Consensus Statement:
ADULT Rapid Sequence Intubation and Post-Intubation Analgesia and Sedation for Major Trauma Patients

January 2025

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EVIDENCE CONSIDERED IN REACHING THE CONSENSUS STATEMENT:

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PREAMBLE:

This update builds on the work of previous author teams and incorporates the latest research and expert opinion. We would like to thank everyone involved in the production of past and the present versions of these documents for their hard work, diligence, and rigour in researching, writing, and producing these valuable resources.

This consensus statement summarizes recommendations for Rapid Sequence Intubation. Recommendations are based on current best practice and are adapted from medical literature. It is recognized that the geography, population, and availability of specialized services in New Brunswick provide a unique context to be considered in any overall recommendations for rapid sequence intubation.

SCOPE:

The statement outlines the preferred guidance for patients ≥ 16 years of age who require emergent airway stabilization:

- Emergency airway guidance
- Post intubation management

The consensus statement does not apply to pediatric patients less than 16 years of age. These cases will be evaluated on a case-by-case basis in consultation with the Trauma Control Physician (TCP) and consultants.

BACKGROUND:

1. Rapid Sequence Intubation (RSI) or Drug-Assisted Intubation (DAI) is a method to achieve airway control that involves the administration of sedative-hypnotic induction agent followed by a neuromuscular blocking agent when the patient's gag reflex is intact, to minimize the risk of aspiration of gastric contents during endotracheal intubation. It is the most frequently used approach for airway management in trauma.
2. The purpose of RSI is to affect a state of unconsciousness and neuromuscular blockade, allowing for increased first pass success of endotracheal intubation.
3. Planning for the possibility of intubation of the trauma patient is essential. This includes defining roles and assuring properly functioning airway equipment is organized, tested, and strategically placed to be easily accessible. A provincially standardized equipment layout is recommended to optimize the preparation for RSI (Appendix A)
4. Advanced Trauma Life Support (ATLS) principles will guide the initial assessment and resuscitation of the major trauma patient requiring RSI for airway control using the mnemonic ABCDE in a systemic approach.
5. A trauma patient may require airway management in a variety of circumstances. RSI should be considered for all trauma patients meeting any of the following:
   - ✓ GCS < 8, quickly deteriorating GCS or loss of airway protection
   - ✓ Facial trauma with poor airway control
   - ✓ Burns with suspected inhalation injury
   - ✓ Respiratory failure
   - ✓ Persistent hypoxia or uncompensated shock (reduction of respiratory efforts)
   - ✓ Agitation with possible injury to self or others

- ✓ Potential for eventual respiratory compromise
- ✓ Possible respiratory and/or neurological deterioration during transport

6. Hemodynamic instability and hypoxemia must be managed prior to RSI as the optimization of the patient's physiologic status is vital to mitigate or prevent post intubation hypotension.
7. The shock index can be utilised to help identify patients at risk for hypotension in the peri-intubation phase.
   - The Shock Index (SI) is a quick non-invasive measurement used to predict hemodynamic instability in trauma. SI is calculated by dividing the patient's heart rate by their systolic blood pressure. The normal range is between 0.5-0.7. SI above 0.8 suggests significant instability.
8. RSI Guidelines should include assessments to help identify the possibility of a difficult intubation. The modified LEON acronym is a recognized assessment tool to help predict a difficult intubation.

