The Journal of Laryngology and Otology
March 1992, Vol. **106,** pp. 252–253

Necrosis of the incus by the chorda tympani nerve

CARL WATSON (Leeds)

Abstract
Ossicular necrosis is often associated with chronic adhesive otitis media. An unusual abnormality discovered in an incus removed during tympanoplasty is reported. The long process appears to have been grooved by pressure from the chorda tympani. An alternative theory to explain the vulnerability of the long process of the incus is suggested.

Case report

The patient gives a history dating from early childhood of recurrent otitis media with effusion. In the past she had undergone adenotonsillectomy, myringotomy and grommet insertion and a left cortical mastoidectomy. Following cortical mastoidectomy her left ear gave rise to few problems and she was lost to follow-up. She re-attended the clinic after eight years complaining of intermittent left-sided otalgia. Examination showed that the left ear had developed an attic cholesteatoma. The posterior segment of the pars tensa was atrophic and retracted onto the long process of the incus and stapedial head. The patient had a predominantly low tone conductive hearing loss in the left ear averaging 30 dB.

The ear was explored by the trans-canal approach. The cholesteatoma was found to be small and confined to the attic. The long process of the incus was deficient with loss of the lenticular process and replacement by a fibrous strand. The intention, following removal of the cholesteatoma, was to reinforce the atrophic posterior segment with an underlay temporalis fascia graft and establish a Type III tympanoplasty, leaving the option of incus interposition for a second stage. The chorda tympani was displaced to facilitate removal of the incus. The chorda was found to be lying within a deep groove on the lateral aspect of the long process of the incus. The operating microscope was not set up for photography at the time but the pre-operative appearance of the ear is illustrated by a sketch (Fig. 1) and the incus grooved by the chorda tympani is shown in Figures 2 and 3.

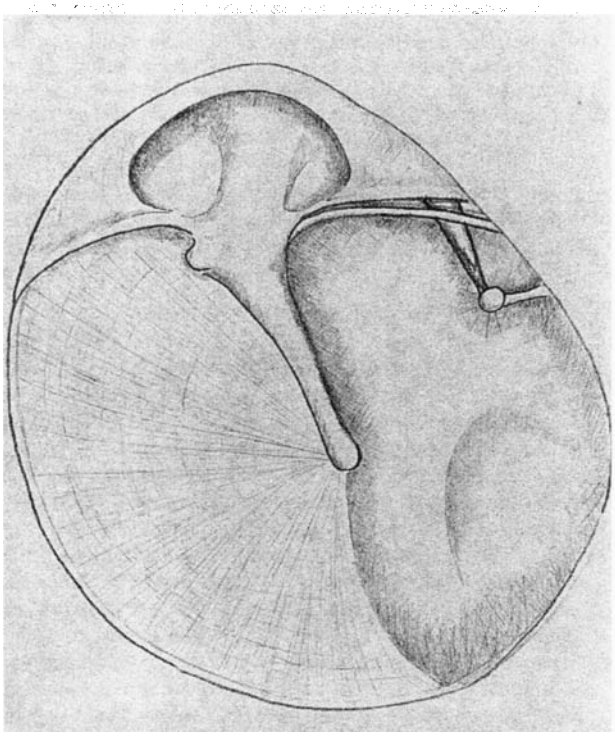

Fig. 1
The appearance of the tympanic membrane showing the attic retraction and the atrophic pars tensa retracted onto the promontory and draped over the ossicular chain.

Discussion

Chronic adhesive otitis media is often associated with ossicular defects, the most frequent being necrosis of the long process of the incus (Tos, 1979). The cause of the bone loss has been dis-

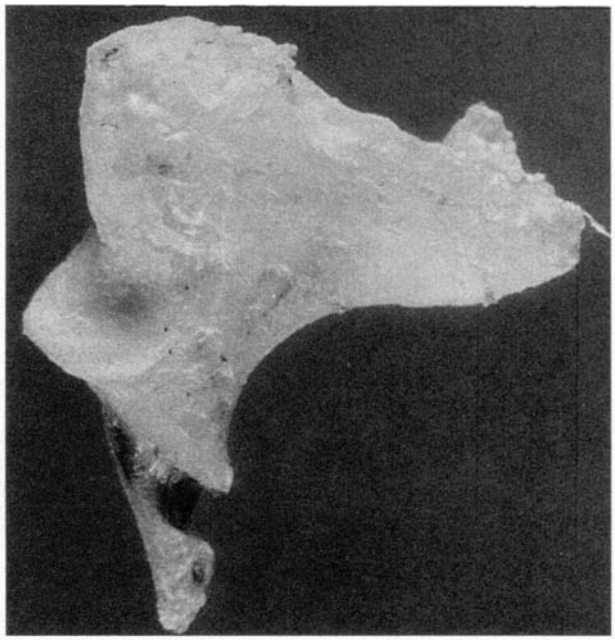

Fig. 2
The incus after removal demonstrating the notch formerly occupied by the chorda tympani. Photographed using Tessovar; original magnification ×3.2.

