

Barotrauma Experienced by an Underground Miner

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Occupational Health
Clinics for Ontario
Workers Inc.

Issue

- An underground miner approached OHCOW to determine if his tympanic membrane rupture and other otological problems are work related or not.
- Other otological problems included hearing loss, swollen tympanic membrane, vertigo, tinnitus, loss of balance, and a sense of fullness and a painful, pressure-like sensation in both ears.



Background

- Felt sharp pain in his right ear during a descent as a shaftman in 2012.
- Medical examination revealed tympanic membrane rupture.
- Returned to work with modified work.
- In 2013, the worker felt sharp pain in his left ear while working as a cagetender.
- He was referred to an ENT specialist and has not returned to work as of yet

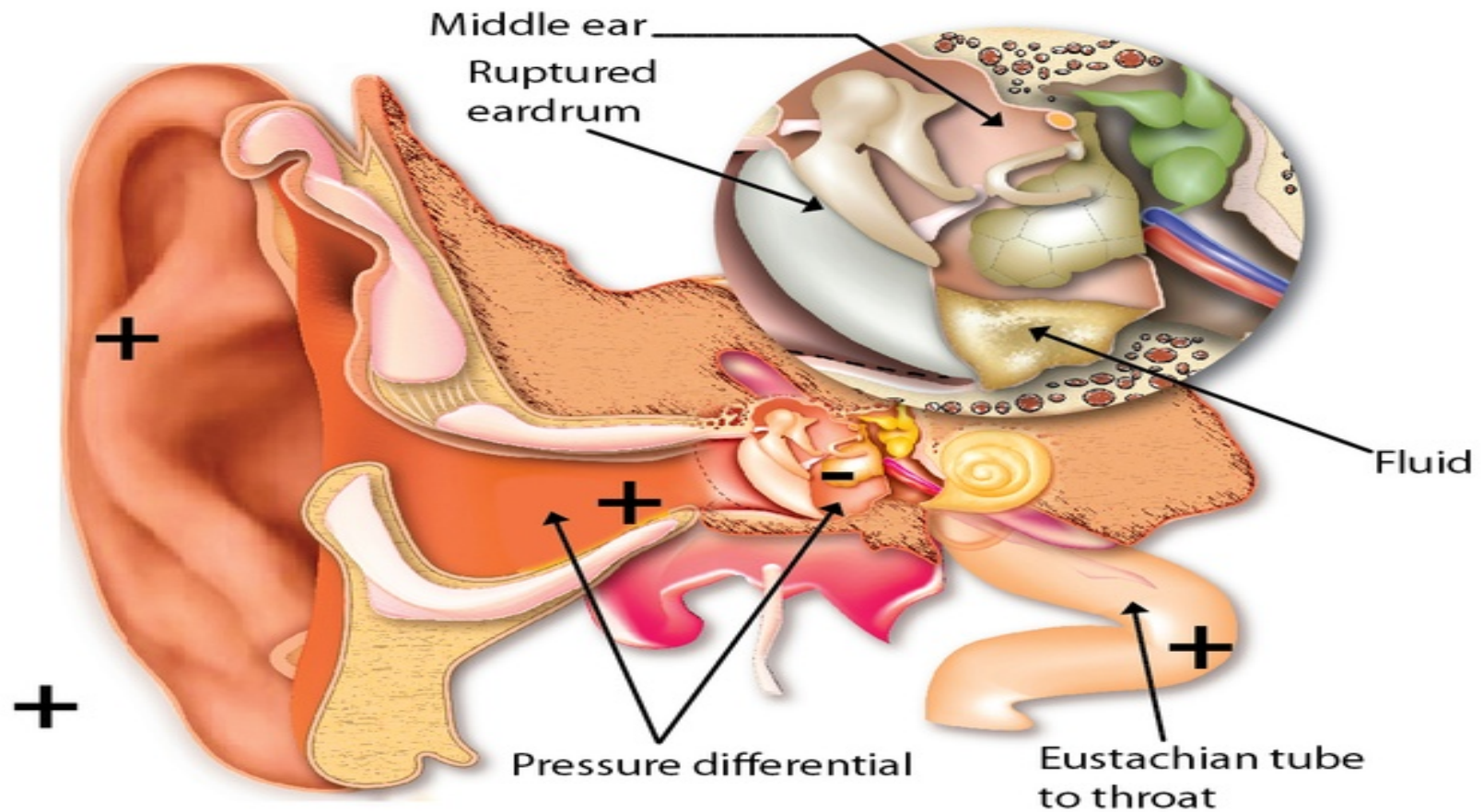


Background

- An audiogram after the first incidence showed hearing loss in the right ear and subsequent audiograms had the same impression at high frequencies.
- A compensation claim was not filed after the first incidence in 2012, however, a claim was filed in 2013 after experiencing the second barotrauma.
- The claim was not allowed.



