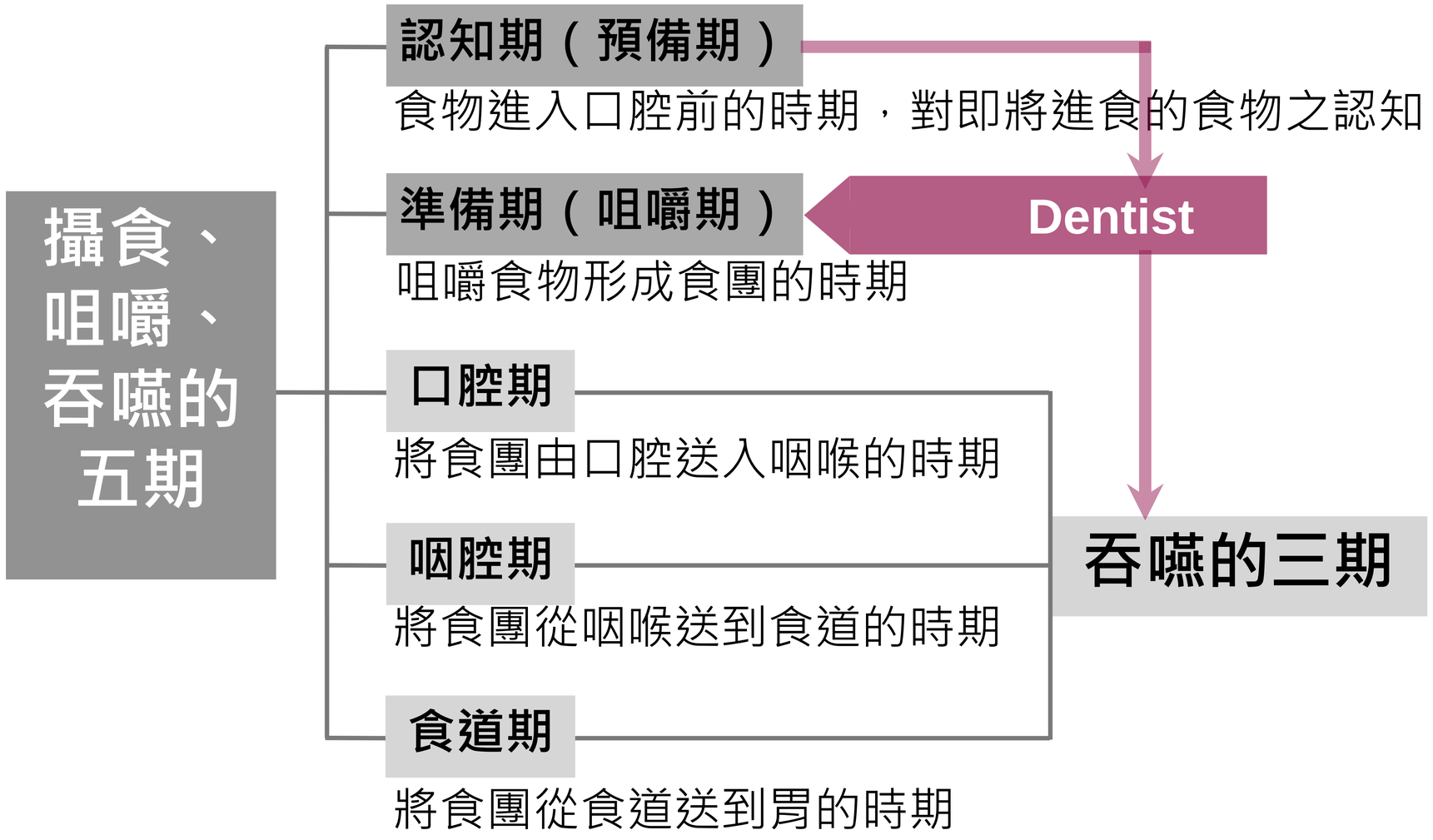
Dysphagia

Chuan-Hang Yu
tao2008@csmu.edu.tw

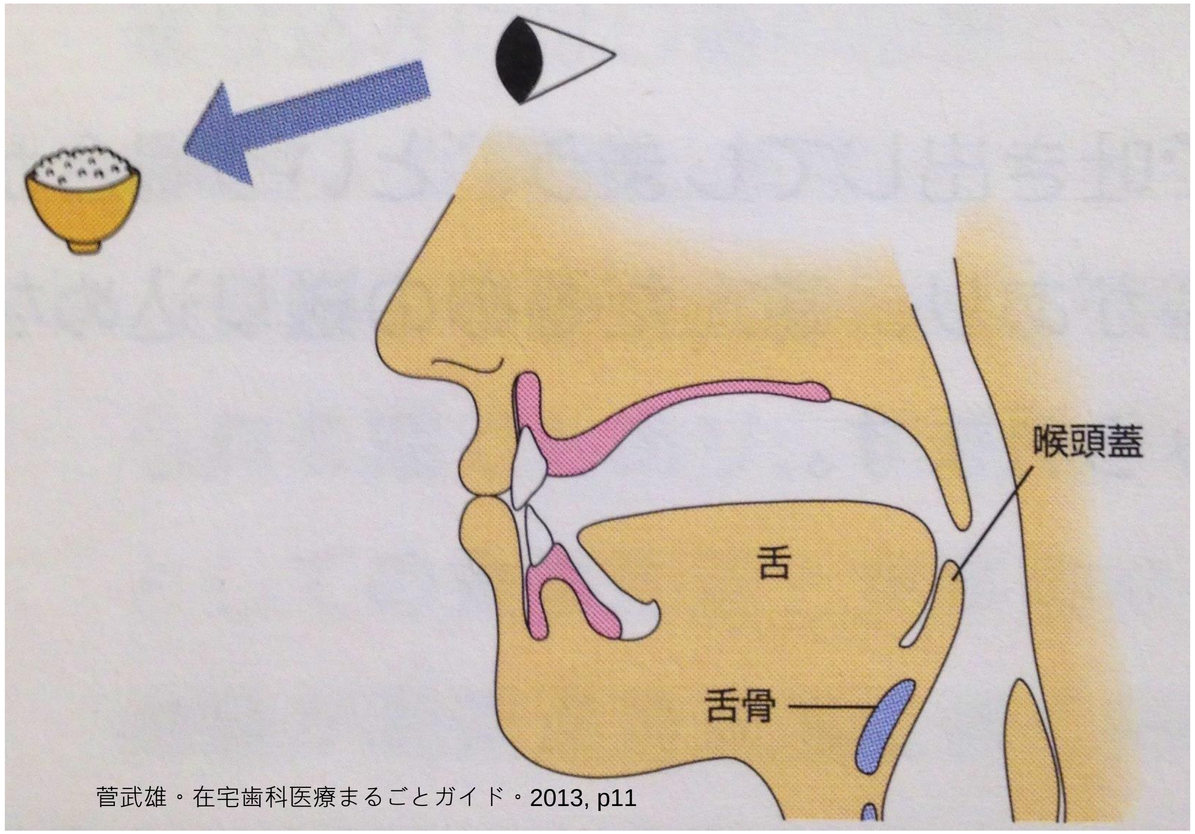
http://moocs.csmu.edu.tw/course/307/intro

攝食、咀嚼與吞嚥的相互關係與流程

(Leopold **five stage** of ingestion)



Leopold N & Kagel M. *Arch Phys Med Rehabil*, 1983



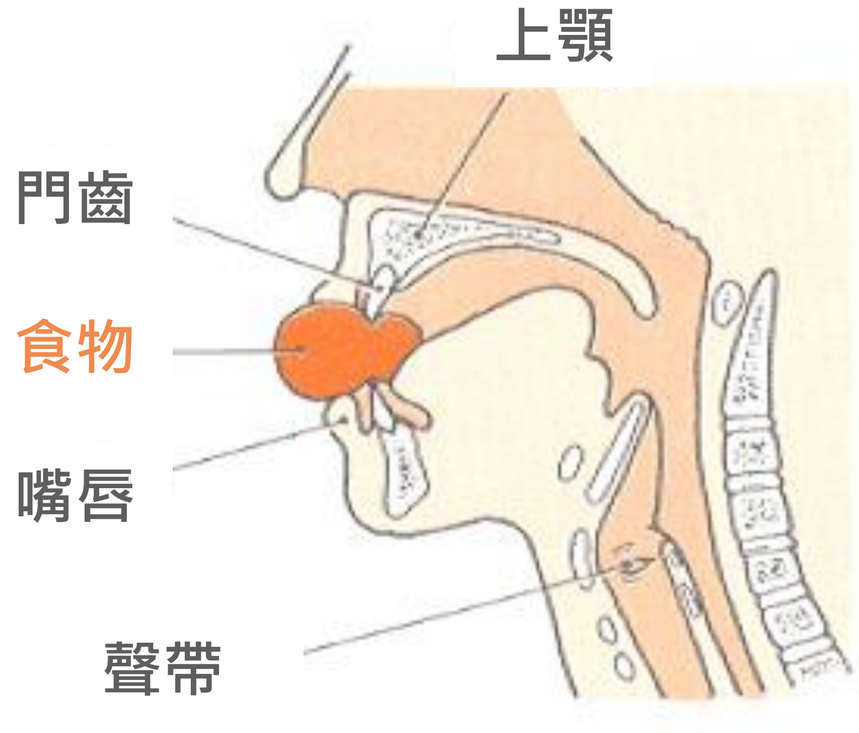
第一期：**認知期**（預備期、先行期） - **食物的認知**

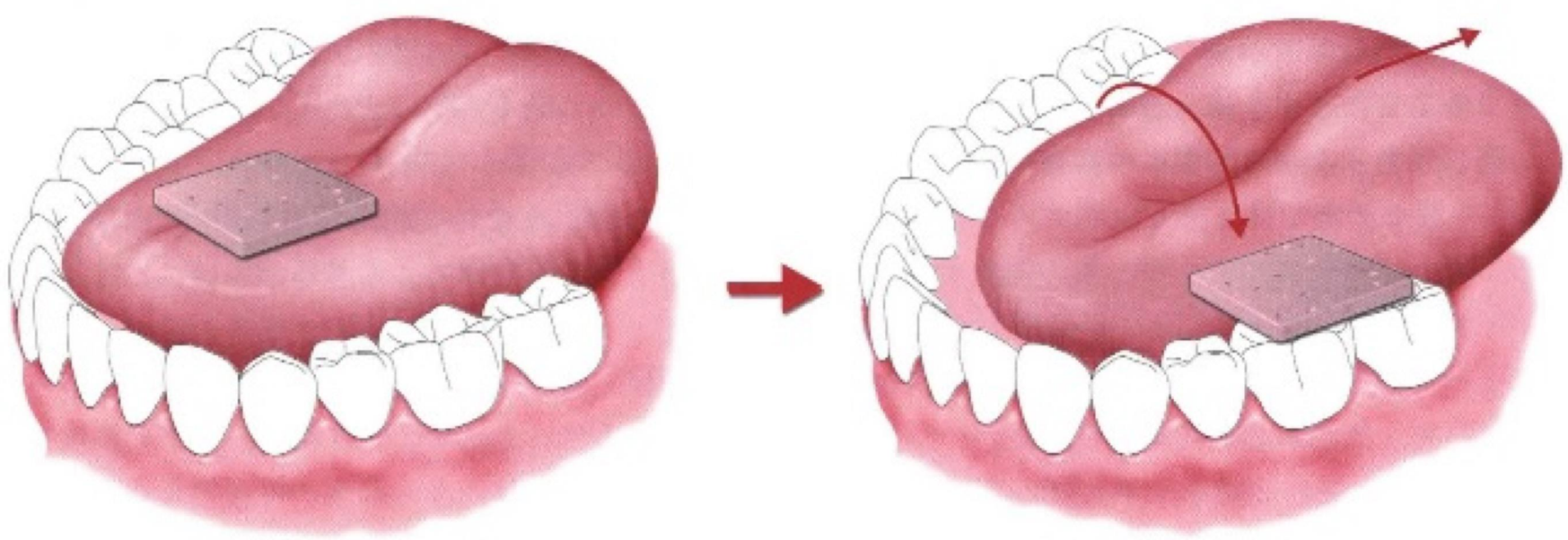
預測即將進食的食物之硬度、味道、氣味、進食速度的快慢、量的多少、溫度與需要的咀嚼力量等。

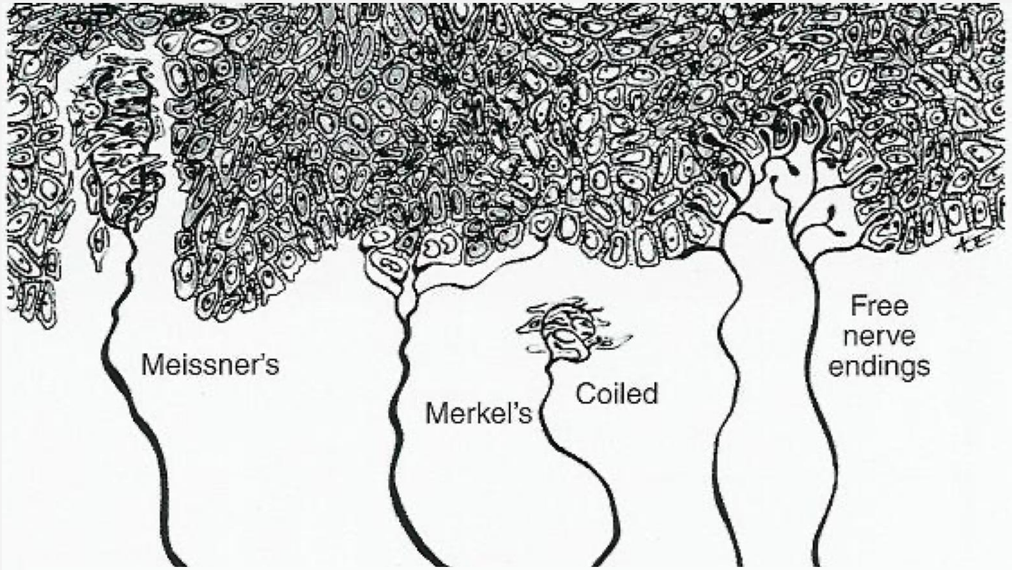
第二期：**準備期**（咀嚼期）-

捕食、咀嚼、形成食團

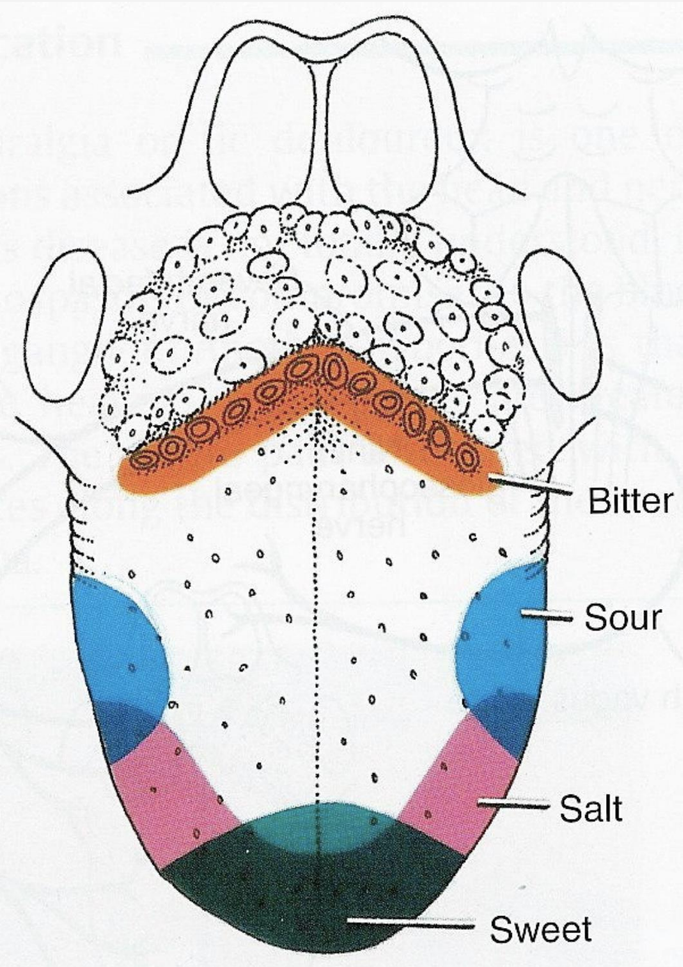
　用前牙將食物放入口中，由舌頭將食物帶往臼齒的咬合面。食物經由咀嚼後，會被咬斷、撕裂、磨碎，並與唾液混合形成食團。

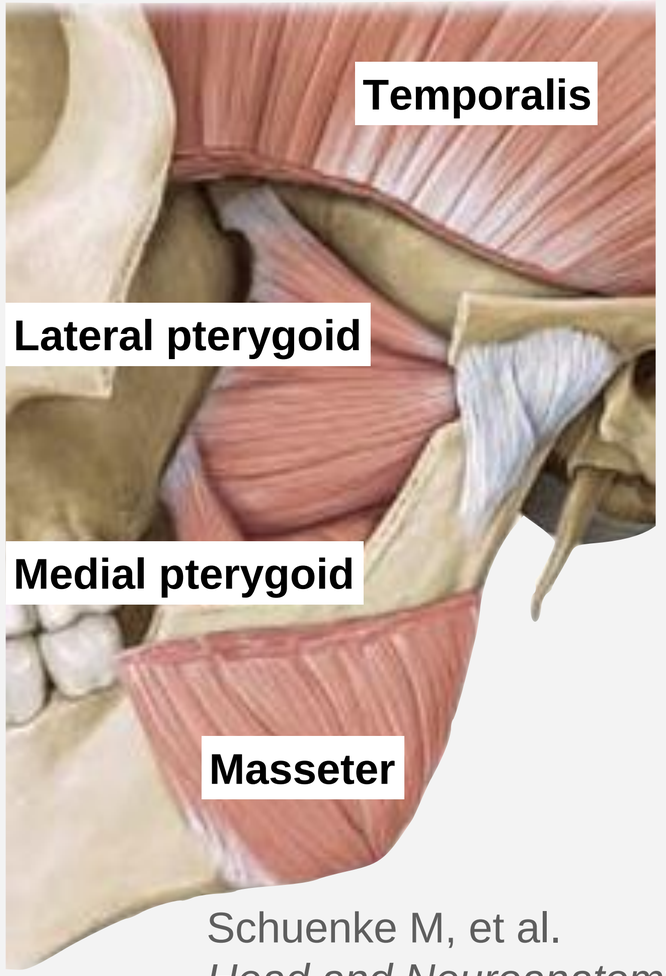






Avery JK. *Oral Development and Histology*, 2001

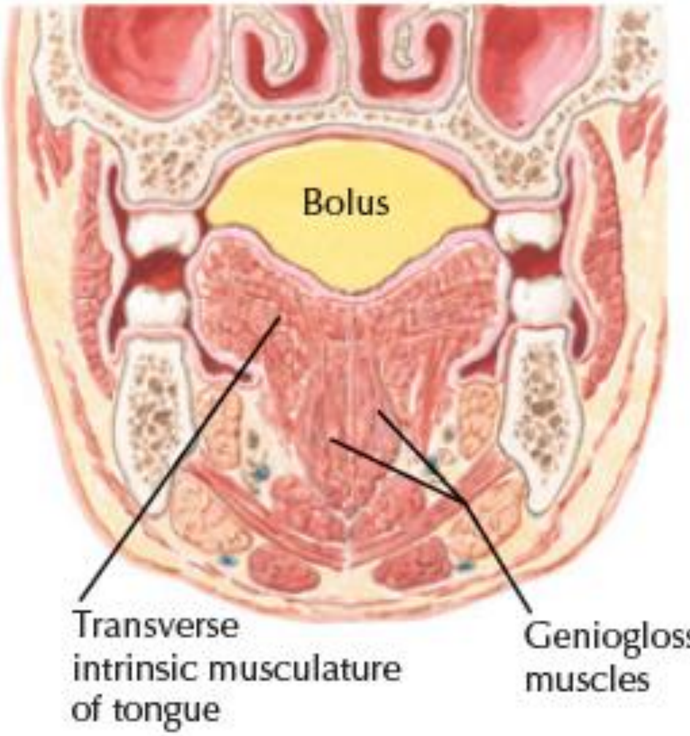


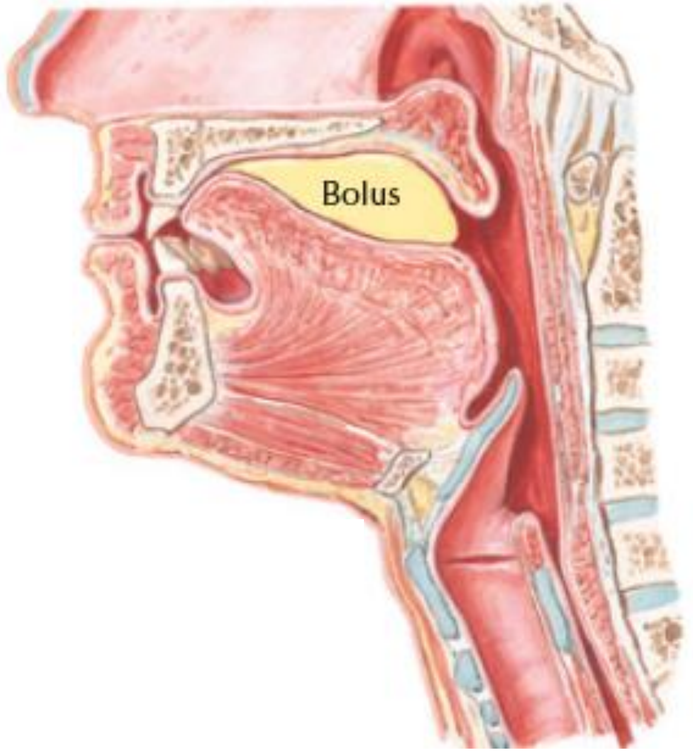


Schuenke M, et al.
Head and Neuroanatomy

第二期：**準備期**（咀嚼期） - 捕食、**咀嚼**、形成食團

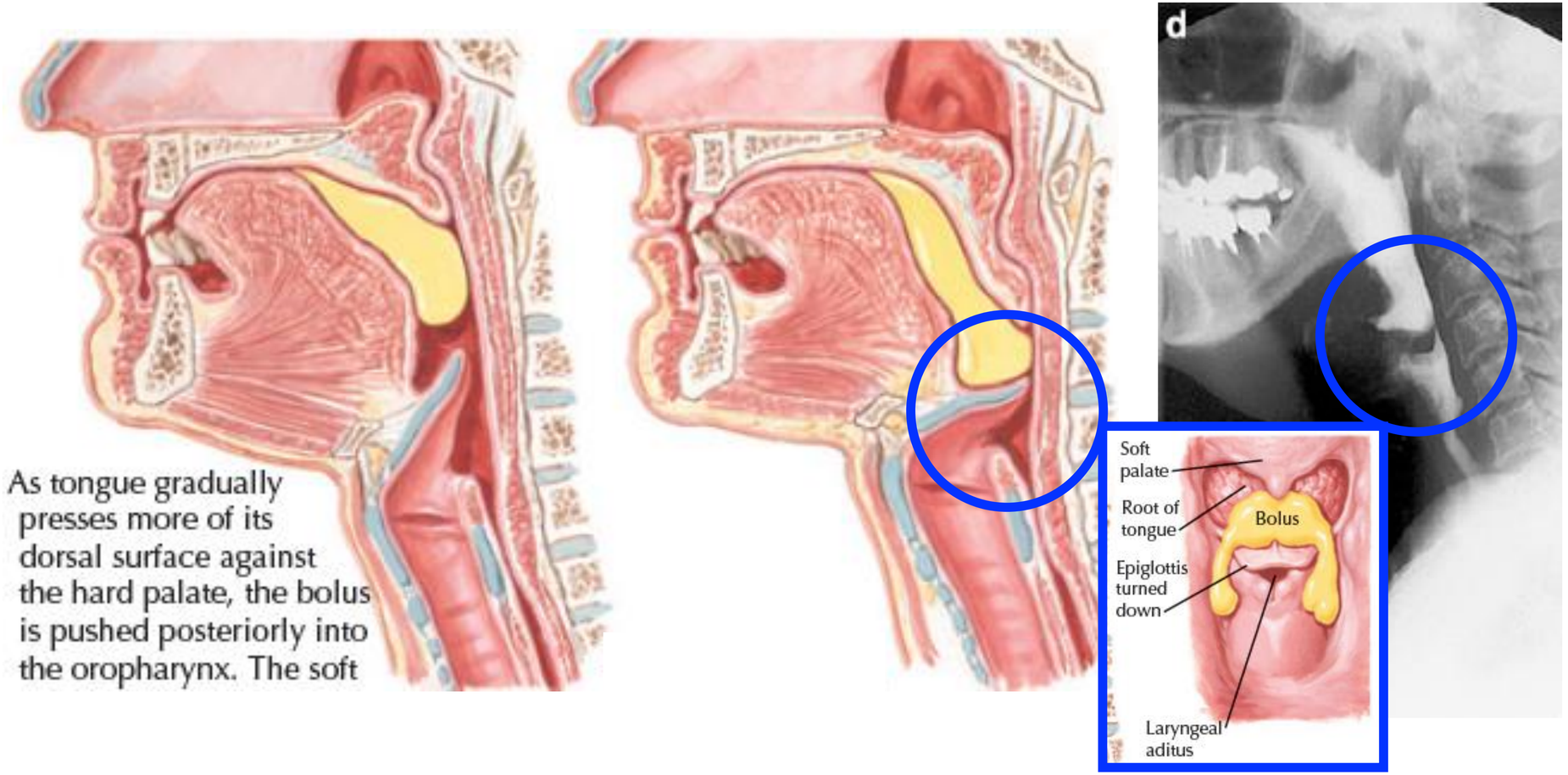
　咀嚼肌和複雜的口腔感覺，如味覺、觸覺、溫度等作用之下，將進入口腔的食物製作成大小、硬度適當的食團。





