

Hypofarynxreconstructie na een totale laryngectomie

Reconstructiekeuze, complicaties en postoperatieve kwaliteit van leven

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Afdeling Plastisch Reconstructieve Chirurgie
Erasmus MC, Rotterdam

ATOS Laryngectomie Symposium
31 oktober 2025

Erasmus MC
University Medical Center Rotterdam



Achtergrond

- Shift in behandeling sinds begin jaren '90¹ → (C)RT vs. TLE
- Toename in salvage TLEs (recidief, afunctionale larynx)
- Complexe reconstructieve uitdaging
 - Verminderde wondgenezing², fibrose na (C)RT
 - Kwetsbare patiëntengroep
 - Frequent morbiditeit t.g.v. complicaties (o.a. fistel, strictuur)
- Doel: herstel continuïteit tractus digestivus, lage morbiditeit reconstructie, optimale functionaliteit/QoL

1. Wolf GT, Fisher SG, Hong WK, et al. *The New England Journal of Medicine*. 1991;324(24):1685-1690.
2. Jacobson L, Johnson M, Dedhia R, Niknam-Bienia S, Wong A. *JPRAS Open*. 2017;13:92-105.

I. Indeling defecten: primaire sluiting

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1. Primaire sluiting hypofarynx

- >3 cm resterende mucosa³
- 2-layer, 3-layer of Stapler (GIA)
- Veel variatie in hechttechniek, type sluiting
- Onlay flap ter bedekking van de naad ^{4,5} → na CRT, cachexie → pectoralis trial (UMCU)
- Fistelincidentie onlay PM vs primaire sluiting (OR 0.21, 95% CI 0.11-0.38; $p=0.001$)⁴

3. Hanasono M, Lin D, Wax M, Rosenthal E. *Head Neck*. 2011;34(4):580-588.

4. Cabrera CI, Joseph Jones A, Philipo Parker N, Emily Lynn Blevins A, Weidenbecher MS. *Otolaryngology-Head and Neck Surgery*. 2020;164(5):972-983.

5. Patel UA, Keni SP. *Otolaryngology-Head and Neck Surgery*. 2009;141(2):190-195.

II. Indeling defecten: **partieel** **hypofarynxdefect**

II. Indeling defecten: **partieel hypofarynxdefect**

- Onvoldoende mucosa
- Noodzaak voor herstel (patch-type)
- Verschillende reconstructieve opties, meest gebruikt:

Regionale lap

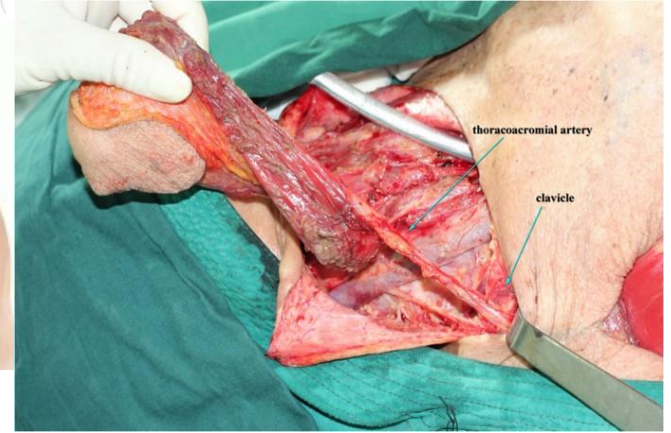
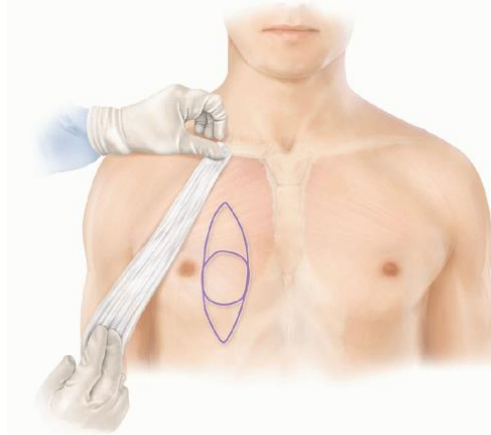
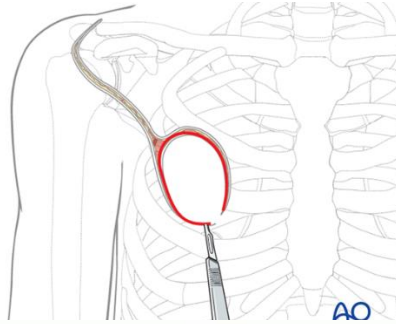
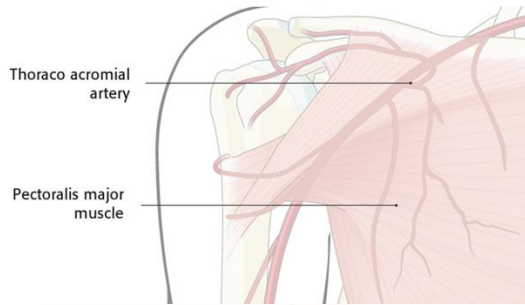
- Pectoralis major myocutane lap
- Pectoralis major myofasciale lap
- Supraclaviculaire arterie eilandlap

Vrije lap

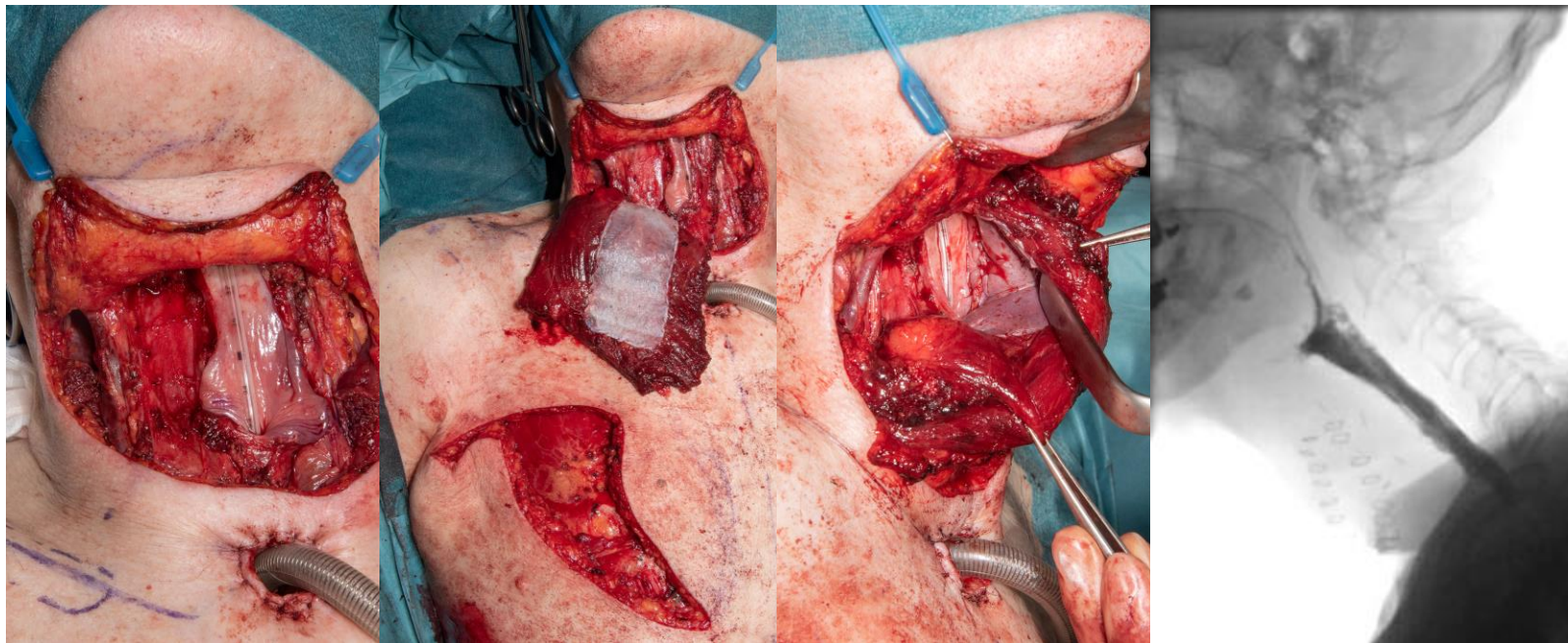
- Radialis onderarmslap
- Anterolaterale dijbeenslap



Myocutane PM lap

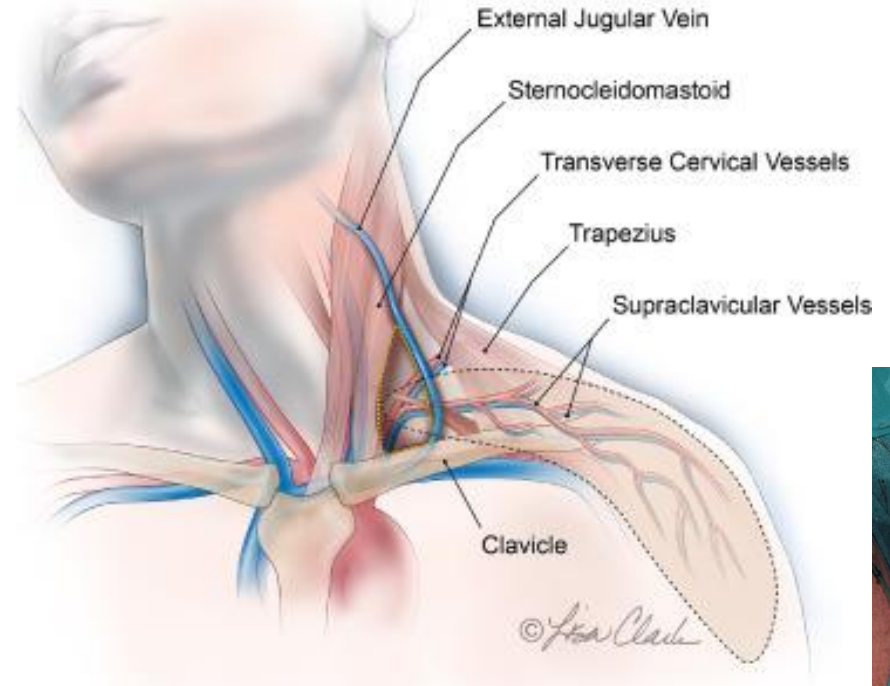
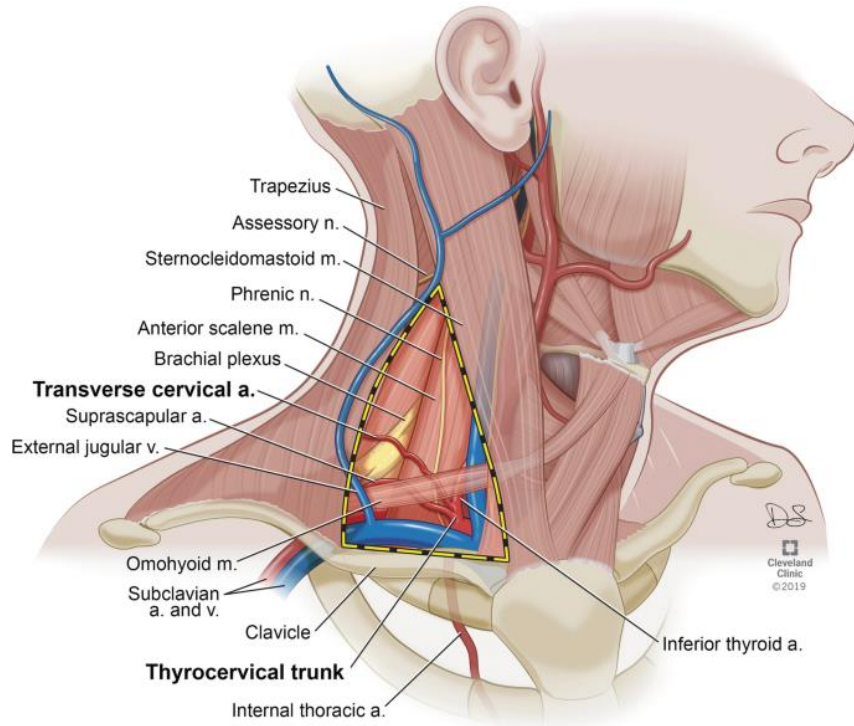


Myofasciale PM lap

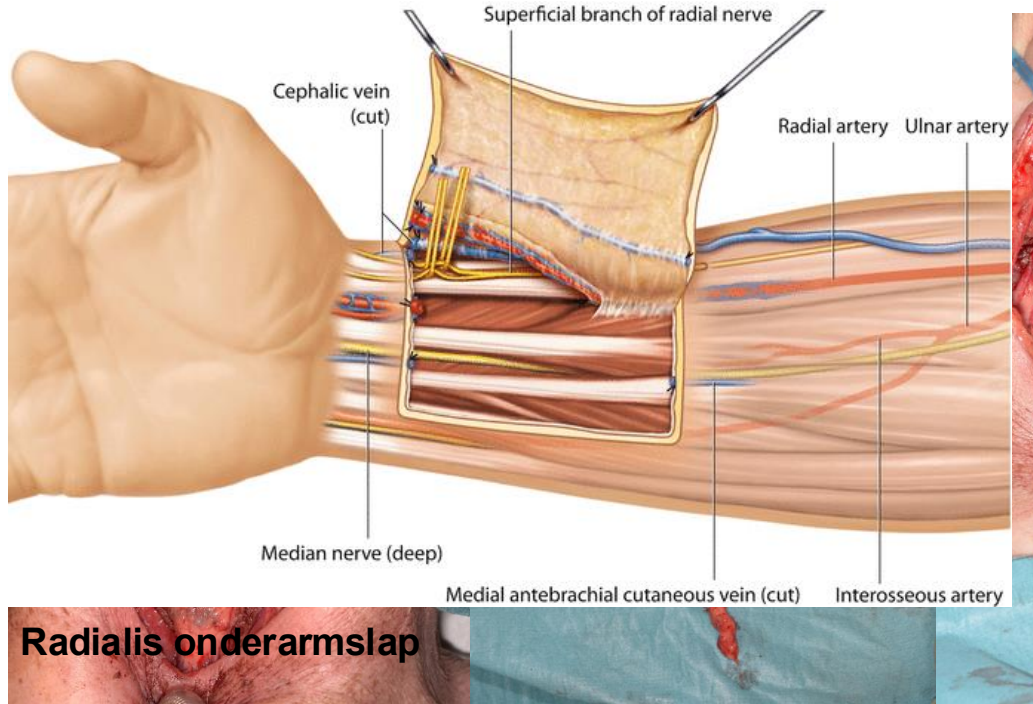


6. Tonsbeek AM, Hundepool CA, Duraku LS, Sewnaik A, Mureau MAM. *Journal of Plastic, Reconstructive Aesthetic Surgery*. 2023;85:47-54.

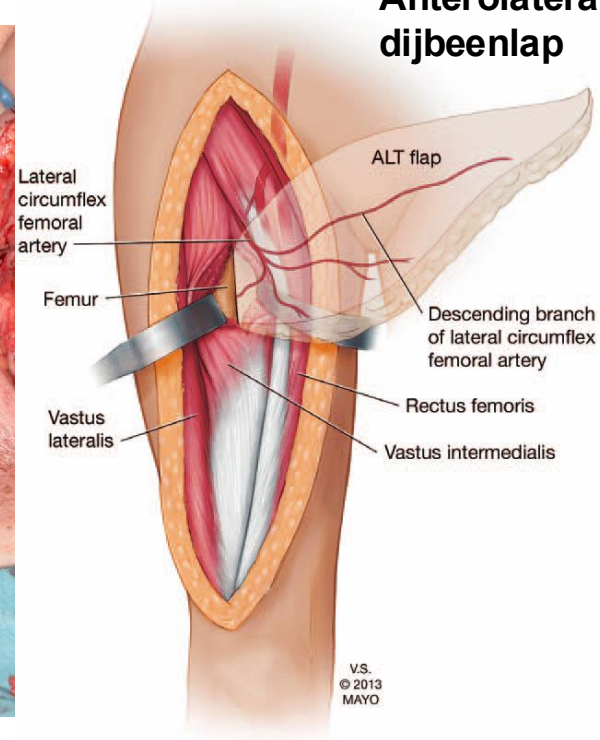
Supraclaviculaire arterie eilandlap



Vrije fasciocutane lap



Anterolaterale dijbeenlap



Monitoring begraven vrije lap

Reguliere beoordeling vrije lap:

Kleur, CR, turgor, temperatuur



Zonder extern (monitor) huideiland niet mogelijk!

Echter groot belang van vroege herkenning lapfalen middels frequente controles:

Monitoringschema

Direct post OK (dus OK-dag en 1^e nacht) à 0,5 uur

Dag 1 post OK vanaf 8.00 uur à 1 uur

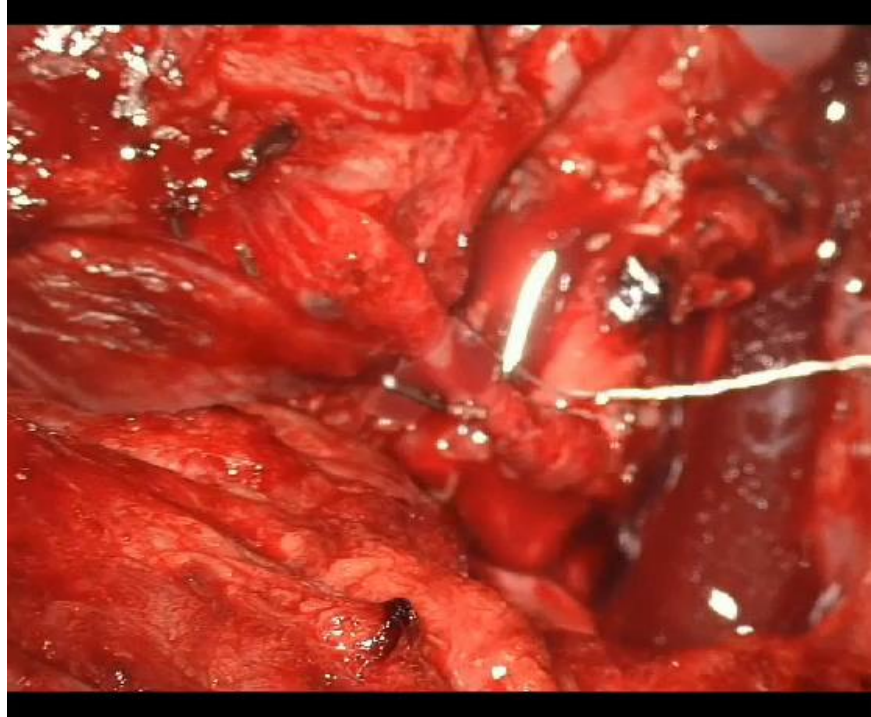
Dag 2 post OK vanaf 8.00 uur à 2 uur

Dag 3 post OK vanaf 8.00 uur à 4 uur

Dag 4 post OK vanaf 8.00 uur 1 x per dienst (tot ontslag)

Bij begraven vrije lap reconstructie: doppler tonen (extern) of intern flow doppler device

Interne flow doppler



Vele (keuze)factoren van invloed

Patiëntfactoren

- Co-morbiditeit
- BMI
- Beharing (PORT?)
- Voorgaande chirurgische ingrepen
- Voorkeur patiënt

Reconstructiefactoren

- Ervaring chirurg
- Beschikbaarheid vaten (vessel-depleted neck)
- Noodzaak bedekking hals
- Complicatiekans (o.a. fistel, strictuur, lapfalen)
- Postoperatieve slikfunctie
- Kwaliteit van spraak
- Donorplaats morbiditeit
- Algehele kwaliteit van leven

**Geen consensus in de literatuur / geen richtlijn →
institutionele heterogeniteit**

Keuze reconstructie – partieel defect

- Meta-analyse partiële defecten na TLE (23 studies, 1979-2023, n=794 patiënten)⁶
 - 394 (PMMC)
 - 57 (PMMF)
 - 160 (RFFF)
 - 183 (ALT)

Uitkomstmaten

- Primair: fisteling, strictuurvorming
- Secundair: lapfalen, spraakfunctie, slikfunctie

7. Tonsbeek A, LeideIJmeijer R, Hundepool C, Duraku L, Van der Oest M, Sewnaik S, Mureau M. Reconstruction of partial hypopharyngeal defects following total laryngectomy: a systematic review and meta-analysis. *Cancers*. 2024 May 8;16(10):1804.

Resultaten

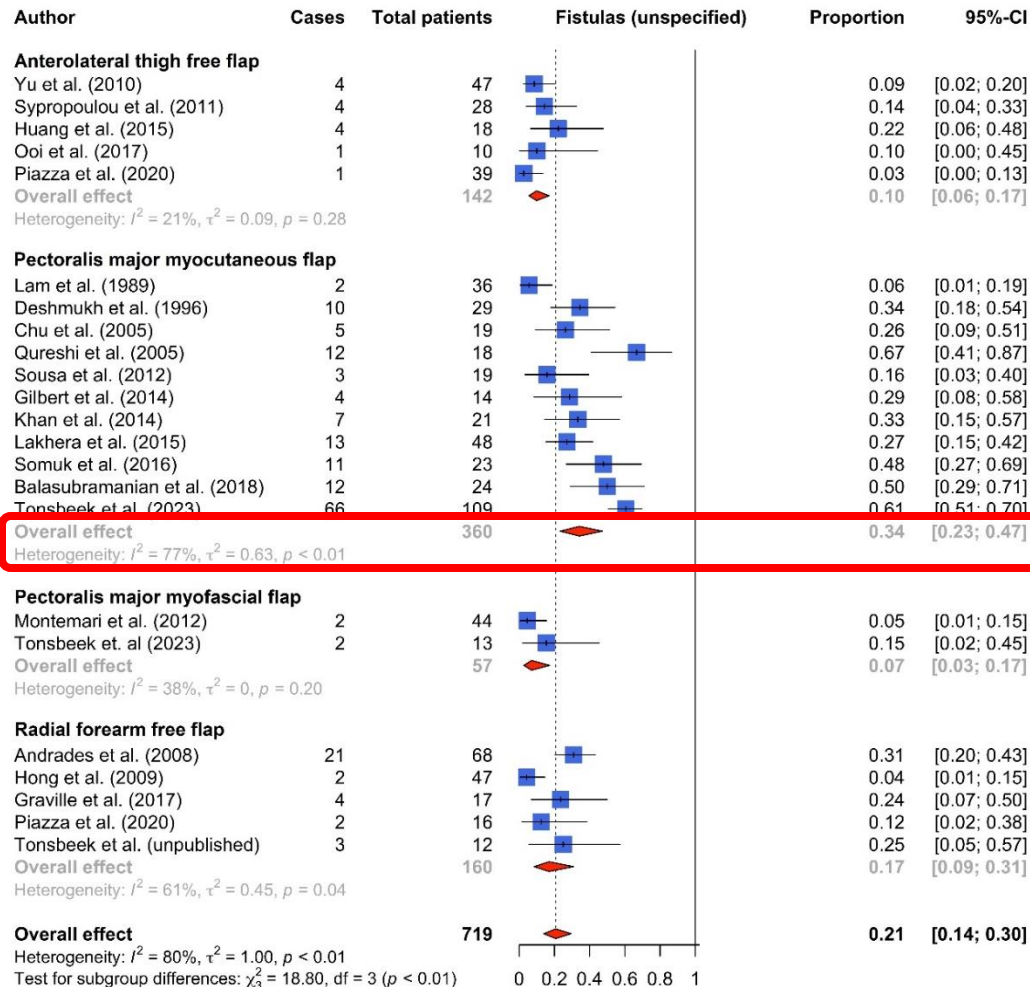
Fistelvorming

- PM (myocutaan) significant hogere fistelincidentie: 34% (95% CI 23-47%), $p < 0.01$
- Hoge heterogeniteit $I^2 = 80\%$

7. Tonsbeek A, Leideimeijer R, Hundepool C, Duraku L, Van der Oest M, Sewnaik S,

Mureau M. Reconstruction of partial hypopharyngeal defects following total laryngectomy:

a systematic review and meta-analysis. *Cancers*. 2024 May 8; 16(10):1804.



