The Journal of Laryngology & Otology

cambridge.org/jlo

Politzer's test – but which one? A plea for standardisation of terms in otology

A Mudry[1] and J R Young[2]

[1]Department of Otolaryngology, Head and Neck Surgery, Stanford University School of Medicine, California, USA and [2]Retired General ENT Surgeon, Bideford, UK

Abstract

Background. Politzer's tuning fork test is a little-known special examination with a chequered history.

Objective. This paper gives Politzer's original description, and explains how he intended it to be used.

Methods. The historiographical research in this study is based on primary references. Secondary documentation is only cited when it is necessary to substantiate any historical argument.

Results and conclusion. After the apparent disappearance of Politzer's tuning fork test from the otological scene in the 1950s, its consequent resurrection was not what it seemed. This story underlines the need for a standardisation of otological nomenclature, particularly when eponyms are used.

Review Article

Dr J R Young takes responsibility for the integrity of the content of the paper

Cite this article: Mudry A, Young JR. Politzer's test – but which one? A plea for standardisation of terms in otology. *J Laryngol Otol* 2022;**136**:1023–1026. https://doi.org/10.1017/S002221512200130X

Accepted: 24 May 2022
First published online: 15 June 2022

Key words:
Otology; History; Politzer; Tuning Fork Test; Eponyms; Standardization

Author for correspondence:
Dr John Riddington Young, West Barton Farm, Horwood, Bideford EX39 4PB, UK
E-mail: riddingtonyoung@gmail.com

Introduction

In 1870, Politzer described his tuning fork test, which is a test of Eustachian tube patency using a tuning fork held in front of the nostrils. By the turn of the twenty-first century, two other procedures were associated with Politzer: 'Politzer's manoeuvre' (of insufflation) and another one involving the auscultation of the middle ear with a tube. Over the years, these three tests have all become muddled. This confusion is a good example of the need for international standardisation of otological terms.

The year 2020 is not only the Jubilee year of the centenary of Politzer's death,[1] it is also the 150th Jubilee of the first publication of his eponymous tuning fork test. Though little-known, this test has a capricious and interesting history.

Adam Politzer (1835–1920) was born in Hungary, but studied and spent most of his life in Vienna. He was certainly well known during the nineteenth century, and considered by some as the 'Father of Otology'.[2] Indeed, the International Otological Surgical Society is called the Politzer Society, and his name lives on in various eponyms. His greatest historical legacy is his seminal work on the history of otology, first published in 1907,[3,4] and most recently revised in 2015.[5] Politzer had a great regard for history, and his work demonstrates the maxim that the study of the past is the key of the present which opens the future.[6]

Politzer's three 'tests'

The re-emergence of Politzer's tuning fork test shows the exigency of a universal international otological nomenclature.

Lucae, in 1866, was the first to dub the insufflation technique (described by Politzer in 1863[7]) as 'Politzer's manoeuvre'.[8] This soon also became known as 'politzerisation', or 'Politzer's method'.[9] A rubber bag fitted with a suitable nasal tip (or 'acorn' or 'olive') is inserted into the nasal vestibule, and while the patient swallows a mouthful of water, the operator then sharply squeezes the bag.[10] This blast of air will open a patent Eustachian tube. Politzer's tuning fork test (another test of Eustachian tube function) was not published until 1870. To complicate matters further, there is Politzer's auscultation test, where the operator uses an auscultation tube connected to the patient's external auditory meatus.

