



# HYPERBARIC OXYGEN THERAPY



# Introduction

- Presenter: Leslie
- Location: ACMH

**This month's topic: Safe Dressings In HBO**

# Overview:

## What Dressings Can and Cannot Go Into the Chamber?

This question is asked of HBO techs daily. Some go to the extreme of removing all medical related dressings and skin barriers prior to treatment.

When it comes to HBOT, you can't be too safe, right?

However, not always; You can run the risk of making the patient's wound worse by drying it out and exposing it to the atmosphere, as well as denying the patient a treatment that a physician has deemed necessary.

Wound dressings used in a hyperbaric oxygen therapy environment must be safe under high-pressure oxygen conditions, non-flammable, and compatible with the therapy.





The answer lies in the balance between the risks associated with the dressing and its potential benefits in treating the wound. First ask, “is the dressing necessary?” If the answer is no, then dressing is removed prior to treatment. If the answer is yes, decide whether to cancel the treatment or mitigate the risk.



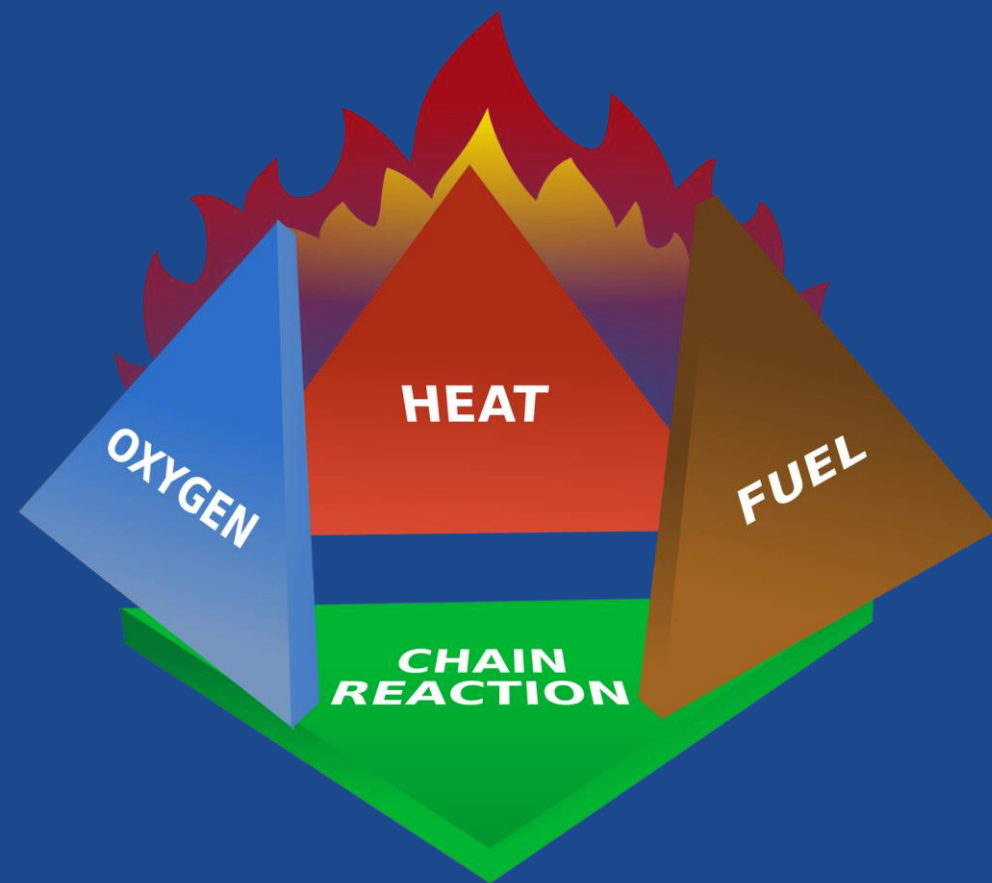
## What do the NFPA Guidelines suggest?

