# HYPERBARIC OXYGEN THERAPY

July 2025

# Introduction

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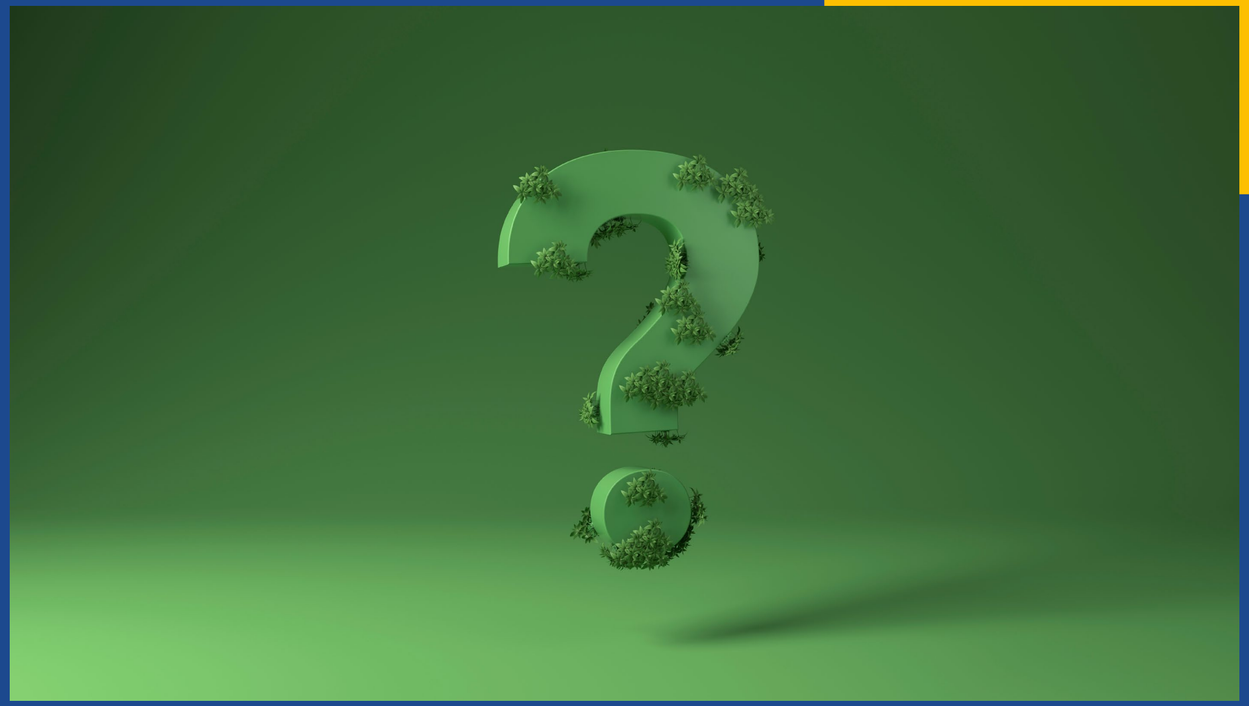
- **Chambersburg PA**
- **1 Year**

This month’s topic:
What Can and Cannot Go in the Chamber?

# Overview:

One of the biggest questions we face on a daily basis, what can and cannot go into the hyperbaric chamber?





## You can NEVER be too safe!

This question can confound HBO techs daily: some have gone to the extreme of removing all medical related dressings and skin barriers prior to HBOT; with the thought process being, you cannot be too safe. This is not necessarily factual. You do the 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.

“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 one of the following:

1. Suture Material
2. Alloplastic devices
3. Bacterial barriers
4. Surgical dressings
5. Biological interfaces” ( NFPA 14.3.5.4.3)



