

Thermal-gustatory stimulation for dysphagia associated  
with cerebral palsy: a clinical trial

冷酸刺激對腦麻痺吞嚥障礙的療效

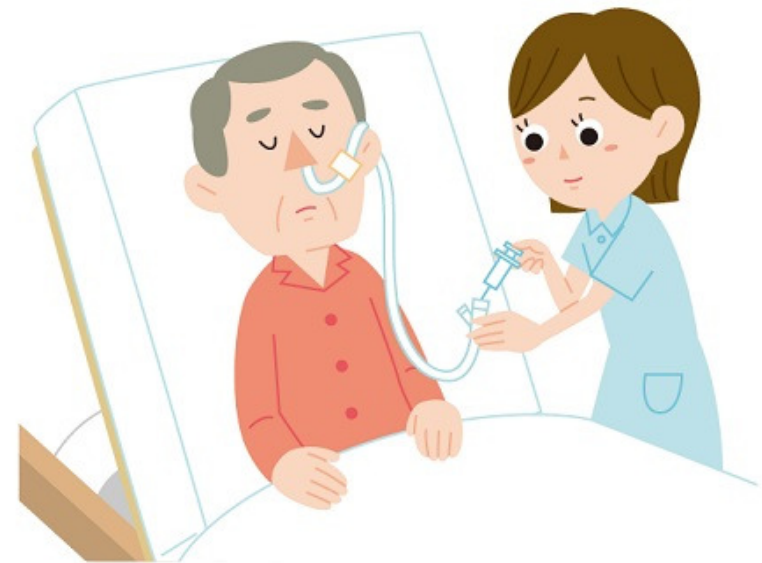
Keywords: dysphagia, ageing, cerebral palsy, intellectual disability



# Dysphagia



生活質素

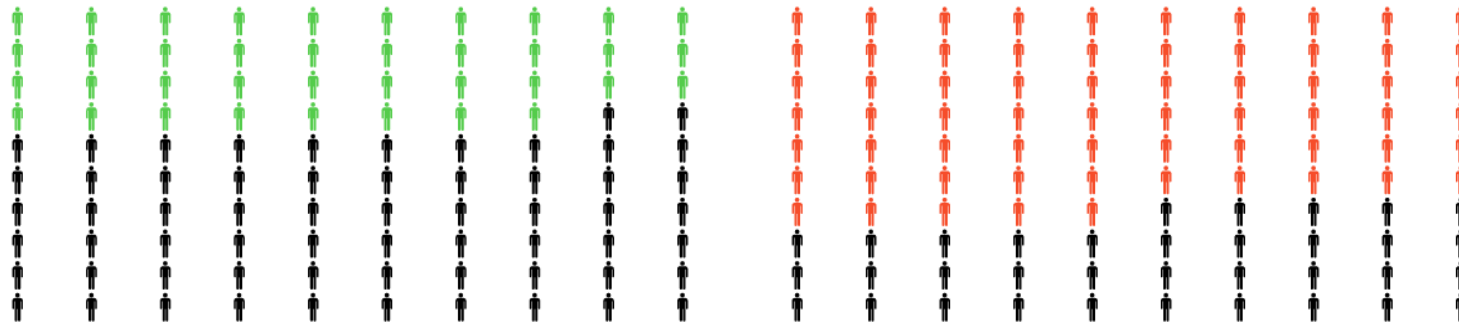


吞嚥困難/障礙



# What is at issue?

## Prevalence rates



Prevalence rates of dysphagia reported in research have ranged from 5-8 % of AWID in community populations. This figure may be as high as 22% in normal adults over 50 years of age.

For every 100 persons with moderate-severe generalized cerebral palsy and intellectual disability, 65 of them experience dysphagia.

國外研究顯示社區裡有約5-8%的成人智障人士患有吞嚥困難。而每100位患大腦麻痺的智障人士就有65人同時患有吞嚥困難。

Chadwick, D. D., Jolliffe, J., Goldbart, J., & Burton, M. H. (2006). Barriers to caregiver compliance with eating and drinking recommendations for adults with intellectual disabilities and dysphagia. *Journal of Applied Research in Intellectual Disabilities*, 19, 153-162.

