ENSIGN SERVICES

POSTette: Respiratory Rehab: SLP Assessment & Intervention

Why is respiratory function so important for SLP involvement?

- Successful Phonation is dependent upon effective respiration.
- Uncoordinated breathing patterns or open vocal folds increase risk for aspiration. Compromised breath support limits cough strength and effectiveness to remove any substances that pass the vocal folds.

Low Oxygen levels can affect:

- The heart due to the need for it to pump harder.
- The brain resulting in mood changes, reasoning and memory deficits (i.e. decreased cognitive function; increased safety risk)
- Physical abilities due to decreased sensory or motor planning (i.e. Increased risk for falls)

Respiratory Assessments

Respiratory Rehab Evaluation Clinical guide ; Quick Assessment Check-List attached; Peak Flow Meter.

Communication Goals

LTG example: Pt will use adequate breath support in order to effectively communicate wants and needs as well as social conversational exchanges in structured and unstructured settings.

STG examples

- Pt. will use diaphragmatic breathing for vowel production 4 out of 5 times in order to improve respiratory strength for communication.
- Pt will sustain continuous airflow for ___ seconds 4 out of 5 trials in order to improve speech production.
- Pt will increase breath support for ___ syllable utterances 4 of 5 trials in order to increase ability to engage in conversations.
- Pt will tell a story of 3-5 sentence length demonstrating breath control and pausing in order to improve conversational speech.
- Pt will produce audible speech at 5 feet using effective breath control and pausing in 4/5 trials in order to call for help.
- Pt. will produce audible speech using electronic means (telephone, Face Time, etc.) using effective breath control and pausing 4/5 trials in order to communicate with family or for medical care/appointments.

Swallow Goals

LTG examples: Pt will safely consume diet of _____ without any signs / symptoms of aspiration in order to maintain/sustain adequate nutrition and hydration.
Pt. will safely manage dysphagia symptoms while consuming a _____diet during all intake opportunities.

STG examples

- Pt. will decrease rate of eating / drinking by pausing for ____ in between bites / swallows in order to safely mange the bolus on 8/10 trials.
- Pt. will demonstrate adequate coordination of breathing and swallowing during ____minutes of eating to avoid swallowing on inhalation in order to decrease risk for aspiration on 4/5 opportunities.
- Pt. will demonstrate adequate airway protection on 8/10 thin liquid trials as evidenced by adequate cough strength

Note if any motor speech or cognition issues identified during the initial assessment, additional goals for those areas may also be needed.

Intervention: The focus of respiratory intervention is to improve patient's quality of breathing patterns for improved communication, swallow, and patient performance during ADLs or other physical activities. The goal of Respiratory Muscle Strength Training (RMST) is to increase the "force-generating capacity" of the muscles of inspiration and expiration; RMST can be used to target inspiratory or expiratory muscles, depending on patient needs (*Sapienza, Troche, Pitts, Davenport, 2011*)

Always measure the patient's oxygen level and respiratory rate pre – during – and post therapy activities. If oxygen falls below 90% cue for deep nasal inhalation and/or other breathing techniques such as pursed lip breathing until level resume. If levels unable to resume notify nursing immediately. Additionally asses and document the patient's demeanor / anxiety levels during intervention.

Respiratory treatment interventions need to address:

- Proper breath control / breathing patterns
- Pursed lip/diaphragmatic breathing
- Sustained phonation
- Phrase production
- Respiration with Swallow when issues identified
- Airway Protection

Intervention Tools: Create a Breath Support Tool Kit

- Straws, Whistles, Cotton balls, Pinwheels, Party Horns, Bubbles, etc.
- Professional tools: i.e. The Breather[tm] ; EMST 150 / 75

Sustained Airflow /Phrasing

- Have patient draw circles or other items while sustaining "ah"
- Blow bubbles at a target, blow cotton balls across a table/ into a cup, blow pinwheels, whistles, etc. Add a straw for resistance.
- Utilize pre-made phrases already established in the number of syllables needed.
- Dual task – have patient read phrases while on exercise bike

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Description

Inspiration and expiration through resistance is similar to any resistance training of the skeletal/limb muscles. In a sense, it is weight training for the respiratory muscles. Various diseases and conditions (i.e., neuromuscular disease, head/neck injury or surgery, vocal fold pathology) can cause the airways to be altered creating symptoms such as dysphagia, dysarthria, and dysphonia. Speech, swallowing, and phonation are normal functions that involve respiration/respiratory control. It has been well documented that resistive breathing training (RBT) can strengthen respiratory muscles including the accessory neck muscles which are in close proximity to the pharyngeal and laryngeal muscles. Voice, communication, and swallow functions may be enhanced with strengthening of the respiratory muscles.

