



Evidence-based Updates on COVID-19

Special Topics: Early Proning & Effective Communication with Mechanically
Ventilated Patients

Cindy Zellefrow DNP MSED RN LSN PHNA-BC EBP-C

Kimberly Ichrist MSN AG-ACNP CCRN

Sheena Palmer MSN APRN-FNP-C

Laura Weigel Moore BSN RN

Christa Zellefrow BSN RN

Cindy Beckett PhD RNC-OB LCCE LSS-BB CHRC EBP-C

Mary Beth Happ, PhD, RN, FAAN

Judith A. Tate, PhD, RN

The Ohio State University



COVID-19 Special Topics for Today

- 1) Early Proning
(Presenters: Cindy Zellefrow & Cindy Beckett)
- 2) Effective Communication with Mechanically Ventilated Patients
(Presenters: Mary Beth Happ & Judith Tate)



Early Proning in COVID-19 Patients

Cindy Zellefrow
Cindy Beckett



COVID-19: The State of the State

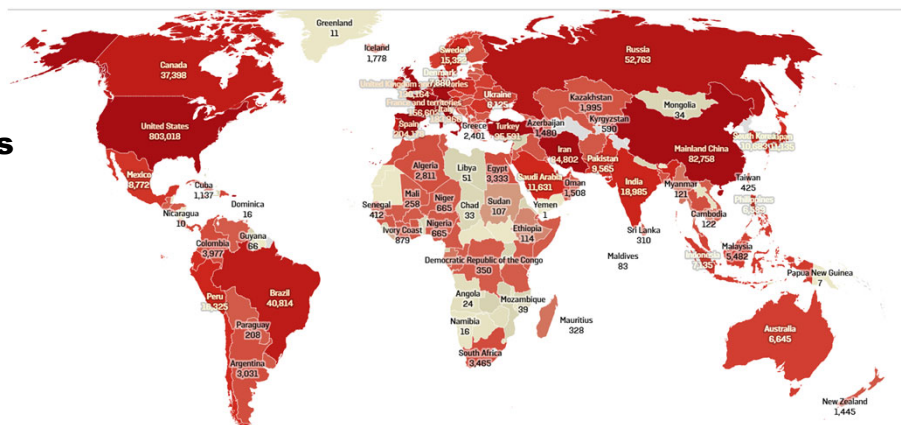
AS OF 4/20/20:

**WORLDWIDE:
2,258,909 Cases**

154,388 deaths

**In the U.S.:
792,938 cases**

39,083 deaths





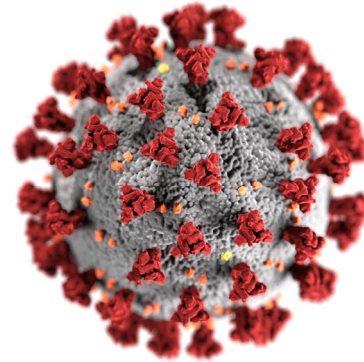
The Pathophysiology of COVID-19

- Symptoms of COVID-19 are nonspecific

- Fever (82%)
- Cough (61%)
- Muscle aches (36%)
- Fatigue (36%)
- Dyspnea (26%)

Other symptoms include:

- Headache
- Sore Throat
- Gastrointestinal symptoms



On CT scan—unique ground-glass opacities, septal thickening and parenchymal consolidation = challenges in medical management similar to that of patients with ACUTE RESPIRATORY DISTRESS SYNDROME (ARDS)

Borges de Nascimento et al., 2020



Berlin Definition of Acute Respiratory Distress Syndrome (ARDS)

Typical Characteristics:

- Timing—within 1 week of injury or new/worsening respiratory symptoms
- Chest Imaging— bilateral opacities; **unique to COVID 19 are glass-like crystallizations**
- Origin of edema—respiratory failure not fully explained by cardiac failure or fluid overload
- Oxygenation—delineated by **PaO₂/FiO₂ (P/F) ratio** with PEEP or CPAP

