

Use of Awake Prone Positioning on COVID-19 Patients A Bridge Review on the Evidence (June 2020-September 2021)

Clinical Question: For adults hospitalized with COVID-19 who need supplemental oxygen via nasal cannula or mask, what is the quantity, quality, and consistency of the evidence for the use of awake prone positioning (PP) and the structures, processes, and outcomes for implementation?

Conclusions/Key Summary of the Evidence: Evidence from this review identified various positive outcome measurements for awake prone patients which include improved ROX index measuring (SPO₂/FiO₂/respiratory rate or separately)^{2,4} and demonstrated an improvement of SpO₂ and/or FiO₂ during and post proning.^{2,3,4,9,10} There is consistent evidence that the use of awake prone positioning on non-intubated COVID-19 patients is feasible^{1,2,3} and requires minimal assistance⁵, suggesting the potential use of PP to improve oxygenation and reduce respiratory effort for mild and discharged COVID-19 patients to be completed independently.⁷ There is emerging evidence that there is an effect on the need for intubation⁴; however mortality may not be effected.⁴ Therefore, more prospective RCTs are needed to determine the efficacy of proning in mild to moderate acute COVID-19 respiratory distress syndrome (ARDS)^{2,3} and need for intubation.^{1,9} Authors reported the benefits of awake proning were limited to mild to moderate COVID-19 ARDS with supplemental oxygen via nasal cannula or mask^{2,3} or a subset of patients with COVID-19¹⁻⁴ and not generalizable outside the study population.¹ There is some conflicting evidence in adverse and/or safety outcome reporting that include: skin breakdown, vomiting, central line dislodgement, and cardiac arrest while proning⁴ and desaturations/coughing during proning.¹⁰ Other authors cited no adverse outcomes^{2,3}, which may reflect variation in adverse event and safety definitions, in addition to a lack of reporting whether rare versus common events. **The overall quality of the evidence is low to moderate** due to the lack of prospective and RCT studies, but there is consistent evidence from this bridge review that highlights more detailed implementation strategies^{1,6} and how to actualize daily and improve evidenced based use of awake PP on COVID-19 patients.^{3,5,6,7,9,10} (See Table 1).

Other key highlights of the evidence include:

- The **role of the registered nurse** at all levels is prominent and cited in multiple articles,^{1,2,5-10} thus, clinical and wound ostomy care nurse specialists knowledgeable about prone positioning can influence at risk skin assessment safety considerations and can offload bony prominences^{1,3,5,10}
- Documentation of start and stop times³ are pivotal structures to awake PP, in addition to monitoring parameters, and timing/scheduling recommendations^{1,5,6,10}
- The evidence appears to highlight the essential need of trained, dedicated staff, or prone team consisting of interprofessional team approach, good communication, routine huddles, emails, and poster^{5,6,10} and development of a standardized patient education material on self-positioning guide⁷ can serve as a blueprint for other institutions to promote PP on non-intubated COVID-19 patients.
- The implementation of PP guidelines with suspected, alert, COVID-19 patients can be accomplished quickly^{1,9} with the use protocols and risk/benefits lens for appropriately selected patients^{6,7} (See reference #7 which provides a prone algorithm).

There are several limitations to this review beyond the fact that clinical trials are still on-going, and evidence will be emerging. Several implementation articles reported that outcomes were not evaluated^{1,6}. Other limitations include small sample size³ and lack of control groups.^{3,5} Variation in type of proning (face down or lateral) may have affected results³, and guidelines were built upon limited case reports, small prospective and retrospective case series with heterogenous aspects in the design.⁵

