Clinical Implications of COVID-19 for the Pelvic Floor Physical Therapist

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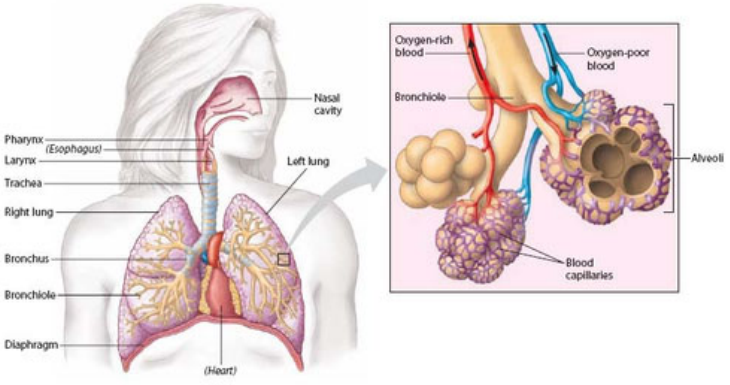
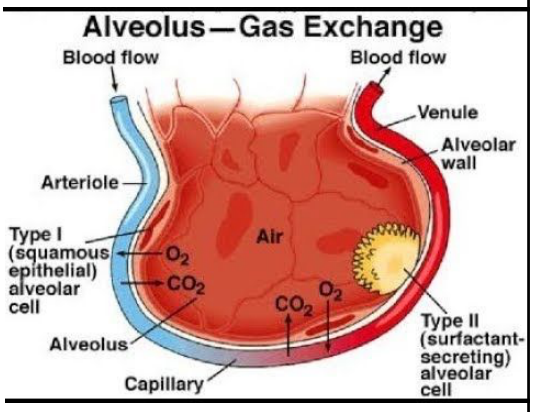
Anatomy of the Lungs and Gas Exchange





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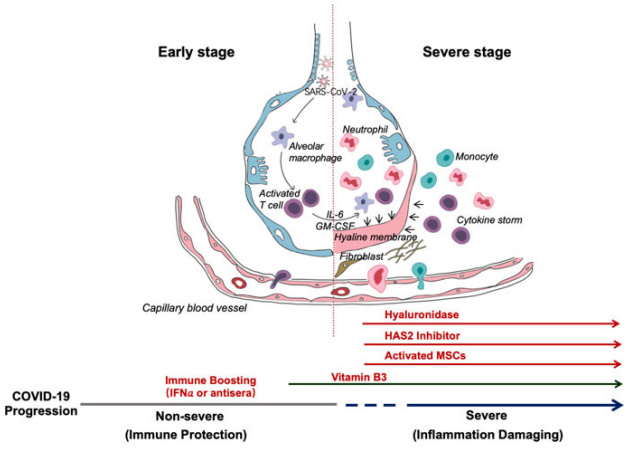
COVID-19 Pathophysiology

COVID-19 virus causes an inflammatory cascade
- Impaired oxygen transport from alveoli to pulmonary capillaries
- Can lead to pneumonia and acute respiratory distress syndrome (ARDS)

Damage to the alveoli can be reversible or permanent
- Might lead to pulmonary fibrosis
  - Restrictive pathology



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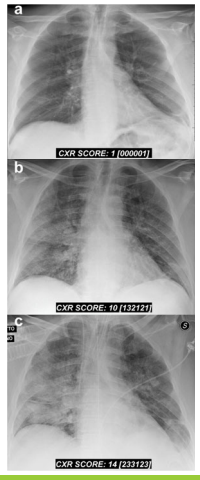
Disease Severity and Pulmonary Sequelae

Mild to moderate- 80%
- Upper respiratory infection like symptoms
- May progress to mild pneumonia resulting in SOB
- Majority will recover
  - Long term effects are unknown

Severe to critical- 20%
- Severe dyspnea and low PaO2 (<93%)
- Widespread infiltrates in lungs
  - Severe pneumonia
  - ARDS
- Might have lasting damage to the lungs
  - Long term effects are unknown
- Other systems can be involved