Purpose

- Strengthen and tone inspiratory muscles. (i.e., diaphragm, external intercostals, accessory muscles of the neck, pharyngeal, and laryngeal muscles)
- Strengthen and tone expiratory muscles. (i.e. internal intercostals, abdominals)
- Generate improved airflow through the vocal folds.
- Improve swallowing.
- Improve protective cough and assist airway clearance.
- Assist teaching diaphragmatic breathing / deeper breathing (incentive spirometry).

Indications

- Dysarthria
- Dysphonia or Aphonia
- Dysphagia
- Shortness of Breath (i.e., chronic obstructive lung disease; asthma, CHF, stress, COVID)

Contra-indications

Although no absolute contra-indications to RBT have been reported, the following should be carefully evaluated before the initiation of therapy: active hemoptysis, untreated pneumothorax, esophageal surgery, intracranial pressure > 20 mm Hg, recent facial, oral, or skull surgery or trauma, acute sinusitis, epistaxis, hemodynamic instability, bolus emphysema, extreme nausea, and suspected tympanic membrane rupture or other middle ear pathology.

Precautions

- Give patient training breaks as necessary.
- Carefully increase resistances as RBT is more strenuous than appears.
- Patient should try to maintain diaphragmatic breathing throughout the session.
    - Training may trigger coughing. This is therapeutic in that coughing helps to clear the airways.
    - If patient experiences shortness of breath or a “panicking feeling,” he should simply inhale and exhale comfortably through the device and avoid forceful use as in strength training. Often it takes less than a moment for breathing to become under control.
    - Patient should try to train on a daily basis as it may take up to 4 weeks for beginning results.
    - Initially training may cause a light-headed sensation which is normal and should quickly subside. Some patients may yawn or sigh during training due to the opening of smaller airways and alveoli.
    - If shortness of breath, increased heart rate, or breathing difficulties occur during or after training, notify patient’s physician and document.
    - The optional oxygen adaptor may be used for patients who have a prescription for supplemental oxygen. Note A: The optional oxygen adaptor is not necessary if patient is using a cannula and has normal, patent airways for normal inhalation naturally entrains the oxygen enriched air into the lungs. Note B: Ensure appropriate liter flow of oxygen in accordance with physician orders if adaptor is used. Note C: If nose clips are used, the oxygen adaptor is necessary.
    - Resistance breathing devices are designed for single patient use and should be cleaned according to manufacturer’s instructions.

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Equipment

- PPE
- Permanent marker to label patient's resistive breather device for individual use.
- Pulse Oximetry may be considered to monitor patient's heart rate and oxygen saturation levels.
- Watch or clock with a second hand to monitor patient's respiratory rate.
- Soap, water and/or bactericidal agent to clean the device on a daily basis according to manufacturer's instructions on package insert.
- Nose clips (single patient use item) may be considered if patient exhibits impairment of the velopharyngeal port to the extent that air is flowing in and out of the nose during resistive breathing exercise.
- Disposable valve face mask (single patient use item) may be considered if patient cannot maintain a seal with the mouth due to weak labial muscles. Mask can also be used for patients with velopharyngeal closure deficits.

Procedure Considerations

- Most resistive breathing devices classification by the FDA is spirometer-therapeutic. This is incentive spirometry because it creates a low-flow, sustained, maximum inspiration. This encourages the patient to breathe more deeply.
- Read manufacturer's instructions on package insert prior to initiating RBT. Explain resistive breathing therapy to patient.
- Establish resistive breathing tasks as part of patient's plan of treatment via appropriate long term and short term goals on appropriate documentation form per facility protocol.
- Position the patient to maximize patient's ability to breathe diaphragmatically.
- Obtain and perform monitoring of patient's heart rate, respiratory rate, and, if indicated, oxygen saturation.
- Follow device protocols and continue increasing the resistances.
    - After maintaining the prescribed training level, the level of resistance may be increased. Inhalation and exhalation settings are independent from each other; i.e., inhalation may increase more quickly than exhalation resistance. Each breath should still be forcefully maintained approximately 2 to 3 seconds. Please note: Both inhalation and exhalation resistance should be set at levels where the patient and clinician detect that there is an adequate level of resistance being met.
    - As resistance levels increase, training time may initially be decreased and then gradually increased again as tolerated.
- Clean the device per manufacturer recommendations.
- Monitor patient for signs of distress before, during, and immediately after treatment.
- Document patient's progress. I.e. levels of resistance, number of sets, time, etc. in addition to the skilled training/ instruction of the clinician.
- Obtain and document the patient's heart rate, respiratory rate, and, if indicated, oxygen saturation at the close of the RBT treatment session.

