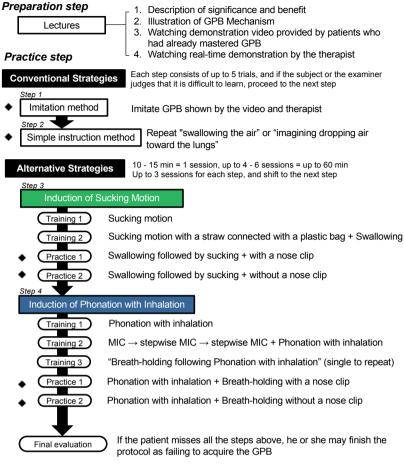
Supplementary material to article by K. Haruyama et al. "Strategies for learning glossopharyngeal breathing in boys with Duchenne muscular dystrophy: A feasibility case series"



## Through all the steps:

- If any of the trainings or practices in each step subjectively or objectively show that it is difficult
  to learn, you may proceed to the next step.
- Subject may receive thorax and thyroid cartilage mobilization or stretch as warming up.
- If achievement of mastery criteria is confirmed by spirometry, you may finish the protocol at that
  point (The therapist can perform measurements at items marked by ◆)
- Stepwise MIC: Repeat the air stacking followed by a small amount of insufflation with a bag valve mask as the patient repeatedly inspires (repeat to MIC)

Abbreviation: MIC, maximum insufflation capacity

The following options are available for air leaks during training

## Countermeasures against mouth leak

In the case of sucking motion:

- A) Promotion of tongue movement
- B) Assistance with neck extension
- C) Feedback of laryngeal movement

In the case of phonation with inhalation:

- A) Repetition of quick change between inhalation and exhalation
- B) Feedback of laryngeal movement
- C) Change in pronunciation of phonation with inhalation (e.g. /ka/, /ku/, /gu/, or /go/)
- D) Performance of neck extension during inspiration and neck flexion during breath holding
- E) Voluntary repetition of root of tongue descent and elevation and intake synchronized with its movement

## Countermeasures against nasal leak

In both induction methods:

(Use nasal mirror as feedback if necessary)

- A) Supraglottic swallow
- B) Blowing training
- C) Sucking training (reverse blowing)
- D) Tongue movement with bulged cheeks
- E) Inhibition of nasal respiration using smells

Fig. S2. Learning protocol for glossopharyngeal breathing (GPB). MIC: maximum insufflation capacity.