LEON
Look Externally
Evaluate (3-3-2 Rule)
Obstruction
Neck mobility

9. Successful intubation on the first attempt is crucial. It significantly reduces the risk of complications like hypoxia, cardiovascular instability, and airway trauma, which can arise from repeated attempts at placing an endotracheal tube, ultimately improving patient outcomes and considered a key quality metric in airway management. ≥3 intubation attempts have been proven to be associated with a multitude of complications.
10. Neuromuscular blocking agents do not have amnesic, sedative, or analgesic properties. Intubated trauma patients require post-intubation analgesia and sedation. Appropriately titrated infusions ensure adequate pain control, minimise agitation and cardiovascular compromise, and provide medically induced amnesia for major trauma patients.
11. The routine use of subjective scales for pain, agitation, and sedation promotes effective management of analgesia and sedation infusions, including patient-focused titration of medications to specific endpoints. Deeper levels of sedation will often be required in ED and during transport due to the stimulating environment. The following scales are recommended for use:
    - The Richmond Agitation Sedation Scale (RASS) establishes criteria for assessing arousal and agitation. The RASS score guides sedation therapy to better meet patients' titration needs; and improves communication regarding sedation and agitation among healthcare providers. A RASS of - 4 while in ED and during inter/intrafacility transfer is recommended. (Appendix F)
    - The critical-care pain observation tool (CPOT) has been demonstrated to be a valid and reliable behavioral scale for the assessment of pain in nonverbal ICU patients. The CPOT scale ranges from 0-8. A score of 0 is recommended. (Appendix F)
12. In support of the best and most current evidence-based practices for RSI the following provincially standardized documents are included as Appendices:
    - ✓ Appendix A - Equipment Layout Scheme
    - ✓ Appendix B - RSI Algorithm
    - ✓ Appendix C - Adult Pre-Intubation Checklist
    - ✓ Appendix D - Adult Post - Intubation checklist
    - ✓ Appendix E - Post Intubation Sedation and Analgesia Guidance
    - ✓ Appendix F - RASS and CPOT Scales

Contraindications:

- RSI should not be considered or applied for trauma patients who are in cardiac arrest or who are apneic.

Pre-Hospital Care

- Trauma patients in need of ventilatory support including those with moderate to severe respiratory distress or those with imminent loss of airway require transportation to the closest available Emergency Department, as per Field Trauma Triage Guidelines.
- Prehospital emergency airway management is a key moderating factor for patient survival and mortality rates.
- The providers scope of practice will dictate which device is selected for airway management.
- Ambulance New Brunswick should ensure consistency with the provincially standardized guidelines for RSI and Post-Intubation Sedation and Analgesia in procedures for Ambulance New Brunswick's Air Medical Crew and Advance Care Paramedics (ACP).

Special Patient Populations:

