12e Post O.N.S. Meeting

IMAGE GUIDED RADIO THERAPY BIJ LONGCARCINOOM

Ted Goossens, MANP
St. Jansgasthuis Weert

RADIOTHERAPIE

Hoog energetische stralen:

- versnelde elektrisch geladen deeltjes (elektronen)
- versterkte lichtdeeltjes (fotonen)
- *binnenkort: protonen*
- gammastralen: uit verval van radioactieve stoffen (iridium-192, Jodium-125)

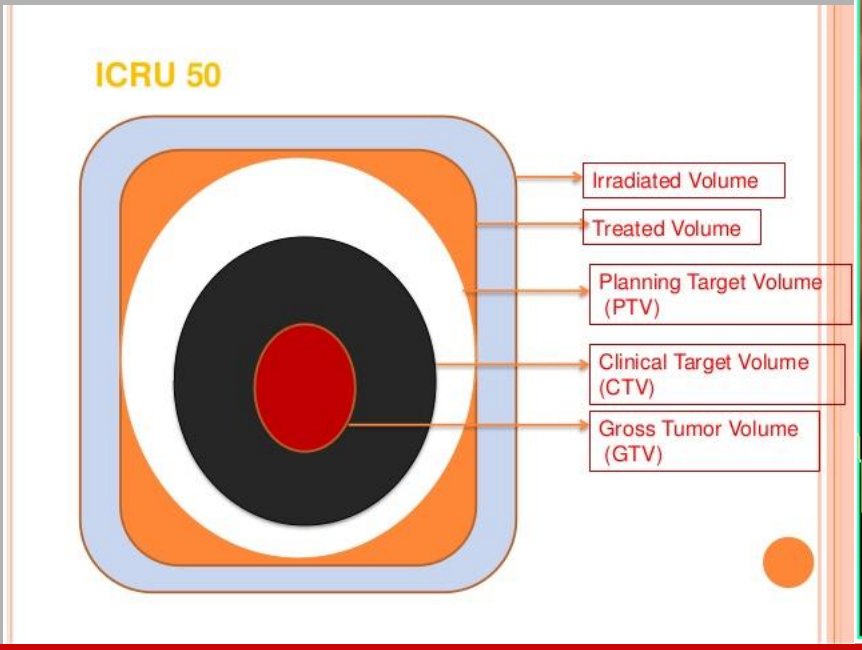
RADIOTHERAPIE

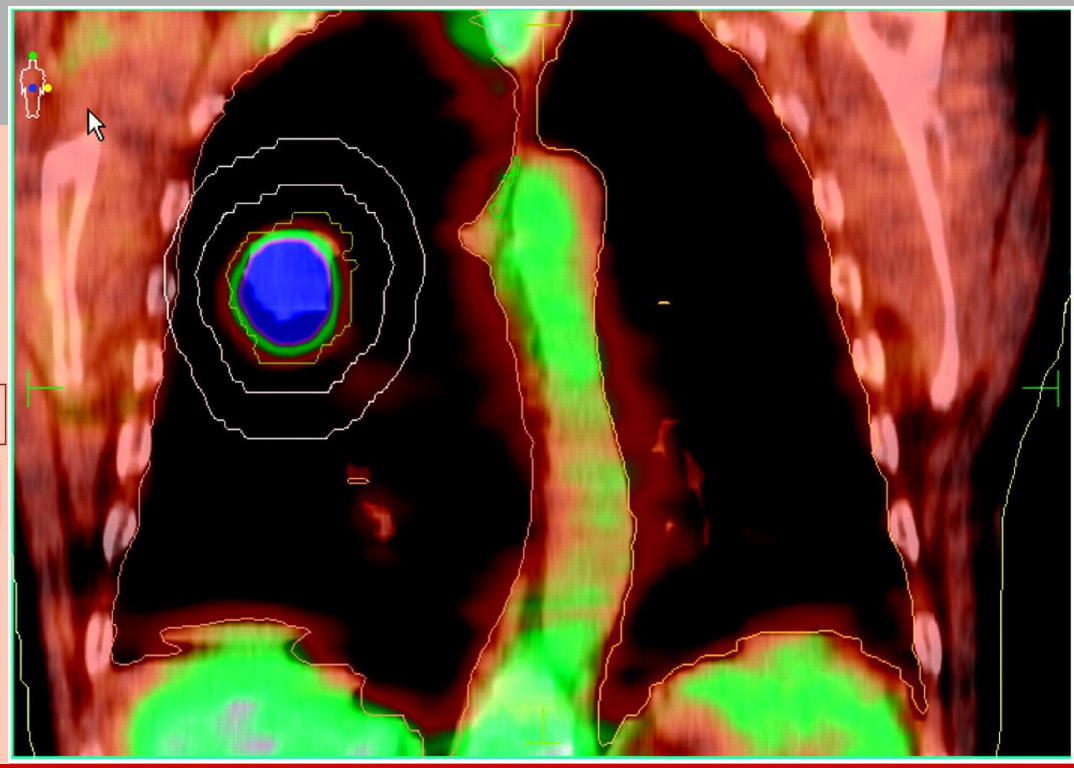
RADIOTHERAPIE

Voorbereiding:

- Plannings-CT
- “Aantekenen”

→ bepaling bestralingsgebied

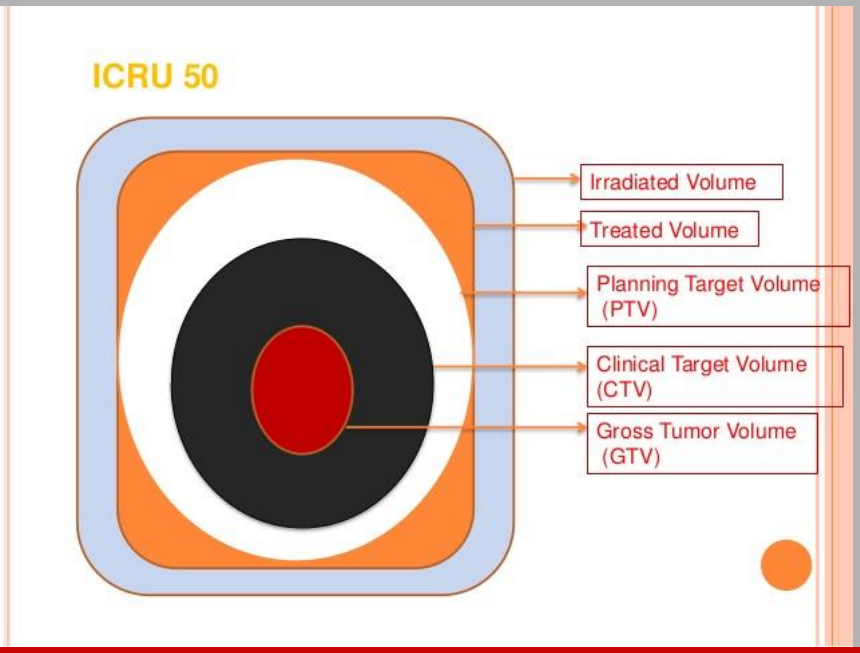


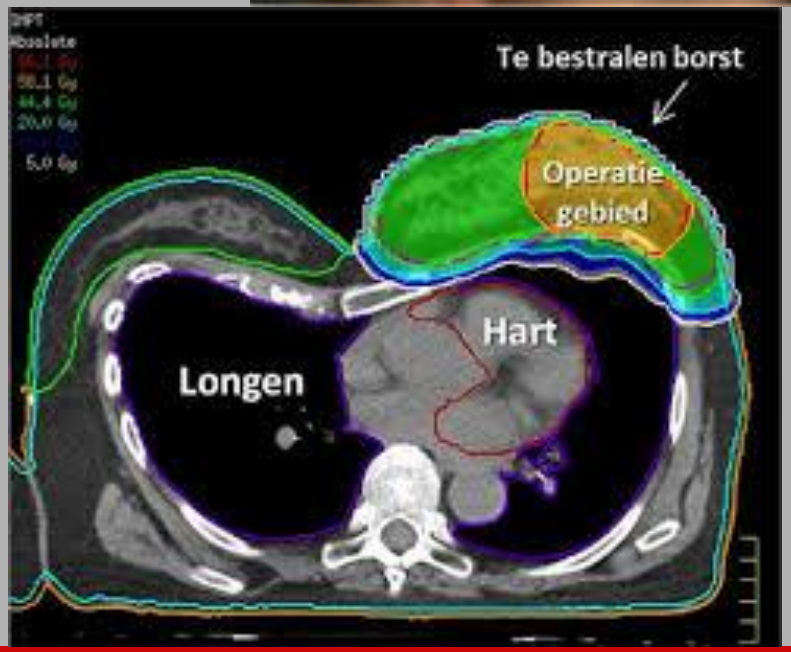


RADIOTHERAPIE

Doel:

