



Treatment of External Auditory Canal Exostoses Using an Ultrasonic Serrated Knife

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Objective

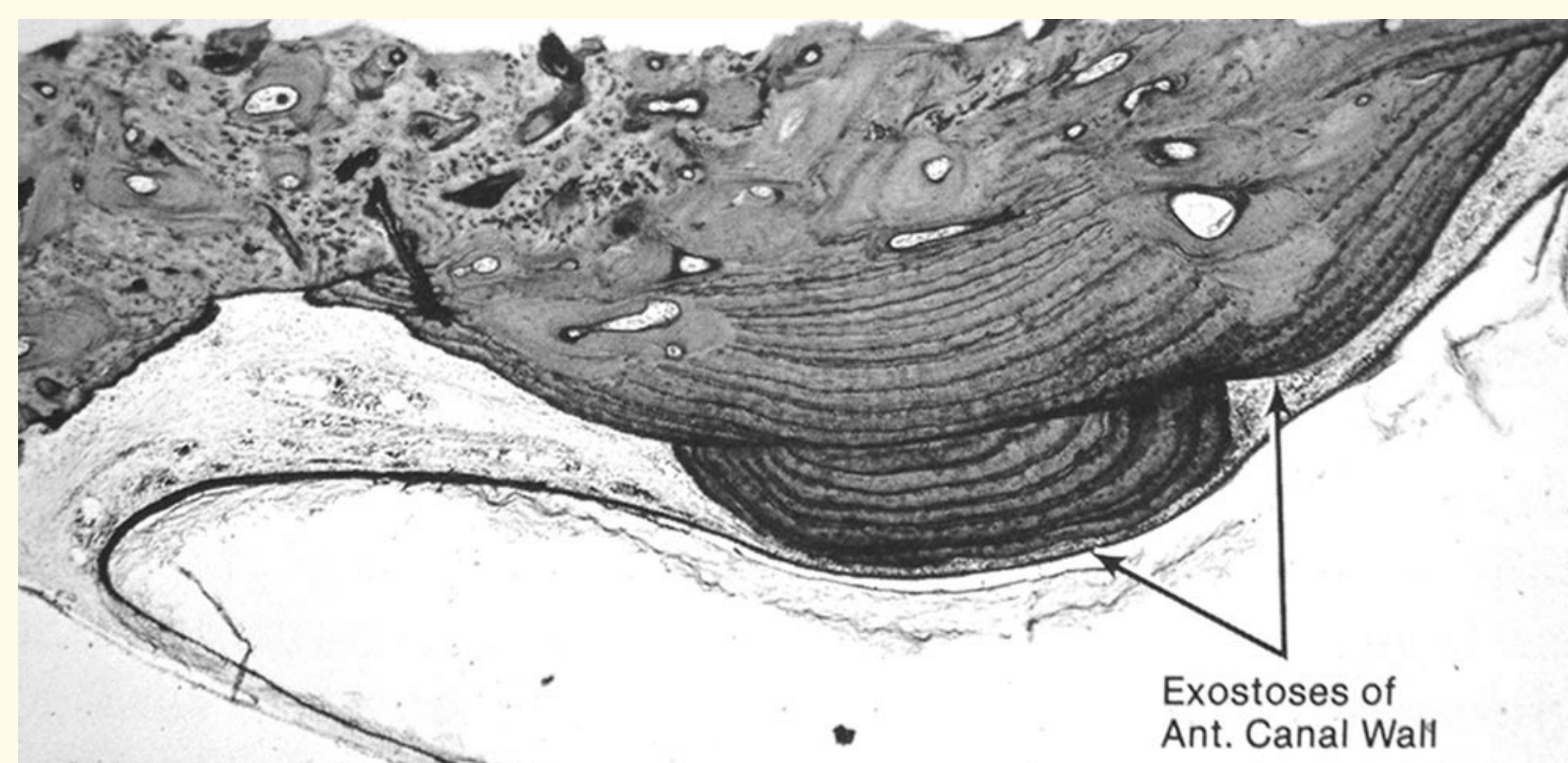
To describe a novel transcanal approach for removal of external auditory canal exostosis.