PaO₂-partial pressure of oxygen=measurement of oxygen pressure in arterial blood

FiO₂-fraction of inspired oxygen of room air; concentration of O₂ that a person inhales

- **Mild:** 200-300 mmHg with > 5cm H₂O
- **Moderate:** 100-200 mmHg with > 5cm H₂O
- **Severe:** <100 mmHg with >5cm H₂O



Early proning is the talk of the town

CORONAVIRUS

'Such a simple thing to do': Why positioning COVID-19 patients on their stomachs can save lives

by: CNNwire

Posted: Apr 14, 2020 / 08:32 AM EDT / Updated: Apr 14, 2020

This Photo by Unknown author is licensed under CC BY-SA/NC

Worst COVID-19 Patients May Want to Lie Facedown

Per a research letter out of Wuhan, China

By **Newsweek Editors**, Newsweek Staff
Posted Mar 25, 2020 11:30 AM CDT

COVID-19 Update: Lying In This Position Can Improve Breathing In Severe Coronavirus Patients

By **Dr. Divya Ramesh**
Posted Mar 25, 2020 11:30 AM CDT

Science | Health



Report: Positioning coronavirus patients on their stomachs can save lives

"By putting them on their stomachs, we're opening their lungs that weren't open before," says one expert.



Proning: Definitions

Proning: placing a patient, esp. one with respiratory failure due to ARDS, face down in a prone position
(Venes, D. & Tabers, C.W., 2017)

Early proning (also referred to as **self proning** or **awake proning** in the literature):

- non-mechanically ventilated patients
- patients able to participate in proning
- implemented as soon as a potential diagnosis is made

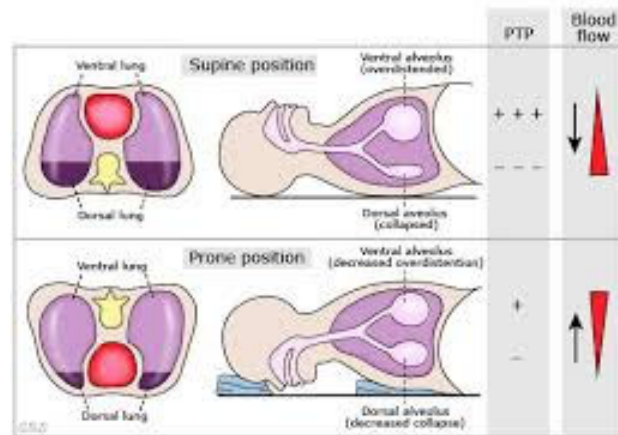




The Physiology of Proning

Proning:

- Changes pressure within the chest and abdominal cavities by changing the way structures and organs lie within these cavities
- Increases air flow, allowing compressed alveoli to open up
- Improves fluid drainage out of the dorsal lobes
- Increases perfusion to the lungs
- Improves oxygenation



In Juangsu Province, China, survival rates were better than other locations due to early recognition, followed by...

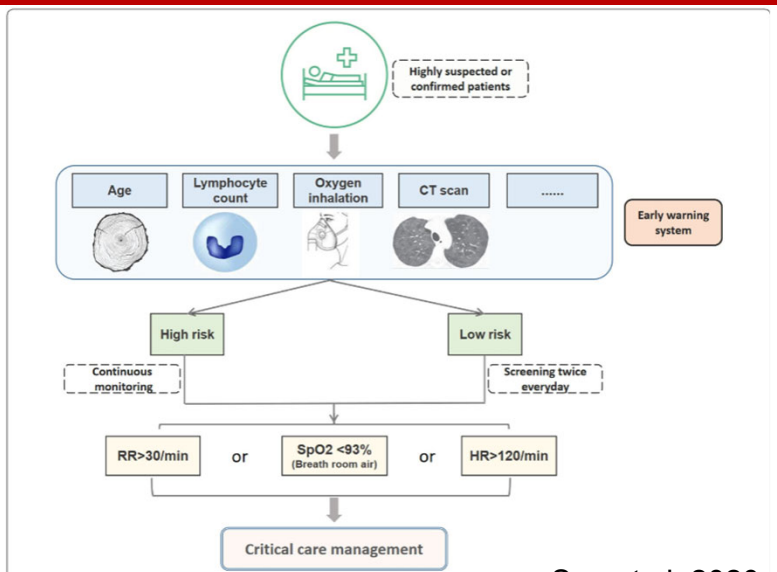


Fig. 1 Early warning system and screening procedures for NCP patients

Sun et al. 2020



...early
intervention for
critical patients
with COVID-19!