- Maximale behandeling tumor
- Minimaal effect gezond weefsel

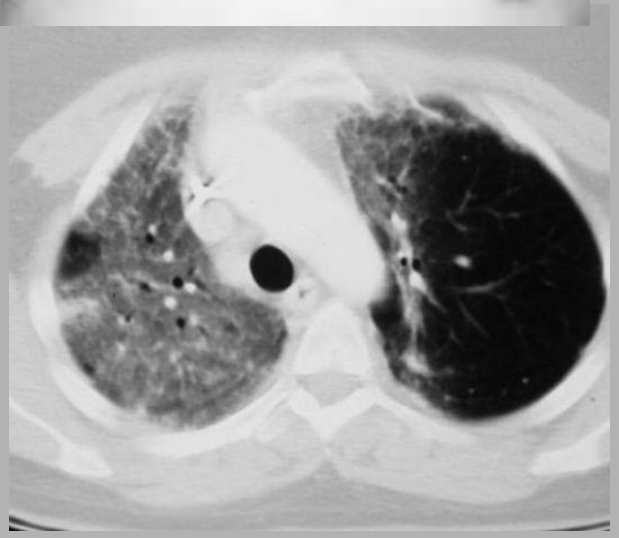




RADIOTHERAPIE

Radiatiepneumonitis

- Na beëindiging RT (1-6 mnd)
- Dyspnoe
- Hoesten
- Algehele malaise
- Invaliderend
- Prednison
- Ondersteunend



RADIOTHERAPIE

Nieuwe technieken

- Nieuwe inzichten
- Krachtigere apparatuur (megavolt)

  → Doordringend vermogen 
- Ontwikkelingen beeldvorming
  - CT-scan
  - PET-CT
  - MRI
- Ontwikkelingen ICT = sophisticated software

Nieuwe technieken

3D-therapie

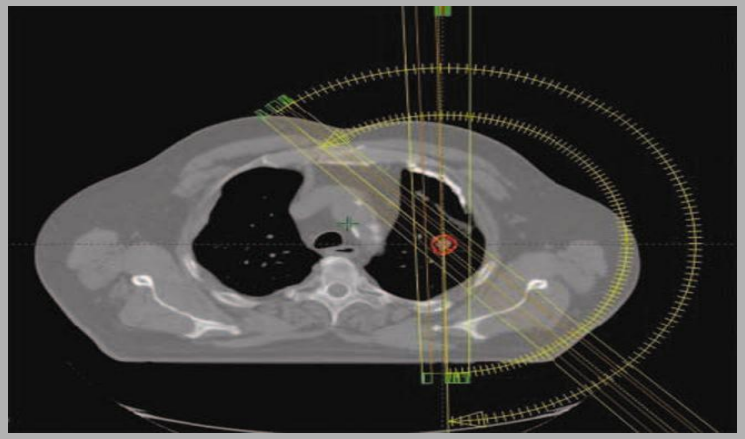
- Hyperfractionering (bijv. SCLC)
- Hypofractionering
  - Stereotactische radiotherapie
  - Intensity modulated radiotherapy (IMRT)