Accepted for publication: 6 November 1991.

https://doi.org/10.1017/S002221510011919X Published online by Cambridge University Press

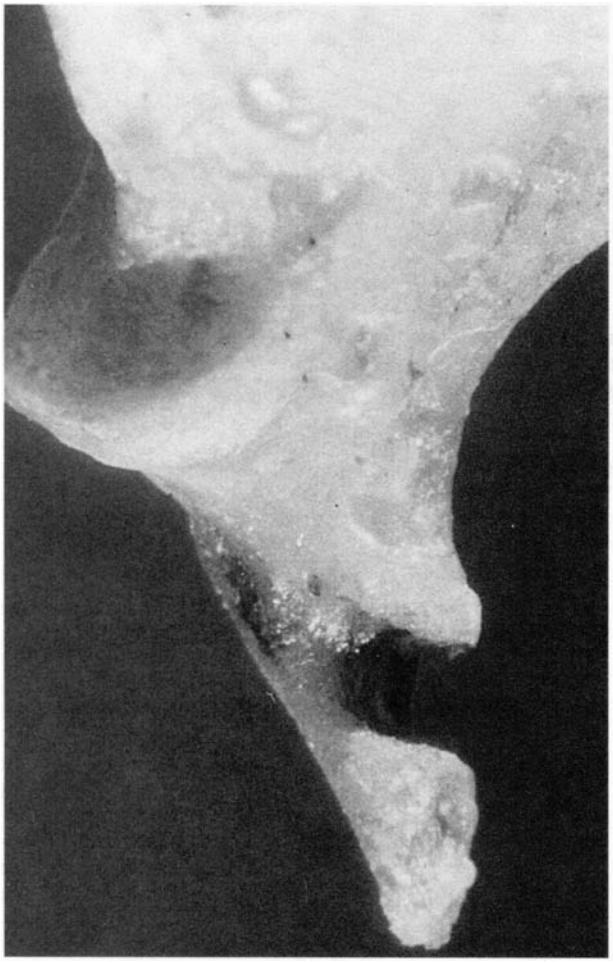

Fig. 3

A closer view of the notch in the long process. Tessovar; original magnification ×6.4.

uted. In the past ischaemia was thought to be responsible however it has been suggested that bone reabsorption may be associated with surrounding hyperaemia and increased lysosomal activity (Thomsen *et al.*, 1974).

Key words: Incus; Chorda tympanic nerve

Schucknecht (1974) believes that necrosis of the incus progresses from the lenticular process to ultimately involve loss of the entire long process and in support of this theory he illustrates a series of incudes showing varying degress of necrosis of the long process. His illustration is interesting in that one of the specimens has lost most of the long process, the remaining stump is longer posteriorly than anteriorly, and has an upward concavity corresponding to the curve described by the chorda tympani as it passes anteriorly over the long process.

It is often found that in cases of loss of the distal portion of the long process that a fibrous strand is present connecting the remainder of the long process to the stapedial head. In other cases where the bone loss is more extensive and only a stump of long process remains no such fibrous strand is found. It is postulated that chronic retraction of the tympanic membrane may, by pressure of the intervening chorda tympani on the incus, cause necrosis of a segment of the long process. The long process may be so weakened as to result in its eventual failure with relatively minor stress. The fractured long process would then have a precarious blood supply particularly if the distal segment of the long process was also necrosed and replaced by fibrous tissue. In these cases the entire long process may quickly be reabsorbed leaving no trace of its existence and no fibrous strand. This theory may explain why patients with chronic adhesive otitis media and ossicular discontinuity, occasionally report sudden hearing loss.

Acknowledgements

I would like to thank Mr D. R. Hanson for his permission to report this case. I would also like to thank Mr D. Hawkridge of the Department of Dental Illustration for photographing the incus using the Tessovar equipment.

References

Schuknecht, H. F. (1974) *Pathology of the ear*. Chapter 5. Harvard University Press: Cambridge, Massachusetts. p. 233–238.

Thomsen, J., Jorgensen, M. B., Bretlau, P., Kristensen, H. K. (1974) Bone resorption in chronic otitis media. A histological and ultrastructural study. *Journal of Laryngology and Otology,* **88:** 975–992.

Tos, M. (1979) Pathology of the ossicular chain in various chronic middle ear diseases. *Journal of Laryngology and Otology,* **93:** 769–780.

https://doi.org/10.1017/S002221510011919X Published online by Cambridge University Press