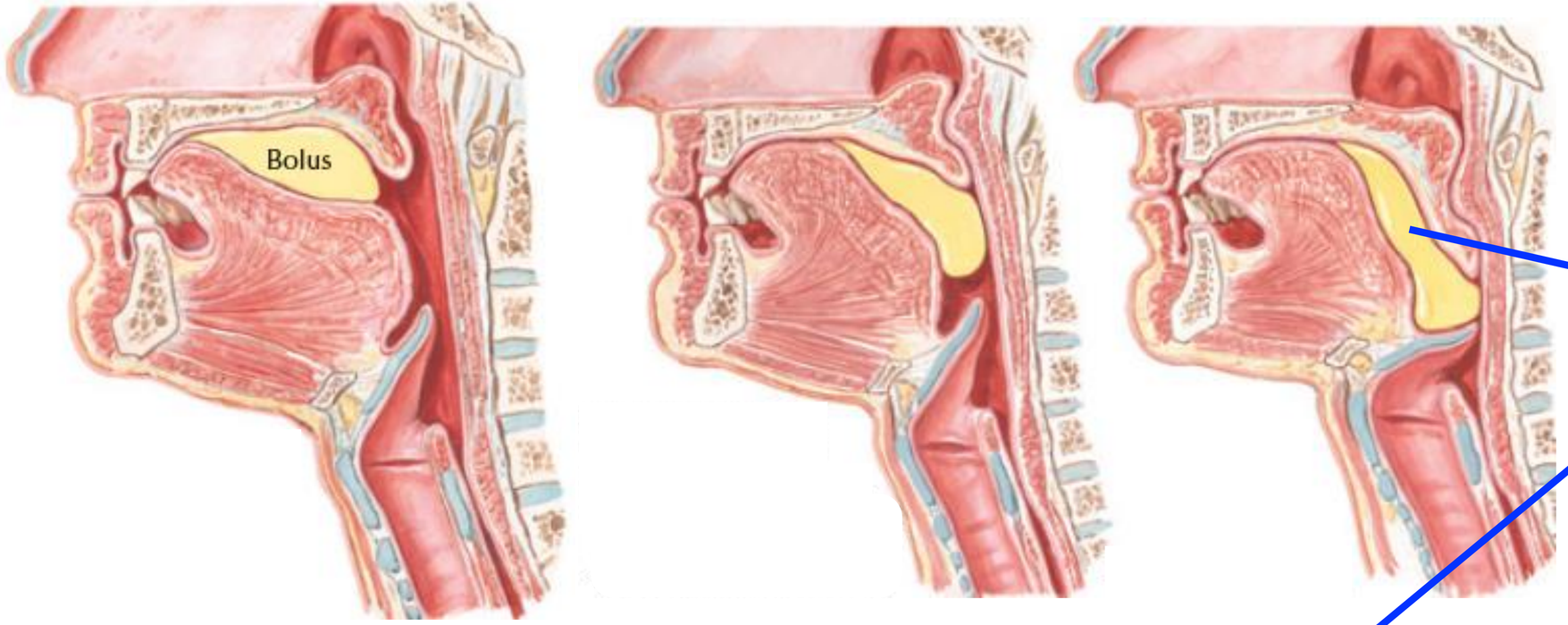
第三期：**口腔期 - 舌頭將食團送往咽腔**

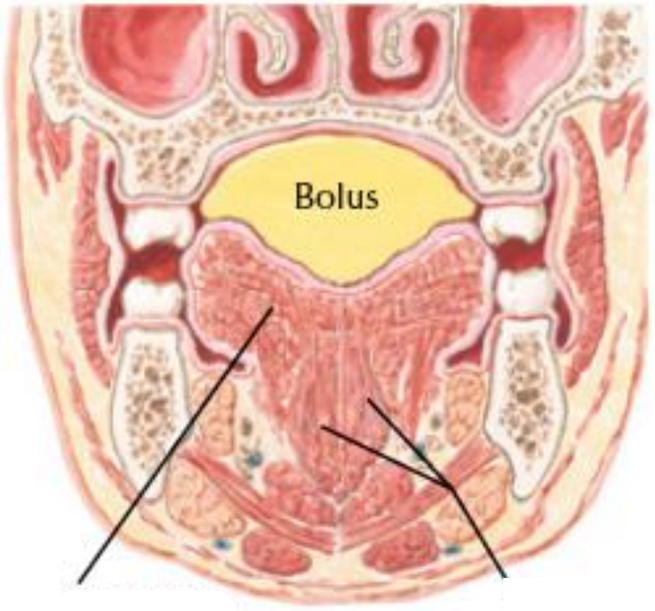
咀嚼運動停止。舌頭前端以及邊緣部位觸碰硬顎，將食團集中並置於舌背中央凹陷處，準備往後方將食團從口腔推入咽腔。軟腭上抬、咽縮肌收縮形成隆起向軟腭靠近。

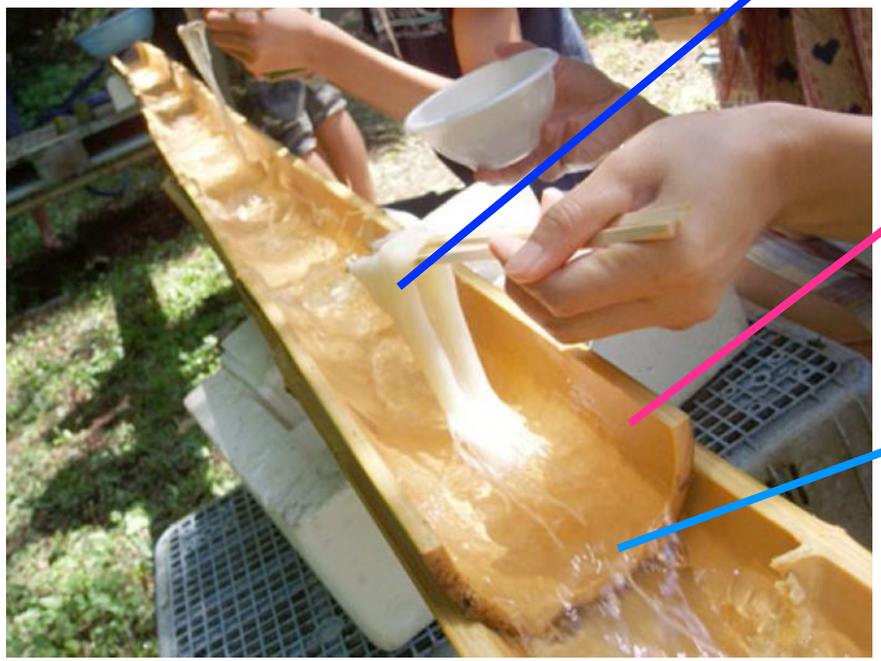


第四期：**咽腔期 - 食團通過咽腔、鼻咽閉鎖、呼吸停止**

軟腭上抬關閉口鼻腔通道、舌根、舌骨上移關閉口咽腔通道、環咽肌張開、喉頭向前上方移動。聲帶內收，會厭軟骨向下關閉氣道開口。食團由口腔往咽腔移動，刺激咽壁的感覺接受器，啟動吞嚥反射。



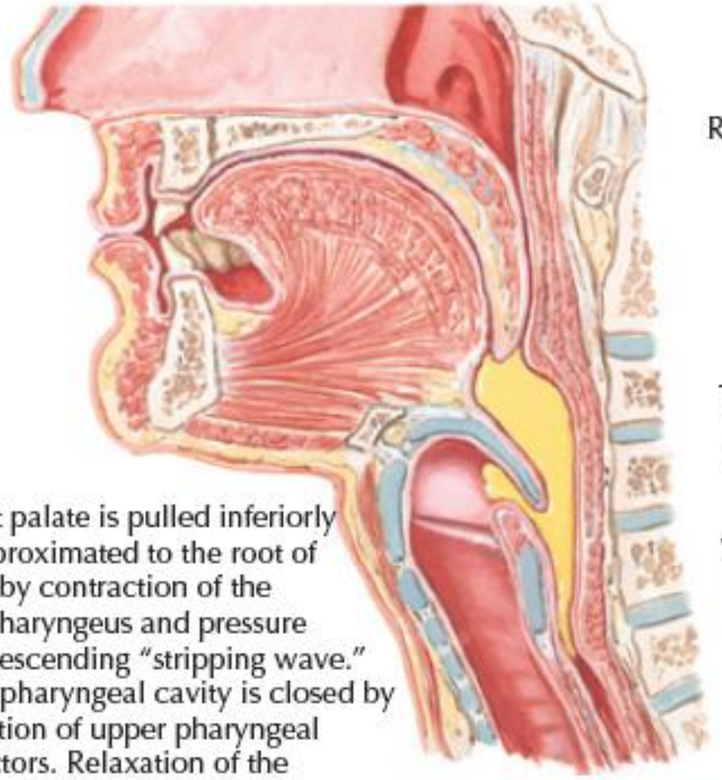




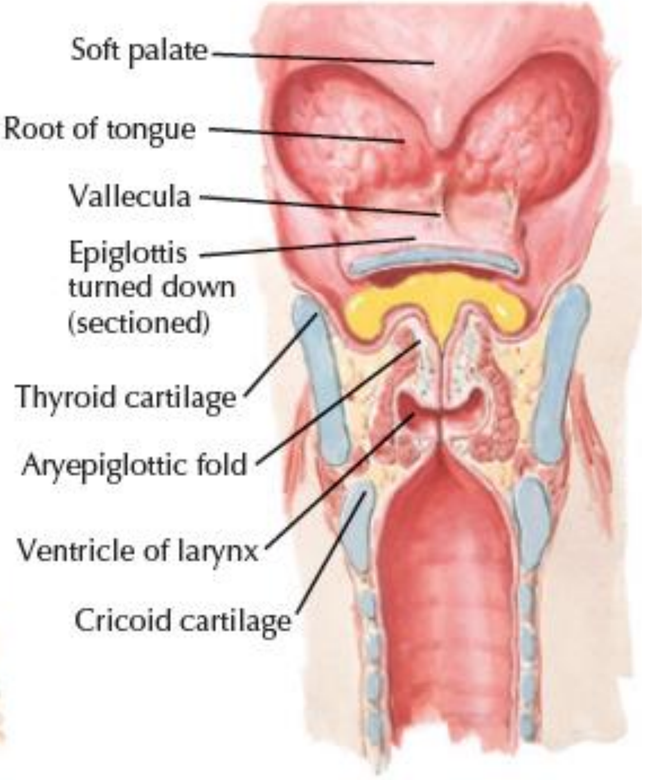
Bolus

Tongue

Lubricant



F. The soft palate is pulled inferiorly and approximated to the root of tongue by contraction of the palatopharyngeus and pressure of the descending "stripping wave." The oropharyngeal cavity is closed by contraction of upper pharyngeal constrictors. Relaxation of the

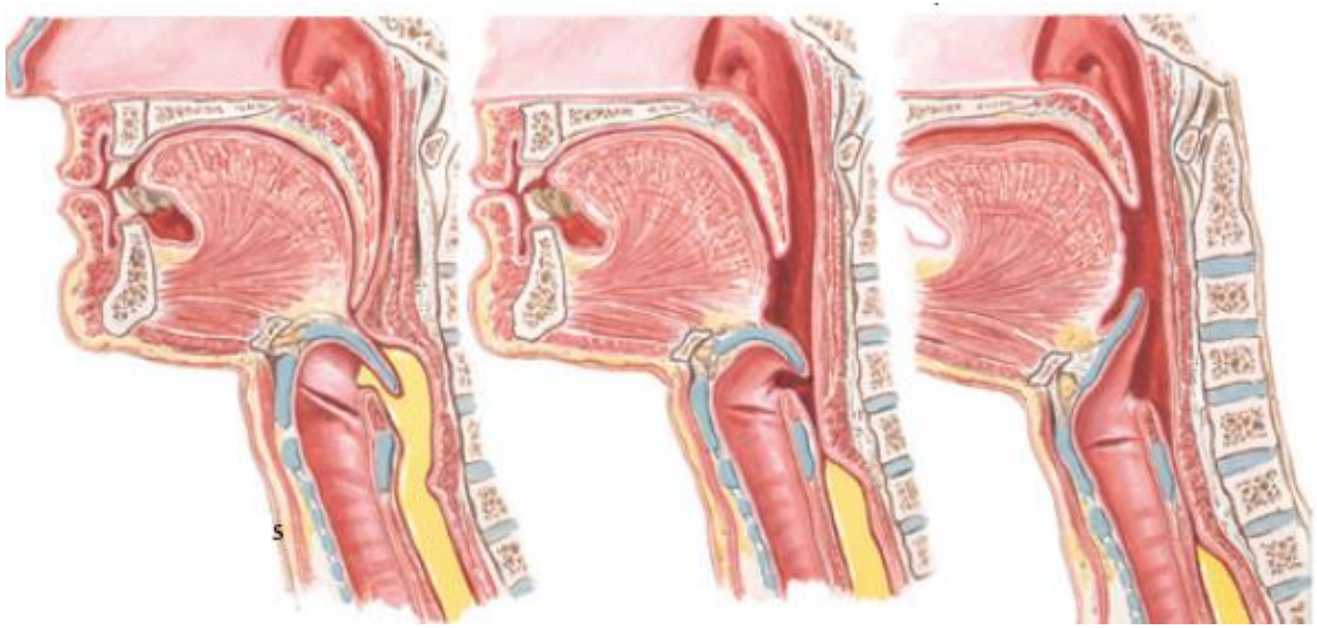


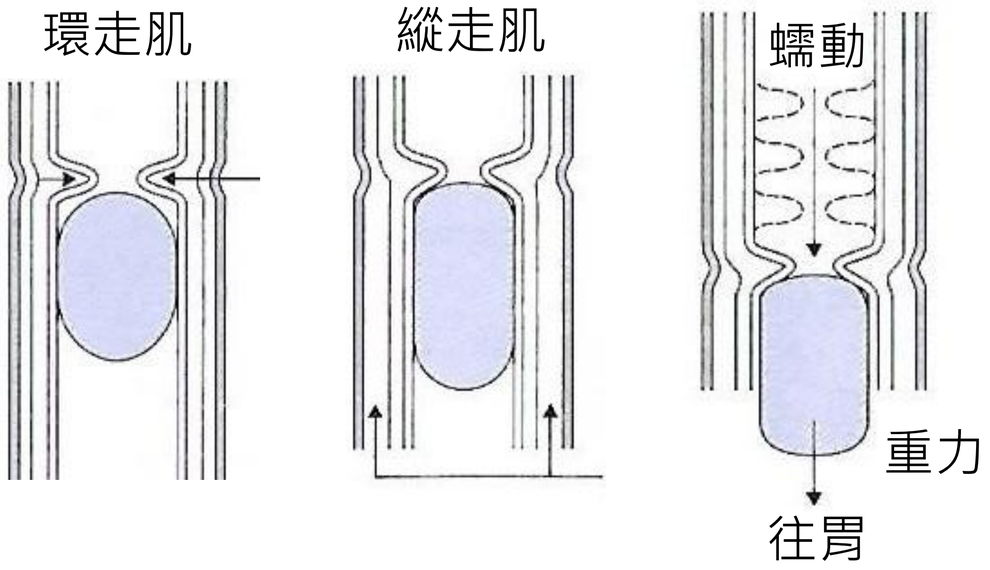
第四期：**咽腔期 - 食團通過咽腔、鼻咽閉鎖、呼吸停止**

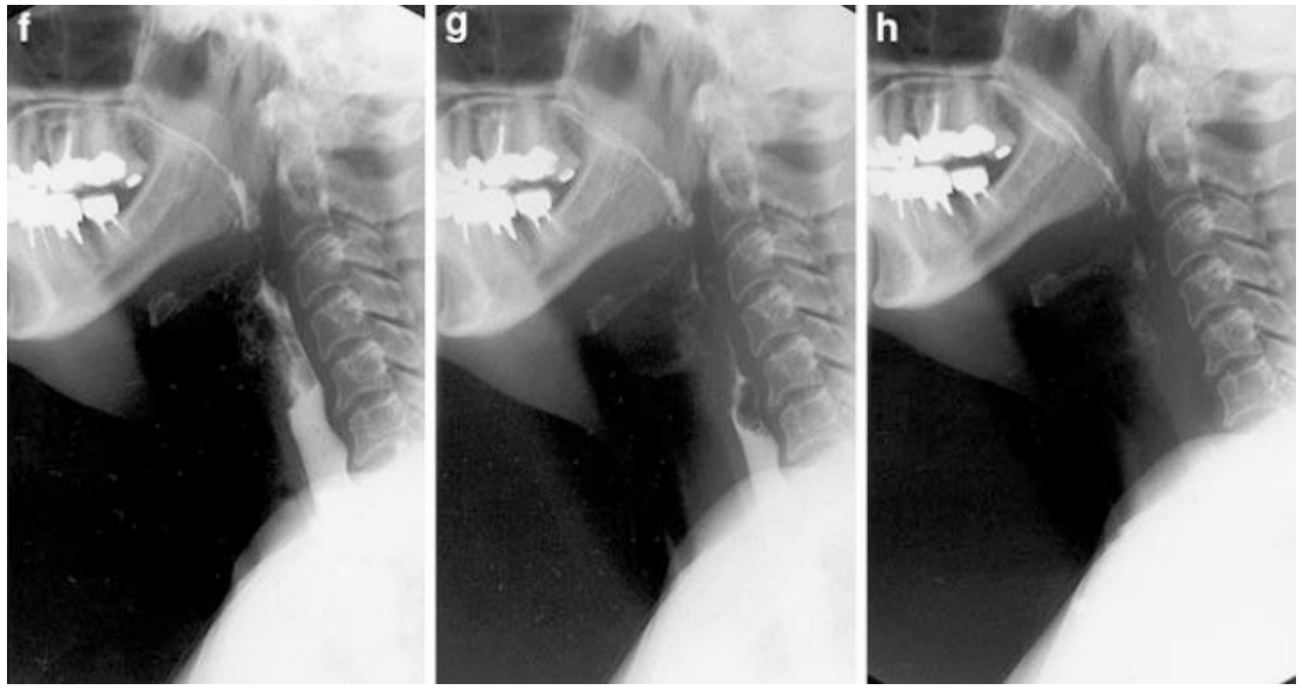
軟腭上抬關閉口鼻腔通道、舌根、舌骨上移關閉口咽腔通道、環咽肌張開、喉頭向前上方移動。聲帶內收，會厭軟骨向下關閉氣道開口。食團由口腔往咽腔移動，刺激咽壁的感覺接受器，啟動吞嚥反射。