Politzer's tuning fork test

In 1870, Politzer described this tuning fork test as follows:

> *If I hold the vibrating tuning-fork in front of the nostrils, the sound becomes immediately louder in both ears at the moment of swallowing when the Eustachian tube opens wide. In my opinion, this is because the vibrations that enter the nasopharynx through the nostrils penetrate into the tympanic cavity during the opening of the Eustachian tube.*[11]

If one Eustachian tube is blocked, the sound is weaker on that side. He discussed it again in 1878, in the first edition of his textbook,

> *The opening of the Eustachian tube during the act of swallowing can also be proved by another simple experiment, which was first performed by me in 1869. If a vibrating tuning-fork is held in front of the nostrils, a uniformly weak sound will be heard in both ears; during an act of swallowing, however, the tone of the tuning-fork will be perceived in both ears greatly increased, as its vibrations penetrate unchecked into the tympanic cavity through the open Eustachian tube.*[12]

He completed its description in the third edition of his textbook, published in 1893:

> *The author's test to prove the perception of the vibration of the tuning-fork through the Eustachian tube … is suitable for a series of cases: (1) to prove the permeability of the Eustachian canal; (2) to diagnose an obstruction to the conduction of sound in the middle ear … In middle ear affections of one side with impermeability of the Eustachian tube, …the tuning-fork C_2, when held before the nostrils, will in most cases be heard only in the normal ear. … In unilateral labyrinth affections, where the objective examination and all the symptoms leave no doubt of the presence of affection of the auditory nerve, the C_2 tuning-fork will be heard only in the normal ear, as well as during swallowing as when the tube is in a state of rest.*[13]

Reception by colleagues

Randall seems to be the first to mention using Politzer's tuning fork test, in 1897. He commends its use in the assessment of Eustachian tube patency:

> *Politzer's test with the tuning fork vibrating before the nostrils shows that the right tube* [i.e. Eustachian tube] *opens more freely than the left in the act of swallowing.*[14]

Then, in 1901, Randall completed his observations with the test:

> *Far too little employed is the valuable test of Politzer as to the permeability of the Eustachian tube in the act of swallowing, for the tuning-fork vibrating before the nostrils should be heard much louder at the moment that the tube opens in deglutition. This tells of its physiological action as contrasted with its more passive distensibility on inflation, gives clear contrast as to the two ears and often tells more as to the stage and prognosis than any other test at our command.*[15]

Gould's *A Dictionary of New Medical Terms* included the test in 1905.[16] In 1908, Stewart discussed the test and wrote,

> *Politzer's test with the tuning fork vibrating before the nostrils should disclose greater hearing power at the instant of swallowing, if the Eustachian tubes are patulous and no labyrinthine involvement is present. It is well to re-test aerial and bone conduction after inflation in any doubtful case.*[17]

Alexander described Politzer's test in 1914 as follows,

> *While the patient holds a swallow of water in his mouth, the tuning-fork is held before his nose. The sound will be perceived stronger during the act of swallowing if the tube is normal, the volume of tone suddenly increased. The test proves the importance of the pharyngo-tympanic air conduction. The test is negative in tubal affections. In unilateral affections, the sound will only be heard through that tube which opens during the act of swallowing. Thus the condition of the Eustachian tube can be rapidly established by this test, which is particularly valuable in cases where other methods of tubal examination are not available.*[18]

It is interesting to note that when Alexander had written about the test two years previously in his German textbook of paediatric otology, he used the term, 'Politzer's attempt' ('Politzer'sche versuch') rather than 'test'.[19]

Politzer's test was still mentioned in the *Blakiston's New Gould Medical Dictionary* in 1956, and was described as follows:

> *Introduced a method of testing hearing. A tuning fork held in front of the nares will be heard only by an unaffected ear during swallowing; called Politzer's test.*[20]

Politzer's two other tests

It is difficult to find any references to Politzer's original tuning fork test after the middle of the twentieth century. It made a rare appearance in 2008, when it was described as follows in an obscure textbook on geriatric medicine:

> *If a patient has unilateral hearing loss, then check Politzer's test. Place the vibrating tuning fork in front of the nose and ask the patient to swallow, to open the Eustachian tube. The patient will localize the sound to the good side if there is unilateral hearing loss, but only when they swallow.*[21]

Nevertheless, although Politzer's test had evidently 'disappeared', it would apparently not lie down. But what, one may well ask, is meant by the term?