Ear barotrauma



HELP

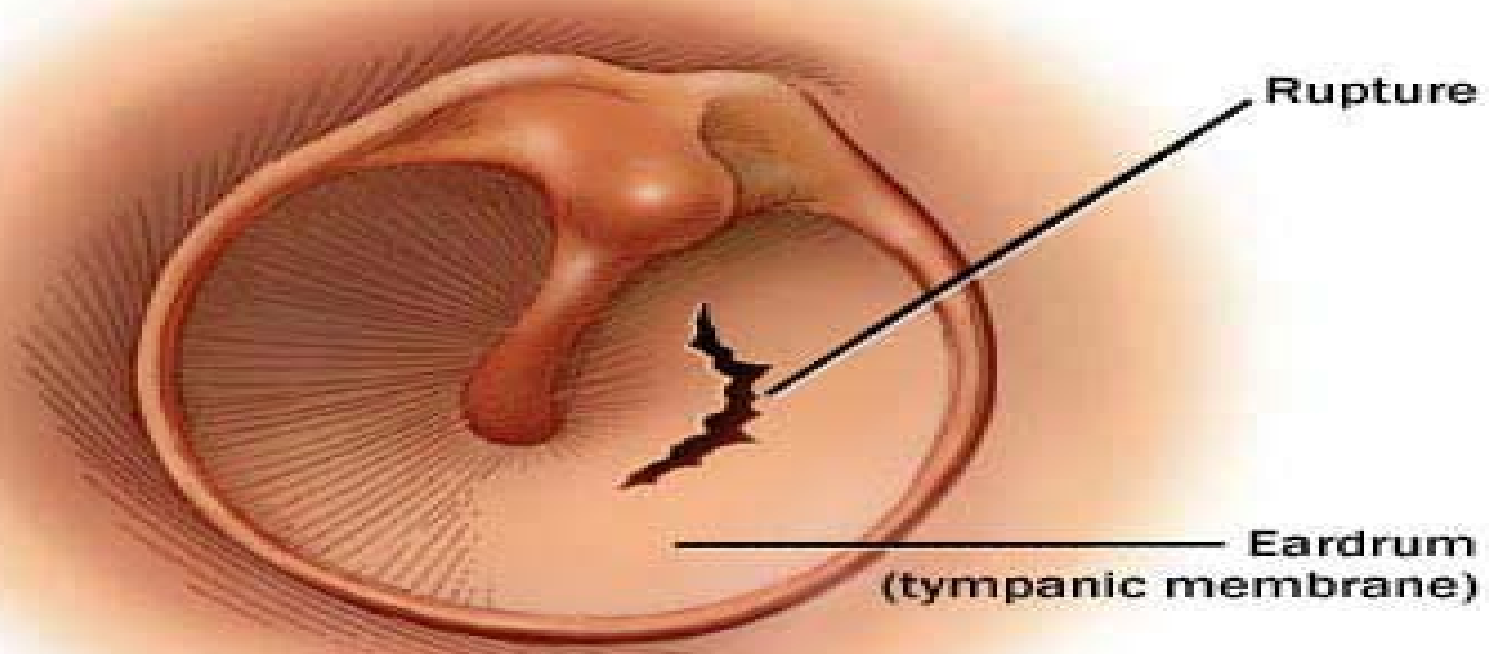
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Ruptured/Perforated tympanic membrane



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As a Shaftman....

- Main job duty was to inspect the inside of the cage (elevator) shaft.
- To perform inspection he would stand on top of the cage moving at a speed of 60 fpm (1 km/h).
- The shaft was 5000 feet deep and 20 feet in diameter.
- 3 inspection trips per shift.
- First incidence of tympanic membrane rupture took place during a descend in 2012.



As a Cagtender.....

- Loading and unloading miners and material at various levels of the under ground mine.
- The cage dimension was 5' x 10'.
- Day shift: 10-16 trips to the depth of 5000 feet at a speed of 2150 fpm (40 km/h).
- Night shift: 25-39 trips at the same speed.
- 165 trips in a 7.5 shifts
- Suffered a barotrauma during a descend in 2013.



OHCOW Assessment

- Self referred to OHCOW
- Interviewed by the Occupational Hygienist to obtain work history
- Ear condition was examined by the occupational medicine physician
- Medical documents including audiograms were reviewed
- Literature search was also conducted



Literature search

- Unfortunately, the literature is scarce on this issue.
- Schutte & Franz (2005) studied barometric hazards in deep-level mining
 - Estimated 66% increase in atmospheric pressure at the depth of 5000 m (16 400 ft)
 - Pose little threat during descent provided good dental care, healthy sinuses, unobstructed ear canals, and normally functioning Eustachian tubes
 - Speed of descent and repeated exposure to pressure variation?



Literature search

- According to Mayo clinic
 - During sudden change in atmospheric pressure the Eustachian tubes does not react fast enough to compensate pressure difference in the environment
- According to Richardson & Mirza (2005)
 - Repeated exposure to pressure variation can cause permanent hearing loss, chronic tinnitus, and damage to inner ear and Eustachian tubes.



WSIAT decisions

WSIAT Decision 500/92

The panel opined based on an ENT specialist testimony that the frequent and repeated descents and ascents may cause Eustachian Tube Dysfunction (ETD).

WSIAT Decision 2264/06

The claim for ETD was allowed based on an ENT specialist opinion that the repetition of descent and ascent in the underground mine may cause ETD.



Finding

OHCOW provided an occupational hygiene and occupational medicine report in which Dr. House concluded that the worker's work as a shaftman and cagetender exposed him to repeated barotrauma and this exposure placed him at risk of ETD and tympanic membrane rupture.



Outcome/Learning lesson

- Compensation claim was allowed WSIAT.
- The worker is still experiencing the barotrauma related symptoms.
- Other miners performing the same job task.
- Barotrauma is not well recognized in the mining industry



Outcome/Learning lesson

- Should research be conducted?
- Prevention
 - Medical Screening
 - Education/awareness
 - Administrative control



Questions/Comments



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