



UNIVERSITY of CALIFORNIA, SAN DIEGO

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Pulmonary Barotrauma, Arterial Gas Embolism & Decompression Sickness in a F-18 pilot

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Introduction:

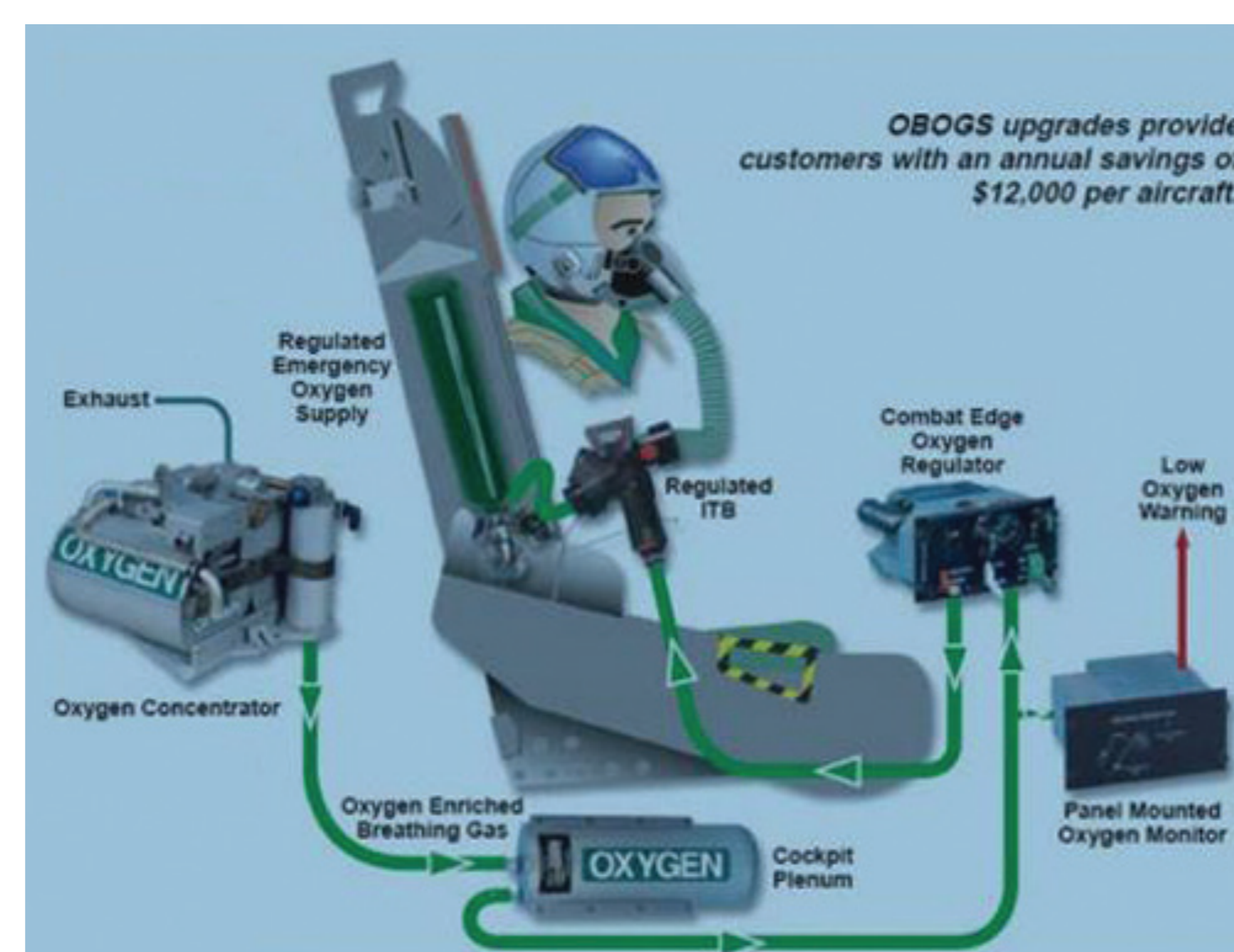
- Rapid changes in ambient pressure can result in several physiologic effects as a consequence of two well-described mechanisms: dissolving inert gases effluxing from solution and barotrauma resulting in gas embolism.
- Aircraft cabin pressurization and On Board Oxygen Generating Systems (OBOGS) mitigate the effects of pressure changes while at altitude.
- With cabin pressurization system failure, aircraft occupants are at significant risk for decompression sickness (DCS) and arterial gas embolism (AGE).
- DCS is commonly seen in both diving, altitude chambers and flights. AGE has been widely reported in diving but has been very rarely related to altitude events.