第五期：食道期 -
食團通過食道

　　食團進入食道，刺激食道肌肉產生蠕動。經由食道肌肉產生規律的舒張與收縮，可將食團往下推而進入胃。







攝食、咀嚼與吞嚥的相互關係與流程

Five stage of ingestion

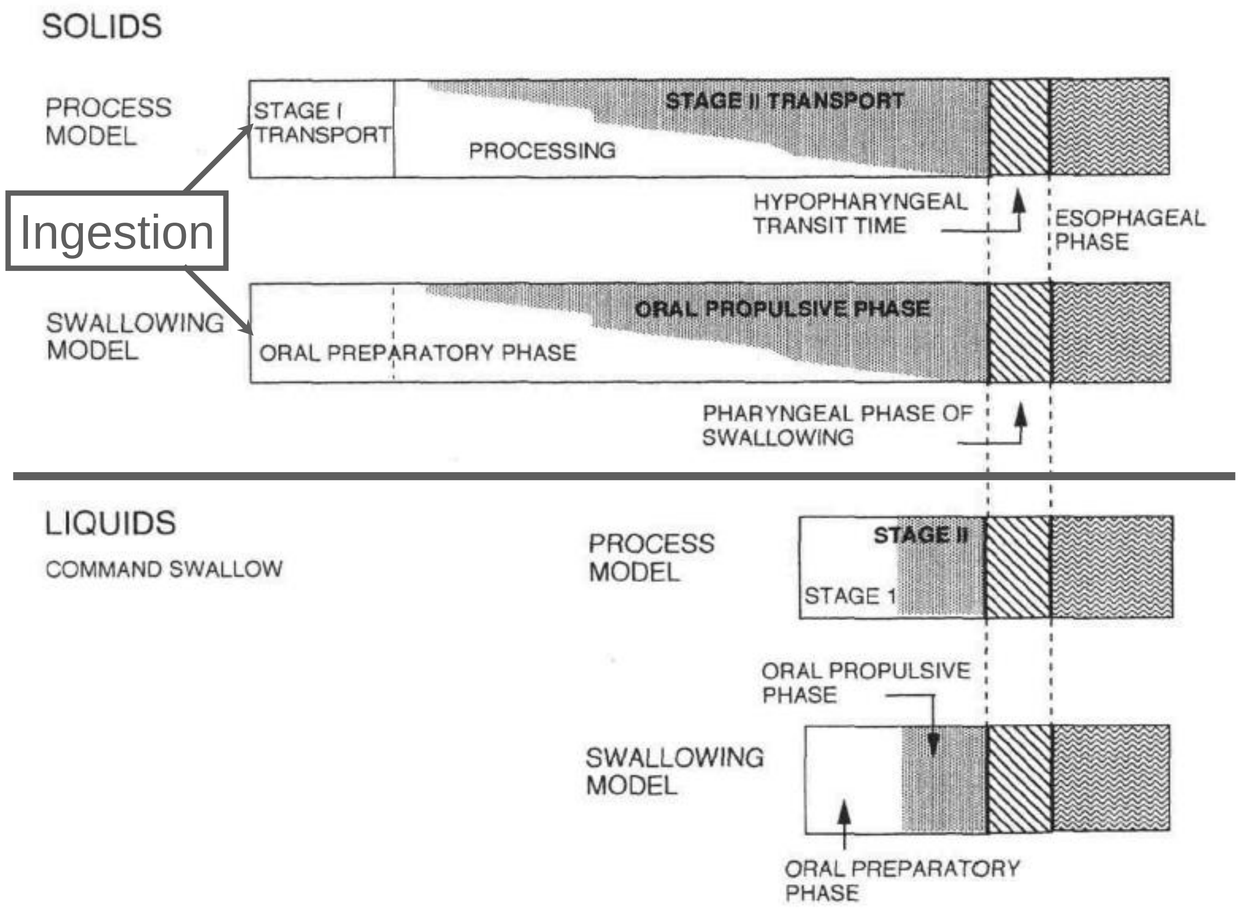
Leopold NA & Kagel MC. *Arch Phys Med Rehabil*, 1983

攝食、咀嚼、吞嚥的五期

- 認知期（預備期）
- 準備期（咀嚼期）
- 口腔期
- 咽腔期
- 食道期

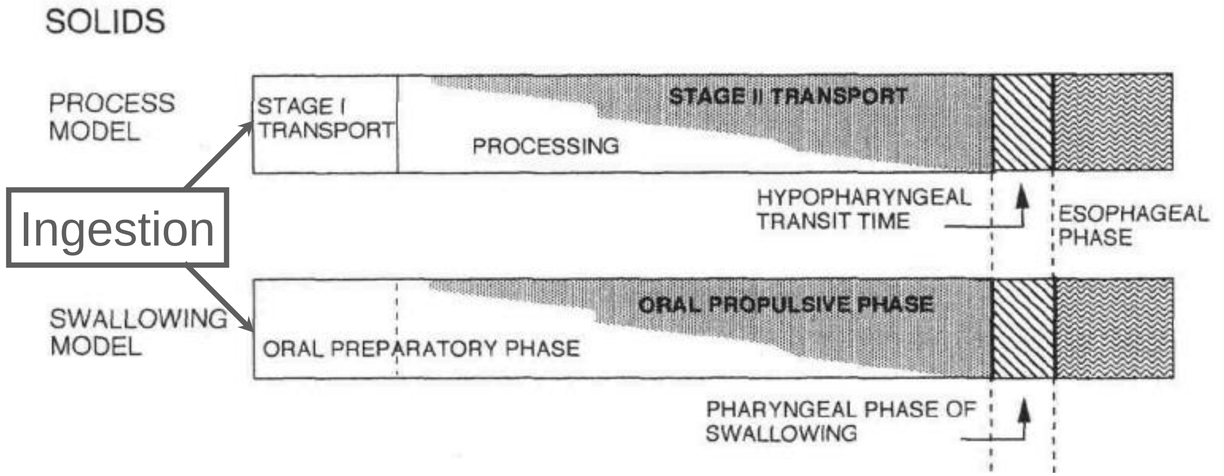
Process model

Palmer JB & Hiiemae KM. *Jpn J Dysphagia Rehabil*, 1997

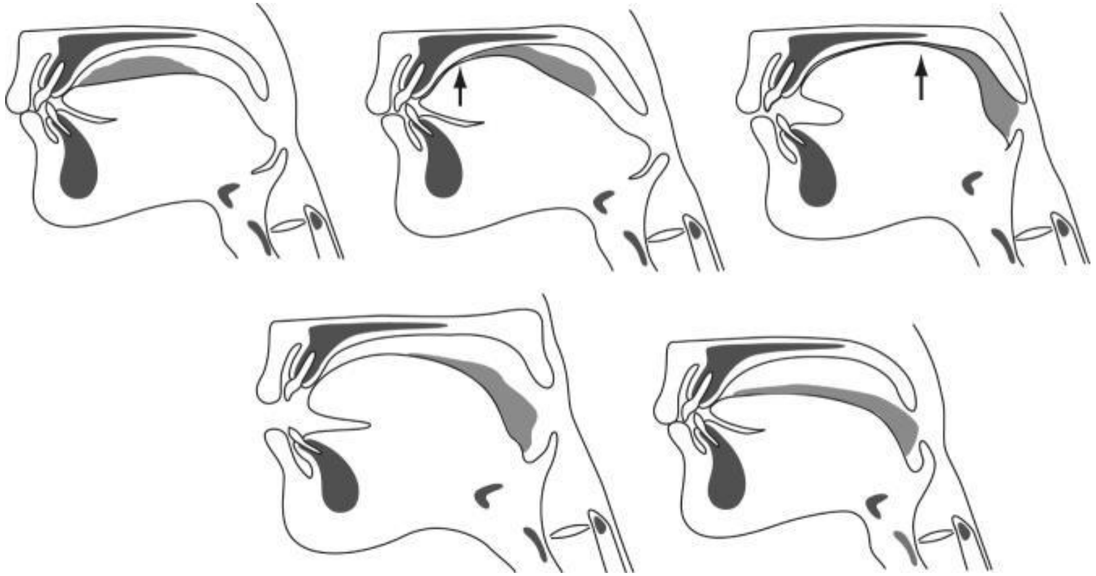


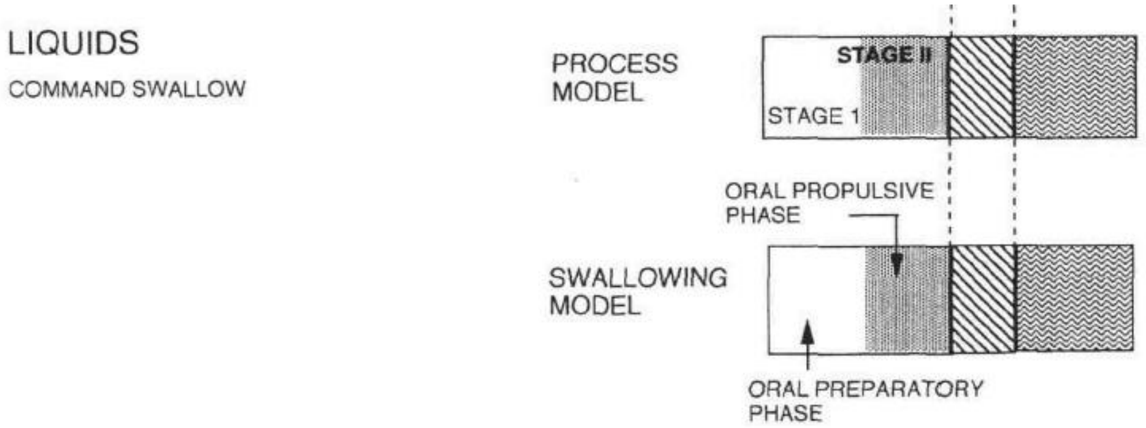
Process model

Palmer JB & Hiiemae KM. *Jpn J Dysphagia Rehabil*, 1997
Matsuo K & Palmer JB. *Phys Med Rehabil Clin N Am*, 2008

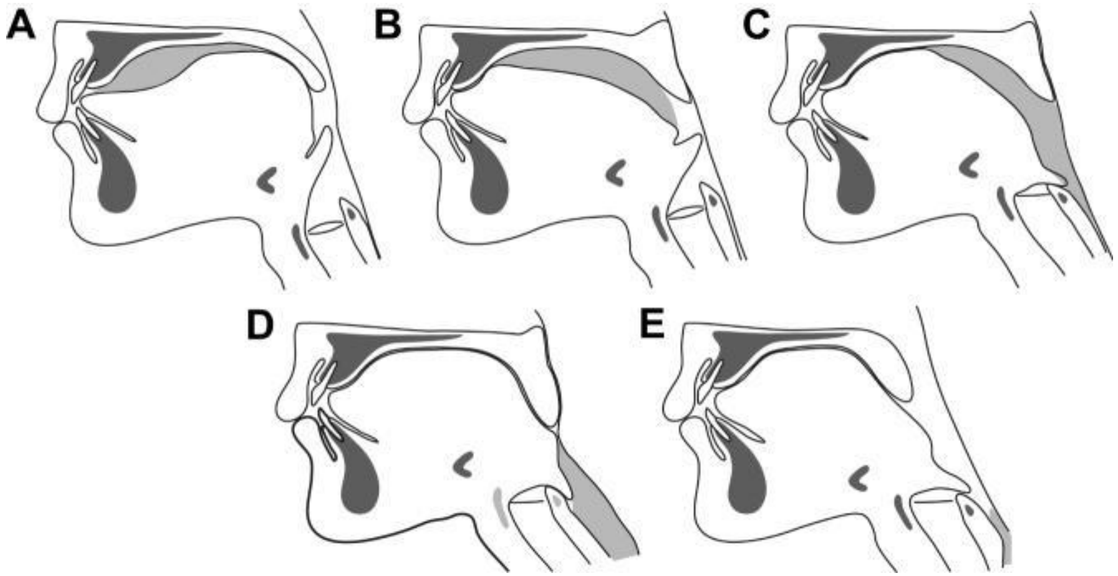


承接 — **咀嚼** — 運送



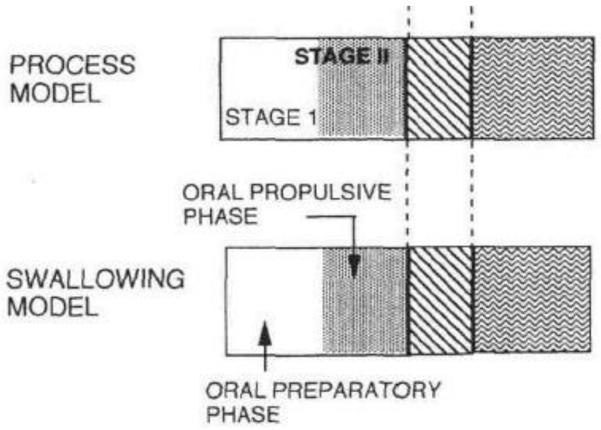


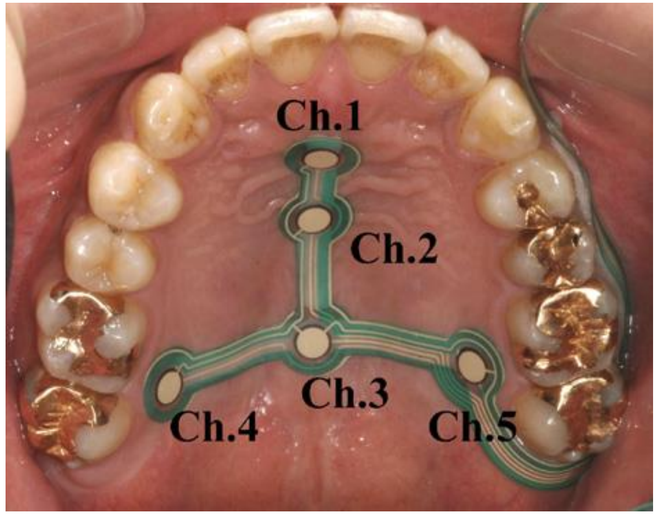
承接 — 運送



LIQUIDS

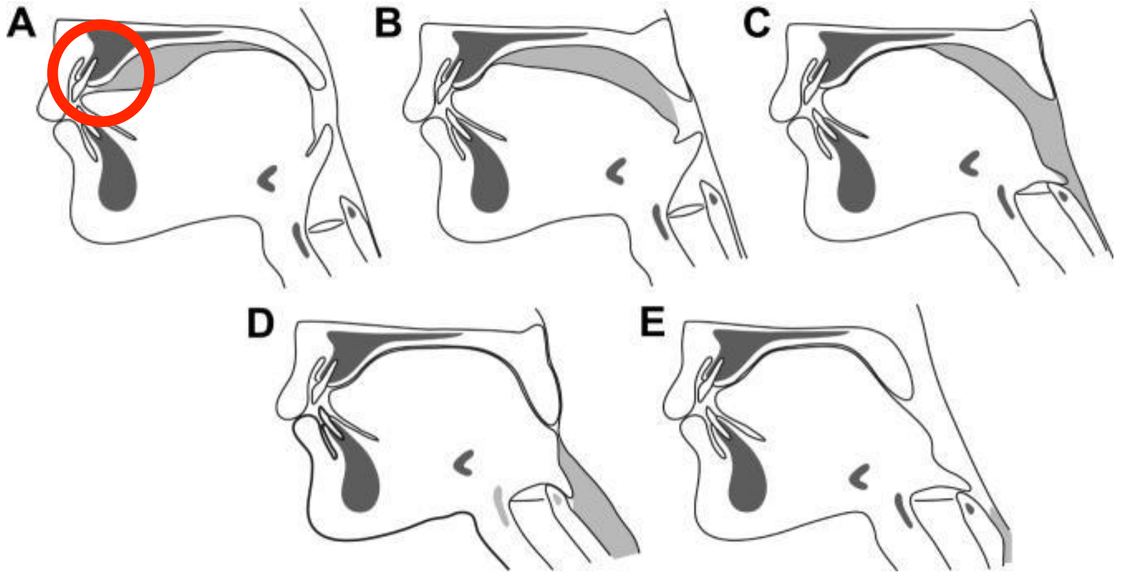
COMMAND SWALLOW



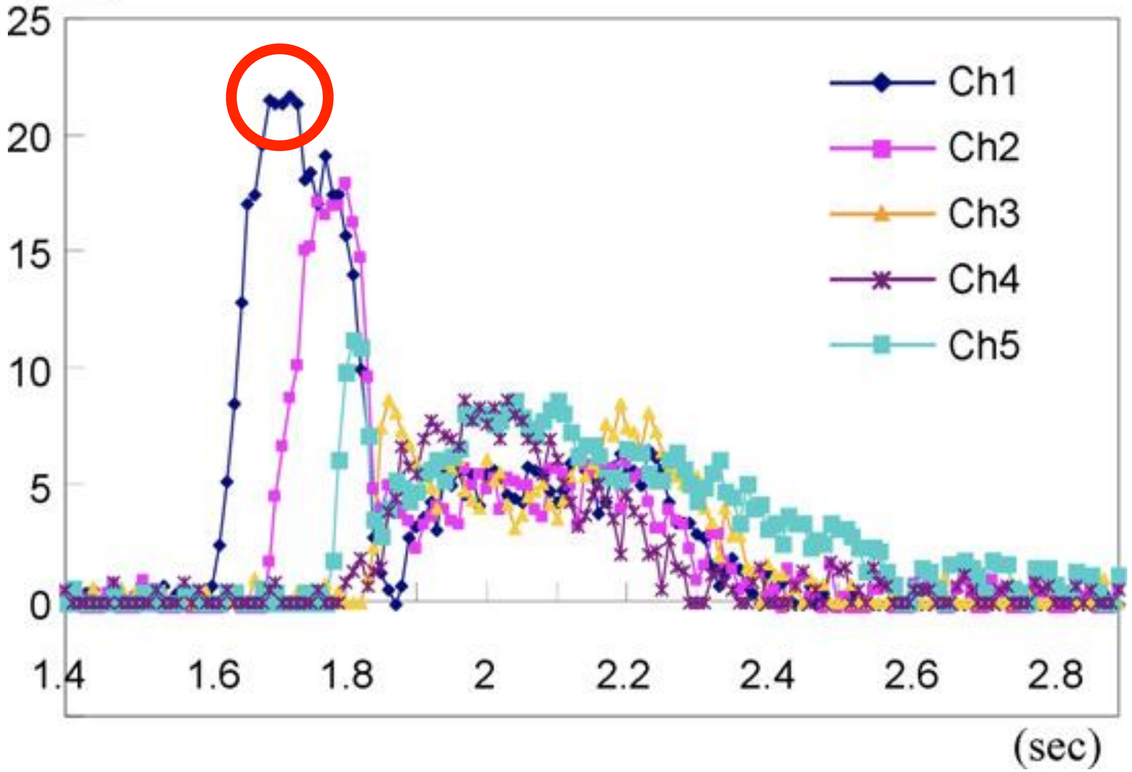


Subject: 30
Water: 15 ml

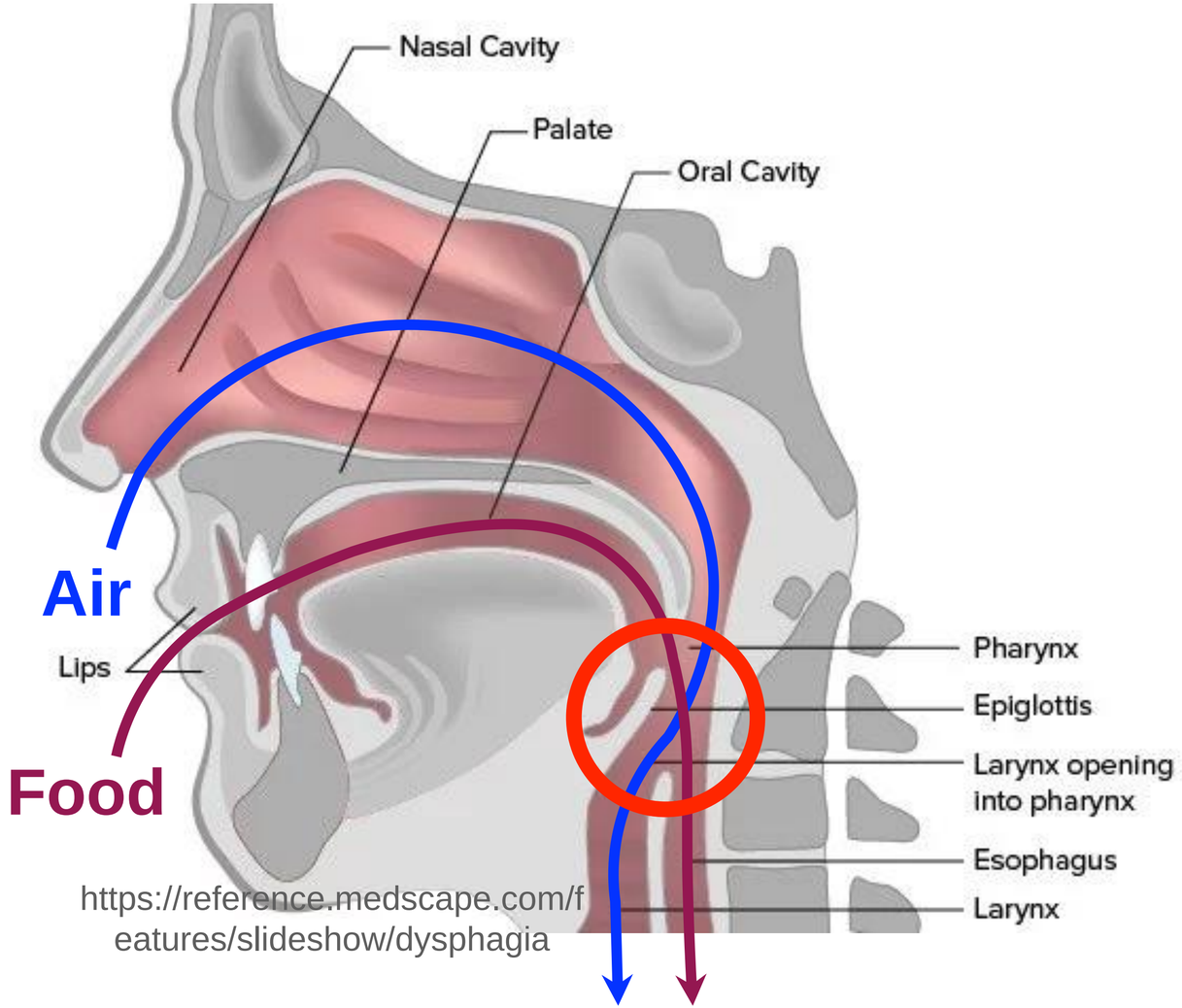
承接 — 運送



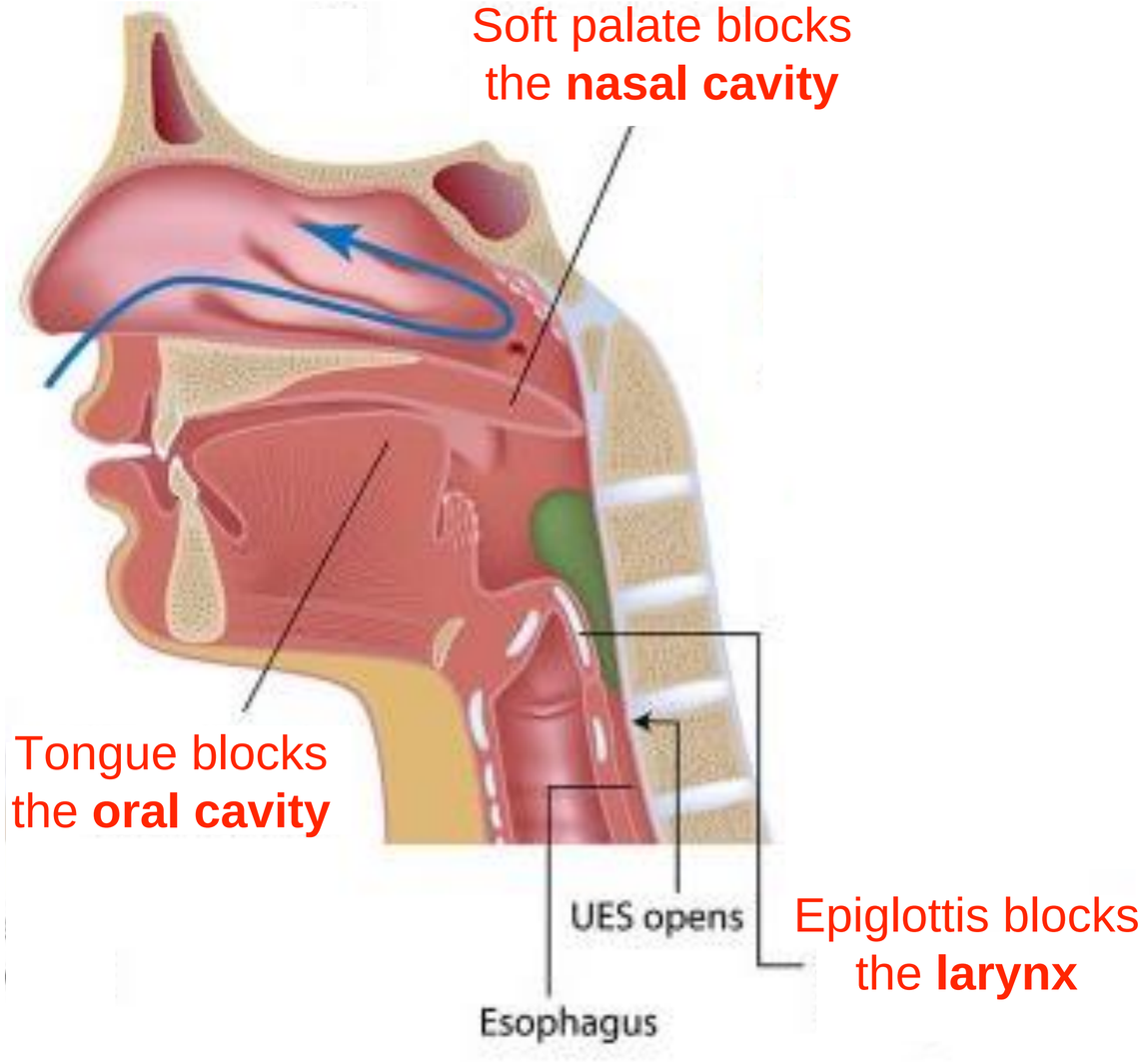
(kPa) Hori K, et al. *J Prosthodont Res*, 2009