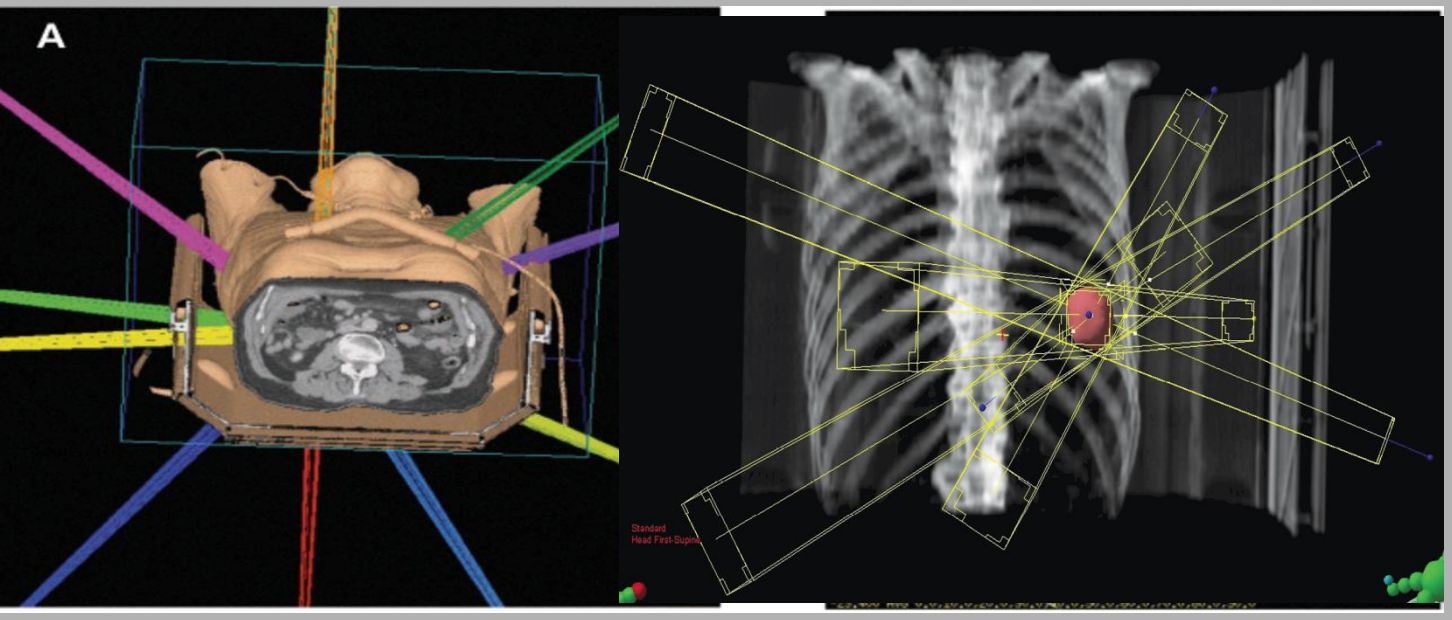
4D-therapie (3D + tijd)

- Respiratory Gating
- Image Guided Radio Therapy (IGRT)

STEREOTACTISCH

- Stereotactisch
- Hypofractionering (Minder fracties)
- Grotere doses
- Groter biologisch effect

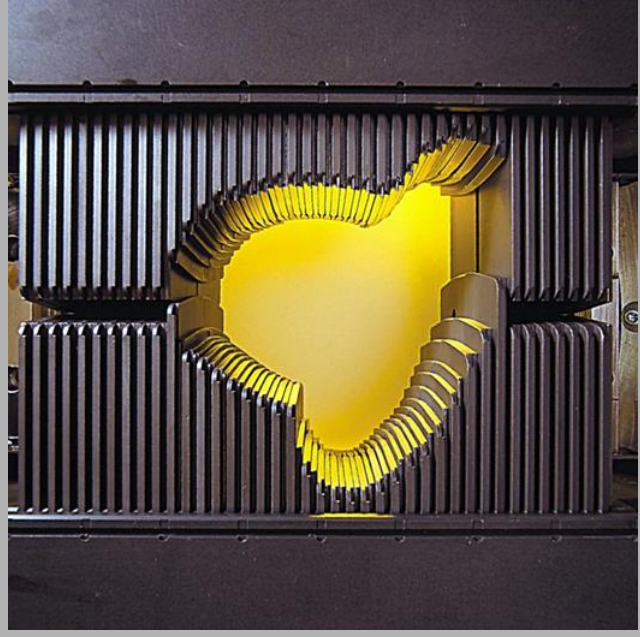




STEREOTACTISCH

- Tumor als main target
- Sparen omliggend weefsel
- Hypofractionering (3-5)
- Effectiviteit
- Kleine longtumoren
- Perifeer gelegen longtumoren

IMRT



Intensity modulated radiotherapy (IMR)

- Multileave collimator

→ opdeling stralenbundel

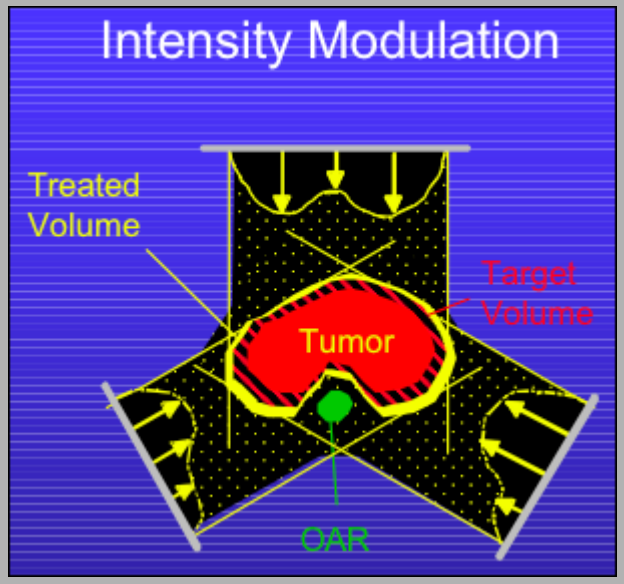
→ wisseling afgrenzing bestralingsbundel