We hear in 1976 that 'Politzer's test [is used] to confirm any organic obstruction of the Eustachian tube and to expel mucus'.[22] This time, however, it appears to refer to Politzer's manoeuvre.

To complicate matters further, the following definition appeared in an otology textbook in 1994:

> *Politzer's test. The principle of this test is the physiologic process by which increased air pressure in the nasopharynx when the soft palate is elevated causes opening of the tube and increased pressure in the middle ear. The doctor occludes one of the patient's nasal cavities with the olive of a rubber balloon and pinches the other nostril tightly. The patient elevates the palate actively by swallowing or saying 'Kay, Kay, Kay'. At the same time the air pressure in the closed nasal cavity is increased by compression of the Politzer balloon. The doctor can hear the rush of air into the middle ear by auscultation using a tube and can assess the degree of tubal patency from the noise produced.*[23]

The term reappears again in 2005, when we are told,

> *Politzer's test is performed by compressing one naris into which the end of a rubber tube attached to an air bag has been inserted while compressing the opposite naris with finger pressure. The subject is asked to repeat the letter K or is asked to swallow to close the velopharyngeal port. When the test result is positive, the overpressure that develops in the nasopharynx is transmitted to the middle ear, thus creating positive middle-ear pressure.*[24]

Although Politzer's test was mentioned again in further academic papers (2016[25] and 2017[26]), it is not made absolutely clear whether a tuning fork is involved; in these cases, the context indicates that it more likely to mean Politzer's manoeuvre.

Neither of these two new definitions applied to Politzer's original tuning fork test. The one describing auscultation of

https://doi.org/10.1017/S002221512200130X Published online by Cambridge University Press

the ear is noteworthy. Politzer was a great advocate of this procedure, which he simply named 'auscultation'. He wrote that,

> *The importance of auscultation in the diagnosis of the affections of the middle ear has been both over- and under-estimated. It cannot be denied that although auscultation often furnishes negative and uncertain results, it may nevertheless often suffice to decide the diagnosis of an affection of the middle ear in a given case. And though the diagnostic value of auscultation by itself is on the whole limited, it is of importance in connection with other symptoms, for by completing the objective group of symptoms it contributes considerably to the recognition of the pathological alterations in the middle ear.*[12]

Politzer was not the first to use this auscultation tube. It was first mentioned by Deleau in 1829,[27] who had probably been inspired by the auscultation of the mastoid by Laennec.[28] Deleau did not use a listening tube, but put his own ear close to that of the patient. Toynbee mentions the use of a tube in 1850, in a paper with the bewilderingly confusing title of 'otoscope'.[29]

Conclusion

There is an old Army maxim, 'order, counter-order, disorder!' This sums up nicely what has happened with the Politzer's tuning fork test. It is a good example of the dire need for a universally accepted list of otological terms, as it clearly shows the confusion which can arise. The lack of a defined list leads to the misuse of terms, a recent example of which is the Valsalva manoeuvre.[30] The authors propose that the specific term 'Politzer's tuning fork test' should disappear from present otological parlance, and only remain as an interesting historical fact. It is further proposed that the term 'Politzer's manoeuvre' should remain as such (and not be transformed simply into 'Politzer' as suggested).[9]

Establishing clear and efficient medical (and specifically otological) terminology will always be a difficult task. Anatomists were the first to try to rationalise nomenclature. In 1895, they set up international anatomical classification, but it has not been without its problems. The names for the different bony canals of the chorda tympani remain muddled.[31] The Bárány Society made a concerted effort to put some order into the proliferation of terms in vestibular disorders. They seem to have been reasonably successful in giving clear definitions to words used to describe vestibular symptoms, while deleting unnecessary ones.[32] The European Academy of Otology and Neurotology appear to have had similar success with the classification of different cholesteatoma types.[33]

These attempts at rationalisation have not always met with universal approval. The International Classification of Diseases – Clinical Modification published a most disappointing classification of the different types of tympanic membrane perforation. It was far from concise, and fell on the use of such nondescript terminology as 'other' or 'unspecified' (H72). The main problem here was almost certainly because the list was not compiled by otologists. A complete otological categorisation is probably an endless task, but this is certainly no excuse for not attempting to bring more order and logic into our specialty.