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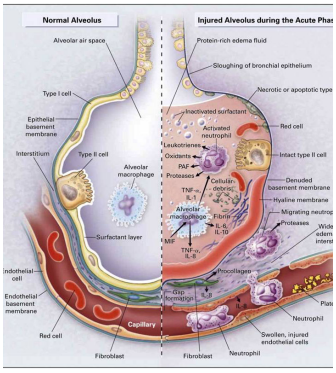
Acute Respiratory Distress Syndrome

Characterized by

- Damage to pulmonary cells and basement membrane
- Leaky capillaries
- Pulmonary edema
- Decreased surfactant
- Low PaO2/FiO2



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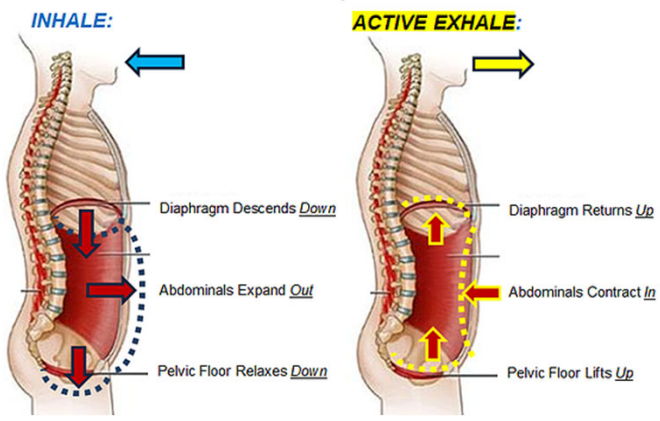

Respiratory and Pelvic Diaphragm

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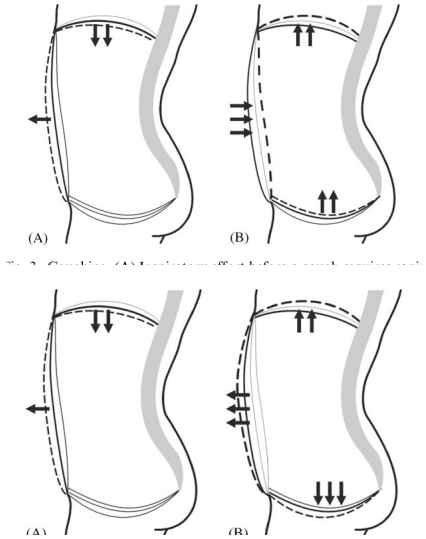

Pelvic Floor Dysfunction and Coughing

Repetitive coughing might cause micro trauma to the pelvic floor with increases in IAP

- Populations with chronic coughing have shown increased urinary and fecal incontinence and pelvic organ prolapse
  - Interstitial lung disease
  - Cystic Fibrosis
  - COPD
  - Hay fever
- The intensive coughing associated with COVID might produce or worsen urinary or fecal incontinence or pelvic organ prolapse

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Pelvic Floor and Residual Effects of ARDS

ARDS functions as a restrictive lung disease

- Difficulty with complete lung expansion due to alveolar damage
- Decreased volume of inspiration and excursion of the diaphragm

Decreased diaphragmatic excursion prevents full pelvic floor ROM

- Non-relaxing pelvic floor and pelvic pain
- Incomplete eccentric lengthening leading to dyssynergic defecation

Shortness of breath might cause issues with urinary incontinence

- Urgency from autonomic effect of breathlessness
- Stress incontinence from overuse of pelvic floor as a muscle of respiration

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Sequelae of Long Term Hospitalization

Post Intensive Care Syndrome (PICS)

- New or worsening change in:
  - Cognition
    - Memory
    - Decision making and planning
    - Concentration
  - Mental health
    - Anxiety
    - Depression
    - PTSD

- Physical function
  - ICU acquired weakness
    - Neuropathy/myopathy
  - Fatigue
  - Impaired respiratory function
  - Decreased appetite and weight loss

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Sequelae of Long Term Hospitalization