- Vanuit verschillende richtingen
- Aanpassing bundel aan contour tumor

→ Wisselende stralingsintensiteit

→ Tumor als main target

→ Sparen omliggend weefsel



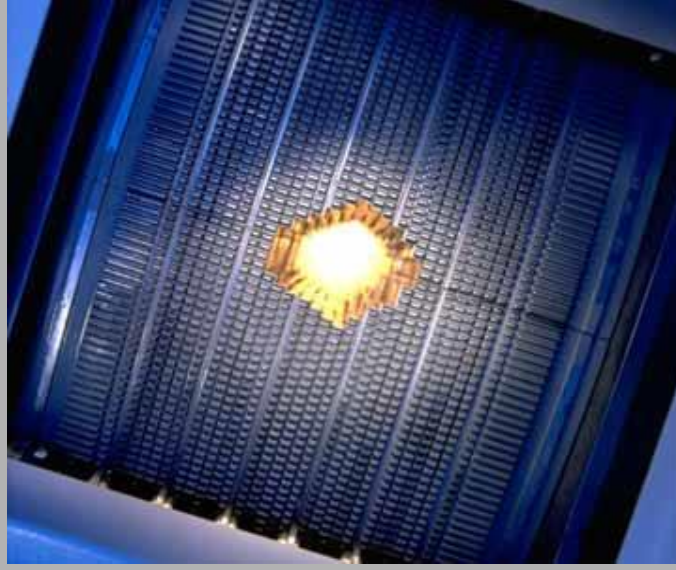
IMRT

Intensity modulated radiotherapy (IMR)

- Nauwkeurige afstemming

→ bijwerkingen/complicaties ↓

→ bestralingsduur ↑



Indicaties:

- Prostaat
- CZS
- Hoofd- hals
- Long (beperkt)

Respiratory gating

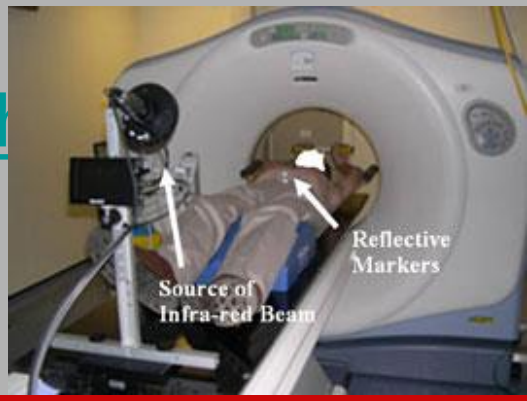
Respiratory gating

- Aanpassing Rt aan ademhalingsbewegingen
- Plaatsing uitwendige markeerblok op thorax
- Montoring door bestralingsapparaat

  → bestraling aangepast aan ah-cyclus

  → sparen omliggend weefsel

https://www.youtube.com/results?search_query=respiratory+gating



IGRT

Image Guided Radio Therapy (IGRT)

- Beeldvorming tijdens simulatie
- Monitoring tumor voor en tijdens behandeling

  (lineaire versneller + beeldvorming)
  - CT
  - MRI
  - Echo
- Dynamic monitoring