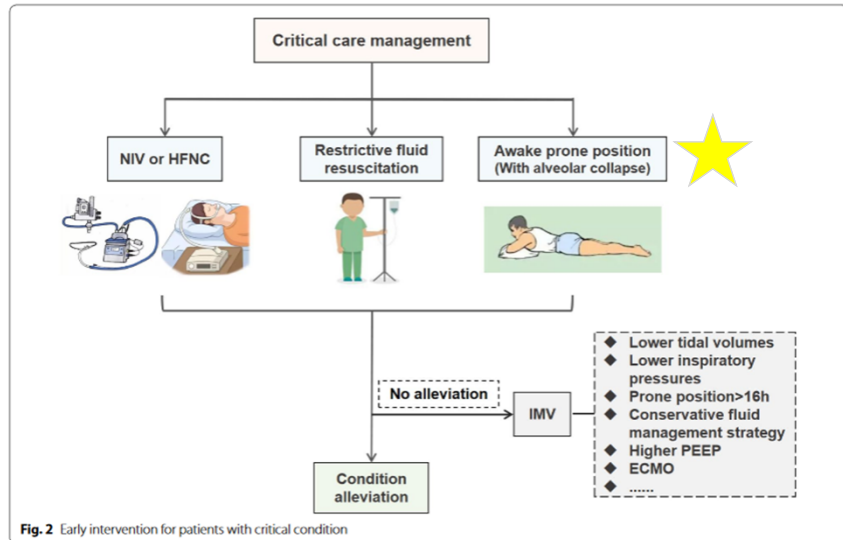


Fig. 2 Early intervention for patients with critical condition

Sun et al. 2020



Search Strategy & Results

Databases searched: CINAHL, PubMed, Medline, Medline Plus Full Text, Scopus, Trip Database, Cochrane Library, Google Scholar, Web of Science

Additional search strategies: Gray literature, title search

Search techniques utilized: key words, MeSH headings, Subject headings, truncation, parentheses, quotation marks

Boolean Operators: AND & OR

Results: 98 articles reviewed

- 7 "keepers"
- Additional 13 kept for background information including nursing consideration





Levels of Evidence Table

- Level I: 1
- Level IV: 3
- Level VI: 1
- Level VII: 2

★ = COVID-19 article

	Marini, et al. 2016	Scaravilli et al 2015	Tullenken et al	Valter et al, 2003	Suzuki et al 2008	Sun et al 2020★	Ding, L. 2020
Level 1: Systematic Review of all RCTs	X						
Level 2: Single RCT							
Level 3: controlled trials without randomization							
Level 4: Cohort or Case Controlled studies		X				X	X
Level 5: Systematic Review of Descriptive studies or Qualitative studies with or without meta-synthesis							
Level 6: Single descriptive or qualitative study, Literature Review, Clinical Practice Guideline, EBP or Quality Improvement Project					X		
Level 7: Expert Opinion			X	X			



Outcomes Synthesis Table of Early Proning

Legend:

★ = COVID-19 article

↑ = increase

↓ = decrease

*green indicates good outcome

	Marini, et al. 2016	Scaravilli et al 2015	Tullenken et al	Valter et al, 2003	Suzuki et al 2008	Sun et al 2020★	Ding, L. 2020
Pulmonary perfusion					↑		
SpO2						↑	
PaO2		↑	↑	↑			↑
PaCO2			↓	↓			
Alveolar-arterial oxygen difference			↓	↓			
Need for mechanical ventilation		↓	↓	↓		↓	↓
Lung consolidation (upon chest radiograph)			↓				
Pulmonary heterogeneity						↑	
Pao2/Fio2 ratio	↑	↑					↑
Hb02		↑					