Resistive Device training videos

The Breather[tm]
https://www.pnmedical.com/lessons/in-service-video/

EMST 1500
https://emst150.com/how-to-train/

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Assessment	Responses	Comments
Observations while patient is at rest		
Mouth position while breathing	Open / Closed	
Measure Length of inhalation/exhalation at rest		
Frequency and force of cough		
Placement of nasal cannula/mask		
Number of O2 Liters		
Posture / positioning		
Type of breathing pattern:	Shoulders / Diaphragm	
Facial Expression	Pain / anxious / calm	
Respiratory rate at rest (In adults over 65 can be 16-25 Breaths/min)		
Quality of speech		
Quality of cough		
Willingness to participate in conversation		
Medications (GERD, inhalers, etc.)		
Cognition		
Thought Organization in conversation Problem solving: Able to stay on topic; list out an ADL process, etc.	ADDENBROOKE'S COGNITIVE EXAMINATION – ACE-III https://neurovascularmedicine.com/ace.pdf	
Memory		
Alertness	Fatigue / no issues	
Attention		
Divided		
Alternating		
Complaints of confusion or feeling "foggy" cognitively		
Communication		

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Length of utterance: Number of syllables between breaths Assess while lying and seated	_____ Syllables average _____ Syllables Lying _____ Syllables Seated	
Sustained phonation/ah/: (Average M over 61 is 23.23 sec. Average F over 61 is 20.96)	_____ Seconds Do 3 trials and record the longest of the three.	
Quality of Speech	Wet / hoarse /volume / vocal fatigue	
Breathing Pattern during assessment	Shoulders / Diaphragm	
Can hold breath:	_____ Seconds	
Respiratory rate during active assessment		
Respiratory with Swallow		
Position / posture while eating		
Rate of consumption		
Talking while eating		
Needs Frequent Breaks		
Easily distracted		
Needs assist		
Modified Textures		
Labial Strength/ ROM		
Lingual Strength/ ROM		
Dentition		
Swallow Function		
Complaints of pain or discomfort when eating or swallowing.		
Measure cough strength (use Peak Flow meter)		

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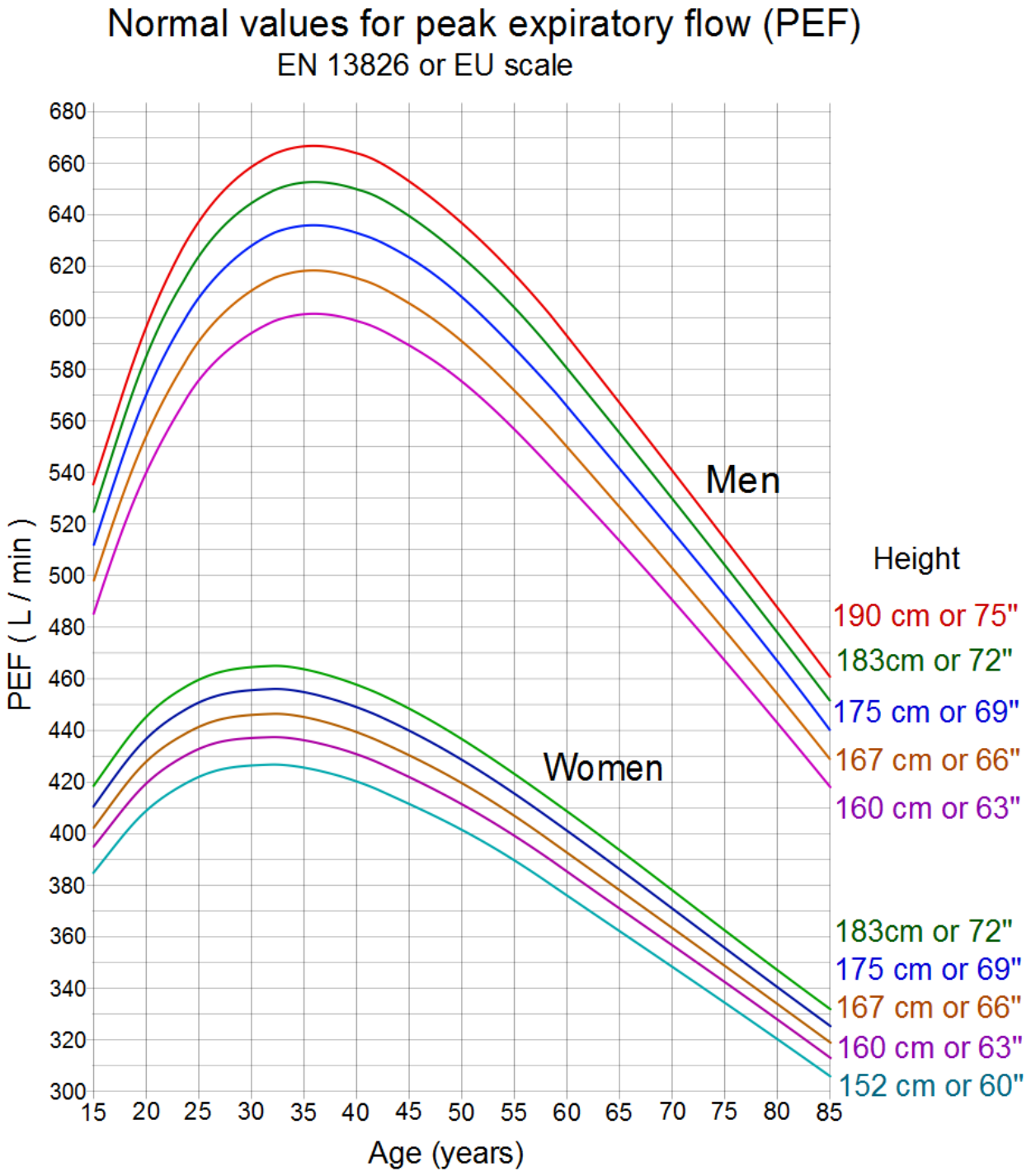
Using Respiratory Devices Quick Reference (Note: Always refer to the manufacturer recommendations and adjust for each clinical situation. This is only a guide).