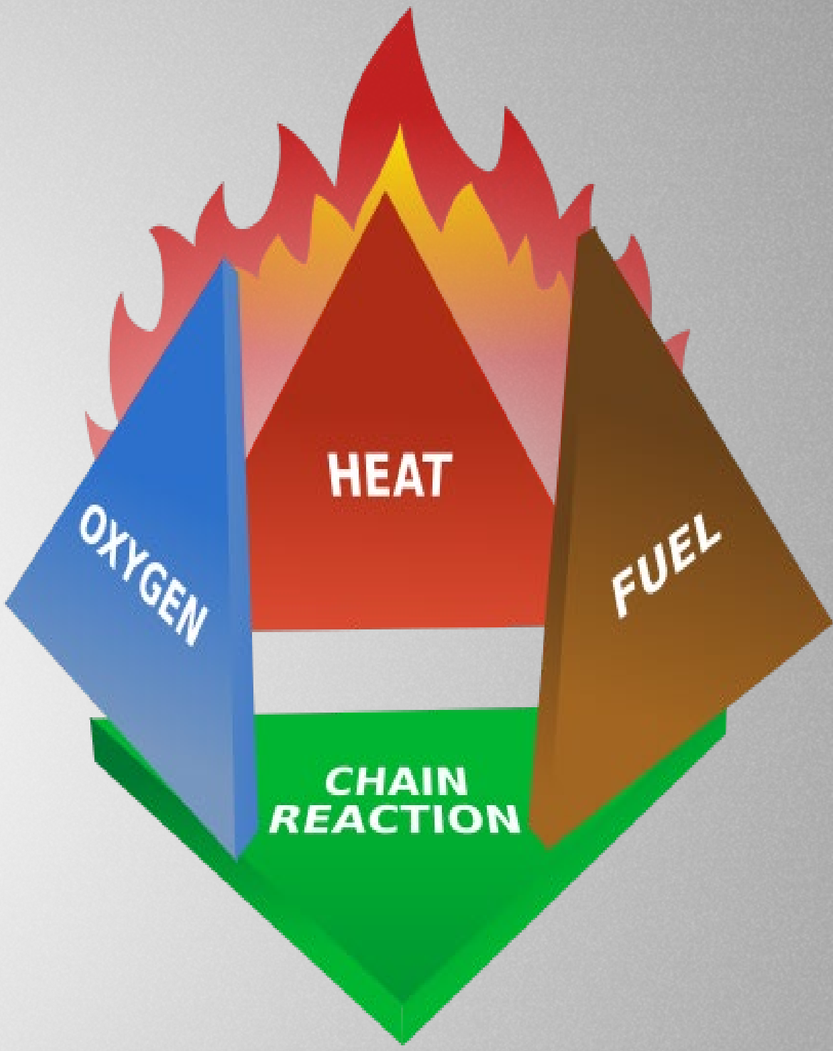

# Continued……

- The answer of what can go in the chamber, 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, the dressing is removed prior to treatment. If the answer is yes, decided whether to cancel the treatment or if the risk can be mitigated.

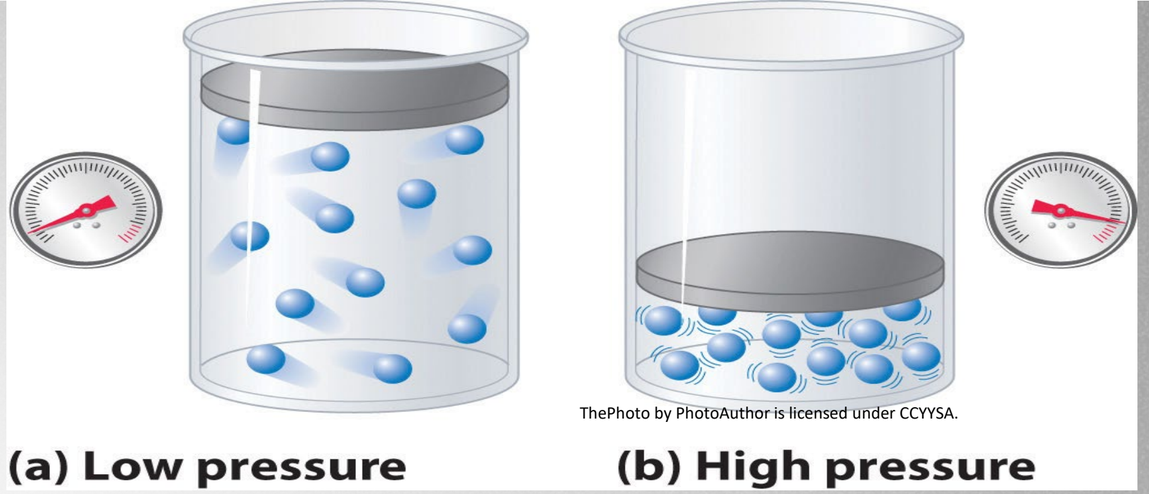
# Knowing the Role of Fuel

- 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 (wood or gasoline, for example). Of course, wood and gasoline do not spontaneously catch on 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.

- 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 for us for two reasons:



# Converting Fuel





- First the hyperbaric environment is 100% oxygen under pressure. There are 15 times more molecules of oxygen available to "mix" with molecules of fuel. 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).