Synthesis Table on Indications for Early Proning

	Article 1: Marini, et al. 2016 (SR, n=6)	Article 2: Scaravilli et al 2015	Article 3: Valter et al, 2003	Article 4: Sun et al 2020	Article 5: Ding, L. 2020	Article 6: Weig et al	Article 12: DynamicHealth ; non-critical pts. (2020)	Article 13: DynamicHealth ; critical pts.(2020)	Article 14: Obaidan, A., et al 2018	Article 15: Gordon A. L., 2019
Respiratory rate >30/min			X	X						
Heart rate >120/min				X						
SpO2 <93 % on rm air				X						
FiO2 > or equal to 0.6			X						X	
PaO2/FiO2 <200 (moderate ARDS)	X								X	X
PaO2/FiO2 <300 mmHg (mild ARDS)		X				X				
Alveolar collapse				X						
ARDS requiring elevated plateau pressure (nonspecific)							X	X		



Indications for Early Proning

- Respiratory Rate >30/min
- Heart Rate >120/min
- SPO2 < 93% on room air
- FiO2 > or equal to 0.6
- PaO2/FiO2 < 300 mmHg (mild ARDS)
- PaO2/FiO2 < 200 mmHg (moderate ARDS)
- Alveolar collapse—seen on radiography





Contraindications for Early Proning

	Article 3: Miller et al., 2003	Article 4: Sun et al., 2010	Article 5: Schub S, Fleiger, 2007	Article 6: Kernowski et al (2018)	Article 7: Lefkovic Custer 2017	Article 10: Lefkovic et al. (2017)	Article 11: McIntyre et al. (2017)	Article 12: Dymov/Novak monograph 2018	Article 13: Dymov/Novak et al (2018)	Article 14: Chaitan, A, et al 2018	Article 15: Gordon et al., 2019
Recent intra-abdominal pressure	X		X	X							
Recent abdominal surgery/open abdominal wounds	X		X	X	X	X		X	X		X
Intestinal ischemia	X					X					
Large abdomen											
Pregnancy			X	X	X	X	X	X	X	X	X
Hemodynamic instability	X	X	X	X	X	X	X	X	X	X	X
Recent cardiac (pericardial) tamponade										X	
Unstable angina								X	X		
Recent myocardial infarction				X				X	X		
DVT treated for less than 2 days										X	X
Abnormal hemostasis											X
Recent hemorrhage								X	X		X
Recent thrombocytopenia						X	X	X	X		X
Recent stroke						X	X	X	X		X
Recent spinal cord procedures (surgery)			X		X	X	X	X	X	X	X
Recent spinal cord procedures (epidural)			X		X	X	X	X	X	X	X
Recent intracranial pressure	X		X	X	X	X	X			X	X
Burns or open wounds on ventral torso	X										X
Multiple fractures				X	X	X					X
Unstable fractures	X						X	X	X	X	X
Recent fractures	X			X	X	X					X
Major/fatal fractures and/or surgery	X		X	X	X	X	X	X	X	X	X
Spinal cord injury											X
Flail chest											X
Recent tracheal surgery or intubation							X			X	X
Recent thoracic or abdominal drains											X
Use of non-rebreather ventilation, nitric oxide, or albuterol bronchodilation											X
High dependency on airway and vascular access					X						X
Weight >135 kg (298); < 40 kg (88 lbs.);			X			X		X	X	X	X
Height >198 cm (6ft. 6in.)								X	X		X



Contraindications for Early Proning

- Abdominal
- Cardiac
- Bleeding
- Neuro
- Trauma
- Increased intraocular pressure or ocular surgery
- Drainage tubes (chest tubes with anterior leaks; thoracic or abdominal)
- Tracheal surgery or sternotomy
- Asthma
- High dependency on airway and vascular access
- Weight: >135 kg (298); < 40 kg (88 lbs.);
- Height >198 cm (6ft. 6in.)