Three important mechanisms to prevent miss swallow during pharyngeal phase



https://reference.medscape.com/features/slideshow/dysphagia



攝食、咀嚼、吞嚥的過程

1

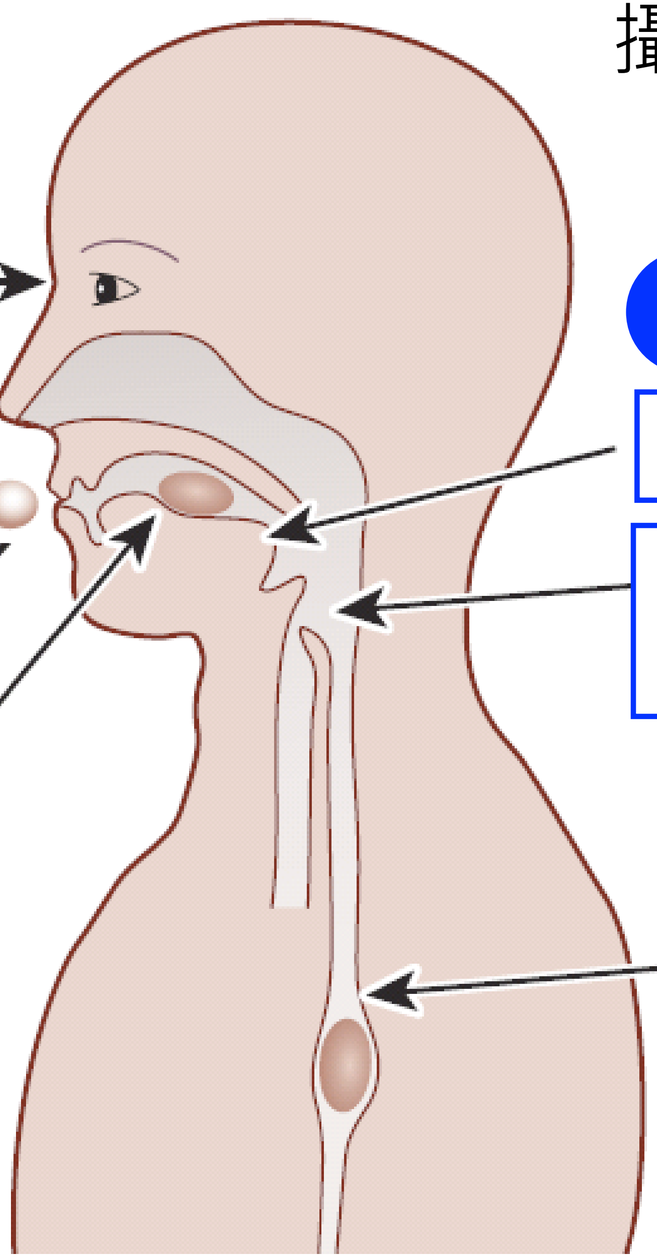
對於即將要吃的食物的認知
（認知期）

2

經由口腔攝取食物

3

咀嚼形成食團
（準備期）



4

將食團送往咽腔（口腔期）

5

食團通過咽腔
（咽腔期、吞嚥反射）

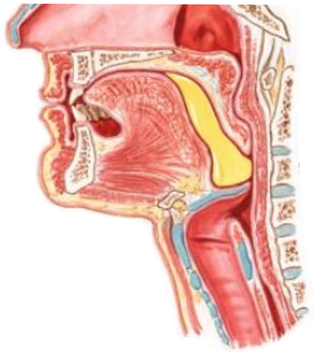
6

食團通過食道（食道期）

Three elements of Oral Healthcare

- Toothbrush
- Interdental brush
- Dental floss

- Mastication
- Swallowing



- Oral spongy brush
- Oral wet tissue
- Tongue scraper
- Oral moisturizing gel

Oral hygiene

Oral function

Oral environment

台灣社區65歲以上長者有21.8%於每週至少3次有進食嗆到的現象，有**12.8%**經過評估為吞嚥異常，即**每10個高齡者可能就有1個輕度以上之吞嚥障礙**。

吞嚥沒問題 營養有保障 長者「吃得下」 身心快活

長輩「吞未落」是大事，吞嚥多練習有方法 **(國民健康署，2017/12/22)**

長者因器官退化、虛弱或是有疾病(如中風、帕金森氏症等)，會有吞嚥困難問題，於進食時造成嗆咳、吸入性肺炎等。國內研究發現，台灣社區65歲以上長者有21.8%於每週至少3次有進食嗆到的現象，有12.8%經過評估為吞嚥異常，即每10個高齡者可能就有1個有輕度以上之吞嚥障礙。爰此，衛生福利部國民健康署與中華民國語言治療師公會全國聯合會共同呼籲，長者透過加強吞嚥功能的訓練，不但可改善因吃不下造成營養攝取不足問題，也能提昇生活品質。

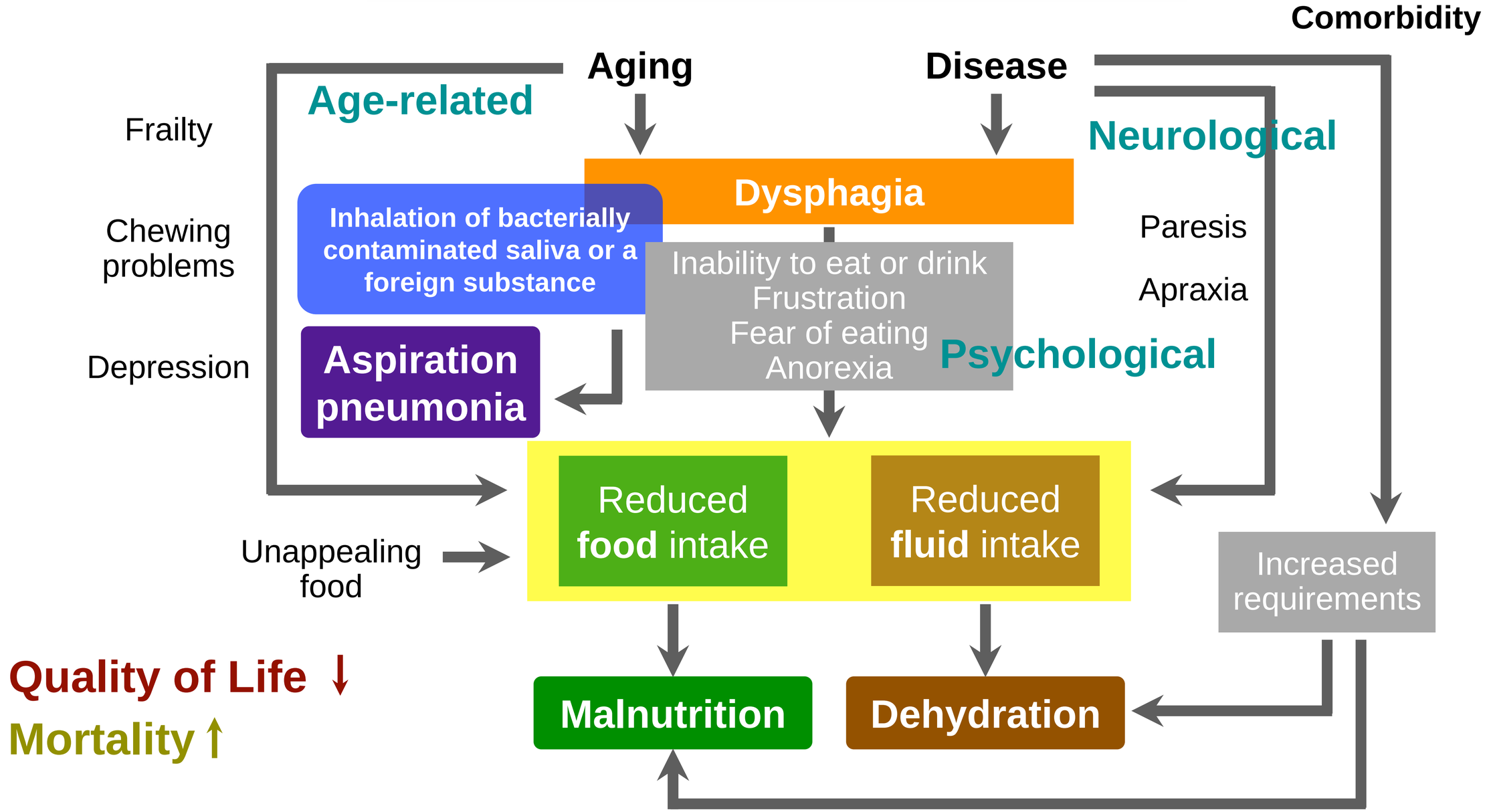
國 良
問題 症
候群 致長
者平
中 咽
時間 呷百
二 趣
味口 餐飯
前1 肉
運動 聲音
功能 尤
其對於易發生吞嚥障礙高風險族群(如失智症、帕金森氏症等)，即早進行「呷百二吞嚥健康操」也可預防或延緩被放置胃管的機會。

Prevalence of dysphagia among the elders

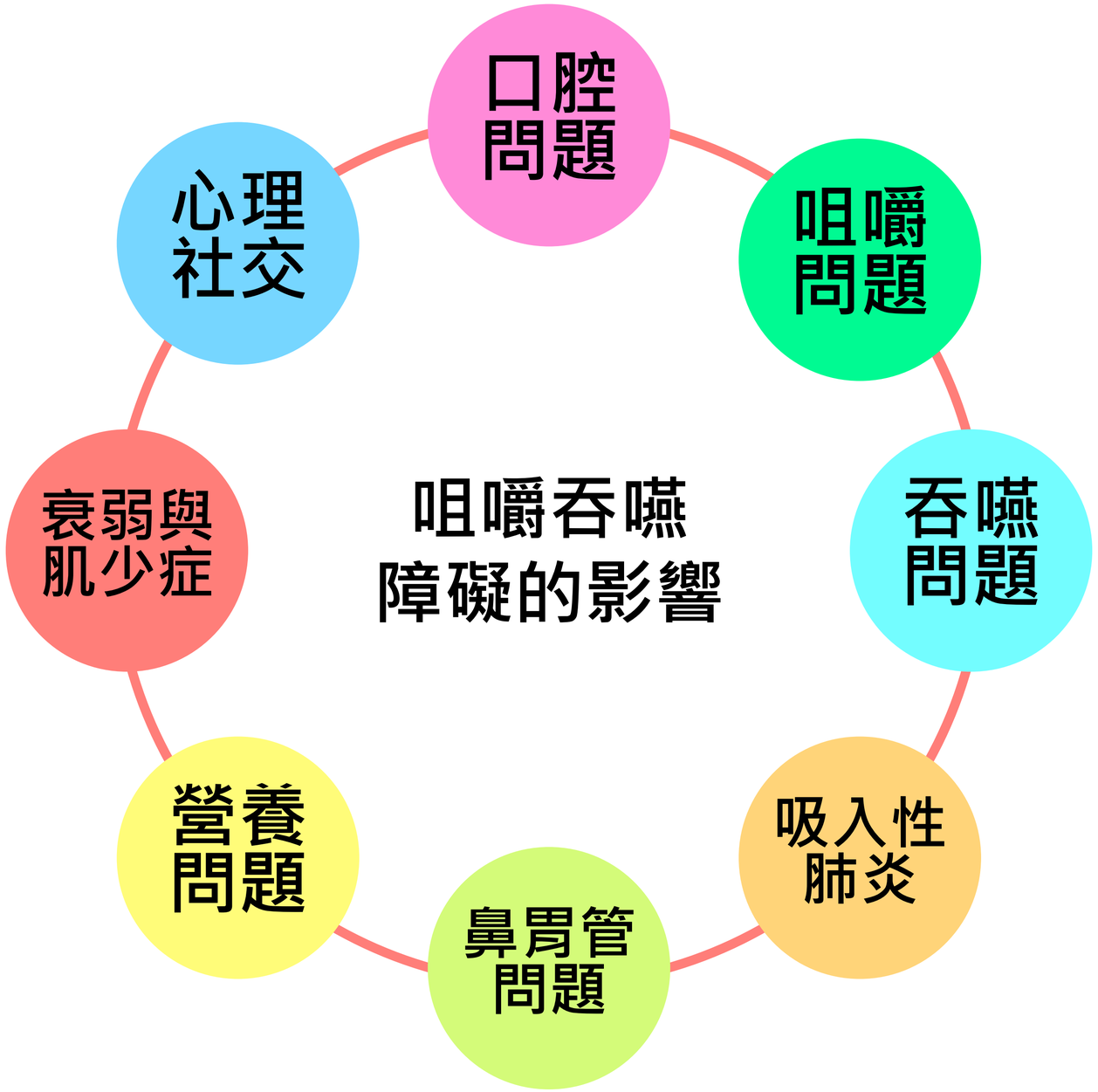
- **13% - total population (≥ 65 years)**
- **16% - independent elders (70-79 years)**
- **33% - independent elders (≥ 80 years)**
- **51% - institutionalized elders**

Wirth R, et al. *Clin Interv Aging*, 2016

Health consequences of dysphagia



Modified from Wirth R, et al. *Clin Interv Aging,* 2016



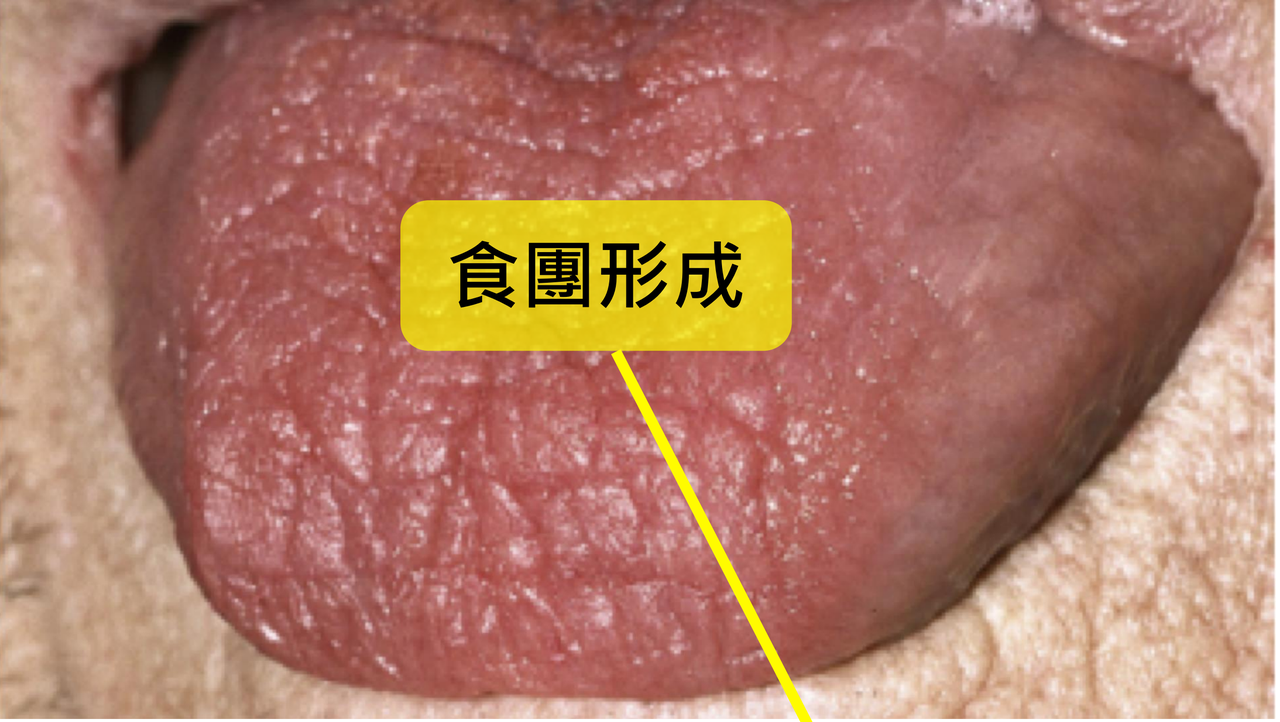
Modified from: Huang ST. *J Nurs*, 2020

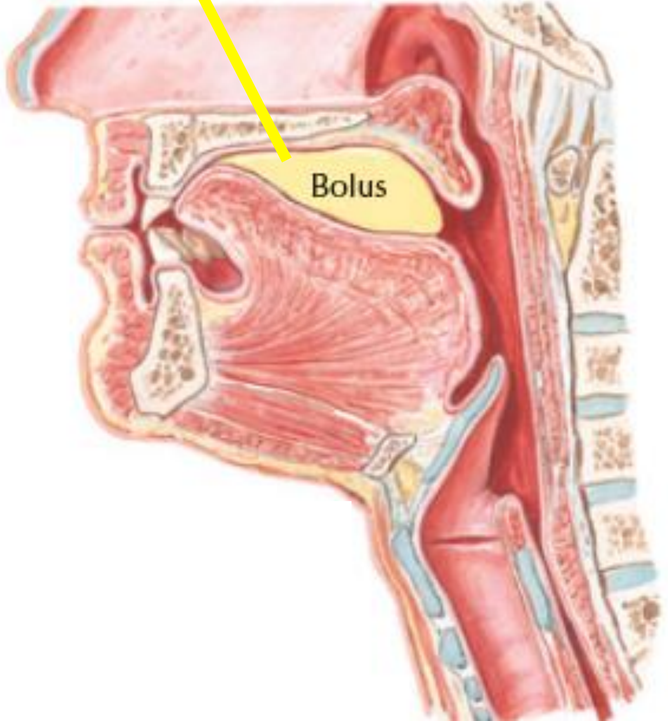
口腔問題 | 咀嚼問題 | 吞嚥問題 | 吸入性肺炎 | 鼻胃管問題 | 營養問題 | 衰弱與肌少症 | 心理社交