Background/History: The emergence of the COVID-19 pandemic overwhelmed many elements of healthcare and posed unprecedented challenges to manage deteriorating patients.^{2,3} Hospitals rapidly looked at ways to improve oxygenation and strategies in the use of prone positioning on awake non-ventilated as alternative methods of respiratory support for COVID-19 patients.^{1,3,5,6,9,10} While the vast majority of data on proning comes from mechanically ventilated ARDS patient population, there have been reports of proning in non-intubated patients.^{1,3,10} Prone positioning (PP) is a technique, which involves placing a patient prone (face down)^{1,3} and is thought to have various physiological effects including improving the ability for more homogenous oxygenation of the severely injured lungs.^{1,3,9} During the months of March through April 2020, the population of patients diagnosed with COVID-19 steadily grew.¹ Thus, **the evidence from this review is based on patient data from those dates through August 2020**^{1,2,3,4,9,10}, and one study that conducted a multi-site RCT collected their data until January 2021⁴. This is a follow up bridge review of the limited evidence available at the time of the original prone review¹², thus reflects the latest evidence from June 2020 through September 2021 within this evolving clinical topic and practice.

Recommendations/Future Research: The application of PP on awake, non-intubated COVID-19 patients as a potential alternative demonstrates improvement in patients' SpO₂ levels^{2,3,4,9,10} and can be easily done with minimal assistance.⁵ The emerging and evolving evidence is promising as there are on-going trials that when completed, will inform future recommendations¹² on this clinical topic. There are additional recommendations and future studies for the interprofessional clinicians as they face questions and options involving this at-risk patient population:

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- More awake PP studies that measure outcomes in the following areas: need for intubation^{1,9}, duration of intubation^{1,9,10}, length of stay in ICU and at hospital¹, survival rate^{1,9}, variations in FiO₂ and positive pressure², proning in mild to moderate ARDS in RCTs^{2,3}, duration of PP², and mortality¹⁰
- There is also an opportunity for qualitative research to gather perspectives of both healthcare providers and patients on the experience of this practice change.⁵
- Evaluation studies on PP of mild to moderate COVID-19 respiratory involvement to mitigate disease progression.⁷

Search Results: The population examined in this review was restricted to hospitalized awake/conscious adult patients with COVID-19 pneumonia in PP and receiving supplemental oxygen via nasal cannula or mask in the acute care setting. This bridge review examines the emerging and evolving evidence that were highlighted as recommendations in the original PP review.¹¹ A total of 12 articles with contextual links were found that pertained to the area of clinical inquiry. The final evidence consisted of one high quality level (multi-site RCTs⁴), four moderate quality level of evidence consisting of (three rapid reviews^{8,11,12} and one qualitative study⁶), and seven low quality of evidence consisting of (three opinion^{1,5,7}, three retrospective chart review^{2,9,10}, and one prospective observational study³). Each citation was ranked using the Johns Hopkins Evidenced-Based Appraisal Tools, the final appraisal grade for the quality of this evidence was deemed low to moderate due to the lack of rigorous research studies.

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Table 1

Structures, Processes, and Outcomes of Awake Prone Positioning with Supplemental Oxygen via Nasal Cannula or Mask