- ICU Acquired Weakness
  - Neuromuscular dysfunction with no etiology besides critical illness and its treatment
  - Weakness that is
    - Generalized
    - Symmetrical
    - Proximal >Distal
      - Especially including respiratory muscles
  - Proposed neuropathic and myopathic contribution
    - Changes in EKG
    - Can exceed 10% loss in muscle mass in the first week

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Pregnancy and COVID

COVID-19
- No greater risk for transmission or severe pneumonia
- No greater risk for negative fetal or maternal outcomes
- No risk of vertical transmission

Consider common maternal co-morbidities
- Gestational diabetes or hypertension

Pre and postpartum care might be delivered via telehealth

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Precautions for Post-COVID Infection Care

COVID positive patient is considered negative again using 2 methods
- Symptom based
  - At least 3 days without a fever without use of antipyretics
  - Improvement in respiratory symptoms
  - At least 10 days since the initiation of symptoms
- Test based
  - Resolution of fever without use of antipyretics
  - Improvement of respiratory symptoms
  - 2 negative test results taken at least 24 hours apart

Once considered negative, return to universal source control precautions

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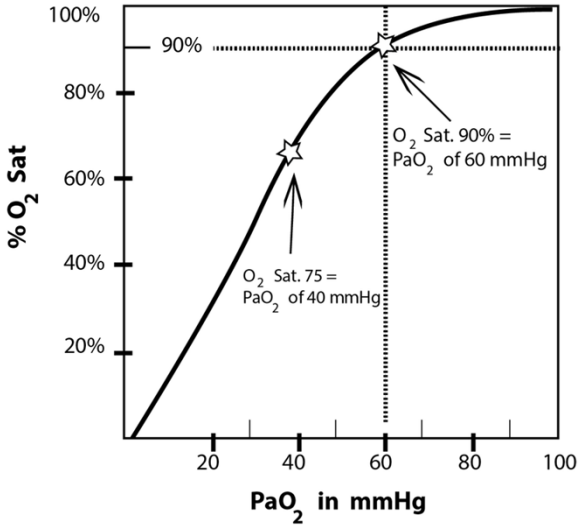

Vitals Monitoring in Post-COVID Patients

Consider monitoring blood pressure, heart rate, and oxygen saturation before, during, and after treatment

- SPO_2 should remain above 90%
  - Some COVID patients have desaturation without dyspnea
- In a deconditioned patient heart rate, blood pressure, and respiratory rate might rapidly rise with light activity
- Possibility for orthostatic or exertional hypotension

Keep in mind that pregnant patients already have elevated respiratory rates

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Telehealth in Pelvic Floor Physical Therapy

Limited evidence available on the efficacy of pelvic floor telerehabilitation

- Beneficial for urinary incontinence

Consider the patient's

- Risk level
- Acuity of symptoms
- Complexity of diagnosis
- Need for manual therapy
- Your skill and comfort level

Telehealth might also be used to decrease the frequency of in person appointments

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Bowel and Bladder Complications

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Neurologic Complications of COVID-19

- ICU acquired weakness
- TBI/Dementia type changes
- Embolic stroke
- Peripheral nerve injuries

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PICS and Pelvic Floor Dysfunction

ICU acquired pelvic floor weakness
- ICU acquired weakness affects proximal muscles to a higher degree
- Urinary incontinence, anal incontinence, pelvic organ prolapse

Cognitive decline might cause changes in food or fluid intake
- Dehydration
  - Bladder irritation and urgency
  - Constipation
- Fiber-poor diet
  - Constipation

Psychological
- Depression, anxiety, and PTSD can contribute to bladder, bowel, and sexual dysfunction

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PICS and Functional Incontinence

Mobility deficits from ICU acquired weakness
- Generalized muscle weakness
- Poor endurance and shortness of breath
- Balance impairments
- Need for new adaptive equipment

Cognitive decline
- Sequencing issues
- Decreased awareness of urge
- Inability to clearly communicate

Psychological
- Depression might cause decreased responsiveness to urge
- Anxiety might cause stronger urge that exacerbates poor mobility

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Hospitalization/Immobility and Constipation

