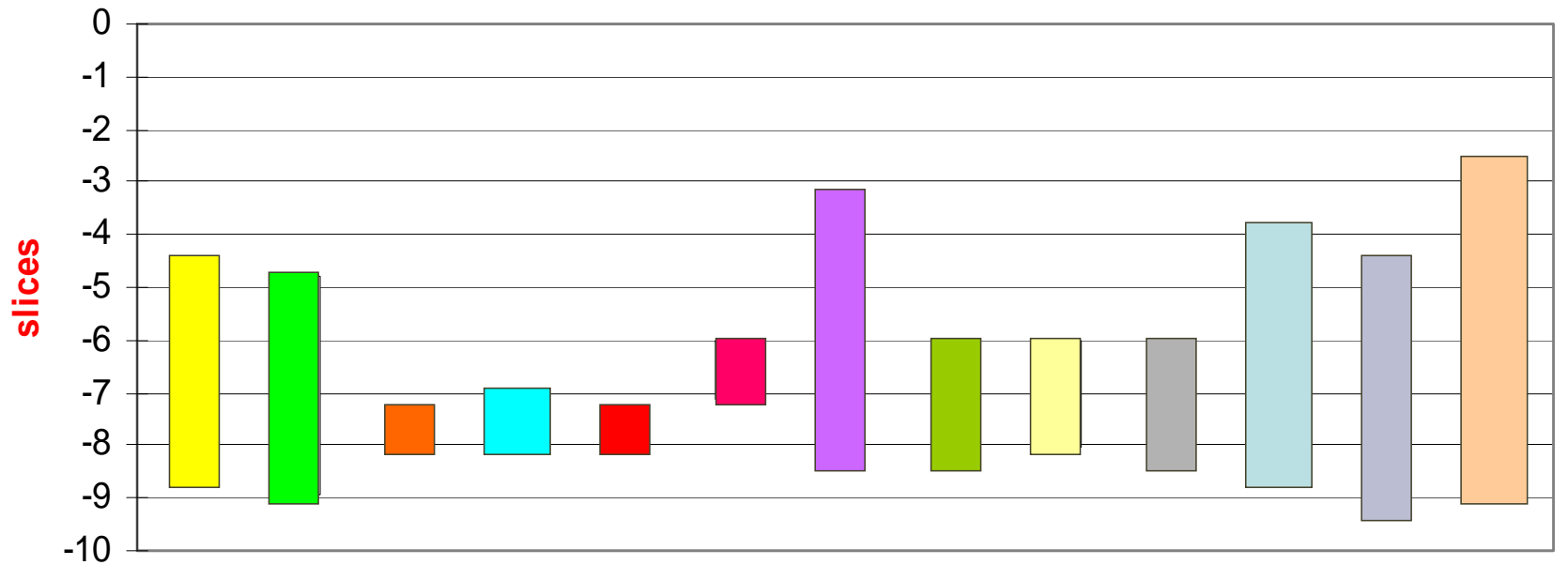


ANALISI QUANTITATIVA

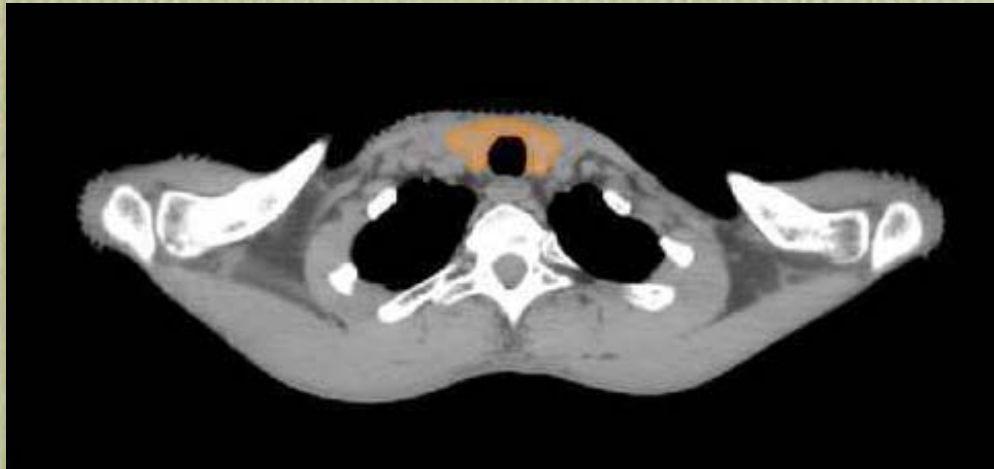
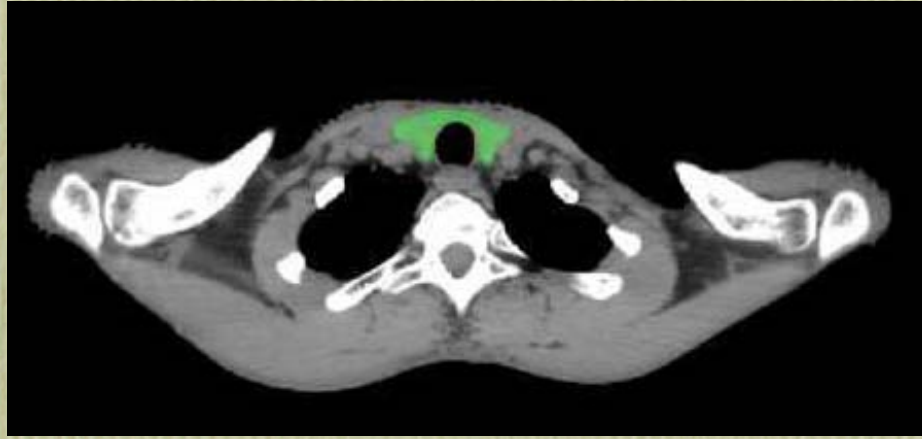
LARINGE

Volume cc
MEDIA: 23,62
35,8
22,1
1,2
1,6
1,5
12
48,8
20,2
17,9
20,4
36,8
48,3
42,1