IGRT

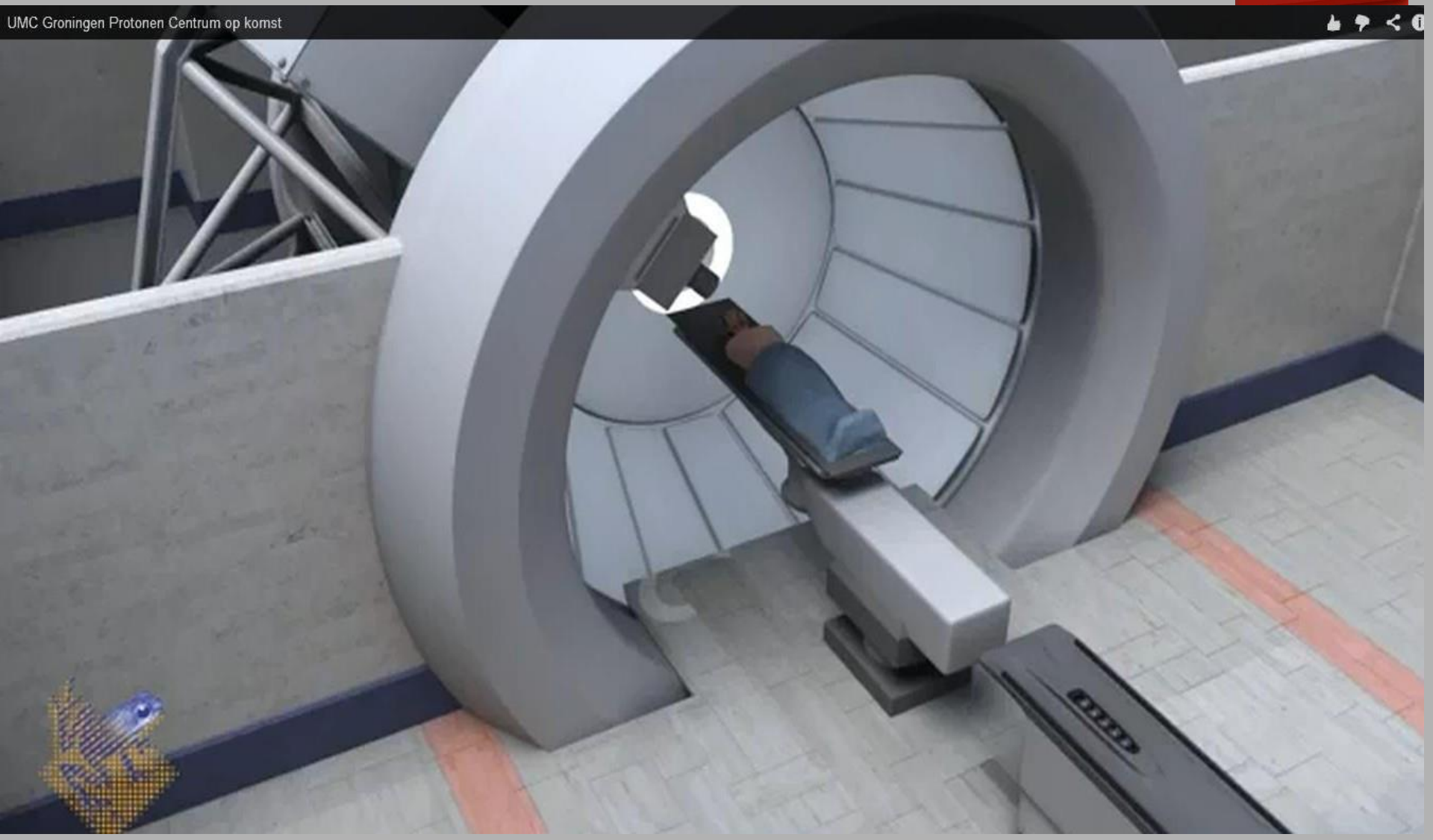
- Sophisticated software
- Vergelijking beelden tijdens RT
  → 4D radiotherapie
- Bij afwijkingen:
  → aanpassing stralenbundel
  → aanpassing positie
- Radiotherapie vanuit diverse richtingen

IGRT

- Prostaat
- Long
- Mamma
- Hoofdhals

Toekomst

- Verder ontwikkelingen
- Protonentherapie in Nederland
- Regulatie energie-afgifte (doelgericht)
- Gericht hoge doses in tumor
- Bescherming omgeving


UMC Groningen Protonen Centrum op komst

12e Post O.N.S. Meeting

NEWS FROM RADIATION ONCOLOGY LASERBEHANDELING BIJ ORALE MUCOSITIS

Ted Goossens, MANP
St. Jansgasthuis Weert

ORALE MUCOSITIS

Orale mucositis:

- Slijmvliesbeschadiging in de mondholte t.g.v. oncologische behandelingen
- Incidentie
  - “Conventionele” chemotherapie: 20-40%
  - Hoge doses chemotherapie (SCT): 80%
  - Radiotherapie hoofdhalsgebied: > 95%

Bron: Multinationale Association of Supportive Care in Cancer and International Society of Oral Oncology (MASCC/ISOO); 2014

ORALE MUCOSITIS

ORALE MUCOSITIS

Gradering (1)

- CTCAE

Graad	Symptomen Pijn	Symptomen Voeding
1	Asymptomatisch/mild	-------
2	Middelmatige pijn	geen belemmeringen voedselintake
3	Ernstige pijn	Belemmeringen voedselintake
4	Levensbedreigend	Spoedinterventie

Bron: Common Terminology Criteria Adverse Events (CTCAE), versie 4.0

ORALE MUCOSITIS

Gradering (2)

Graad	Klinische symptomen	Subjectieve pijnervaring	Voeding
0	Geen symptomen	-------	------
1	Erytheem	Gevoelig	
2	Ulcerering met/zonder erytheem	Pijn	Kan vast voedsel verdragen
3	Onderling verbonden plekken van ulceratie met/zonder erytheem	Zeer pijnlijk	Kan vloeistoffen verdragen maar geen vast voedsel
4	Diepe ulceraties met/zonder necrose	Extreem pijnlijk	Orale voeding/drinken niet mogelijk

Bron: WHO Oral Toxicity Scale

LOW LEVEL LASER THERAPY

Low Level LaserTherapie (LLLT).

