

Main Articles

Audiological medicine in the UK: the historical perspective of its role and scope

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Abstract

A medical, as opposed to a surgical, specialty which was to be entrusted with the investigation, care and management of patients with hearing and balance disorders was established in the UK in 1975. This medical specialty was termed 'audiological medicine' and its specialists, 'audiological physicians'. The relationship of the audiological physician to the ear, nose and throat surgeon is analogous to that between the neurologist and the neurosurgeon, or to that between the cardiologist and the cardiac surgeon. The audiological physician's role needs to be distinguished also from that of the audiologist. An audiologist is a scientist (or technician). (In the UK, science is firmly established as an integral and autonomous discipline within British health-care systems.) The role and scope of the audiological physician is clarified. Audiological physicians are concerned primarily with patients suffering from disorders of auditory communication, equilibrium and spatial disorientation, i.e. 'deaf and dizzy' patients.

Key words: Health Occupations; Health Personnel; Physicians; Audiology; Specialities, Medical; Great Britain

The 1973 publication of Jack Ashley's autobiographical *Journey into Silence*¹ triggered a train of responses. A meeting convened by Dr Elizabeth Shore at the Department of Health and Social Security indicated the need for a medical specialty committed to the investigation and care of patients with auditory and associated disorders. The senior de facto audiological physician, Professor Ian Taylor, was asked to approach the Royal College of Physicians of London with a view to the establishment of the envisaged specialty. A formal proposal was put to the Joint Committee on Higher Medical Training (JCHMT) by the Specialist Advisory Committee in Neurology. The proposal was accepted. The new specialty was to be named audiological medicine. It became an official medical specialty in the UK in 1975.

Audiological medicine is not, and never has been, a surgical specialty or subspecialty in the UK. Audiological physicians were to be concerned primarily with patients suffering from disorders of auditory communication, equilibrium and spatial disorientation, i.e. of hearing and balance – 'deaf and dizzy' patients. 'Auditory communication' needs to

cover speech and language also.² Thus, the description of this type of specialist as an 'audiological' physician is too restrictive a designation but more appropriate designations would have been too cumbersome. Previously, much of the work of the audiological physician was divided amongst general physicians, geriatricians, neurologists, ophthalmologists, otolaryngologists and paediatricians. Even now, there are not enough audiological physicians in the country to look after all those with disorders of auditory communication, equilibration and spatial disorientation.

The establishment of a dedicated medical specialty entrusted with the care and management of patients with disorders of hearing also received support from the immediate past President of the British Association of Otolaryngologists at that time. He himself was deaf in one ear following surgery. He voiced his support to the then President of the Royal College of Physicians of London, although the selection and training which he appeared to have envisaged for such specialists was not what the JCHMT determined.

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The first five years history of the specialty has been reported by Stephens.³ The following years have seen a rapid growth in the specialty. The 2003/2004 Medical Directory showed 107 doctors listing their specialty as audiological medicine.

The specialty did not arise *de novo*. In 1975, there were already a dozen doctors of consultant status who were specializing in this field. This group had been drawn from various other medical or surgical specialties. Each had his or her own particular interest. Some were interested more in children than in adults, others more in the investigative aspects of the specialty, others more in vestibular disorders, and there were those who were primarily concerned with rehabilitative measures (what should now be referred to as enablement). It was these, already diverse, interests within audiological medicine that helped the specialty to become recognized. The committee debating whether or not to recognize this proposed new specialty was chaired by Sir Douglas Black, subsequently President of the Royal College of Physicians of London. He said that his main criterion as to whether a specialty had arrived or not was whether it had already begun to subspecialize. Each 'subspecialty' of audiological medicine, e.g. paediatric audiological medicine, has its own particular perspectives, policies and procedures.⁴⁻⁶

The specialty of audiological medicine needs to be distinguished from other specialties, disciplines and areas of interest. Even a medical man might well be forgiven if he considers an audiologist to be synonymous with an audiological physician, since a neurologist is the same as a neurological physician. However, an audiologist is a scientist (or technician). The 1968 Department of Health and Social Security (DHSS) (Zuckerman) report⁷ firmly established science as an integral and autonomous discipline within British health-care systems. It is to the discipline of science that an audiologist belongs. Currently, hearing therapists, scientists and technicians are being integrated into a body termed the British Academy of Audiology.

