**Supplemental Table 37. Summary of evidence for physical rehabilitation or mobilization performed either in-bed or out-of-bed STOPPING criteria**

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Lowest  reported values | Highest reported values | Comments |
| Cardiovascular | | | |
| Heart Rate (HR) in beats/minute | <40 [1-3] to <50 [4] | >120 [5]  >130 [1-3]  >140 [4, 6] | 7 unique studies reported heart rate considerations. 6 reported specific threshold values. 2 reported stop criteria in relationship to maximal or baseline HR.  1 study reported >70% maximum HR as stop criteria [7].  1 study reported HR increase > 20 during session as stop criteria [6]. |
| Mean  Arterial Pressure (MAP) in mmHg | <55 [8] to <65 [1, 2, 4] | >110 [1, 3, 9]  >120 [4]  >140 [8] | 11 unique studies reported a blood pressure parameter to guide cessation of therapy. 6 studies used MAP values. 7 studies used SBP values. 1 study used DBP values (in addition to SBP). 3 studies used less defined parameters of either a percentage decrease or clinical judgment related to symptomatic or instability. No study described the duration of concerning changes in blood pressure before stopping the session.  1 study reported a decrease of SBP or DBP decrease of 20% as stop criteria [7].  1 study reported a SBP decrease of 20% below baseline during session as stop criteria [6].  1 study reported an increase of 10mmHg in SBP or DBP in renal patients as stop criteria [10]. |
| Systolic Blood Pressure (SBP) in mmHg | <90 [5] | >180 [7, 11, 12]  >200 [1, 3, 6] |
| Diastolic BP (DBP) in mmHg |  | >110 [6] |
| Chest Pain/Cardiac Ischemia |  |  | 4 unique studies used the concern for/onset of chest pain or cardiac ischemia as a stop session criteria; no study indicated the duration of chest pain to guide the decision to stop.  3 studies report presence/occurrence of chest pain during session results in stop [2, 6, 11].  1 study reports “concern for myocardial ischemia” as stop criteria [1]. |
| New/Symptomatic arrhythmia |  |  | 8 unique studies indicated that a dysrhythmia would stop a session but no study detailed the frequency, duration or type of dysrhythmia.  6 studies use the term “arrhythmia” as stop criteria [1-4, 11, 12].  1 study uses the term “malign arrhythmias” [7].  1 study states “dysrhythmia requiring addition of new antiarrhythmic agent” [13]. |
| Respiratory | | | |
| Respiratory Rate | <5 [1, 11] | >35 [5, 10]  >40 [1, 3, 11] | 6 unique studies detailed a respiratory rate of 35-40 as stop criteria for a session |
| Oxygen Saturation |  | <85 [10]; < 85 for >3 minutes [1]  <88 [1-3, 9, 11, 12]  <90 [7] | 12 unique studies recommended stopping a session for low peripheral capillary oxygen saturation (SpO2) values, variously detailed at 85-90%. 1 study reported criteria that include desaturation for > 3 minutes. 1 study used “frequent” desaturation but did not provide detail.  1 study used “frequent episodes of desaturation” [14].  1 study used presence of “hypoxia” (not defined) [15] .  1 study used >10% decrease in SpO2 [10]. |
| Ventilator asynchrony |  |  | 5 unique studies used ventilator asynchrony as a criteria to stop a session [1-3, 11, 12]. |
| Endotracheal or tracheal tube removal or malfunction |  |  | 7 unique studies used malfunction or loss of an artificial airway as stop criteria [1-3, 8, 9, 11, 12]. |
| Neurological | | | |
| Agitation/Sedation/Change in level of consciousness |  |  | Five studies used behaviors of agitation or decreasing level of consciousness to stop a session. No study reported on the use of an objective score during a session to guide cessation.  2 studies use the phrasing “Patient being physically combative” [1, 3].  Each of the following phrases was used in 1 unique study:  “Decrease in mental status or agitation preventing posture maintenance” [5]  “Development of lightheadedness” [6]  “Patient becomes drowsy or unable to follow commands” [4] |
| Hematologic | | | |
| Bleeding |  |  | 9 studies used the new occurrence of bleeding [1, 2, 4, 8, 9, 11, 12, 16], including gastrointestinal bleeding (1 study) [1], to stop a session |
| Other | | | |
| Device removal/ malfunction—Vascular access device, including devices inserted at a femoral site |  |  | 3 unique studies specifically addressed the malfunction (e.g., dampened waveform) or unintentional removal of a vascular access device to stop a session [8, 9, 16]. |
| Device removal/malfunction--Other |  |  | 2 studies had stop criteria for other indwelling lines or catheters malfunction or removal.  1 study used the phrase “indwelling catheter prolapse [9].  1 study specified percutaneous feeding, nasogastric, and chest tube [8]. |
| Clinical signs of distress |  |  | 4 unique studies reported additional parameters of clinical distress to guide cessation of a session.  2 studies stated “Respiratory distress evidenced by nonverbal cures or gestures” [1, 3].  1 study stated “cardiorespiratory distress”, not defined [7].  1 study stated “Patient becomes pale and sweaty” [4] . |
| Fall |  |  | 6 studies recommended stopping a session if the patient fell during mobilization [2, 4, 8, 9, 11, 12]. |
| No specific stop indicators |  |  | 2 studies in this series had no stop indicators [13, 17]. |

References

1. Schweickert WD, Pohlman MC, Pohlman AS, Nigos C, Pawlik AJ, Esbrook CL, Spears L, Miller M, Franczyk M, Deprizio D *et al*: **Early physical and occupational therapy in mechanically ventilated, critically ill patients: a randomised controlled trial**. *Lancet* 2009, **373**(9678):1874-1882.

