

# Chondritis in the Burned Ear: A Narrative Review

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# What is it?

- Presents between 3-5 weeks following a burn
- Ear becomes red, warm, tender, increase in auriculocephalic angle
- A fluctuance develops, exposing necrotic cartilage
- Usually polymicrobial
- 83-95% of cultures positive for *Pseudomonas*

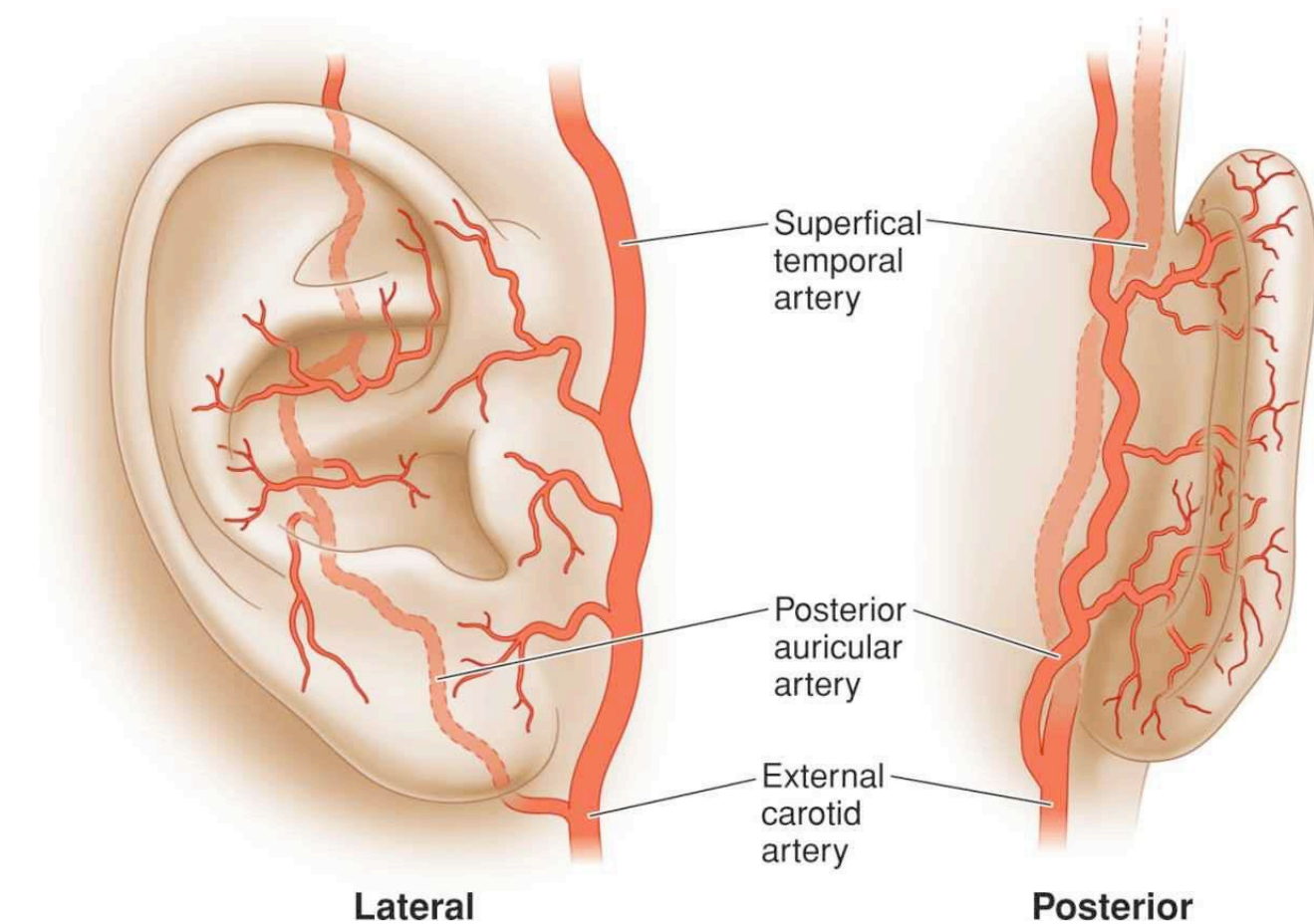
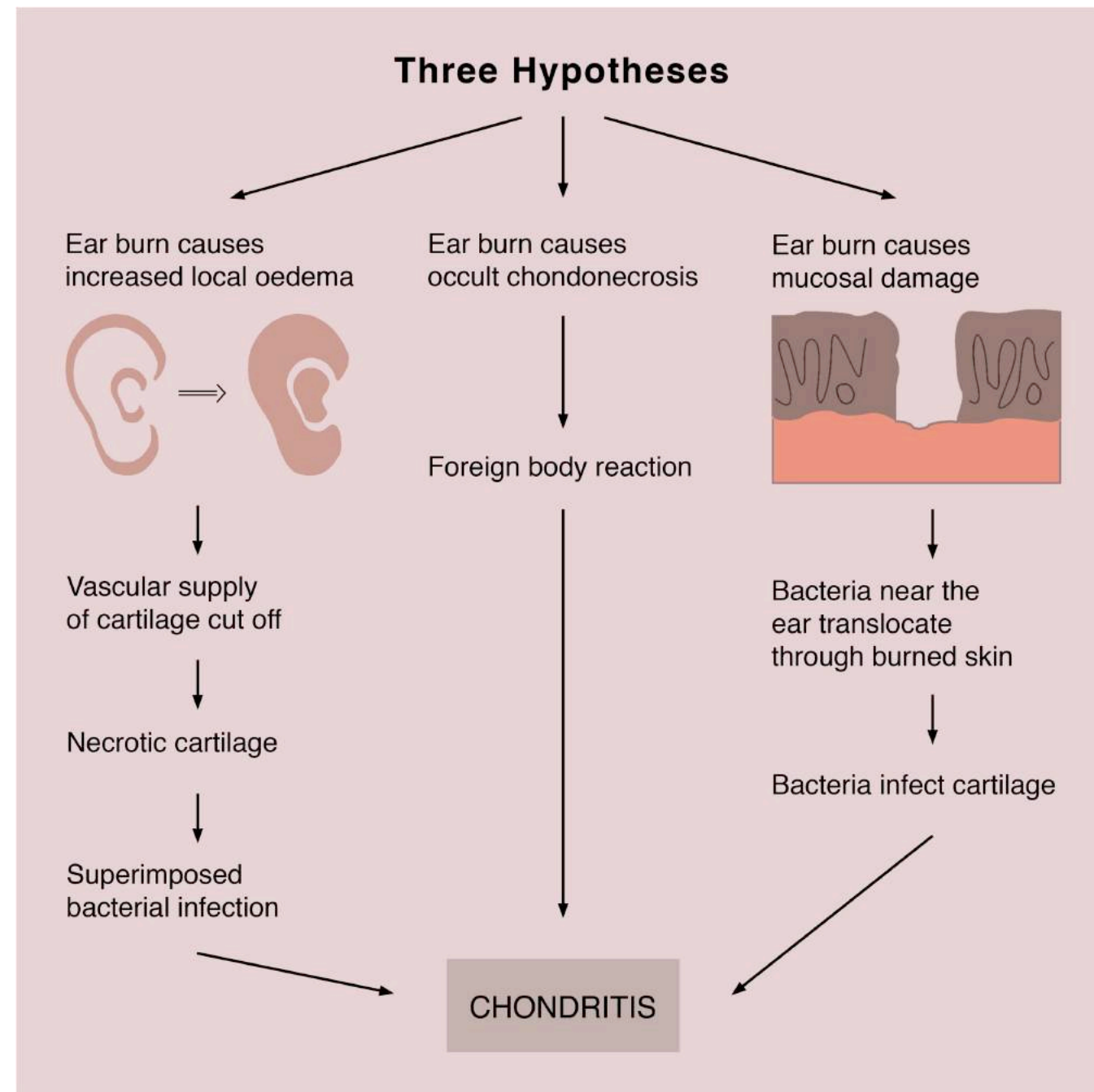


FIG. 1. Acute chondritis, left ear, with increased auriculocephalic angle, erythema and induration.