ESTENSIONE CRANIO-CAUDALE



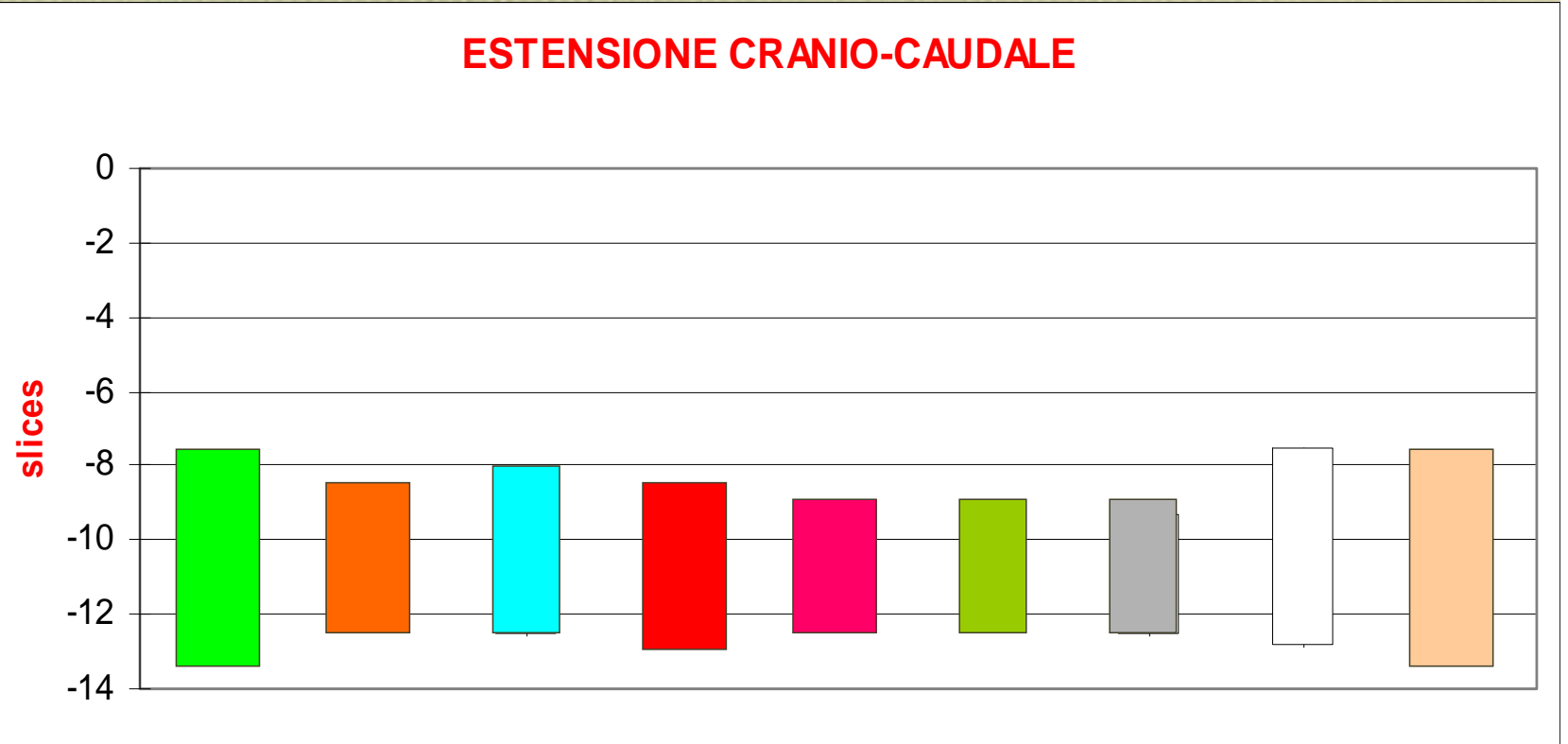
TIROIDE



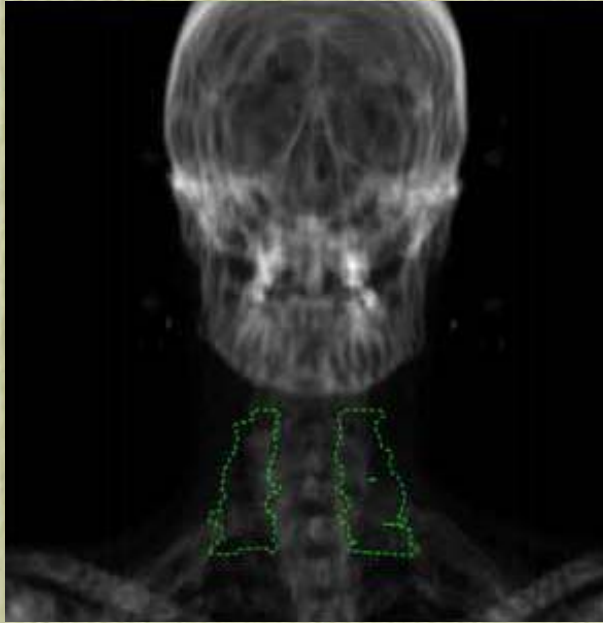
ANALISI QUANTITATIVA

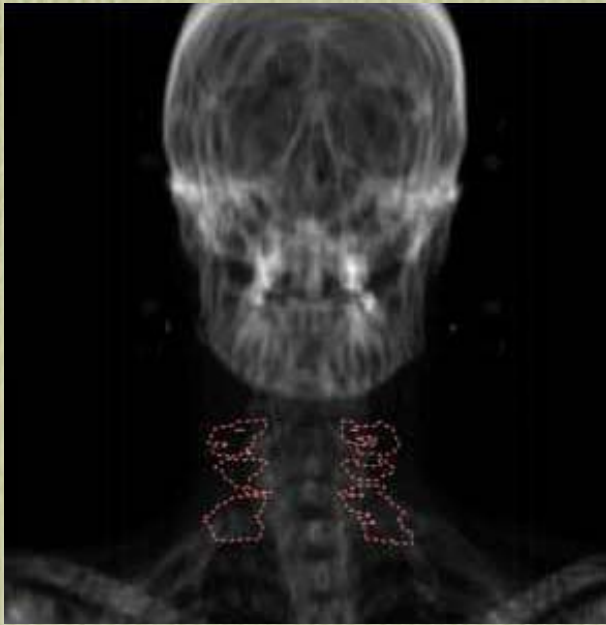
TIROIDE

Volume cc
MEDIA: 15,81
17,7
13
16,6
22,5
10,7
10,8
11,5
16,8
20,8



PLESSO BRACHIALE



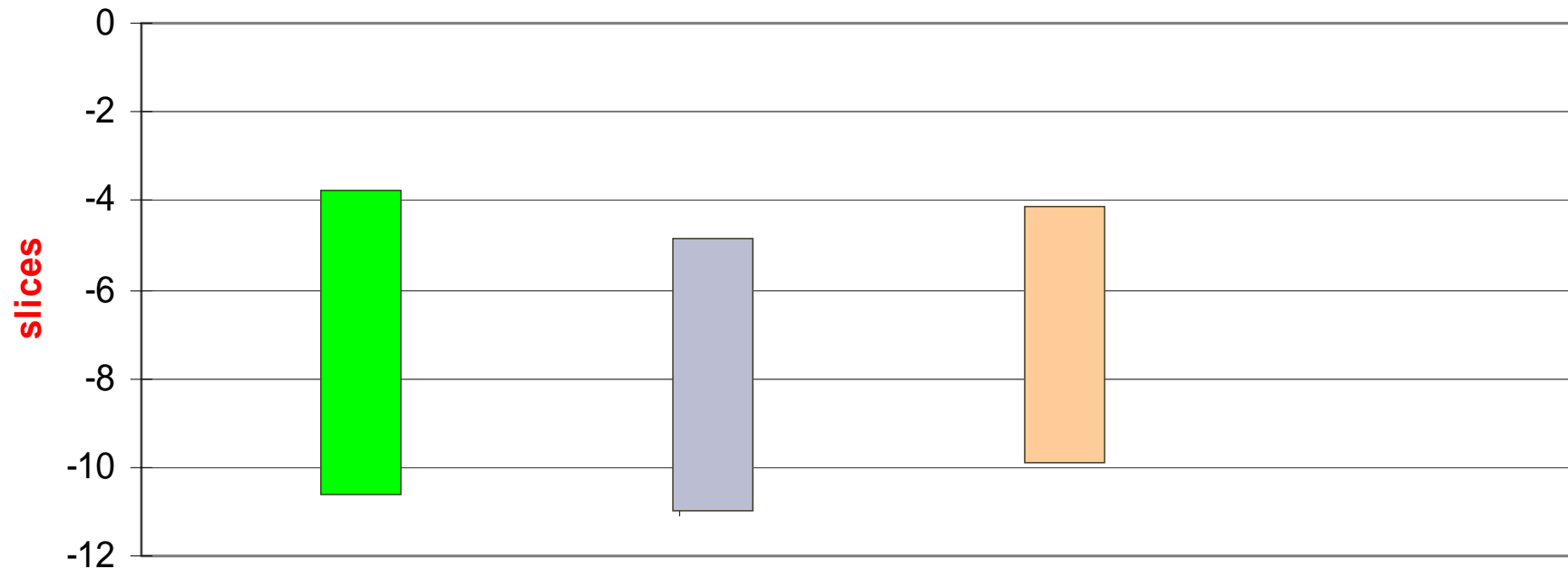


ANALISI QUANTITATIVA

PLESSO BRACHIALE

Volume cc
MEDIA: 9,625
14,5
6
3,5

ESTENSIONE CRANIO-CAUDALE



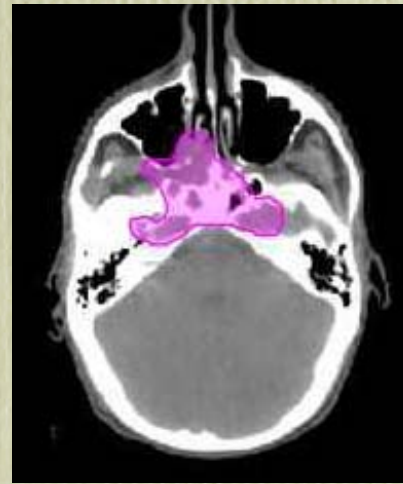
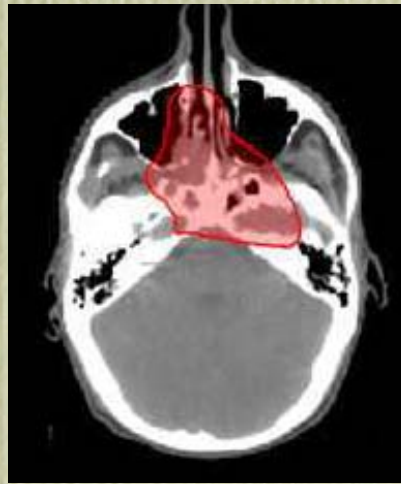
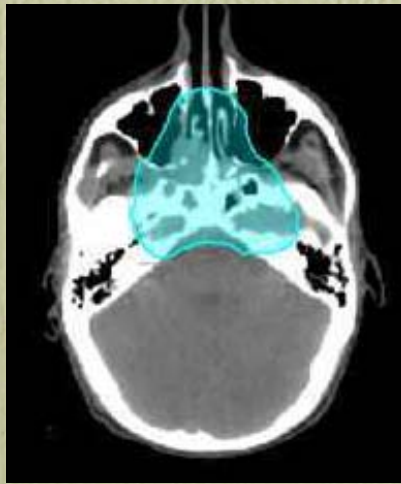
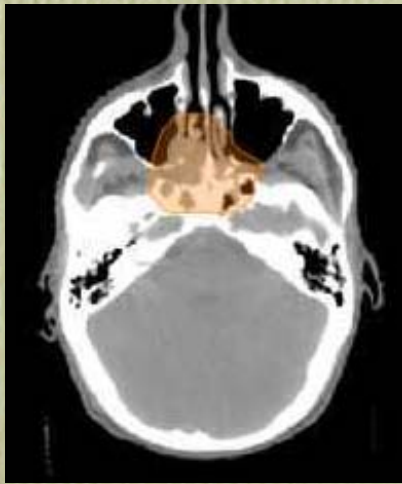
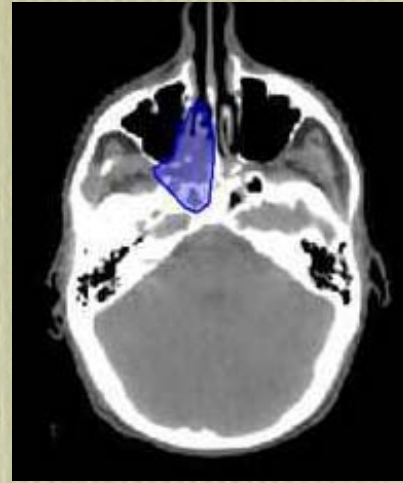
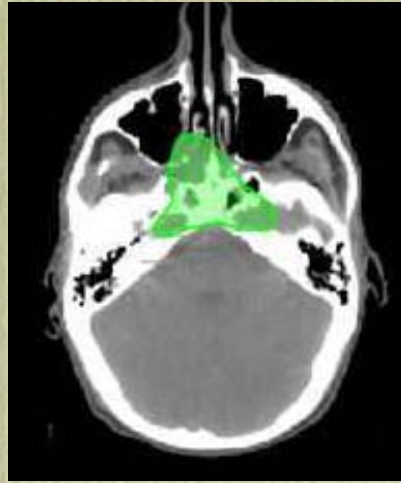
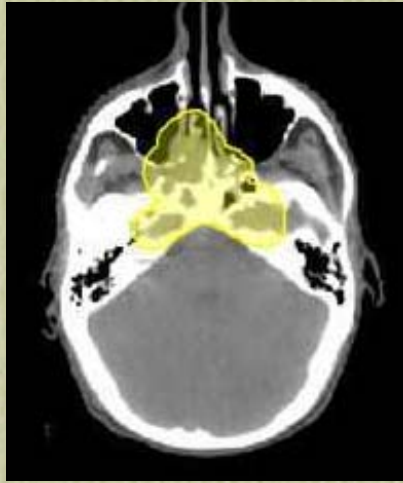
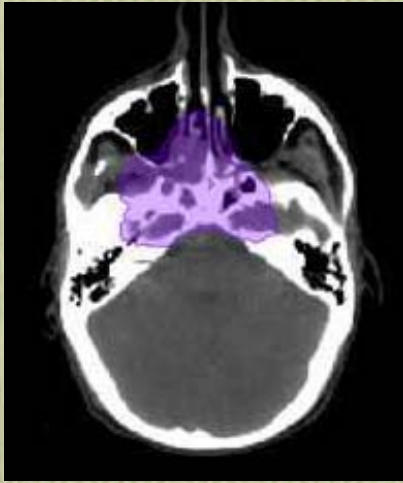


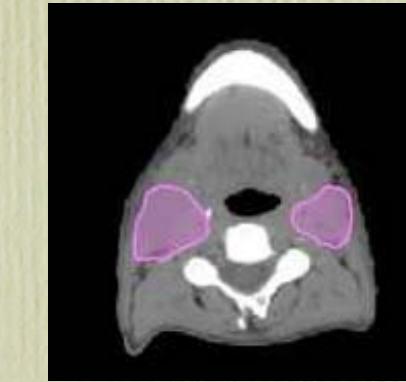
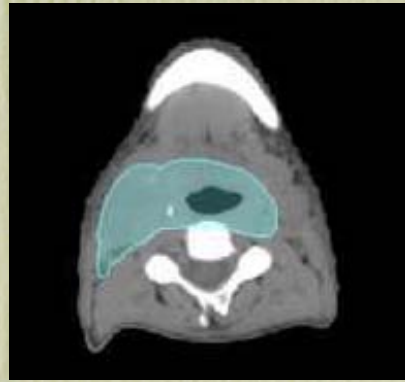
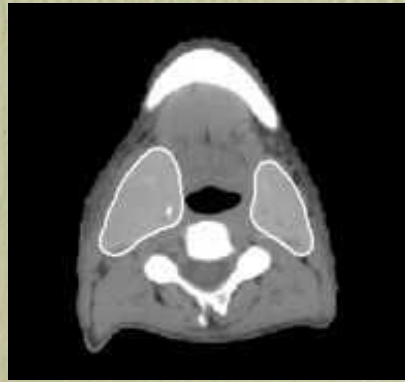
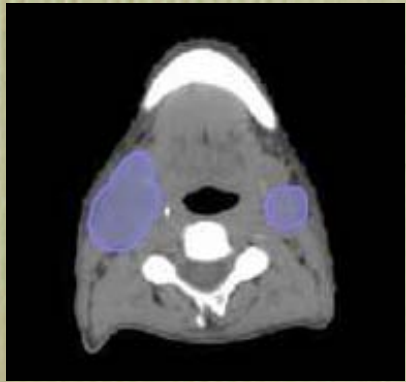
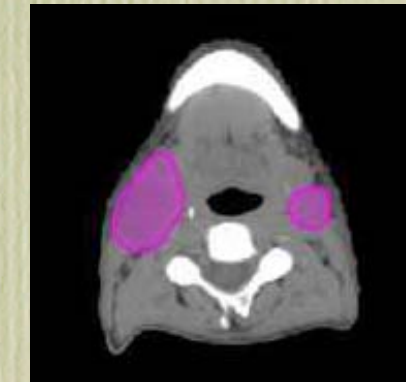
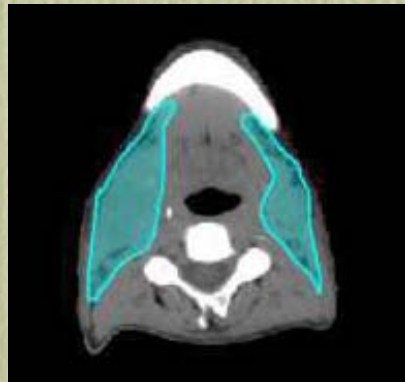
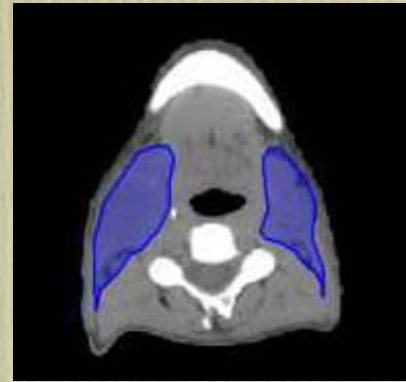
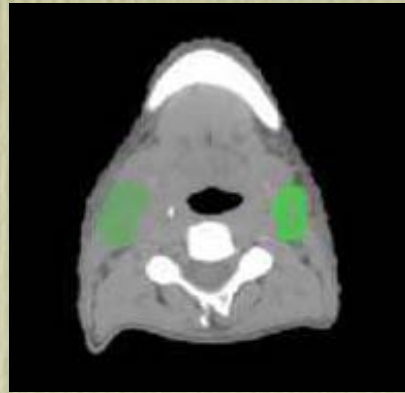
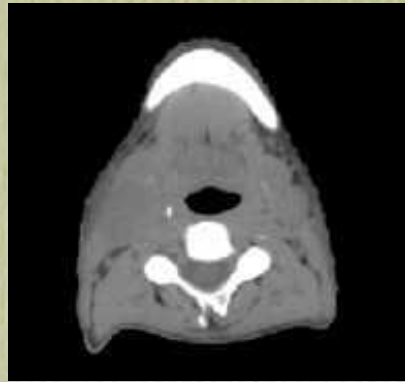
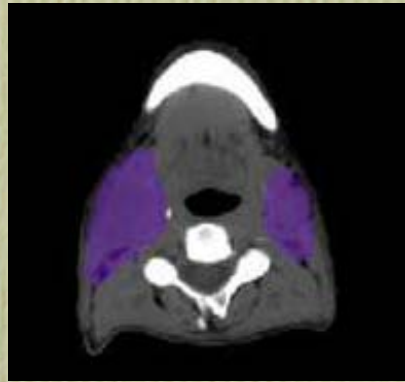
*Abruzzo,
2013*

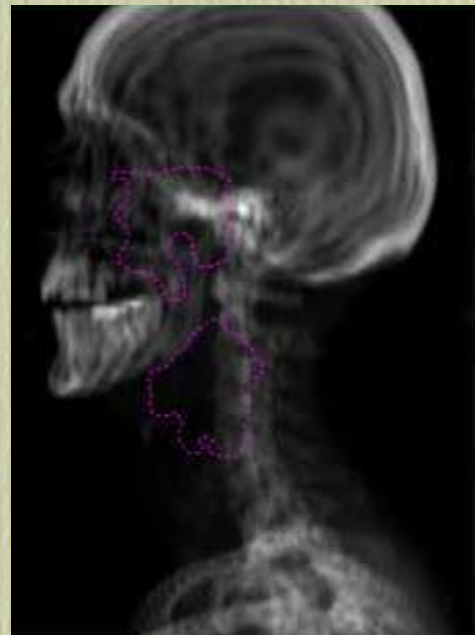
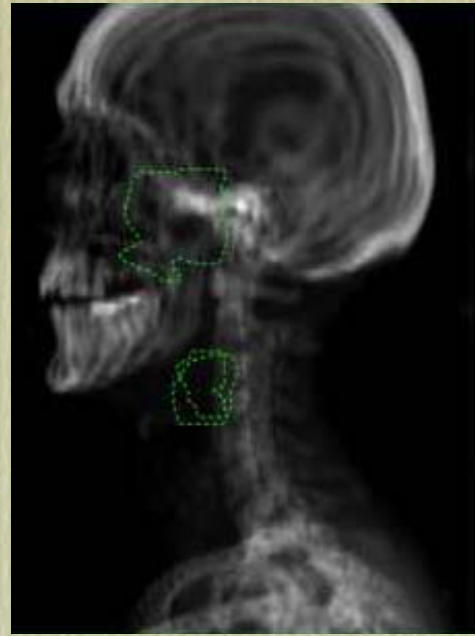
CASO 1

- D. A, 17 anni
- Carcinoma squamoso poco differenziato
invasivo della rinofaringe
- cT4 cN2 M0

CTV HD











ANALISI QUANTITATIVA

CTV HD

VOLUME cc
MEDIA: 155,88
104,9
96,4
60,7
164,4
285,4
263,3
98,9
266
116,8
47,9
98,4
342,5
190,3
65,6
151,8
236,2

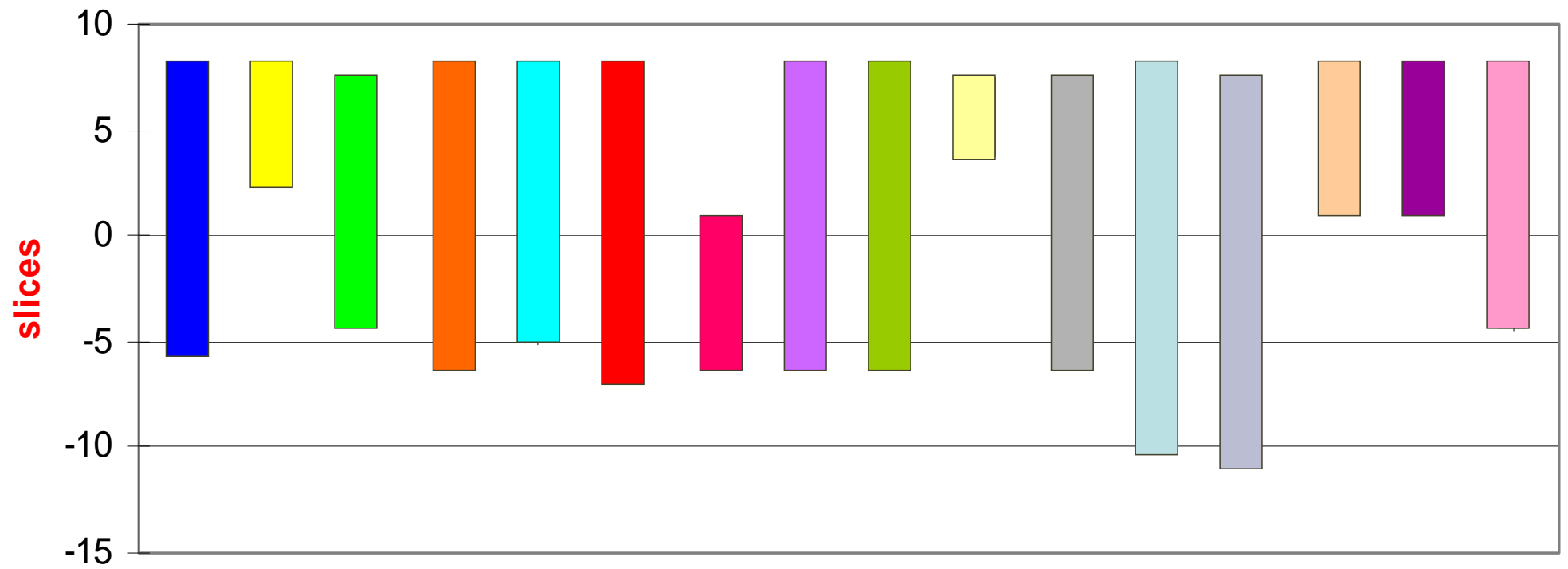
ESTENSIONE LATERO- LATERALE (cm)
MEDIA: 5,91
12,58
7,83
15,29
11,3
12,49
10,82
10,61
12,1
9,5
6,44
10,15
14,54
9,2
8,06
8,78
14,22