“The physician or surgeon in charge, with the concurrence of the safety director, shall be permitted to use prohibited items in the chamber that are the following:

- Suture material
- Alloplastic devices
- Bacterial barriers
- Surgical dressings
- Biological interfaces

(NFPA 14.3.5.4.3)





When evaluating a dressing it is important to first understand the role of fuel in the chemical reaction known as fire. Normally this reaction is between oxygen in the atmosphere and some sort of fuel. (for example, wood or gasoline) Of course, wood and gasoline do not spontaneously catch fire just because they are surrounded by oxygen. Fuel must be heated to its ignition temperature for combustion to occur. The reaction will keep going as long as there is enough heat, fuel, and oxygen. This is known as the fire triangle.

## **Threats We Must Omit From The Chamber**

1. Any material or product that can contain/release gas (fuel and/or could ignite)
2. Any material that could create or hold a static charge (ignition source)
3. Any product that could damage or scratch the acrylic (physical damage)
4. Any object that could block the air passage (choking hazard)

# Materials That Could Contain or Release Gas or Damage the Acrylic

- Alcohol based dressings
- Petroleum based dressings
- Benzine based dressings
- Casts
- Prosthetics
- External Fixators

Many skin and wound care products have petroleum, alcohol, or benzine bases. These are rich fuels and according to our prohibited items list should not enter the chamber.

These highly flammable products are used mostly as “carriers”, in other words they keep the product moist or pliable for storage and once exposed to air they evaporate. Once they evaporate, they are no longer a “rich fuel” and no longer pose an unacceptable fire risk.

# Fire

Fuels can be solids, liquids or gases. During the chemical reaction that produces fire, fuel is heated to such an extent that (if not already a gas) it releases gases from its surface. Only gas can be used as fuel. Gas is made up of molecules (groups of atoms). When these gases are hot enough, heated molecules are loosened, moving apart to form a gas. The gas molecules combine with oxygen in the air resulting in fire. This is important to us for two reasons: first, the hyperbaric environment is 100% oxygen under pressure. There are 15 times more molecules of oxygen available to "mix" with molecules of fuel.



# Fire continued...

This lowers the heat required for combustion, or flash point. The second factor is the need to convert fuel to gas, meaning that any product that evaporates or 'off gases' at room temperature becomes exceptionally rich fuel as no heat is required to convert the solid or liquid to gas. An example of this can be found in the oily rags left in the attic that on a hot summer day spontaneously combust. This happens at temperatures as low as 120 degrees Fahrenheit in room air (21% oxygen).