Lindgren, S., & Janzon, L. (1991). Prevalence of swallowing complaints and clinical findings among 50-79-year-old men and women in an urban population. *Dysphagia*, 6, 187-192.



# Symptoms



weight loss



poor appetite



drooling, coughing



aspiration pneumonia

Fig 1. Some symptoms of dysphagia  
一些吞嚥困難的癥狀

Aspiration can lead to asphyxiation and aspiration pneumonia.  
氣哽/哽塞可引致窒息、吸入性肺炎。



# Why the brain?

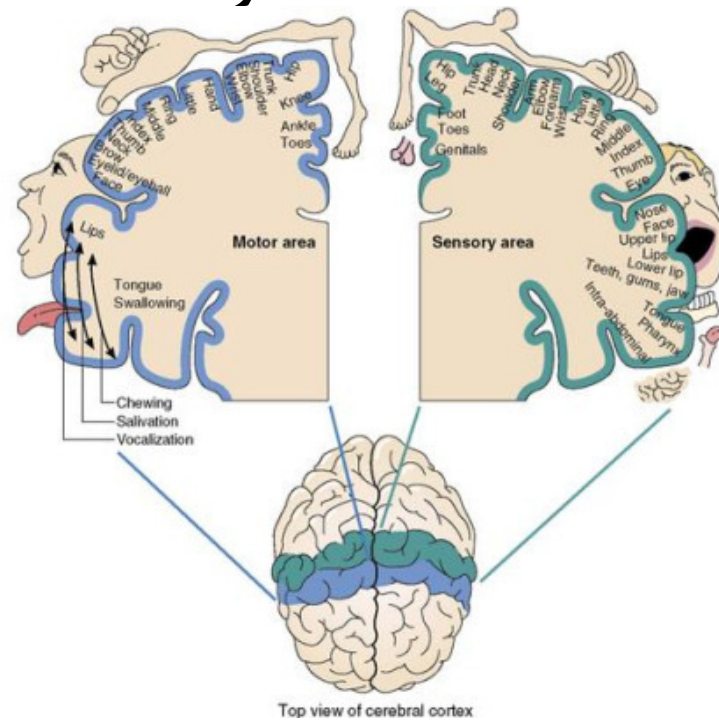
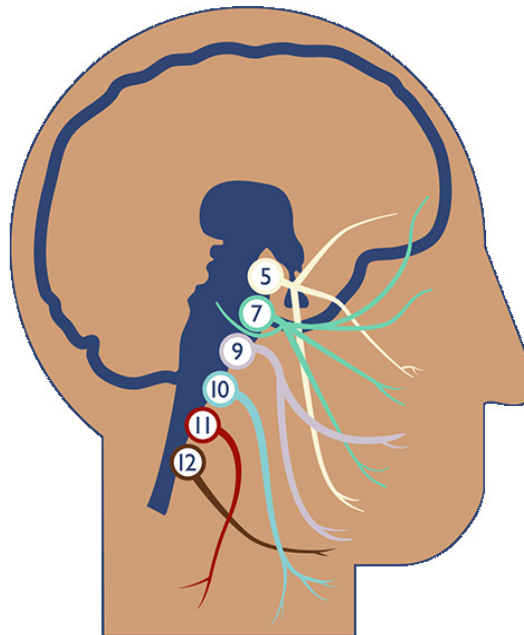


Fig 2. Motor & sensory maps in precentral gyrus; also known as the cortical homunculus  
身體各部位在感覺皮質及運動皮質層中所佔的比例