ESTENSIONE ANTERO- POSTERIORE (cm)
MEDIA: 8,86
10,82
6,95
6,66
10,49
11,22
10,31
6,03
10,69
7,8
6,72
11,13
9,83
13,12
6,69
7,1
8,47

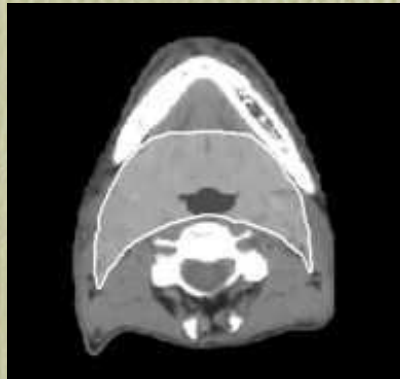
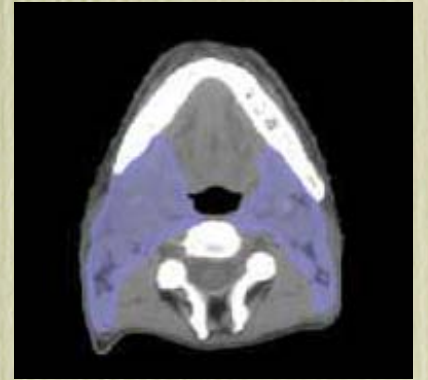
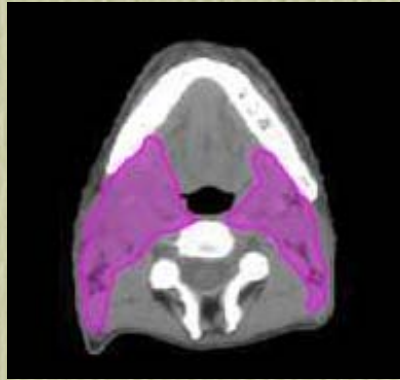
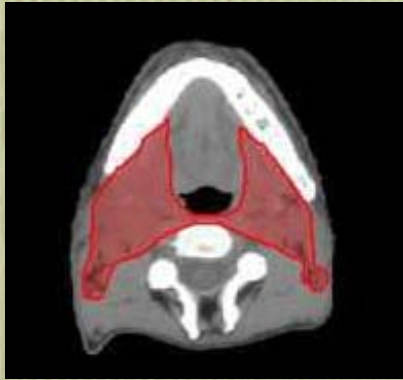
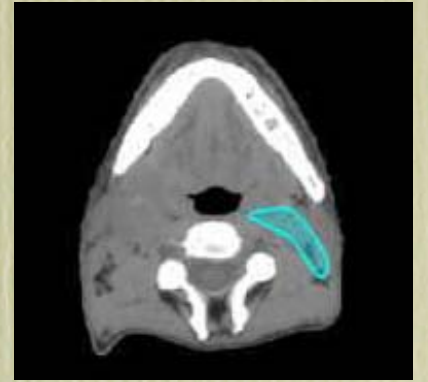
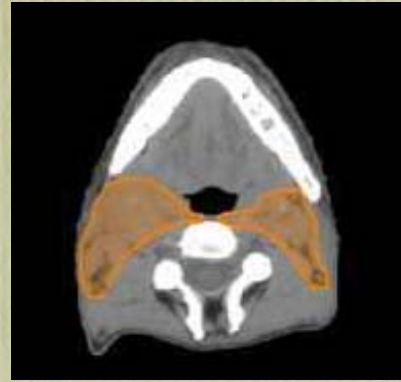
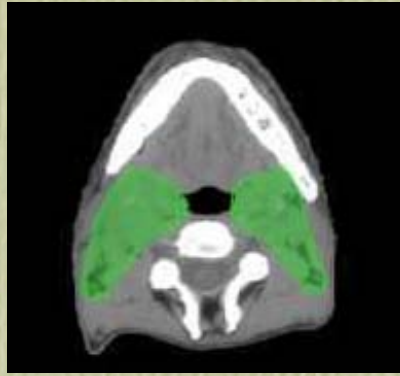
ANALISI QUANTITATIVA

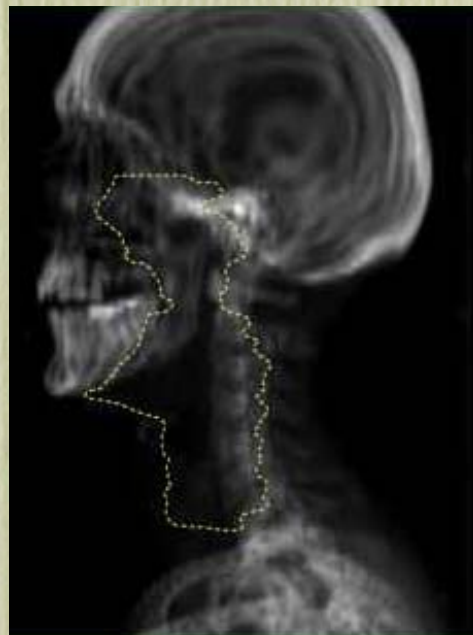
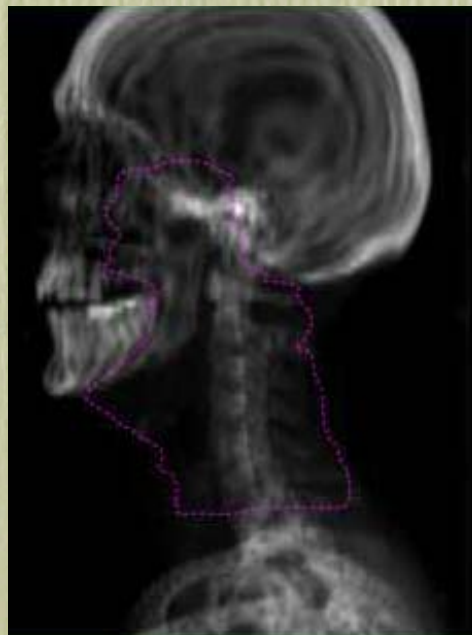
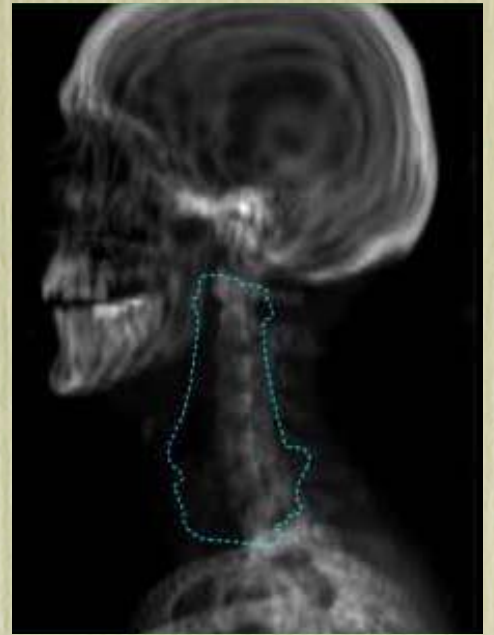
CTV HD

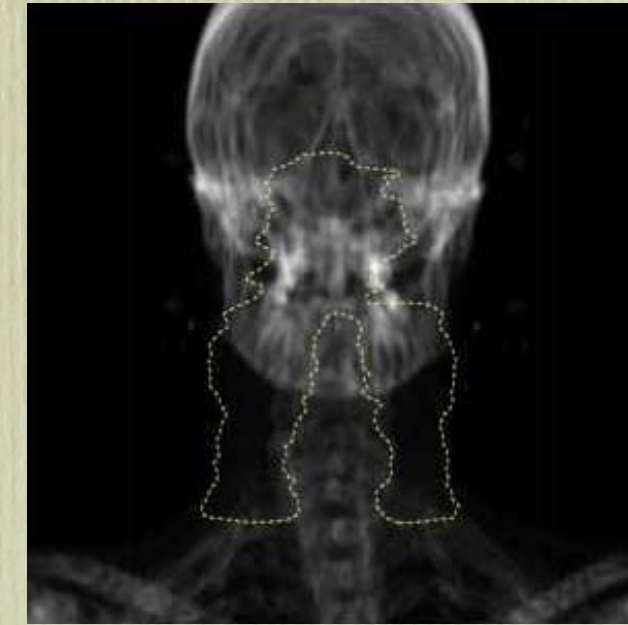
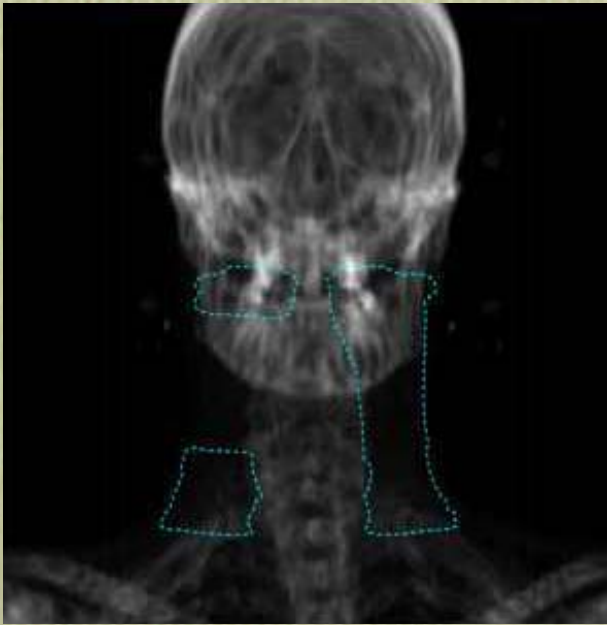
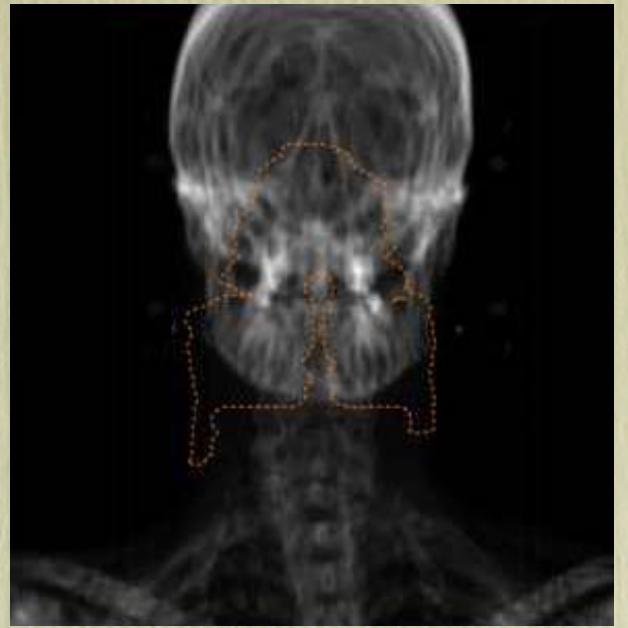
ESTENSIONE CRANIO-CAUDALE

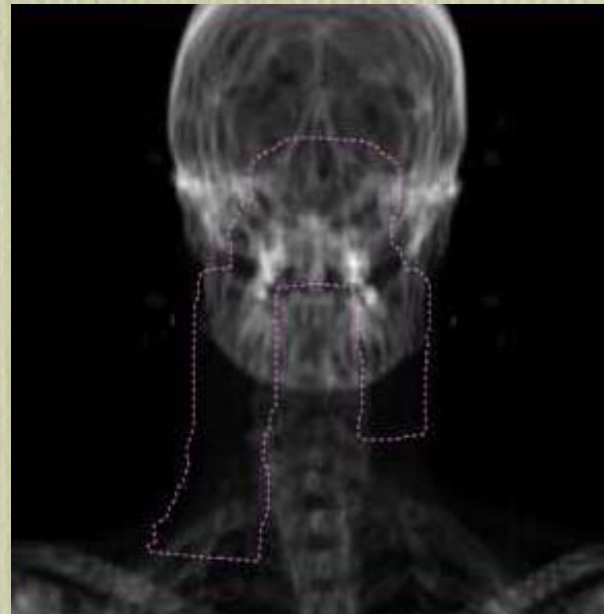


CTV HR









ANALISI QUANTITATIVA

CTV HR

VOLUME cc
MEDIA: 12,56
69,2
408,9
212,3
80,8
378,6
401,6
56,7
441,7
310,1
398,1
377,1
131,8
299,3

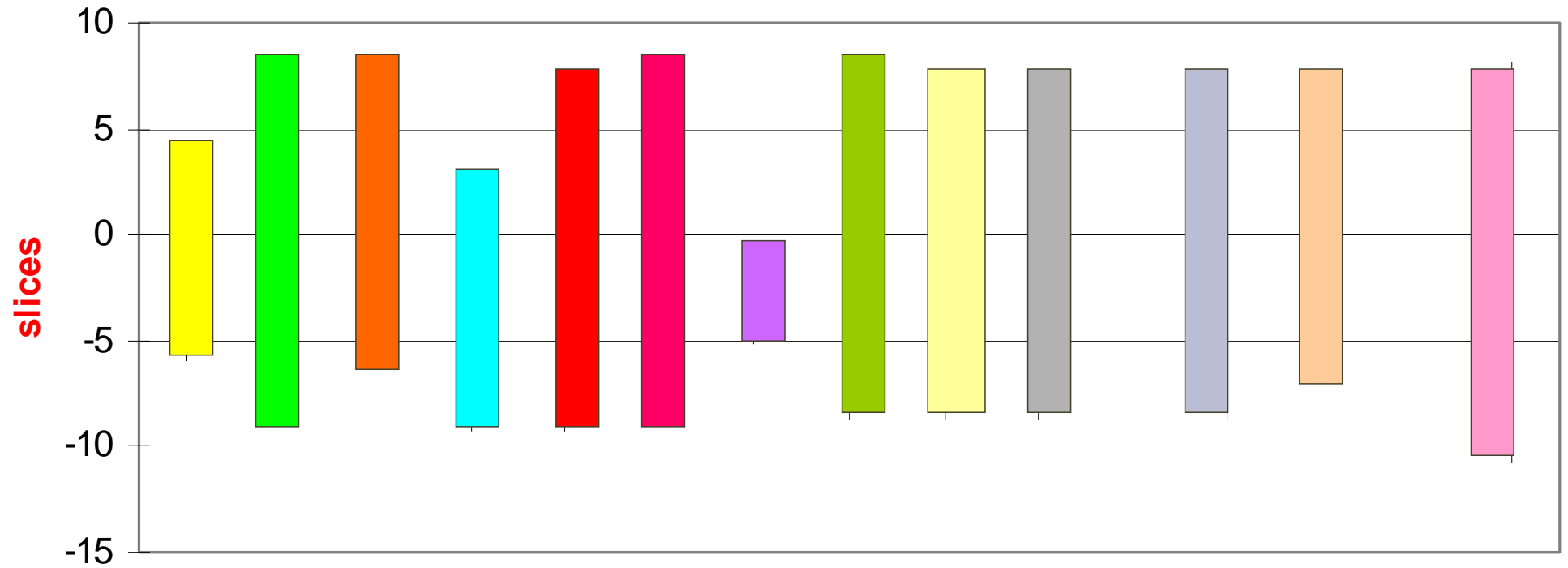
ESTENSIONE LATERO-LATERALE (cm)
MEDIA: 14,29
12,83
14,82
12,15
14,4
16,63
14,31
12,29
13,85
12,03
14,7
15,4
13,01
18,25