- Most skin and wound care products have petroleum, alcohol, or benzine base. These are all rich fuels and according to our prohibited items list should not enter the chamber. Let's examine this a little more closely. These highly flammable products are used in most cases 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. Think of how quickly an alcohol prep pad dries out once the packaging has been opened... Now think of how quickly Vaseline gauze dries out... Very different, but the concept is the same.

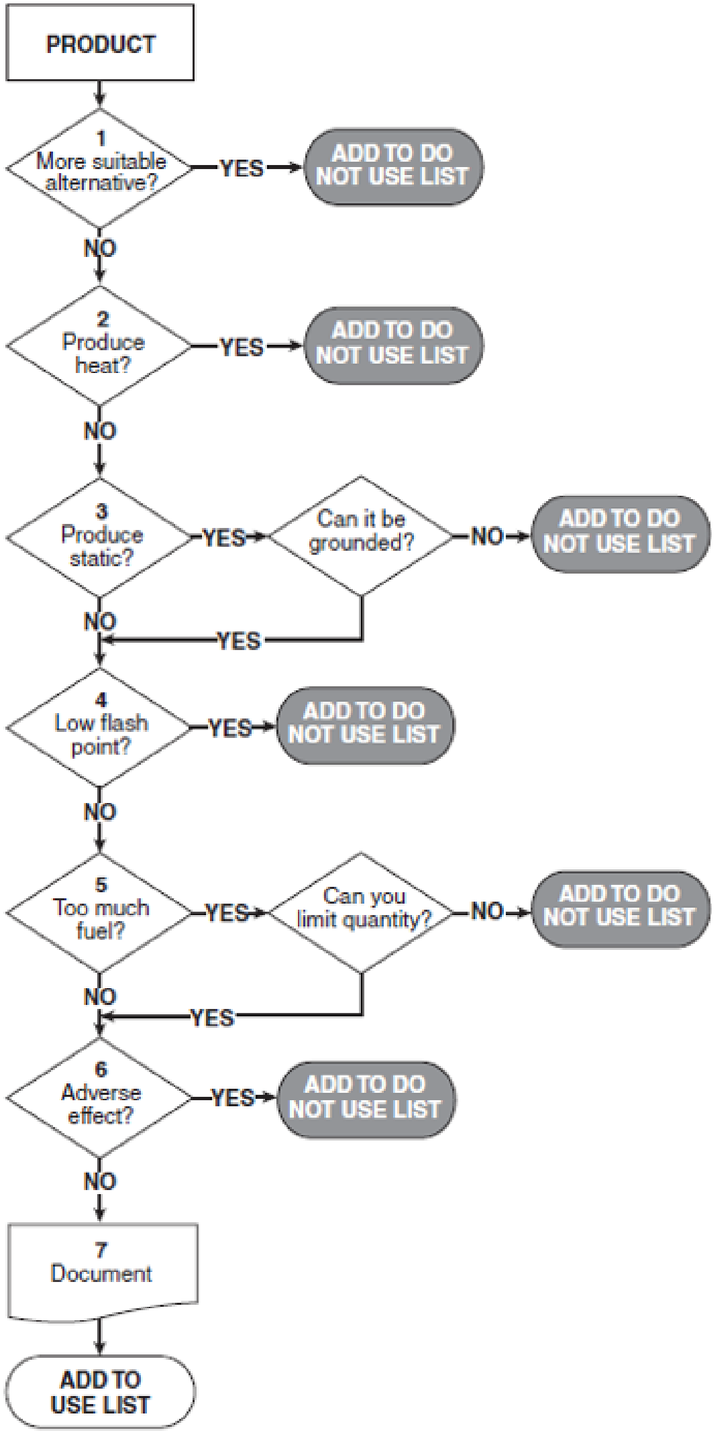
- Fuel is not the only consideration in deciding on whether an item can enter the chamber. We must consider the amount of fuel, potential energy sources, interactions with high dose oxygen, ability to produce a static charge, and potential damage to the chamber acrylic.

# "Go" or "No Go" List

When developing a "go" or "no go" list, it is 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.

## The NFPA Risk Assessment Flow Chart

The NFPA 99-14 risk assessment flow chart is a detailed process for effectively making decisions on the safety of patient care product(s) in a hyperbaric environment. Products may include wound care dressings, textiles, other related products, and patient care devices.



# Procedure:

When evaluating a dressing for use in HBOT, employ a logical method and document the reasoning, underpinning the decision. To lesser extent, consider the psychosocial result when considering low risk personal items (such as Depends, tampons, glasses); however, never compromise safety: when in doubt leave it out.