Synthesis Tables on Clinician Considerations

- Patient Positioning
- Length of time and frequency of proning
- Patient Monitoring
- Resources needed
- Potential complications

Potential Complications of Proning Synthesis Table										Resources Required for Prone Position Synthesis Table					
	Article 1: Maitani et al. (2018) (n=10)	Article 2: Sawicki et al. (2015) (n=10)	Article 3: Valle et al. (2015) (n=10)	Article 4: Schmitt et al. (2015) (n=10)	Article 5: Maitani et al. (2018) (n=10)	Article 6: Maitani et al. (2018) (n=10)	Article 7: Maitani et al. (2018) (n=10)	Article 8: Maitani et al. (2018) (n=10)	Article 9: Maitani et al. (2018) (n=10)	Article 10: Maitani et al. (2018) (n=10)	Article 11: Maitani et al. (2018) (n=10)	Article 12: Maitani et al. (2018) (n=10)	Article 13: Maitani et al. (2018) (n=10)	Article 14: Maitani et al. (2018) (n=10)	Article 15: Maitani et al. (2018) (n=10)
Pressure Ulcers	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Facial, orbital and ocular edema	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Accidental dislodgement of invasive tubes/lines (i.e. N2, nasogastric monitoring lines, endotracheal catheter, NG tube, etc.)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Inadvertent binding of tubes	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Upper limbs alongside body	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Respiratory	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Eye injury/corneal abrasion	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Respiratory	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Pressure Necroses	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Pressure Necroses	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Foot Drop	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Hypertension of shoulder	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Asymptomatic	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Wound dehiscence	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Nerve injury to arm	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Aspiration	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Cardiovascular instability	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Hemodynamic instability	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Prone Length of Time/Frequency Synthesis Table			
	Article 1: Maitani et al. (2018) (n=10)	Article 2: Sawicki et al. (2015) (n=10)	Article 3: Valle et al. (2015) (n=10)
Ave. Length of time in prone position	2 hrs	3 hrs	2.5hrs (ave 3.75)

Patient Monitoring While in Prone Position Synthesis Table									
	Article 1: Maitani et al. (2018) (n=10)	Article 2: Sawicki et al. (2015) (n=10)	Article 3: Valle et al. (2015) (n=10)	Article 4: Schmitt et al. (2015) (n=10)	Article 5: Maitani et al. (2018) (n=10)	Article 6: Maitani et al. (2018) (n=10)	Article 7: Maitani et al. (2018) (n=10)	Article 8: Maitani et al. (2018) (n=10)	Article 9: Maitani et al. (2018) (n=10)
Heart rate	X	X	X	X	X	X	X	X	X
Blood pressure	X	X	X	X	X	X	X	X	X
Central Venous Pressure	X	X	X	X	X	X	X	X	X
Respiratory Effort and effort	X	X	X	X	X	X	X	X	X
Capnography	X	X	X	X	X	X	X	X	X
Pulse ox	X	X	X	X	X	X	X	X	X
Oxygen setting	X	X	X	X	X	X	X	X	X
PaO2/FiO2	X	X	X	X	X	X	X	X	X
Agitation	X	X	X	X	X	X	X	X	X
Vasoconstrictors	X	X	X	X	X	X	X	X	X

Patient positioning Clinician Considerations

- Alternating swimmers position q 2 hrs. (1 arm up; 2nd arm alongside body)
- Upper limbs alongside body
- Alternate position of head q 2 hrs. from facing right to facing left

Length of time proning 2-5 hours each session as tolerated

Frequency of proning; average twice daily but as much as tolerated by patient

Patient monitoring

- Heart rate; blood pressure; respiratory rate & effort; capnography; pulse oximetry; oxygen setting; PaO2/FiO2; agitation, central venous pressure (CVP) (if applicable);