Audiological medicine is not primarily about audiometry or electro-oculography in one or other of their shapes or forms, any more than cardiology or neurology is primarily about electrocardiography or electroencephalography, respectively. Being medical specialties, all three are about patients and diseases. The section on injuries to the ear in the Royal College of Pathologists' report on the pathology of injury,⁸ contributed by an audiological physician (then termed a neuro-otologist), contained no record of any test of auditory or vestibular function. Likewise, there was not a single audiogram or electro-oculogram nor any other record of a test of auditory or vestibular function or of the equipment to conduct such examinations, portrayed in the five chapters contributed by an audiological physician (also termed a neuro-otologist) to Ransome, Holden and Bull's *Recent Advances in Otolaryngology*.⁹ Illustrations were confined to photomicrographs. Thirty years on, those contributions would of course have been replete with magnetic resonance imaging scans and there would have been more interesting cases.

Neither I nor, I suspect, the vast majority of audiological physicians have held a post as an audiologist. One notable exception was provided by the audiological physician IG Taylor. He held the Ellis Llwyd Jones Chair in Audiology and Education of the Deaf at the University of Manchester from 1964 until his retirement in 1988, but he also had a specialized knowledge of, and experience in, those two disciplines. Another exception was L Fisch who, even earlier, had had the title of audiologist. It was Dr Fisch who proposed a multidisciplinary Institute of Hearing Research¹⁰ almost ten years before the UK government eventually acceded to such a proposal.¹¹

Prior to the specialty of audiological medicine being recognized, the area was referred to as neuro-otology. So, what was reported as the role and scope of neuro-otology over 40 years ago¹² is very much the role and scope of audiological medicine now. A number of us continued with a 'neuro-otologist' title after audiological medicine was recognized. However, neuro-otology has also attracted neurologists, otolaryngologists and scientists, who brought to the subject their own particular expertise. Some of these individuals might have been more appropriately termed 'clinical auditory (or vestibular) physiologists'.

The specialty of audiological medicine needs to be distinguished from a multidisciplinary area of interest which has been referred to as medical audiology. The term 'medical audiology' refers to that aspect of audiology which has a particular application to medicine (as opposed to industrial audiology, paediatric audiology or surgical audiology).

The disorders with which audiological medicine is concerned have always been of interest to physicians. The *Coan Prognosis* is an important collection of aphorisms derived from the Hippocratic school of medicine on Cos, later than but more extensive than the *Prorrhetic*, but still dating from the fifth century BC. We read:

157. When patients who are not febrile complain of headache and noises in the head, vertigo, slowness of speech and numbness of the hands, expect them to become either epileptic or to suffer from apoplexy, or to suffer from loss of memory ... 186. The onset of deafness in the course of acute difficult illnesses is a bad sign; it is also bad in protracted cases for in these it also brings on pains in the hips ... 189. Buzzing and noises in the ears is a sign of death in acute diseases ... 193. To be hard of hearing, to show tremor in picking up anything, to have a paralysed tongue, to be sluggish is bad ... 195. Swellings near the ear accompanied by pain constitute a fatal sign ... 240. Aphonia is of the most serious significance if accompanied by weakness.¹³

Physicians' interest in disorders of hearing, speech and equilibration expanded over the two millennia and a half since the time of Hippocrates.

What has been referred to as the 'dawn of scientific medicine'¹⁴ – the 19th century – was

associated with a surge in physicians' interest in and contributions to audiological medicine. Experimenting on the pigeon, the French physician Marie-Jean-Pierre Flourens¹⁵ demonstrated the equilibrated function of the semicircular canals. Basing the interpretation of his clinical observations on Flourens' experimental work, the French physician Prosper Ménière¹⁶ described the condition which now bears his name.

The Austrian physician Josef Robert Breuer¹⁷ extended the work of Flourens and demonstrated the relationship of nystagmus to vestibular labyrinthine malfunction. Breuer was considered one of the best physicians and scientists in Vienna; he was physician to many of the professors at the medical faculty, as well as to Sigmund Freud and to the Prime Minister of Hungary. He was elected to the Viennese Academy of Science in 1894.

In Britain, Sir Benjamin Ward Richardson FRCP FRS (1828–1896)¹⁸ was the first physician in more recent times to take a special interest in disorders of hearing. He was the first to use Hughes' audiometer, demonstrating its many applications at a meeting of the Royal Society on 15 May 1879.¹⁹ This was half a century before the Section of Otolology of the Royal Society of Medicine,²⁰ after its deliberations on tests of hearing, concluded:

As oscillometers, the present audiometers are scientifically accurate. It is in their application to clinical otology that they have failed, in that results obtained differ from those obtained from tuning forks. The results of testing by tuning forks have been for many years, and still are, the standard in otology, and until audiometers give results directly comparable with them, they cannot be accepted as a standard means of testing. New methods must evolve from existing knowledge, and the Committee considers that future methods of testing must be based on the old-established tests by tuning forks.²⁰

Moving into the 20th century, we note that Sir Robert Hutchison's textbook on *Clinical Methods*, which was used by trainee physicians in the 20th century, contained a substantial amount of material on examinations for disorders of balance, hearing and speech. The book's influence is indicated by noting that it went through 21 editions, from the first, at the end of the 19th century,²¹ to the last, at the beginning of the 21st century.²² When combined with his *Principles of Diagnosis, Prognosis, and Treatment*,²³ the book still forms useful reading for both intending and already practising audiological physicians.