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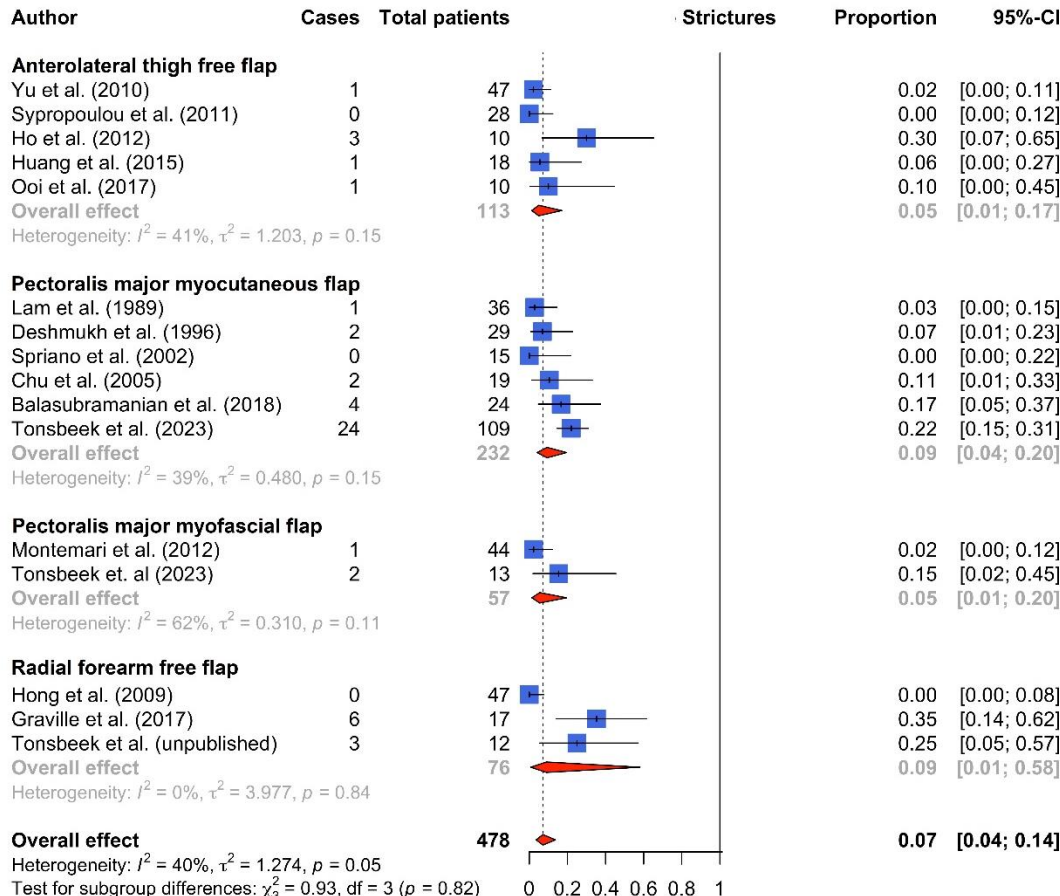
Struïctuurvorming

- Geen significant verschil tussen reconstructies
- Overall effect 7% (95% CI 4-14%)

7. Tonsbeek A, Leideimeijer R, Hundepool C, Duraku L, Van der Oest M, Sewnaik S,

Mureau M. Reconstruction of partial hypopharyngeal defects following total laryngectomy:

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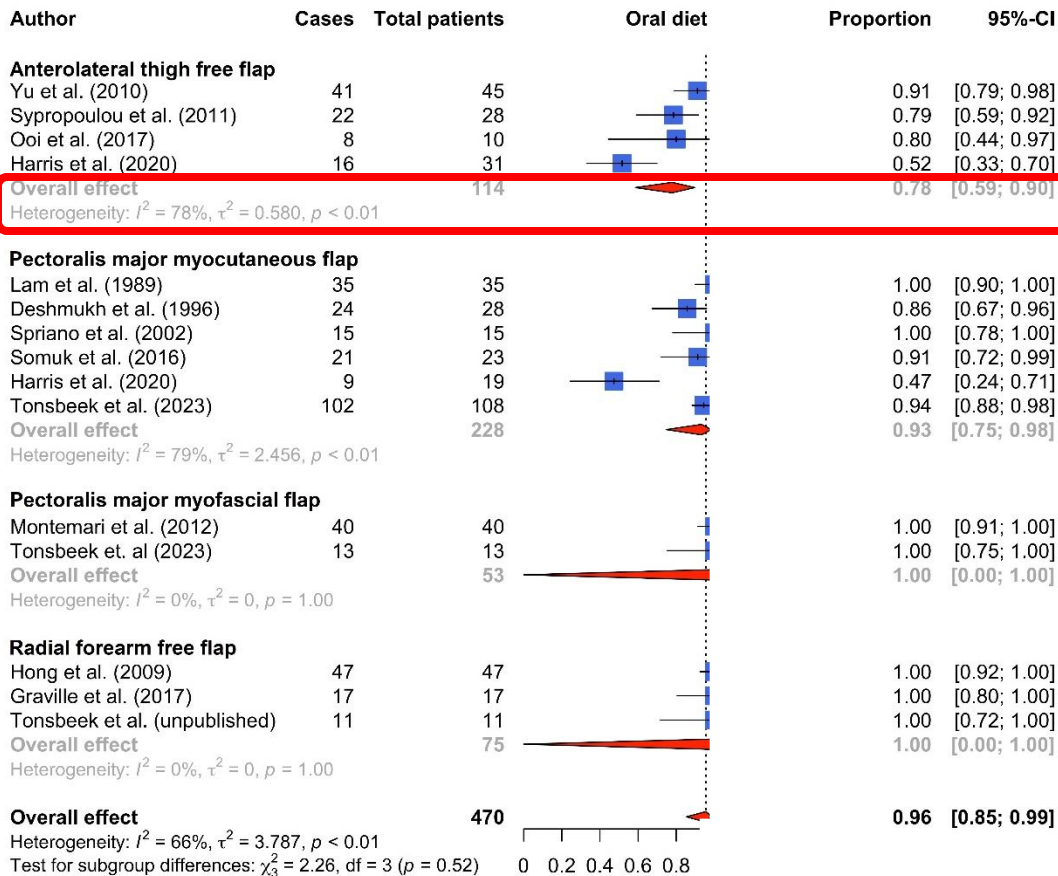
Orale intake

- Weinig kwalitatieve data
- Geen statistisch significante verschillen
- Opvallend hoge incidentie (PEG)sonde afhankelijkheid na ALT (20%, 95% CI 10-36% (NS))

7. Tonsbeek A, Leidelmeijer R, Hundepool C, Duraku L, Van der Oest M, Sewnaik S.

Mureau M. Reconstruction of partial hypopharyngeal defects following total laryngectomy:

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Resultaten

Lapfalen/spraak

Lapfalen

- Geen statistisch significante verschillen

1. ALT 3% (n=3/87)
2. PM (myocutaan) 1% (n=3/260)
3. RFFF 1% (n=1/92)
4. PM (myofasciaal) 0% (n=0/57)

Spraak

- Te weinig beschikbare data

Conclusie meta-analyse

- Myocutane PM reconstructies verdienen **niet de voorkeur** als primaire reconstructie
- Myofasciale PM reconstructies: **non-inferieur** aan vrije lap reconstructies
→ verder onderzoek nodig
- Primaire reconstructiekeuze partieel hypofarynxdefect:

Vrije lap OF myofasciale PM

III. Indeling defecten: circulair **hypofarynxdefect**

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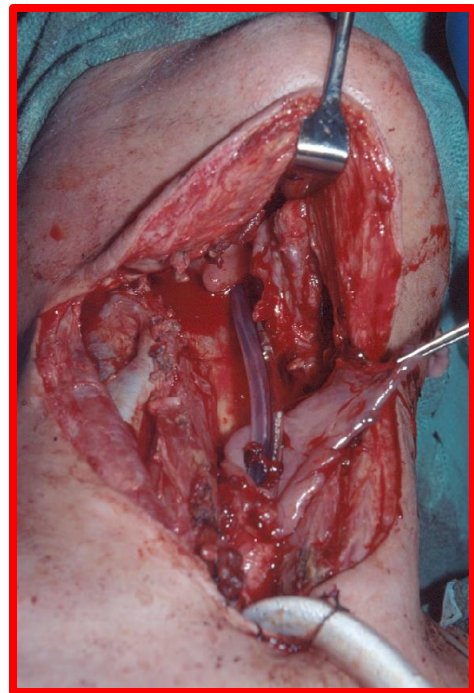
- Noodzaak voor herstel (buis-type)
- < ± 1960: regional lap of buismaag (gastric pull-up)
- > ± 1960: jejunum of gebuisde fasciocutane vrije lap
- Verschillende opties voor herstel mogelijk, meest gebruikt:

Vrije enterale lap

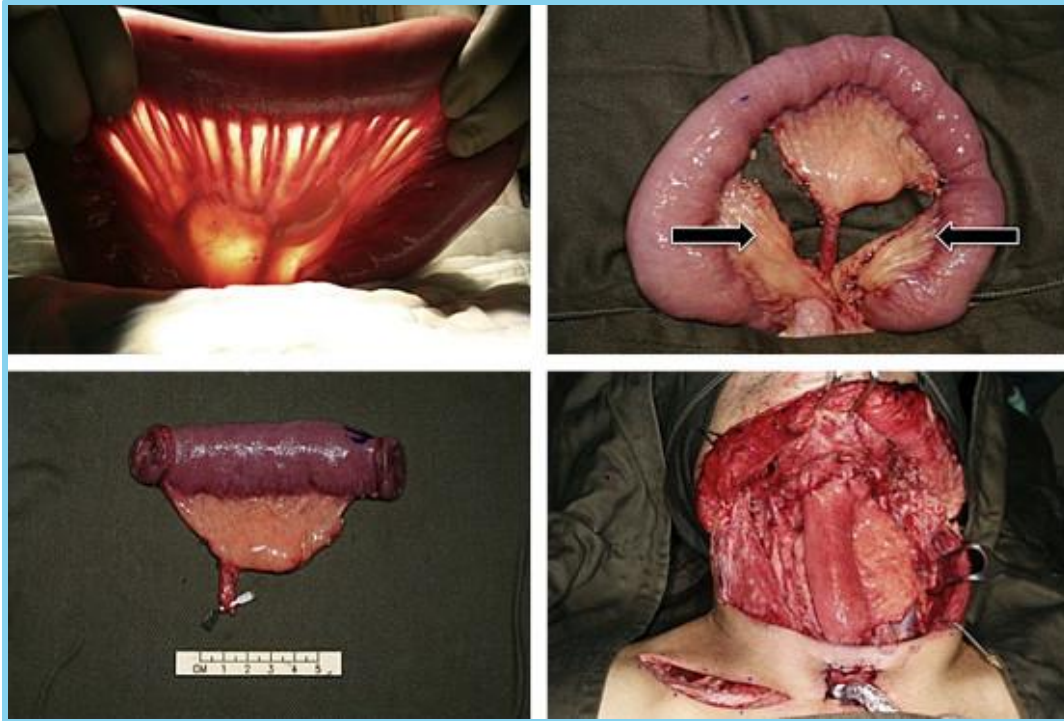
- Jejunum

Vrije fasciocutane lap

- Radialis onderarmslap
- Anterolaterale dijbeenslap

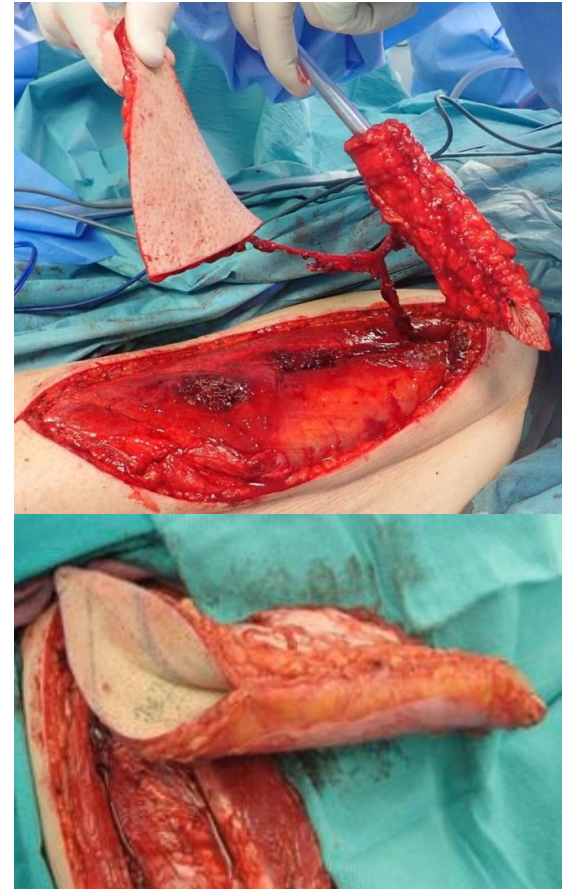
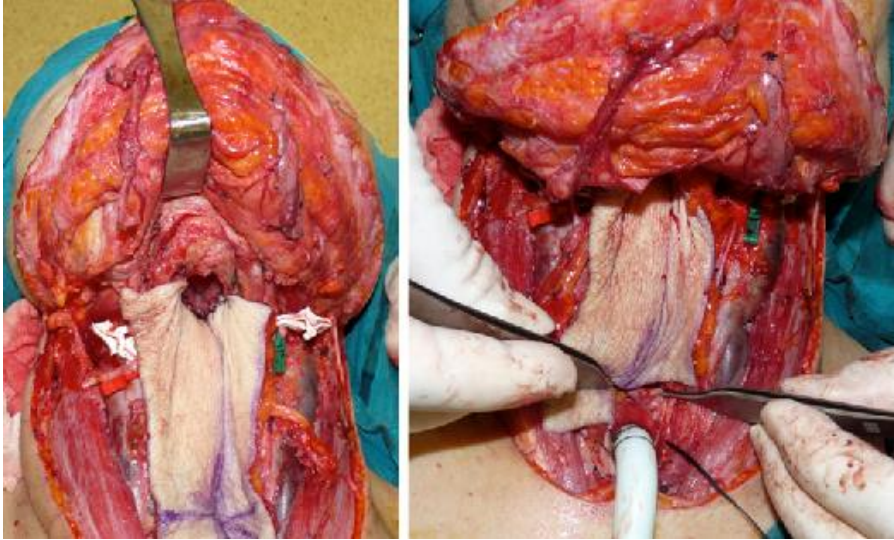


Jejunum lap



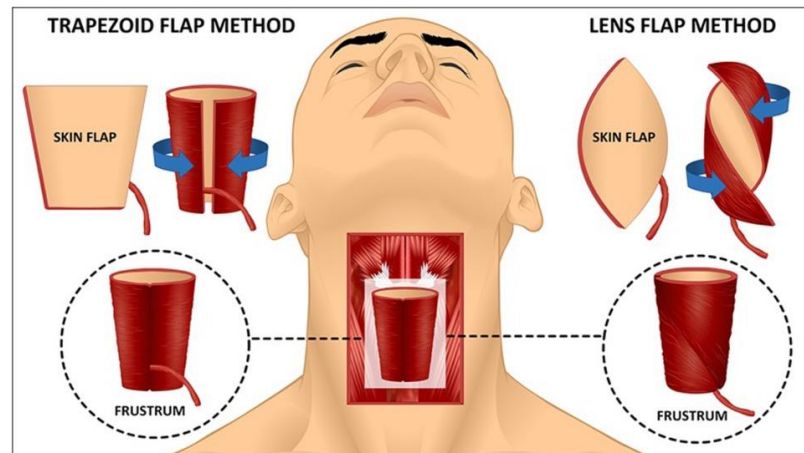
8. Chan Y, Ng R, Lun Liu L, Chung H, Wei W. J Plast Reconstr Aesthet Surg 2011;64(8):1022-1028

Vrije fasciocutane lap



Flap inset en modificaties

Modifications	
Fistula and stricture	• Z-plasty ('triangle' at both the distal and proximal anastomotic ends)^{9,10,11,14,15-17,19,20,25,26} • 'Spatulation' of the anastomosis²² • Conical or trapezoidal flap design resulting in 'spiral' vertical anastomotic suture line⁸ • Edge de-epithelialisation/stump invagination^{7,23} • Intra- and extraluminal tubes (e.g. salivary tube) – used to decompress and stent the neoesophagus^{7,11,21} • Posterior positioning of suture line^{13,16} • Fascia for second layer closure^{15,21,23}



9. Murray D, Novak C, Neligan P. *Journal of Plastic, Reconstructive & Aesthetic Surgery*. 2008;61(10):1148-1156.

10. Butskiy O, Kim V, Chang B, Anderson D, Prisman E. *Laryngoscope*. 2017;127(10):2252-2255.

Keuze reconstructie – circulair defect

- Geen internationale consensus t.a.v. reconstructiealgoritme →

hoge heterogeniteit in de literatuur:

- Jejunum lap: stricturen en fistels ↓
- Fasciocutane vrije lap: donor-site morbiditeit↓, lapfalen ↓

→ Multicenter review Erasmus MC/LUMC

11. Koh H, Tan N, Tan B, Ooi A. *Ann Plast Surg* 2019;82(6):646-652

12. Bouhadana G, Azzi A, Gilardino M. *J Plast Reconstr Aesthet Surg* 2021;74(8):1779-1790

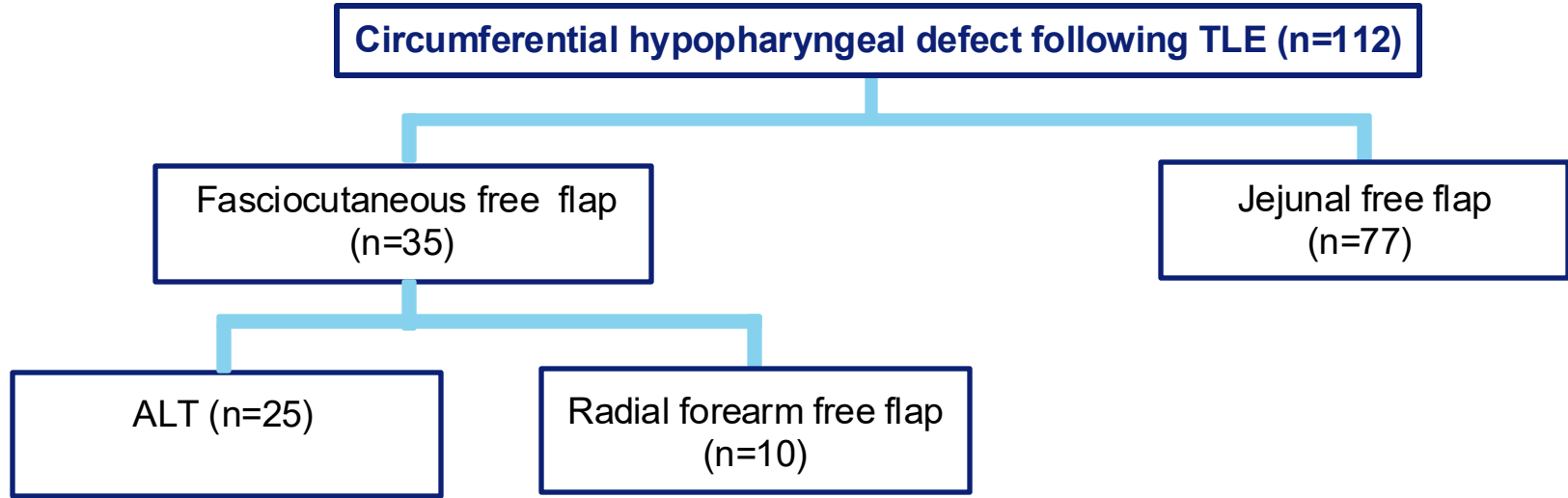
Methode

- **Retrospectieve analyse 2000-2022**
 - Twee tertiaire centra
- **Circulair hypofarynxdefect**
 - Group 1: Vrije jejunum reconstructie
 - Group 2: Vrije fasciocutane reconstructie
- **Postoperatieve uitkomsten**
 - Primair: fistels, stricturen
 - Secundair: lapfalen, donor-site morbiditeit



13. Tonsbeek AM, Hundepool CA, Duraku LS, Sewnaik A, Wijnhoven BPL, Mureau MAM. Fasciocutaneous and jejunal free flaps for circumferential hypopharyngeal defect reconstruction: a 22-year multicenter cohort study. *Head Neck*. 2024 Jun;46(6):1351-1361

Resultaten



13. Tonsbeek AM, Hundepool CA, Duraku LS, Sewnaik A, Wijnhoven BPL, Mureau MAM. Fasciocutaneous and jejunal free flaps for circumferential hypopharyngeal defect reconstruction: a 22-year multicenter cohort study. *Head Neck*. 2024 Jun;46(6):1351-1361

Resultaten – Baseline



Fasciocutane vrij lappen

69 jaar (IQR 59-74 jaar)

Vrije jejunum lap

63 jaar (IQR 59-69 jaar)

p-waarde

0.04*

Geen significante verschillen in BMI, roken, chemotherapie en radiotherapie

Mediane follow-up na TLE: 22.1 maanden (IQR, 10.5-57.1 maanden)

13. Tonsbeek AM, Hundepool CA, Duraku LS, Sewnaik A, Wijnhoven BPL, Mureau MAM. Fasciocutaneous and jejunal free flaps for circumferential hypopharyngeal defect reconstruction: a 22-year multicenter cohort study. *Head Neck*. 2024 Jun;46(6):1351-1361

Resultaten

Outcomes	Fasciocutaneous free flap (n=35)	Jejunal free flap (n=77)	p-value
Fistulas	34%	12%	0.008*
Strictures	49%	29%	0.04*
Flap failure	11%	9%	0.46
Severe donor-site morbidity	0%	18%	0.009*

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e.g. fascial dehiscence (13%), intra-abdominal hemorrhage (4%), abdominal sepsis (4%)



Multivariable analysis: perioperative albumin levels ($p=0.018$) and prior cerebrovascular disease ($p=0.03$)

Resultaten

Outcomes	Fasciocutaneous free flap (n=35)	Jejunal free flap (n=77)	p-value
Median length of stay	26 days [IQR 17-40 days]	18 days [15-26 days]	0.03*
Start of oral intake	26 days [IQR 14-57 days]	14 days [IQR 10-19 days]	0.003*
TEP speech achieved	68.4%	68.7%	NS
Cardiopulmonary complications	8.6%	6.6%	NS
Perioperative mortality	2.9%	6.5%	NS

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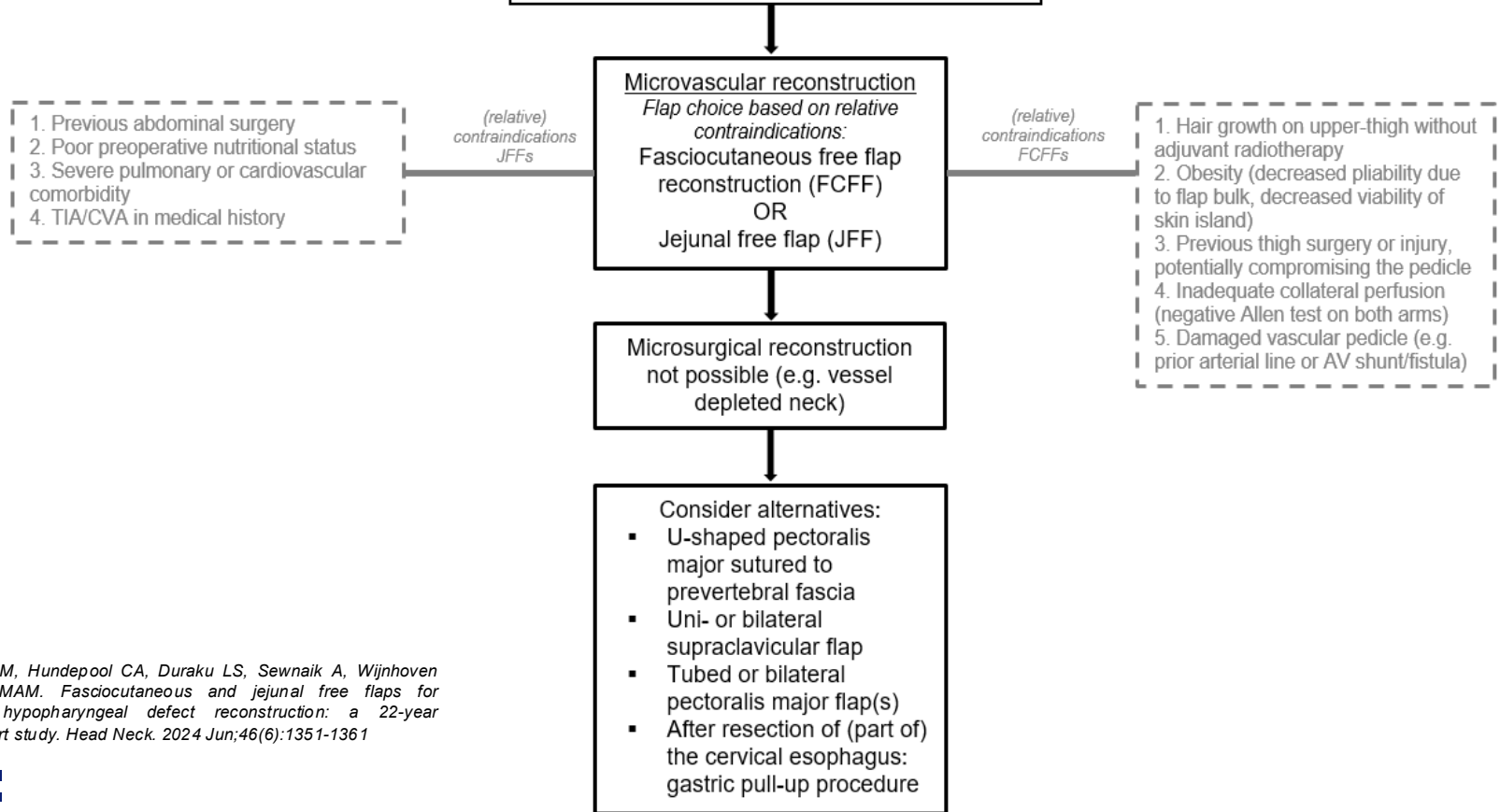
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Reconstructiefactoren - circulair