Case report:

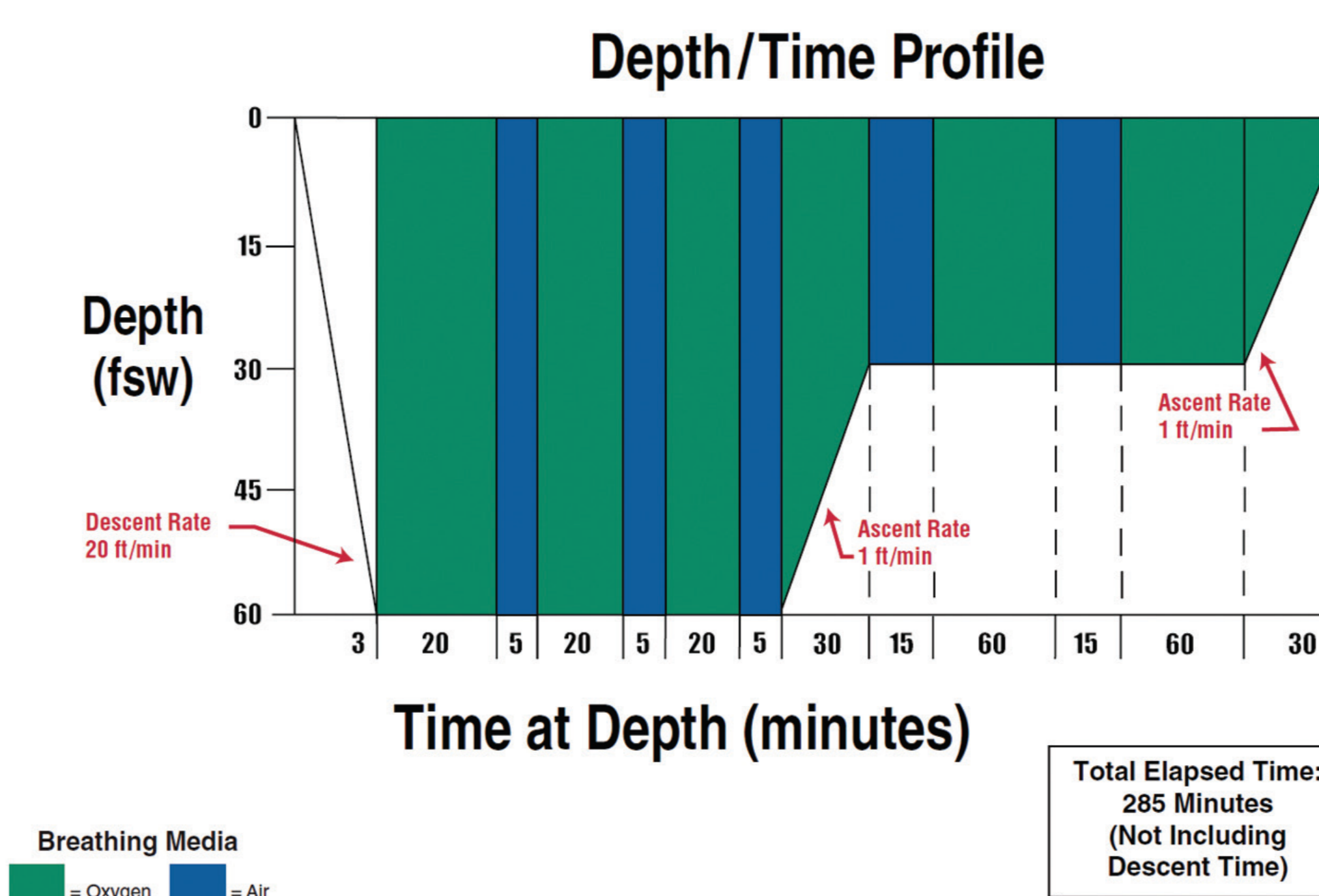
- 33 yo F-18 pilot with no medical history experiences four rapid decompression cycles from 11,000 ft to 29,000 ft in a 20-sec period.
- Performs multiple Valsalva maneuvers during pressure fluctuations.
- Reports in-flight chest tightness, mild shortness of breath, confusion, memory loss, "foggy thinking" and nausea.
- He lands the F-18 safely although has no recall of events related to landing. His symptoms improved.
- 5.5 hrs post event, new symptom onset: unsteady gait, headache, nausea & vomiting, altered sensorium.
- Transferred to UCSD ED with ataxia with positive Romberg, slow alternating hand mvt, abnormal clock drawing and signature. No signs of ear barotrauma. Pulmonary symptoms resolved. CXR normal; CK moderately elevated.