Swallowing is controlled in large part by the medulla

吞嚥主要由延腦控制

Fig 3. Some cranial nerves and their origin  
部分腦神經及其來源



# What may be at fault?

Sensorimotor impairment involving oral & pharyngeal muscles

Gastrointestinal (GI) issue

Behavioural issue

口肌、咽喉肌肉的感覺與運動障礙

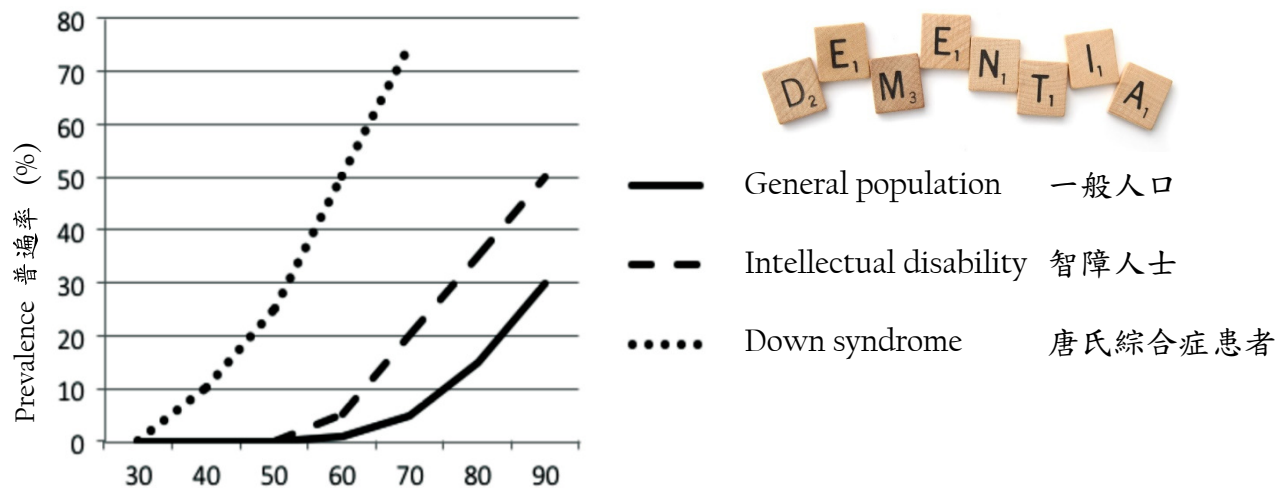
腸胃道問題

行為問題



# Ageing individuals with ID

Higher prevalence of dementia 認知障礙更普遍



British Psychological Society and Royal College of Psychiatrists. (2015). *Dementia and people with intellectual disabilities. Guidance on the assessment, diagnosis, interventions and support of people with intellectual disabilities who develop dementia*. Leicester: BPS.

Haveman, M., Perry, J., Salvador-Carulla, L., Walsh, P. N., Kerr, M., Van Schrojenstein Lantman-de Valk, H., Van Hove, G., Berger, D. M., Azema, B., Buono, S., Cara, A. C., Germanavicius, A., Linehan, C., Maatta, T., Tossebro, J. and Weber, G. (2011). Ageing and health status in adults with intellectual disabilities: results of the European POMONA II study. *Journal of Intellectual & Developmental Disability*, 36, 49-60.

Robertson, J., Emerson, E., Gregory, N., Hatton, C., Turner, S., Kessissoglou, S. & Hallam, A. (2000). *Lifestyle related risk factors for poor health in residential settings for people with intellectual disabilities*. *Research in Developmental Disabilities*, 21, 469-486.

Winter, C.F., Hermans, H., Evenhuis, H.M., & Echteld, M.A. (2015). Associations of symptoms of anxiety and depression with diabetes and cardiovascular risk factors in older people with intellectual disability. *Journal of Intellectual Disability Research*, 52, 176-185.





# Ageing individuals with ID

Increased risk of inactivity 增加不活動風險

(Robertson et al., 2000)

Physical and mental health issues more prominent 生、心理問題更突出

([Haveman et al., 2011](#) ; [Winter et al., 2015](#))

British Psychological Society and Royal College of Psychiatrists. (2015). *Dementia and people with intellectual disabilities. Guidance on the assessment, diagnosis, interventions and support of people with intellectual disabilities who develop dementia*. Leicester: BPS.