Structures	Processes		Outcomes				
<p>Feasibility:</p> <ul style="list-style-type: none"> Awake proning was clinically feasible and safe.^{2,3} PP on awake non-intubated patients is low cost, use of low flow oxygen therapies, utilizes no additional personnel or departmental resources, and can easily be done with minimal assistance as the patient is often able to help reposition themselves.⁵ <p>Dedicated Team, Training & Education:</p> <ul style="list-style-type: none"> Nurses, Nurse leaders, Intensive Care Unit Clinical Nurse Specialist (CNSs) that are knowledgeable served about proning.^{1,3,6} Interprofessional team approach include respiratory therapy, physiotherapy, nursing, medicine, dietary, and leadership buy in.^{5,6} Culture of team-belief in proning, good communication, voice opinions, mentorship, prior negative experiences, routine unit huddles, emails, posters.^{5,6} Prone Team (PT) of trained staff, availability of staff available clinical protocols, equipment, eye shields, foam pillows to prevent HAPI, and delineate roles and responsibilities.⁶ Structured, collaborative training and patient education materials such as illustrated detailed PP one-page, procedural steps, body mechanics, monitoring parameters, and timing/scheduling recommendations, automated learning.^{1,5,6,10} A key component to awake self-prone positioning was ensuring that the patient was 	<p style="text-align: center;">Scheduled Proning Time and Position:</p> <ul style="list-style-type: none"> Patients in awake PP were instructed to lie in PP for as long and as frequently as possible each day.⁴ PP was done during evening hours to avoid mealtimes and medication administration.¹⁰ Face down or lateral, this sample was given the option of face down or lateral proning, followed by 30 minutes- 120 minutes left side lying, right side lying, and upright sitting positions, avoiding supine with head of bed flat.^{3,5} Position patients in a lateral recumbent position and allowing them ample time to improve oxygenation and/or stop coughing, then finally lateral to prone.¹⁰ <p style="text-align: center;">Inclusion/Exclusion Criteria for Awake Prone Positioning:</p> <ul style="list-style-type: none"> Having clear inclusion/exclusion criteria as effective for staff to carry out practice.⁵ <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Inclusion Criteria for Proning:</th> <th style="text-align: center;">Exclusion Criteria for Proning:</th> </tr> </thead> <tbody> <tr> <td style="vertical-align: top;"> <ul style="list-style-type: none"> Set parameter for hypoxia at room air driving need for oxygenation, and thus a parameter for inclusion/candidate for proning, for example keep oxygenation >92%^{2,3,5,7} Can have either supplemental O₂^{2,3}, High flow O₂², or non-invasive PPV^{2,4} Able to self- prone, independent requires little assistance^{3,5,7} Covid diagnosis^{2,4,5,10} Able to cooperate/communicate⁵ No anticipated airway issues⁵ </td> <td style="vertical-align: top;"> <ul style="list-style-type: none"> Inability to prone^{3,4} Confusion^{3,5,7,10} Vomiting³ Did not consent⁴ Hemodynamically unstable^{4,5,7} Severe obesity BMI > 40^{4,5,7} Pregnancy^{4,5,7} Respiratory distress/need for intubation^{5,7} Unstable spine^{5,7} Thoracic injury^{5,7} Abdominal surgery^{5,7} Pelvic injuries^{5,10} Facial injury⁵ Neurological issues⁵ Pressure sores/ulcer or those at high risk⁷ </td> </tr> </tbody> </table>		