Resources

- PPE; foot board; pain meds; extra EKG leads; minimum of 2 staff members; suction; additional pillows, sheets, towels and/or blankets; foam/foam dressings; turning/support frame (i.e. Vollman Prone Positioner)



Clinician Considerations- Complications (continued)

- Pressure ulcers
- Facial, orbital and ocular edema
- Accidental dislodgement or kinking of tubes or drains
- Aspiration
- Eye injury/corneal ulceration; Unilateral blindness; Retinal ischemia
- Nerve damage (pressure neuropathies, hyperextension of the shoulder, nerve injury to arm)
- Wound dehiscence
- Cardiovascular instability, arrhythmia
- Hemodynamic instability



Key points to leave you with...

- Oxygenation has been a difficult issue to manage in COVID 19 patients
- Research supports proning changes the natural mechanics of ventilating the lungs and improves oxygenation
- Literature supports early proning as an **easily implemented, cost effective** intervention that **shows promise of improving** outcomes for patients with COVID-19
- Early proning requires staff, patient and family education
- Patients who are early proning must be monitored for changes in condition and potential complications
- More research needs to be done around early proning



Evidence-based Recommendations

- **Implement early proning** as soon as a potential COVID-19 case is identified
- **Train** clinicians, patients and families on early proning:
 - How to prone (human and supply resources needed, proper positioning)
 - How often (at least twice a day but more if tolerated by patient,
 - How long (minimum of 30 minutes but average 2-5 hrs./day or more as tolerated)
 - Monitoring of patients
 - Potential complications
- **Document** details of proning and monitoring in detail
- **Engage QI department** to support tracking and trending outcomes data
- **Engage researchers** to conduct research on early proning



- *Let the evidence guide your journey,*
- *Engage quality improvement,*
- *Engage research*

It's not necessarily the amount of time you spend at practice that counts; it's what you put into the practice.

Eric Lindros



Evidence-based Techniques for Effective Communication with Mechanically Ventilated Patients

Mary Beth Happ
Judith Tate



- Communication impairment is a common, frightening condition of mechanical ventilation
- PPE masks are communication barriers
- Families are not present
- Misinterpretation (ex: pants vs. pain) can be dangerous





Common Myths:

- One size fits all
- I'm a good lip reader
- I know the 5 things my patient needs to say
- Family members can interpret
- My patient can't use a communication tool






- ✓ Communication Assessment and Intervention Framework – use as clinical decision guide
- ✓ Provide support for patient comprehension
- ✓ Use communication tools and techniques – download and print
- ✓ View training or demonstration videos
- ✓ Consult the experts – Speech Language Pathologists (SLP) to help

Happ, MB et al. *Heart Lung*, 2014; 43(2), 89-98; Happ, MB et al. *Heart Lung*, 2015; 44(5), 408-415; ten Hoorn, S. *Crit Care*, 2016; 20(1), 333; Radtke JV et al. *J of Pall Care Med* 2011; 14(6):791-5