ESTENSIONE ANTERO- POSTERIORE (cm)
MEDIA: 12,09
6,21
10,8
13,46
11,21
20,73
13,4
12,13
13,13
12,68
13,1
11,14
10,2
10,37

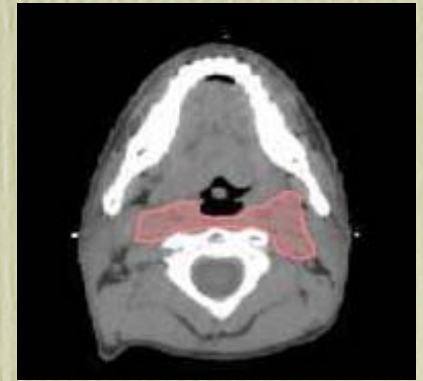
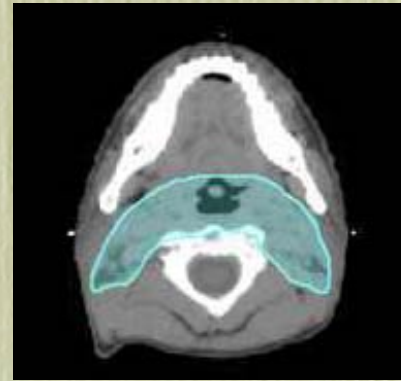
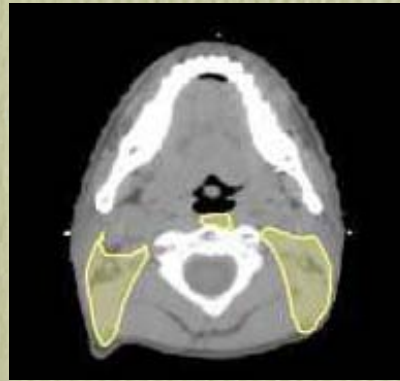
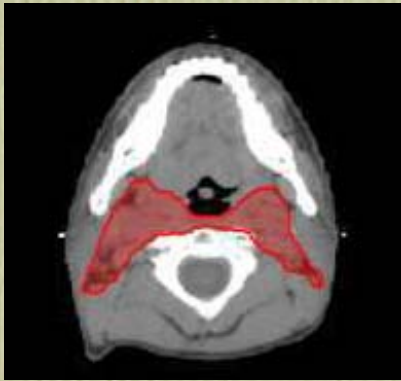
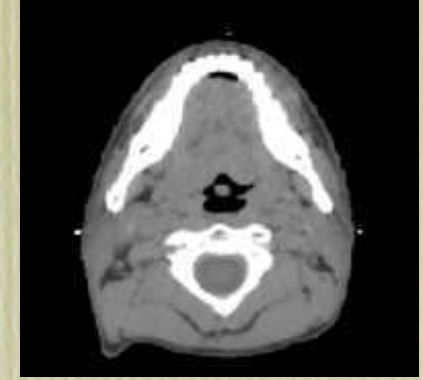
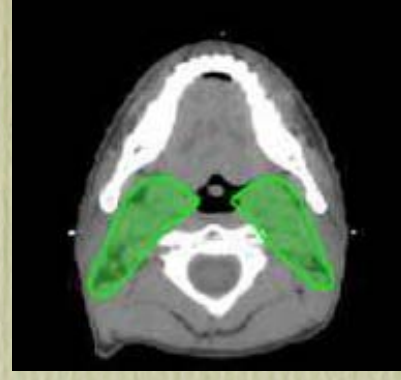
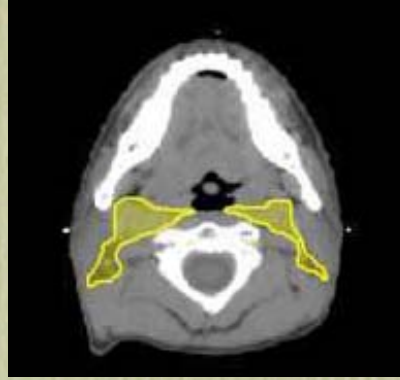
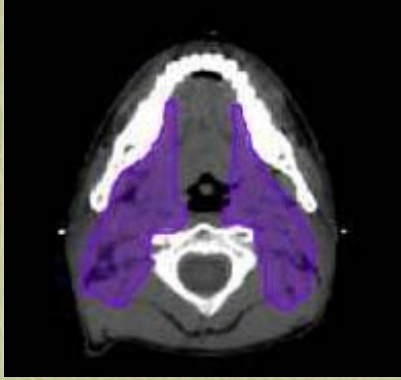
ANALISI QUANTITATIVA

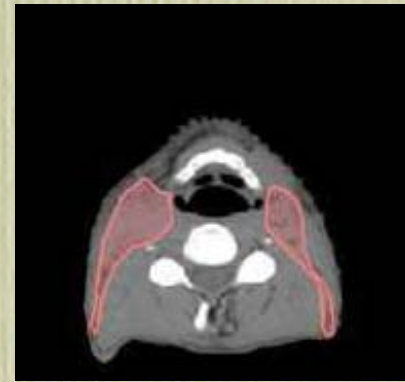
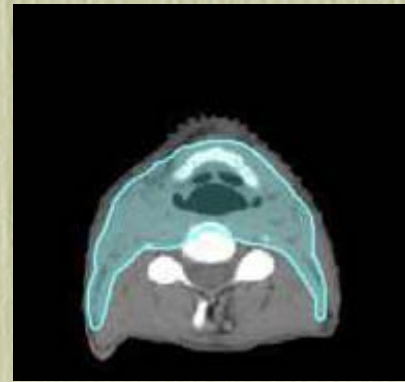
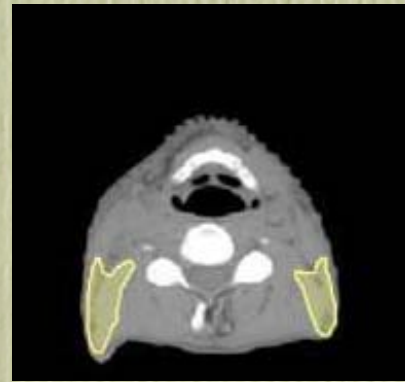
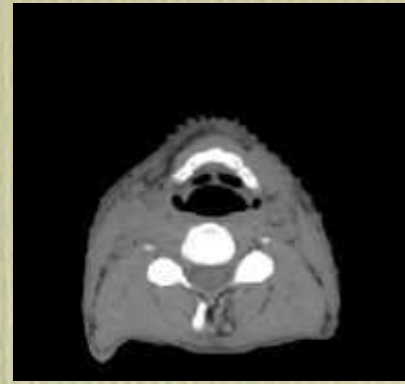
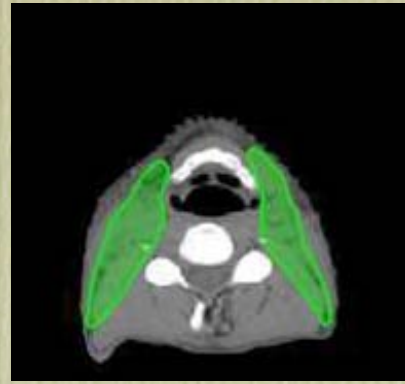
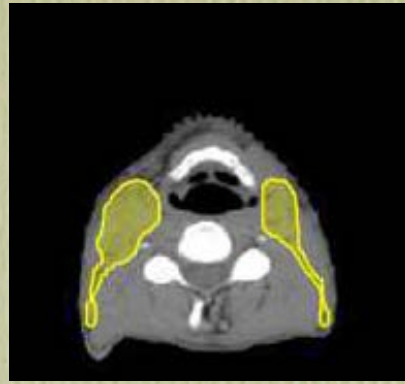
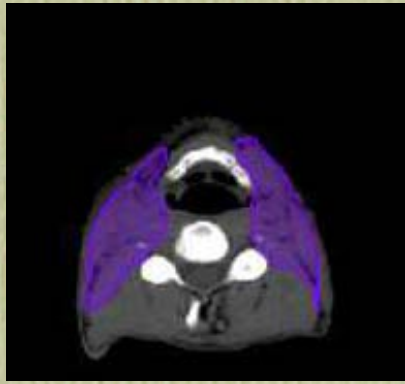
CTV HR

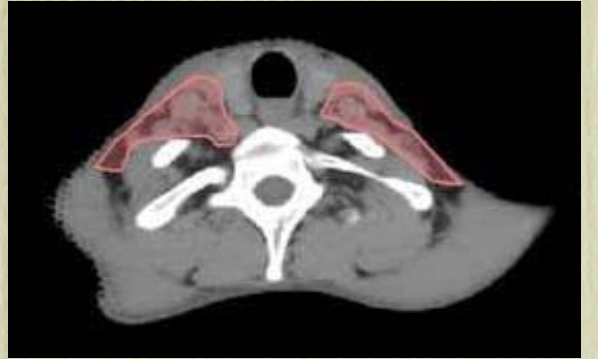
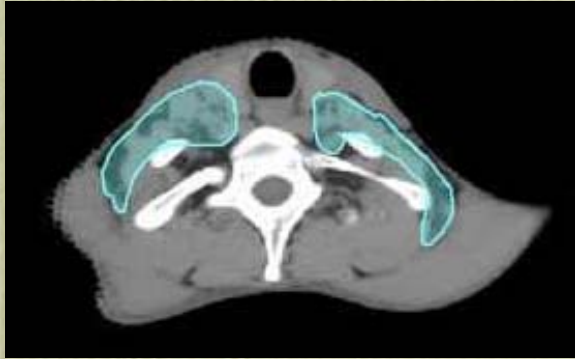
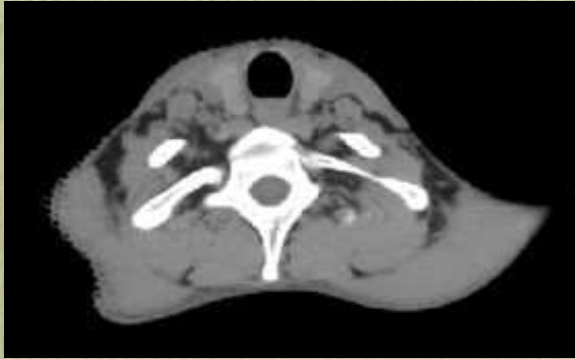
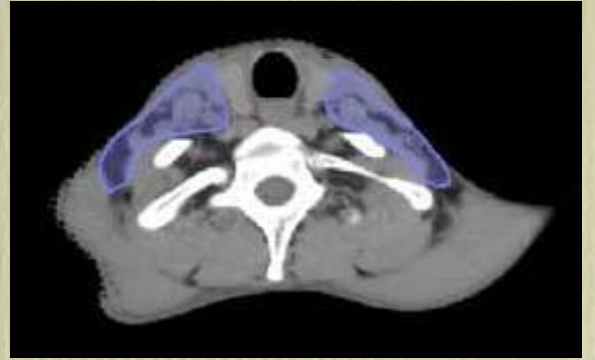
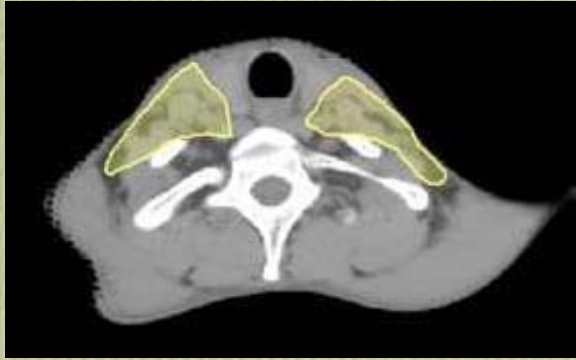
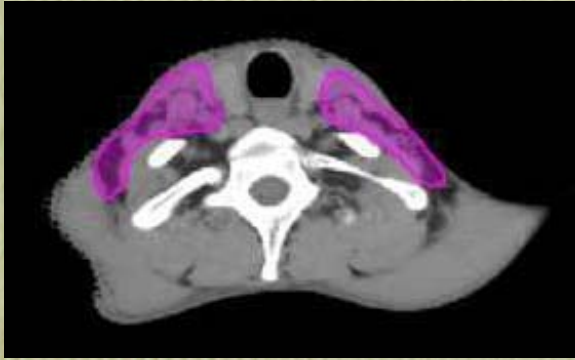
ESTENSIONE CRANIO-CAUDALE