- Geen one size fits all → geïndividualiseerde benadering:
 - eerdere RTx, noodzaak PORT
 - voedingsstatus
 - lichaamsbouw/BMI
 - comorbiditeit
 - haargroei
 - voorgeschiedenis van abdominale chirurgie
 - lokale situatie (bijv. beschikbaarheid vaten and type defect)

Treatment algorithm for primary reconstruction of circumferential pharyngolaryngoesophageal defects



13. Tonsbeek AM, Hundepool CA, Duraku LS, Sewnaik A, Wijnhoven BPL, Mureau MAM. Fasciocutaneous and jejunal free flaps for circumferential hypopharyngeal defect reconstruction: a 22-year multicenter cohort study. *Head Neck*. 2024 Jun;46(6):1351-1361

Conclusies – circulaire defecten

- Voor- en nadelen voor beide technieken, hoge morbiditeit
- Gepersonaliseerde benadering noodzakelijk → reconstructie-gerelateerde morbiditeit minimaliseren
- Het formuleren van een omvattend reconstructiealgoritme is momenteel niet mogelijk

IV. Complicaties

IV. Complicaties

Frequent complicaties na hypofarynxreconstructies, waaronder:

- Fisteling / naadlekkage
- Strictuur / stenose
- Lapfalen
- Nabloeding

Tevens: infectie, wonddehiscentie, donor-site morbiditeit, HAP, bacteriëmie/sepsis



IV. Complicaties - naadlekkage

- Inherent verschil met 'fisteling' – geen neo-epithelialisatie van de faryngocutane opening → conservatieve maatregelen afdoende (verlengd NPO beleid, AB, evt. scopolamine) → secundaire wondgenezing
- **Geen noodzaak tot heroperatie**



IV. Complicaties - strictuur



- Dysfagie klachten
- Frequent NMS/PEG om intake waar te borgen
- Langdurig (poli)klinische dilataties
- Grote impact op HRQOL
- Bij ernstige affunctionaliteit: noodzaak revisie reconstructie

V. Kwaliteit van leven

V. Kwaliteit van leven na hypofarynxreconstructie

- Afgelopen decennia focus van overleven ook naar kwaliteit van leven
- Inherente functionele en psychosociale consequenties na TLE
- Invloed van complicaties (fistel/strictuur)
- Literatuur naar HRQOL uitkomsten na TLE
 - met name in vergelijking met orgaansparende behandeling
 - geen onderscheid tussen verschillende defecten in gerapporteerde resultaten
 - zeer weinig literatuur naar (lange-termijn) HRQOL na hypofarynxreconstructies

Lange termijn HRQOL na hypofarynxreconstructie

- Cross-sectionele studie middels patiënt gerapporteerde uitkomsten → FACE-Q hoofd-halskanker module
- 13 onafhankelijke vragenlijsten voor functionele en psychosociale domeinen
- Psychometrisch gevalideerd

Inclusie

- Patiënten na TLE tussen 2000 en 2020, curatieve behandeling, ten minste 3 jaar na TLE

14. Tonsbeek A, Hundepool C, Molier A, Corten E, Rijken B, Offerman M, Sewnaik A, Mureau M. Associations between hypopharyngeal defect closure and quality of life in long-term total laryngectomy survivors. Oral Oncology. 2024 Jun; 153:106813.

Resultaten

- 79 van 132 verzonden vragenlijsten ingevuld (response rate 60%)
- Mediane follow-up 92.1 maanden (IQR 75.6-140.2)

Type defect

- 51 patiënten na primaire sluiting
- 28 patiënten na hypofarynxreconstructie (18 partieel, 10 circulair)

14. Tonsbeek A, Hundepool C, Molier A, Corten E, Rijken B, Offerman M, Sewnaik A, Mureau M. Associations between hypopharyngeal defect closure and quality of life in long-term total laryngectomy survivors. Oral Oncology. 2024 Jun; 153:106813.

Postoperatieve uitkomsten

Table 2 – Postoperative outcomes by type of hypopharyngeal defect following total laryngectomy

	Primary closure	Partial defect	Circumferential defect	p-value
<i>Outcome rates - no. (%)</i>	(n=51)	(n=18)	(n=10)	
Fistula [†]	0 (0)	0 (0)	3 (30)	<0.001*
Anastomotic leakage [‡]	7 (14)	10 (56)	2 (20)	0.002*
Stricture	8 (16)	8 (44)	5 (50)	0.01*
Flap failure	NA	0 (0)	2 (20)	0.06

* Denotes statistical significance ($p < 0.05$).

[†] Any abnormal connection between skin or trachea and the reconstructed hypopharyngeal segment requiring surgical revision.

[‡] Any abnormal connection between the skin or trachea and the reconstructed hypopharyngeal segment that spontaneously resolved following prolonged tube feeding, antibiotic therapy, and/or scopolamine therapy.

14. Tonsbeek A, Hundepool C, Molier A, Corten E, Rijken B, Offerman M, Sewnaik A, Mureau M. Associations between hypopharyngeal defect closure and quality of life in long-term total laryngectomy survivors. *Oral Oncology*. 2024 Jun; 153:106813.

Functionele FACE-Q uitkomsten

Median FACE-Q subscale scores [IQR] [†]	Primary closure (n=51)	Partial defect (n=18)	Circumferential defect (n=10)	p-value
Function scales				
Appearance	100 [X]	100 [X]	100 [X]	0.86
Eating	78 [62-100]	57 [47-74]	57 [29-80]	0.01*
Oral Competence	100 [87-100]	87 [66-100]	81 [64-100]	0.05
Salivation	78 [62-100]	69 [46-90]	83 [56-100]	0.27
Smile	100 [X]	100 [78-100]	100 [95-100]	0.74
Speech	63 [43-75]	40 [23-63]	19 [0-75]	0.01*
Swallowing	73 [58-88]	53 [45-70]	63 [48-88]	0.03*

14. Tonsbeek A, Hundepool C, Molier A, Corten E, Rijken B, Offerman M, Sewnaik A, Mureau M. Associations between hypopharyngeal defect closure and quality of life in long-term total laryngectomy survivors. Oral Oncology. 2024 Jun; 153:106813.

Psychosociale FACE-Q uitkomsten

Median FACE-Q subscale scores [IQR] [†]	Primary closure (n=51)	Partial defect (n=18)	Circumferential defect (n=10)	p-value
Distress				
Appearance	100 [88-100]	100 [66-100]	95 [9-100]	0.24
Drooling	100 [X]	100 [90-100]	100 [88-100]	0.60
Eating	95 [79-100]	74 [50-92]	81 [22-85]	0.01*
Smile	100 [X]	100 [X]	100 [X]	0.86
Speaking	77 [61-100]	49 [42-73]	56 [0-83]	0.006*
Modifiers				
Cancer Worry	16 [5-34]	29 [20-44]	24 [0-32]	0.18

14. Tonsbeek A, Hundepool C, Molier A, Corten E, Rijken B, Offerman M, Sewnaik A, Mureau M. Associations between hypopharyngeal defect closure and quality of life in long-term total laryngectomy survivors. Oral Oncology. 2024 Jun;153:106813.

Prognostische factoren

Multivariabele analyse: strictuur enige factor voorspellend voor lange-termijn HRQOL → negatief geassocieerd met:

- eating (Δ median -25, $p < 0.001$)
- salivation (Δ median -30, $p = 0.003$)
- swallowing (Δ median -24, $p = 0.001$)
- eating-related distress (Δ median -50, $p < 0.001$)

→ Belang om reconstructieve resultaten te optimaliseren en complicaties limiteren

Beloop van HRQOL na TLE

- Prospectieve cohortstudie in Erasmus MC
- 2014-2023 in 128 TLE patiënten
- Routinematig verzamelde data (Zorgmonitor) gedurende polikliniek bezoeken
 - Voice Handicap Index (VHI), Hospital Anxiety and Depression Scale (HADS-A, HADS-D), EORTC-QLQ-HN-35 and QLQ-C30
- Analyse van uitkomsten middels mixed-models
 - time from surgery, age at surgery, need for reconstruction, postoperative radiotherapy (PORT), stricture occurrence, fistula occurrence, and mean preoperative PROM score.

15. Tonsbeek AM, Hundepool CA, van der Oest M, et al. Life following total laryngectomy: mixed-model analyses of longitudinal patient-reported outcomes in a prospective cohort. *Oral Oncol.* 2025;107:107431.

Beloop van HRQOL na TLE - uitkomsten

	<i>VHI</i>	<i>HADS-D</i>	<i>HADS-A</i>	<i>EORTC C-30 summary score</i>	<i>HN-35 (SW,SP,SO)</i>
<i>Time from surgery</i>					
<i>Age at surgery</i>					
<i>Need for reconstruction</i>	-				
<i>PORT</i>					
<i>Stricture</i>					
<i>Fistula</i>					
<i>Preoperative PROM score</i>					

Spraakrevalidatie en timing

Table S1 Voice rehabilitation by type of hypopharyngeal defect closure

	Primary closure (n=87)	Partial hypopharyngeal defect closure (n=27)	Circumferential hypopharyngeal defect closure (n=14)	p-value
Tracheo-esophageal puncture (TEP) – no. (%)				<0.001*
Primary	72 (83%)	6 (22%)	0 (0%)	
Secondary	10 (12%)	16 (59%)	9 (64%)	
No TEP	5 (6%)	5 (19%)	5 (36%)	
Speech at latest follow-up – no. (%)				0.016*
TEP speech	73 (89%)	19 (70%)	8 (57%)	
Electrolarynx	10 (12%)	3 (11%)	3 (21%)	
Esophageal speech	2 (2%)	0 (0%)	1 (7%)	
Mobile voice application	0 (0%)	1 (4%)	0 (0%)	
Pseudo-whispered speech	1 (1%)	1 (4%)	2 (14%)	
Inability to speak	1 (1%)	3 (11%)	0 (0%)	

* Denotes statistical significance $p < 0.05$

15. Tonsbeek AM, Hundepool CA, van der Oest M, et al. Life following total laryngectomy: mixed-model analyses of longitudinal patient-reported outcomes in a prospective cohort. *Oral Oncol.* 2025;107:107431.

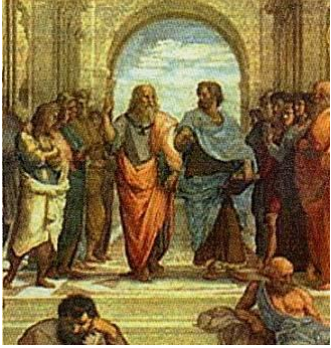
Take home messages

- Complexe chirurgie met aanzienlijke kans op morbiditeit
- Verschillende hypofarynxdefecten en reconstructieve opties met inherente voor- en nadelen
- Geen consensus / richtlijn t.a.v. reconstructie → veel institutionele heterogeniteit
- Belang van limiteren complicaties, met name functionele beperkingen op de lange-termijn
- HRQOL → optimalisatie van pre- en post-rehabilitatie



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13. Tonsbeek AM, Hundepool CA, Duraku LS, Sewnaik A, Wijnhoven BPL, Mureau MAM. Fasciocutaneous and jejunal free flaps for circumferential hypopharyngeal defect reconstruction: a 22-year multicenter cohort study. *Head Neck*. 2024 Jun;46(6):1351-1361.
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15. Tonsbeek AM, Hundepool CA, van der Oest M, et al. Life following total laryngectomy: mixed-model analyses of longitudinal patient-reported outcomes in a prospective cohort. *Oral Oncol*. 2025;107:107431.



Complications/Adverse events/trouble shooting in VP

Dr C. Parrilla, MD PhD

Catholic University of Sacred Heart
Gemelli Academic Hospital
Head and Neck Department:
Chairman Prof. J. Galli

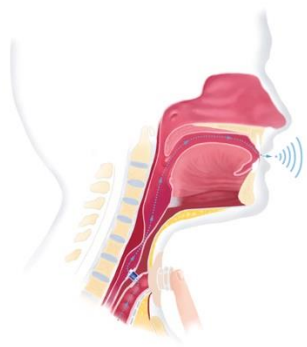


Tracheoesophageal speech

- Originally designed as a salvage procedure for those patients unable to utilize electrolarynx or esophageal speech
- Over time has become the “**gold standard**” in many parts of the world, representing the **first choice for voice rehabilitation** in both primary and secondary setting



- ✓ Most natural substitution voice with acoustic and aerodynamic parameters more similar to laryngeal one
- ✓ High success rate (>90%)
- ✓ Easy to learn



- ✓ In TE pts better patient-related outcomes scores if compared with ES pts
- ✓ Voice rehabilitation outcome significantly impacts patient's QoL
- ✓ Better vocal scores = better psycho-emotional domains

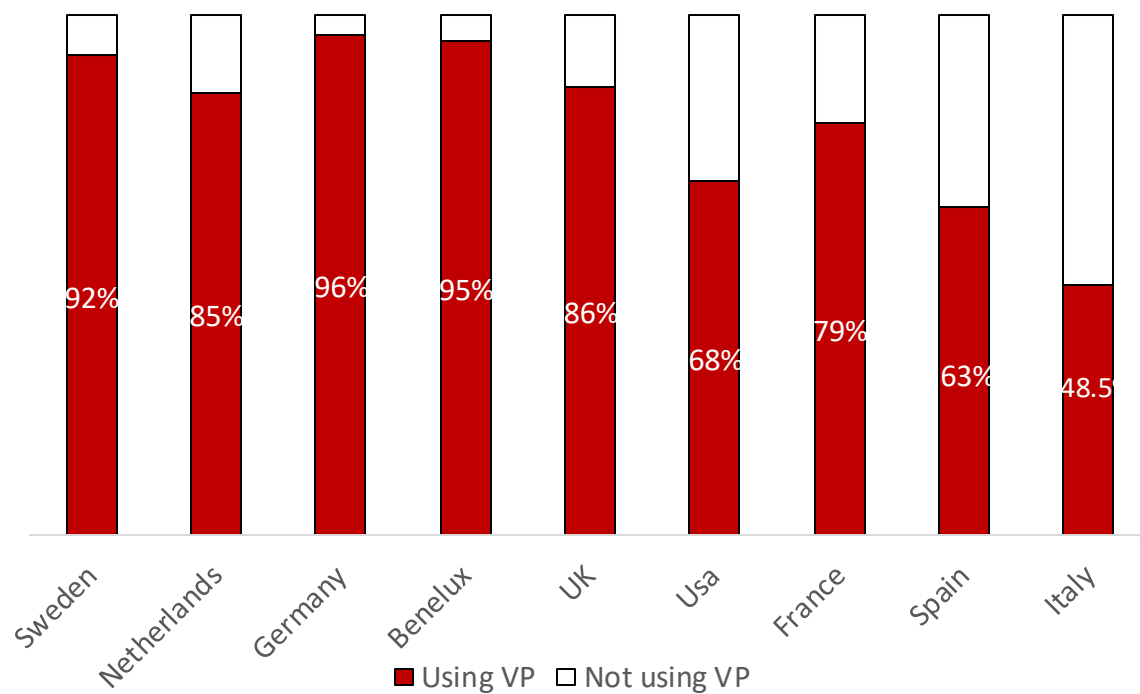




Mismatch between excellent functional outcomes and The actual adoption rate of VP rehab

VP and HME gold standard after TL
With >90% success rate

BUT





Oral Oncology

Volume 91, April 2019, Pages 56-64



Patient access to voice prostheses and heat and moisture exchangers: Factors influencing physician's prescription and reimbursement in eight European countries

A.C.C. Beck^{a b}  , V.P. Retèl^{b c} , M.W.M. van den Brekel^{a d e} , W.H. van Harten^{b c} 

Factors influencing clinical consistency and variability in voice prosthesis management

Kelli L. Hancock , Elizabeth C. Ward ,

Robyn A. Burnett, Peta K. Graciet, Priscilla J. Lenne,

Julia C. F. MaClean  & ...show all

Pages 720-730 | Received 28 Nov 2016, Accepted 05 Jul 2017,

Published online: 31 Jul 2017

Reluctance on VP rehabilitation Clinicians point of view

Acta Oto-Laryngologica >

Volume 143, 2023 - Issue 5

60

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Views

CrossRef citations to date

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Oncology

The French way of voice rehabilitation post total laryngectomy: current clinical practices and tendencies

Dhari Al Burshaid  , Morgane Corda,

Serge Aho-Glele, Caroline Guigou ,

Mohamed Al Shehabi & Mireille Folia

Pages 440-445 | Received 10 Apr 2023, Accepted 13 Apr 2023,

Published online: 09 May 2023

International Journal of Language & Communication Disorders /

Volume 58, Issue 5 / p. 1481-1495

RESEARCH REPORT

 Open Access

Approaches to tracheoesophageal voice rehabilitation: a survey of the UK and Irish speech and language therapists' current practice and beliefs

Freya Sparks , Lucy Dipper, Margaret Coffey, Katerina Hilari

Three main reasons

1. Management of complications

Surgical Complications (early complications)

Long-term voice prosthesis/fistula troubles (*late complications*)

2. Physicians burden

3. Costs of devices

Surgical Complications in prosthetic voice rehabilitation

Major complications

- Major complications are quite rare, but rates of up to 25% have been recorded
- Always related to difficult oesophagoscopy

Oesophagoscopy for secondary puncture may be technically difficult because of a tortuous neopharynx, stenosis or stricture formation and cervical spine deformity, especially after radiotherapy



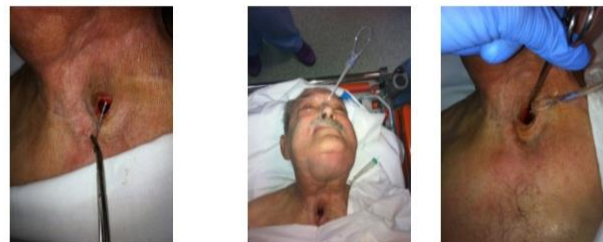
- TOP patients should also be monitored for pneumothorax, pneumomediastinum and subcutaneous emphysema

Major complications

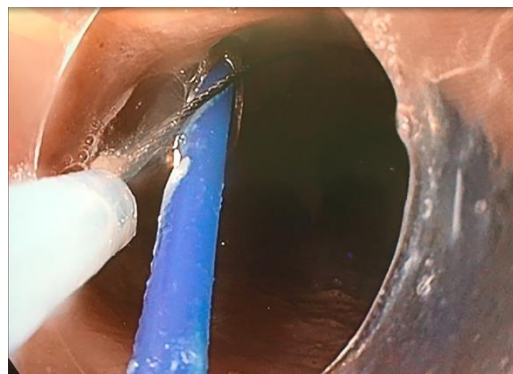
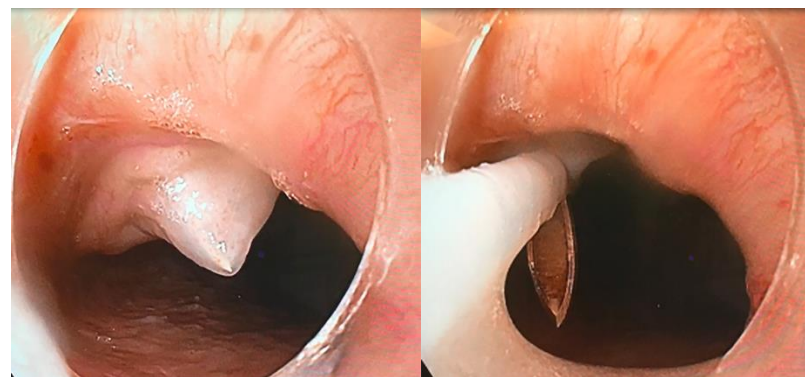
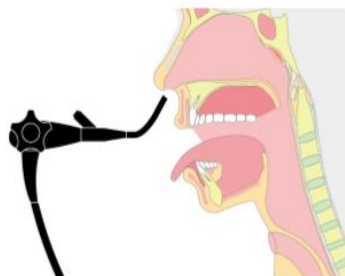
- Some cases of oesophageal perforation resulting in **mediastinitis** have been reported
Andrews laryngoscope 1987; Mehle Otolaryngol head neck surg 1992
- **Mediastinitis** has been reported in up to 8% of secondary TOP
 - Because of **posterior oesophageal wall perforation**, or the creation of a false passage between the trachea and oesophagus
Scheuermann HNO 2005; Kaldioglu 2004; Silver Laryngoscope 1985
Prichard J R Coll Surg Edinbur 1994; Leakos J otolaryngol 1992
Driver et al Journal of Laryngol Otol 1997
- 10 cases of **cervical spine infection** complicating TOP have been reported, associated with secondary puncture
Silver Laryngoscope 1985
Ruth Otolaryngol Head Neck surg 1985
- **Dysphagia, fever, reduced neck mobility: signs of retropharyngeal abscess!!**
- Also **“late”** perforation of the esophagus with a mediastinal abscess has been reported (3 months after puncture)
Scheuermann HNO 2005

Surgical complications

Strategy to minimize major complications in secondary puncture



Fukuhara Technique

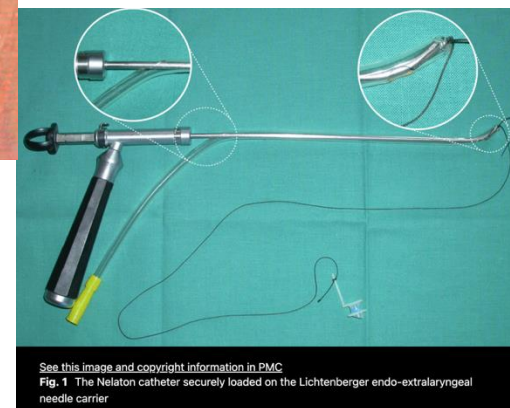


Journal of Voice
Available online 10 April 2022
In Press, Corrected Proof

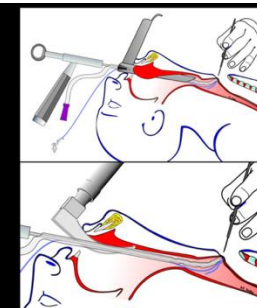


A Multidisciplinary Approach to Secondary Tracheoesophageal Puncture for Voice Prosthesis Insertion Using Flexible Esophagoscopy

Saikrishna Ananthapadmanabhan^{1,2,3,4,5}, Joe Jabbour¹, Stephanie Lai¹, Anand Suruliraj^{1,2,3}, Mark Smith^{1,2,3}, Faruque Rifat^{1,2,3}, Michael Devadas⁴, Han Liem⁴, Niranjana Sritharan^{1,2,3}



See this image and copyright information in PMC
Fig. 1 The Nelaton catheter securely loaded on the Lichtenberger endo-extralaryngeal needle carrier



See this image and copyright information in PMC
Fig. 2 The intervention can be carried with both Kleinsasser type surgical laryngoscope (top) or intubational laryngoscope of the Macintosh type (bottom). The tip of the endo-extralaryngeal needle carrier is positioned by digital palpation through the stoma. The puncture is performed with scalpel blade 11

Surgical complications

Strategy to minimize major complications in secondary puncture

Yankauer suction catheters



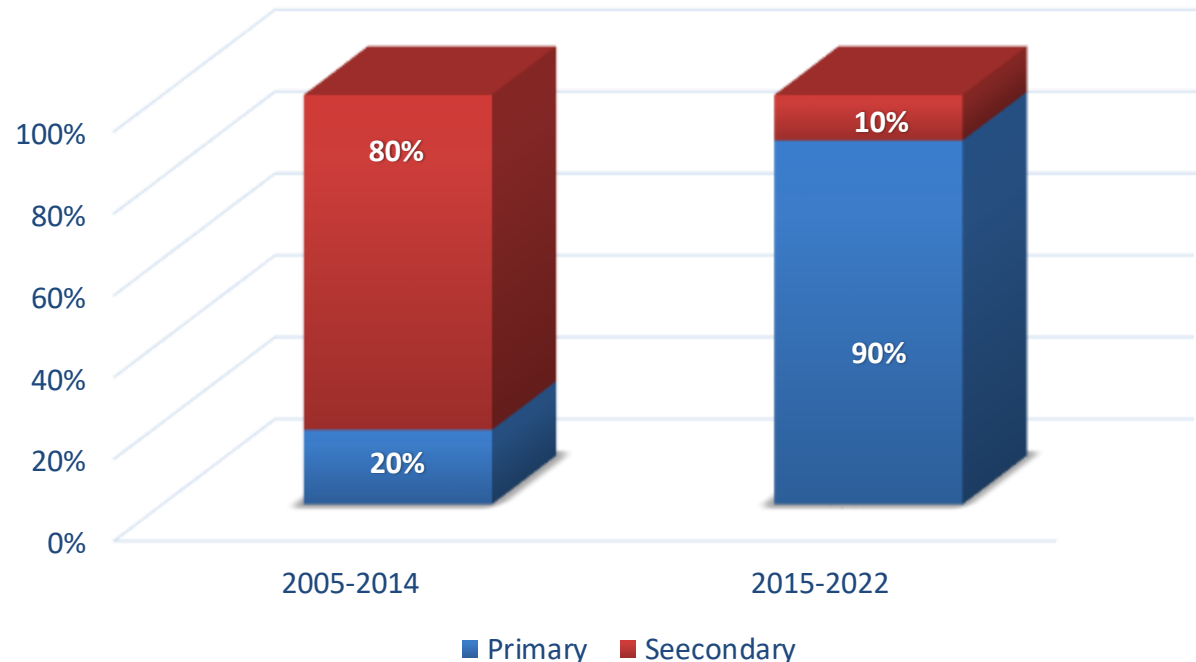
Minimal surgical set-up

Easy to handle pharynx protector making safe and easy «out clinic» secondary puncture is missing!!