# Why does it occur?



- Highly vascular skin + avascular cartilage



# Trends over time

- Mafenide (topical sulfamylon) most commonly used
- Vaseline, polysporin, silver sulfadiazine, medicinal honey, Acticoat and Matriderm have also been used
- Systemic antibiotics have no effect
- Rates have fallen from 29% to 0%
- Meticulous pressure care is key



# References

- Beederman M, Humphries L, Kueberuwa Yates E, Gottlieb L. Acute Ear Burns: An Algorithm for Treatment. *PRS Global Open* 2017; **Plastic Surgery the Meeting 2017 Abstract Supplement**: 168-9.
- Dowling J, Foley F, Moncrief J. Chondritis in the Burned Ear. *Plastic & Reconstructive Surgery* 1968; **42**(2): 115-22.
- Engrav L, Richey K, Walkinshaw M, Gottlieb J. Chondritis of the Burned Ear: A Preventable Complication If... *Annals of Plastic Surgery* 1989; **23**(1): 1-2.
- Hashemi B, Bayat A, Kazemei T, Azarpira N. Comparison between topical honey and mafenide acetate in treatment of auricular burn. *Amerian Journal of Otolaryngology* 2011; **32**: 28-31.
- Jang Y, Lee J, Kwon O, Choi S, Oh S. Management of Burned Ear Using Acticoat® Silver Coated Dressing: Treatment and Prevention of Suppurative Chondritis. *Journal of Burn Care & Rehabilitation* 2002; **23**(S137).
- Kraenzlin F, Mushin O, Ayazi S, Loree J, Bell D. Epidemiology and Outcomes of Auricular Burn Injuries. *Journal of Burn Care & Research* 2018; **39**(3): 326-31.
- Mills D, Willis Roberts L, Mason J, AD, McManus W, Pruitt B. Suppurative Chondritis: Its Incidence, Prevention, and Treatment in Burn Patients. *Plastic & Reconstructive Surgery* 1988; **82**(2): 267-76.
- Plastic Surgery Key. Ear. 2016. <https://plasticsurgerykey.com/ear/> (accessed 14th October 2018).
- Purdue G, Hunt J. Chondritis of the Burned Ear: A Preventable Complication. *The American Journal of Surgery* 1986; **152**: 257-9.
- Sarabahi S. Management of ear burns. *Indian Journal of Burns* 2012; **20**(1): 11-7.





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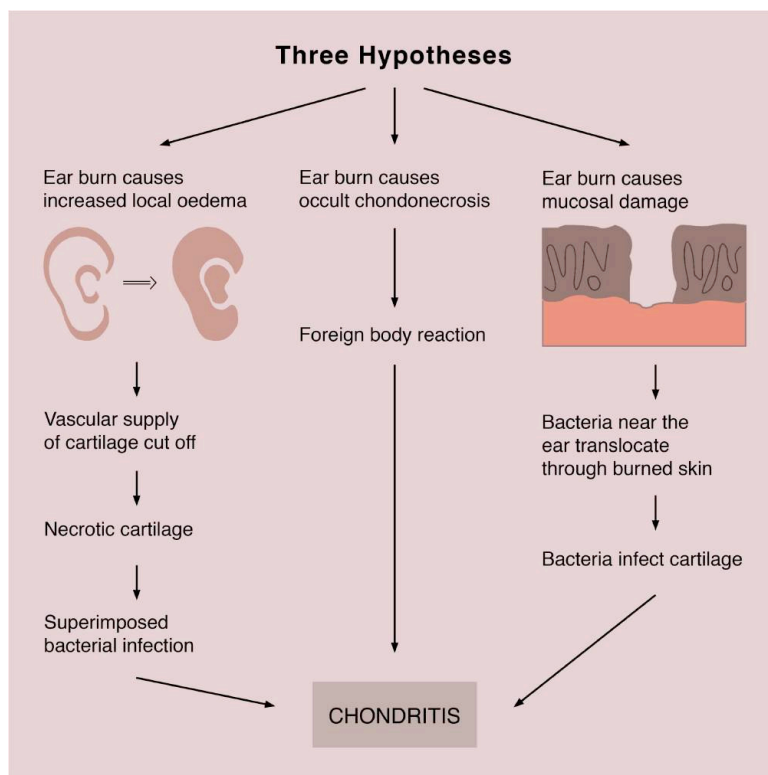
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## 1. Introduction