攝取**水份不足**導致口腔乾燥、口腔免疫功能下降、食物殘渣堆積、口腔污染物

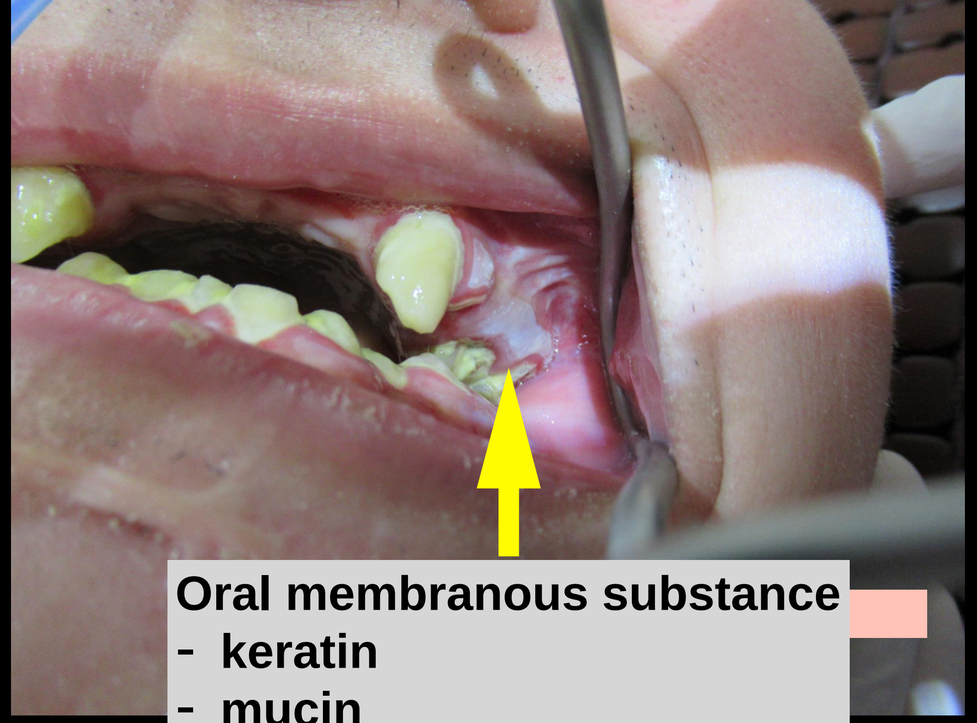

口腔乾燥


口腔膜狀物



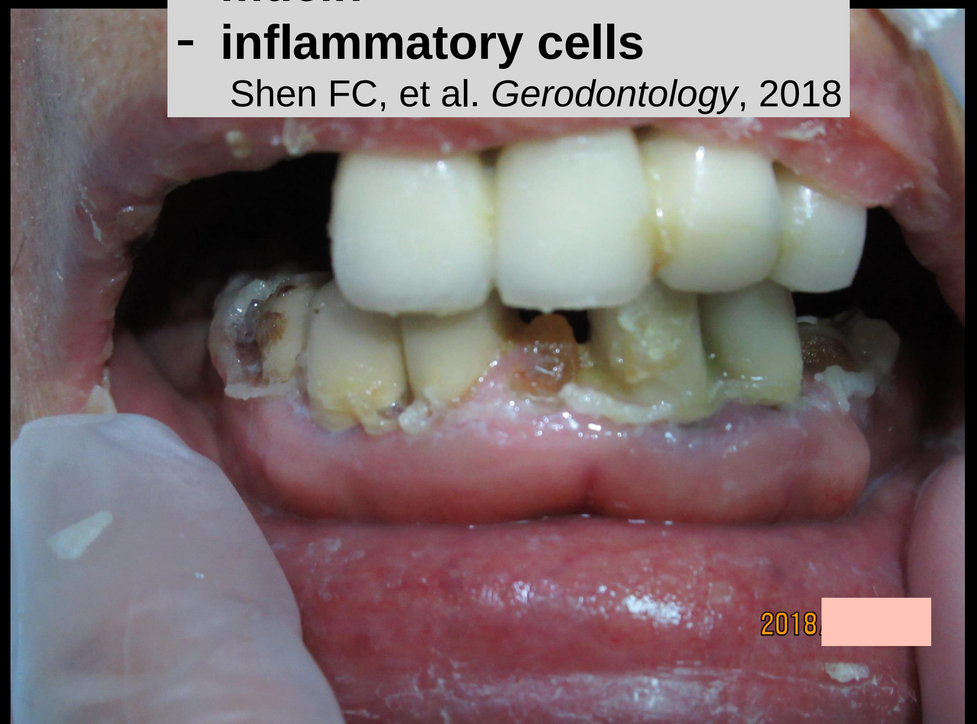


口腔乾燥影響**食團形成**，導致食物殘渣堆積在口腔，造成**口腔衛生不良**。



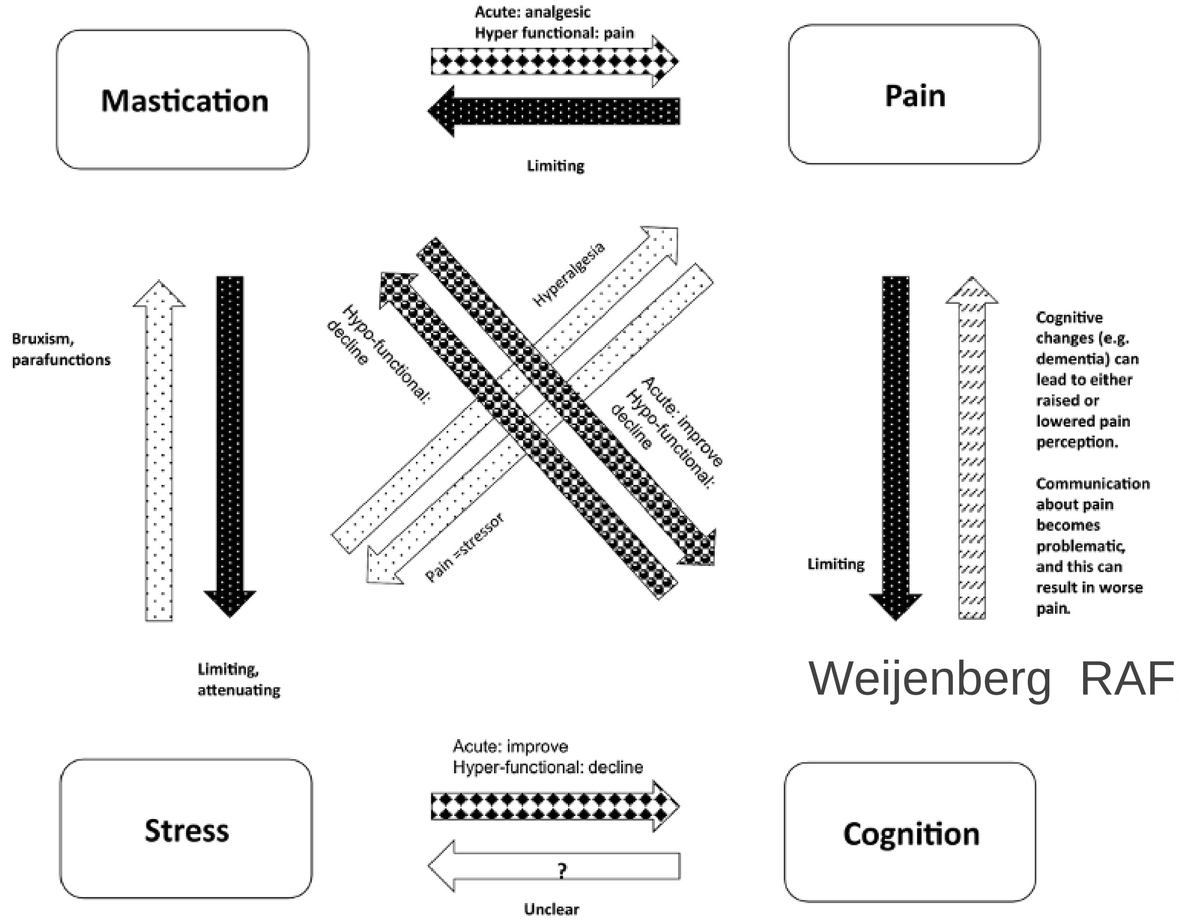
Oral membranous substance
- **keratin**
- **mucin**
- **inflammatory cells**

Shen FC, et al. *Gerodontology*, 2018



口腔問題 | **咀嚼問題** | 吞嚥問題 | 吸入性肺炎 | 鼻胃管問題 | 營養問題 | 衰弱與肌少症 | 心理社交

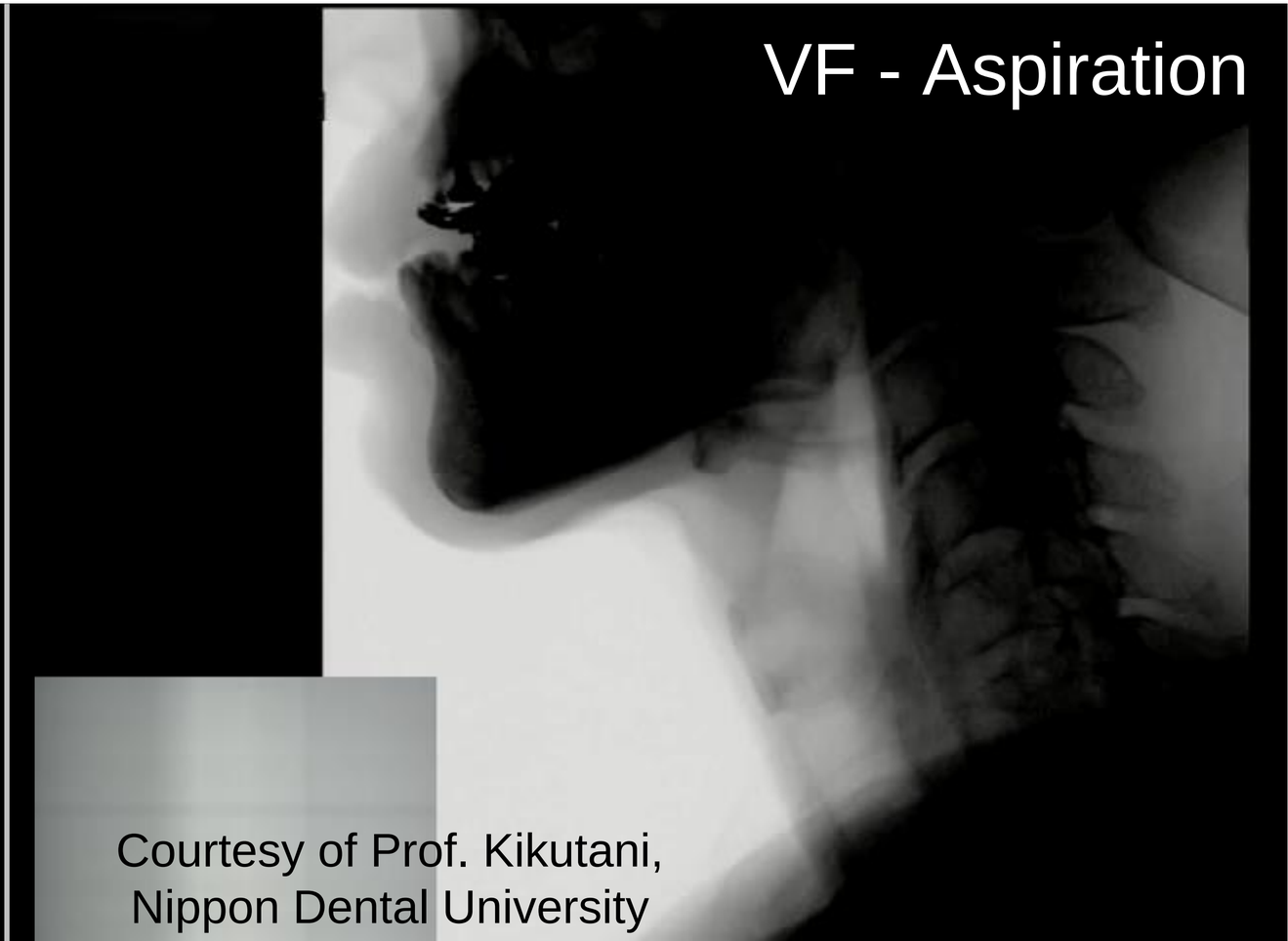
咀嚼能力下降、咬得動的食物減少、咀嚼次數減少而影響認知功能

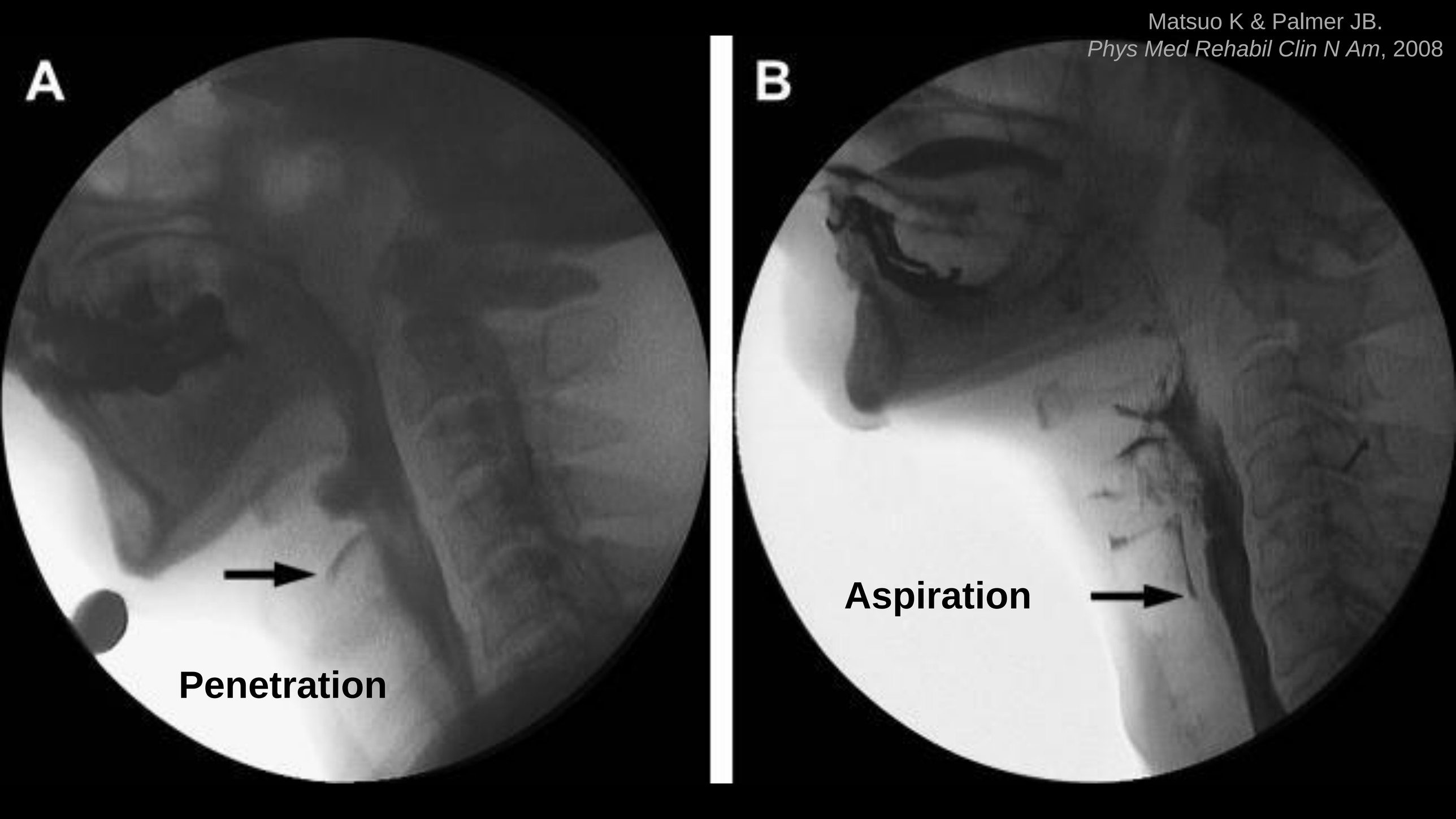


Weijenberg RAF, et al. *Gerodontology*, 2019

口腔問題 | 咀嚼問題 | **吞嚥問題** | 吸入性肺炎 | 鼻胃管問題 | 營養問題 | 衰弱與肌少症 | 心理社交

吞嚥困難、無法吞嚥、嗆咳、吸入、窒息風險





Matsuo K & Palmer JB.
Phys Med Rehabil Clin N Am, 2008

口腔問題 | 咀嚼問題 | 吞嚥問題 | **吸入性肺炎** | 鼻胃管問題 | 營養問題 | 衰弱與肌少症 | 心理社交

年齡別五大死因

順位	0歲		1-14歲		15-24歲		25-44歲		45-64歲		65歲以上	
	死亡原因	死亡率(每十萬活產)	死亡原因	死亡率(每十萬人口)	死亡原因	死亡率(每十萬人口)	死亡原因	死亡率(每十萬人口)	死亡原因	死亡率(每十萬人口)	死亡原因	死亡率(每十萬人口)
	所有死亡原因	383.3	所有死亡原因	12.9	所有死亡原因	41.3	所有死亡原因	108.7	所有死亡原因	537.5	所有死亡原因	3,620.7
1	先天性畸形、變形及染色體異常	80.5	事故傷害						癌症	232.1	癌症	901.9
2	源於周產期的呼吸性疾患	42.3	癌症						心臟疾病(高血壓性疾病除外)	53.8	心臟疾病(高血壓性疾病除外)	434.7
3	與妊娠長短及胎兒生長有關的疾患	40.0	先天性畸形變形及染色體異常	1.1	癌症	4.3	事故傷害	13.9	腦血管疾病	29.5	肺炎	395.9
4	事故傷害	26.3	流感	0.7	心臟疾病(高血壓性疾病除外)	1.2	心臟疾病(高血壓性疾病除外)					
5	特發於周產期的感染	15.4	加害(他殺)	0.5	腦血管疾病	0.8	慢性肝病及肝硬化					

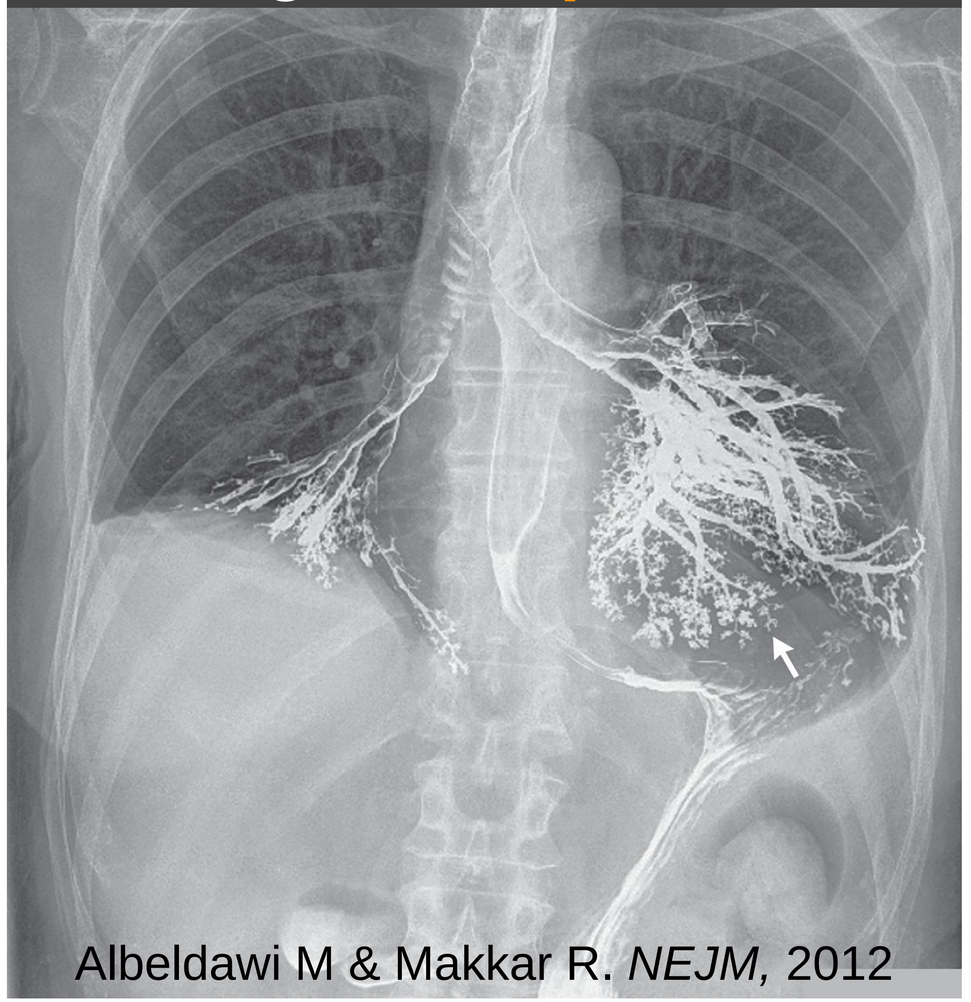
65歲以上老年人死亡人數，肺炎為第三位

5-15% of all community-acquired pneumonias are **AP**

Komiya K, et al. *Aging Dis*, 2016

衛生福利部民國108年死因統計結果分析 (2020/06/16)

Image of Aspiration



Albeldawi M & Makkar R. *NEJM*, 2012

65歲以上人口主要死因

順位	Young 65-74歲 old		Mid- 75-84歲 old		Oldest 85歲以上 old	
	死亡原因	死亡率(每十萬人口)	死亡原因	死亡率(每十萬人口)	死亡原因	死亡率(每十萬人口)
	所有死亡原因	1,463.3	所有死亡原因	4,316.9	所有死亡原因	13,569.9
1	癌症	570.5	癌症	1,187.1	肺炎	2,065.0
2	心臟疾病(高血壓性疾病除外)	153.5	心臟疾病(高血壓性疾病除外)	481.4	癌症	1,955.8
3	糖尿病	101.3	肺炎	414.3	心臟疾病(高血壓性疾病除外)	1,848.7
4	腦血管疾病	94.2	腦血管疾病	347.4	腦血管疾病	1,077.0
5	肺炎	81.8	糖尿病	304.6	慢性下呼吸道疾病	784.1
6	事故傷害	53.8	慢性下呼吸道疾病	195.6	高血壓性疾病	726.3
7	腎炎、腎病症候群及腎病變	41.2	高血壓性疾病	156.8	糖尿病	709.7
8	高血壓性疾病	40.4	腎炎、腎病症候群及腎病變	150.9	腎炎、腎病症候群及腎病變	491.5
9	慢性下呼吸道疾病	38.9	事故傷害	121.0	血管性及未明示之癡呆症	464.0
10	慢性肝病及肝硬化	33.1	敗血症	82.3	衰老/老邁	422.0

衛生福利部民國108年死因統計結果分析 (2020/06/16)

Nursing home acquired pneumonia

Risk factors of pneumonia

1. **Inadequate oral care**
2. **Difficulty in swallowing**
3. Lack of influenza vaccination
4. Depression
5. Feeding position of less than 90 degree from horizontal
6. Active smoking
7. Receipt of sedative medication
8. Receipt of gastric acid-reducing medication
9. Use of ACE inhibitors

Quagliarello V, et al. *Clin Infect Dis*, 2005

Table I Causes and risk factors of aspiration pneumonia

Causes	Risk factors
Impaired consciousness	Drug or alcohol abuse, general anesthesia, seizures, sedation, acute stroke and other brain lesions, head injury
Age-associated	Increasing age, polypharmacy, functional decline, poor mobility
Swallowing disorders	Esophageal stricture, esophageal diverticula, gastro-esophageal reflux, oropharyngeal dysphagia in multiple diseases
Iatrogenic	Adverse drug effects, adverse effects of medical treatment
Others	COPD, male sex, tracheostomy, tracheo-esophageal fistula, ventilator-associated pneumonia, periodontal disease

Wirth R, et al. *Clin Interv Aging,* 2016

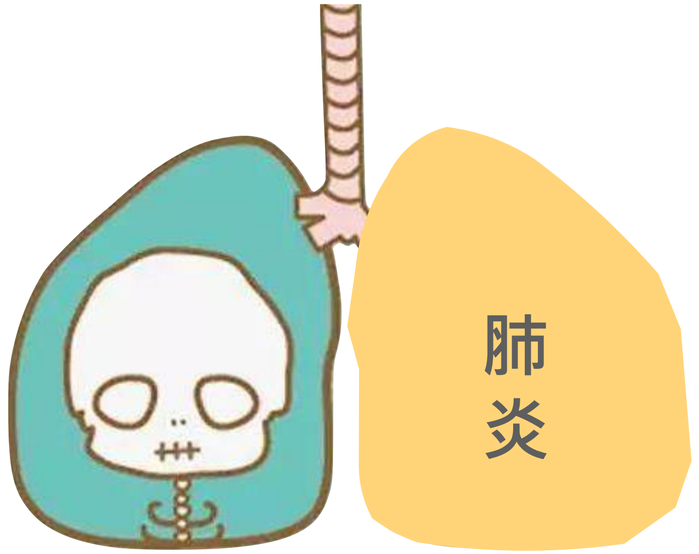
STROKE → **Risk of Pneumonia**

＋Dysphagia - ↑3

＋Aspiration - ↑11

Martino R, et al. *Stroke,* 2005

65歲以上老年人死亡人數，肺炎為第三位



https://itw01.com/Q338SEP.html

Aspiration pneumonia is the **leading cause of death** and the second most common cause for hospitalization among nursing home patients.

Table 1. *Comparison of Microorganisms of the Oral Cavity and Known Respiratory Pathogens*[1,3,6,21-23]

Physiologic Oral Microflora	Oral Microflora Associated with Oral Disease	Respiratory Pathogens
*Staphylococcus aureus**	*Staphylococcus aureus**	*Staphylococcus aureus**
Candida albicans	*Haemophilus influenzae**	*Haemophilus influenzae**
Streptococcus sobrinus	*Actinomyces* species*	*Actinomyces* species*
Streptococcus mutans	*Peptostreptococcus**	*Peptostreptococcus**
Streptococcal species	*Streptococcus mutans*	*Fusobacterium nucleatum**
Streptoccocus sanguis	*Ca*	
	Ps	
	Porphyromonas gingivalis	
	Staphylcoccus aureus	*Bifidobacterium* species*
	Neisseria species	*Proteus mirabilis*
	Streptococcus milleri	*Haemophilus parainfluenzae*
	Lactobacillus species	*Klebsiella pneumoniae*
	Bacteriodes forsythus	*Streptococcus pyogenes*
	Prevotella intermedia	*Pseudomonas aeruginosa*
	Prevotella melaningenica	*Escherichia coli*
	Facultative anaerobes	*Streptococcus pneumoniae*
	Klebsiella pneumoniae	
	Pseudomonas aeruginosa	
	Enterobacter cloacae	

Certain oral microflora are responsible for AP

* Pathogens implicated in aspiration pneumonia.