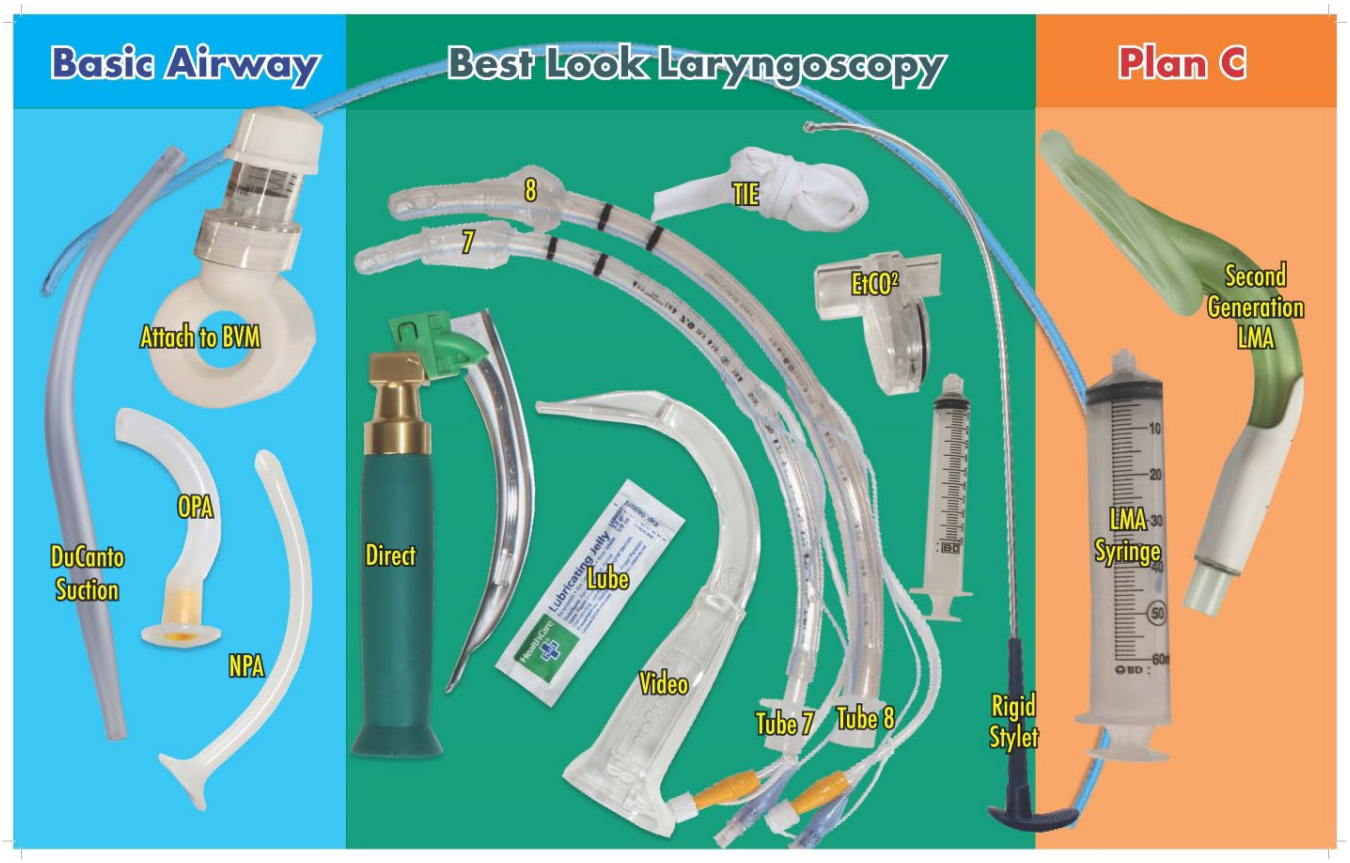
- **Pediatrics (age less than 16 years)**: These guidelines are written for the adult patient population. The skill to assess and manage the pediatric airway is essential. Correlating anatomic considerations with the need for escalating airway management is critical to optimize each child's outcome. Referencing pediatric specific guidance is recommended.
- **Geriatrics**: Age-related changes need to be considered during the assessment, treatment, and evaluation of care. Particular attention should be given to the resuscitation phase as the elderly have limited physiologic reserve necessary to respond to hypoxia and shock.
- **Patients with high Body Mass Index (BMI)**: Bag-valve mask (BVM) ventilation is more difficult as the soft tissue of the pharynx collapses under anesthesia or sedation. When spinal injury is not suspected, appropriate positioning (ramped position) improves the adequacy of mask ventilation therefore eases intubation. The redundant tissues in the upper airway make visualization of the glottis by direct laryngoscopy more difficult.
- **Pregnant patients:** For optimal outcome of mother and fetus, clinicians must assess and resuscitate the mother first. Management of the pregnant patient should be consistent with ATLS guidelines (e.g., patient positioning and consideration of potential difficult airway). Early consultation with an obstetrician is recommended.

GRADE Level of Evidence:

- Level B: recommendation
- Generally, clinicians should follow the recommendations but should remain alert to new information and be aware of contraindications.