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Rhinological and Otological Society, Inc.

Trend primary vs secondary



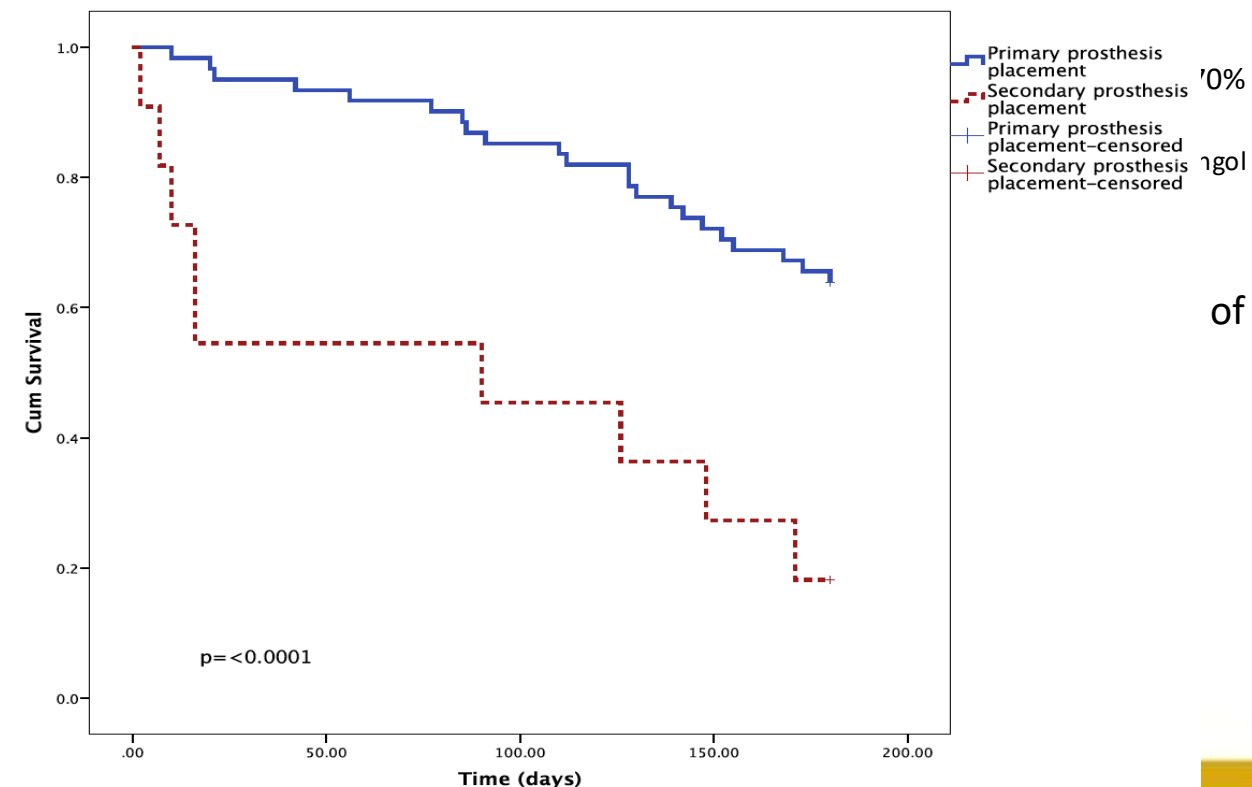
Lesson learned

Primary better than Secondary

Secondary Tracheoesophageal Puncture After Laryngectomy Increases Complications With Shunt and Voice Prosthesis

Claudia Scherl, MD ; Julia Kauffels, MD; Anne Schützenberger, MD; Michael Döllinger, PhD; Christopher Bohr, MD, PhD; Stephan Dürr, MD; Rainer Fietkau, MD, PhD; Marlen Haderlein, MD; Michael Koch, MD, PhD ; Maximilian Traxdorf, MD, PhD; Konstantinos Mantsopoulos, MD, PhD ; Sarina Müller, MD; Heinrich Iro, MD, PhD

B Tracheoesophageal puncture and voice prosthesis complication free survival



DOI: 10.1002/hed.27571

OPERATIVE TECHNIQUES

WILEY

This article supplements the Operative Techniques video presentation, which can be viewed online on Head & Neck's home page at [http://onlinelibrary.wiley.com/journal/10.1002/\(ISSN\)1097-0347](http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1097-0347)

Hybrid primary puncture in stapler-assisted total laryngectomy

Jacopo Galli MD, PhD^{1,2}  | Luca Perna MD¹ | Giorgia Rossi MD¹  |
Luigi Corina MD¹  | Claudio Parrilla MD, PhD¹ 

Primary TEP indications and Contraindications

Table 2. Summary of statements related to primary TEP indications.

Number	Statement	Level of Evidence	Grade of Recommendation
6	Primary TEP can be performed in all laryngectomized patients, regardless of the location and extent of the tumor or the need for reconstructions with free or pedicled flaps.	4	C
7	Primary TEP in salvage total laryngectomies after chemoradiotherapy has not been shown to increase the incidence of complications related to the VP.	4	C
8	<u>A multidisciplinary and multidimensional preoperative evaluation is recommended to correctly select candidates for primary TEP. This evaluation should include an assessment of the patient's overall health, motivation, speech therapy evaluation, ORL evaluation, and evaluation of social/family support.</u>	3b	B
9	<u>The best rehabilitative outcomes are found in centers with experience, high specialization, and sufficient resources and patient volume.</u>	2b	B

Abbreviations: TEP, tracheoesophageal puncture; VP, voice prosthesis; ORL, otorhinolaryngology.

Table 3. Summary of statements related to primary TEP contraindications

Number	Statement	Level of Evidence	Grade of Recommendation
10	Primary TEP is not recommended in cases of lingual or mandibular involvement requiring total glossectomy or resulting in sequelae that prevent proper word articulation.	4	C
11	Primary TEP is not recommended for patients in poor overall health, with incapacitating comorbidities, a lack of motivation for rehabilitation, or a negative assessment following preoperative evaluation.	4	C
12	In a patient at high risk of postoperative complications, including pharyngocutaneous fistula, deferring the performance of primary TEP should be considered.	4	C
13	<u>The performance of primary TEP or rehabilitation with tracheoesophageal voice in healthcare centers without the necessary resources for proper rehabilitative treatment and follow-up is not recommended.</u>	2b	B

Abbreviations: TEP, tracheoesophageal puncture.

> Support Care Cancer. 2019 Sep;27(9):3537-3544. doi: 10.1007/s00520-019-4647-1. Epub 2019 Jan 26.

Integrated rehabilitation after total laryngectomy: a pilot trial study

Ylenia Longobardi ¹, Vezio Savoia ², Francesco Bussu ^{3,4}, Luciana Morra ¹, Giorgia Mari ¹, Domenico A Nesci ², Claudio Parrilla ⁵, Lucia D'Alatri ¹

Three main reasons

1. Management of complication

Surgical Complications (early complications)

Long-term voice prosthesis/fistula troubles (*late complications*)

2. Physicians burden

3. Costs of devices

Biofilm in voice prosthesis: A prospective cohort study and laboratory tests using sonication and SEM analysis

J. Galli | L. Calo | D. Meucci | M. Giuliani | D. Lucidi | G. Paludetti | R. Torelli |
M. Sanguinetti | C. Parrilla



Management of Voice prosthesis complications

Intravalvulare leakage first cause of prosthesis replacement

TABLE 1 Bacterial strains identified during cultural examination

Bacteria		Total devices
<i>Staphylococci</i> spp.	13	15
<i>Streptococci</i> spp.	9	15
<i>Enterococcus faecalis</i>	1	15
<i>Neisseria sicca</i>	2	15
<i>Haemophilus influenzae</i>	5	15
<i>Klebsiella pneumoniae</i>	3	15

TABLE 2 Candida strains identified during the culture examination

Candida strains		Total devices
<i>Candida albicans</i>	12	15
<i>Candida glabrata</i>	7	15
<i>Candida krusei</i>	2	15

The growth of biofilm generates an initial deterioration of the silicone smooth surface through physical and chemical mechanisms, which results in leakage and malfunction of the valve mechanism.

Intravalvular leakage first cause of prosthesis replacement

Solution:

- Topographic and/or systemic antifungal agents (?)
- Dietary changes
(Busscher et al., 1998; Free et al., 2000, 2003; Schwandt et al., 2004)
- Frequent Flushing of the prosthesis with air
(Free et al., 2003)

Ongoing research

New prevention methods with active and passive surface modification that inhibit the Yeasts biofilm formation on silicone surfaces

Some patients experience excessive biofilm formation leading to device life times of 4 to 8 weeks or even less



> [Eur Arch Otorhinolaryngol.](#) 2022 Aug;279(8):4167-4172. doi: 10.1007/s00405-022-07313-x. Epub 2022 Feb 26.

Long-term outcomes and cost-effectiveness of a magnet-based valve voice prosthesis for endoprosthesis leakage treatment

Miguel Mayo-Yáñez ^{1 2 3}, Carlos Chiesa-Estomba ^{4 5}, Jérôme R Lechien ^{4 6 7}, Christian Calvo-Henríquez ^{8 4 9}, Luigi A Vaira ^{4 10}, Irma Cabo-Varela ¹¹

For every replacement not made thanks to the active valve there was saving of 133 Euro

Fistula-related problems

- Leakage around the prosthesis
 - Too long prosthesis
 - subsiding of surgical edema and tissue reaction is a natural course of events this means that during follow-up often a shorter prosthesis is sufficient
 - Tissue problems/tissue atrophy
 - Excessive speaking force



In the literature:

Fairly extensive work on

- risk factors
 - therapy outcomes
 - management attempts
- without*

a consensus about a systematic troubleshooting algorithm

Check for updates

Original Research

Periprosthetic Leakage in Tracheoesophageal Prosthesis: Proposal of a Standardized Therapeutic Algorithm

Claudio Parrilla, MD, PhD¹, Ylenia Longobardi, SLP, MSc¹, Jacopo Galli, MD, PhD¹, Mario Rigante, MD, PhD¹, Gaetano Paludetti, MD, PhD¹, Francesco Bussu, MD, PhD², and Emanuele Scarano, MD, PhD³

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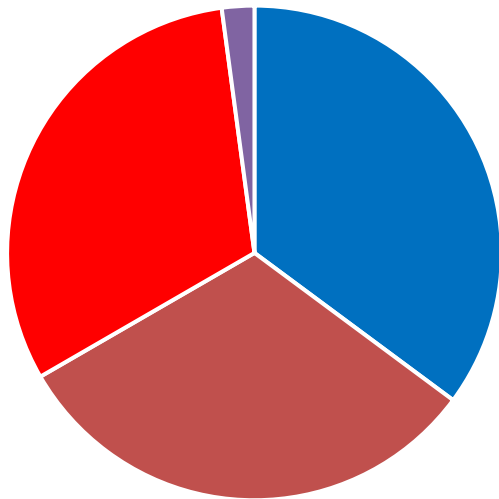
Periprosthetic leakage

Classification

December 2014-December 2019

115 VP patients treated with the **same step-by-step therapeutic approach** until it was successful

Causes of periprosthetic leakage



- 35.15% Too long prosthesis
- 31.51% Enlarged fistula
- 31.22% Granulation tissue formation

Minor leakage

(1 or 2 leaks per patient,
manageable with simple
conservative procedures)

in 51 of 82 patients (62.19%)

Clinically relevant leakages

(2 events in a short period -1 month)
associated or not with enlargement of
the tracheoesophageal fistula

in 24 of 82 (29.2%)

Major fistula enlargement

(associated or not with atrophic,
infected, or necrotic fistula)

in 7 of 82 (8.53%)

Vocal Effort

In 18.18% of accesses periprosthetic leakage was recorded immediately after or during a period of **vocal effort** (none of these was a major fistula Enlargement)

Spasm or Hypertonicity

Excessive speaking force Air may be forced around the prosthesis, which (especially in combination with poor tissue health) may ultimately lead to enlargement of the puncture

> [Laryngoscope](#). 2024 Jan;134(1):198-206. doi: 10.1002/lary.30857. Epub 2023 Jun 27.

Management of Enlarging Tracheoesophageal Fistula with Voice Prosthesis in Laryngectomized Patients

Arman Saeedi ¹, David P Strum ², Ghayoor Mir ², Michael S Chow ², Nupur Bhatt ², Adam S Jacobson ²

Early leakage

25 of 82 patients (30.48%) **early periprosthetic** leakage (<6months from surgery)
57 (69.51%) **had a late** periprosthetic leakage (>6 months from surgery)

Between patients with early and late leakage, a statistically significant difference in the mean number of subsequent periprosthetic leakages was found (4 +/- 3.49 vs 2.04 +/- 1.46, respectively; P = .02)

Excessive speaking force

Treatment sequence:

1. speech therapy
2. relaxation exercises
3. chemical denervation with Botulinum toxin
4. surgical treatment (myotomy/neurectomy)

Chemical denervation with Botulinum toxin



Diagnostic work-up

1. Endoscopic view of prosthesis
(no doubt that the effort in voicing is due to i.e. esophageal granulation)



2. Lidocain injection

3. In our hands lidocain test sufficient to assess the area of hypertonicity to identify the injection site

Periprosthetic Leakage in Tracheoesophageal Prosthesis: Proposal of a Standardized Therapeutic Algorithm

Claudio Parrilla, MD, PhD¹, Ylenia Longobardi, SLP, MSc¹,
Jacopo Galli, MD, PhD¹, Mario Rigante, MD, PhD¹,
Gaetano Paludetti, MD, PhD¹, Francesco Bussu, MD, PhD²,
and Emanuele Scarano, MD, PhD³

Radiotherapy does not influence the annual number of accesses per patient due to periprosthetic leakage, in neither a preoperative setting nor an adjuvant one

Table 4. Impact of Risk Factors on the Annual Number of Accesses per Patient.

Risk factor	No. of accesses, mean $\pm$ SD	P value
Radiotherapy		.71
Irradiated	2.68 $\pm$ 2.55	
Nonirradiated	2.42 $\pm$ 2.09	
In preoperative setting		
Irradiated	2.12 $\pm$ 1.35	.59
Nonirradiated	2.42 $\pm$ 2.09	
In adjuvant setting		
Irradiated	2.80 $\pm$ 2.75	.68
Nonirradiated	2.42 $\pm$ 2.09	
Total laryngectomy		.72
Primary	2.68 $\pm$ 2.66	
Salvage	2.44 $\pm$ 1.72	
Tracheoesophageal puncture time		.50
Primary	2.77 $\pm$ 2.06	
Secondary	2.34 $\pm$ 2.96	

Risk factors: RT

Significantly higher rates of clinically relevant leakages were recorded in patients undergoing **primary irradiation: salvage TL**

Table 5. Impact of Risk Factors on the Incidence of Clinical Relevant Leakage and Major Fistula Enlargement.

Risk factor	Clinically relevant leakage, %	P value	Major fistula enlargement, %	P value
Radiotherapy		.18		.07
Irradiated	31.03		12.07	
Nonirradiated	25		0	
In preoperative setting				
Irradiated	72.72	.009 ^a	36.36	.006 ^a
Nonirradiated	25		0	
In adjuvant setting				
Irradiated	21.27	.21	6.38	.28
Nonirradiated	25		0	
Total laryngectomy		.038 ^a		.06
Primary	21.73		5	
Salvage	47.05		18.18	
Tracheoesophageal puncture time		.17		.28
Primary	27		8	
Secondary	33.33		10	

^aP < .05

Periprosthetic Leakage in Tracheoesophageal Prosthesis: Proposal of a Standardized Therapeutic Algorithm

Claudio Parrilla, MD, PhD¹, Ylenia Longobardi, SLP, MSc¹,
Jacopo Galli, MD, PhD¹, Mario Rigante, MD, PhD¹,
Gaetano Paludetti, MD, PhD¹, Francesco Bussu, MD, PhD²,
and Emanuele Scarano, MD, PhD¹

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DOI: 10.1177/194599820983343
http://otojournal.org
SAGE

Troubleshooting algorithm for periprosthetic leakage

1. Inspection of local conditions

- Deep cleaning
- Prosthesis reallocation in situ

2. Prosthesis replacement

- Insert of shorter prosthesis
- Insert of analogous prosthesis via overshooting
- Insert of longer prosthesis

3. Widening of the flanges

- Silicone ring behind the tracheal flange
- Specialized VP with an enlarged esophageal flange

4. Tissue augmentation

- Silicone injection
- Fat injection

5. Fistula shrinkage

- Prosthesis removal and nasogastric feeding tube insertion

6. Fistula closure

- Definitive closure of the fistula with surgical technique

Prosthesis
Assessment, resizing
and costumization as
the initial step

Long lasting solution

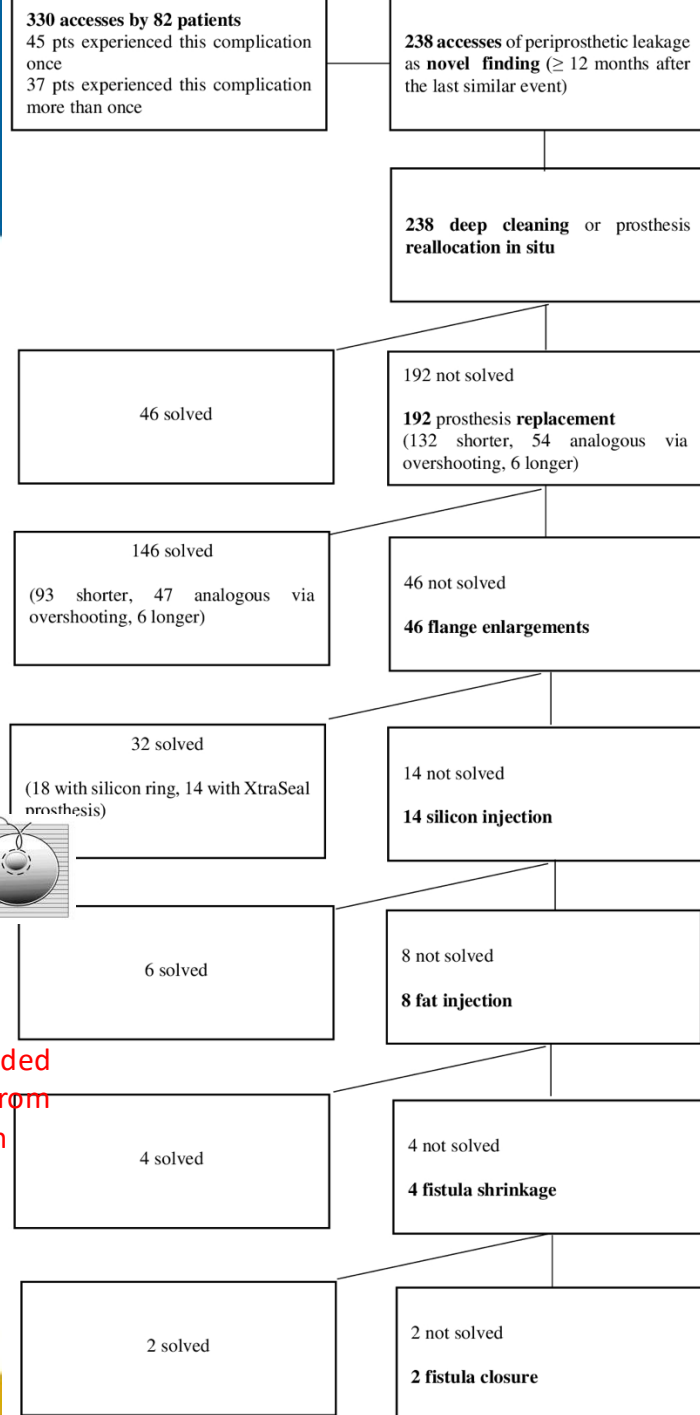
Unpleasant for patient

Unpleasant for patient
Frustrating for caregivers

Xtra-seal prosthesis

Submucosal purse
string suture around
fistula tract

We intentionally excluded
purse string sutures from
our therapeutic algorithm



A single approach is not successful for all patient!!

After failure with Prosthesis Assessment,
resizing and customization as the initial step

Solution algorithm

Silicon sealing ring behind tracheal flange

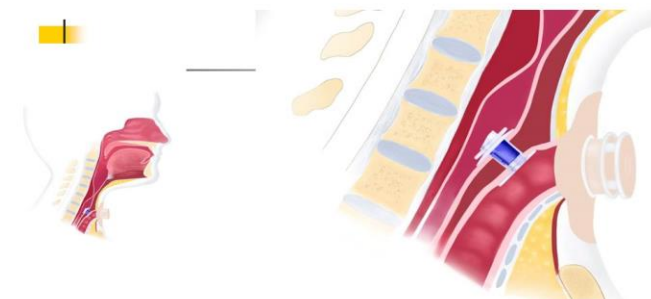


Fistula-related problems

Periprosthetic leakage

TE Tissue atrophy

Provox Vega XtraSeal



Fistula-related problems

Periprosthetic leakage

TE Tissue atrophy

Solution algorithm

Atrophic/scarred TE fistula augmentation with injectable silicon (Bioplastique™)



Management of Voice prosthesis complications

Perivalvular leakage



cells



Article

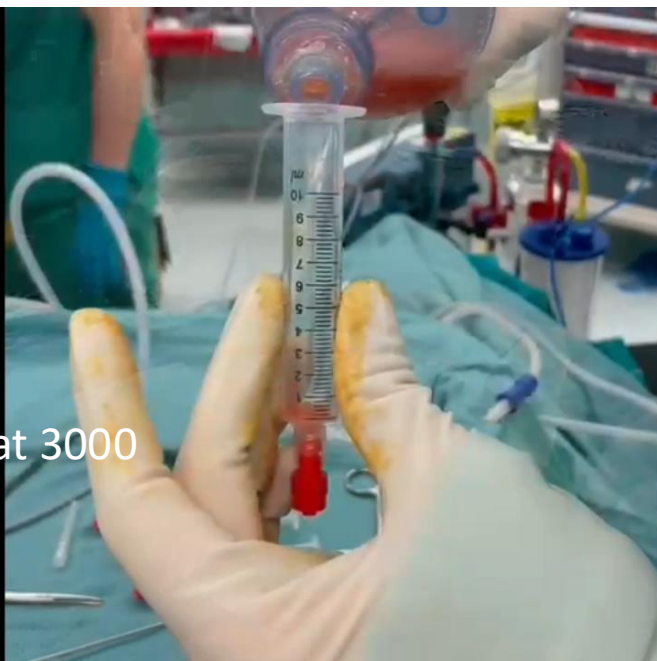
Regenerative Strategy for Persistent Periprosthetic Leakage around Tracheoesophageal Puncture: Is It an Effective Long-Term Solution?

Claudio Parrilla ^{1,†}, Aurora Almadori ^{2,3,*,†}, Ylenia Longobardi ^{1,†}, Wanda Lattanzi ⁴ , Marzia Salgarello ² and Giovanni Almadori ^{1,5}

Fat injection

23.11.2020

centrifuged at 3000
rpm for 10 s



Coleman technique: aspirate, process and inject the adipose tissue

- Augmentation purpose(padding effect)
- Regenerative aims remodelling of the extracellular matrix



ASCs (**adipose-tissue derived stem cells**), pericytes, endothelial cells and adipocytes, capable of releasing biological molecules such as cytokines and growth factors equipped with factors angiogenic, immunomodulatory and trophic properties

[Arch Plast Surg](#). 2022 Sep; 49(5): 617–632.