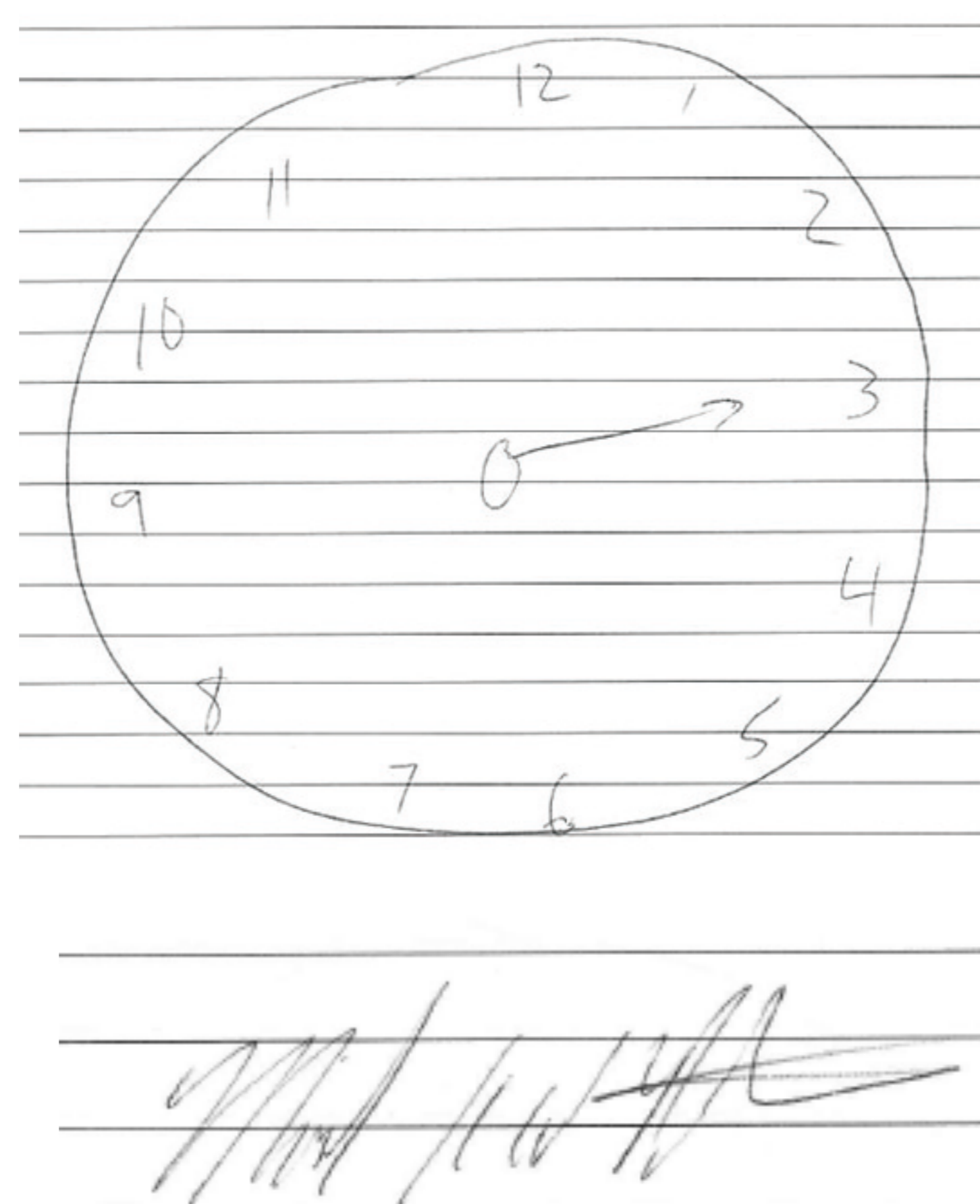
On Board Oxygen Generating Systems (OBOGS)