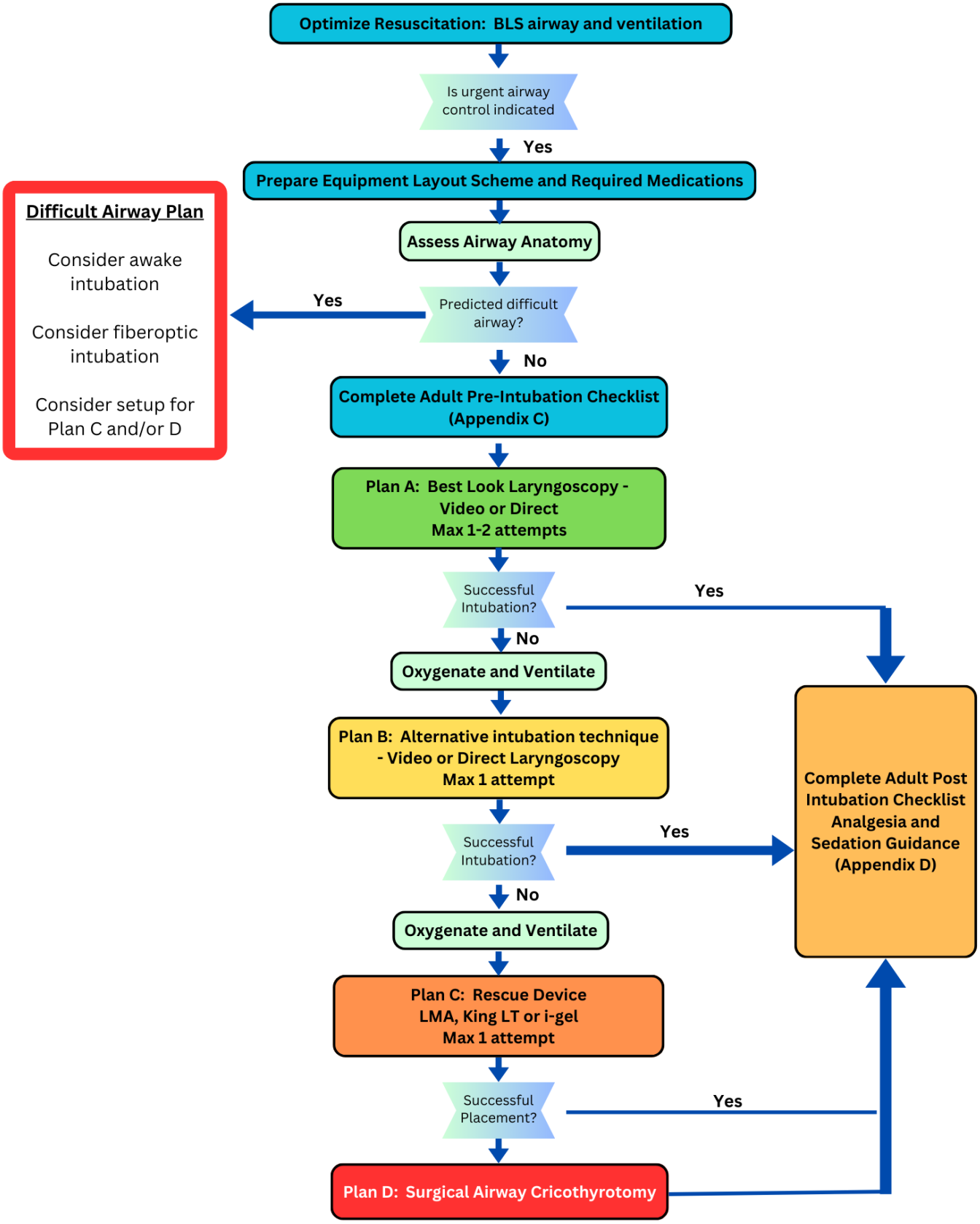
Appendix A: Equipment Layout Scheme

For the most current version, suitable for lamination and use in your facility, contact Trauma NB:
NBTrauma@HorizonNB.ca
(506) 648-8040



Appendix B: Rapid Sequence Intubation Algorithm

this is not an order sheet



The recommended approach for airway stabilization should be tailored to the clinical presentation