PMCID: PMC95076

Published online 2022 Sep 23. doi: [10.1055/s-0042-1756347](https://doi.org/10.1055/s-0042-1756347)

PMID: [361593](https://pubmed.ncbi.nlm.nih.gov/361593)

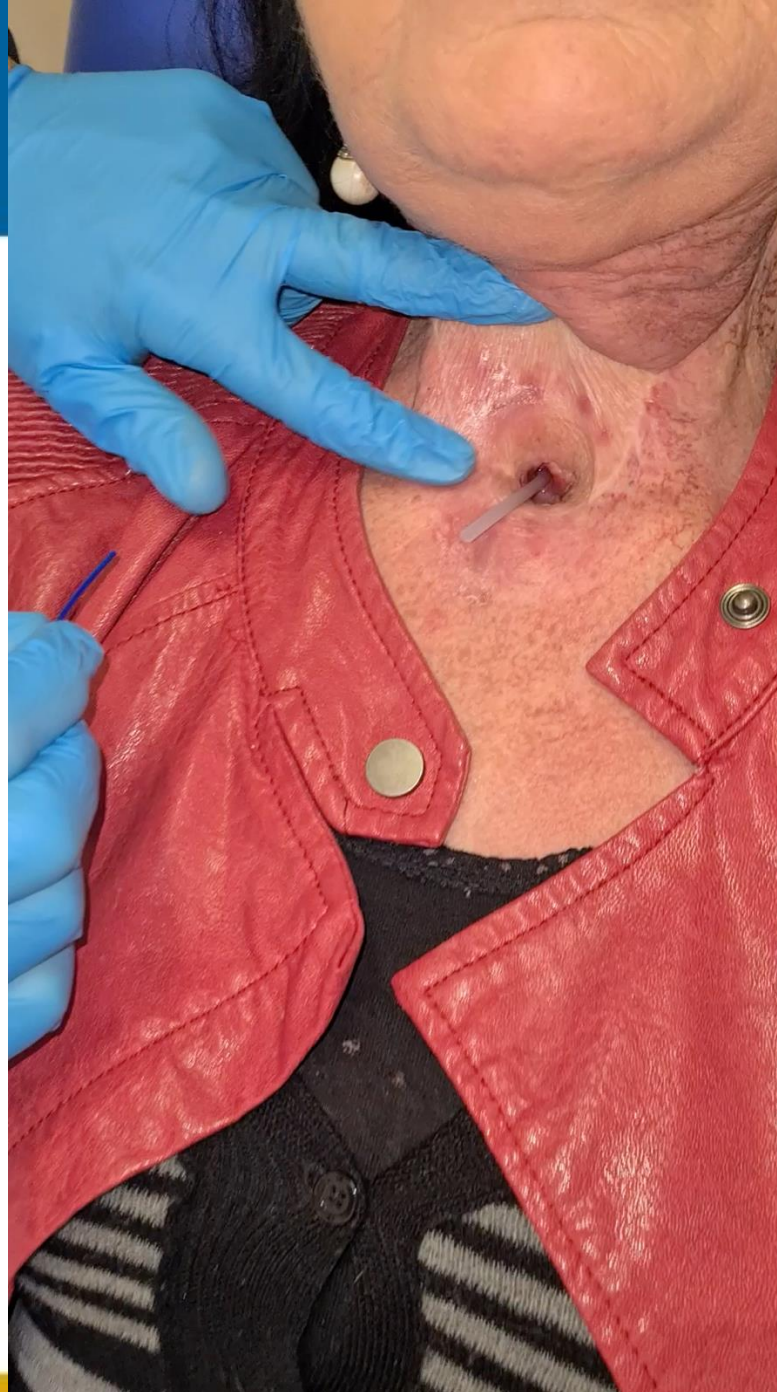
Definitive Closure of the Tracheoesophageal Puncture Site after Oncologic Laryngectomy: A Systematic Review and Meta-Analysis

[Joseph M. Escandón](#), MD,^{1,§} [Arbab Mohammad](#), MBBS,^{2,§} [Saumya Mathews](#), MS, MCh,³ [Valeria P. Bustos](#), MD,⁴ [Eric Santamaría](#), MD,⁵ [Pedro Ciudad](#), MD, PhD,^{6,7} [Hung-Chi Chen](#), MD, PhD, FACS,⁷ [Howard N. Langstein](#), MD,¹ and [Oscar J. Manrique](#), MD, FACS¹

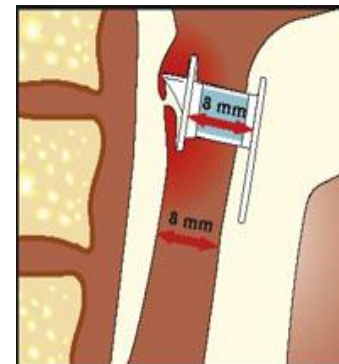
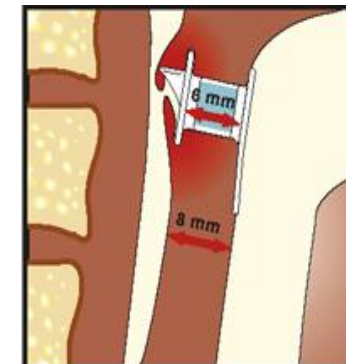
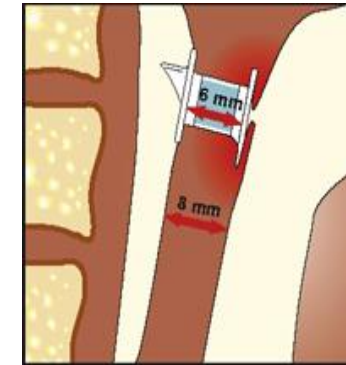
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Retrograde insertion when anterograde fails



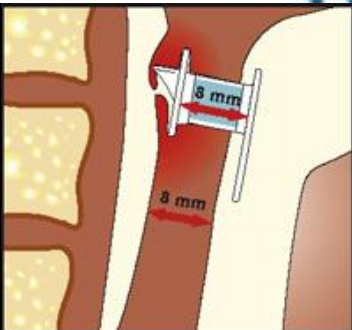
Opposite to atrophic
TE Tissue hypertrophy



TRACHEAL GRANULATION
+ EXTRUSION



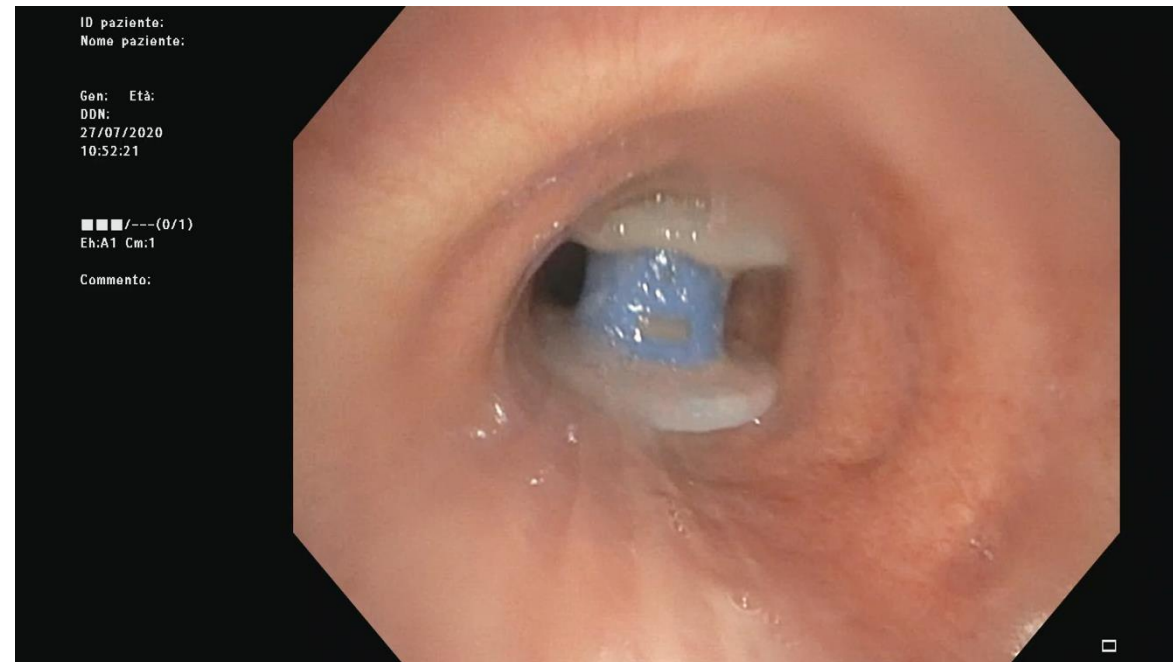
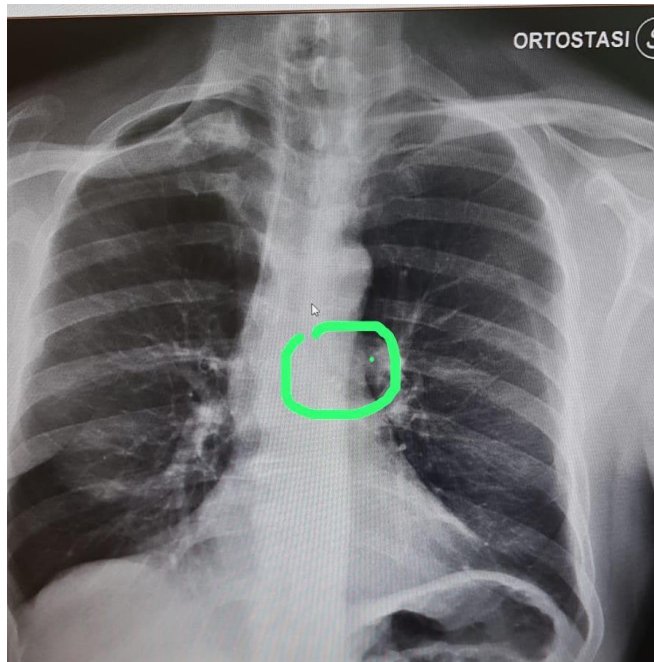
Oesophageal granulation:
Endoscopic laser excision
via rigid esophascopy



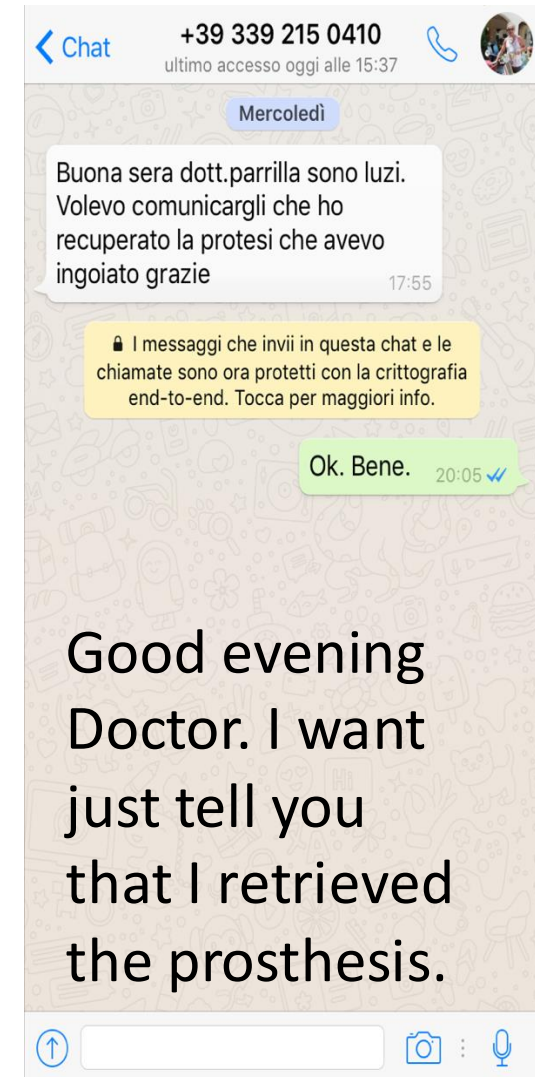
Valve Aspiration

- A loose valve or coughing during valve change can result in aspiration of the valve into the airway. Reported with an incidence of 0.75-13%

Osrovsky Ann Otol Rhinol Laryngol 2004; Singer Head neck surg 1993



- Accidental ingestion of the provox devices may occur. An explanation could be the local gradual overgrowth of tracheal mucosa
- Verify if the prosthesis is indeed ingested and is not just hidden in the fistula under the mucosa
- Can be removed by esophagoscopy or may pass spontaneously into the stomach and usually pass the intestinal tract
- 1 case requiring laparotomy in the literature
 - Hiltmann Laryngorhinootologie 2002



Three main reasons

1. Management of complication

Surgical Complications (early complications)

Long-term voice prosthesis/fistula troubles (*late complications*)

2. Physicians burden

3. Costs of devices

- ✓ Main obstacle for many clinicians to voice prosthesis rehabilitation
- ✓ The management is considered 'time demanding'
- ✓ Anxiety in non-experienced/non-specifically trained specialists
- ✓ Much more frequent visits to health care providers than esophageal speakers even at the end of vocal rehabilitation
- ✓ Higher cost for the Healthcare System

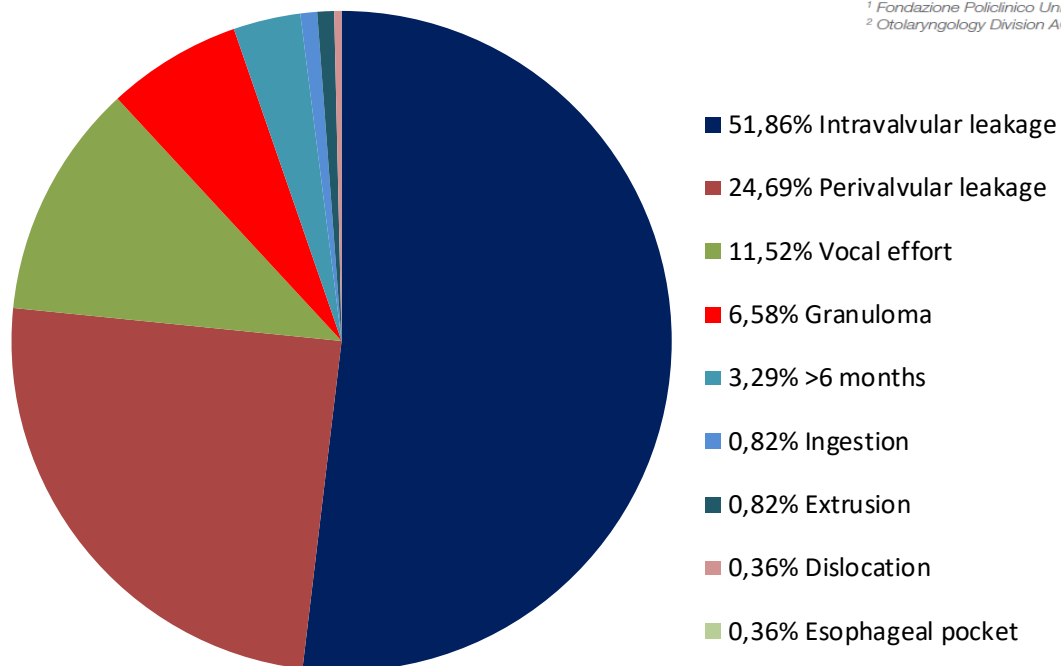
A one-year time frame for voice prosthesis management. What should the physician expect? Is it an overrated job?

*Finestra di un anno sulla gestione di pazienti con protesi fonatoria.
È un carico clinico sovrastimato?*

Claudio Parrilla¹, Ylenia Longobardi¹, Gaetano Paludetti¹, Maria Elisabetta Marenda¹, Lucia D'Alatri¹, Francesco Bussu^{2,3}, Emanuele Scarano³, Jacopo Galli¹

¹ Fondazione Policlinico Universitario A. Gemelli IRCCS, Università Cattolica del Sacro Cuore, Istituto di Otorinolaringoiatria, Rome, Italy;

² Otolaryngology Division AOU, Sassari, Italy; ³ Università Cattolica del Sacro Cuore, Istituto di Otorinolaringoiatria, Rome, Italy



- June 2017-June 2018
- 70 VP patients
- 243 accesses at the Otolaryngology Clinic and Phoniatric Unit for **prosthesis issue** has been registered on a **specific database**.
- Information on the incidence, management and outcome of adverse events

Median prosthesis life-time = 5.1 months

Thanks to speech therapist trouble-shooting the number of physician visit per patient per year decreased from **3.6** to **2.7**

Multidisciplinary algorithm for the management of issues related to the voice and related to the VP

AIMS

- Make the burden of VP management **reasonably acceptable**, especially in referral center with large number of patients, **offering a simple solution to the most common complications**
- **Guarantee the high success rate that VP promises** from a **phonatory point of view**
 - Strict adherence to a customized troubleshooting algorithm
 - A multidisciplinary approach

**NEED FOR
MULTIDISCIPLINARY APPROACH**



LARYNGOLOGY

A one-year time frame for voice prosthesis management. What should the physician expect? Is it an overrated job?

Finestra di un anno sulla gestione di pazienti con protesi fonatoria. È un carico clinico sovrastimato?

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Original Research

Periprosthetic Leakage in Tracheoesophageal Prosthesis: Proposal of a Standardized Therapeutic Algorithm

Claudio Parrilla, MD, PhD¹, Ylenia Longobardi, SLP, MSc¹, Jacopo Galli, MD, PhD¹, Mario Rigante, MD, PhD¹, Gaetano Paludetti, MD, PhD¹, Francesco Bussu, MD, PhD², and Emanuele Scarano, MD, PhD³

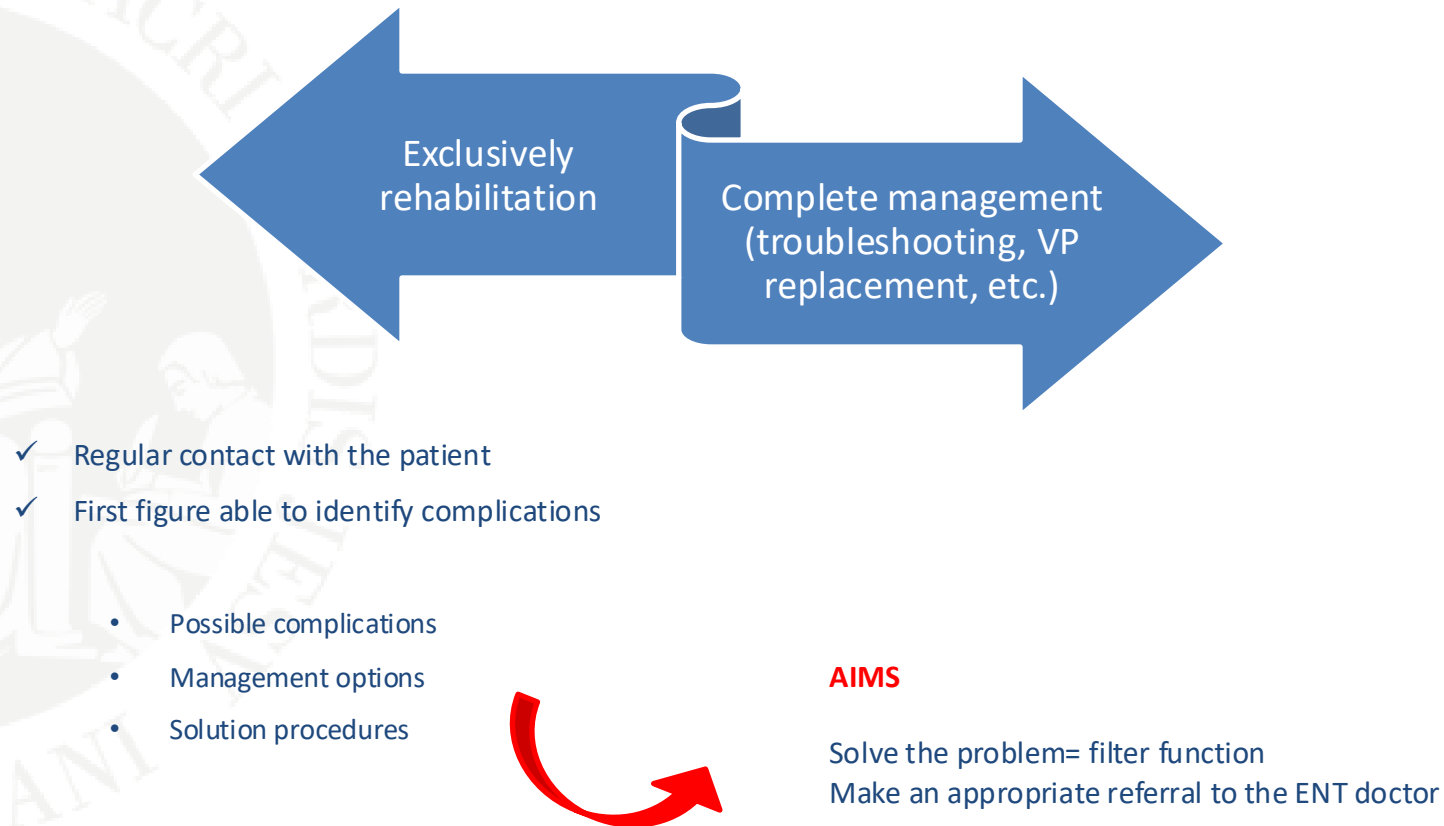
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OTOLARYNGOLOGY,
HEAD AND NECK SURGERY
FOUNDATION

Otolaryngology—
Head and Neck Surgery
Topic
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Multidisciplinary algorithm for the management of issues related to the voice and related to the VP

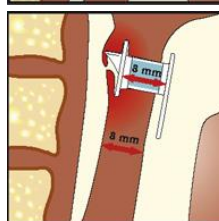
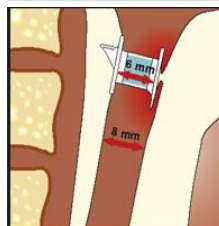
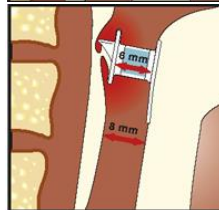
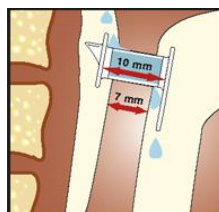
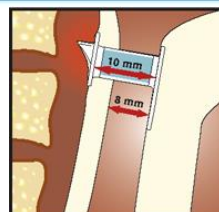
Extreme variability around the world on the role of the SLP/SLT in taking care of the VP patient



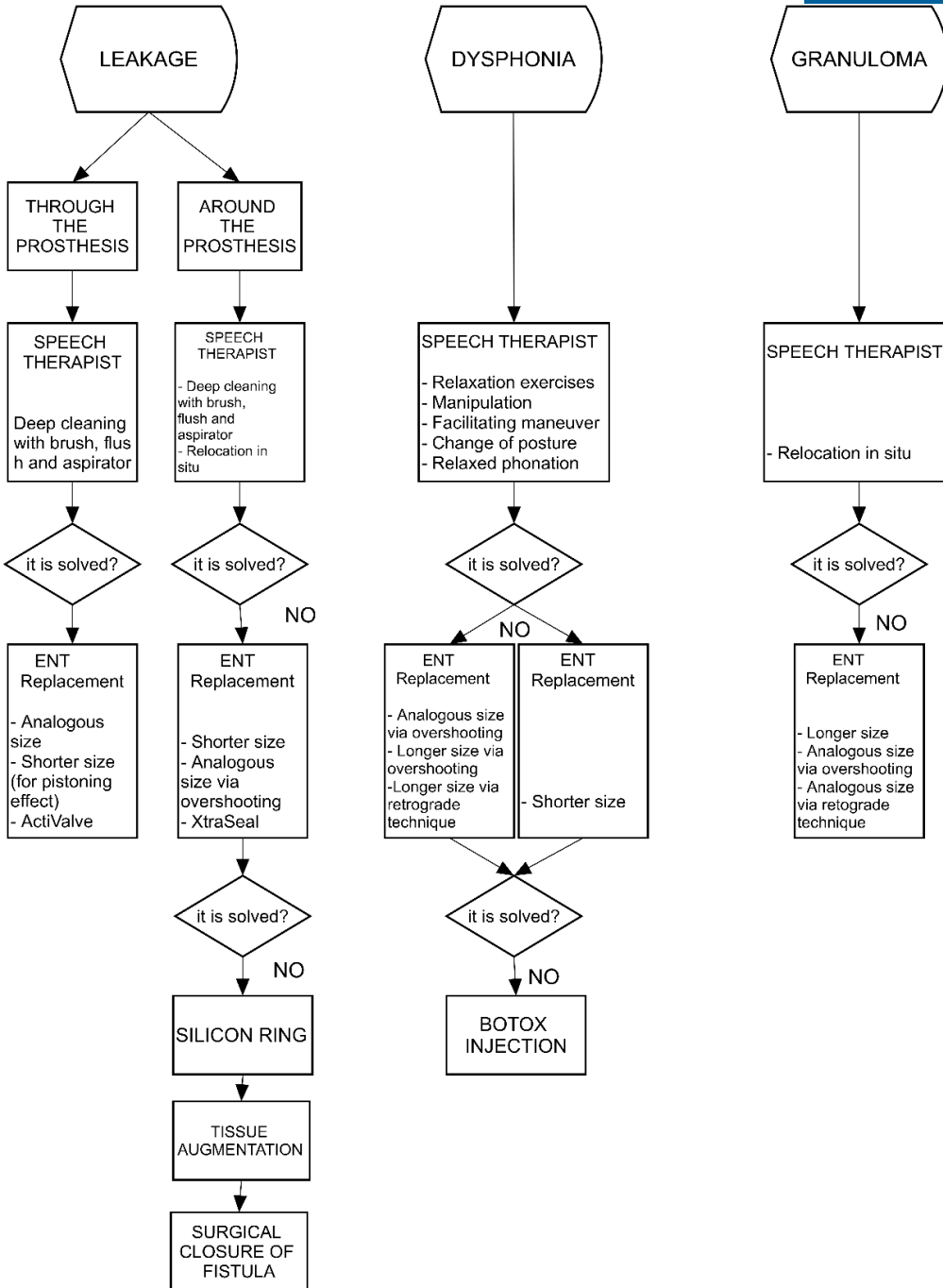
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- Using the correct size voice prosthesis is very important
 - prosthesis that is too short or too long may lead to problems with the TE puncture or with voicing
- Always check the proper length of the current prosthesis
- Educate the patient about signs of an improper fit
- Determine the indication for replacement (leakage through or around, infection of the fistula tract, etc.)
- Determine the **required length of the new prosthesis** (never automatically replace the existing device with one of the same size)



Troubleshooting in prosthetic voice rehabilitation

COVID-19 Pandemic

Offer all patients the possibility of a **teleconsultation**:

- ☐ management of VP complications
- ☐ cancer monitoring
- ☐ assessment of psychophysical well-being

AIM:

To assess the patient's general condition and to intervene before emergencies arise whose resolution would have required a visit and / or hospitalization

62% case solved via teleconsultation

- 1 case of Second primary (tonsil)
- 1 case of Peristomal recurrence
- 3 cases of severe Anxiety/depressive disorder

Original Research

Patients With Voice Prosthesis Rehabilitation During the COVID-19 Pandemic: Analyzing the Effectiveness of Remote Triage and Management

Ylenia Longobardi, SLP¹, Jacopo Galli, MD, PhD¹,
Lucia D'Alatri, MD¹, Vezio Savoia, PhD², Giorgia Mari, SLP¹,
Mario Rigante, MD, PhD¹, Giulio Cesare Passali, MD, PhD¹,
Francesco Bussu, MD, PhD³, and Claudio Parrilla, MD, PhD¹

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DOI: 10.1177/0194599820948043
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SAGE

From 2020 to 2023: 542 teleconsultations

80% of our patients have used the service

34% used it more than once

Most frequent reason for teleconsultation VP related reasons

The service has been included in the post pandemic management protocols whit a filter function for hospital accesses

Three main reasons

1. Management of complication

Surgical Complications (early complications)

Long-term voice prosthesis/fistula troubles (*late complications*)

2. Physicians burden

3. Costs of devices

Patient access to voice prostheses and heat and moisture exchangers: Factors influencing physician's prescription and reimbursement in eight European countries

A.C.C. Beck^{a b} , V.P. Retèl^{b c} , M.W.M. van den Brekel^{a d e} , W.H. van Harten^{b c} 

overview of the reimbursement systems applied to the voice prosthesis and HME in the EU

Table 3. Survey and interview results: Reimbursement of the voice prosthesis and HME (n = 8).