Risk factors during hospitalization
- Prior constipation
- Opioid or sedative use
- Initially decreased enteral fiber and fluid intake
- Immobility

After discharge
- Decreased mobility
- Persisting changes in diet and fluid intake
  - Decreased independence with ADLs
  - Post-ventilation acquired dysphagia
  - Decreased appetite

Ensure Original Vanilla

Nutrition Facts
Serving Size 1 bottle (8 fl oz)

Amount Per Serving

Calories 220		Calories from Fat 50	
	% DV*		% DV*
Total Fat 6g	9%	**Sodium** 200mg	8%
Saturated Fat 1g	5%	**Potassium** 370mg	11%
Trans Fat 0g		**Total Carb** 32g	11%
Polyunsaturated Fat 2g		Dietary Fiber <1g	<4%
Monounsaturated Fat 3g		Sugars 15g	
Cholesterol <5mg	<2%	**Protein** 9g	18%

Vitamin A	25%	Vitamin C	50%
Calcium	30%	Iron	25%
Vitamin D	80%	Vitamin E	25%
Vitamin K	25%	Thiamin	25%
Riboflavin	25%	Niacin	25%
Vitamin B_6	25%	Folate	25%
Vitamin B_{12}	25%	Biotin	25%
Pantothenic Acid	25%	Phosphorus	25%
Iodine	25%	Magnesium	25%
Zinc	25%	Selenium	25%
Copper	25%	Manganese	60%
Chromium	25%	Molybdenum	50%
Chloride	8%		

*Percent Daily Values (DV) are based on a 2,000 calorie diet.

INGREDIENTS: WATER, CORN MALTODEXTRIN, SUGAR, MILK PROTEIN CONCENTRATE, BLEND OF VEGETABLE OILS (CANOLA, CORN), SOY PROTEIN ISOLATE. NONFAT MILK. **LESS THAN 0.5% OF:** MAGNESIUM PHOSPHATE, POTASSIUM CITRATE, NATURAL AND ARTIFICIAL FLAVOR, CELLULOSE GEL, SALT, CALCIUM CARBONATE, CALCIUM PHOSPHATE, CHOLINE CHLORIDE, ASCORBIC ACID, SODIUM CITRATE, CELLULOSE GUM, POTASSIUM CHLORIDE, MONOGLYCERIDES, SOY LECITHIN, CARRAGEENAN, POTASSIUM HYDROXIDE, LIQUID SUCRALOSE, FERROUS SULFATE, ZINC SULFATE, ACESULFAME POTASSIUM, dl-ALPHA-TOCOPHERYL ACETATE, NIACINAMIDE, MANGANESE SULFATE, CALCIUM PANTOTHENATE, COPPER SULFATE, THIAMINE CHLORIDE HYDROCHLORIDE, PYRIDOXINE HYDROCHLORIDE, VITAMIN A PALMITATE, RIBOFLAVIN, CHROMIUM CHLORIDE, FOLIC ACID, BIOTIN, SODIUM MOLYBDATE, POTASSIUM IODIDE, SODIUM SELENATE, PHYLLOQUINONE, VITAMIN D_3 AND VITAMIN B_{12}.
CONTAINS MILK AND SOY INGREDIENTS.
Abbott Nutrition, Abbott Laboratories, Columbus, Ohio 43219-3034 USA

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COVID and Mental Health Concerns

Anxiety and depressive symptoms related to COVID are common
- Dyspnea related anxiety
- In the non-infected
  - Rapid changes to daily life and routine
  - Risk of infection to self and others
  - Social isolation
  - Financial stress

Anxiety and depressive symptoms can contribute to pelvic floor symptoms
- Urgency and frequency
- Decreased sphincter closure pressure
- Changes in GI function causing constipation or diarrhea
- Pelvic pain and overactive pelvic floor

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Bladder Complications of Stroke

Most common complaints
- Nocturia
- Daytime frequency
- Urgency

Lesser common complaints
- Urinary retention due to detrusor hypoactivity
- Urinary incontinence

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Bladder Complications of Stroke

No statistically significant difference between types of stroke and incidence of urinary incontinence.