- Biostimulatie
  - aanmaak endorfinen
  - celactiviteit
  - angiogenese
- Verminderde productie (o.m.) prostagladines

→ ontstekingsremmend effect

→analgetisch effect

→ verbeterde wondgenezing

LOW LEVEL LASER THERAPY

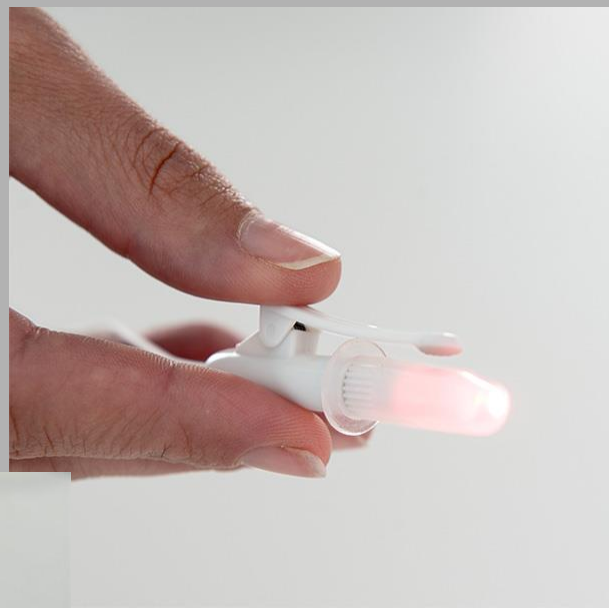
Low Level LaserTherapie (LLLT).

Praktijk

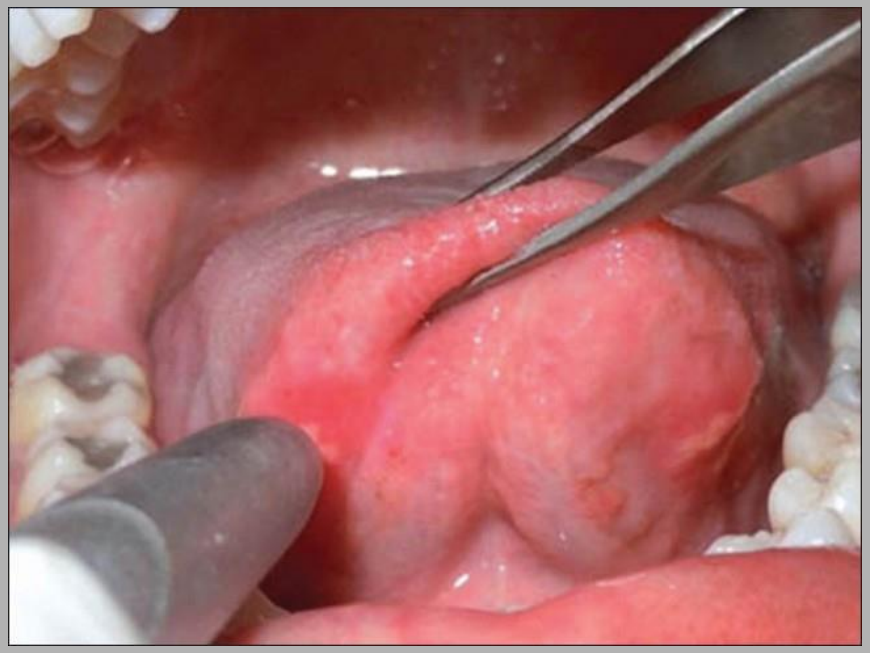
- Verschillende laserapparaten beschikbaar
- Variaties in:
  - Lengte lichtgolven
  - Energieniveau (J/cm$^{2)}$
  - Frequentie behandeling