Country	Device	Reimbursement method	Funding by IP or OP	Payer
Belgium	VP	Lump sum	IP	NHI + contribution patient
	HME	Lump sum	IP	NHI + contribution patient
France	VP	Itemized billing ^b	OP	NHI
	HME	Itemized billing ^b	OP	NHI
Germany	VP	1. DRG + flat rate	1. IP + OP	1. SHI
		2. DRG + itemized billing	2. IP + OP	2. PHI
	HME	1. DRG + flat rate	1. IP + OP	1. SHI
		2. DRG + itemized billing	2. IP + OP	2. PHI
Italy	VP	Per case tariffs	IP	NHS (Regions)
	HME	None	NA	NHS (HD) or patient
Netherlands	VP	DRG-based	IP	PHI + contribution patient
	HME	Itemized billing ^b	OP	PHI + contribution patient
Poland	VP	Hospital budget ^a	IP	NHS
	HME	None	NA	Patient
Spain	VP	Hospital budget ^a	IP	MOH
	HME	Itemized billing ^b	OP	NHS
UK	VP	Hospital budget ^a	IP	NHS
	HME	Itemized billing ^b	OP	NHS

Device Costs

Extreme variations among different health care systems

- Italy 16 euro per day considering HME, adhesives and prosthesis

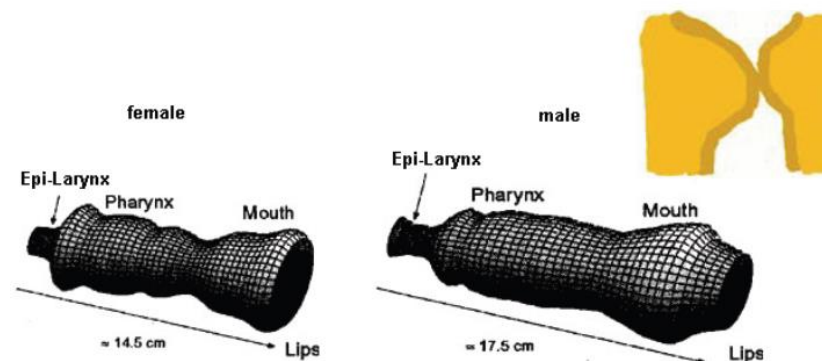
Big question

Does 16 euros per day compensate the advantages of VP rehabilitation?

Conclusion

- Female tend to be more dissatisfied with speech valve performance, mainly because of the low pitched valve voice

new sound source, i.e. the neoglottis, which is similar for both sexes, generally produces a low-pitched, male-type voice



Tubular representations of the neutral (average) vocal tract shapes

NOT SOLVED PROBLEMS

- Less than 25% of free hands speaker
- Ongoing studies
 - Moldable adhesives
 - Specific training
 - Neck brace

The Laryngoscope
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behalf of The American Laryngological,
Rhinological and Otological Society, Inc.

Improving Hands-Free Speech Rehabilitation in Laryngectomized Patients with a Moldable Adhesive

Maartje Leemans, MSc ; Ylenia Longobardi, SLP, MSc; Richard Dirven, MD, PhD;
Jimmie Honings, MD PhD ; Lucia D'Alatri, MD; Jacopo Galli, MD, PhD; Michiel van den Brekel, MD, PhD;
Claudio Parrilla, MD, PhD ; Klaske E. van Sluis, PhD

The Performance of Automatic Speaking Valves and Fixation Devices Enabling Hands-Free Speech Following Total Laryngectomy—A Systematic Review

Max J Dullaart ¹, Sebastiaan R de Vreugd ², Maartje Leemans ¹, Rob van Son ¹,
Arjan Malekzadeh ³, Maarten J A van Alphen ¹, Lisette van der Molen ¹,
Michiel W M van den Brekel ^{1 4}, Luc H E Karssemakers ^{1 5}, Richard Dirven ^{1 6}

Affiliations + expand

Automatic Speaking Valve Largely unchanged over time

- The mean baseline **daily compliance rate was 25%**
- Which increased to 51% short-term but decreased to 33% long-term

Main reasons for **non compliance**:

- **Inadequate fixation**
- **Skin problems**
- **Voicing being too tiresome**

Final remarks: Patient-specific customization Provide the best possible results

- Working together with the patient in choosing the right device (patch fixation device, lary-button, external neck brace)
- Considering aspects such as
 - Tracheostoma anatomy
 - Skin condition
 - Manual dexterity
 - Patient's personal preference

Automatic speaking valve in tracheo-esophageal speech: treatment proposal for a widespread usage

Ylenia Longobardi¹ · Lucia D'Alatri^{1,2} · Valentina Francesca Brandi³ · Giorgia Mari¹ · Maria Elisabetta Marenza¹ · Maria Raffaella Marchese¹ · Jacopo Galli^{1,2} · Claudio Parrilla¹

European Archives of Oto-Rhino-Laryngology

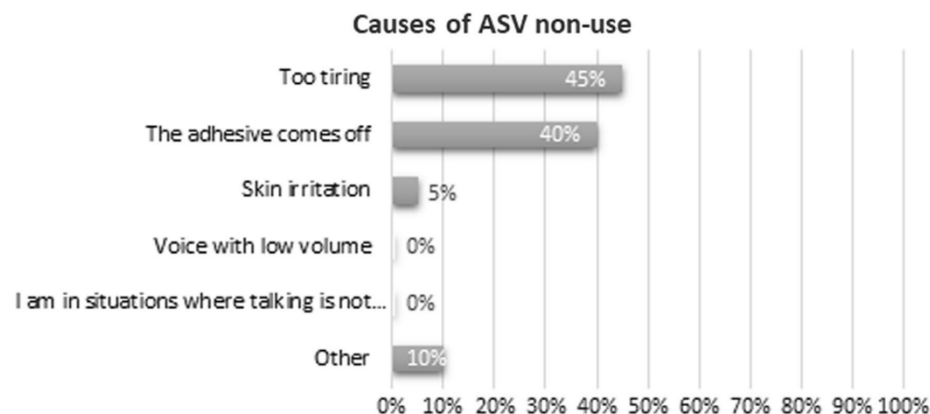
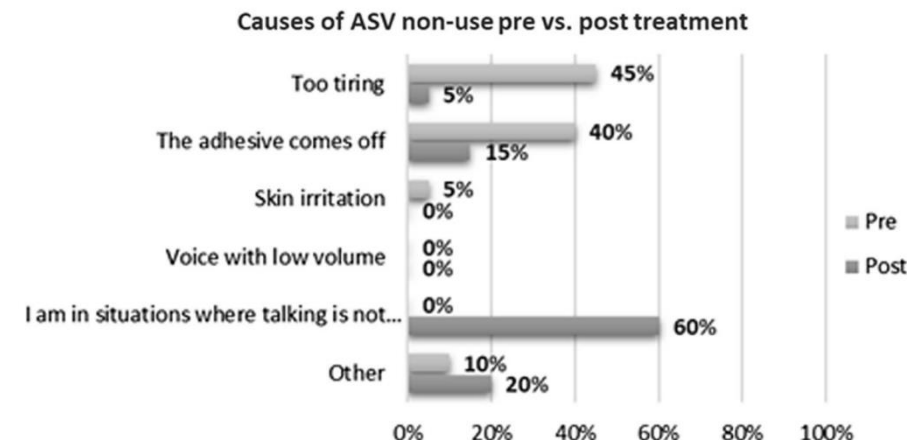


Fig. 4 Reasons for ASV non-use reported by patients at T1

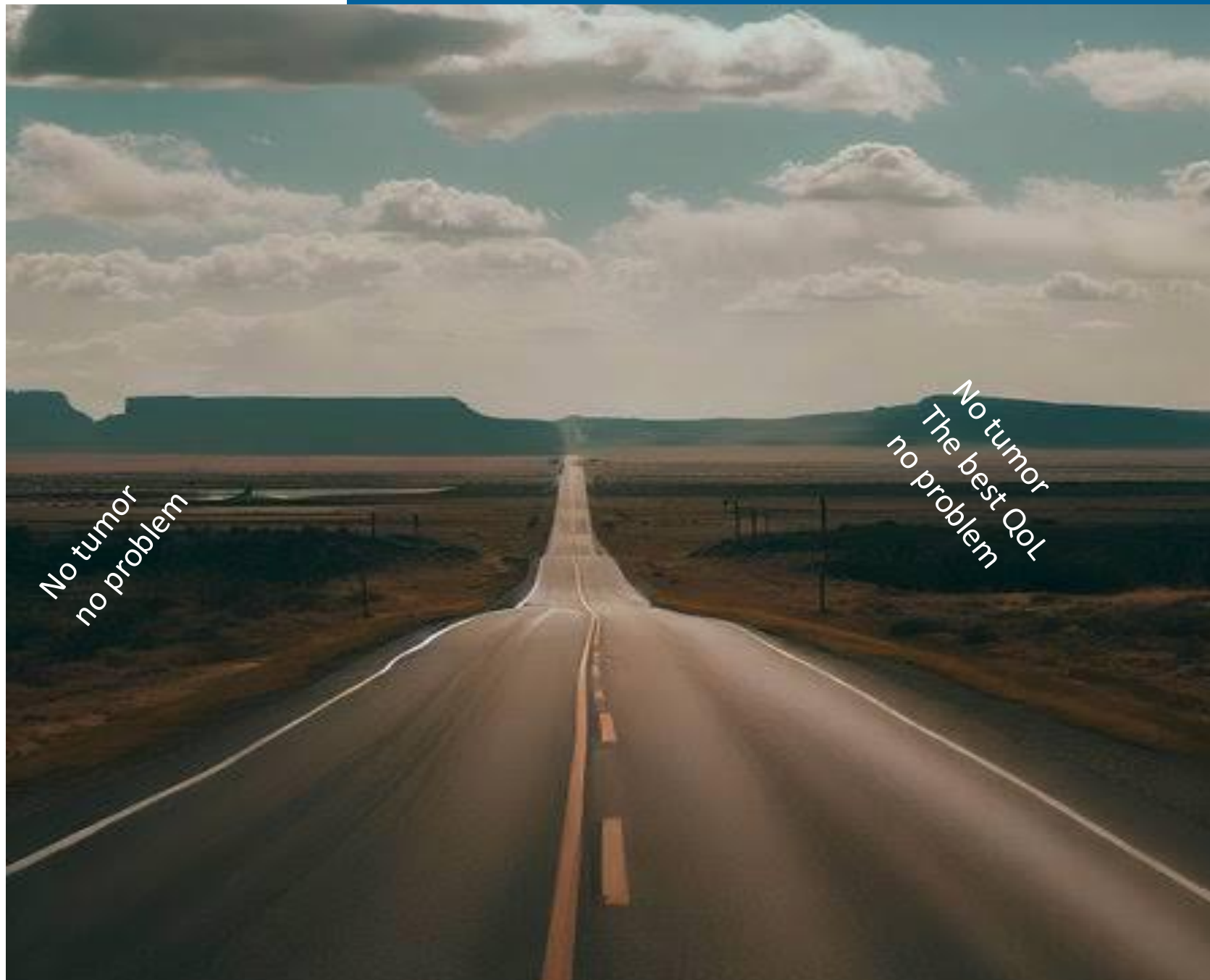
Fig. 5 Causes of non-use of the ASV pre vs. post-treatment with the respective percentages



Results In the *census* phase the percentage of use of ASV (everyday, without problems) was equal to 17.27% (19/110 patients). The main causes of disuse concerned excessive fatigue and poor durability of the adhesives. The analysis of the results pre vs. post-training showed a statistically significant increase ($p < 0.05$) in all the investigated parameters. Patients (1.4 ± 1.01 h/day) and high degrees of satisfaction. After treatment, the percentage of use of AVS increased by 43% reaching a rate of 60% (66/110 patients).

Conclusion A specific and targeted approach that simulate the phonatory and breathing difficulties of everyday life can increase the ASV usage rate.

- The impact
compens



No tumor
no problem

No tumor
The best QoL
no problem

nts considerably

Thank you

Spraakrevalidatie na laryngectomie

Van theorie naar praktijk

Jacintha Oldenbeuving
Logopedist, Taal- en Spraakpatholoog

Radboudumc

Jacintha Oldenbeuving
Logopedist & Taal- Spraakpatholoog
Radboudumc

Specialisatie

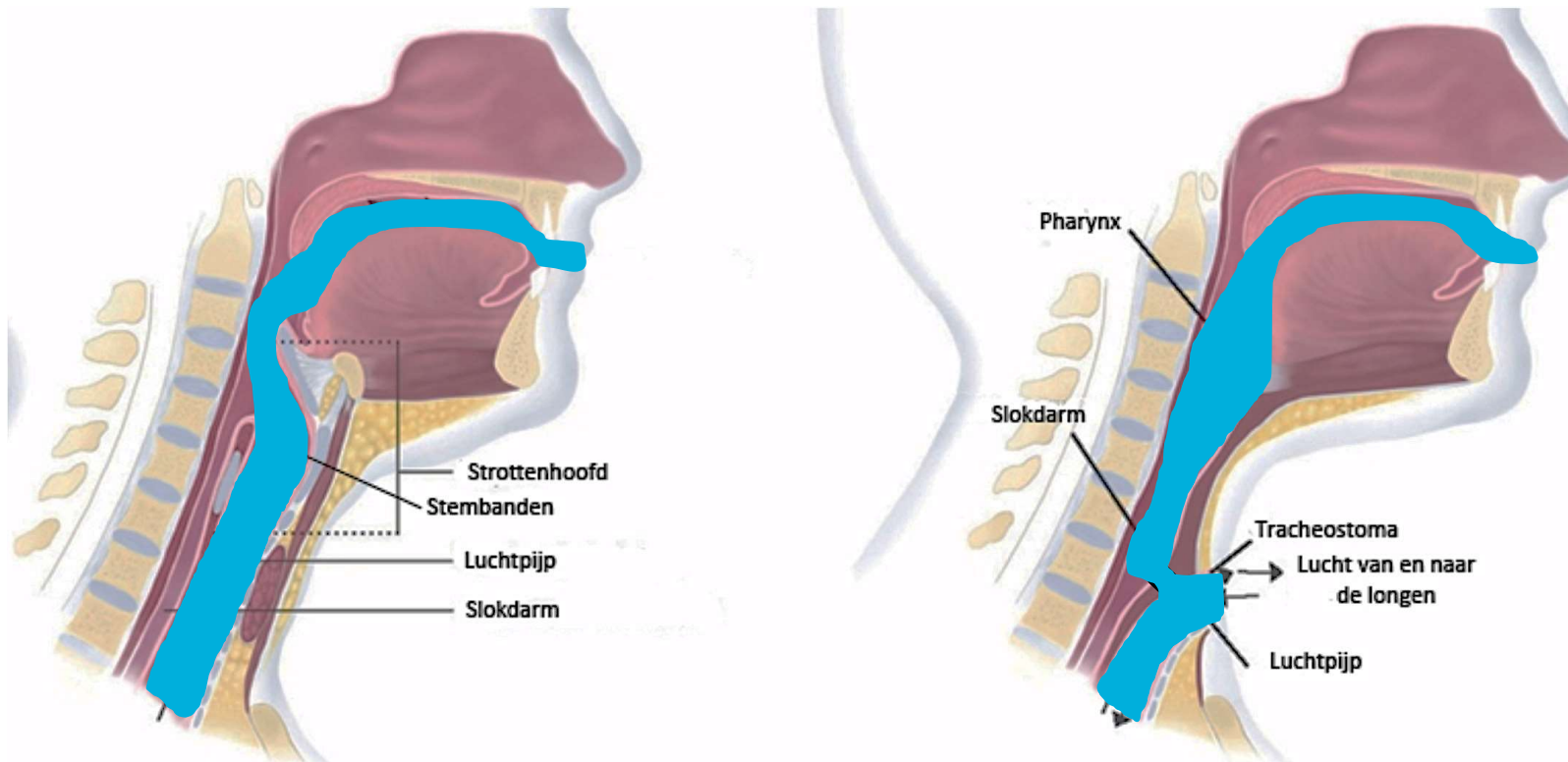
Stem-, spraak- en slikproblemen bij hoofd-halsoncologie
Stemspreekuur/transpersonen
Facialisspreekuur

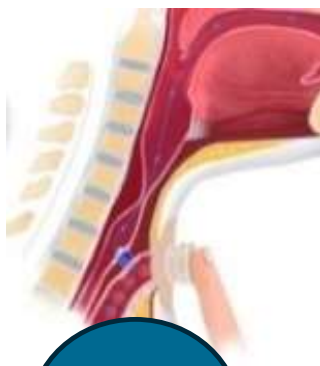
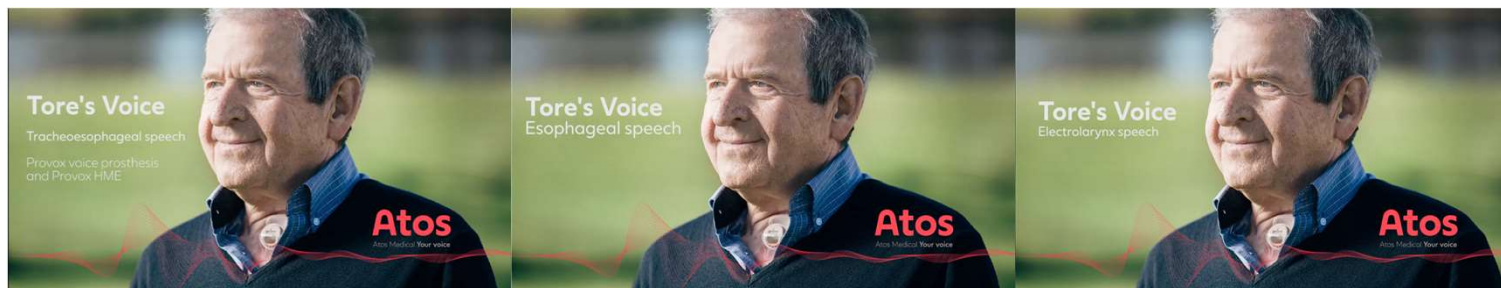


Wat klopt hier niet?