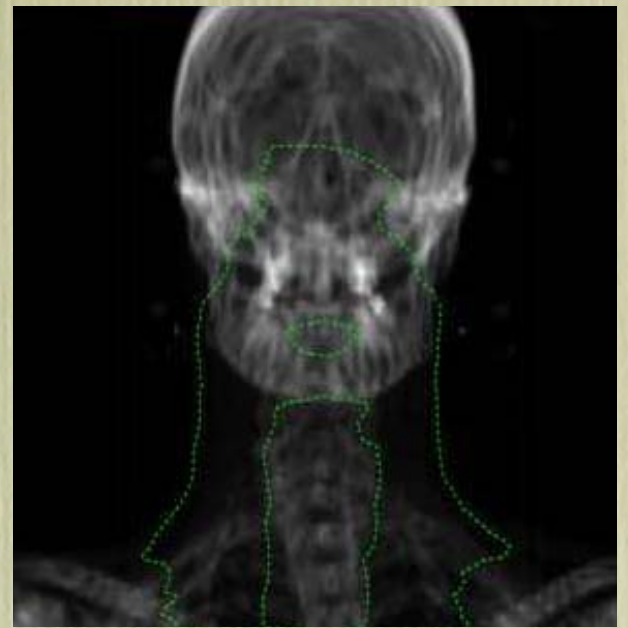
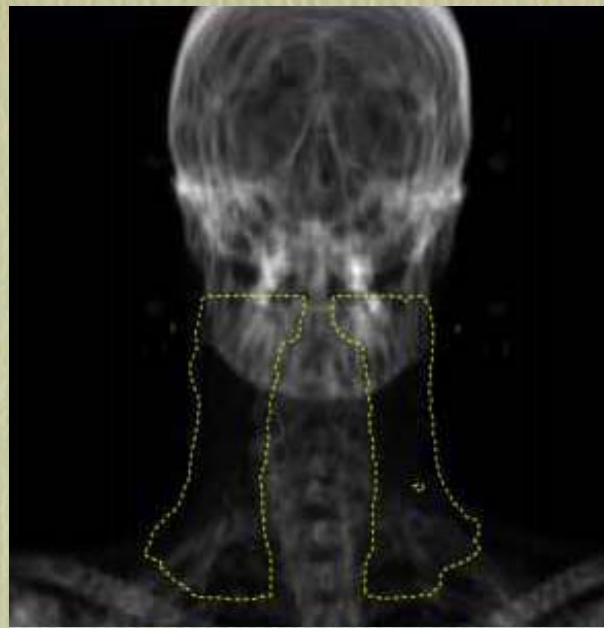


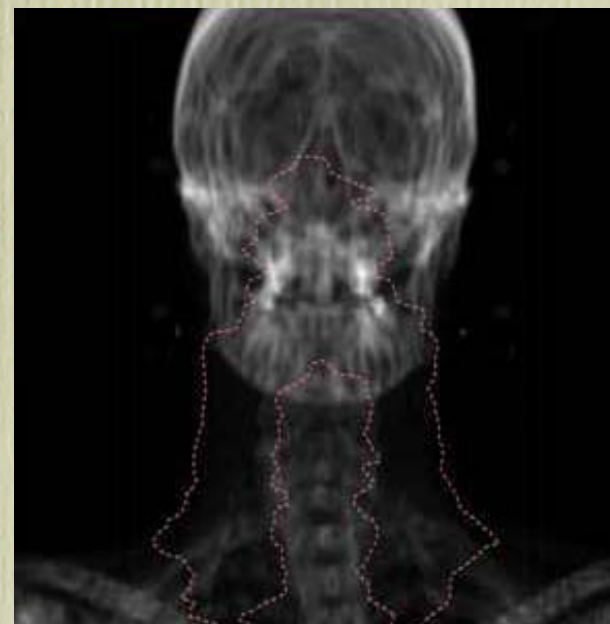
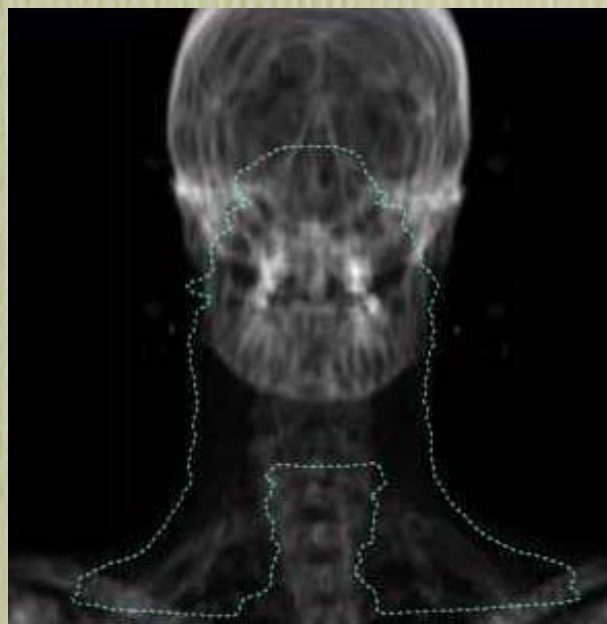
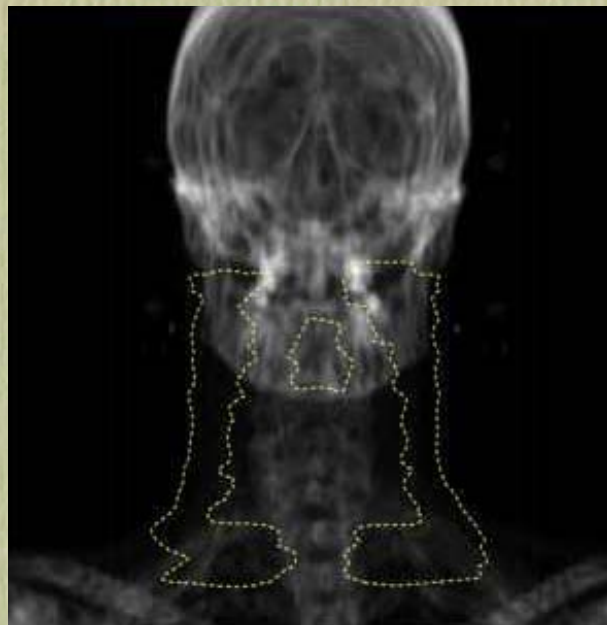
CTV LD

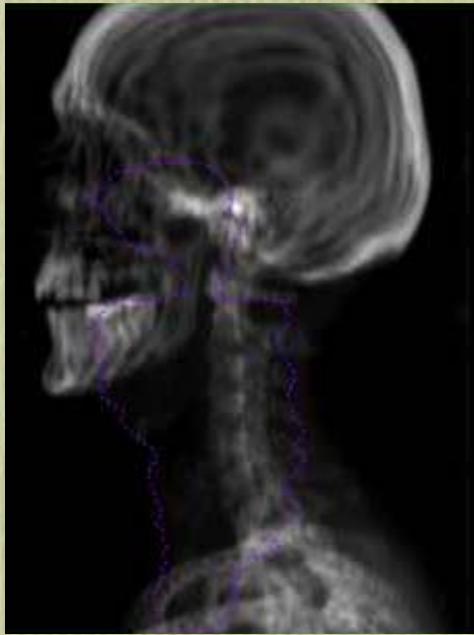


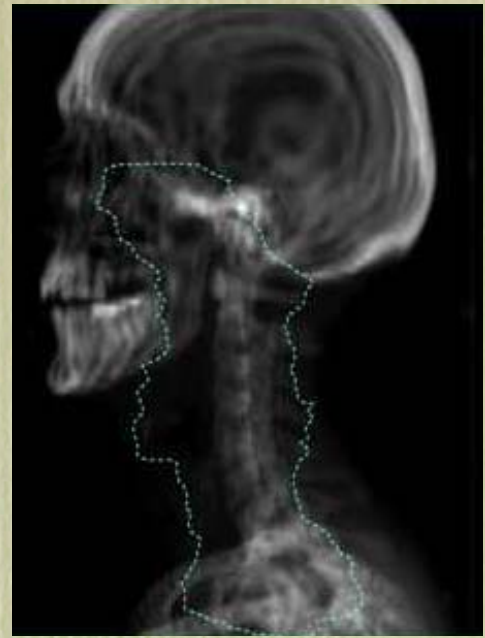












ANALISI QUANTITATIVA

CTV LR

VOLUME cc
MEDIA: 241,61
68,1
156
508,8
62,8
34,7
470,8
64,2
108,2
70,5
171,5
67,2
597,7
119,6
262,2
497,3
339,1

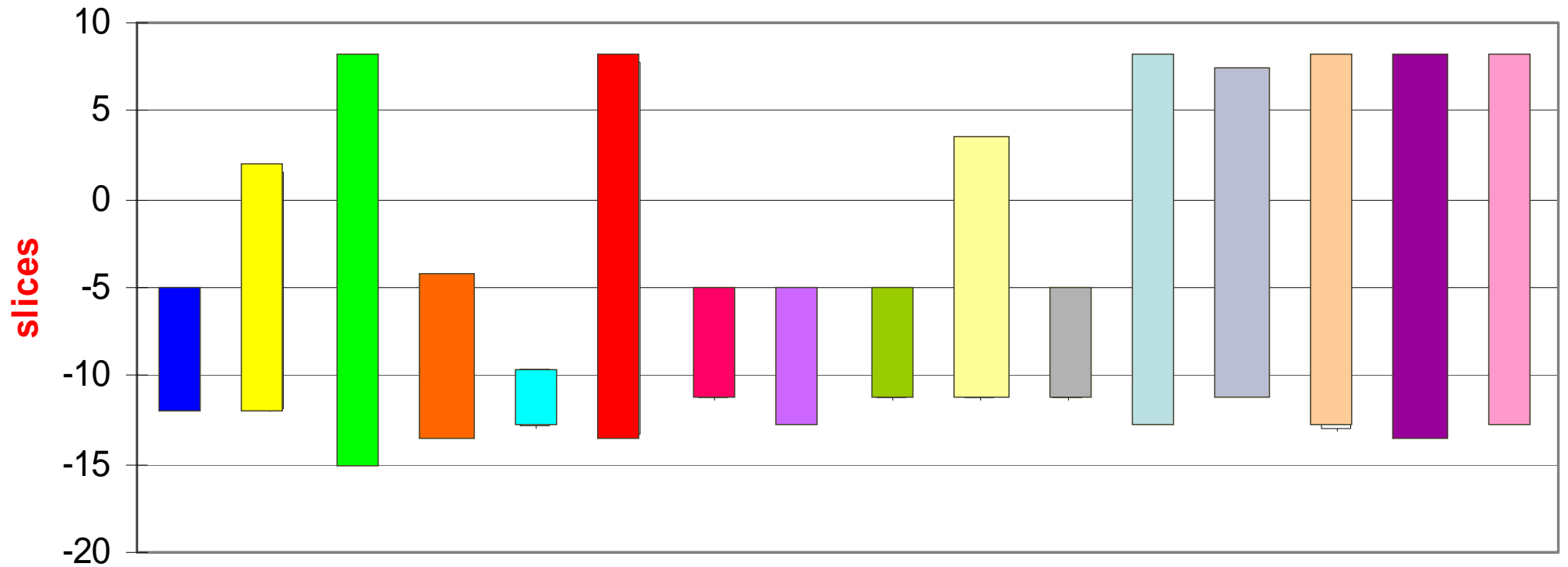
ESTENSIONE LATERO-LATERALE (cm)
MEDIA: 16,58
7,74
15,98
17,56
17,56
15,31
17,54
16,41
15,8
17,16
18,75
17,25
24,49
13,14
17,34
16,45
15,74

ESTENSIONE ANTERO-POSTERIORE (cm)
MEDIA: 10,24
15,3
10,17
11,5
8,77
4,94
11,25
8,1
8,59
8,45
8,32
11,1
11,92
9,21
14,38
11,54
10,37

ANALISI QUANTITATIVA

CTV LR

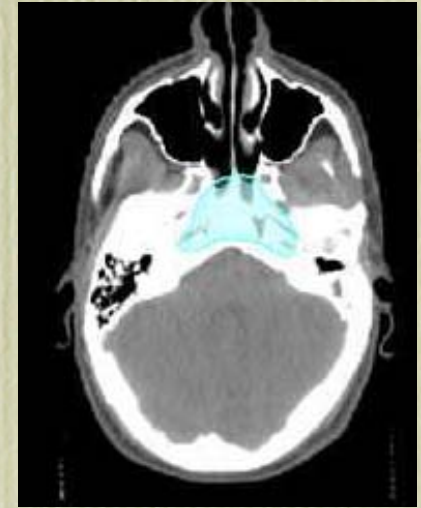
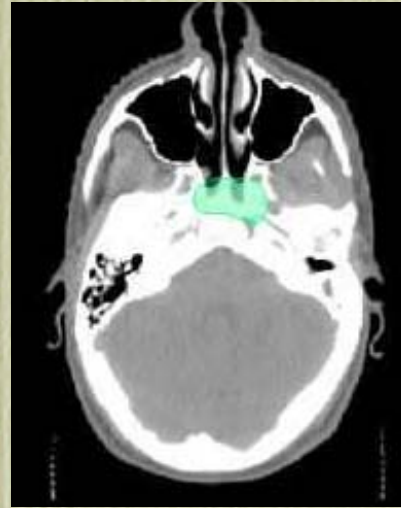
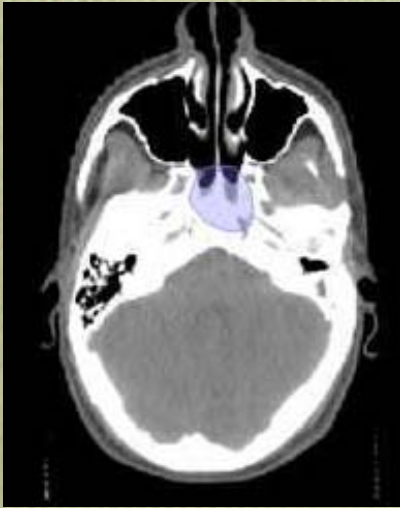
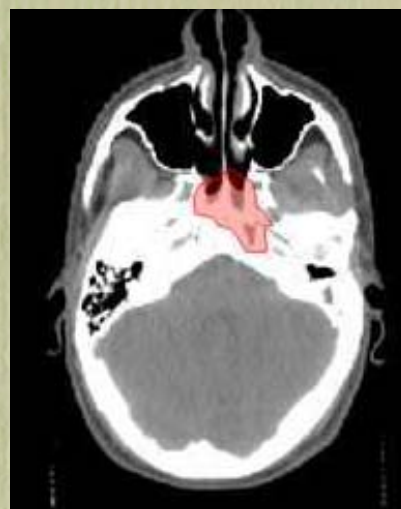
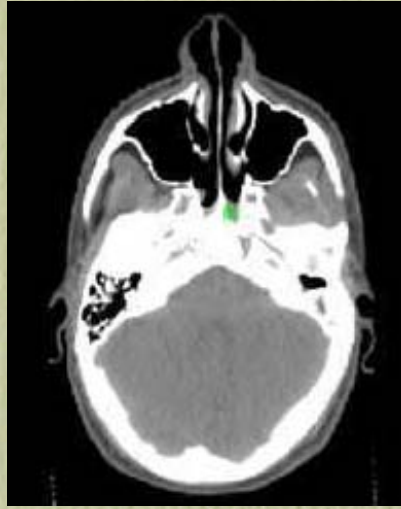
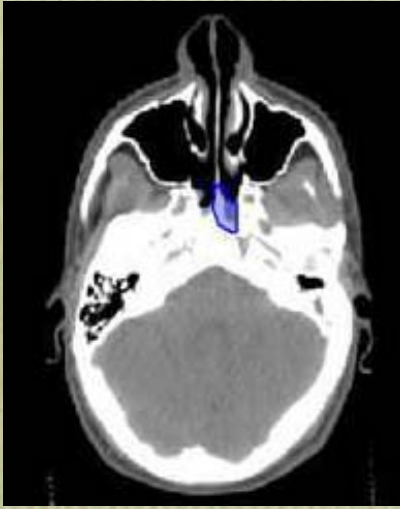
ESTENSIONE CRANIO-CAUDALE