Sarin J, et al. *J Am Med Dir Assoc*, 2008

Oral Care Reduces Pneumonia in Older Patients in Nursing Homes

Takeyoshi Yoneyama, DDS, PhD, Mitsuyoshi Yoshida, DDS, PhD, Takashi Ohrui, MD, PhD, Hideki Mukaiyama, DDS, Hiroshi Okamoto, DDS, PhD, Kanji Hoshiba, DDS, PhD, Shinichi Ihara, DDS, Shozo Yanagisawa, DDS, Shiro Ariumi, DDS, Tomonori Morita, DDS, Yasuro Mizuno, DDS, Takayuki Ohsawa, DDS, PhD, Yasumasa Akagawa, DDS, PhD, Kenji Hashimoto, DDS, MD, PhD, Hidetada Sasaki, MD, PhD, and Members of the Oral Care Working Group

Oral care reduces pneumonia

Table 4. Comparisons Between Oral Care and No Oral Care Groups in Dentate and Edentate Patients

Patients	Group	Number of Patients	Age, Years, mean ± SD	F/M	ADLs at Baseline, mean ± SD	MMSE at Baseline, mean ± SD	Number of Patients with Fever (%)	Number of Patients with Pneumonia (%)	Number of Patients Dying (%)
Dentate	Oral care	109	79.9 ± 7.9	82/27	17.1 ± 6.3	14.8 ± 8.5	13** (11)	12** (9)	8* (6)
	No oral care	99	79.3 ± 7.6	80/19	16.7 ± 6.8	15.3 ± 9.9	26 (26)	19 (21)	20 (20)
Edentate	Oral care	75	84.3 ± 7.4	63/12	15.8 ± 6.5	12.7 ± 7.8	14* (18)	9 (9)	6 (7)
	No oral care	83	84.9 ± 7.1	68/15	16.0 ± 6.9	12.4 ± 9.2	28 (34)	15 (20)	10 (13)

*$P < .05$ and **$P < .01$ show significant differences between groups with oral care and no oral care.
SD = standard deviation; F/M = female/male; ADLs = activities of daily living; MMSE = Mini-Mental State Examination.

Yoneyama T, et al. *J Am Geriatr Soc*, 2002

Oral care reduces pneumonia

Table 2 Effectiveness of oral care in reducing risk of pneumonia in nursing home residents

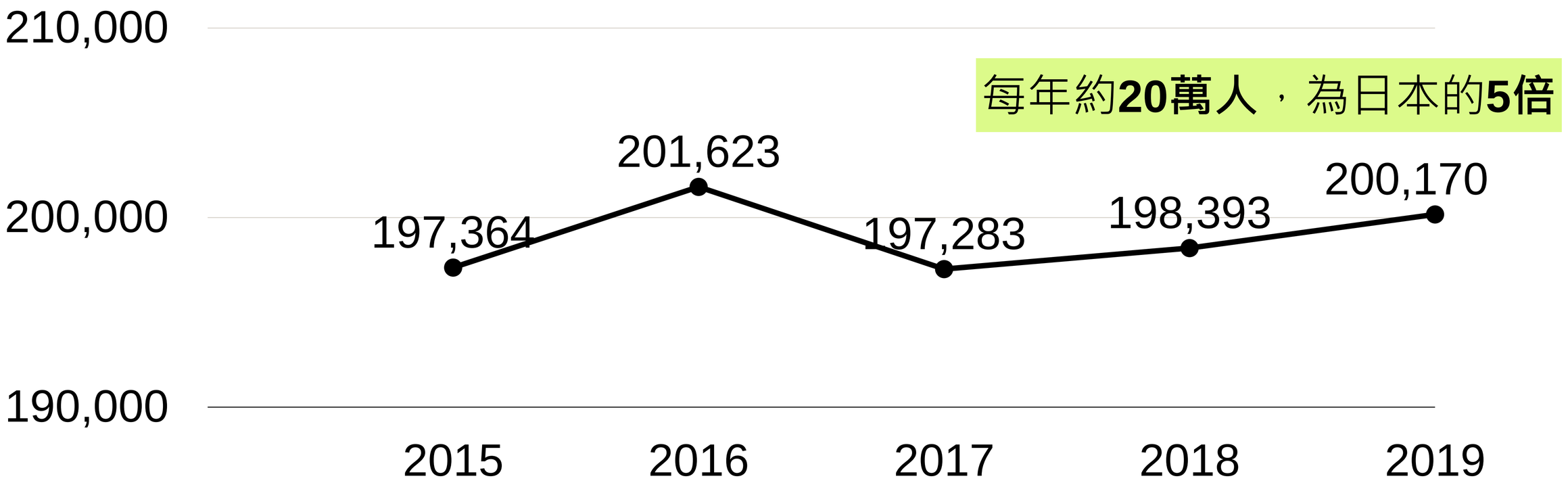
Ref.	Population	Design	Intervention	Outcomes
Yoneyama et al. [42] **2002, Japan**	417 NH residents	Randomized controlled trial over 2-year period	Daily tooth brushing plus scrubbing of pharynx with povidone iodine 1% (including professional care once a week) vs. routine oral care	RR of developing pneumonia 1.67 in the group on no oral care compared with oral care ($p = 0.04$)
Simons et al. [59] **2002, UK**	111 dentate elderly	Double-blind, randomized controlled trial over 12-month period	CHX/xylitol gum vs. xylitol (X) gum vs. no gum	Significant reduction in denture debris, stomatitis, and cheilitis in CHX/X and X groups compared to no gum
Ueda et al. [49] **2003, Japan**	105 long-term-care residents	Prospective interventional study	Oral care intervention at intervals of 1, 2, 3, 4, and 6 weeks	Oral hygienic condition could be improved by performing oral care at intervals of 1 week for 12 consecutive weeks, and maintained at intervals of 1 week thereafter
Abe et al. [50] **2006, Japan**	190 elderly patients	Prospective, randomized for 6 months	Weekly professional oral care versus self oral care	RR of developing influenza while under professional oral care compared to that in the control group was 0.1 (95% CI 0.01-0.81, $p = 0.008$)
Adachi et al. [62] **2007, Japan**	216 NH residents	Prospective interventional study over 24 months	Daily routine oral care plus either mechanical cleaning weekly vs. basic oral hygiene (swabbing and denture cleaning)	Fatal aspiration pneumonia (RR = 2.67; $p < 0.5$) higher in those who did not receive professional oral care compared to interventional group
Ishikawa et al. [63] **2008, Japan**	202 NH residents	Prospective interventional study over 5-month period	Professional oral care weekly vs. gargling with 0.35% povidone iodine daily vs. no professional care	Professional oral care decreased burden of oropharyngeal bacteria and was more effective than gargling with povidone iodine
Bassim et al. [29] **2008, US**	143 NH residents	Retrospective review up to 79 weeks	Assisted oral hygiene (toothbrushing, antiseptic mouth wash) vs. no assisted oral care	Odds ratio for dying from pneumonia 3.57 higher in the control group than the oral hygiene group

NH nursing home, *CHX* chlorhexidine, *RR* relative risk

EI-Solh AA, et al. *Lung*, 2011

口腔問題 | 咀嚼問題 | 吞嚥問題 | 吸入性肺炎 | **鼻胃管問題** | 營養問題 | 衰弱與肌少症 | 心理社交

台灣歷年鼻胃管插管人數

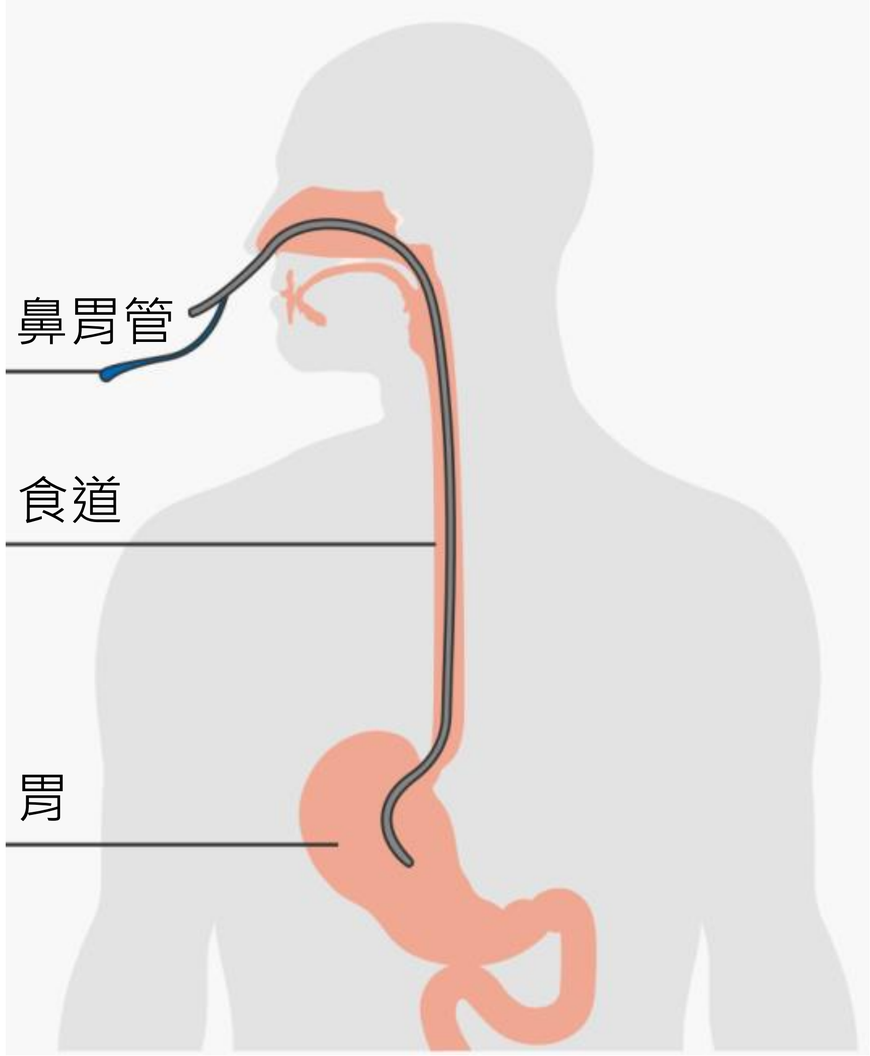


每年約**20萬人**，為日本的**5倍**

衛生福利部，2020/09/24

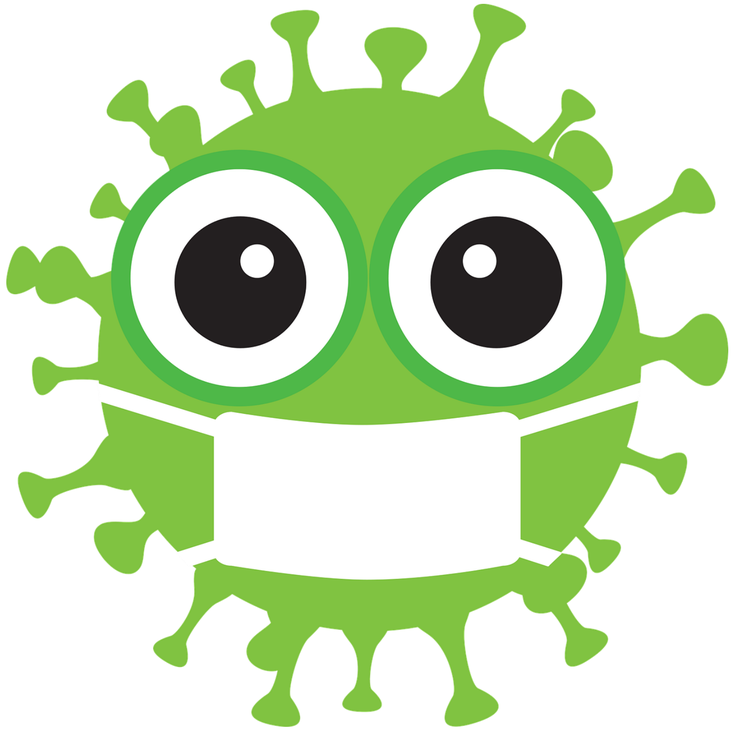
長期使用鼻胃管所造成的問題：

- 長期壓迫導致鼻咽黏膜、食道黏膜壓傷、潰瘍、感染
- 咀嚼活動減少，降低對腦部的刺激
- 缺乏刺激唾液腺分泌，造成口腔乾燥、自淨作用降低
- 缺乏咀嚼運動，口顏面組織、肌肉與顳顎關節退化
- 吞嚥動作減少，造成吞嚥功能退化，增加嗆咳風險
- 胃食道逆流增加吸入性肺炎的風險
- 喪失進食的樂趣
- 失去尊嚴與生活品質
- 降低社會活動與社交意願

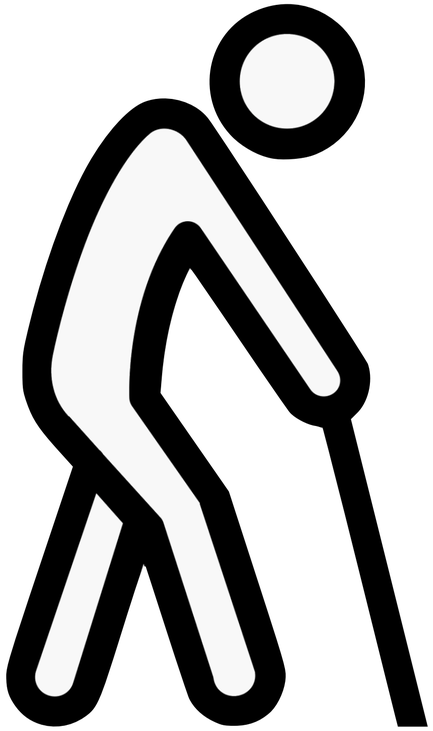


口腔問題 | 咀嚼問題 | 吞嚥問題 | 吸入性肺炎 | 鼻胃管問題 | **營養問題** | 衰弱與肌少症 | 心理社交

免疫功能低下



身體衰弱



肌少症

口腔問題 | 咀嚼問題 | 吞嚥問題 | 吸入性肺炎 | 鼻胃管問題 | 營養問題 | **衰弱與肌少症** | 心理社交

Aging

- Diminished sociability/scope of daily activities
- Decline of oral literacy (Interest in oral health)
- Decreasing motivation/depression
- Caries/periodontal disease
- Tooth loss

Oral frailty

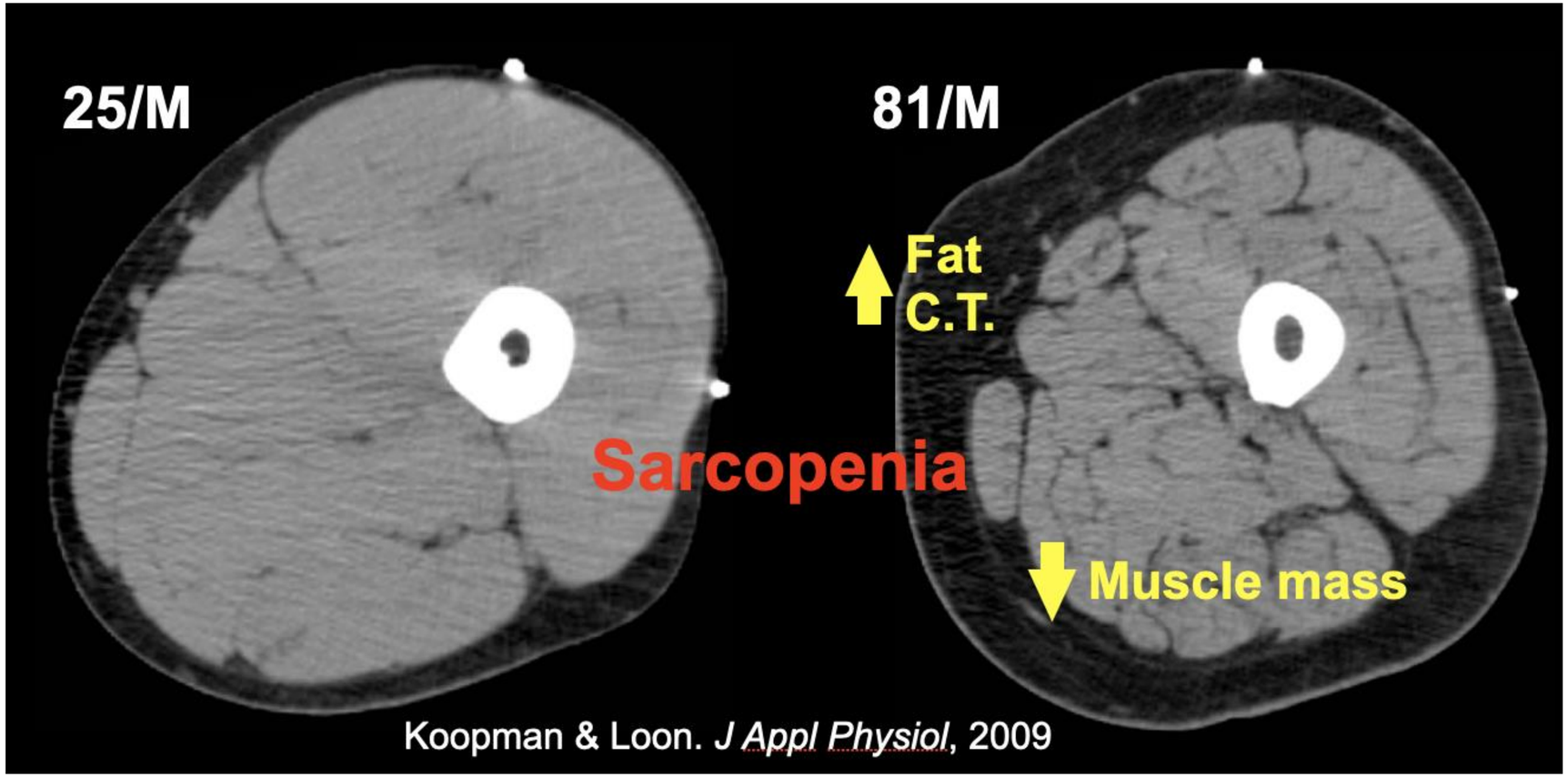
- Decreased articulation
- Slight choking/spillage while eating
- Increase in unchewable foods

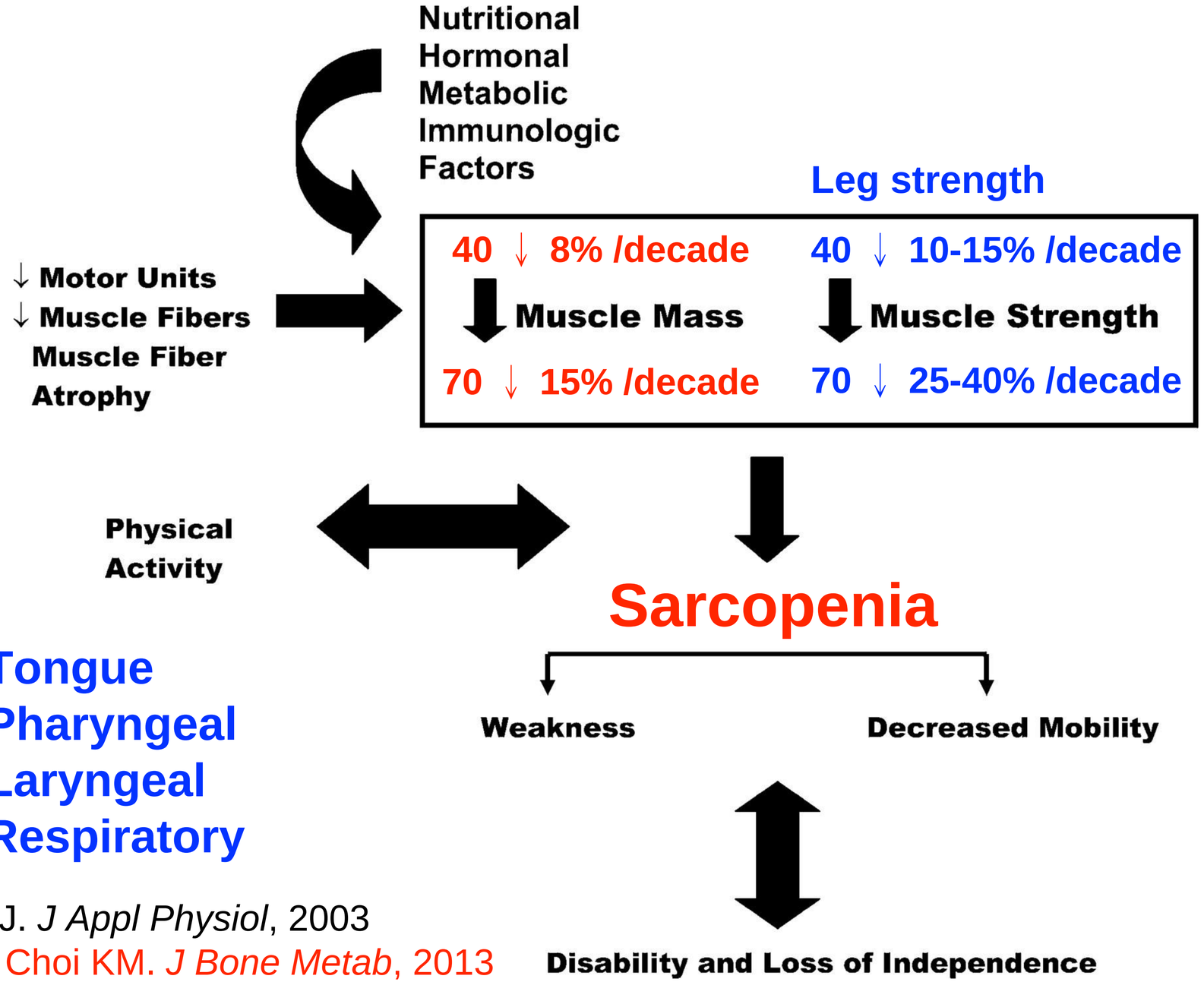
Minakuchi S, et al. *Gerodontology*, 2018

台灣肌少症盛行率:

- **3.9-7.3%**
- M: 5.4-6.5%
- F: 2.5-6.5%

Wu IC, et al. *Geriatr Gerontol Int*, 2014





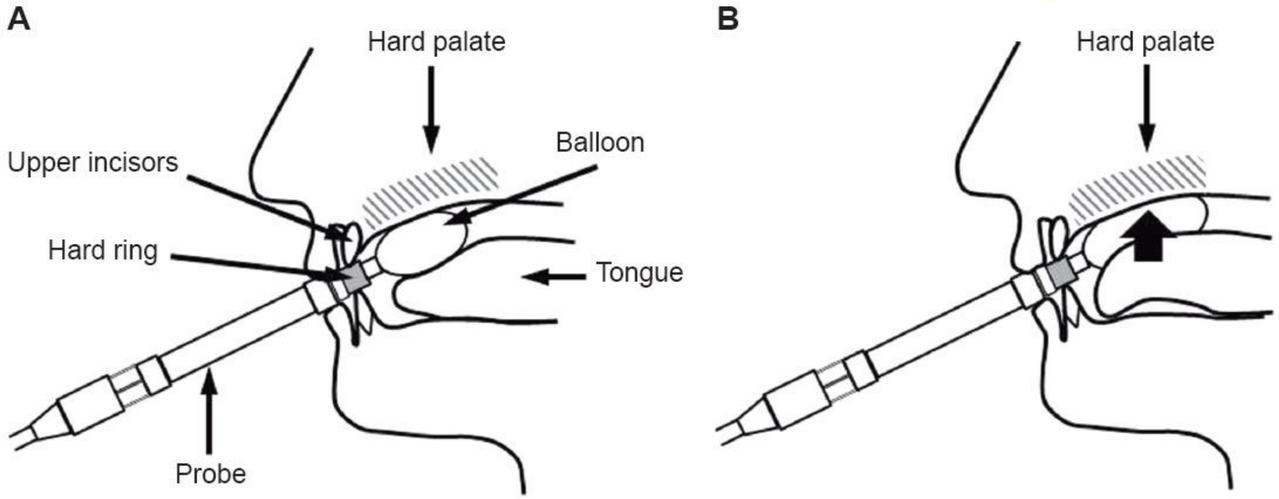
Doherty TJ. *J Appl Physiol*, 2003

Kim TN & Choi KM. *J Bone Metab*, 2013

Tongue pressure

(Utanohara Y, et al. *Dysphagia*, 2008; Yoshida M, et al. *Dysphagia*, 2006)

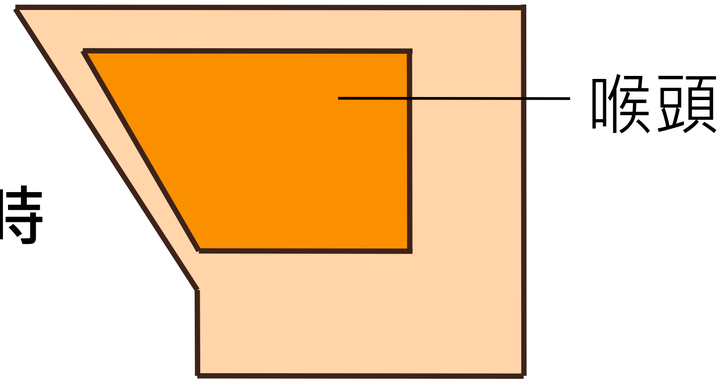
Tongue pressure value (kPa)	
Male 20-59 years	35~
Female 20-59 years	30~
60-69 years	30
70~ years	20



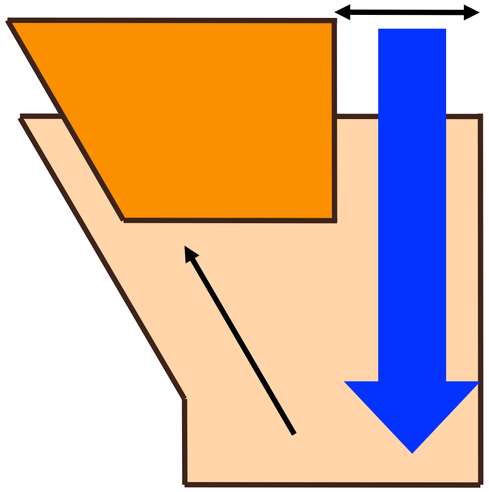
Hiramatsu T, et al. *Clin Interv Aging*, 2015

Figure 1 Tongue–palate pressure test.
Notes: Intraoral positioning of the balloon (**A**). The placement of the tongue during measurement of maximum tongue pressure (large arrow) (**B**).

成年人



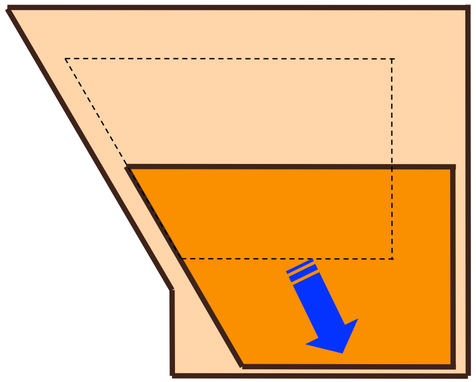
靜止時



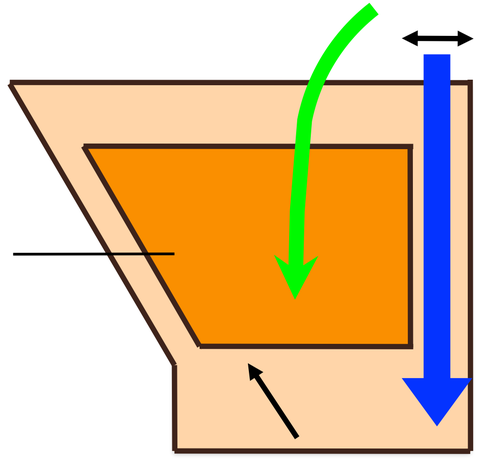
吞嚥時

喉頭往前上方上抬，同時食道的入口會擴張。

老年人



喉頭位置下降，往下往後方移動

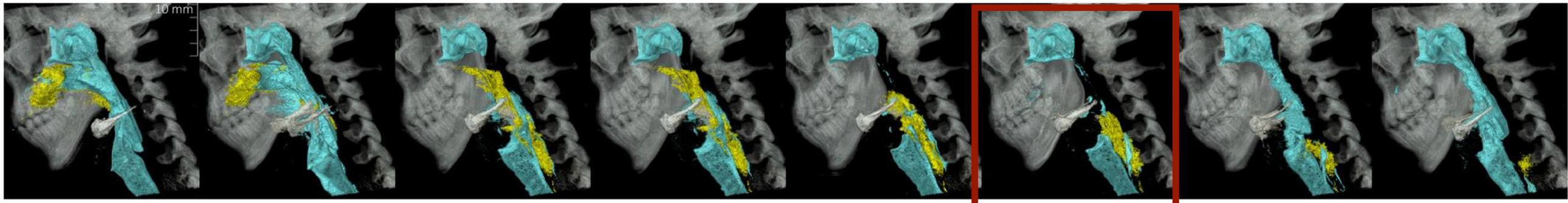


喉頭處不能充分的抬高，食道入口處的擴張量減少，易造成食物在咽頭處的殘留或誤嚥。

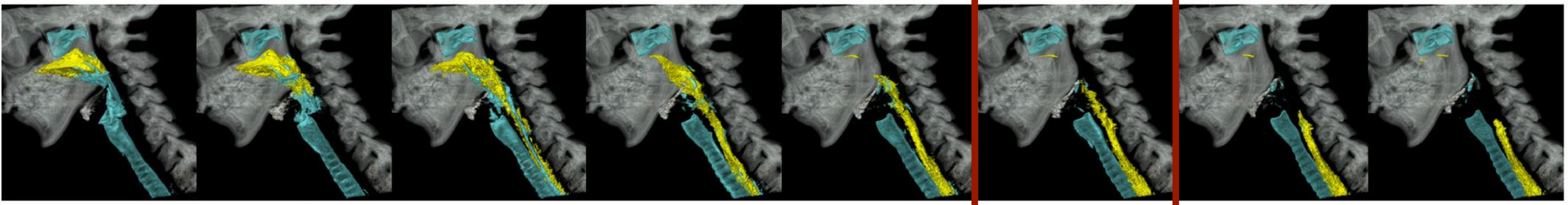
The duration of swallowing events among three-aged group

Young (23 y, male)

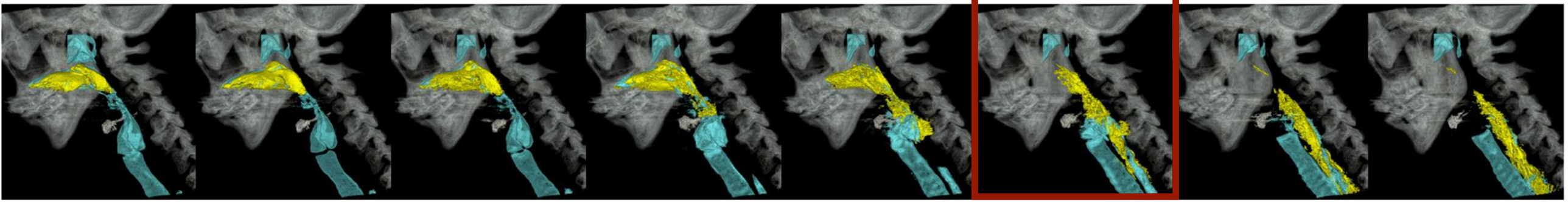
Pongpipatpaiboon K, et al. *J Oral Rehabil*, 2018



Middle-aged (43 y, female)



Older adults (66 y, female)



0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 (sec)

口腔問題 咀嚼問題 吞嚥問題 吸入性肺炎 鼻胃管問題 營養問題 衰弱與肌少症 **心理社交**

無法享用美食、對進食產生恐懼、害怕與朋友聚餐、社交活動減少

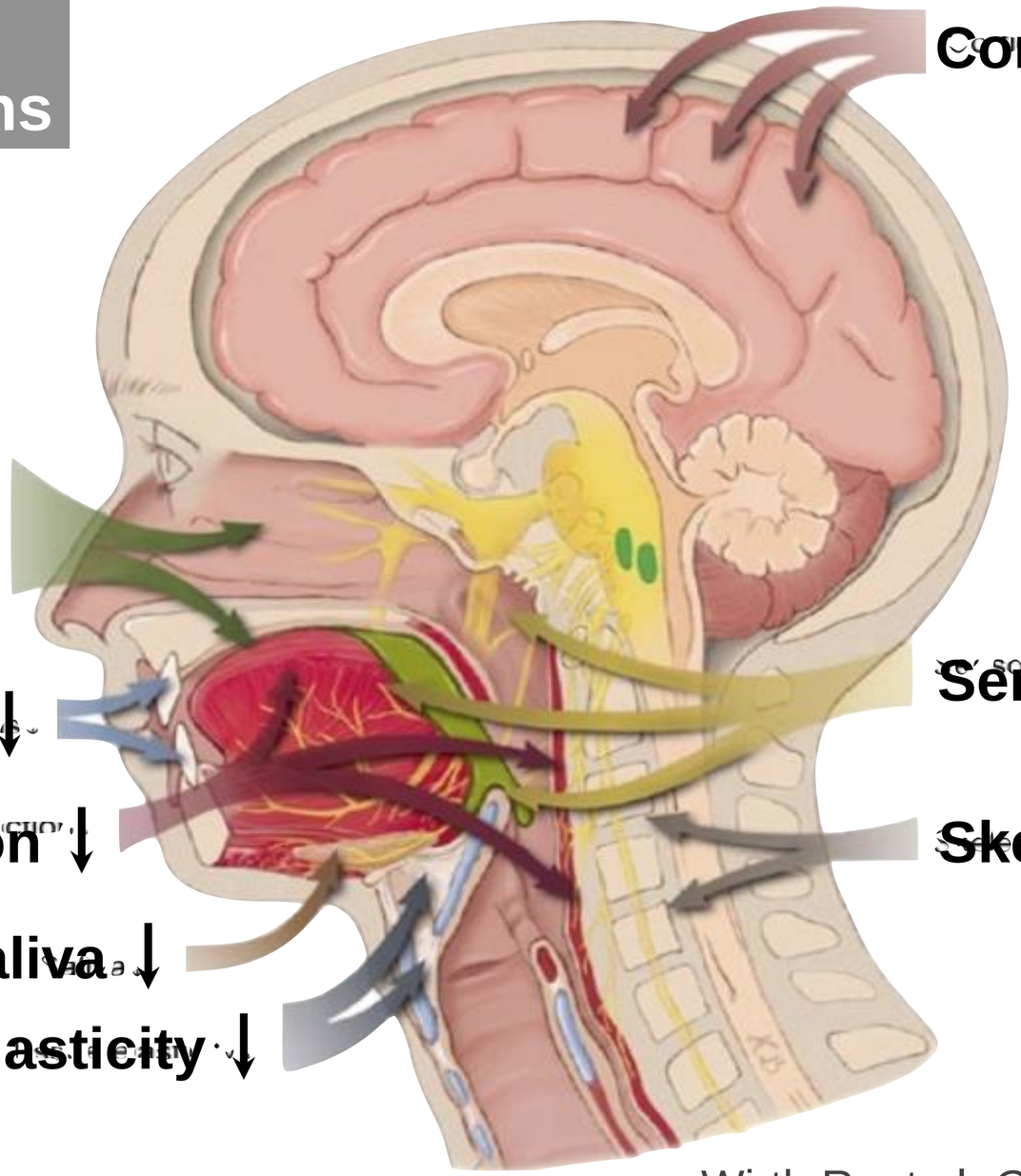
Table 6. Psychosocial effects of dysphagia

	UK	Spain	Germany	France	Total
Avoid eating with others because of swallowing problems[a] (%)	49	16	29	52	36
Feel embarrassed at mealtimes because of swallowing problems[a] (%)	68	19	17	39	37
Experience anxiety or panic during mealtimes because of swallowing problems[a] (%)	47	47	22	48	41
Swallowing problems make life less enjoyable	73	45	43	61	55

[a]Questions asked only of persons who were bothered by swallowing at mealtimes, equivalent to 68% of all respondents ($n = 237$).

Ekberg O, et al. *Dysphagia*, 2002

Factors associated with dysphagia in older persons



Olfaction ↓

Taste ↓

Dental status ↓

Muscle function ↓

Saliva ↓

Tissue elasticity ↓

Cortical plasticity ↓

Sensory capacity ↓

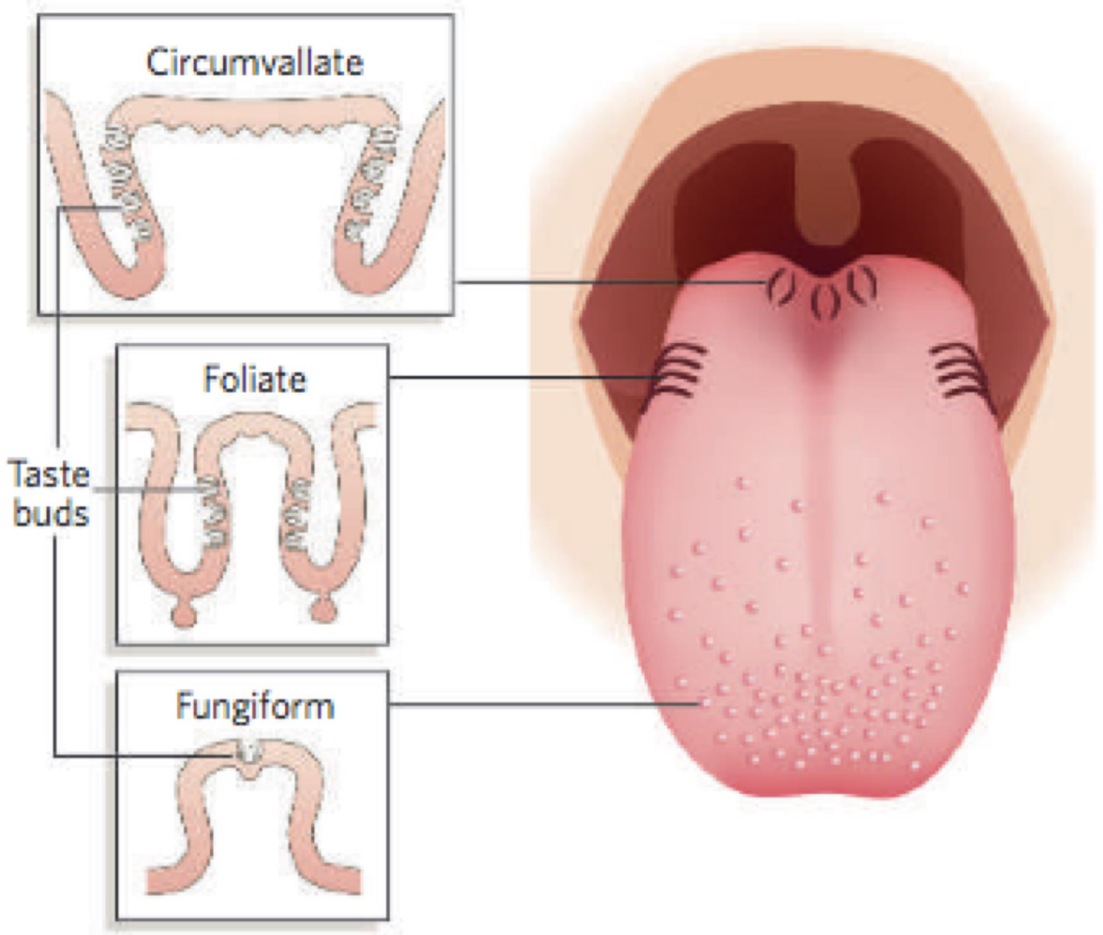
Skeletal changes ↓

Wirth R, et al. *Clin Interv Aging,* 2016

Impact of aging on dysphagia - **Gustatory function**

Age	Mean number of taste buds per papilla and trench wall
0-11 m	251
1-3 y	260
4-20 y	**326**
30-45 y	**242**
50-70 y	**268**
74-85 y	**101**

Avery JK. *Oral Development and Histology*, 2002

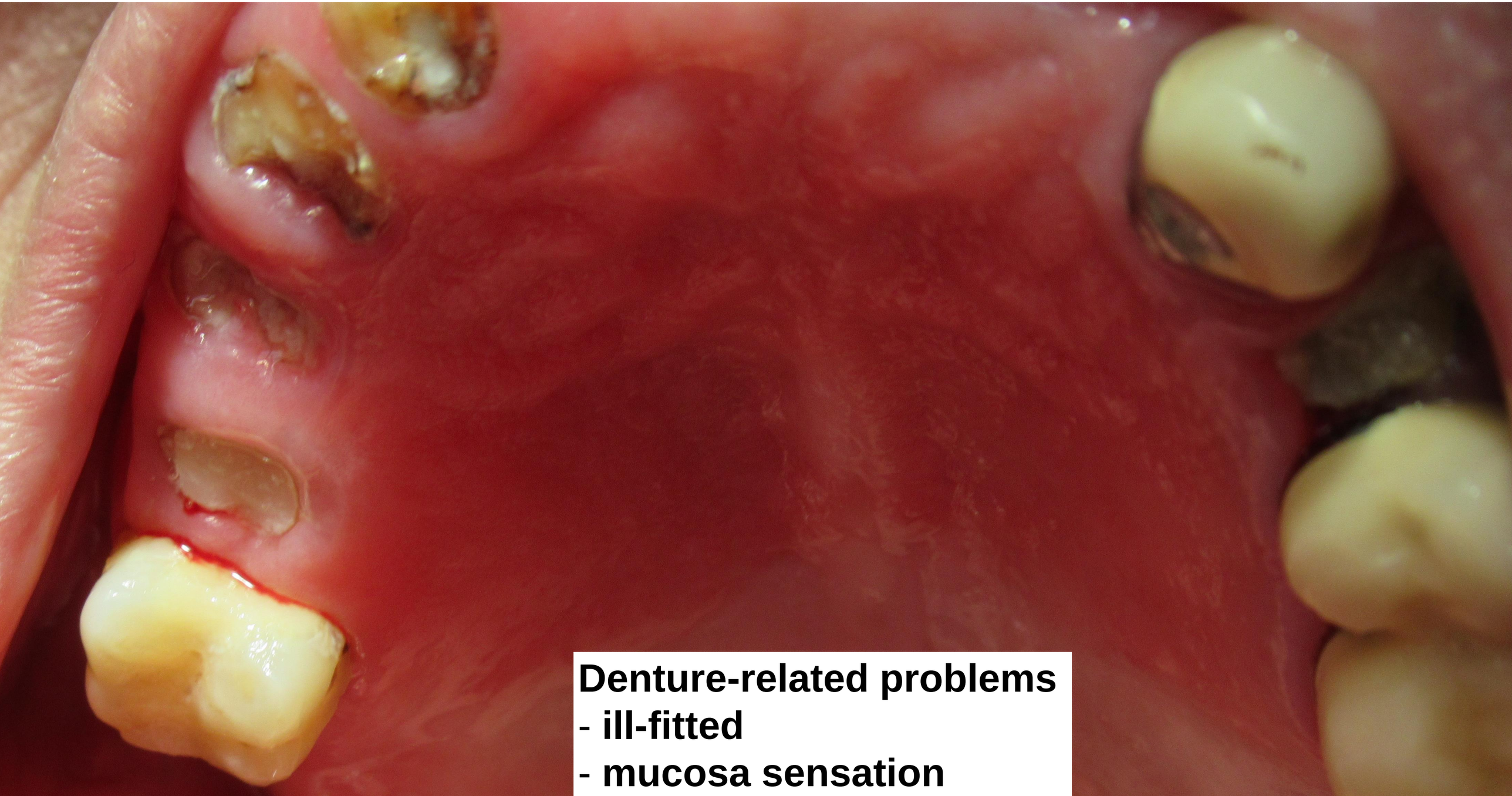


Chandrashekar J, et al. *Nature*, 2006

Impact of aging on dysphagia - **Dental status**

Impaired chewing function

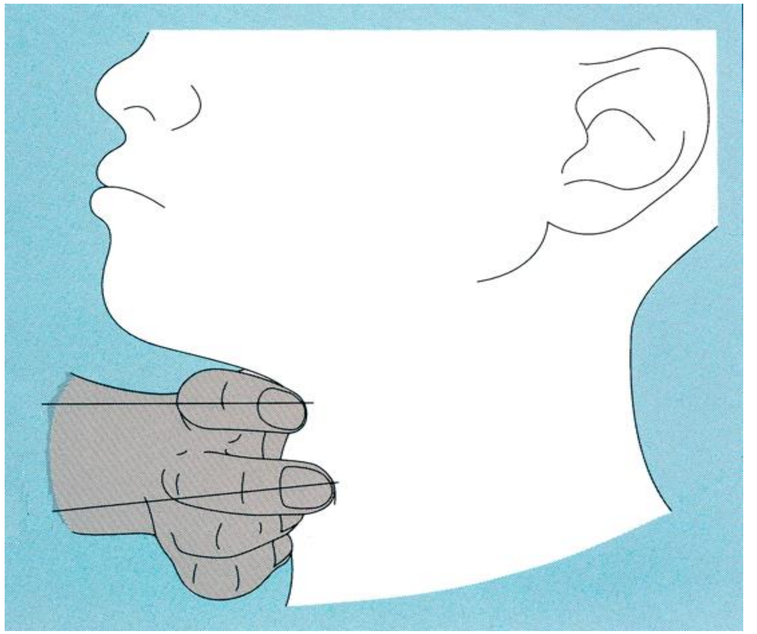
Impact of aging on dysphagia - **Dental status**