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# Role of allied health professionals

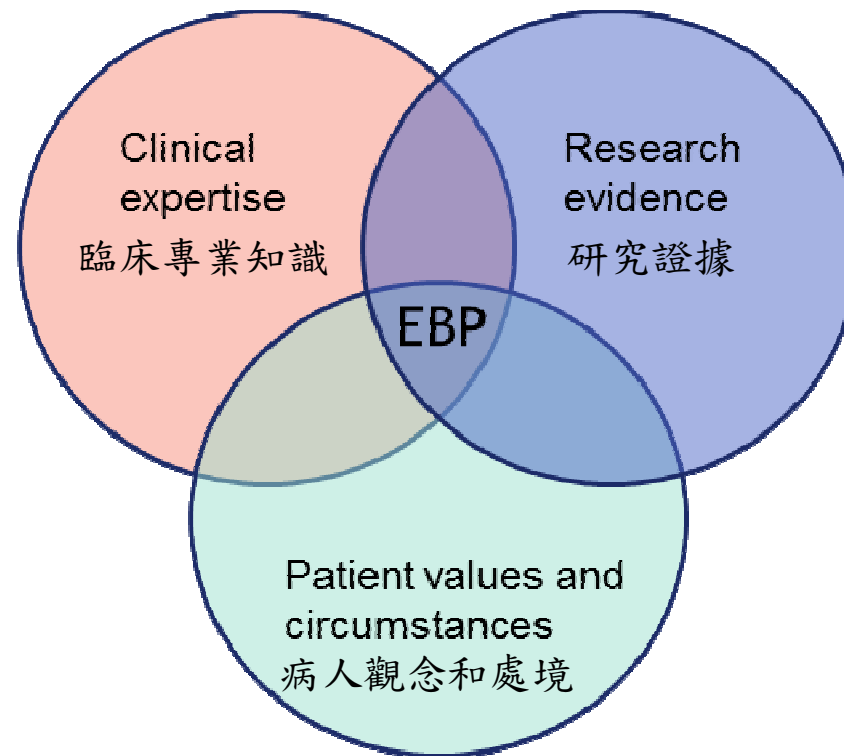


Fig 4. Components of evidence-based practice  
實證為本治療



# Swallowing therapy

Goals of sensory-motor treatment for oral musculature include...



mobility



strength



control for swallowing

口肌訓練透過提升肌肉的**活動能力**、**力量**和**控制**，改善吞嚥能力



# Oral sensorimotor stimulation

Sensory input to the oropharynx...



tactile 觸感



thermal 溫度



gustatory 味道

improves triggering and timing of the pharyngeal motor response

不同感官輸入可加快吞嚥反射



# Clinical trial

Experimental group (n=6)

實驗組

Service user	Sex; Age
A	F; 28
B	F; 37
C	M; 40
D	M; 45
E	F; 38
F	F; 65
Mean Age	42.2
S.D.	12.5

Age-matched control group (n=6)

對照組

Service user	Sex; Age
A2	M; 32
B2	M 38
C2	M; 43
D2	M; 44
E2	F; 42
F2	M; 68
Mean Age	44.5
S.D.	12.3

Inclusionary criteria

- service users with intellectual disability and cerebral palsy previously diagnosed with oropharyngeal dysphagia
- able to open the mouth on command