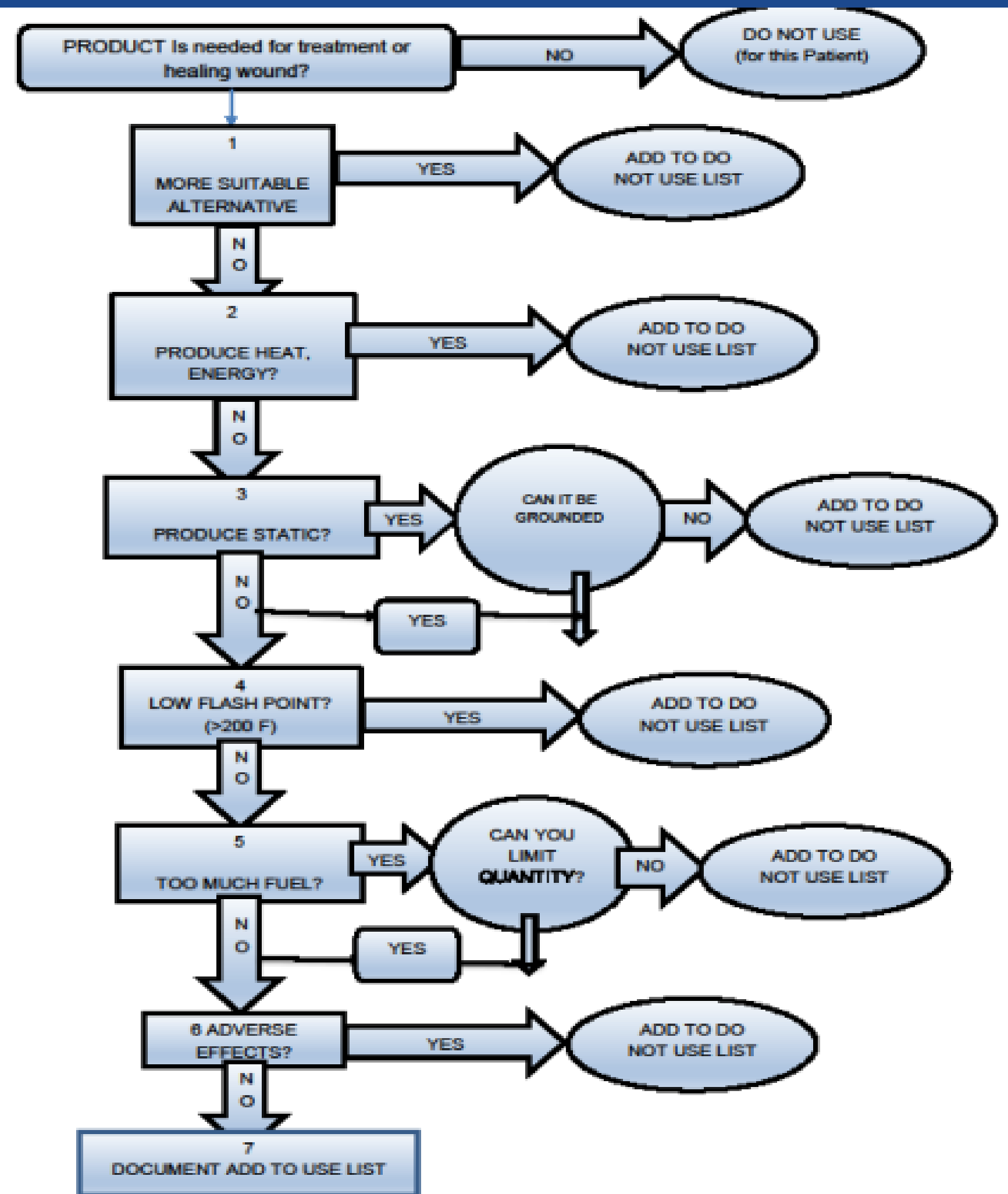


When developing a “go” or “no go” list, it is also important to consider ways to mitigate risk, minimizing the likelihood of an incident. Mitigating risk can include covering a dressing with a damp cloth, increasing the vent rate, padding over a device, and substitution with a compatible product.

Utilizing the decision tree on the next slide, let’s walk through a go/no-go list.

# Flow Chart

Available on the member's portal.





# How Can We Make Our Environment Safer?

- **Increase humidity in the room to reduce static.**
- **Ensure prohibited items are not brought into the chamber area.**
- **Prior to going into the chamber, stop everything for 60 seconds of safety.**
- **Pre-dive checklist.**
- **Cover casts or external fixators to protect the chamber.**
- **Cover unna boots with moist HBO approved linen (pillow case).**
- **Perform wound dressing changes AFTER hyperbaric treatment.**

# Safe Dressings

- Hydrocolloids
  - Example: Tegaderm, Duoderm, Hydrocoll, Subrasorb
  - Benefits: Provide a moist wound environment and are oxygen permeable
- Hydrogels
  - Example: Aquaflo, Intrasite Gel
  - Benefits: Keep the wound moist. Non-flammable
- Foam Dressings
  - Example: Mepilex, Allevyn, Optifoam, Hydrofera Blue
  - Benefits: Absorb exudate while maintaining a moist environment
- Non-Adherent Dressings
  - Example: Adaptic, Xeroform (if not petroleum-based)
  - Benefits: Protecting the wound bed or graft without sticking
- Silicone-Based Dressings
  - Example: Mepitel, Safetec
  - Benefits: Gentle on the skin and prevent wound/peri-wound trauma during dressing changes
- Calcium Alginates With or Without Silver
  - Example: Maxorb, Algisite, Aquacell
  - Benefits: Highly absorbent and safe for wounds with moderate to heavy exudate
- Secondary Dressings
  - Example: dry dressings (conform bandage, ABDs, gauze)
  - Benefits: Absorption, securing dressing