Bladder complications are listed as some of the most stressful complications for caregivers

Stroke size, localization and type of lesion have a better correlation with type of LUT

Bladder complications can be a major safety issue if the patient has decreased mobility

Motor functioning may play into the treatment of incontinence and bowel function

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Bladder Complications of Stroke

Findings by lesion

- Cerebral cortex- uninhibited relaxation of the sphincter
- Basal ganglia or thalamus- normal sphincter function
- Frontal lesions- uninhibited sphincter relaxation
- Most common was involuntary contractions of the bladder
- Hemispheric stroke- nocturnal urinary frequency and difficulty voiding
- Reflex incontinence- first sensation and maximum desire to void simultaneously followed by strong detrusor hyperreflexia

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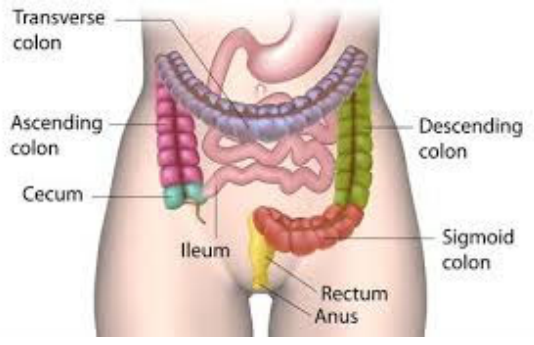

Bowel Complications of Stroke

Constipation

- Incidence of constipation is less in an ischemic stroke than in a hemorrhagic stroke

Fecal incontinence

- Less than 5% of stroke survivors experience fecal incontinence

Bowel obstruction

- Very low incidence of this in stroke victims
- Usually as a result of co-morbid factors

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Bowel Complications

Poor nutritional habits or swallowing dysfunction may be a complication with CVA

Mobility issues can also impact constipation

Seen as a function of autonomic function imbalance

Overall difficulty with defecation is much less than difficulty with micturition

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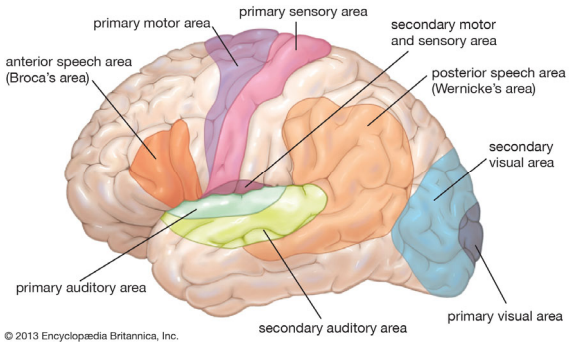

Sexual Complications of Stroke

Cerebral processing controls libido and desire

Ability to effect a sexual response is controlled by the spinal autonomic reflexes

In healthy males there is increased activity of the prefrontal cortex during ejaculation so strokes in this area can decrease the ability to ejaculate

Temporal lobe brain infarcts can cause sexual apathy

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Peripheral Nerve Injuries

Less likely to be direct cause of bowel and bladder issues in this population

Can be the cause of decreased mobility which could lead to issues with bowel and bladder function

- Mobility concerns may lead to both urgency and incontinence
- Decreased mobility can lead to constipation

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ICU Bladder Complications

Catheter acquired urinary tract infections

- Most important risk factor is length of catheterization

Urinary retention

- Risk factors
  - Use of hypnotics
  - Indwelling catheterization for more than 7 days
  - Bed restraint
- Can persist after discharge from ICU which makes it important for surveillance after discharge
- Reversal of urinary retention after ICU stage correlates with recovery of strength and mobility of lower extremities (Rodrigues 2016)

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ICU Bowel Complications

Constipation

Delayed gastric emptying

Diarrhea

Vomiting

Impaired gastrointestinal transit
- Constipation
- Radiologically confirmed ileus
- Feed intolerance
- Abdominal distension
- Gastric decompression