Appendix C: Adult Pre-Intubation Checklist

Complete RSI Checklist AFTER initial Primary Survey and Resuscitation	
1. **SpO2 probe, ECG** attached? **Blood pressure** on 3 min cycles?	
2. **What is the Pulse, Blood Pressure, Respiratory Rate, Oxygen Sats and GCS?**	
3. **Nasal Cannula at 15L, Bag Valve Mask at 30L** and **Peep valve at 5 cm**?	
4. **IV or IO Access** Working?	
5. **Hypotension YES/NO**? - **If Hemorrhagic shock start MTP.** - **If Septic shock start Norepinephrine infusion.**	
6. **Laryngeal Injury or Distortion?** ***Double Setup*** *better?*	
7. In non-trauma is there **Ear to Sternal Notch Alignment**?	
8. Why **RSI**? Give a summary to the team.	
9. **Bed height** at Intubator's navel?	
10. **Equipment silhouette** items present? **Waveform End Tidal CO2** connected?	
11. **Suction on** and Pre-positioned?	
12. What is **Plan A** for Best Look Laryngoscopy?	
13. What is **Plan B** for Alternative Intubation?	
14. What Size **LMA or i-gel® (Supraglottic device)** for **Plan C**?	
15. Is the **Surgical Cricothyrotomy** Kit in the Airway Cart?	
16. **C-Collar undone** with manual immobilization from below?	
17. Who is giving the **Drugs**?	
18. Signs of **Shock?** ***If YES halve the induction dose!***	
19. Patient **estimated or actual weight** in Kilos?	

20. **#1 – KETAMINE or ETOMIDATE DOSE?**			
	STABLE DOSE	SHOCKED DOSE	Dose?
KETAMINE	**2.0 mg/Kg**	**1.0 mg/Kg**	
ETOMIDATE	**0.3mg/Kg**	**0.15 mg/Kg**	

21. **#2 – ROCURONIUM or SUCCINYLCHOLINE DOSE?**			
	ADULTS	SHOCKED DOSE	Dose?
ROCURONIUM	**1.5 mg /Kg**	**1.5 mg /Kg**	
SUCCINYLCHOLINE	**1.5 mg/Kg**	**2.0 mg/Kg**	

22. **Give the Drugs NOW by rapid IV Push! SEDATIVE THEN PARALYSIS!** Start the clock	
23. **Wait for drugs to work! 45 secs for Succinylcholine & 60 secs for Rocuronium**	
24. **Bag the patient if the O2 Sat drop below 95%**	

Appendix D – Adult Post Intubation Checklist

Complete this checklist after securing the airway with a definitive airway device

1. **ETT placement confirmed?**	
2. **ETT secured? Size and depth of tube documented?**	
3. **ETCO2 continuous monitoring initiated?**	
4. **Gastric tube inserted?**	
5. **Portable chest x-ray completed and reviewed by MD?**	
6. **HOB at 30 degrees?** *(if not contraindicated)*	
7. **Consider VBG or ABG, titrate ventilator settings accordingly and document**	
8. **For ongoing manual ventilation with BVM, consider adding a PEEP valve set at 5 cm H2O**	
9. **Trend and document vital signs including Neuro assessment, ETCO2, CPOT and RASS**	
10. **Identified Blood Pressure targets?** *For suspected TBI : MAP > 80 mmHg or systolic BP ≥ 110 mmHg*	
11. **Hypotension?** *If bleeding ruled out, consider dose pressors Phenylephrine 50-200 mcg every 1-2 min prn*	
12. **Initiate Analgesia and Sedation infusions? See Appendix E** *Titrate to target RASS or CPOT score*	
13. **Wrists restraints applied?**	

Written admission or Transfer orders?

Consider Team debrief?
What went well?
What are the opportunities?

Appendix E – Post Intubation Analgesia and Sedation Guidance

This is not an order sheet. Obtain written orders

Goal in Emergency Phase of Care and During Interfacility Transfer:
RASS -4 and CPOT 0