# Dressings to Avoid

- **Petroleum-Based Products:** These are highly flammable and unsafe in high oxygen environments
  - Example: Adaptic Petrolatum Gauze, Vaseline Gauze, Xeroform with Petroleum base
- **Ointments with Flammable Ingredients:** Avoid dressings or creams containing alcohol or oil bases. Alcohol is highly volatile and flammable, and oil-based products have a low flash point.
  - **Alcohol Base Examples:** Santyl Collagenase Ointment (if compounded with alcohol), some antiseptic gels, some liquid skin adhesives
  - **Oil Base Examples:** Aquaphor, Neosporin, Bacitracin (Petrolatum-based formulations)
- **Adhesives with Volatile Components:** Some adhesives contain flammable solvents which may emit flammable vapors under high oxygen pressure
  - Example: certain brands of waterproof adhesive dressings with solvent-based adhesives, some Steri-Strips
- **Charcoal-Containing Dressings with Adhesives:** Charcoal-based dressings may have binding agents that contain solvents which can pose risks
  - Examples: Actisorb (if combined with adhesives containing solvents)
- **Silver or Antimicrobial Dressings with Incompatible Carriers:** The antimicrobial agent itself may be safe, but the carrier medium (e.g., petrolatum or solvent) may not be
  - Example: Silvadene Cream (in petrolatum base), some silver-impregnated dressings with volatile compounds in their layers

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# Conclusion

If a dressing is not safe for use in HBOT, can we make it safe or safer? Sometimes, we can. If a dressing is deemed necessary and a safer option cannot be identified, we can attempt several accompanying techniques to minimize the risk. You could use a very minimal amount of the prohibited item, cover it with moistened gauze or towel, use a secondary dressing to cover the flammable primary dressing. Remember that if the physician and the local safety director make an allowance for a prohibited item, the item and allowance must be documented in writing, per the NFPA.

General Rule - Always check product labels for terms like "petrolatum", "alcohol", "solvent", or "flammable". For safety, opt for water-based, silicone-based, or oxygen-permeable dressings.

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Quiz



# Question 1

Which dressing base is safe for use in hyperbaric?

- a. oil-based dressing
- b. alcohol-based dressing
- c. silicone-based dressing
- d. benzine-based dressing

Answer 1

Silicone-based  
dressings

# Question 2

Name a common dressing used in your center that is safe for use in HBOT.

# Answer 2

Dry sterile dressings, foam dressings, hydrogels, alginates, optifoams, etc.

# Question 3

TRUE or FALSE

A wound dressing that is prohibited cannot be made safe?

# Answer 3

A wound dressing that is prohibited could be made safer by applying a damp covering, padding, reducing amount, etc. This is on a case-by-case basis. BUT when in doubt, leave it out.

# Round Table



- Weekly chamber checks
- Troy, MI chamber explosion/fire
- Welcome to Merriann
- New SG PAT and expanded checklists



# Attendance: December

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## In Attendance:

- Henry Ford
- Chambersburg
- Fairview
- Inspira
- Monroeville
- Jackson
- ACMH

## Absent:

- Woodlands
- Akron
- MGMC



NEXT MONTH

**Topic:**

*Barotrauma*

*March 4<sup>th</sup>, 2025, at 12:15pm*



Contact Us

# QUESTIONS/PROBLEMS

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## MEMBER'S PORTAL

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THANK YOU !!!