Inclusion Criteria for Proning:	Exclusion Criteria for Proning:	<ul style="list-style-type: none"> Set parameter for hypoxia at room air driving need for oxygenation, and thus a parameter for inclusion/candidate for proning, for example keep oxygenation >92%^{2,3,5,7} Can have either supplemental O₂^{2,3}, High flow O₂², or non-invasive PPV^{2,4} Able to self- prone, independent requires little assistance^{3,5,7} Covid diagnosis^{2,4,5,10} Able to cooperate/communicate⁵ No anticipated airway issues⁵ 	<ul style="list-style-type: none"> Inability to prone^{3,4} Confusion^{3,5,7,10} Vomiting³ Did not consent⁴ Hemodynamically unstable^{4,5,7} Severe obesity BMI > 40^{4,5,7} Pregnancy^{4,5,7} Respiratory distress/need for intubation^{5,7} Unstable spine^{5,7} Thoracic injury^{5,7} Abdominal surgery^{5,7} Pelvic injuries^{5,10} Facial injury⁵ Neurological issues⁵ Pressure sores/ulcer or those at high risk⁷ 	<p>Measured Outcomes for Awake Proned Patients:</p> <ul style="list-style-type: none"> Improvement of spO₂ and/or Fio₂ during⁸ and post proning^{2,3,4,9,10} Respiratory rate (RR) improvement^{2,4} <i>Conflicting evidence</i>-RR remained the same post proning³ Improved the ROX index ((SpO₂/Fio₂/Respiratory Rate)^{2,4} Intubation as either lower cumulative incident or as a lower hazard ratio⁴ Lower risk of treatment failure (defined as death or intubation)⁴ Longer proning was reported more frequently with treatment success⁴ If subsequently intubated, more likely to be weaned⁴ Mortality not significantly different between proned and not proned groups⁴ <p>Adverse/Safety Outcomes:</p> <ul style="list-style-type: none"> Appears to be beneficial and have positive outcomes to those who did awake proning¹ No complications/adverse events^{2,3} <i>Conflicting evidence</i>-Adverse /safety outcomes were skin breakdown, vomiting, central line dislodgement, and cardiac arrest while proning⁴ Desaturations and coughing during proning¹⁰ <p>Anecdotal Outcomes reported in the literature:</p> <p><u>Patient related</u></p> <ul style="list-style-type: none"> Deferred or delayed intubation^{5,8} Allowed for optimal ventilation/perfusion (V/Q) matching⁵ Minimal risks⁷ with use of a guideline^{1,5} Patients understood proning instructions and were easy to follow⁵ <p><u>Organizational related</u></p> <ul style="list-style-type: none"> Reduces workflow for and the number of nurses/allied health professionals⁵ Reduce need for vital pandemic resources such as ventilators⁵
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<p>thoroughly educated on the process by using teach back method and instructed to inform healthcare providers of any pain/discomfort, numbness, or SOB.^{1,5}</p>		<ul style="list-style-type: none">• Reduced exposure risk to healthcare workers by initiating self proning schedules for patients⁵• Increased EMR documentation of prone positioning¹⁰ <p>Healthcare worker implementation experience and strategies for proning:</p> <ul style="list-style-type: none">• Created a learning collaborative driving educational outreach⁶• Need for:<ul style="list-style-type: none">○ Resources⁶○ Decreased variability in practices⁶○ Culture of teamwork⁶○ Clinical policies/guidelines and protocols^{5,6}○ Prone-positioning team^{5,6}○ Automated alerting⁶
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**Frequently cited articles regarding COVID-19 prone positioning with HFNC or NC*