Problems will inevitably continue to arise when new terms are discovered (or as in the case of Politzer's tuning fork test, resurrected). A recent example of this was 'Geswein hole', which had been used as a synonym for preauricular sinus.[34] When this happens, detailed historical research is always a good way to start to sort things out; then as near a complete list as possible can be made in order to establish which term best describes the subject in question. This protocol was recently successfully followed for 'cauliflower ear'.[35]

It is not only anatomy, pathology, symptomatology and clinical signs that will be involved. Surgical procedures (such as antrotomy,[36] antrectomy,[37] antrostomy,[38] antrumotomy[39] or antrocellulotomy[40]) are an obvious challenge. Eponyms and surgical incisions are particularly frustrating. History has shown that consensus never comes easily between surgical colleagues. International conferences are the obvious venues to try to settle on a mutually acceptable classification. If agreement and concordance is made, all the main international and national otolaryngological journals could dispense this knowledge. Perhaps then we will avoid a repeat imbroglio like three Politzer tests.

Competing interests. None declared

References

1 Mudry A, Young JR. Centenary memorabilia of Adam Politzer. *J Med Biogr* 2022;**30**:106–14
2 Mudry A. *Adam Politzer. A Life for Otology*. Asuncion, Paraguay: Wayenborgh, 2010
3 Politzer A. *History of Ear Medicine*, Vol. I [in German]. Stuttgart: Enke, 1907
4 Mudry A. A century ago: Adam Politzer published the first volume of his history of otology. *Otol Neurotol* 2007;**29**:97–9
5 Mudry A. *The History of Otology. A Tribute to Adam Politzer*. Piribebuy, Paraguay: Wayenborgh, 2015
6 Mudry A, Young JR. 100 years on: Politzer's greatest historical legacy. *Otol Neurotol* 2020;**41**:997–1001
7 Politzer A. On a new treatment for deafness caused by impassability of the Eustachian auditory tube [in German]. *Wien Med Wochenschr* 1863;**13**:83–7,102–4,117–19,148–52
8 Lucae A. Apparatus for the diagnostic and therapeutic use of the air shower in ear diseases [in German]. *Dtsch Klin* 1866;**8**:69–71
9 Mudry A. Politzer, otitis media with effusion and crenotherapy. *Int J Pediatr Otorhinolaryngol* 2020;**132**:109941
10 Mudry A. Adam Politzer (1835-1920) and the Eustachian tube [in French]. *Ann Otolaryngol Chir Cervicofac* 2004;**121**:75–82
11 Politzer A. Contributions to the hearing tests using the tuning fork [in German]. *Wien Med Presse* 1870;**12**:203–5,217–19
12 Politzer A. *Textbook of Otolaryngology*, Vol. I [in German]. Stuttgart: Enke, 1878;76,158
13 Politzer A. *Textbook of Otolaryngology*, 3rd edn. [in German]. Stuttgart: Enke, 1893;113–14. English, 3rd edn., 1894;135–6 (119)
14 Randall A. Some observations on objective and subjective tinnitus, aneurysmal, anaemic and muscular. *Trans Am Otol Soc* 1897;**6**:361–6
15 Randall A. Diagnosis and prognosis of ear disease. *JAMA* 1901;**36**:785–8
16 Gould GM. *A Dictionary of New Medical Terms*. London: Baillière, Tindall & Cox, 1905;473
17 Stewart TM. Physiologic hearing tests. *Laryngoscope* 1908;**18**:699–704
18 Alexander G. *Diseases of the Ear in Childhood*. Philadelphia: Lippincott, 1914;74
19 Alexander G. *Diseases of the Ear in Childhood* [in German]. Leipzig: Vogel, 1912;71
20 Hoerr NL, Osol A. *Blakiston's New Gould Medical Dictionary*, 2nd edn. New York: McGraw-Hill Book, 1956;943
21 Williams ME. *Geriatric Physical Diagnosis*. Jefferson, North Carolina: McFarland, 2008;112
22 Andréasson L, Ivarsson A. On tubal function in presence of central perforation of drum in chronic otitis media. *Acta Otolaryngol* 1976;**82**:1–10
23 Becker W, Naumann HH, Pflaltz CR. *Ear, Nose, and Throat Diseases*, 2nd edn. Stuttgart: Thieme, 1994;40
24 Bluestone CD. *Eustachian Tube*. Hamilton, Ontario: BC Decker, 2005;120
25 Bansal M. *Essentials of Ear, Nose and Throat*. New Delhi: Health Science Publisher, 2016;98,40
26 Alper CM, Teixeira MS, Kim JH, Swarts JD. Diagnostic accuracy of tubomanometry R value in detecting the Eustachian tube pressure equalizing function. *Eur Arch Otorhinolaryngol* 2017;**274**:1865–72