Praten na TL(P)E





Prothesespraak

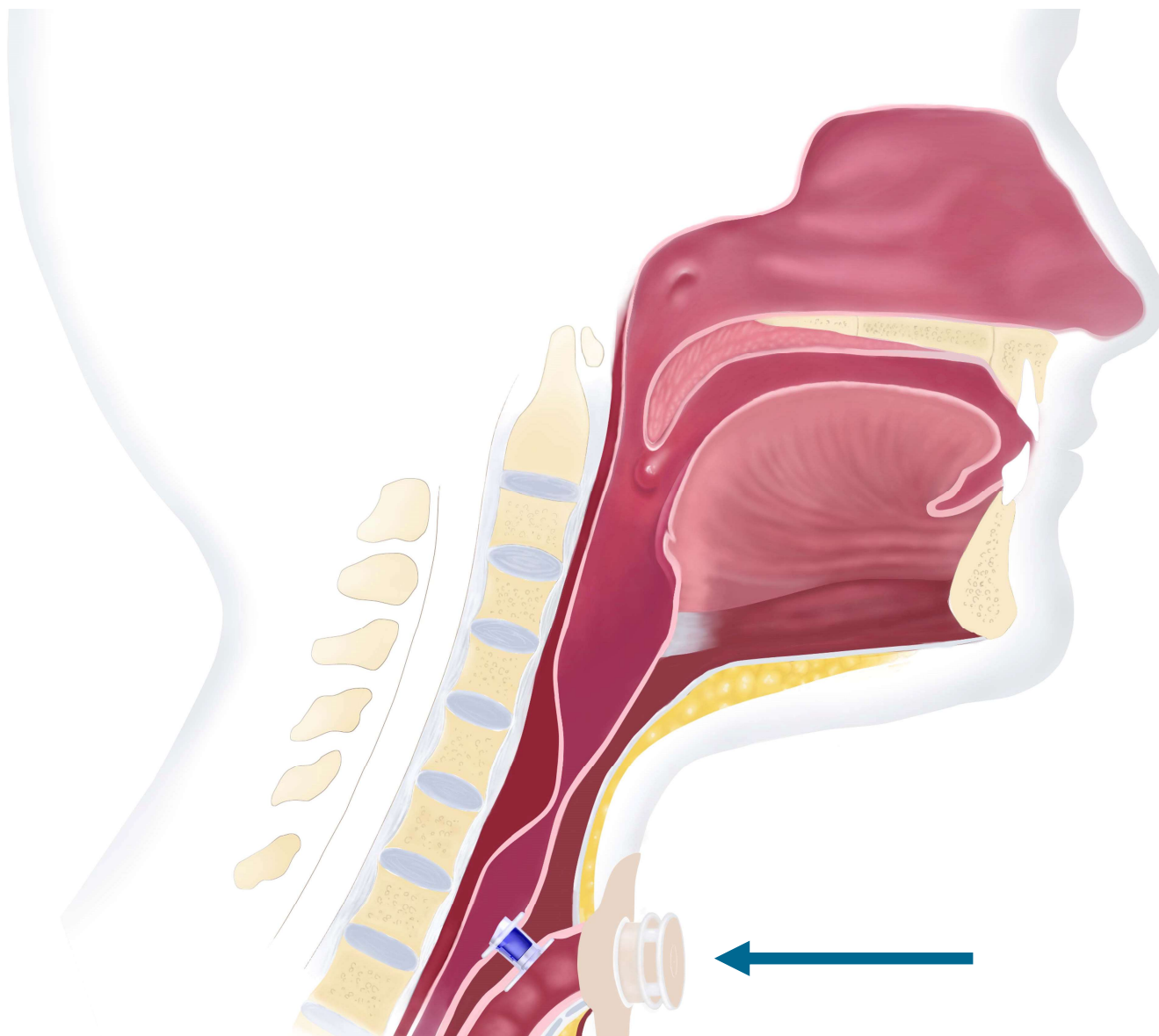


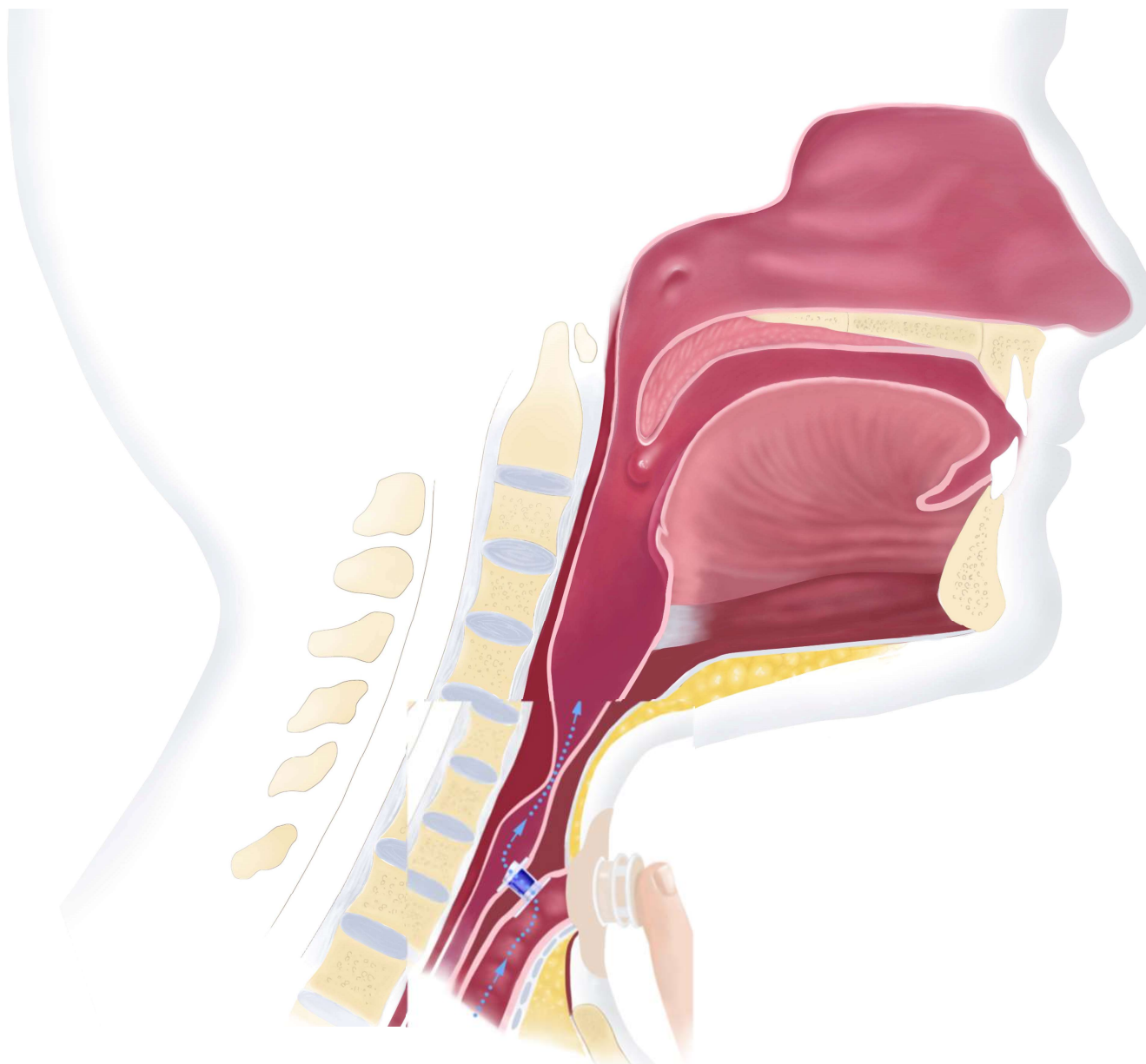
Slokdarmspraak

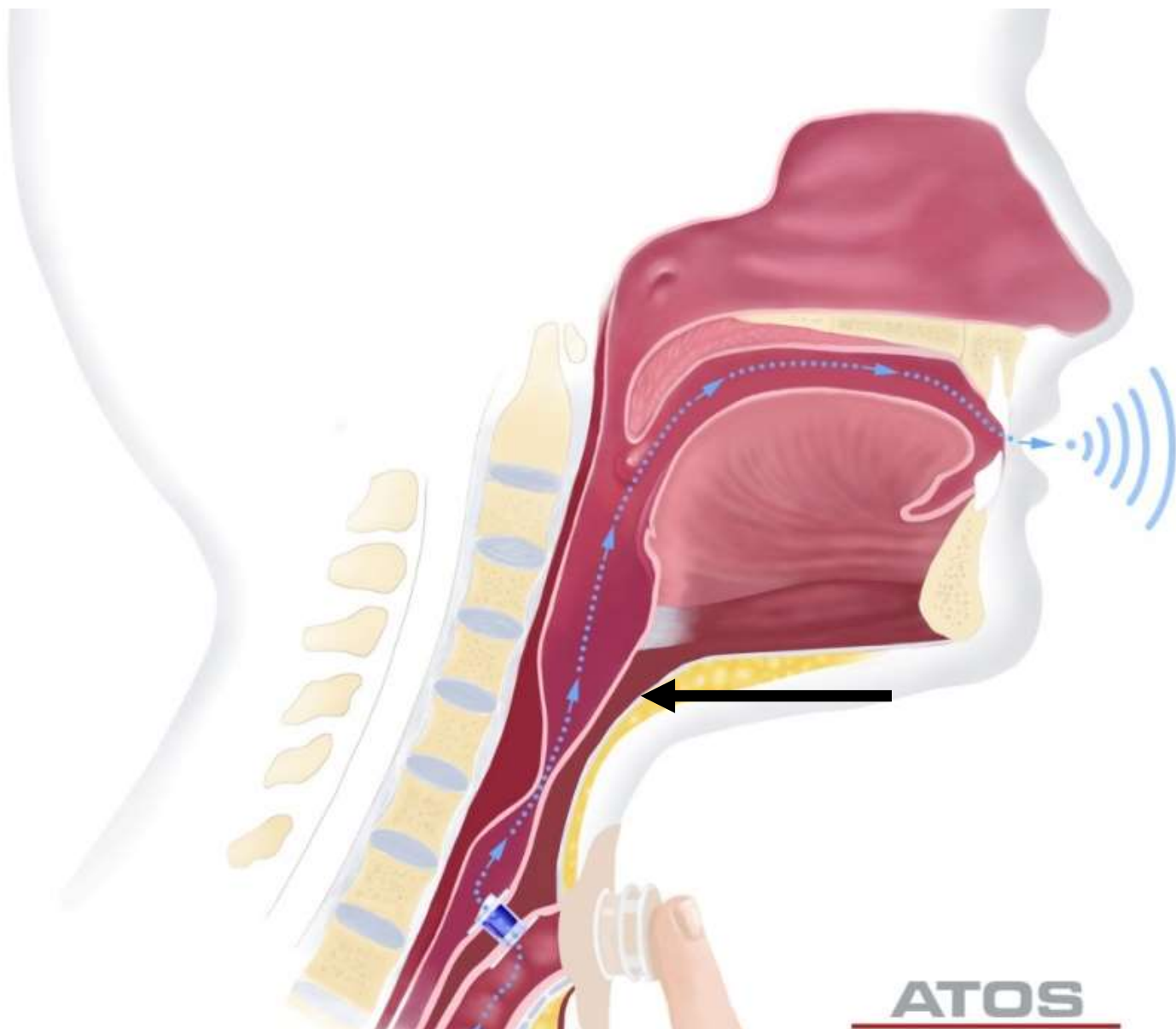


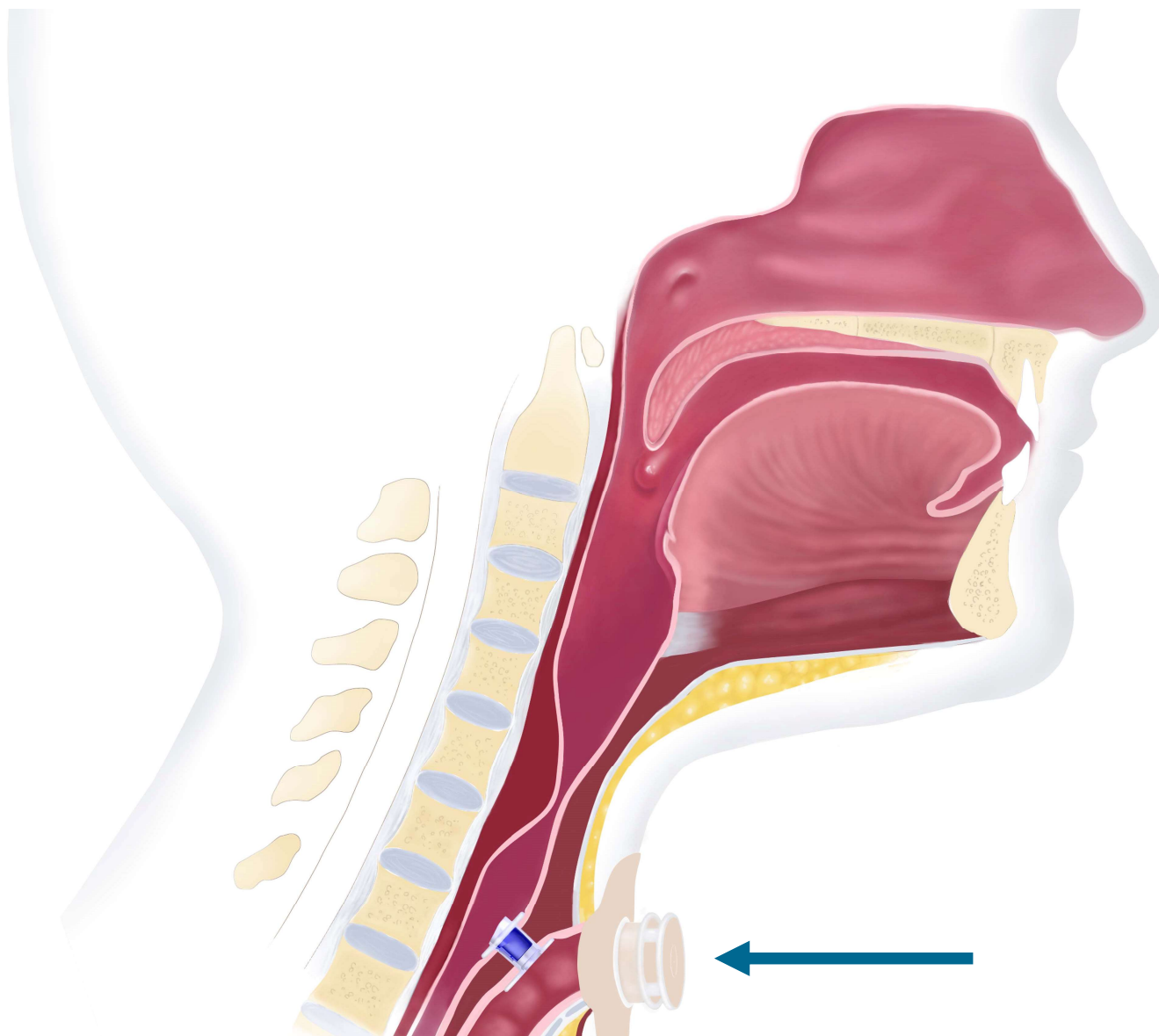
Electrolarynx

¹Meulemans et al, 2020









Afsluiten stoma



Prothesespraak

Wat als het spreken niet lukt?



Luchtstroom beperkt



Anatomie beperkt



Techniek niet optimaal



- Pleister/larytube lekt lucht
- Stemprothese is verstopt/vies
- Neofarynx is onvoldoende doorgankelijk



- **Pleister/larytube lekt lucht**
- Stemprothese is verstopt/vies
- Neofarynx is onvoldoende doorgankelijk

Luchtlekkage pleister

Larytube met luchtlekkage



- Pleister/larytube lekt lucht
- **Stemprothese is verstopt/vies**
- Neofarynx is onvoldoende doorgankelijk





- Pleister/larytube lekt lucht
- Stemprothese is verstopt/vies
- **Neofarynx is onvoldoende doorgankelijk**





- Stenose
- Oedeem
- Radiotherapie
- Reconstructie farynx
- Stemprothese problematiek
- Slijm/speekselstase

TLPE geeft
slechtere
verstaan-
baarheid¹

¹Meulemans et al, 2020



- Stenose
- Oedeem
- Radiotherapie
- Reconstructie farynx
- Stemprothese problematiek
- **Slijm/speekselstase**

Slijm/speekselstase



- Inadequate coördinatie
- Hypertonie
- Hypotonie
- Overige factoren



- **Inadequate coördinatie**
- Hypertonie
- Hypotonie
- Overige factoren



Inadequate coördinatie

- Te laat indrukken van filter
- Te vroeg indrukken van filter
- Te vroeg loslaten van filter
- Te lang indrukken van filter
- Scheef/onvolledig indrukken van filter
- Verkeerde timing
- Lichamelijke beperking



Inadequate coördinatie

- Te laat indrukken van filter
- Te vroeg indrukken van filter
- Te vroeg loslaten van filter
- Te lang indrukken van filter
- **Scheef/onvolledig indrukken van filter**
- Verkeerde timing
- Lichamelijke beperking

Onvolledig indrukken van het filter





- Inadequate coördinatie
- **Hypertonie**
- Hypotonie
- Overige factoren



Hypertonie

- Patiënt is te gespannen
- Patiënt zet te veel druk
- *Neofarynx is onvoldoende doorgankelijk*
- *Stenose*
- *Oedeem*
- *Radiotherapie*

Plots
ontstaan:
altijd check
KNO

Hypertoon geluid



- Inadequate coördinatie
- Hypertonie
- **Hypotonie**
- Overige factoren



Hypotonie

- Neofarynx is te breed
- Te weinig trilling (lap)
- Patiënt is te 'ontspannen'
- Patiënt zet te weinig druk in neofarynx

Plots
ontstaan:
altijd check
KNO



- Inadequate coördinatie
- Hypertonie
- Hypotonie
- **Overige factoren**



Overige factoren

- Vibratiemogelijkheden van neofarynx zijn beperkt
 - Te weinig intonatie
 - Te weinig variatie luidheid
- Te weinig onderscheid tussen stemhebbende en stemloze klanken
- Verminderde articulatie → uitval nervus hypoglossus bij TLPE
- Te lange/korte zinnen



Overige factoren

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- Verminderde articulatie → uitval nervus hypoglossus bij TLPE
- Te lange/korte zinnen

Onderscheid stemloos/stemhebbend

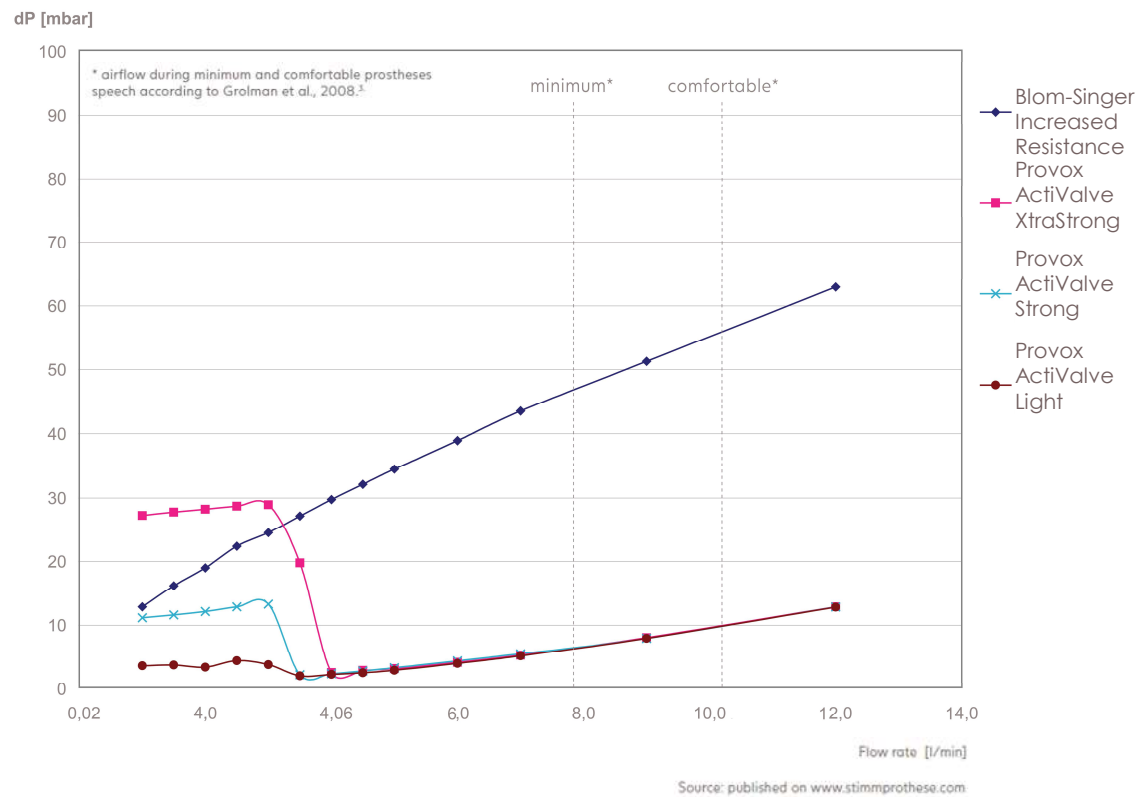


Overige factoren

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 - Te weinig intonatie
 - Te weinig variatie luidheid
- Te weinig onderscheid tussen stemhebbende en stemloze klanken
- **Verminderde articulatie → uitval nervus hypoglossus bij TLPE**
- Te lange/korte zinnen

Verminderde articulatie

Stemprothese



Stemprothese

Vega

Activallve

Stemprothese

Vega

Activallve

Recap

- 3 manieren van spraakrevalidatie: **prothesespraak**, slokdarmspraak, elektrolarynx
- Zorg dat luchtstroom zo optimaal mogelijk is
- Anatomie neofarynx is van invloed op spreken
- Zorg voor een zo optimaal mogelijke techniek
- Stemprothese kán invloed hebben op verstaanbaarheid

Contact

Jacintha.olderbeuving@radboudumc.nl

Meld je aan voor onze cursus hoofd-
halsoncologie voor logopedisten

- Jaarlijks een verdiepingsdag met elk jaar een ander thema



Freehands spreken na laryngectomie

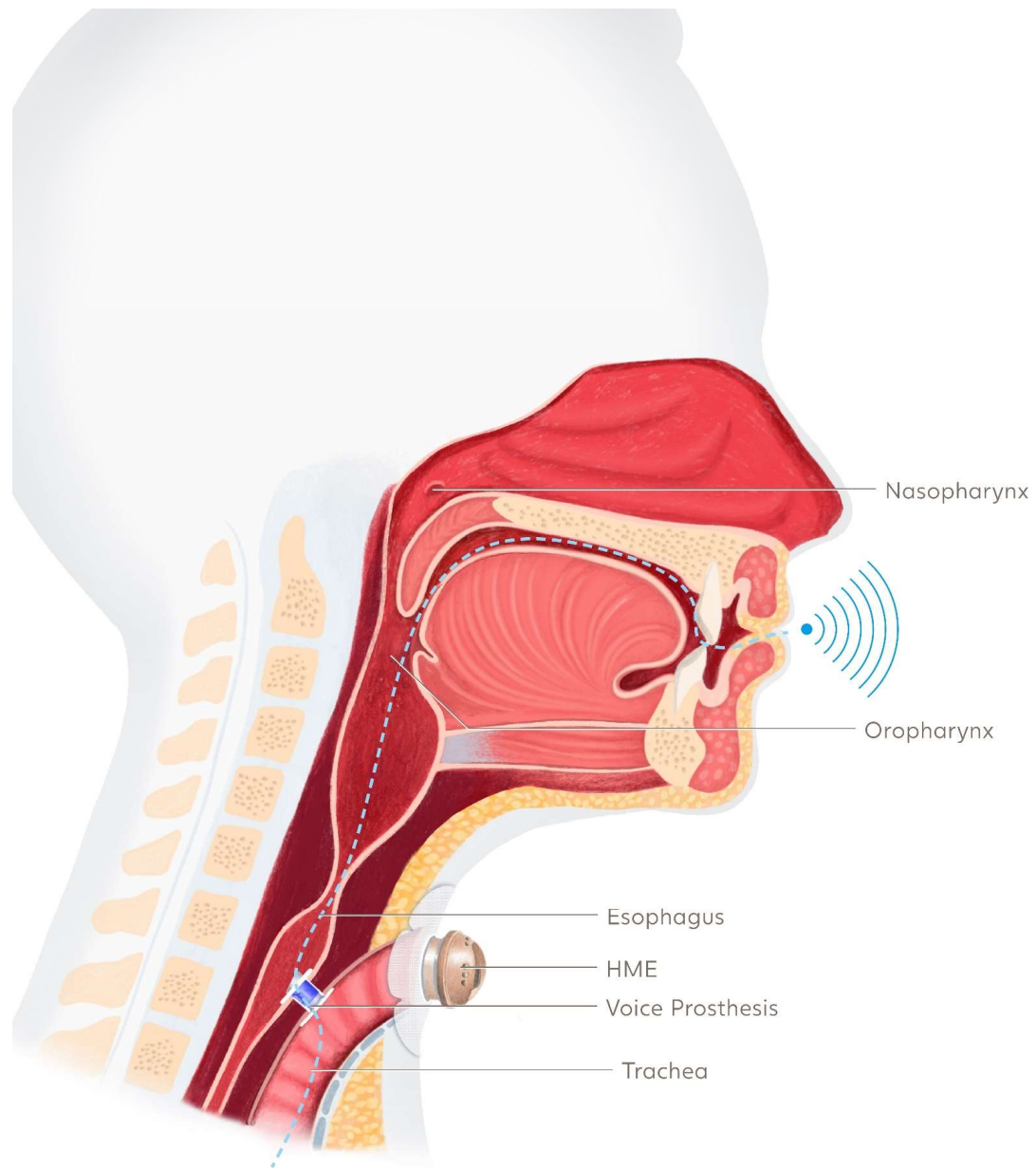
Jacintha Oldenbeuving
Logopedist, Taal- en Spraakpatholoog

Jacintha Oldenbeuving
Logopedist & Taal- Spraakpatholoog
Radboudumc

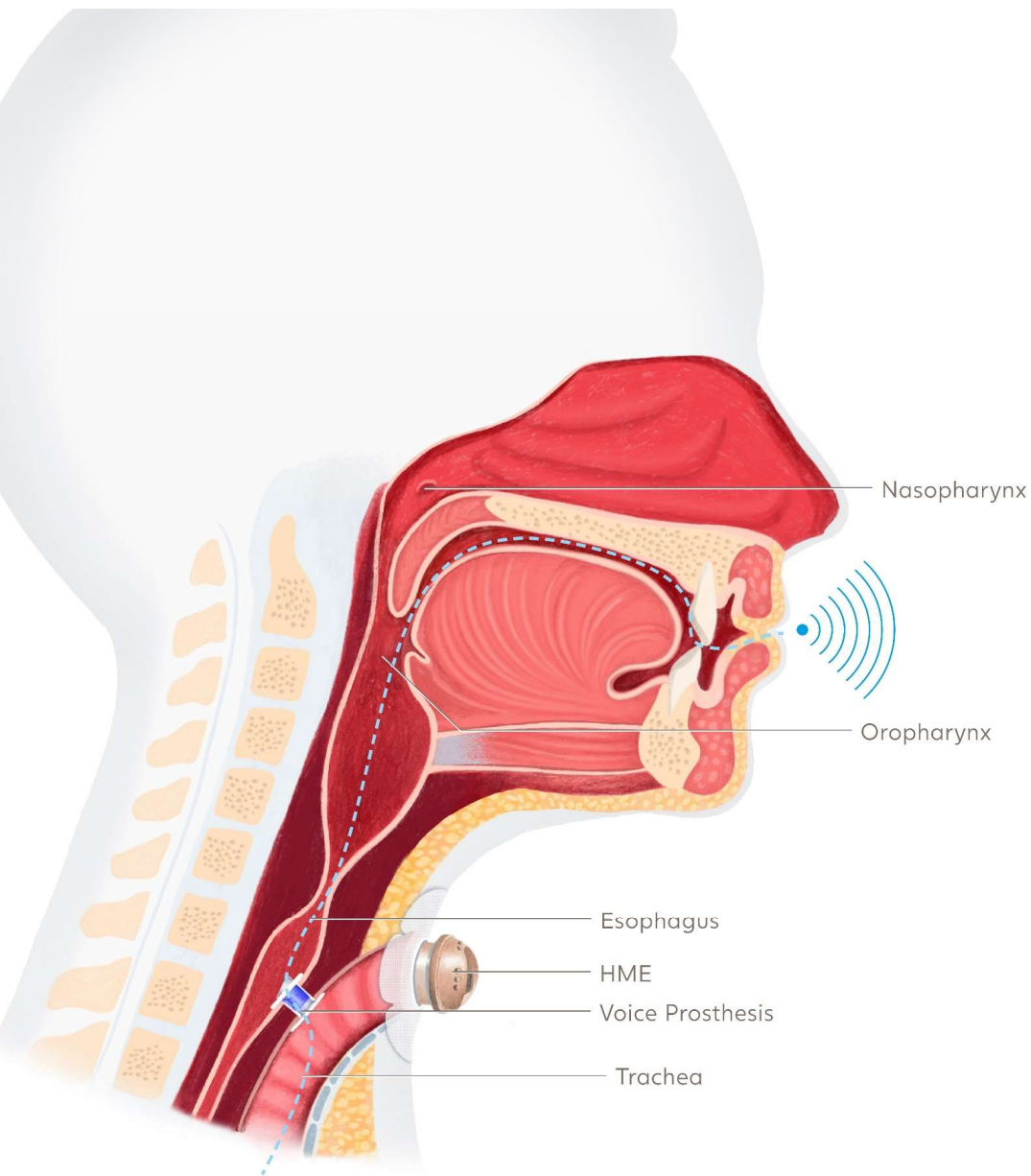
Specialisatie

Stem-, spraak- en slikproblemen bij hoofd-halsoncologie
Stemspreekuur/transpersonen
Facialisspreekuur





kauboudinc



Voordelen:

- Zonder handen spreken
- Sneller kunnen reageren

Nadelen:

- Lukt meestal niet bij een te gespannen spreektechniek
- Meer focus op rustige ademhaling
- Afblazen van de pleister
- Vermoeiender dan spreken met gewoon filter

Voorwaarden gebruik freehands



- Materiaal dat blijft zitten
- Ontspannen spreektechniek

Standaard
2-3
maanden
na OK

Voorwaarden gebruik freehands



- **Materiaal dat blijft zitten**
- Ontspannen spreektechniek



Voorwaarden gebruik freehands



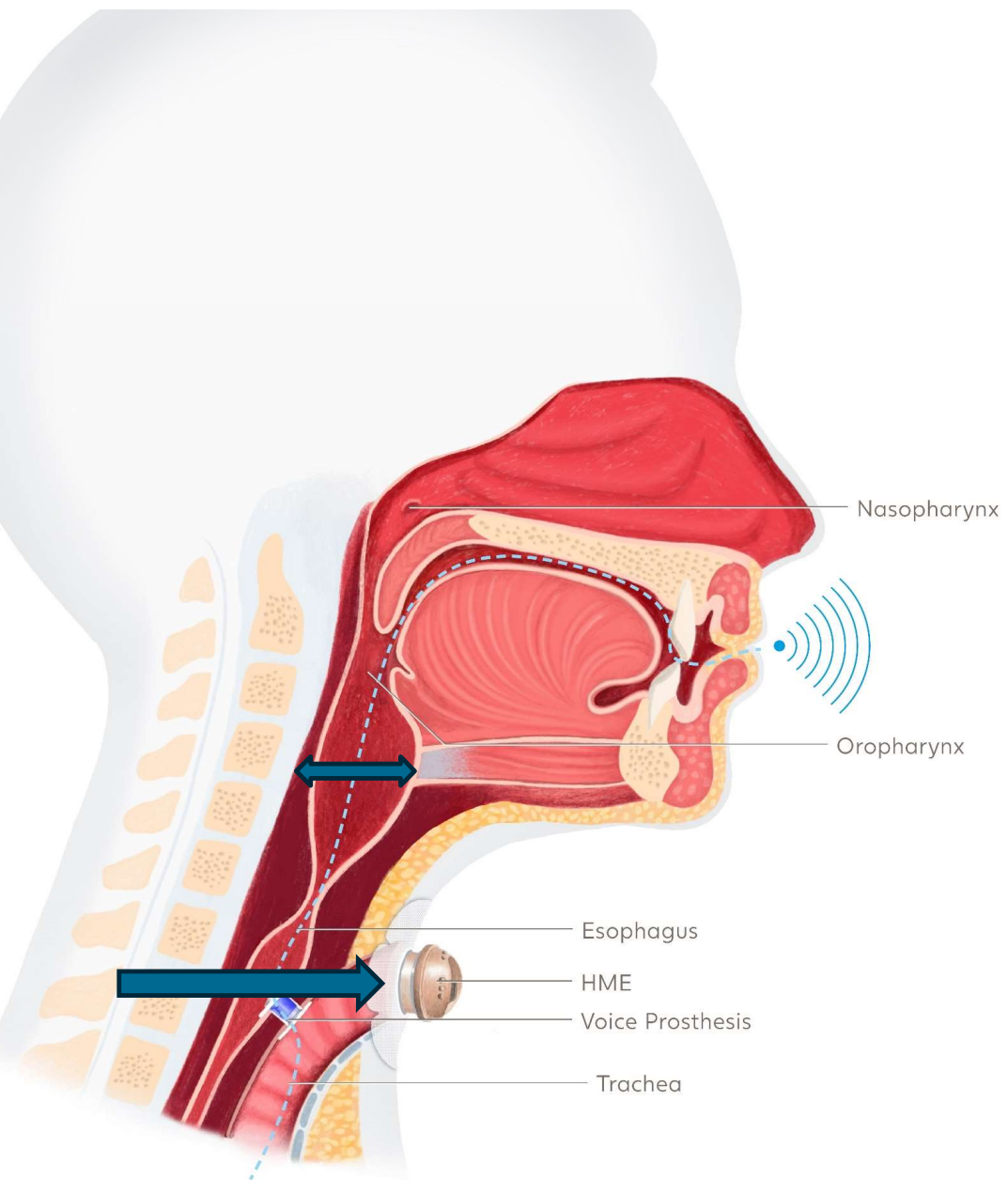
- Materiaal dat blijft zitten
- **Ontspannen spreektechniek**

In enkele gevallen juist bij gespannen spreektechniek

Wanneer geen freehands?



HME versus freehands

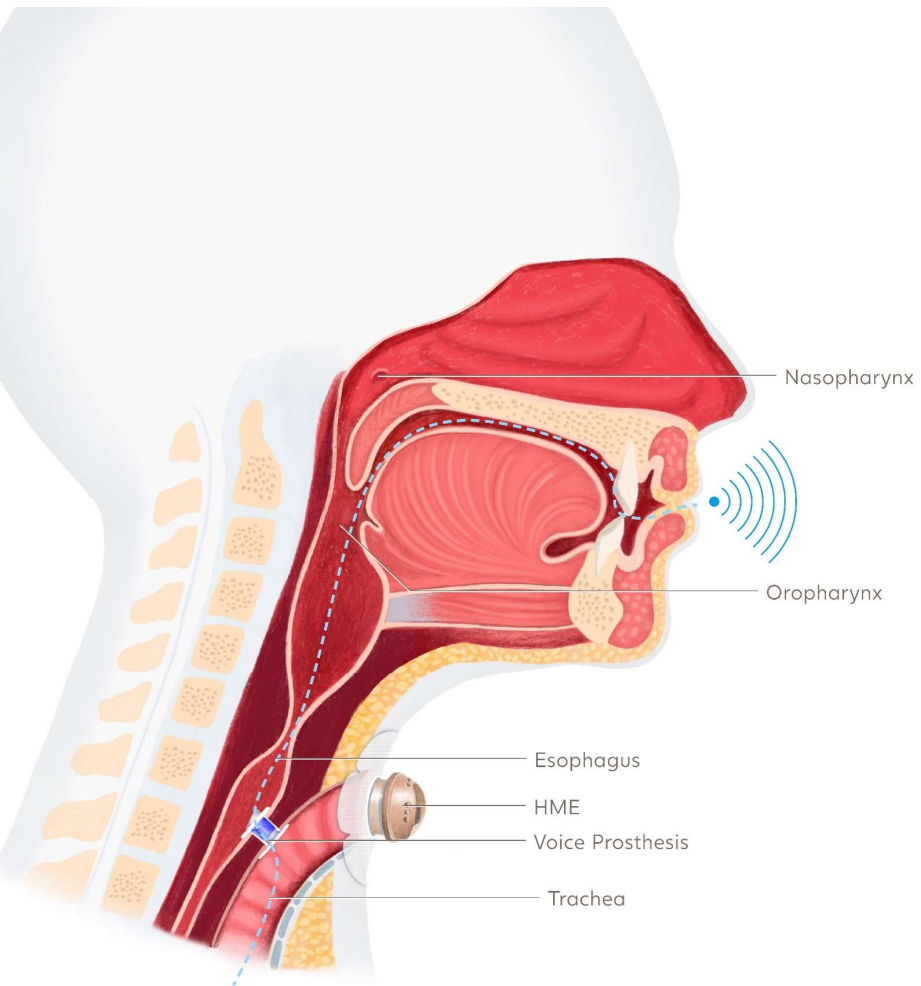


HME

Freehands

HME versus freehands

Patiëntervaring



Recap

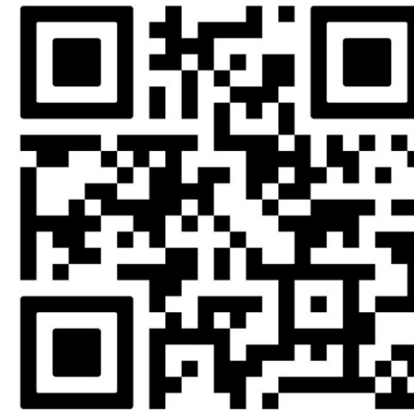
- Zorg voor optimaal materiaal
- Meestal pas starten bij ontspannen spreektechniek
- Freehands kan zorgen voor ander geluid en verstaanbaarheid

Contact

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ANTONI
VAN
LEEUWENHOEK
NEDERLANDS KANKER INSTITUUT



Identiteit en gepersonaliseerde revalidatie

Het leven oppakken na een laryngectomie. Wat kunnen wij daar aan bijdragen?

Klaske van Sluis, 31-10-2025

Introductie en opbouw sessie

- Achtergrond kwaliteit van leven
- Interactief deel van de sessie
- Casus voorbeelden veerkracht
- Vertalen naar acties in begeleiding, voorlichting en revalidatie

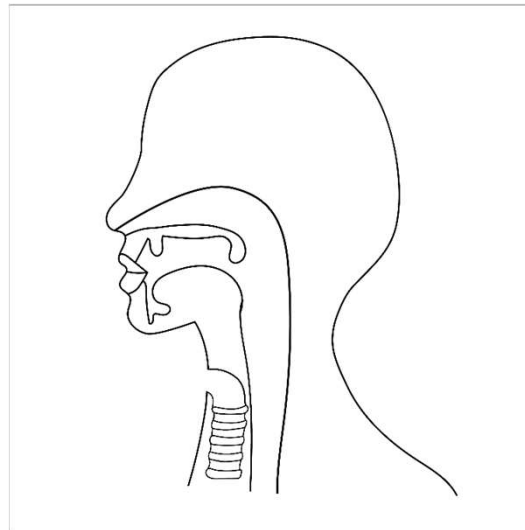


Veranderingen na een totale laryngectomie

Fysieke functies

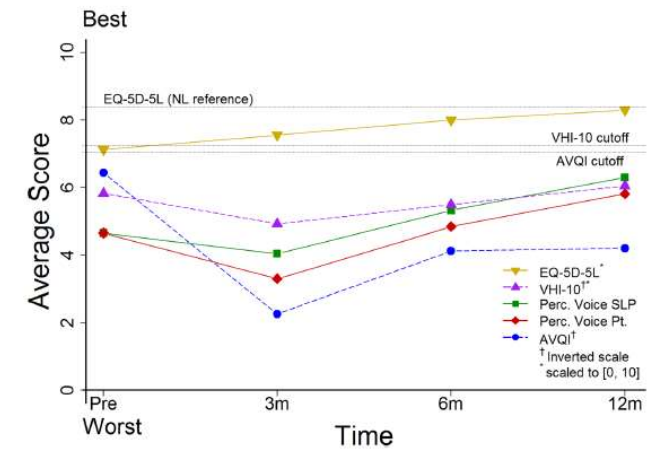
Uiterlijk

Psycho-sociaal



Kwaliteit van leven na TLE

- Stemgerelateerde kwaliteit van leven is het beste voor patiënten met stemprothesespraak (van Sluis et al., 2018; van Sluis et al., 2021)
- Stemuitkomsten en kwaliteit van leven zijn het slechtst drie maanden na de laryngectomie en laten weer een verbetering zien (van Sluis et al., 2021; Lee et al., 2010; Souza et al., 2020)
- Bij 20 tot 25% van de patiënten is vóór een totale laryngectomie sprake van psychische klachten, met een piek in angst voorafgaand aan de operatie en een piek in depressie binnen 3 tot 6 maanden (Mukoyama et al., 2023)



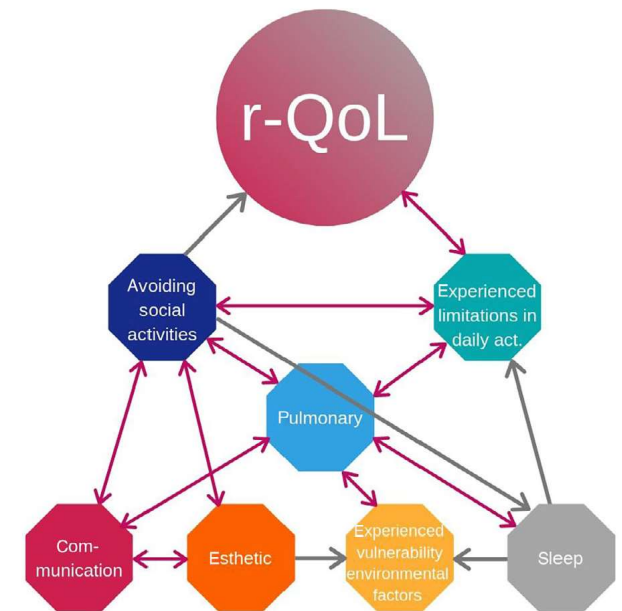
Kwaliteit van leven na TLE

- Lage preoperatieve HRQOL voorspelt lagere postoperatieve uitkomsten.

(Tonsbeek et al., 2025)

- Patiënten met een reconstructie flap, post op RT en post op complicaties hebben lagere HRQOL-uitkomsten. (Tonsbeek et al., 2025)

- Slijmklachten spelen een grote rol bij het kunnen communiceren en kunnen meedoen aan sociale activiteiten (Leemans et al., 2020;)



Leemans et al., 2020

Verschillen voor mannen en vrouwen na TLE



Verschillen voor mannen en vrouwen na TLE

- Vrouwen laten lagere kwaliteit van leven scores zien (Lee et al., 2010; Souza et al., 2020)
- De veranderingen in uiterlijk en stem hebben een grotere impact voor vrouwen (Cox et al., 2015, van Sluis et al., 2020)
- Mannelijke gelaryngectomeerden keren vaker terug naar werk (Lee et al., 2010)
- Het effect op de relatie is groter voor vrouwen na laryngectomie, met verandering in het uitvoeren van zorgrollen (Offerman et al., 2015; Van Sluis et al., 2020)

Veel overlappende problemen: omgaan met slijm, intimiteit, sociale situatie

Interactief deel: Aanbevelingen formuleren

- Werkvorm: World Café
- Stap 1: Groepsgesprek over voorbereiding en ondersteuning
- Stap 2: Formuleer 2-3 aanbevelingen per groep

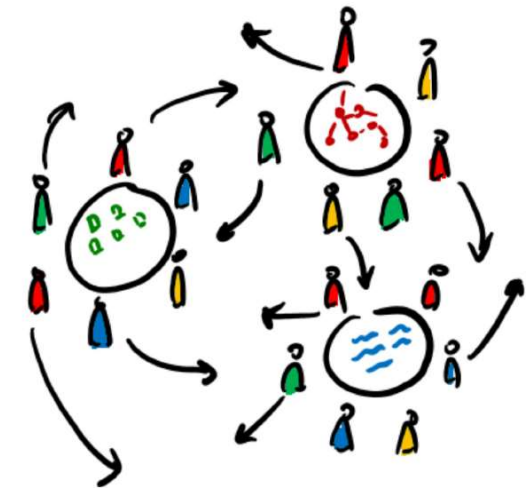
Denk aan:

Voorlichting

Begeleiding post operatief

Terugkeer in maatschappij

- Stap 3: Plenaire terugkoppeling



Casus voorbeelden van veerkracht

Bevalling na laryngectomie

Kleding maken en zwemmen

Emoties in stemgeluid

Casus voorbeelden van veerkracht

Lachen

Veranderd stemvolume

Seks na laryngectomie

Wat neem je hieruit mee?

- Onderlinge uitwisseling in groepjes
- Plenaire terugkoppeling

Wat kunnen wij doen als zorgverleners?

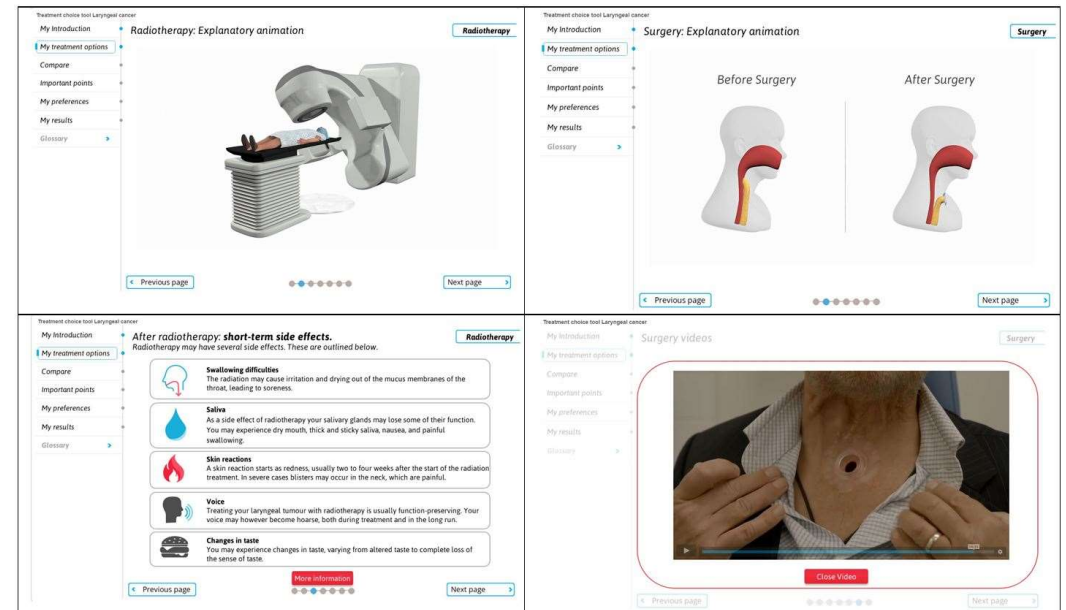
- Gedeelde besluitvorming
- Patiëntgerichte benadering → identiteit en revalidatie
- Ondersteuning door lotgenoten aanbieden
- Bewustwording stigma in de maatschappij



Gedeelde besluitvorming

Keuzehulptool larynxkanker
www.beslissamen.nl

Gedeelde besluitvorming leidt tot een betere
 patient tevredenheid en betere uitkomsten
 (Petersen et al. 2019; Heirman et al., 2025)



Pre-operatieve voorlichting

“Toen is er iemand op bezoek geweest van de vereniging [...] Die meneer stelde het zo voor dat ik denk verhip, ik had het liever gister gedaan dan vandaag. De voorlichters mogen ook wel wat nadelen omschrijven . Participant studie Van Sluis et al., 2020)

Revalidatie; rouw en veerkracht

“Je moet het gaan accepteren, je moet het gaan verwerken, je moet gaan vechten. [...] Je hebt geen keus.” Participant studie Van Sluis et al., 2020)

- Patiënten ervaren rouw
- Veerkracht
 - Helpen in het vinden van een manier van ermee omgaan: weerstand - overgave - humor
- Zorgverleners kunnen veiligheid bieden en vertrouwen geven in het hebben van aanpassingsvermogen

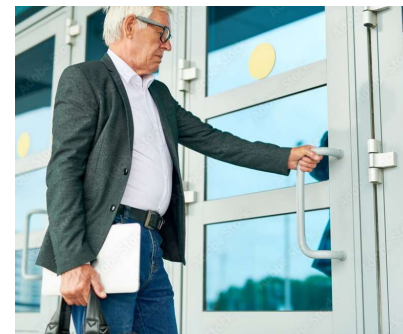


Revalidatie; Omgaan met veranderde rollen

- Patient is bezig met het reconstrueren van de identiteit
- Veranderingen in de rol die iemand heeft in een groep /situatie

Zorgverleners kunnen:

- Realistische verwachtingen creëren
- Begeleiden naar betekenisvolle activiteiten



Terugkeer naar werk

Aanpassingsvermogen kunnen hebben

Revalidatie; patientgerichte benadering

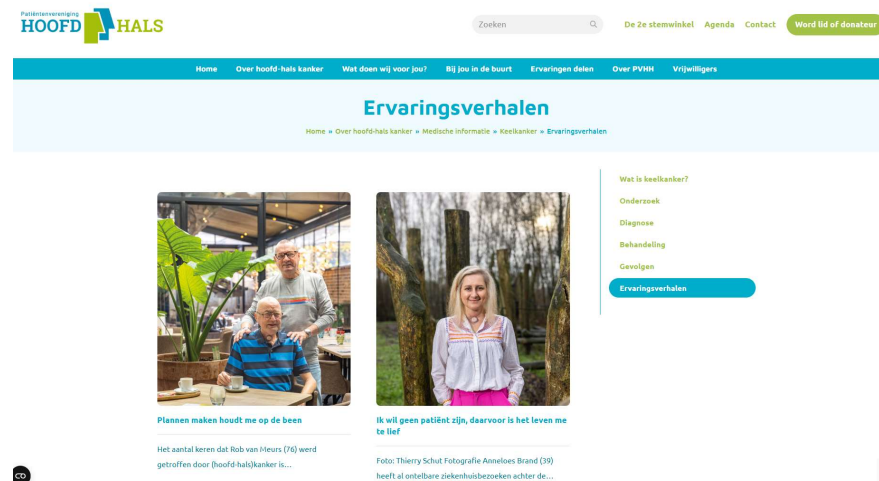
“Het is moeilijker als je alleen bent; [. . .] dat er iets is, en niet kunnen praten is heel eng”. Participant studie Van Sluis et al., 2020)



- De patiënt heeft een fundament nodig
- Beïnvloedende factoren: opleidingsniveau, het hebben van een partner, sociaal netwerk, begrijpen van de consequenties van de laryngectomie

Revalidatie; stimuleren en faciliteren van lotgenotencontact

Het hebben van lotgenotencontact is van waarde voor patiënten met kanker. Men kan ervaringen delen en praktische tips. Het geeft de mogelijkheid om een helpende rol aan te nemen. (Hoey et al., 2008, Watson, 2017).



Website PVHH

Lotgenotencontact met het inlooppreekuur

“Ik leer ontzettend veel van mijn lotgenoten [...] wat zij meemaken, wat zij voelen [...] nou, dat is voor mij herkenbaar [...] ik voel me altijd veilig en fijn bij ze [...] dan mag ik knorren en dan mag ik hoesten en dan mag ik van alles, maar bij anderen moet ik me zo krampachtig inhouden”. Participant studie Van Sluis et al., 2020)



Inlooppreekuur AVL

Wat is stigma?

- (a) negatief gedrag,
- (b) ongewenste aandacht, en
- (c) negatieve stereotypen



Stigma en maatschappelijke verwachtingen

“Kinderen die aanbellen, [roepen]: ‘Heks, heks, je kan niet praten!’[...] ‘Zeg eens iets, zeg eens iets’ Ik vind dat vreselijk” Participant studie Van Sluis et al., 2020

- Wanneer iemand begint te spreken oordeelt de luisteraar direct; sociale status, opleidingsniveau en persoonlijkheid. (McArdle, 2005)
- Het gezicht van de schurk wordt in westerse media zoals (teken)films en boeken vaak met littekens weergegeven, de stem van de schurk is vaak rauw en schor. (Yaron, 2018)



Reacties op stemgeluid

Wat neem je mee?



Afsluitend: Wat kunnen wij doen als zorgverleners?

- Gedeelde besluitvorming
- Patiëntgerichte benadering → identiteit en revalidatie
- Ondersteuning door lotgenoten aanbieden
- Bewustwording stigma in de maatschappij



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Dank jullie wel!

Discussie

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