

# The Development of Prolonged Weaning Guidelines to Facilitate Ventilatory Liberation

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# The Development of Prolonged Weaning Guidelines to Facilitate Ventilatory Liberation

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## Introduction

- Unsuccessful ventilator liberation is associated with increased morbidity and financial burden.
- These issues have become more evident as acceptance to long-term weaning facilities become more restrictive and limited.
- Historically, the ICU clinical team was responsible to wean all ventilator patients regardless of etiologies or ventilator duration.
- To address the above issues has become more evident as acceptance to long-term weaning facilities become more restrictive and limited.

## Methods

- A multidisciplinary team was assembled to develop a strategic methodology to facilitate the weaning of patients who had failed traditional weaning or were deemed difficult to wean, defined as failure of > 3 spontaneous breathing trials.
- Clinical experiences and review of the literature were used to develop a systematic approach utilizing three weaning strategies based on the clinical status of the patient.

## Systematic Approach

- **Developed a three tier weaning approach:**
  - **Option A:** a quicker more aggressive weaning plan,
  - **Option B:** a more conservative weaning approach and
  - **Option C:** a very conservative weaning process
- All options allowed weaning via conventional or high flow oxygen, and included hyper-inflation therapy every four hours.
- Ambulation was encouraged along with nursing, physical therapy and nutritional support.

Wean option must be selected

Options explained in order reference

OPTION A	OPTION B	OPTION C
2 hrs AM & 2 hrs PM	2 hrs AM	1 hr AM
4 hrs AM & 4 hrs PM	2 hrs AM & 2 hrs PM	1 hr AM & 1 hr PM
6 hrs AM & 6 hrs PM	4 hrs AM & 2 hrs PM	1.5 hr AM & 1.5 hr PM
8 hrs AM & 4-6 hr PM	4 hrs AM & 4 hrs PM	Once tolerating continue weaning following Option B
12 hrs AM	8 hrs AM & 4 hrs PM w/12 hrs rest	
16 hrs AM	12 hrs AM w/ 12 hr rest period	
24 hrs	16 hrs AM w/ 8 hr rest period	
36 hrs	20 hrs AM w/ 4 hour rest period	
48 hrs	24 hrs	
	36 hrs	
	48 hrs	

**Respiratory assessments should be performed daily and weaning conducted via one of the following strategies maintaining the patient's pre-weaning FiO<sub>2</sub> or 10% higher.**

- PSV (Level  $\geq 6 \leq 16$  cm/H<sub>2</sub>O) via mechanical ventilation achieving an F/Vt between 40-90
- CPAP/flow-by mode via mechanical ventilation
- High flow oxygen via trach mask with every four hour hyperinflation therapy
- High flow oxygen via Optiflow with every four hour hyperinflation therapy
  - A Passy-Muir should be considered for any patient with a tracheostomy
- Hyperinflation therapy may include the following modalities:
  - Encouragement of deep breathing
  - Inter-percussive Therapy (IPV)
  - Incentive spirometry therapy
  - EzPAP/PEP Therapy
  - Sigh volumes via mechanical ventilation with volume targeted to 12-15 cc/kg/IBW



- Monitoring of the patient during a weaning trial will include hemodynamic monitoring, and continuous ETCO<sub>2</sub> and SpO<sub>2</sub> measurements. Progressive weaning should be conducted via one of the following options depending on the patients overall strength.

## Results

- 24 patients were placed on the prolonged weaning guidelines from July 1 - Dec 31, 2013.
- The mean ventilatory duration was 22.3 days and the mean age was 63.2.
- All patients were admitted to MSICU for respiratory failure. The most common etiologies were pneumonia and exacerbation of COPD.
- Eighteen (75%) were liberated from ventilator support, defined as assisted breathing absent of mechanical ventilation for greater than 48 hours.
- The average time until ventilator liberation for this group was 8.8 days.
- Four patients were transferred to an outside weaning facility and two were deemed not able to wean secondary to neuromuscular weakness.
- Historically, this category of patient population would have transferred to weaning centers, it was not possible to compare this process with past outcomes.
- Our inference is that this group of patients who were weaned via the guidelines would have had a longer ventilator duration without this intervention.

## Conclusion

- The prolonged weaning guidelines are a systematic method to wean patients at different levels of ventilator failure.
- By utilizing the guidelines, there is a target progression used to determine ventilator settings in addition to assessing the clinical status of the patient as a monitor of progression or failure.
- In our patient population it produced a 75% success rate in patients deemed difficult to wean.
- Currently all patients who failed conventional weaning are ordered on the Prolonged Weaning Guidelines.

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