Suppurative chondritis is an increasingly rare delayed complication of ear burns. Prior to the routine use of topical antibiotics for all ear burns, the incidence of chondritis in burns patients was as high as 25%.<sup>1</sup> Since the mid-1960s, incidence rates have fallen, with some recent studies even claiming that treatment protocols have evolved to the stage where incidence rates should be approaching zero.<sup>2</sup> Much literature exists on the long-term surgical options for ear reconstruction following burns. However, literature on the epidemiology and the acute management of ear burns is sparse.<sup>3</sup> This narrative review aims to address this void in the literature. The primary aim of this study was to discuss the evidence for the acute management of ear burns from the 1960s to the present and how it has evolved over time. Our secondary aims were to summarise the microbiological organisms implicated in chondritis secondary to ear burns, as well as the clinical presentation and approach to the diagnosis of this increasingly rare pathology.

## 2. Pathophysiology



## 4. Clinical Presentation

- Presents between 3-5 weeks following a burn
- Dull pain that becomes more severe within hours
- Ear becomes red, warm, tender, increase in auriculocephalic angle
- A fluctuance develops, exposing necrotic cartilage

## 3. Microbiology

- Two large scale studies from prior to 1990

### 1. Dowling, Foley and Moncrief (1968)

- Retrospective chart review on 147 patients
- Positive cultures in 56/147 (38%)
- Out of the patients with positive cultures, only 27% cultured a single organism; the majority were polymicrobial
- **95% of cultures + *Pseudomonas***
- **55% of cultures + *Staph aureus***
- **27% of cultures + *Aerobacter***
- **20% of cultures + *Proteus***

### 2. Mills et al. (1988)

- Retrospective chart review of 317 cases admitted to one hospital between 1967-1984
- 233/246 (95%) of cultures were positive
- **83% of cultures + *Pseudomonas***
- **56% of cultures + *Staphylococcus***
- **20% of cultures + *Proteus***
- **20% of cultures + *Providencia***

## 5. Conclusion

- From 1968 to now, the incidence of chondritis has decreased from 29% of patients with ear burns to 0%
- Many different topical treatments have been trialled
- Pressure therapy is very important
- Systemic antibiotics have no effect

## 6. Narrative Review

1968

- Retrospective chart review of 147 patients between 1957-1966
- Topical sulfamylon (Mafenide) is introduced as a routine treatment in 1964
- The rate of chondritis falls from 29% to 19%,  $p = 0.005$

1986

- Retrospective chart review of 136 patients admitted over a two year period
- Burned ears were washed in chlorhexadine solution 2-3 times a day then Mafenide was applied
- 75% of ears healed without operations
- 0% incidence of chondritis

1988

- Retrospective chart review of 317 cases admitted between 1967 - 1984
- Both Mafenide and silver sulfadiazine were used; Mafenide was much more effective
- During the study period, incidence of chondritis decreased from 20% to 3%

1989

- Retrospective chart review of 190 patients admitted between 1980-1987
- Patients were treated with silver sulfadiazine and pressure therapy
- Incidence of 2% chondritis

2017

- Retrospective chart review of 109 patients who presented between 2007-2013
- Patients were managed with Mafenide, pressure therapy and bedside debridement
- 25% of patients needed operations, which occurred 8.8 days after admission on average
- Incidence of chondritis was 0%

2018

- Retrospective chart review of 132 patients that presented between 2011-2014
- Severe burns were treated with Mafenide (44%); other patients were treated with Vaseline (45%) or Polysporin (11.5%) – nil sig. difference between groups
- Incidence of chondritis was 0%