

History of Otosclerosis and Stapes Surgery



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KEYWORDS

• Stapes • Otosclerosis • Stapedectomy • Stapedotomy • Fenestration • Lempert
• Rosen • Shea

KEY POINTS

- The study of otosclerosis dates back to as early as 1704 with the research of Antonio Maria Valsalva.
- Stapes surgery was first described by Johannes Kessel in 1876, but fell into disrepute in 1899 due to concerns of patient safety at the time.
- Julius Lempert's ingenious single-stage fenestration operation became the mainstream method to indirectly treat Otosclerosis in the 1930s to 1950s.
- John Shea rediscovered and modernized the stapedectomy procedure in 1956.
- Modern stapes surgery is still evolving, but studying the history, rediscovery, and modification of otosclerosis therapy is essential for appreciating advances in medicine today and in the future.

INTRODUCTION

The current advancements in otosclerosis therapy cannot be fully appreciated without studying the history, rediscovery, and modification of a once-forgotten procedure.

The study of otosclerosis dates back to as early as 1704 with the research of Antonio Maria Valsalva¹ (**Fig. 1**). Valsalva, who was Professor of Anatomy in Bologna, is credited with first describing stapes fixation as a cause of hearing loss. His meticulous postmortem dissections of a deaf patient in 1704 revealed fixation of the stapes as the cause of hearing loss. The dissections were performed in the Anatomical Theater of the Archiginnasio in Bologna, Italy (**Fig. 2**). In 1841, Toynbee's publication firmly established the link between deafness and stapes fixation. He dissected 1659 temporal bones and found stapes fixation in 39. He concluded that "osseous ankylosis of the stapes to the fenestra ovalis was one of the common causes of deafness."

Disclosure: The authors have nothing to disclose.

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Otolaryngol Clin N Am 51 (2018) 275–290

<https://doi.org/10.1016/j.otc.2017.11.003>

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Fig. 1. Antonio Maria Valsalva. (Data from <https://wellcomecollection.org/works/yhyxsfk3> under a Creative Commons Attribution 4.0 international license.)

In 1873, Schwartze described a reddish hue on the cochlear promontory of patients with active otosclerosis (Schwartze sign).² This active hyperemic stage with increased vascularity was later named otospongiosis by Siebenmann. It was assumed by Toynbee and others that chronic inflammatory mucosal changes in the middle ear resulted in secondary ankylosis of the stapes.³ However, in December, 1893, some 52 years later, Adam Politzer (**Fig. 3**) described the histologic findings in 16 cases of stapes fixation. His findings indicated that the deafness, which had been attributed to chronic interstitial middle ear catarrh with secondary stapes fixation, was really due to a primary disorder of the labyrinthine capsule.⁴ He referred to this pathology as otosclerosis. His findings were initially published in 1894 in *Zeitschrift Für Ohrenheilkunde*



Fig. 2. The dissections of Valsalva were performed at the Anatomical Theater of The Archiginnasio in Bologna, Italy.

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