See corresponding scales Appendix F

Post Intubation Analgesia and Sedation IV Infusions This is not an order sheet - written orders are required		
Analgesia 1	**INFUSION dose**	**BOLUS dose (if required)**
Fentanyl	25-200 mcg/hr (1-2 mcg/kg/hr)	25 to 100 mcg every 15 mins prn
titration	By 25-50 mcg/hr every 30 mins	-----
Sedation 2 **Choose one**	**INFUSION dose** ***Usual starting dose***	**BOLUS dose (if required)**
Ketamine (+analgesic properties)	0.05 to 1.2 mg/kr/hr *0.2 to 1 mg/kg/hr	0.5 mg/kg every 5-15 mins prn
titration	By 0.2 mg/kg/hr every 15 mins	-----
Midazolam	1 to 7 mg/hr	1 to 2 mg every 2 mins prn
titration	By 1 mg/hr every 15 mins	-----
Propofol	5 to 50 mcg/kg/min *20-30 mcg/kg/min	10-20 mg prn; frequency as directed by physician
titration	By 5-10 mcg/kg/min every 5-10 mins	-----

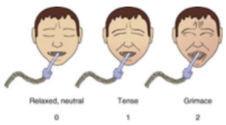
If 3 bolus doses are required in a 30-minute period to maintain target RASS or CPOT,
Consider titrating the infusion
Consider giving a bolus dose prior to moving the patient

Critical Guidance	Clinical Guidance
Refer to local policy for guidance on propofol infusion age restrictions Call sending physician if: • Patient becomes acutely agitated or presents a safety concern • Patient becomes hypotensive, hold sedation (continue analgesia)	Refer to local policy for minimum and maximum infusion dosage limits • Regularly repeated ABCDE assessments are recommended. • Vital signs are recommended prior to the administration of all medications

Richmond Agitation-Sedation Scale

	Target RASS Value	RASS Description
+4	Combative	Combative, violent, immediate danger to staff
+3	Very Agitated	Pulls or removes tube(s) or catheter(s); aggressive
+2	Agitated	Frequent non-purposeful movement, fights ventilator
+1	Restless	Anxious, apprehensive but movements are not aggressive or vigorous
0	Alert and Calm	
-1	Drowsy	Not fully alert, but has sustained awakening to voice (eye opening & contact **greater** than 10 seconds)
-2	Light Sedation	Briefly awakens to voice (eye opening & contact **less** than 10 seconds)
-3	Moderate Sedation	Movements or eye opening to voice (but **NO** eye contact)
-4	Deep Sedation	No response to voice, but has movement or eye opening to physical stimulation
-5	Unarousable	No response to voice or physical stimulation

Critical Care Pain Observation Tool (CPOT)

INDICATOR	SCORE		DESCRIPTION
Facial expression	Relaxed, neutral	0	No muscle tension observed
	Tense	1	Frowning, brow lowering, orbit tightening, and levator contraction or any other change (e.g., opening eyes or tearing during nociceptive procedures)
	Grimacing	2	All previous facial movements plus eyelids tightly closed (the patient may present with mouth open or biting the endotracheal tube)
Body movements	Absence of movements or normal position	0	Does not move at all (does not necessarily mean absence of pain) or normal position (movements not aimed toward the pain site or not made for the purpose of protection)
	Protection	1	Slow, cautious movements, touching or rubbing the pain site, seeking attention through movements
	Restlessness	2	Pulling the tube, attempting to sit up, moving limbs or thrashing, not following commands, striking at staff, trying to climb out of bed
Compliance with the ventilator (mechanically ventilated patients)	Tolerating ventilator or movement	0	Alarms not activated, easy ventilation
	Coughing but tolerating	1	Coughing, alarms may be activated but stop spontaneously
	Fighting ventilator	2	Asynchrony; blocking ventilation, alarms frequently activated
or			
Vocalization (nonventilated patients)	Talking in normal tone or no sound	0	Talking in normal tone or no sound
	Sighing, moaning	1	Sighing, moaning
	Crying out, sobbing	2	Crying out, sobbing
Muscle tension	Relaxed	0	No resistance to passive movements
Evaluation by passive flexion and extension of upper limbs when patient is at rest or evaluation when patient is being turned	Tense, rigid	1	Resistance to passive movements
	Very tense or rigid	2	Strong resistance to passive movements, incapacity to complete them
TOTAL		0-8	