NOTE: Above information is based on one prospective observational cohort study,⁴ two case studies,^{2,6} one position paper,¹ and expert opinion^{3,5} (one with embedded case study³), which limits the generalizability of findings

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Review References

1. Allicock, K.A., Coyne, D., Garton, A.N., Hare, E.C. & Seckel, M.A. (2021). Awake self-prone positioning: Implementation during the COVID-19 pandemic. *Critical Care Nurse*, 41(5). <https://doi.org/10.4037/ccn2021153>
2. Cherian, S. V., Li, C., Roche, B., Reyes, S. A., Karanth, S., Lal, A. P., Estrada-Y- Martin, R. M. (2021). Predictive factors for success of awake proning in hypoxemic respiratory failure secondary to COVID-19: A retrospective cohort study. *Respiratory Medicine*, 181. <https://doi.org/10.1016/j.rmed.2021.106379>
3. Dubosh, N., Wong, M.L., Grossestreuer, A.V., Loo, Y.K., Ilg, A., Donnino, M.W. (2021). Early, awake proning in emergency department patients with COVID-19. *American Journal of Emergency Medicine*, 46, 640-645. <https://doi.org/10.1016/j.ajem.2020.11.074>
4. Ehrmann, S., Li, J., Ibarra-Estrada, M., Perez, Y., Pavlov, I., McNicholas, B., Roca, O., Mirza, S, Vines, D., Garcia-Salcido, R., Aguirre-Avalos, G., Trump, M.W., Nay, M.A., Dellamonica, J., Nseir, S., Mogri, I., Cosgrave, D., Jayaraman, D., Masclans, J., Laffey, J.G., Tavernier, E. (2021). Awake prone positioning for COVID-19 acute hypoxaemic respiratory failure: a randomized, controlled, multinational open label meta-trial. *Lancet Respir Med*. [https://doi.org/10.1016/S2213-2600\(21\)00356-8](https://doi.org/10.1016/S2213-2600(21)00356-8)
5. Kalan, S. & Chapple, R. (2021). Clinical experiences and reflections on awake non-intubated prone positioning for hypoxic patients amidst the COVID-19 pandemic. *The Canadian Journal of Critical Care Nursing*, 32(3), 18-22. <https://doi.org/10.5737/23688653-3231822>
6. Klaiman, T.; Silverstri, J.A., Srinivasan, T., Szymanski, S., Tran, T., Oredoko, F., Sjoding, M.W., Fuchs, B.D., Maillie, S., Jablonski, J., Lane-Fall, M.B., & Kerlin, M.P. (2021). Improving prone positioning for severe acute respiratory distress syndrome during the COVID-19 pandemic. *Annals of the American Thoracic Society*, 18(2), DOI: 10.1513/AnnalsATS.202005-571OC
8. Weatherald, J., Solverson, K., Zuege, D., Loroff, N., Fiest, K., Parhar, K. (2021). Awake prone positioning for COVID-19 hypoxemic respiratory failure: A rapid review. *Journal of Critical Care*, 61, 63-70. <https://doi.org/10.1016/j.jcrc.2020.08.018>
9. Wendt, C., Mobus, K., Weiner, D., Eksin, B., Allegra, J. (2021). Nonintubated in hypoxic respiratory distress: Single site retrospective health records review. *Journal of Emergency Medicine*, 47, 270-287. <https://doi.org/10.1016/j.jen.2020.12.006>
10. Zaretsky, J., Corcoran, J., Savage, E., Berke, J., Herbsman, J., Fischer, M., Kmita, D., Laverty, P., Sweeny, G., Horwitz, L. (2021). Increasing rates of prone positioning in acute care patients with COVID-19. *The Joint Commission Journal on Quality and Patient Safety*. <https://doi.org/10.1016/j.jcjq.2021.09.005>

Additional Contextual References

7. Bentley, S, Iavicoli, L., Cherkas, D, Lane, R., Wang, E., Atienza, M, Fairweather, P., Kessler, S. (2020). Guidance and patient instructions of awake, nonintubated COVID-19 patients. *Society for Academic Emergency Medicine*(27),8, 787-791. DOI: 10.1111/acem.14067
11. Crawford, C.L. (2020). Prone positioning for adults with COVID-19 receiving high flow oxygen via nasal cannula. Kaiser Permanente Southern California, Regional Evidence-Based Practice Program. [https:// Kaiser Permanente® Southern California Nursing Research » Literature Reviews/ Evidence Summaries \(kpsc-nursing-research.org\)](https://www.kaiserpermanente.org/healthcare-research/southern-california-nursing-research/literature-reviews/evidence-summaries/kpsc-nursing-research)
12. Society of Critical Care Medicine & European Society of Intensive Care Medicine. (2021). Surviving sepsis campaign guidelines on the management of adults with Coronavirus Disease 2019 (COVID-19) in the ICU. SSC-COVID19GuidelinesRecTable-First Update.pdf (sscm.org)

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Evidence Search Strategies: A evidence review on the selected clinical question was conducted from June 17th, 2020 through September 2021. This snapshot of the literature examined the evidence for the quantity, quality, and consistency of the evidence for adult hospitalized with COVID-19 who need supplemental oxygen via nasal cannula or mask, what is the quantity, quality, and consistency of the evidence for the use of awake prone positioning (PP) and the structures, processes, and outcomes for implementation?

Search terms were broad and included “prone position*,” “nursing care*,” “oxygenation,” “awake proning,” “high flow oxygen,” “COVID-19,” and/or “SARS-CO-V2,” either alone or in combination. Electronic databases included PubMed, Clinical Key, CINAHL, Cochrane Libraries, and Google Scholar. Searches were individualized for each database for either open year and/or June 2020 to September 2021 or the last 18 months. A final informational search was conducted via the web browser Google Scholar (See Database Search Methodology, Pages 12 and 13).