SPEACS-2 Communication Assessment and Intervention

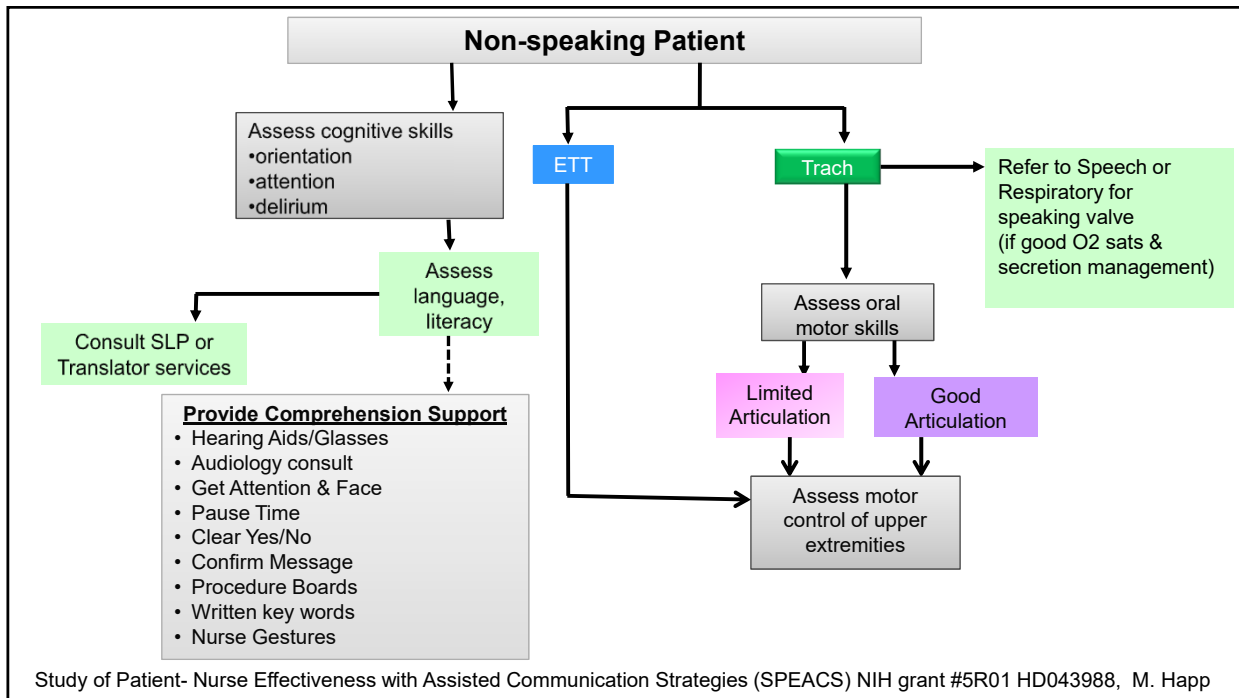
PATIENT ASSESSMENT IS A KEY FIRST STEP



<http://go.osu.edu/speacs>

*Consult Speech Language Pathologist (SLP) for complex strategies or if selected strategies are unsuccessful.

©Garr, Happ, Tate 2006 (Revised 10/07/2009) SPEACS-2; Happ Revised 01/20/2010; University of Pittsburgh School of Nursing; SPEACS: Study of Patient-Nurse Effectiveness with Assisted Communication. Funded by NIH/NICHD grant # R01 HD04988 Improving Communication with Non-speaking ICU Patient.



1. Get the patient's attention - lock eyes



Courtesy of Robert Wood Johnson Foundation



2. Vision and Hearing Aids

- Keep glasses and hearing aids or amplifier at bedside
- Label glasses (case) as “distance” or “reading”
- Hearing aid batteries
- Use LARGE Print



3. Establish a consistent YES / NO

- **Head nods**
- **Eyes up** for YES, **scrunch eyes** for NO
Thumbs up for YES, **thumb in fist** for NO
- Use **tagged** yes/no questions to improve comprehension

Pass it on.... Post a Communication Care Plan



4. Use Visual Cues

- Point and gesture deliberately as you talk
- Write key words or pictures

- YOUR OXYGEN IS LOW
- WE WILL TURN YOU ON YOUR STOMACH
- I WILL GIVE YOU MEDICINE FIRST



Connolly, MA. *Perspect Respir Nurs* 1995; 6 (4): 7-9.



5. Written Choice Strategy

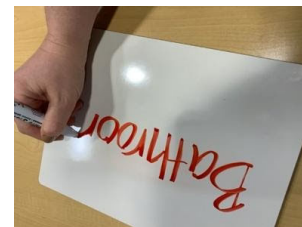
(Garrett & Beukelman, 1995)

“**What** music would you like to listen to?”