# What is Allowed

**Hospital-approved gown or scrubs:** These are provided by the facility for the patient to wear.

**Cotton linens (anti-static blend):** These are also provided by the facility. We try to stick to ONE blanket and ONE pillow only. The more that goes in, the more you increase the risk.

**Wound dressings (with prior approval):** Any dressings must be inspected and approved by the safety director before entering the chamber.

**Contact lenses (some types):** Soft contact lenses may be worn, but hard contact lenses must be removed.

**Pacemakers and ICDs:** Most pacemakers and ICDs are safe to use in the chamber but must be confirmed with the manufacturer.

**Wound Vacs:** 3M/KCI Wound Vacs can be disconnected and the dressing can usually stay intact.

**Water bottle:** If the patient can vent the bottle. The bottle can be filled with juice, Glucerna, etc. if necessary.

**Urinal:** If patient requires.

**Diapers:** Pull up style diapers are permitted. Nothing with Velcro tabs.

# What is Prohibited

**Personal items:** No books, phones, or other personal belongings are allowed.

**Cosmetics and hair products:** This includes makeup, lipstick, hairspray, lotions, and deodorants.

**Flammable materials:** Lighters, matches, and other flammable substances are strictly prohibited.

**Electronics:** Electronics are not allowed due to the fire hazard.

**Clothing items not provided by the facility:** Wear only the provided gown and nothing else, including underwear and socks.

**Certain types of eyeglasses:** Some eyeglasses may contain flammable materials.

**Gum, candy, dentures or anything that can be swallowed accidentally:** These items pose a choking hazard.

**Certain medications and wound care products:** Some medications and wound care products may not be compatible with the hyperbaric environment.

**ACE bandages or Tubigrip:** Elastic, stretchy material = static electricity.

# Contraindicated Wound Dressings

| Product / Category | Specific Names (Examples) | Reason for Contraindication |
|---|---|---|
| Petroleum-based products | *Vaseline®, Xeroform™, Adaptic™, and petrolatum* | Highly flammable in 100% oxygen; risk of combustion. |
| Ointments with paraffin/mineral oil bases | *Silvadene® (silver sulfadiazine), Bacitracin®, Neosporin®* (if ointment base) | Paraffin/mineral oil = fire risk; can vaporize and ignite. |
| Oil-based antimicrobial dressings | *Medihoney® ointment (not gel), Bacitracin ointment* | Oil base = flammable in oxygen-rich settings. |
| Adhesive sprays and aerosolized products | *Spray bandages, adhesive removers, topical anesthetics (e.g. benzocaine sprays)* | Volatile organic compounds can ignite/explode in HBOT. |
| Hydrocarbon-impregnated gauze | *Adaptic™, Jelonet™, or any petrolatum-impregnated gauze* | Contain hydrocarbons = high combustion risk. |
| Topical anesthetics with alcohol or flammable solvents | *Lidocaine gel (with alcohol), Bactine®* | Alcohol = highly volatile and flammable. |

# Safe/Acceptable Alternatives

| Product / Category | Specific Names (Examples) | Notes |
|---|---|---|
| Hydrogel sheets & Water-Based Hydrogels | *Hydrogel pads without alcohol or oils* | Water-based = non-flammable. |
| Alginate dressings | *Calcium alginate (e.g. AlgiSite®, Kaltostat®)* | Safe, non-flammable. |
| Hydrocolloids | *DuoDERM®, Tegasorb®* | Generally safe. Verify ingredients. |
| Silver-impregnated dressings (non-ointment) | *Acticoat®, Aquacel® Ag, Silverlon®* | Dry formats are usually HBOT-safe. |
| Saline-moistened gauze | *Plain gauze with sterile saline* | Preferred under HBOT when unsure. |
| Dry cotton dressings | *Kerlix™, Conform™, plain 4x4s* | Cotton, non-stretchy = safe |

# Wound VACs:

**ALLOWED**

- 3M Wound Vac can be disconnected at the hose and covered with dry gauze and secured with paper tape, while the vac machine remains outside of the hyperbaric chamber
- Black Granufoam and white foam are both okay for use in HBOT


**PROHIBITED**

- PICO® 7 or 14 (Smith+Nephew)
- Prevena™ (3M/KCI)
- Snap™ (Acelity)
- 3M Granufoam Bridge dressing
- VAC Machine