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ICU Bowel Complications

Prevalence of diarrhea in ICU is between 3.3-78%
- Enteral nutrition is the most common reason for diarrhea in patients that are in the ICU and may be avoided if they have had probiotics or soluble fiber added to their enteral nutrition
- Median time for onset of diarrhea in critically ill enteral fed patients is 6 days

Patients that are ventilated for longer 6 days are at a 2 fold increased risk for having constipation than those who are ventilated for less than 5 days

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ICU Bowel Complications

Prevalence of constipation in ICU is between 20-83%

Patients that are ventilated for longer 6 days are at a 2-fold increased risk for having constipation than those who are ventilated for less than 5 days

Constipation has not been shown to be associated with

- Length of hospital stay
- Suspension of nutritional support
- Outcome of hospitalization

Abdominal massage has been shown to be a possible effective treatment for ventilated patients in the ICU who are also being fed enterically

For patients that are intubated, constipation can increase the length of time that a patient remains intubated

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ICU Sexual Complications

52% of patients that had a prolonged ICU stay can experience long term sexual side effects

Can be associated with post traumatic stress disorder

Male sexual dysfunction

- Possible testicular dysfunction due to the infection invading the Leydig cells of the testicle as well as induction of hypergonadism and inflammation
- Erectile dysfunction
  - Cardiovascular side effects of COVID
  - Impaired oxygen saturation can contribute to erectile dysfunction

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Screening Questions

Are you experiencing any urinary incontinence?

Are you able to delay urination if you have the urge? If so for how long?

Are you experiencing any constipation?

Are you experiencing any fecal incontinence?

Are you experiencing any pain in the pelvic or abdominal region?

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Patient Case

- 52 year old man
- Only prior co-morbidity was type 2 diabetes that was well controlled prior to the patient catching COVID
- Patient was hospitalized for 29 days and intubated for 16 days
- Pelvic PT eval
  - Constipation
  - Urinary urgency
  - Urinary incontinence
  - Erectile dysfunction
- Neuro PT eval revealed
  - Widespread weakness
  - Balance difficulties
  - Memory loss

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Contact Information

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References

Dominique Prat, Jonathan Messika, Maude Millereux, Corentin Gouezel, Olfa Hamzaoui, Nadège Demars, Frédéric Jacobs, Pierre Trouiller, Jean-Damien Ricard, Benjamin Sztrymf ˝ Constipation in critical care patients: both timing and duration matter Eur J of Gastroenterol Hepatol 2018. Sept; 30(9): 1003-1008

Tyler Hay, Rinaldo Bellomo, Tom Rechnitzer, Emily See, Yasmine Ali Abdelhamid, Adam M Deane. "Constipation, diarrhea, and prophylactic laxative bowel regimens in the critically ill: A systematic review and meta-analysis" J Crit Care 2019 Aug;52:242-250.

Reis AMD, Fruchtenicht AV, Loss SH, Moreira LF. Use of dietary fibers in enteral nutrition of critically ill patients: a systematic reviewRev Bras Ter Intensiva Jul-Sept 2018;30(3):358-365

Dehghan M, Fatehi Poor A, Mehdipoor R, Ahmadinejad M. Does abdominal massage improve gastrointestinal functions of intensive care patients with an endotracheal tube?: A randomized clinical trial." Complement Ther Clin Pract . 2018 Feb;30:122-128.

Atasever AG, Ozcan PE, Kasali K, Abdullah T, Orhun G, Senturk E. The frequency, risk factors, and complications of gastrointestinal dysfunction during enteral nutrition in critically ill patients. Ther Clin Risk Manag. 2018 Feb 23;14:385-391.

Griffiths J, Gager M, Alder N, Fawcett D, Waldmann C, Quinlan J. "A self-report-based study of the incidence and associations of sexual dysfunction in survivors of intensive care treatment" Intensive Care Med. 2006 Mar;32(3):445-51

Sansone A, Mollaioli D, Ciocca G, Limoncin E, Colonnello E, Vena W, Jannini EA. «Addressing male sexual and reproductive health in the wake of COVID-19 outbreak" J Endocrinol Invest 2020 Jul 13;1-9.

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