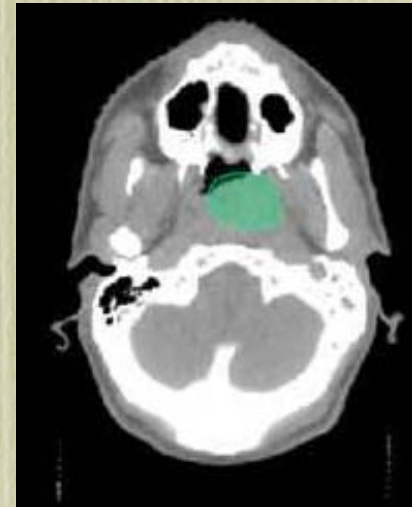
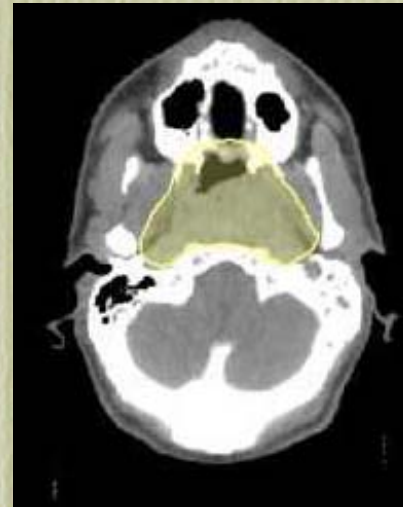
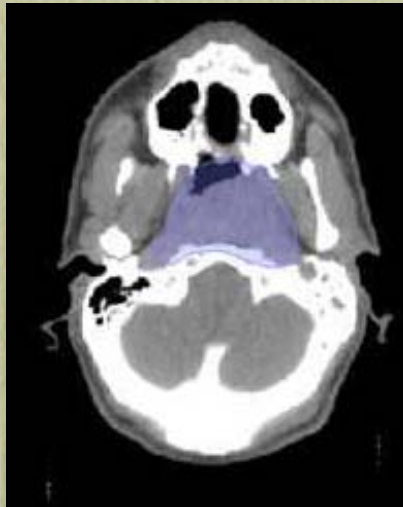
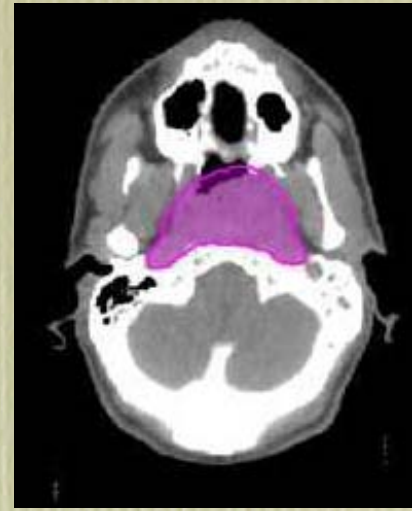
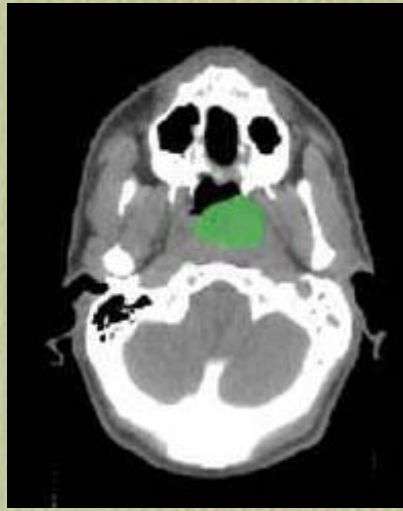
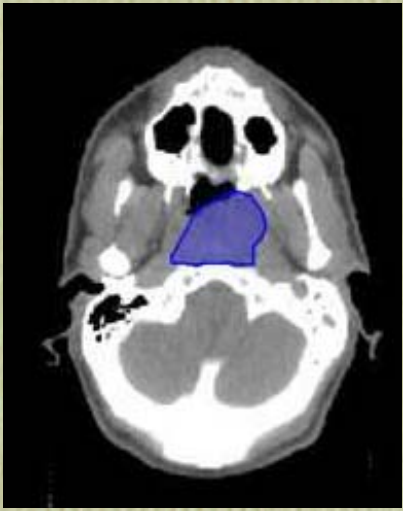


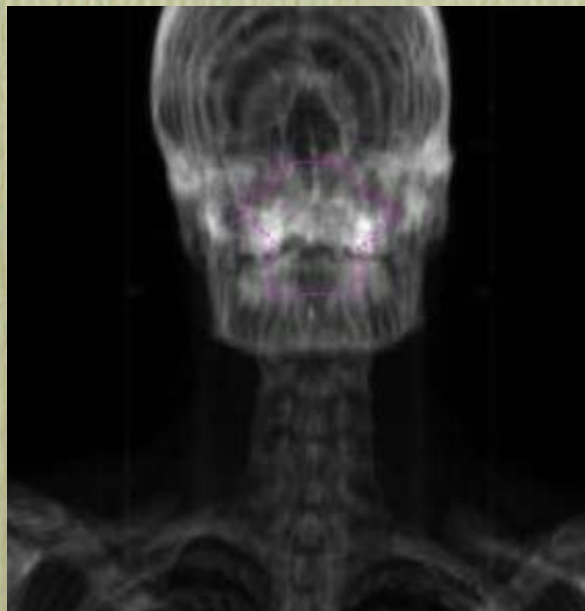
CASO 2

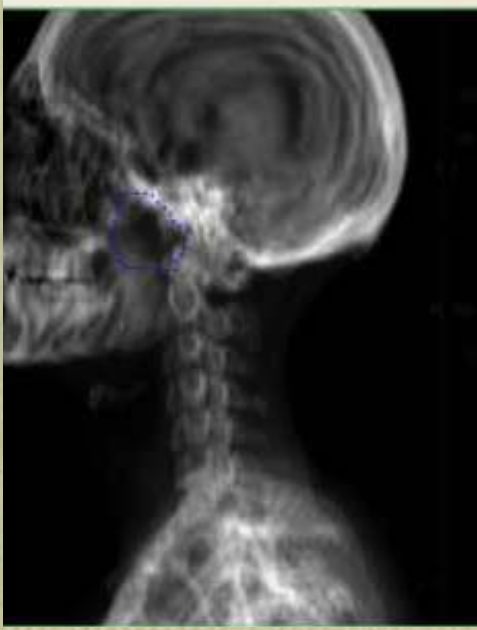
- P. M. 17 anni
- Carcinoma squamoso indifferenziato non cheratinizzante della parete posteriore e laterale sinistra della rinofaringe,
- cT2 cN1 M0

CTV HD









ANALISI QUANTITATIVA

CTV HD

VOLUME cc
MEDIA: 63,64
22,4
10,6
52
80,7
61,1
47,2
59,3
73,1
81,6
62,9
123,6
18,6
30,8
49,5
180,6

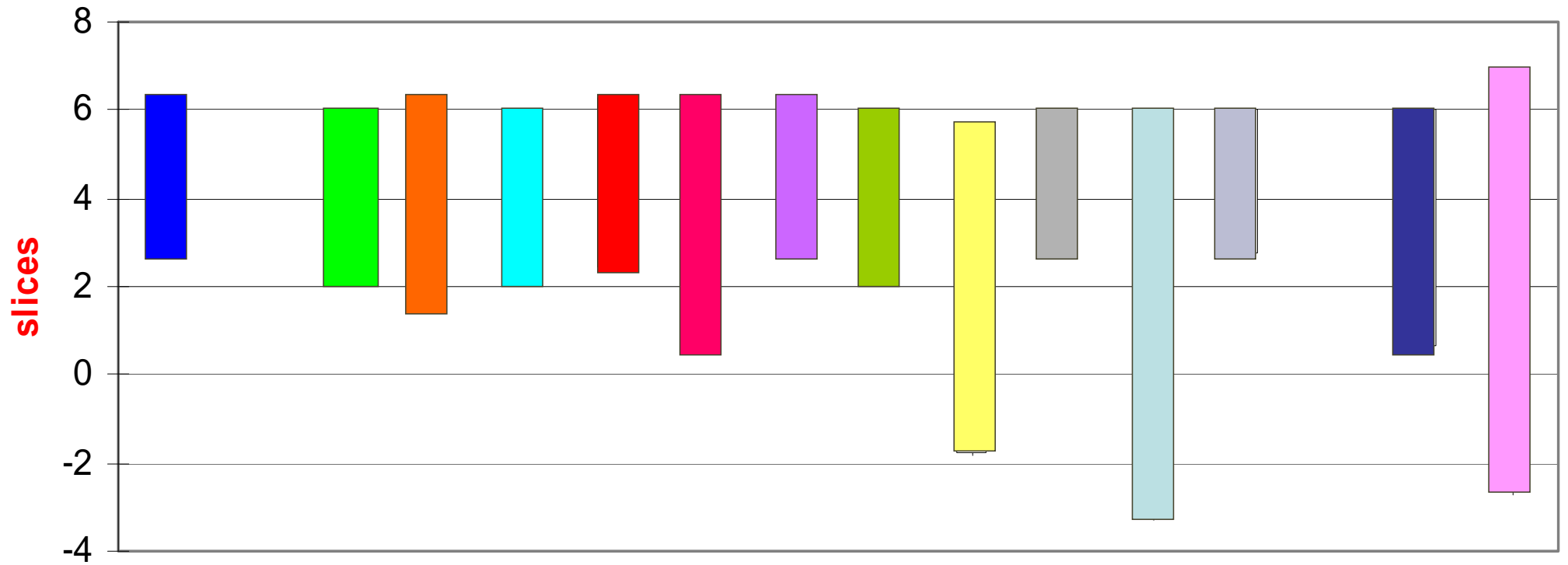
ESTENSIONE LATERO-LATERALE (cm)
MEDIA: 7,03
6,11
4,04
6,38
8,16
8,17
7,42
7,17
7,68
8,23
7,94
8,21
4,92
7,38
9,13

ESTENSIONE ANTERO-POSTERIORE (cm)
MEDIA: 5,28
4,52
2,96
5,41
5,47
5,42
4,44
6,47
6,75
7,39
5,79
6,6
3,02
5,47
6,87

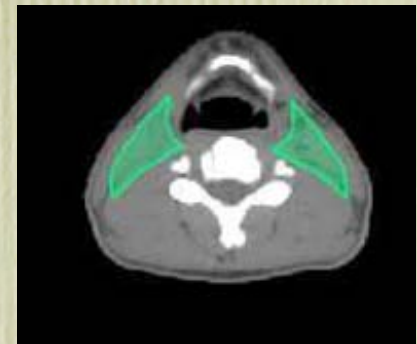
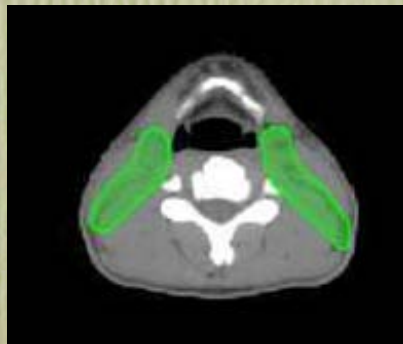
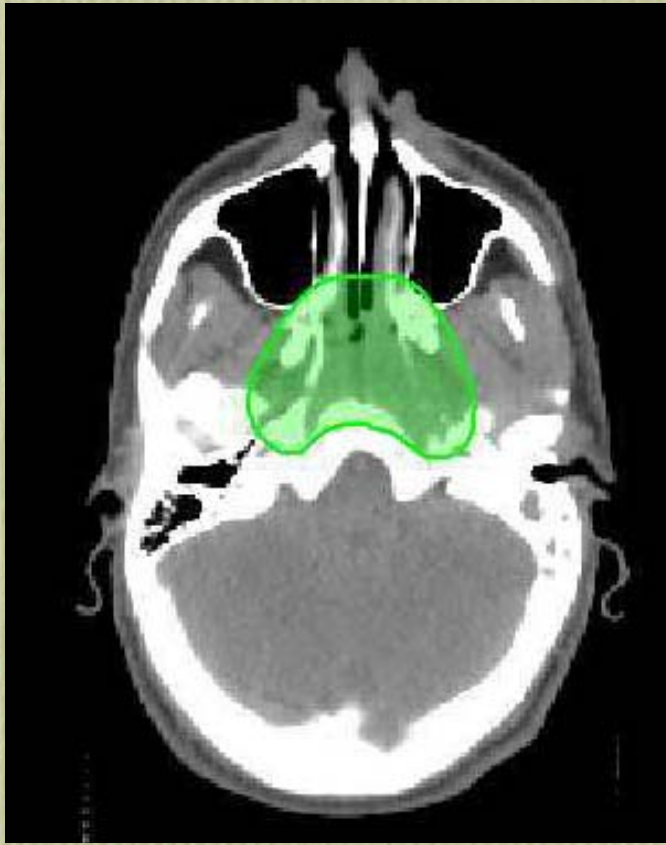
ANALISI QUANTITATIVA

CTV HD

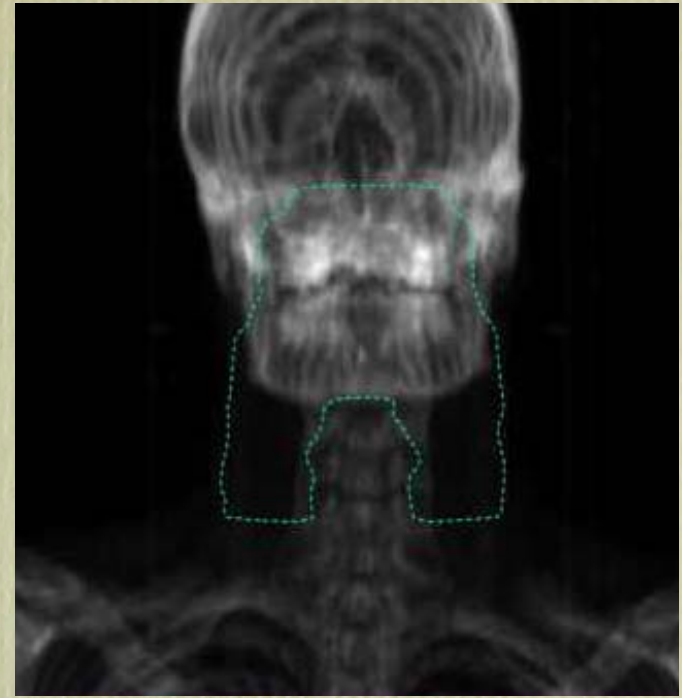
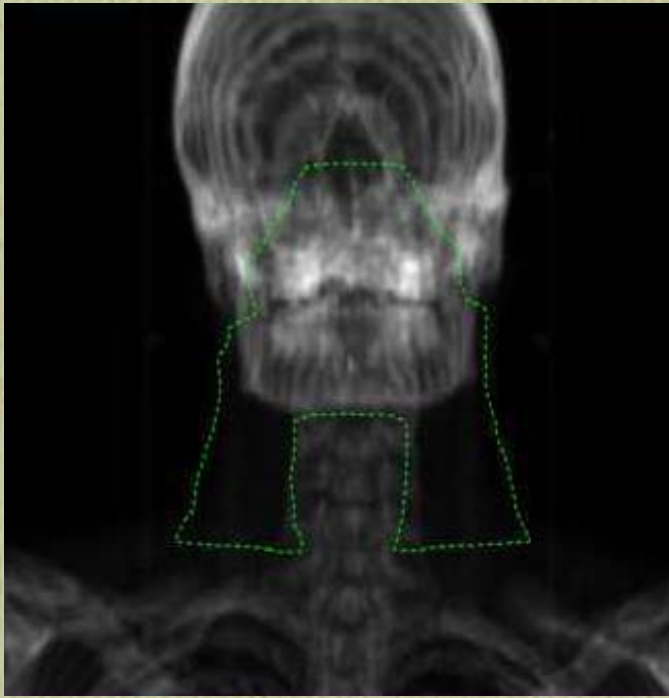
ESTENSIONE CRANIO-CAUDALE