Introduction

- External auditory canal exostoses are broad-based lamellated hyperostotic bony growths.
- They form as a reaction to cold water exposure.
- They are the most common bony abnormality of the external auditory canal and are typically multiple and bilateral.
- Common in the surfing population. Harrison et.al. found a 5.6% incidence in swimmers
- They become problematic as they enlarge.
- Specifically they can cause external auditory canal obstruction, either from a reduction of hearing from occlusion of the canal or by leaving a narrow lumen that becomes occluded with exfoliated skin.
- This results in a conductive hearing loss.
- In addition the exfoliated skin can become infected resulting in repeated canal infections which further reduce hearing and cause pain.
- surgery is indicated after the development of these and other concerning symptoms.

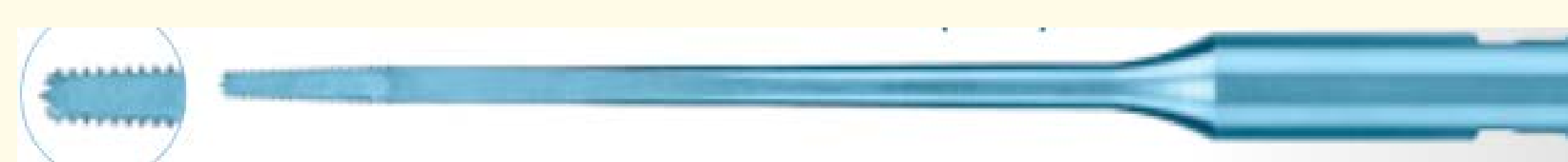
Surgical Challenges

- The variable shape of the exostoses
- A narrowed or absent external auditory canal lumen due to the bulk of the exostoses. This can be further obscured by bleeding.
- The location of anteriorly based exostoses adjacent to the temporomandibular joint.
- The proximity of the facial nerve.
- The proximity of the exostoses to the tympanic membrane which can result inadvertently in traumatic perforations.
- Preservation of the external auditory canal skin over the exostoses.



Instrument

- The Sonopet Ultrasonic Aspirator© (Stryker Corporation, Kalamazoo, MI) with a serrated knife attachment was used in a transcanal approach, in combination with 1 mm and 2 mm osteotomes, to incrementally remove external auditory canal exostosis in symptomatic patients. It has a cutting length of 12.4mm and a width of 0.8mm. It has decreased vibration compared to a drill as well as improved tactile feedback. Preoperative and postoperative clinical evaluation and audiologic testing was performed on all patients.



Methods

- This was a retrospective chart review of patient undergoing sonopet assisted exostoses removal from June 2014 to February 2015. Six ear canals were treated with the sonopet.
- The selected ears had near or total occlusion of the external auditory canal lumen with exostoses.
- The operation was performed under the microscope.
- Lidocaine with epinephrine 1:100,000 was infiltrated at the lateral edge of the most lateral exostosis and at the bony cartilaginous junction if accessible. A round knife was used to incise the skin crest of the most lateral exostosis. The skin envelope was then elevated using a duckbill elevator. Then using a two handed technique the sonopet device was used to mobilize the exostosis at its base. Then osteotomes were used to mobilize the exostoses.

Results

- Six ear canals were treated with the Sonopet©.
- A 100% removal of the symptomatic exostoses was achieved in all cases.
- The external auditory canal walls healed in 4 weeks in 5 of 6 patients.
- The prolonged healing time in 1 patient was secondary to thermal injury to the bone.
- Complications, including tympanic membrane perforation, facial paralysis, hearing loss, stenosis and temporomandibular joint derangements, were not seen.

Ear #	Gender	Age	Pre-op Audiology	Surgical approach	Hospital admission	Complications
1	M	59	Mild High fr. Snhl	transcanal	No	None
2	M	59	Mild High fr. Snhl	transcanal	No	None
3	M	30	Normal hearing	transcanal	No	None
4	M	30	Normal hearing	transcanal	No	None
5	F	50	Normal hearing	transcanal	No	None
6	F	50	Normal hearing	transcanal	No	None

Conclusion

- Exostosis extirpation is a challenging procedure given the narrow canal aperture and the limited or total lack of identifiable landmarks.
- These factors combined increase the risk of complication with traditional methods of exostosis mobilization.
- Sonopet offers a novel approach to assist in the treatment of large broad-based exostosis with its powerful yet controlled precise dissection in the external auditory canal. In addition it can be used to shave down medial irregularities.
- Intraoperative complications including tympanic membrane perforation, facial paralysis, hearing loss, and temporomandibular joint derangements, were not seen