https://doi.org/10.1017/S002221512200130X Published online by Cambridge University Press

27 Deleau N. Excerpt from a thesis on the use of atmospheric air in the diagnosis, prognosis and treatment of deafness [in French]. *J Physiol Exp Pathol (Magendie)* 1829;**9**:311–34
28 Laennec RTJ. *Treatise on Mediate Auscultation*, 2nd edn [in French]. Brussels: Librairie médicale et scientifique, 1828;**57**
29 Toynbee J. A case of stricture of the Eustachian tube, and the appearances presented in a post-mortem examination; to which are added some observations on the use of the otoscope in the diagnosis of diseases of the ear. *Lancet* 1850;**1**:276–7
30 Mudry A. Valsalva manoeuvre: a confusing dichotomatic misnomer. *Int J Pediatr Otorhinolaryngol* 2015;**79**:1851–5
31 Mudry A. Glaser fissure, Huguier canal, and Civinini canal: a confused eponymical imbroglio. *Otol Neurotol* 2015;**36**:1115–20
32 Bisdorff A, von Brevern M, Lempert T, Newman-Toker D. Classification of vestibular symptoms: towards an international classification of vestibular disorders. *J Vestib Res* 2009;**19**:1–19
33 Yung M, Tono T, Olszewska E, Yamamoto Y, Sudhoff H, Sakagami M *et al*. EAONO/JOS joint consensus statements on the definitions, classification and staging of middle ear cholesteatoma. *J Int Adv Otol* 2017;**13**:1–8
34 Mudry A. Geswein hole: a fanciful Wikipedian medical eponym for preauricular sinus. *Int J Pediatr Otorhinolaryngol* 2020;**133**:109958
35 Mudry A, Jackler RJ. Tracing the origins of "cauliflower ear" and its earlier names over two millennia. *Laryngoscope* 2021;**131**:E1315–21
36 Wustrow F. 100 years of antrotomy. *Arch Otolaryngol* 1973;**98**:294–6
37 Arbuthnot W. Antrectomy as treatment for chronic purulent otitis media. *Arch Otol* 1892;**21**:118–24
38 King PF. The use of vein homografts in tympanoplasty. *Ann R Coll Surg Engl* 1965;**37**:65–92
39 Olaizola F. Tympanoplasty: a 5-year review of results using the a la demanda (AAD) technique. *Am J Otol* 1988;**9**:318–22
40 Ataman T. *Cophosurgery*. Bucharest: Orizonzuri, 1997;204

https://doi.org/10.1017/S002221512200130X Published online by Cambridge University Press