This review yielded 87 relevant hits after initial de-duplication between databases and were selected for inclusion. 5 additional duplicates were eliminated, with 19 articles remaining consisting of contextual links. Three rounds of detailed examination of abstracts and full text articles resulted in the elimination of 7 articles, as they did not answer the clinical question, were outside the acute care environment, included healthcare systems that were outside of the U.S., Canada, and England, or focused on concepts other than oxygen delivery via nasal cannula or mask or coupled with prone positioning, or intubation with prone positioning. The articles were ranked using the Academy of Evidence-Based Practice Evidence Leveling System and graded using the Johns Hopkins Evidence Appraisal tools (See Page 11-12).

Evidence Review Results: The current clinical topic of prone positioning of awake patients with supplemental oxygen is continuously evolving. The literature in this bridge review consisted of one high quality level (multi-site RCTS ⁴), four moderate quality level of evidence consisting of (three rapid reviews ^{8,11,12} and one qualitative study ⁶), and seven low quality of evidence consisting of (three opinion ^{1,5,7}, three retrospective chart review ^{2,9,10}, and one prospective observational study ³).

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Academy of Evidence Based Practice[®] (EBP) Evidence Leveling System (ELS)			
LEVEL	DESCRIPTION	RELEVANT ARTICLES	ARTICLE NUMBER
A	Meta-analysis of multiple large sample or small sample* randomized controlled studies, or meta-synthesis of qualitative studies with results that consistently support a specific action, intervention, or treatment	1	4
B	Well-designed controlled studies, both randomized and nonrandomized, prospective or retrospective studies, and integrative reviews with results that consistently support a specific action, intervention, or treatment	1	2
C	Qualitative studies, descriptive or correlational studies, integrative reviews, systematic reviews, or randomized controlled trials with inconsistent results	5	3,6,8,11,12
D	Peer-reviewed professional organizational standards, with clinical studies to support recommendations		
E	Theory-based evidence from expert opinion or multiple case reports, case studies, consensus of experts, and literature reviews	5	1,5,7,9,10,
MA	Manufacturer's recommendation; Anecdotes		
LR	Laws and Regulations (local, state, federal; licensing boards; accreditation bodies, etc.)		
Total		12	12

* A large sample has adequate power to detect the observed effect with confidence (as seen in significant Confidence Intervals). A small sample may lack confidence in the power of the desired effect (Polit & Beck, 2008)

Designed by Emma M. Cuenca and Cecelia L. Crawford, Academy of EBP; ©Kaiser Permanente SCAL Regional Nursing Research Program, May 2011. Adapted from AACN Evidence Leveling System (2009) and Canadian Medical Association & Centre for Evidence-Based Medicine, Levels of the Evidence (2001)

Johns Hopkins Evidence-Based Practice Appraisal Tools

High Quality: #4 (meta trial RCT) = 1 article

(Consistent, generalizable results; sufficient sample size for study design; adequate control; definitive conclusions; consistent recommendations based on comprehensive literature review including thorough reference to scientific evidence **OR** expertise clearly evident; draws definitive conclusions; provides scientific rationale; thought leader in the field.)

Moderate Quality: #6 (qualitative study), #8, 11, 12 (rapid review) = 4 articles

(Reasonably consistent results; sufficient sample size for study design; some control, and fairly definitive conclusions; reasonably consistent recommendations based on fairly comprehensive literature review including references to scientific evidence **OR** expertise appears credible; draws definitive conclusions; provides logical argument for opinions.)

Low Quality: #1, 5, 7 (opinion) #2, 9, 10 (retrospective chart review), #3 (prospective observational study), = 7 articles

(Little evidence with inconsistent results; insufficient sample size for the study design; conclusions cannot be drawn **OR** expertise is not discernable or is dubious; conclusions cannot be drawn.)