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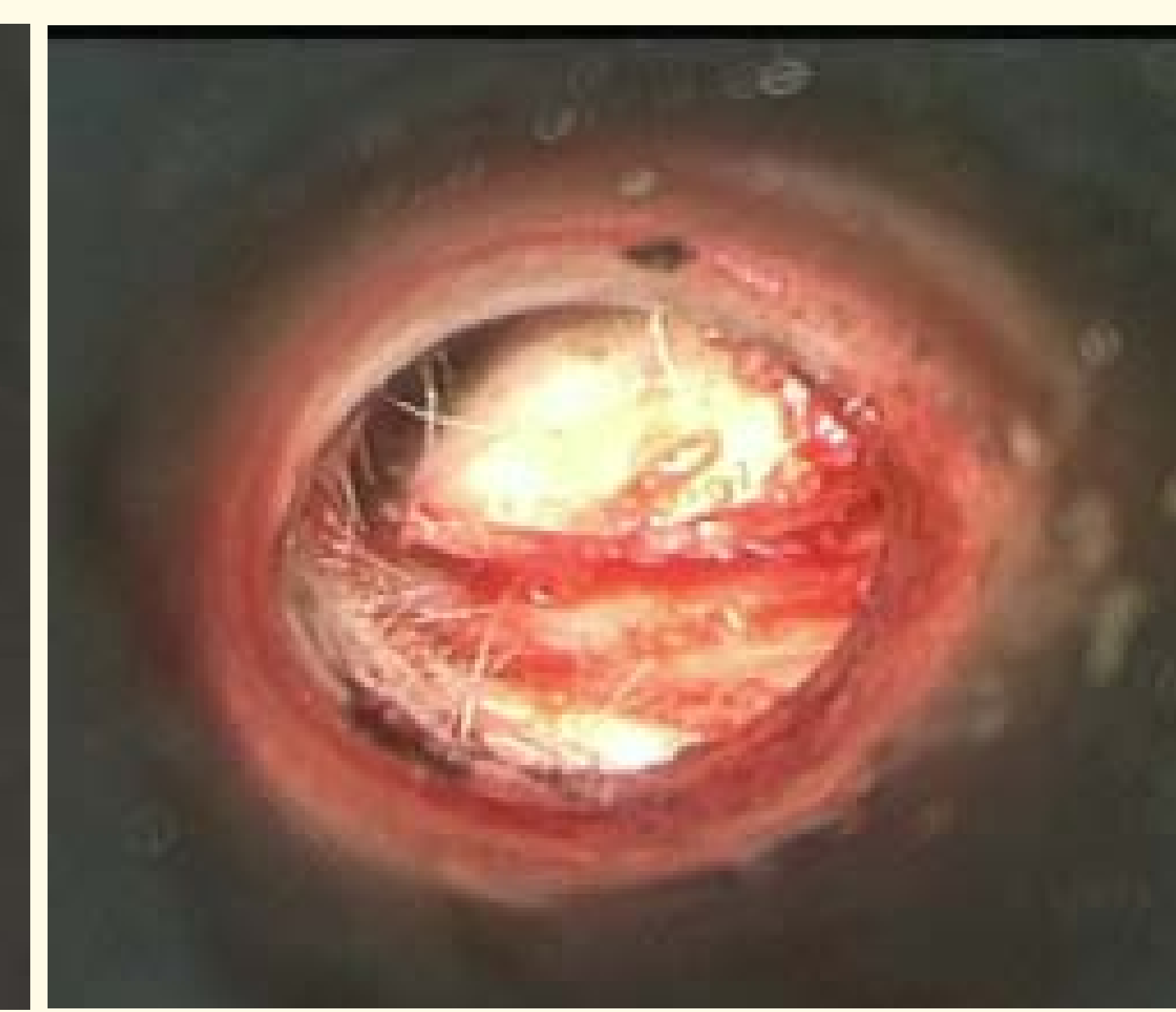
A.



B.



C.



D.

Images. A) exostoses demarcated by red line B) Sonopet at the inferior edge of the exostoses, c) chisel elevating the exterior edge of the exostoses. D) mobile exostoses segment



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