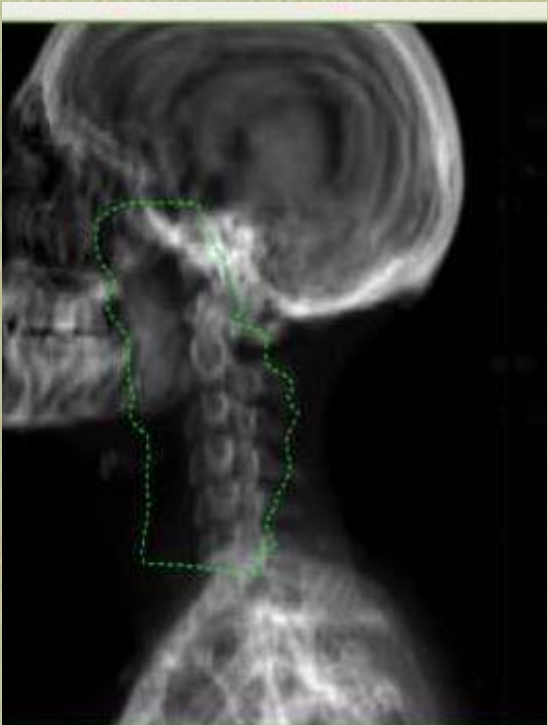


CTV HR









ANALISI QUANTITATIVA

CTV HR

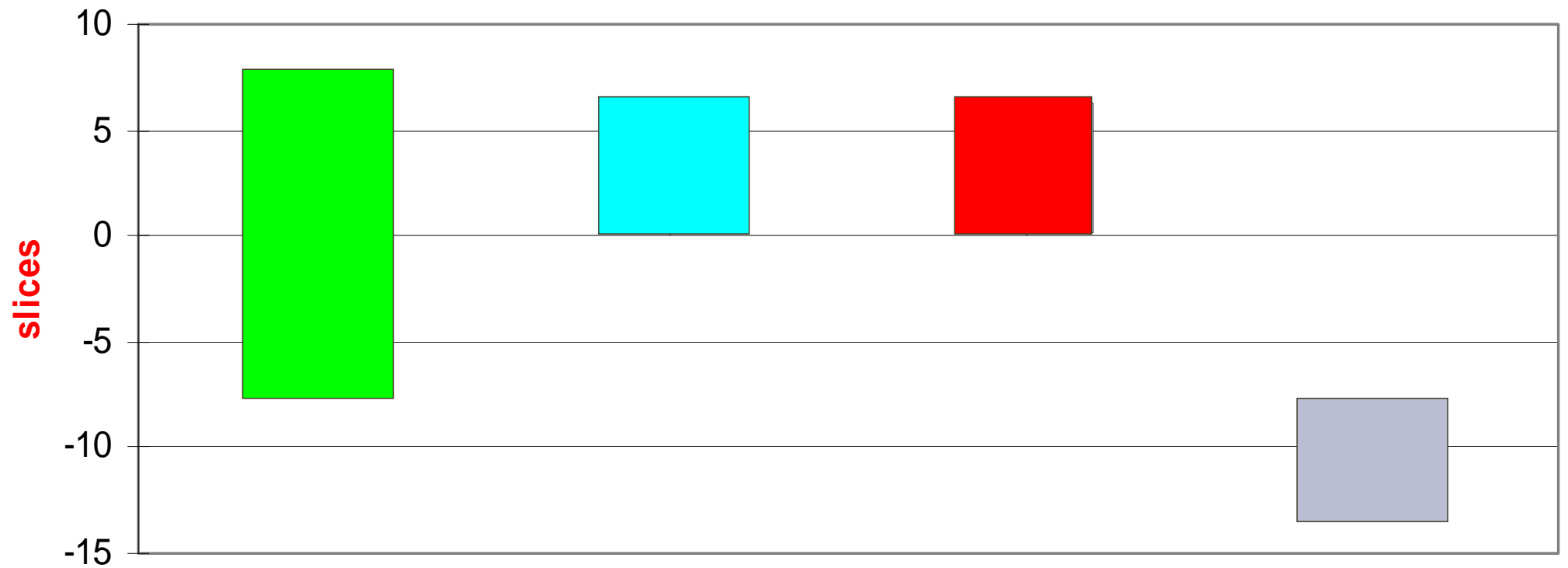
VOLUME cc
MEDIA: 111,62
353,1
80,7
75,7
24,3

ESTENSIONE LATERO-LATERALE (cm)
MEDIA: 10,77
14,83
8,84
8,92
10,65

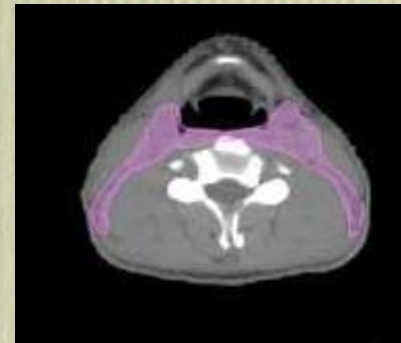
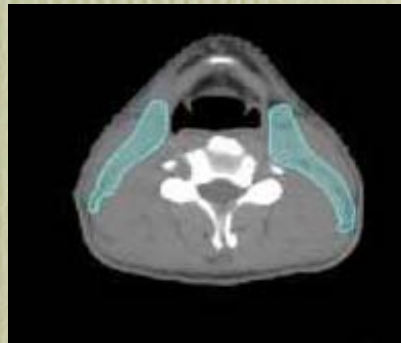
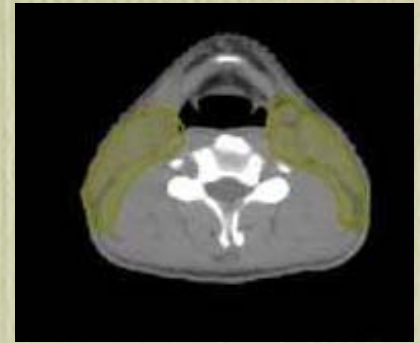
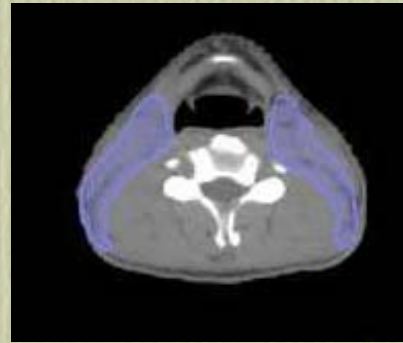
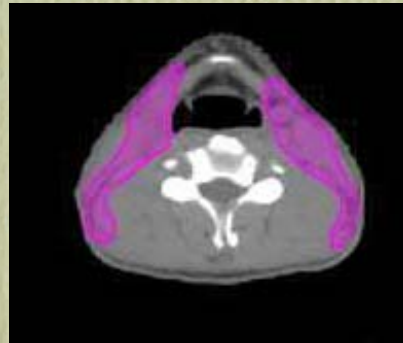
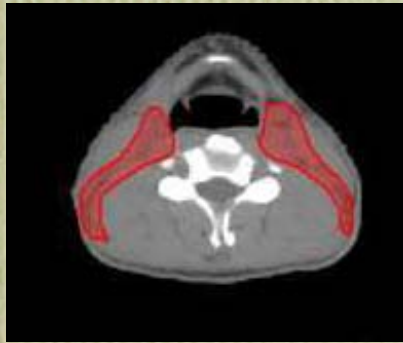
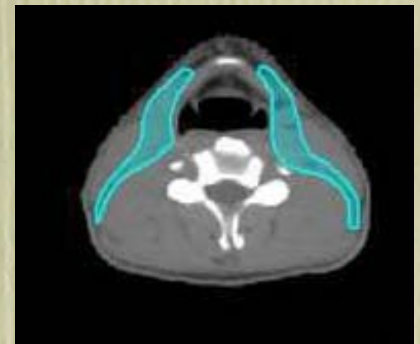
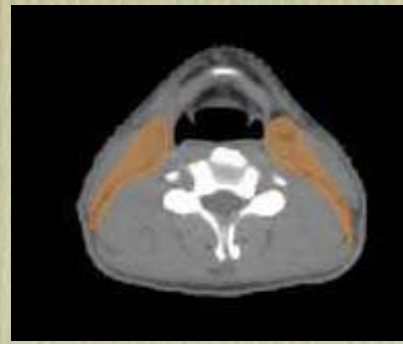
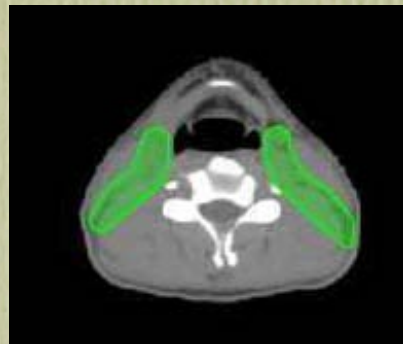
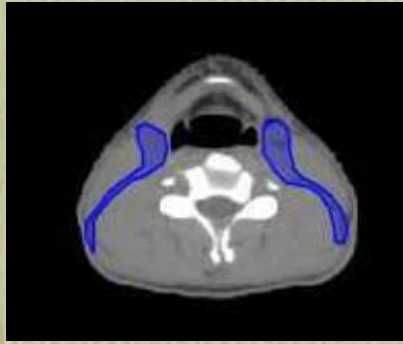
ESTENSIONE ANTERO-POSTERIORE (cm)
MEDIA: 6,14
7,76
5,32
6,28
5,67

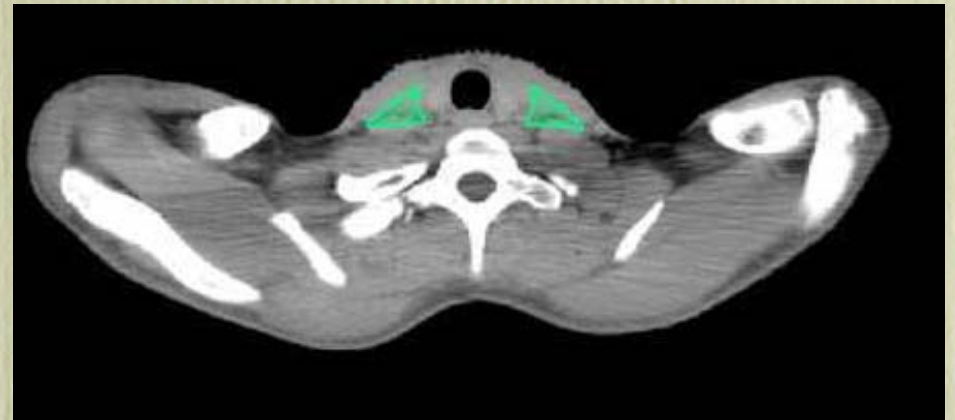
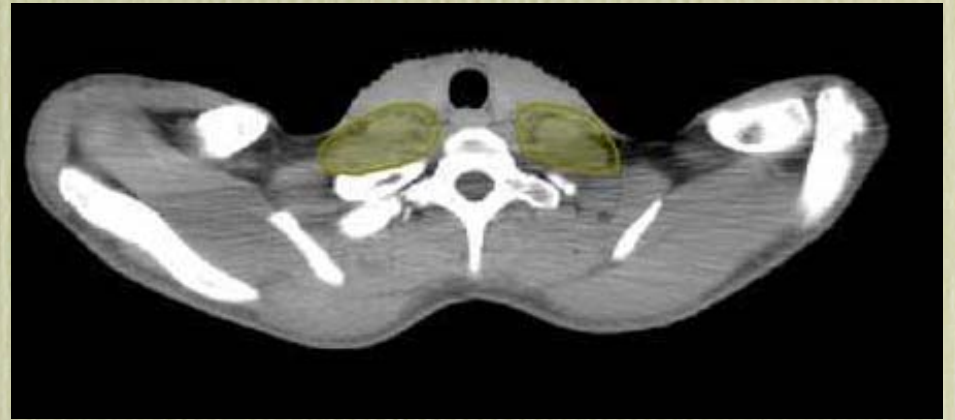
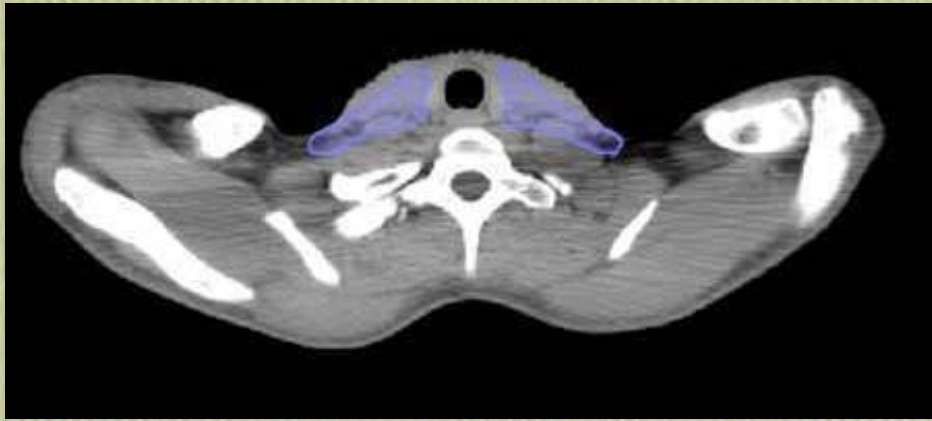
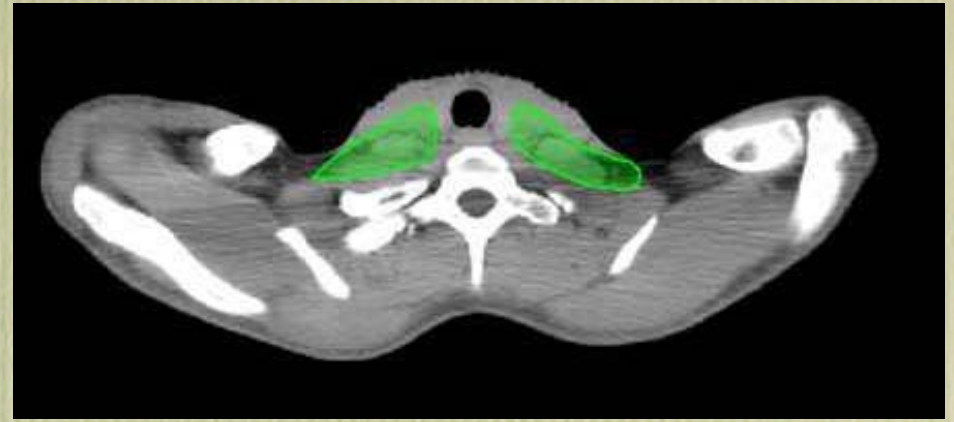
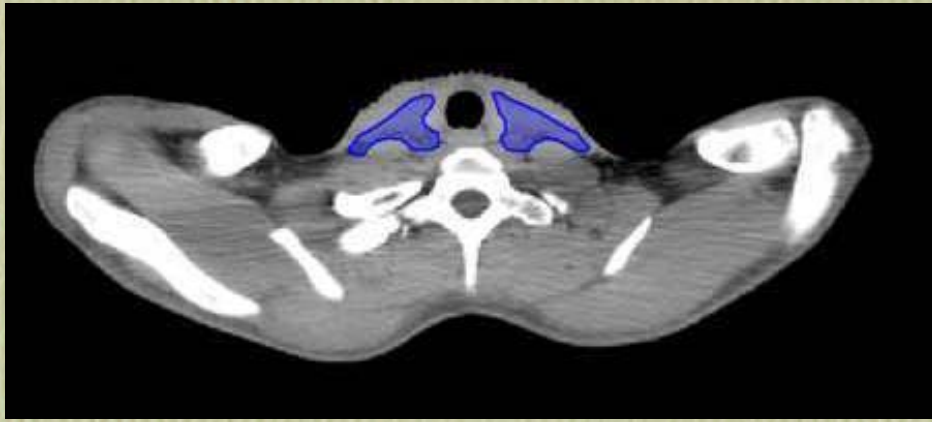
ANALISI QUANTITATIVA CTV HR