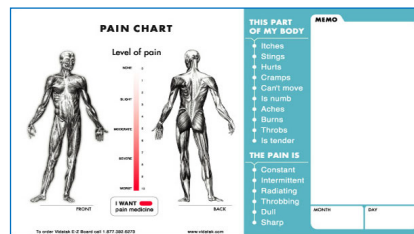
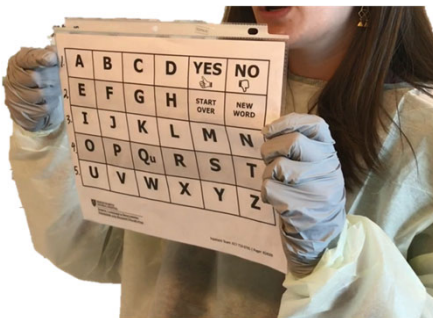
- Jazz
- Rock
- Classical
- Other

6. Writing Tips

- Use thin – medium point felt-tip pens
- Try simple **orthotic aids- pen grips**
- Notebooks, Clipboards
- Coach patients to point to previously used phrases
- White boards – dry erase markers
- Finger writing on touch pad



7. Communication Boards



+ Language Translations

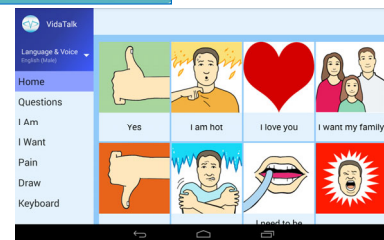
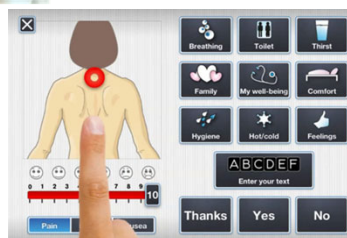


Photo courtesy of Vidatak, LLC

Electronic Tablets

Society of Critical Care Medicine

The screenshot shows the website www.patientprovidercommunication.org with the following content:

- Header:** "communication" logo, date "Wednesday, April 22, 2020", and website URL.
- Main Content:** A red banner with the text "FREE communication tools for patients with COVID-19" and "Download, print, & use! + more FREE resources". Below the banner is a grid of icons representing various communication tools.
- Navigation:** A sidebar on the left with links for "COVID-19", "About PPC", "Communication Tools", "Case Examples", "Medical Encounter Materials", "Useful Information", "Presentations", "Annotated Bibliography", "Participants", and "Contact Us".
- Footer:** "© Copyright 2009-2020 Patient Provider Communication. All Rights Reserved. | Professional Web Site Design by SunStar Media."

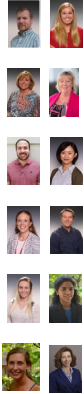
To the right of the screenshot is a large QR code and the URL <https://www.patientprovidercommunication.org/>.

THE OHIO STATE UNIVERSITY
COLLEGE OF NURSING

Helene Fuld Health Trust National Institute for Evidence-based Practice in Nursing and Healthcare

Patient Provider Communication Forum COVID19 Task Force

Tami Altschuler, MA, CCC-SLP, NYU Langone Medical Center
 Sarah Gendreau, MS CCC-SLP, Massachusetts General Hospital
 Jessica Gormley, Ph.D., CCC-SLP, University of Nebraska Medical Center
 Mary Beth Happ, PhD, RN, FAAN, The Ohio State University College of Nursing
 Richard Hurtig, PhD, The University of Iowa Chief Scientific Officer, Voxello
 Sarah Marshall, MA, CCC-SLP, University of Wisconsin-Madison
 Rachel Santiago, MS, CCC-SLP, Boston Children's Hospital
 Stephanie Scibilia, MS CCC-SLP, Massachusetts General Hospital
 Judith A. Tate, PhD, RN, The Ohio State University College of Nursing
 Rachel Toran Towbin, MS CCC-SLP, Massachusetts General Hospital
 Sarah Blackstone, PhD, CCC-SLP
 Harvey Pressman, PhD



We believe that evidence is an especially powerful tool in a time like this. We hope that putting these evidence-based resources into your hands will help you make the best decisions possible while caring for COVID-19 patients and families.



Helene Fuld Health Trust National Institute for
Evidence-based Practice in Nursing and Healthcare



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