Assessment	Intervention	Documentation
Have the patient cough into Peak Flow Meter and obtain a baseline measurement of Peak Expiratory Flow Rate • Use the norms to compare patient to normal values(attached) Use the norms to compare patient to normal values(attached) • Write patient's name and date on box or device and save for reassessment Clinical Note: • Recording peak flow measurements is a helpful measure for Respiratory Rehab assessments. A peak flow meter is useful in detecting changes in a person's airway, which could indicate a worsening of symptoms of respiratory conditions. • While peak flow meters do not provide a resistive load and cannot be used for RMST, they are useful as biofeedback devices for producing stronger and more forceful coughs to improve airway clearance. • Re-test Peak Expiratory Flow weekly, for recertification and at discharge	Respiratory muscle strength training (RMST), including inspiratory muscle strength training (IMST) and expiratory muscle strength training (EMST), has been shown in the literature to be an effective exercise-based intervention to address deficits in respiration, swallowing, airway protection, voicing, and other issues relating to respiratory function in patients with various etiologies (Laciuga et al., 2014, Sapienza & Troche, 2012). To build tolerance to 25 reps to transition to a professional device consider starting with: • Blowing: tissue; cotton balls, horns, party favors, etc. Begin training at level where patient can complete 25 repetitions EMST 75/150: • 5 sets • 5 repetitions • 5 days/week • 5 weeks The Breather: • 6 days per week, twice a day. • Aim for 2 sets of 10 full breaths at each session. • Leave a good 2 minute or more break in between sets.	Document peak expiratory flow value and normal range in Objective testing section of evaluation. Clarify what number (i.e. 6) may indicate with respect to airway protection. Skilled Intervention Documentation: • Vital Signs: respiratory rate and O2 sats pre – during – post sessions; • Respiratory strength training; • Airway defense training; • Describe how respiratory flow is helping to improve respiratory function for communication and/or swallow. • **Sample TEN:** Pt. treated for skilled interventions focused on improving airway protection for safe swallow. Respiratory rate taken at rest was 14. O2 saturation on room air was 97%. Borg score was 0 at rest. Utilized EMST to improve respiratory strength and swallow safety. Patient able to complete 5 sets of 5 repetitions with min. visual cues to achieve labial closure around mouthpiece. Pt. had no signs of distress during treatment as evidenced by respiratory rate of 16 during treatment, O2 sat at 96% and Borg RPE at 3. Trials of thin liquid via teaspoon with clear vocal quality post swallow on 4/7 trials. Training provided to increase pt. awareness of residue and need for post swallow cough to clear. Respiratory rate at end of session was 14 and O2 sat at 96%. Borg scale rate of perceived exertion was at 1 post treatment.


Normal values for peak expiratory flow (PEF)
EN 13826 or EU scale
PEF (L / min)
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
380
360
340
320
300
15 20 25 30 35 40 45 50 55 60 65 70 75 80 85
Age (years)
Men
Women
Height
190 cm or 75"
183cm or 72"
175 cm or 69"
167 cm or 66"
160 cm or 63"
183cm or 72"
175 cm or 69"
167 cm or 66"
160 cm or 63"
152 cm or 60"