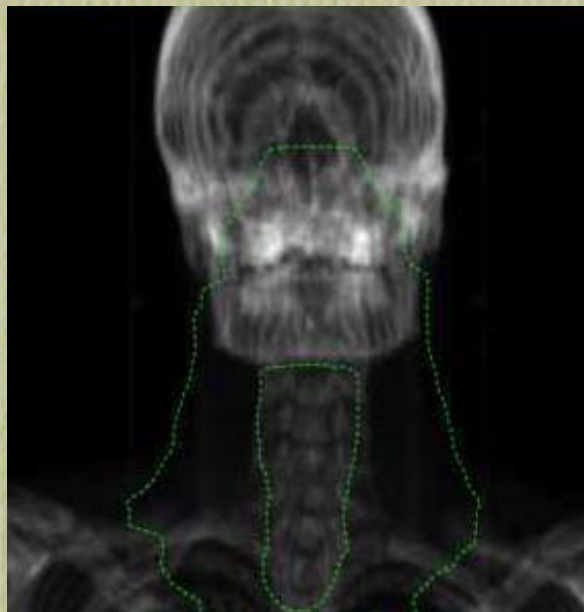
ESTENSIONE CRANIO-CAUDALE

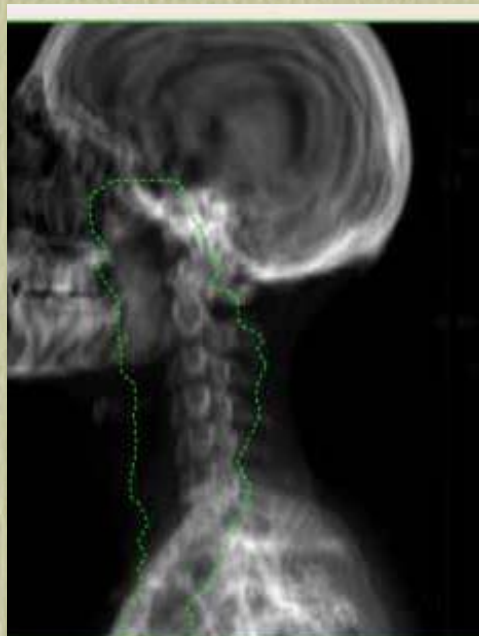


CTV LR









ANALISI QUANTITATIVA

CTV LR

VOLUME cc
MEDIA: 325,81
111
499
212,16
331
349,9
249,9
315,4
494,3
334,3
323,7
431,4
303,3
278,6
355,2

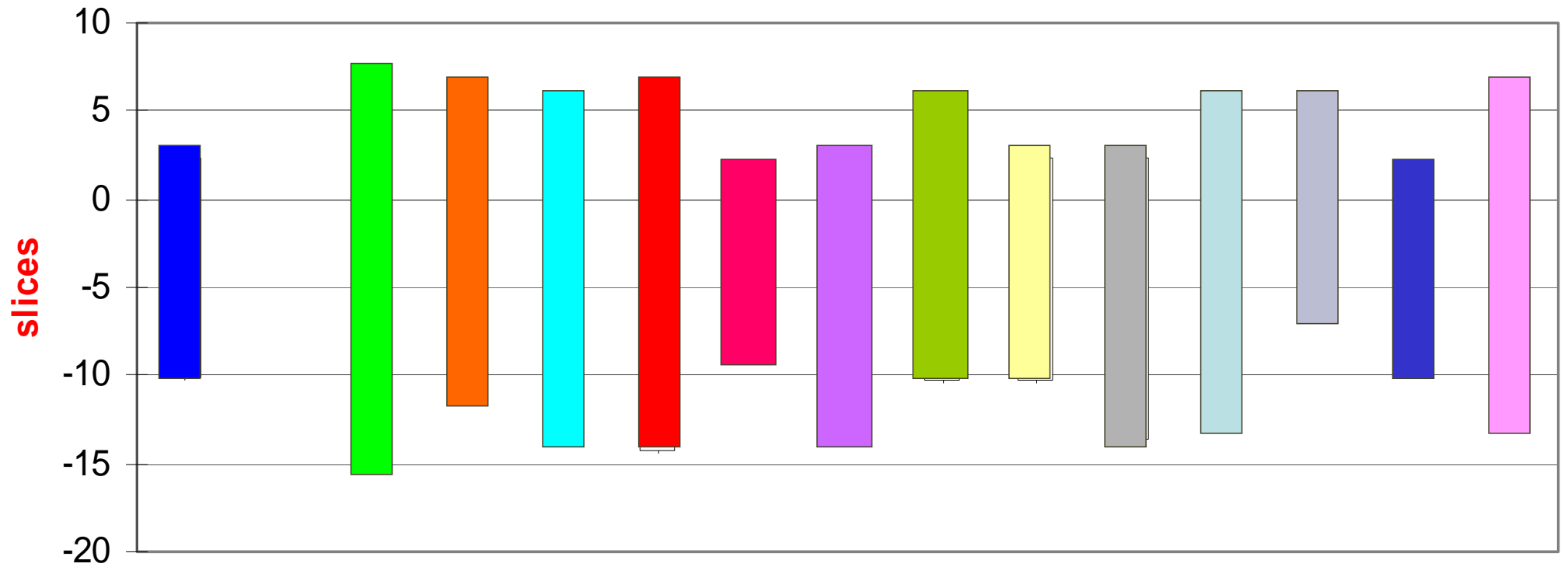
ESTENSIONE LATERO-LATERALE (cm)
MEDIA: 16,10
16,71
16,71
15,08
16,78
15,66
14,4
16,77
15,44
14,66
16,31
22,51
13,3
16,55
17,33

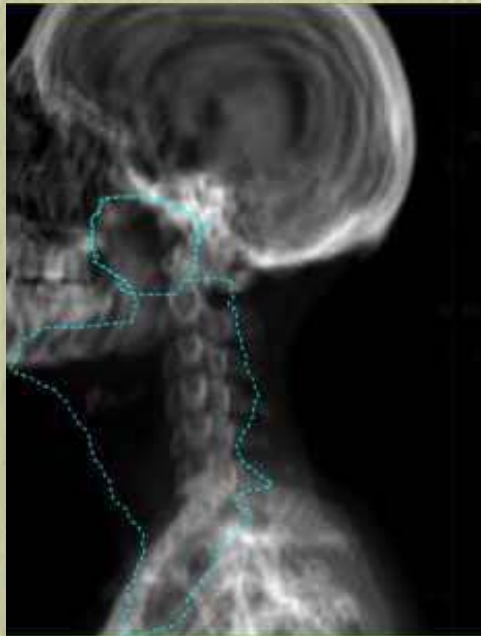
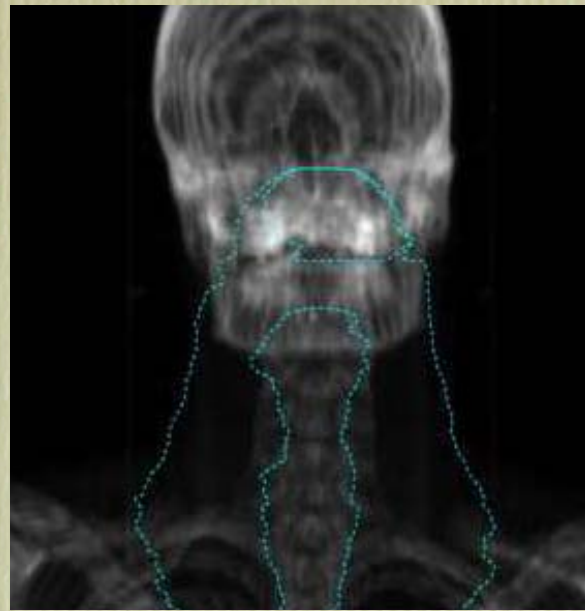
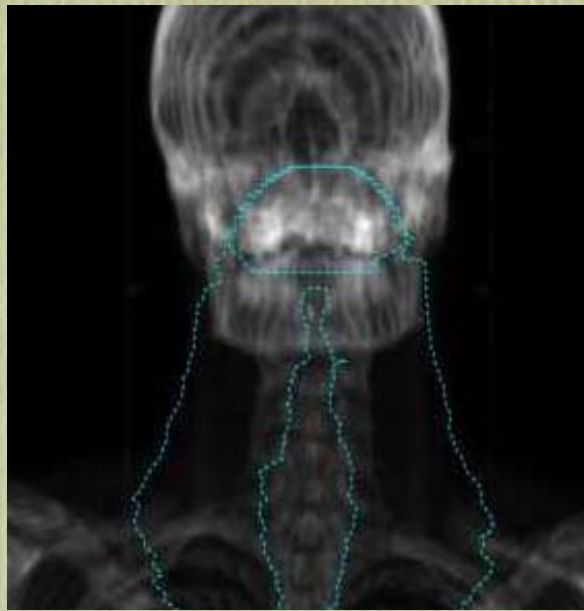
ESTENSIONE ANTERO-POSTERIORE (cm)
MEDIA: 11,50
7,55
7,76
13,37
15,7
9,87
13,03
10,98
12,28
11,55
11,04
13,77
10,61
12,45
11,97

ANALISI QUANTITATIVA

CTV LR

ESTENSIONE CRANIO-CAUDALE





PRIMA

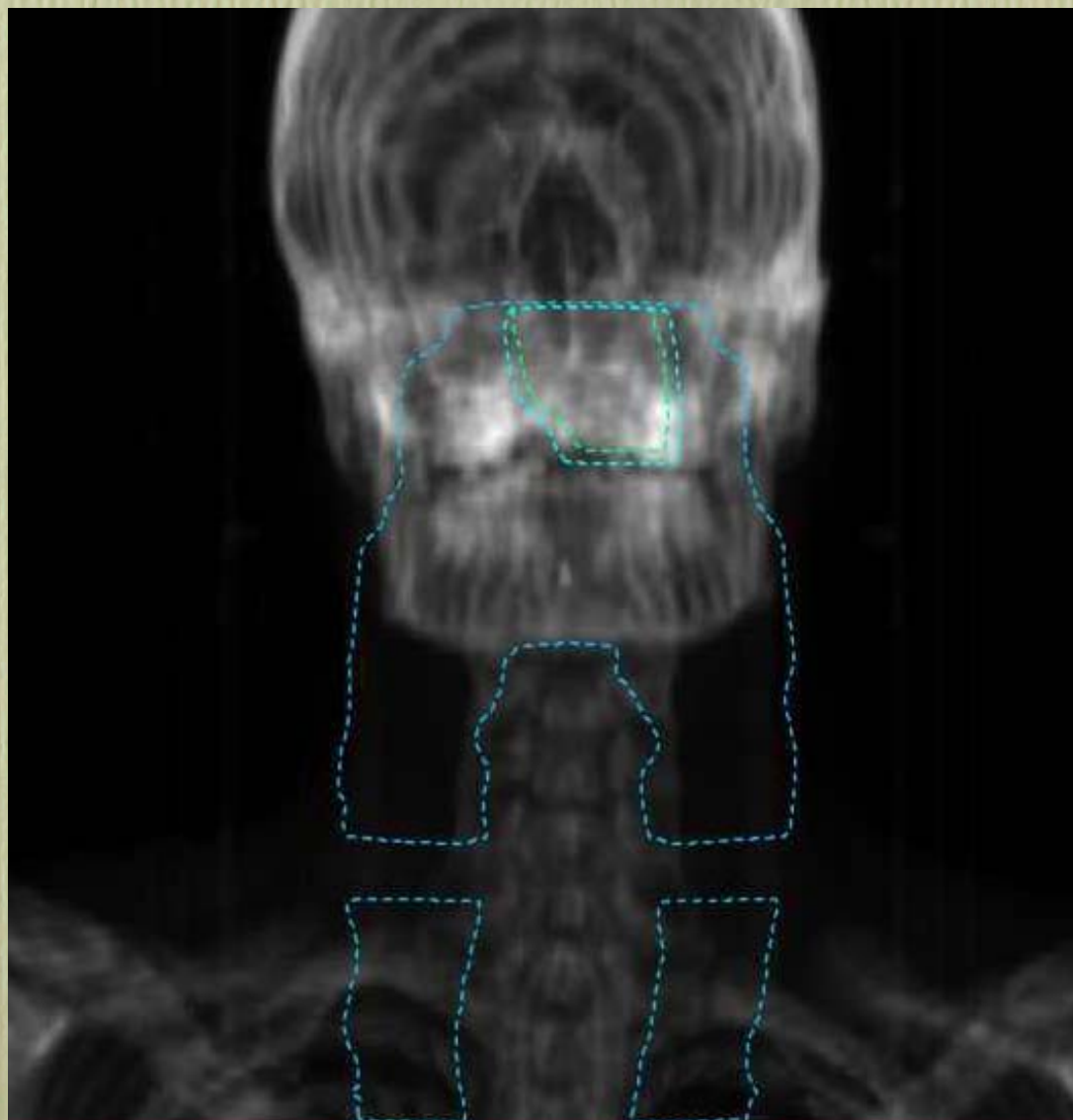
DOPO



PRIMA



DOPO





2019
Abruzzo,

Grazie