Final Summary Evidence Grade = Low to Moderate Quality

(Although citations were ranked between moderate-to-high, the final appraisal grade for the quality of the evidence was deemed **low to moderate quality due to the lack of rigorous research studies with emerging and evolving evidence**. The majority of evidence was: (3) low quality opinion and retrospective, (1) low quality prospective, (3) low to moderate rapid reviews, (1) moderate qualitative, and (1) high quality RCT.

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Search Date(s): June 2020- September 2021

Clinical question: What is the quantity, quality, and consistency of the evidence for the use of prone positioning in nursing with awake or on high flow oxygen via nasal cannula for adult patients with COVID-19 in the acute care setting?

Database	Key Word(s) and/or Controlled Vocabulary Terms #	Total References Identified (hits)	Relevant References	Duplicate Articles	Selected for Review	Excluded	Final Total
PubMed Years: last 18 months	Prone positioning; COVID-19; humans, English, female, male, adult 19+ years	110	56	0	3	53	3
PubMed Years: last 18 months	Prone position; nursing care, AND/OR, COVID-19, humans, English, female, male, adult 19+years high flow oxygen; nasal cannula	31	11	2	0	0	0
Clinical Key Years: last 18 months	Prone position; awake proning; full text and MEDLINE, Specialties (critical care)	54	8	1	1	7	1
CINAHL Years: June 2020-September 2021	Prone position and oxygenation COVID	7	0	0	0	7	0
Cochrane Library Years: N/A	Prone positioning	0	0	0	0	0	0
Google Scholar Years: Since 2021	Prone position; high flow oxygen, nursing,	956	9	2	6	1	5
Articles Context Reference Links	N/A	N/A	3	0	0	0	3
TOTALS		1,158	87	5	10	68	12

#Controlled vocabulary (subject terms, MESH terms, tagged terms specific to database)

*Use the first database as the main comparison for subsequent database searches and identifying duplicate articles

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Clinical Question				
Population and/or Patient(s)	Intervention/Interest Area	Comparison Intervention (Often current practice)	Outcome	Time Period (If Applicable; Optional)
Non-intubated adults with COVID-19 in a non-ICU setting	<ul style="list-style-type: none"> • High flow oxygen delivered via nasal cannula • Prone positioning • Awake prone positioning 	Critical adult patients in ICU who are intubated and on ventilators	<ul style="list-style-type: none"> • Improved lung function • Avoidance of intubation and mechanical ventilation • Other outcomes sourced from the evidence 	Hospital stay
Final Clinical Question: What is the quantity, quality, and consistency of the evidence for the use of prone positioning with high flow oxygen via nasal cannula for adult patients with COVID-19 in the acute care setting?				

Searchable Question
Key Search Terms: prone position*; self-position*; oxygenation; respiratory; awake proning; COVID-19 OR SARS-CO-V2; nursing care
Inclusion Criteria: acute care setting, adult, high flow oxygen delivery via nasal cannula, non-intubated, awake prone positioning
Exclusion Criteria: setting other than acute care, not an adult, not on high flow oxygen delivery via nasal cannula, patient on mechanical ventilators/intubated, not prone positioning.
Limiters (Open year or year ranges, age ranges, and language, etc.): June 2020-September 2021, adults >18 years older, English, Human
Databases: PubMed; Clinical Key; CINAHL; Cochrane Library,
Web Browsers: Google Scholar

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Purpose/intended Audience

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Limitations On Use

These documents have been developed to assist clinicians by providing an analytical framework for the effective evaluation and treatment of selected common problems encountered in patients. These documents are not intended to establish a protocol for all patients with a particular condition. While evidence reviews provide one approach to evaluating a problem, clinical conditions may vary significantly from individual to individual. Therefore, clinicians must exercise independent professional judgment and make decisions based upon the situation presented.

Kaiser Permanente's documents were created using an evidence-based process; however, the strength of the evidence supporting these documents differs. Because there may be differing yet reasonable interpretations of the same evidence, it is likely that more than one viewpoint on any given healthcare condition exists. Many reviews will include a range of recommendations consistent with the existing state of the evidence.

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