LOW LEVEL LASER THERAPY

- Lichtenergie in lage dosering

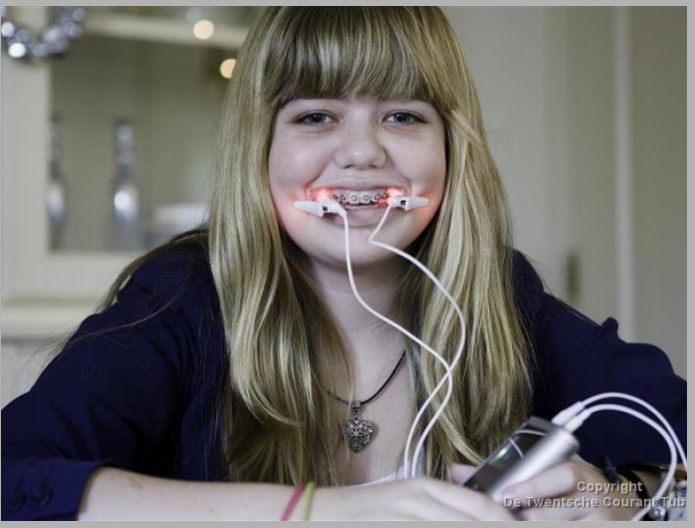


LOW LEVEL LASER THERAPY



LOW LEVEL LASER THERAPY

- Veilig
- Oogbescherming



LOW LEVEL LASER THERAPY

Effecten.

- Positieve effecten beschreven
  - Profylaxe
  - Directe pijnstilling
  - Vermindering duur en ernst
  - (sneller) herstel
  - Interviews/persoonlijke ervaringen

LOW LEVEL LASER THERAPY

Adviezen/aanbevelingen:

- Oncoline: herziening richtlijn orale mucositis
  - Richtlijn 2007
  - Herziene richtlijn 2014 in concept
- Pallialine:

  → Low level laser therapie kan preventief en ter behandeling van orale mucositis worden toegepast.

LOW LEVEL LASER THERAPY

I Evidence obtained from meta-analysis of multiple, well-designed, controlled studies; randomized trials with low false-positive and false-negative errors (high power).

II Evidence obtained from at least 1 well-designed experimental study; randomized trials with high false-positive and/or falsenegative errors (low power).

III Evidence obtained from well-designed, quasi-experimental studies such as nonrandomized, controlled single-group, pretest-posttest comparison, cohort, time, or matched case-control series.

IV Evidence obtained from well-designed, nonexperimental studies, such as comparative and correlational descriptive and case studies.

V Evidence obtained from case reports and clinical examples.

LOW LEVEL LASER THERAPY

Recommendation

Reserved for guidelines that are based on level I or level II evidence.

Suggestion

Used for guidelines that are based on level III, level IV, and level V evidence; this implies panel consensus regarding the interpretation of this evidence.

No guideline possible

Used when there is insufficient evidence on which to base a guideline; this implies

1) that there is little or no evidence regarding the practice in question, or
2) that the panel lacks consensus on the interpretation of existing evidence.

LOW LEVEL LASER THERAPY

Adviezen/aanbevelingen:

- Cochrane review 2010
  - 32 onderzoeken met 1505 patiënten met orale mucositis bij chemo- of radiotherapie
  - 3 vergelijkende onderzoeken: interventie vs placebo

→ the low level laser showed a reduction in severe mucositis when compared with the sham procedure

LOW LEVEL LASER THERAPY

Multinational Association on Supportive Cancer Care (MASCC)

International Society of Oral Oncology (ISOO)

Clinical Practice Guidelines for the Management of Mucositis Secondary to Cancer Therapy (review)

- 570 onderzoeken (papers)
- Clinical Practice Guidelines for the Management of Mucositis Secondary to Cancer Therapy (review)

LOW LEVEL LASER THERAPY

Richtlijnen MASCC/ISOO:

→ The panel recommends that low-level laser therapy (wavelength at 650 nm, power of 40 mW, and each square centimeter treated with the required time to a tissue energy dose of 2 J/cm^2),be used to preventoral mucositis in patients receiving HSCT conditioned with high-dose chemotherapy, with or without total body irradiation (II).

→ The panel suggests that low-level laser therapy (wavelength around 632.8 nm) be used to preventoral mucositis in patients undergoing radiotherapy, without concomitant chemotherapy, for head and neck cancer (III).

LOW LEVEL LASER THERAPY

Veelbelovend?

Meer onderzoek?

Resultaat casestudies bevestigen?

Figure 2: Oral mucositis occurring during week 4 of radiation treatment. (Dose was 45 Gy; patient did not receive chemotherapy.) Image courtesy of Sol Silverman, DDS.