# Other:

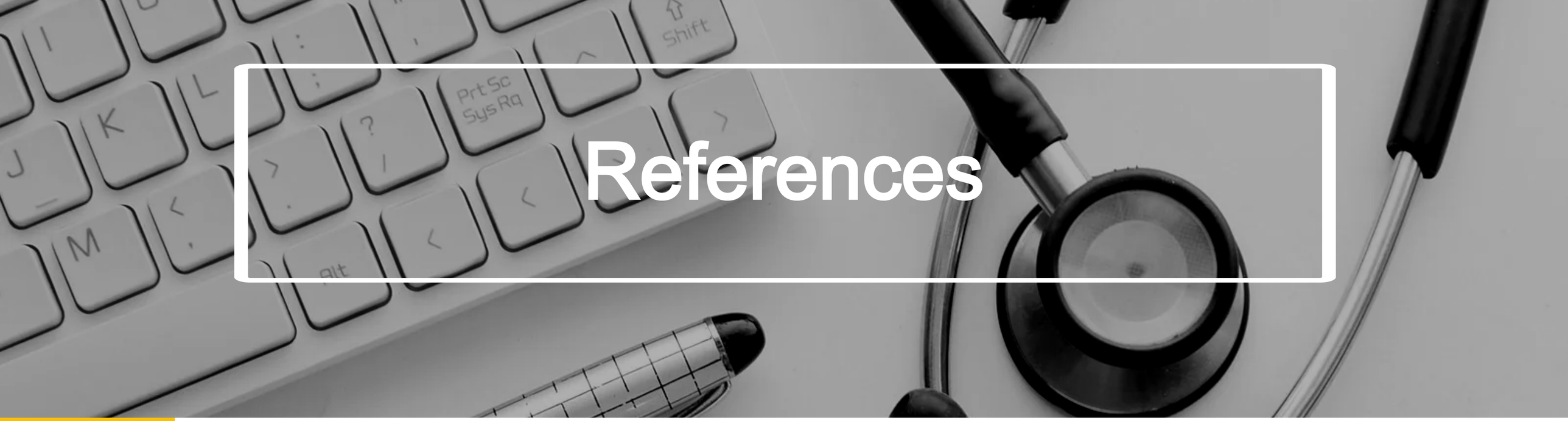
**ALLOWED**

- Total Contact Casts – apply after HBOT
- External Fixators
- Orthopedic Implants (plates, screws, joint replacements)
- Stents




# If you’re every not sure…

Just ASK! Call Ally or Dr. Serena. As new products are constantly coming onto the market, you may need to send a picture of the box so we can ensure we research the correct product to determine its safety in HBO conditions.



# References


"Hyperbaric Medicine Practice" 2nd edition by Dr. Kindwall (pp.417).

NFPA 99, 2012 addition chapter 14

SerenaGroup policy and procedures 2024

Prohibited Item Risk Assessment - Undersea & Hyperbaric Medical Society

# Quiz

# Question 1

1. A 2x2 Vaseline Gauze dressing may be permitted in the monoplace chamber?

True or False

# Answer 1

False. If the dressing can be switched for something safer, it should be. If it cannot be, hold HBOT until that dressing can be alternated with something safer.

# Question 2

2. The first question to ask regarding a dressing going into HBOT…

# Answer 2

…is the product necessary.

# Question 3

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 one of the following: (list two)

# Answer 3

1. Suture Material
2. Alloplastic devices
3. Bacterial barriers
4. Surgical dressings
5. Biological interfaces

# Question 4

If the doctor orders a dressing, then it is safe to go in the chamber without further investigation.

True or False

# Answer 4

False. The safety director and subsequently all HBO technicians, must ask question and verify that the product is safe.

# Question 5

If a product contains a small amount of a questionable ingredient, such as a petroleum base, a good practice is simply to cover it during treatment.

True or False

# Answer 5

False. Oxygen under pressure significantly increases the risk of ignition. A non-HBOT-approved covering (like a transparent film) can trap flammable vapors and not prevent combustion. If a product contains even trace amounts of flammable components like petrolatum, mineral oil, or alcohol, it is contraindicated. In 100% oxygen at 2–3 ATA, materials that are normally stable can ignite or explode.

# Attendance: June

**In Attendance:**

- Henry Ford
- Chambersburg
- Fairview
- Inspira
- Jackson
- Akron

**Absent:**

- Monroeville
- ACMH


# Topic:

## To Dive or Not To Dive

Tuesday, August 19, 2025

12:15 pm est


Contact Us

# QUESTIONS/PROBLEMS

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# THANK YOU !!!