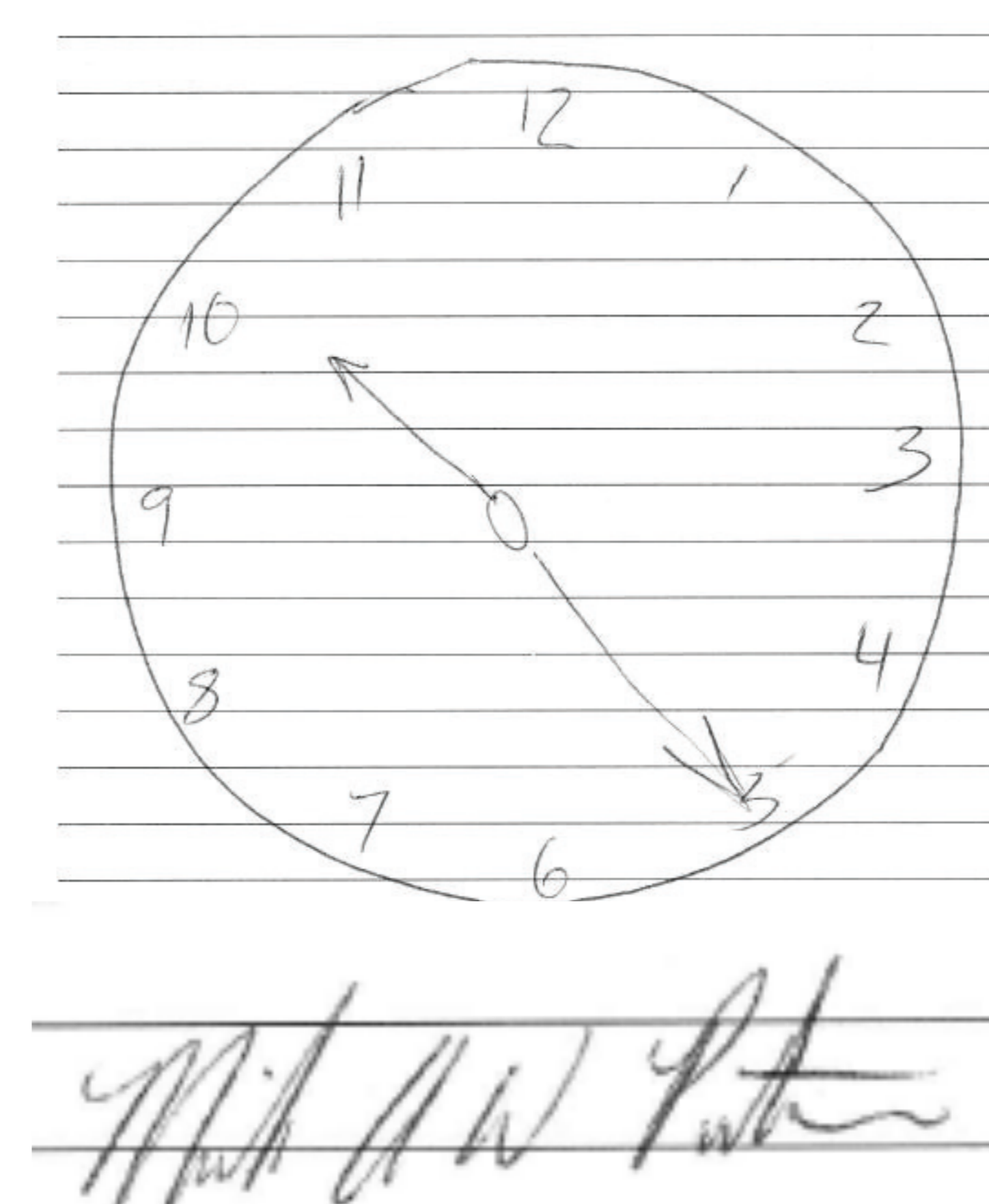
US Navy Treatment Table 6



PRE HBO Treatment Asked to draw 02:30 + signature



POST HBO Treatment Asked to draw 10:25 + signature



Treatment and Outcome:

- Patient treated in a hyperbaric chamber on a US Navy TT6 without extensions approximately 9.5 hrs after onset of symptoms.
- After first O₂ period: headache disappeared, mental "fog" improved.
- After second O₂ period: Romberg improved.
- After third O₂ period: normal hand dysdiadochokinesia, back to baseline cognition and sensorium.
- Post treatment : normal clock drawing and signature, normal neuro exam.
- No recurrence of symptoms, no residual deficits.
- Chest CT post treatment: no anatomic abnormality.
- Upon re-evaluation by the flight surgeon, patient cleared to return to flight duties two weeks after the incident.

Discussion:

- No single pathologic process describes all symptoms.
- Rapid decompression fluctuations, multiple Valsalva maneuvers, immediate onset of symptoms and CK elevation are suggestive of pulmonary barotrauma resulting in an AGE.
- Delayed cerebellar symptoms are consistent with neurologic altitude-induced DCS.
- Symptoms responded appropriately to HBOT.
- AGE and DCS should both be considered in altitude pressurization failures.