Evaluation: pre and post swallow function scores (SFS) & paired t-test



# Thermal-gustatory stimulation



Video 1. Traditional thermal-tactile stimulation  
冷凍觸覺刺激示範



# Swallow function score

分數對應飲料

清水

汽水、清湯

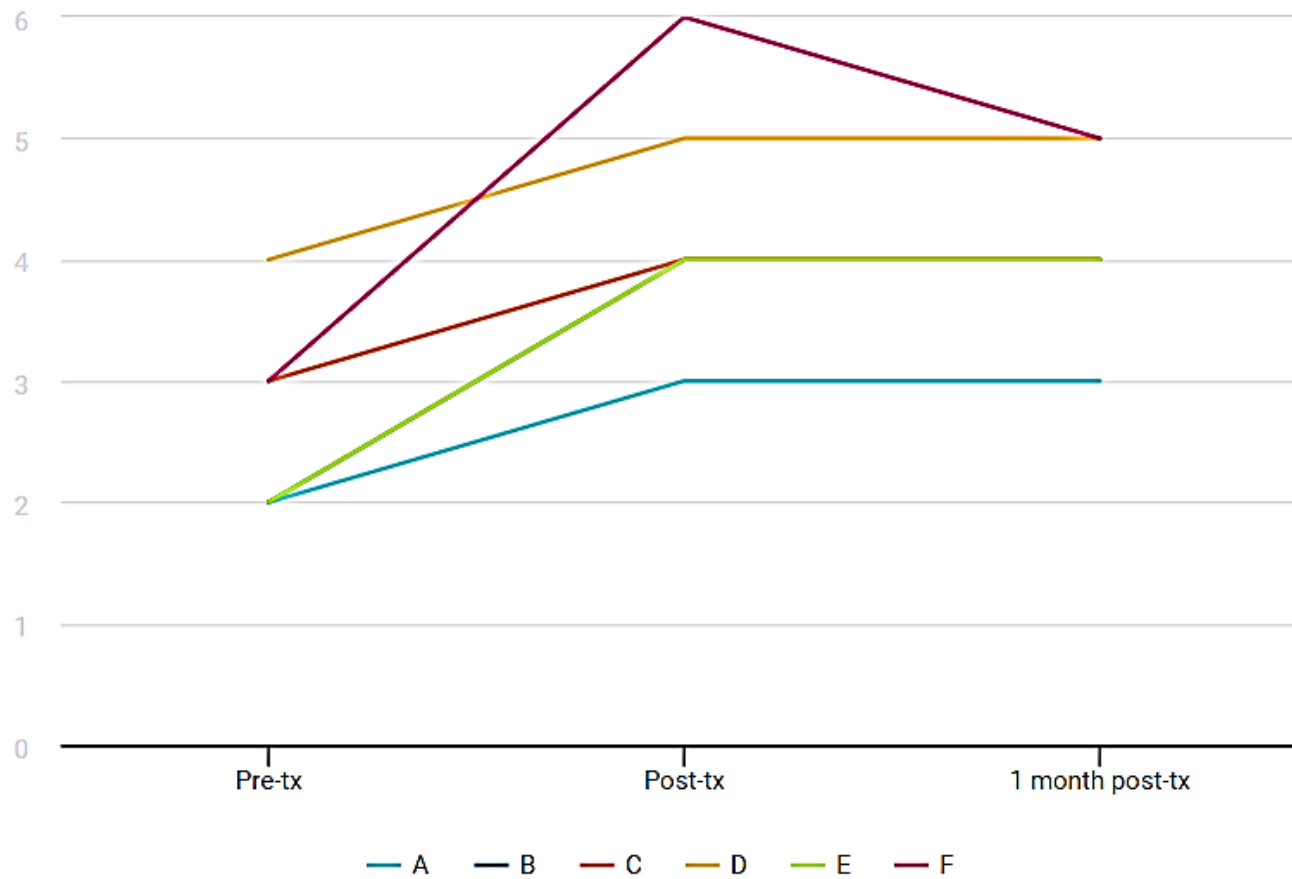
蜂蜜、果汁

蜜糖、合桃露狀

果蓉狀

口水

不能進飲



Experimental  
group  
實驗組



# Swallow function score

## 分數對應飲料

汽水、清湯

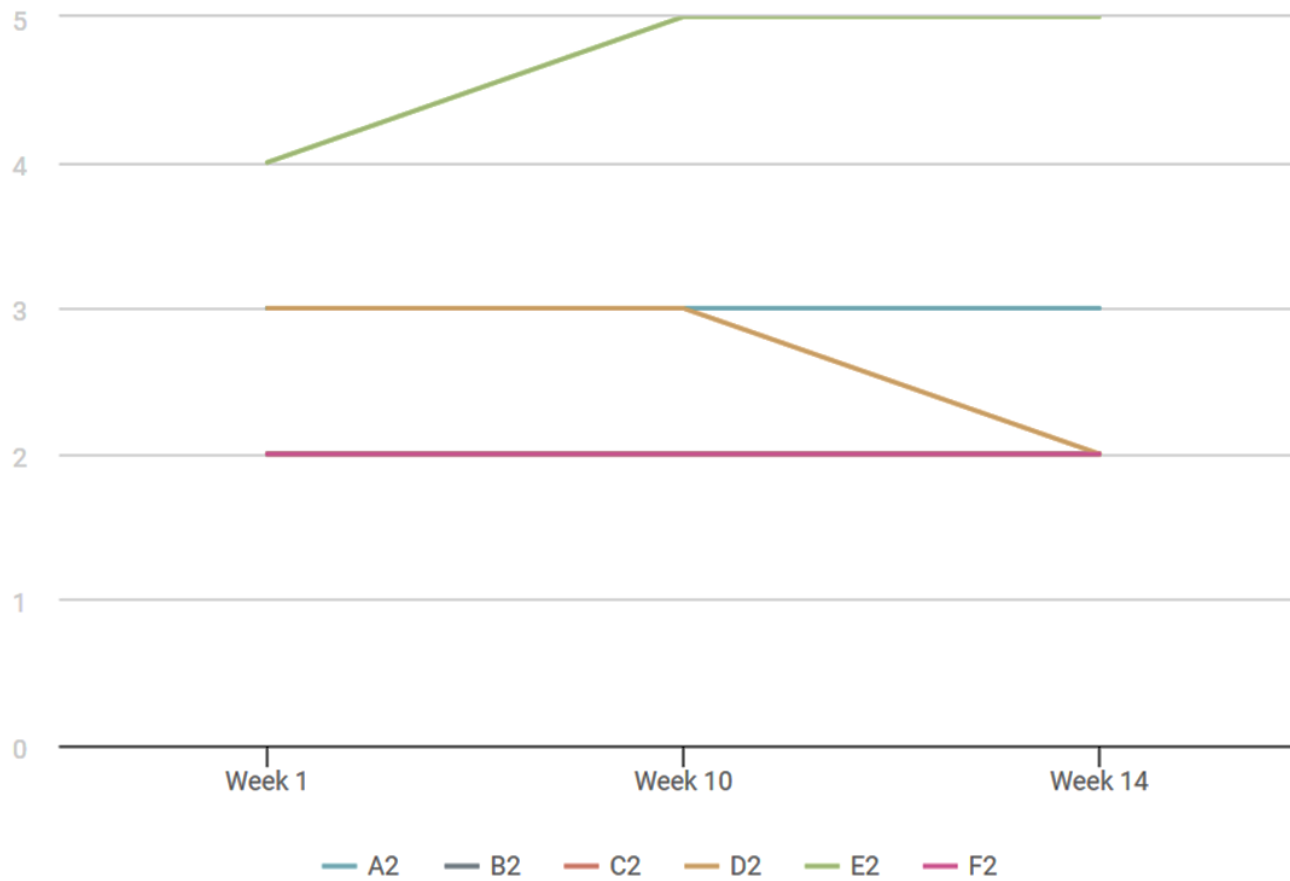
蜂蜜、果汁

蜜糖、合桃露狀

果蓉狀

口水

不能進飲



p-value <0.05

Control group  
對照組





# Discussion

## Muscular conditioning

- neuroplasticity
- specificity, overload, transference



## 肌肉條件反射

- 腦可塑性
- 獨特性、超載、轉移原則

Plasticity is greater in the developing brain than in the mature brain; however, plasticity should be present in adults with CP just as it is in adults with stroke.



# Limitations

- intensity of training unproven
- limited sample
- relapse not yet observed
- 治療密度未經證實
- 有限樣本
- 可能復發



**Q & A**