Denture-related problems
- **ill-fitted**
- **mucosa sensation**

懷疑有**咀嚼吞嚥障礙**時的現象：

- 喉嚨經常出現雜音
- 食物或飲料從口中漏出
- 口中一直進行著咀嚼的動作
- 每一口食物要分多次吞下
- 即使已經吞嚥，口中還是有食物殘留
- 用餐時經常出現嗆咳或咳嗽
- 進食後發聲會有咕嚕聲
- 用餐時間超過一小時以上
- 厭食（例如拒絕他人協助進食）
- 營養不良（體重逐漸減少）
- 有脫水的症狀（例如口腔乾燥或尿量減少）
- 夜間咳嗽（平躺的姿勢）
- **反覆的肺炎或發燒**



Screening: **RSST**, **EAT-10**

請用 0（沒有問題）到 4（問題嚴重）分評估以下問題：		0＝沒有問題 4＝問題嚴重				
1	吞嚥問題讓我體重減輕。	0	1	2	3	4
2	吞嚥問題讓我不能像以前一樣外出用餐。	0	1	2	3	4
3	喝飲料時要花很多力氣。	0	1	2	3	4
4	吃固體食物時要花很多力氣。	0	1	2	3	4
5	吞藥丸時要花很多力氣。	0	1	2	3	4
6	吞嚥的過程會引起疼痛。	0	1	2	3	4
7	吞嚥問題讓我無法享受用餐。	0	1	2	3	4
8	進食後會感到有東西黏在喉嚨上。	0	1	2	3	4
9	進食的時候會咳嗽。	0	1	2	3	4
10	吞嚥的過程讓我感到有壓力。	0	1	2	3	4
		EAT-10 總分：				

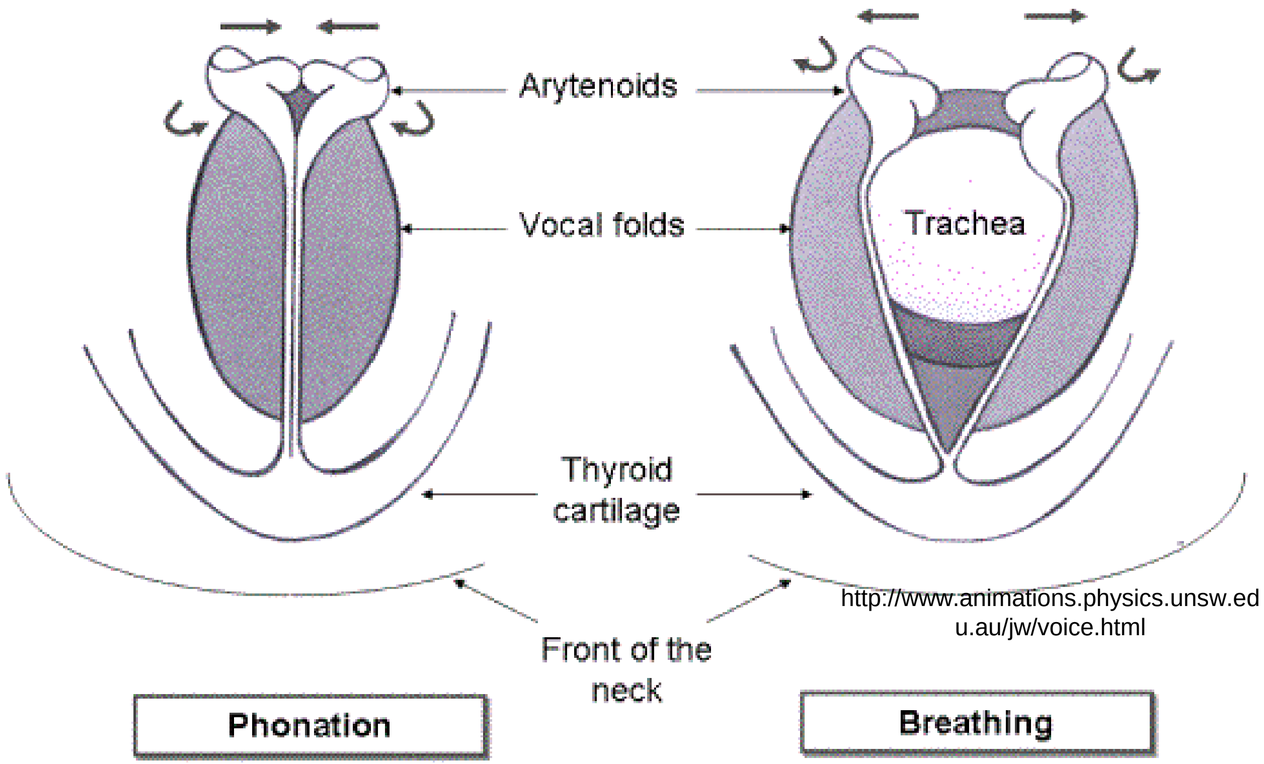
反覆的肺炎或發燒

↓

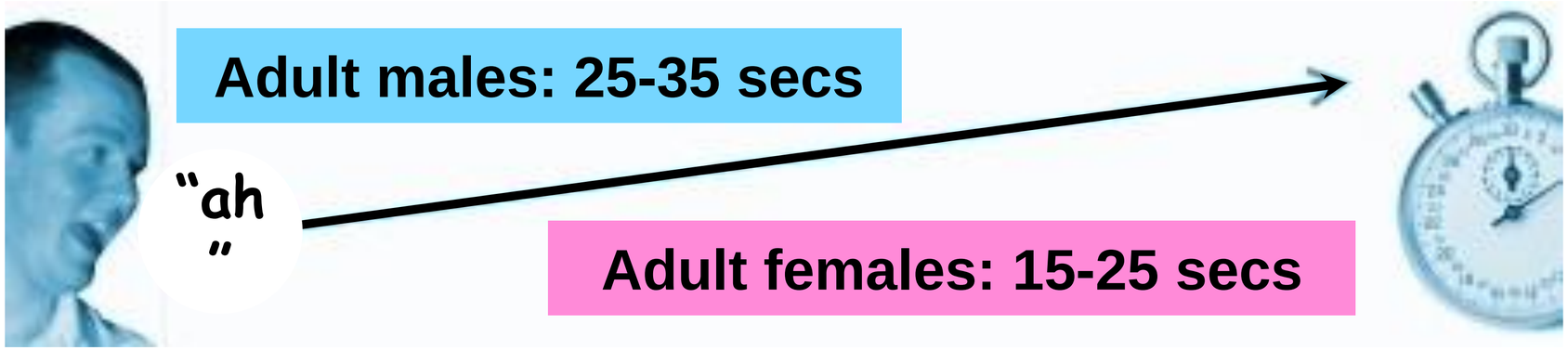
要注意是否有 **Silent Aspiration**:

- No protective cough response when foods or fluids enter the airway
- Is **undetectable** during a bedside assessment
- Has the potential to result in **pneumonia**

MPT (Maximum Phonation Time)



http://www.animations.physics.unsw.edu.au/jw/voice.html



反覆唾液吞嚥測試
(**RSST**: The **R**epetitive **S**aliva **S**wallowing **T**est)

食指放在舌骨
中指放在喉結

↓

在30秒內重覆吞嚥的動作

↓

通過觸診確認吞嚥的動作

↓

- 舌骨和喉頭隆起會向上移動，再回到原來的位置。
- 吞嚥時，甲狀軟骨（喉結）碰到食指算一次。
- 測量30秒內的吞嚥次數。

判定

測試結果在三次以上為正常。隨著年齡的增加，吞嚥次數有降低的趨勢。

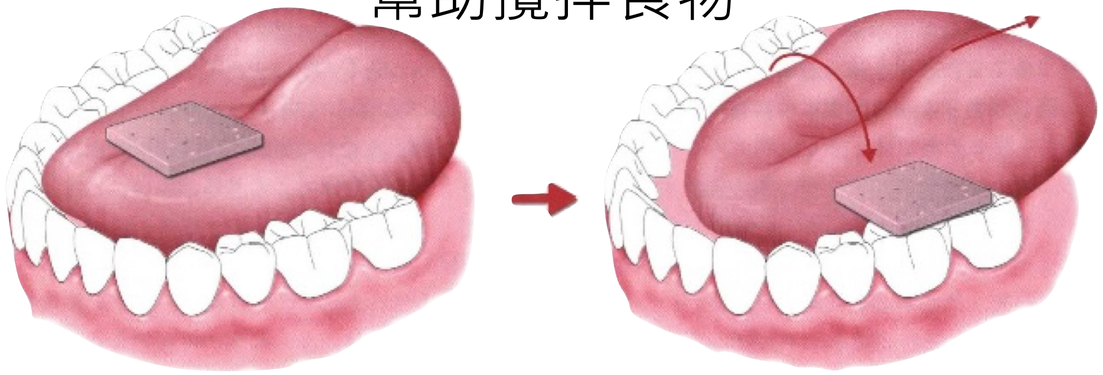
改良式飲水吞嚥測試
(**MWST**: **M**odified **W**ater **S**wallowing **T**est)

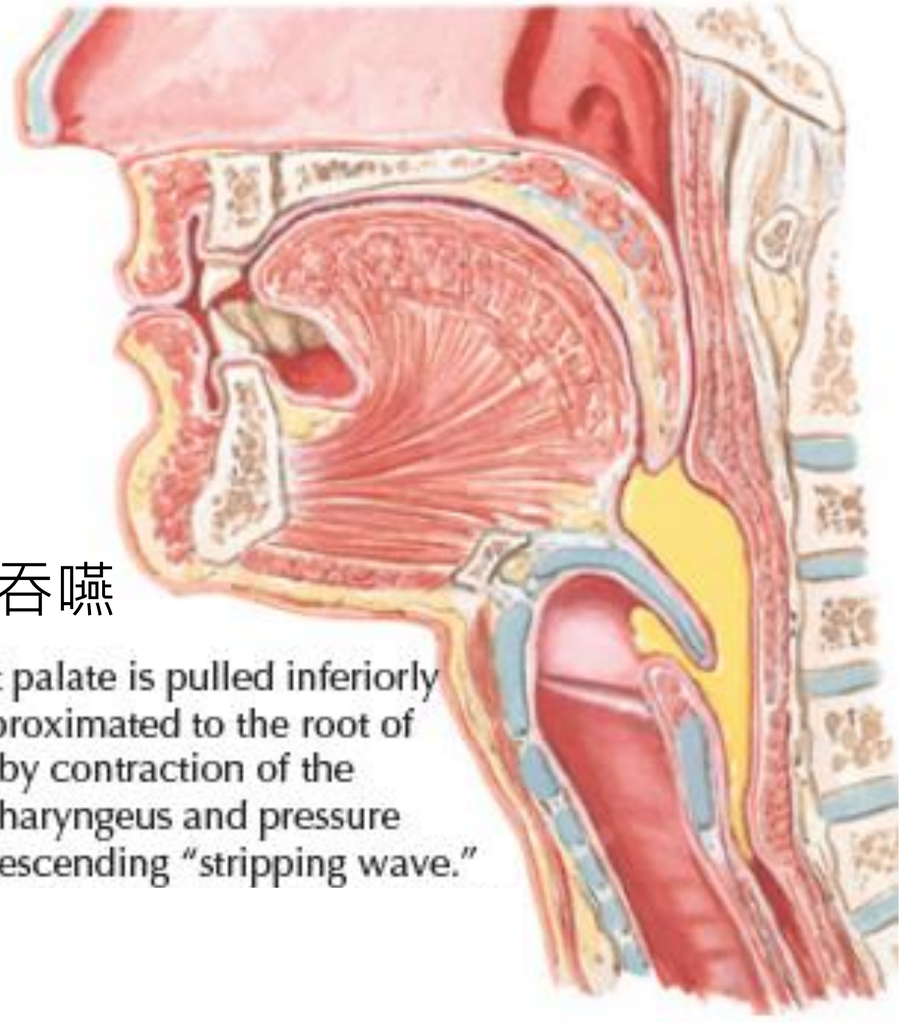
方法：病人採用**90度**的坐姿，用注射針筒裝冷水 **3cc** 注入病人的口底，再請病人將水吞下。若病人可以順利吞嚥，請病人再進行兩次重覆吞嚥。採用最低分數作為評估結果。

MWST 評估標準	
1	不能吞嚥，嗆咳或呼吸急迫
2	可以吞嚥、呼吸急迫
3	可以吞嚥、呼吸良好，有嗆咳或濕囉音
4	可以吞嚥、呼吸良好、無嗆咳
5	分數達到4分，在30秒內可以達到再吞嚥兩次

測量舌壓 - 舌頭在咀嚼與吞嚥過程中的功能

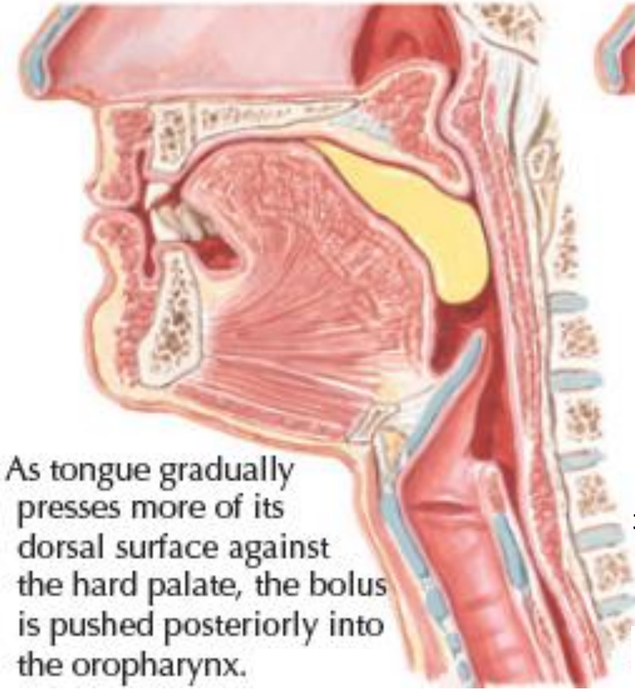
幫助攪拌食物





幫助吞嚥

The soft palate is pulled inferiorly and approximated to the root of tongue by contraction of the palatopharyngeus and pressure of the descending "stripping wave."



As tongue gradually presses more of its dorsal surface against the hard palate, the bolus is pushed posteriorly into the oropharynx.

幫助把食物推向咽喉

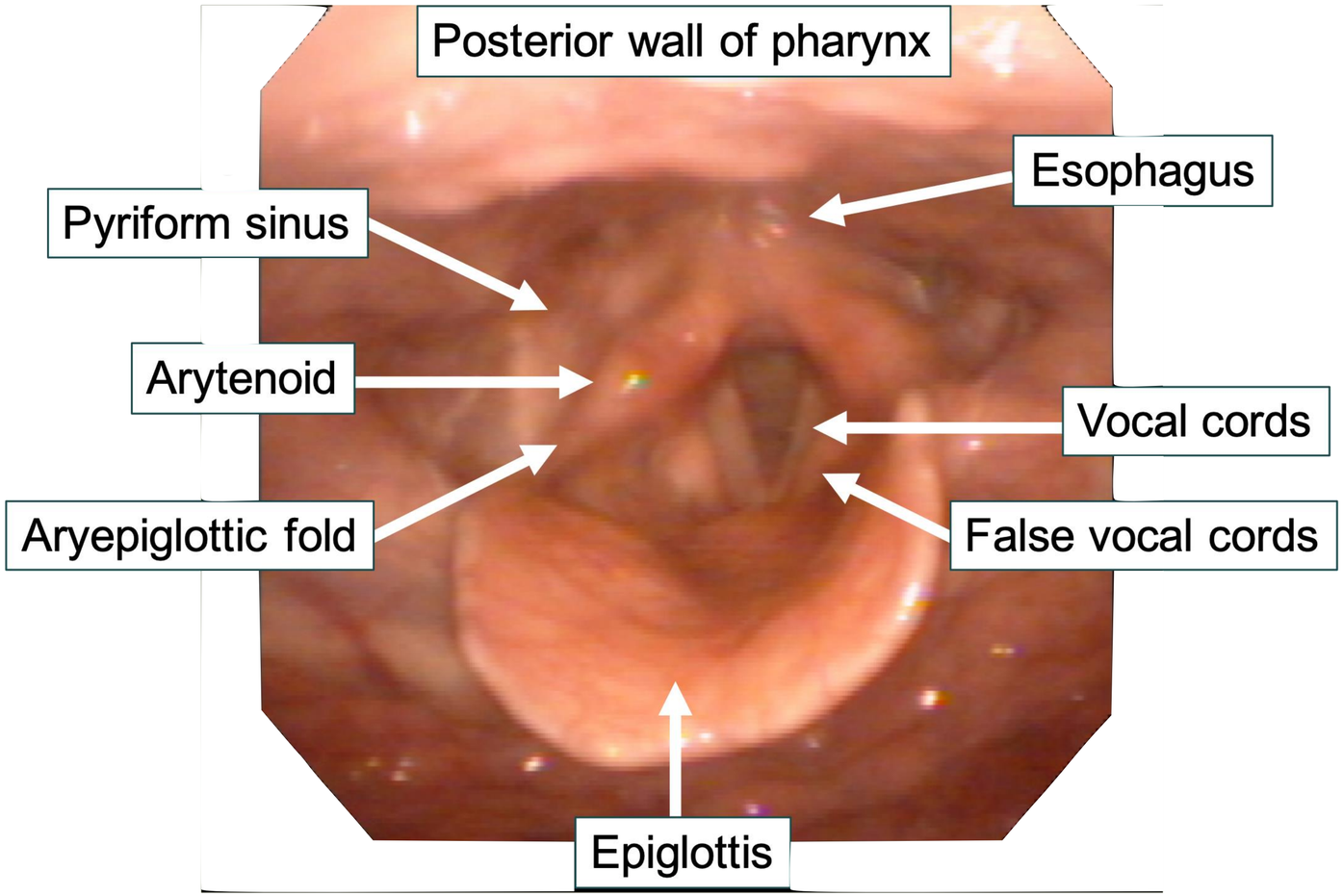
Oral hypofunction

Chuan-Hang Yu
tao2008@csmu.edu.tw

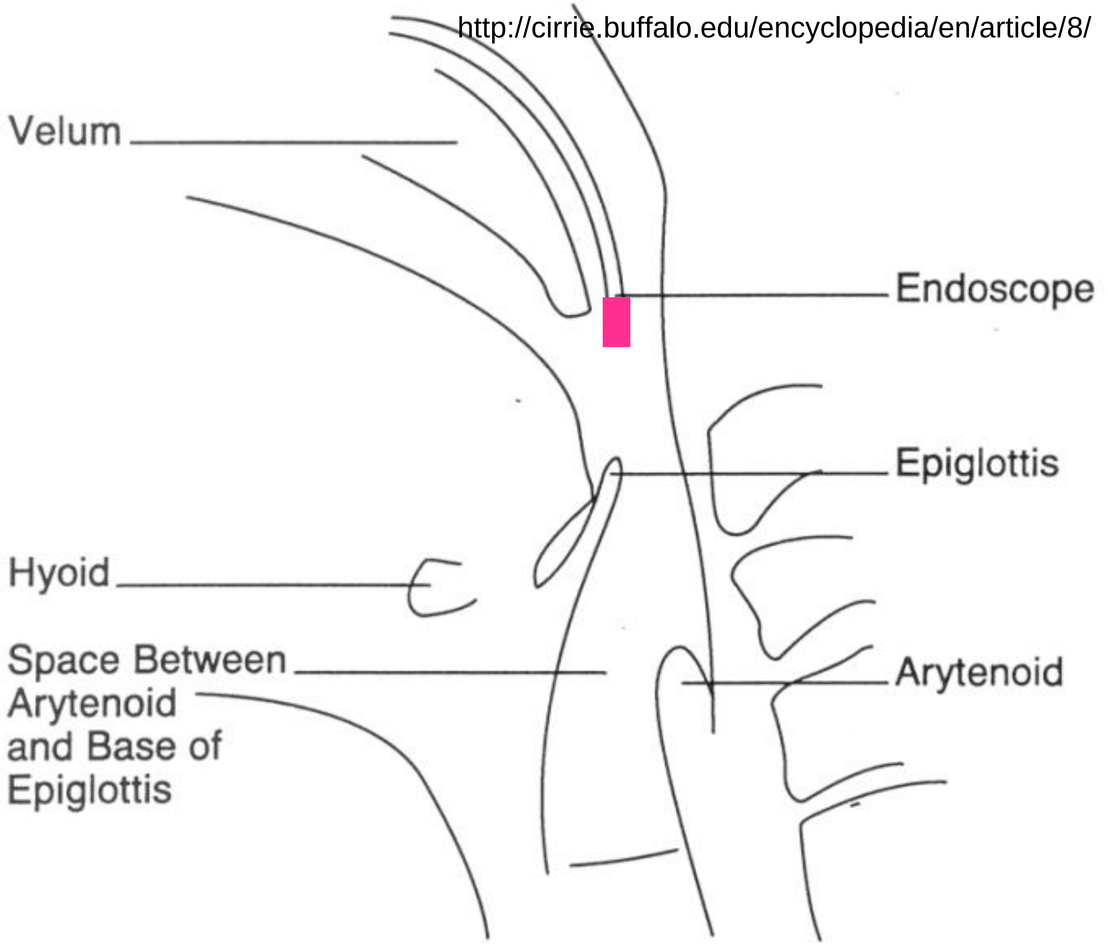
Dysphagia

http://moocs.csmu.edu.tw/course/307/intro

Endoscopic view of the larynx: **Normal anatomy**



http://cirrie.buffalo.edu/encyclopedia/en/article/8/



Swallowing
Video**f**luorography

VF 主要評估項目		
	側面	**正面**
口腔期	攝取食物方式 食物在口腔內的保持狀況 咀嚼過程 食團形成過程 食物在口腔的時間 食團往咽腔運送的過程 吞嚥反射的時間	咀嚼過程 食團形成過程
咽腔期	軟腭上抬 舌根上抬 舌骨的移動 喉頭上抬 喉頭閉鎖 食道入口部的擴大 食物殘留部位 誤嚥或喉頭侵入	食物通過的左右差異 食物殘留部位 誤嚥
食道期	食團通過食道入口 食道逆流、殘留	食道蠕動

VE vs VF

	VE	**VF**
準備期	×	○
口腔期	△	○
咽頭期	○	○
食道期	×	○
輻射線	×	○
檢查場所	Chair side, bed side	輻射防護場所
病人感受	輕微不適	×
檢查材料	一般食材	需混合造影劑
誤嚥的判定	△	○
優點	可直接觀察咽喉的狀態 可觀察唾液誤嚥的情形 可觀察咀嚼後食團的狀態	最適合用來評估誤嚥 可以觀察整個吞嚥過程
缺點	無法觀察吞嚥瞬間的狀態	需曝露在輻射線