2. Pohlman MC, Schweickert WD, Pohlman AS, Nigos C, Pawlik AJ, Esbrook CL, Spears L, Miller M, Franczyk M, Deprizio D *et al*: **Feasibility of physical and occupational therapy beginning from initiation of mechanical ventilation**. *Crit Care Med* 2010, **38**(11):2089-2094.

3. Pires-Neto RC, Pereira AL, Parente C, Sant'anna GNd, Esposito DD, Kimura A, Fu C, Tanaka C: **Characterization of the use of a cycle ergometer to assist in the physical therapy treatment of critically ill patients**. *Rev Bras Ter Intensiva* 2013, **25**(1):39-43.

4. Berney S, Haines K, Skinner EH, Denehy L: **Safety and feasibility of an exercise prescription approach to rehabilitation across the continuum of care for survivors of critical illness**. *Phys Ther* 2012, **92**(12):1524-1535.

5. Hildreth AN, Enniss T, Martin RS, Miller PR, Mitten-Long D, Gasaway J, Ebert F, Butcher W, Browder K, Chang MC *et al*: **Surgical intensive care unit mobility is increased after institution of a computerized mobility order set and intensive care unit mobility protocol: a prospective cohort analysis**. *Am Surg* 2010, **76**(8):818-822.

6. Moss M, Nordon-Craft A, Malone D, Van Pelt D, Frankel SK, Warner ML, Kriekels W, McNulty M, Fairclough DL, Schenkman M: **A Randomized Trial of an Intensive Physical Therapy Program for Patients with Acute Respiratory Failure**. *Am J Respir Crit Care Med* 2016, **193**(10):1101-1110.

7. Burtin C, Clerckx B, Robbeets C, Ferdinande P, Langer D, Troosters T, Hermans G, Decramer M, Gosselink R: **Early exercise in critically ill patients enhances short-term functional recovery**. *Crit Care Med* 2009, **37**(9):2499-2505.

8. Kho ME, Damluji A, Zanni JM, Needham DM: **Feasibility and observed safety of interactive video games for physical rehabilitation in the intensive care unit: a case series**. *J Crit Care* 2012, **27**(2):219.e211-216.

9. Dong Z-H, Yu B-X, Sun Y-B, Fang W, Li L: **Effects of early rehabilitation therapy on patients with mechanical ventilation**. *World J Emerg Med* 2014, **5**(1):48-52.

10. Berney S, Skinner EH, Denehy L, Warrillow S, Others: **Development of a physical function outcome measure (PFIT) and a pilot exercise training protocol for use in intensive care**. *Crit Care Resusc* 2009, **11**(2):110.

11. Balas MC, Vasilevskis EE, Olsen KM, Schmid KK, Shostrom V, Cohen MZ, Peitz G, Gannon DE, Sisson J, Sullivan J *et al*: **Effectiveness and safety of the awakening and breathing coordination, delirium monitoring/management, and early exercise/mobility bundle**. *Crit Care Med* 2014, **42**(5):1024-1036.

12. Brummel NE, Girard TD, Ely EW, Pandharipande PP, Morandi A, Hughes CG, Graves AJ, Shintani A, Murphy E, Work B *et al*: **Feasibility and safety of early combined cognitive and physical therapy for critically ill medical and surgical patients: the Activity and Cognitive Therapy in ICU (ACT-ICU) trial**. *Intensive Care Med* 2014, **40**(3):370-379.

13. Morris PE, Berry MJ, Files DC, Thompson JC, Hauser J, Flores L, Dhar S, Chmelo E, Lovato J, Case LD *et al*: **Standardized rehabilitation and hospital length of stay among patients with acute respiratory failure a randomized clinical trial**. *JAMA - Journal of the American Medical Association* 2016, **315**(24):2694-2702.

14. Morris PE, Goad A, Thompson C, Taylor K, Harry B, Passmore L, Ross A, Anderson L, Baker S, Sanchez M *et al*: **Early intensive care unit mobility therapy in the treatment of acute respiratory failure**. *Crit Care Med* 2008, **36**(8):2238-2243.

15. Dickinson S, Tschannen D, Shever LL: **Can the use of an early mobility program reduce the incidence of pressure ulcers in a surgical critical care unit?** *Crit Care Nurs Q* 2013, **36**(1):127-140.

16. Fowlow B, Price P, Fung T: **Ambulation after sheath removal: a comparison of 6 and 8 hours of bedrest after sheath removal in patients following a PTCA procedure**. *Heart Lung* 1995, **24**(1):28-37.

17. Hanekom S, Louw QA, Coetzee AR: **Implementation of a protocol facilitates evidence-based physiotherapy practice in intensive care units**. *Physiotherapy* 2013, **99**(2):139-145.