In the 20th and 21st century, audiological physicians have followed Richardson in developing tests of auditory and of vestibular function, e.g. acoustically-evoked potentials,^{24–29} acoustic cochleography,³⁰ tonal audiometry for children,³¹ clinical tests for young children who have English as a second language,³² and the bithermal caloric test.³³ Audiological physicians have also taken an interest in related disciplines, such as epidemiology,^{34–36} pathology³⁷ and psychophysics.³⁸

It follows from the *Hippocratic Corpus* that the physician is required to see the life-history of the disease:

It seems highly desirable that a physician should pay much attention to prognosis. If he is able to tell his patients when he visits them not only about their past and present symptoms, but also to tell them what is going to happen, as well as to fill in the details they have omitted, he will increase his reputation as a medical practitioner and people will have no qualms in putting themselves under his care. Moreover, he will the better be able to effect a cure if he can foretell, from the present symptoms, the future course of the disease.¹³

The Hippocratic view of the physician as a naturalist was endorsed by the 19th century Scottish Professor of Medicine, Sir William Gairdner³⁹ and by Cambridge's 20th century Regius Professor of Physic, JA Ryle FRCP,⁴⁰ subsequently Professor of Social Medicine at Oxford. Like the 19th century Sir Benjamin Ward Richardson, Ryle was at heart a naturalist.

Audiological medicine is both complementary to and supplementary to otolaryngology. It is complementary in the same sense that other medical specialties complement their corresponding surgical specialties. In this respect, audiological physicians have concerned themselves with the pathogenesis of disease^{41,42} and with the clinical characterization of diseases, seen for example in a number of reports.^{43–46} Most importantly, like neurology, audiological medicine provides extensive enablement programmes in respect of audiological^{24,47} and vestibulological⁴⁸ rehabilitation.

The following four examples show how the particular skills of the audiological physician can supplement those of the otolaryngologist, or at least provide a different perspective.

First, we see that many publications of our surgical colleagues have included manual pure-tone audiograms.^{49–51} These contribute the first stage (data collection) towards evidence-based diagnosis. Auditory-threshold analysis, e.g. that based on Békésy audiometry, is very complicated and highly sophisticated.⁵² Nevertheless, an initial inspection of our colleagues' manual audiometric data indicates that the slope of the audiogram may be the one and only feature that distinguishes the many and varied types of sensorineural hearing loss, other than those due to endolymphatic hydrops and noise trauma, from one another. Manual pure-tone audiometry has long been the standard special investigation in disorders of hearing. It is ripe for evaluation by the methodology of evidence-based diagnosis.

Secondly, we see other work as being (also) an application of psychophysics.^{53–55} A study on the subjective magnitude of eardrum perforation size⁵⁶ is seen as an experiment to verify whether Stevens' power function (or the Weber–Fechner logarithmic function) applies to estimates of visual area by otolaryngologists (inspection of the published data indicates that it may well do so). As such, the otologists' study would be seen as an extension of the work of psychophysicists on this theme.^{57,58}

In metrological terms, the study would be seen as a calibration of each observer in respect of his psychophysical exponent in the estimation of tympanic membrane perforation area. Otolaryngologists were introduced to the psychophysical law on page 7 of the Institute of Laryngology and Otology's *Scientific Foundations of Otolaryngology*.⁵⁹ An example taken from surgical practice was given on page 22. The estimated volume of operative blood loss was shown to be a power function of the measured volume of blood loss. In that case, estimates of volume of blood loss were based primarily on the extent of bloodstained and other material. Thus, the subjective magnitude of area was involved. The value of the exponent (0.783) in the power function of best fit to those data was similar to the exponent of 0.7 which psychophysicists have reported⁵⁷ for this particular sensory continuum.

Thirdly, we see reports by otolaryngologists in the medicolegal area as requiring the critical appraisal exercise of evidence-based medicine, just as much as are those by others. (One should note that it is this that distinguishes the clinical opinion per se, to which Karl Popper objected, and the clinical opinion which is sought in modern evidence-based medicine.) The selection of controls drawn from the examiners' situation-specific and contemporaneous clinical and audiometric experience is the most appropriate in this area. Had this been done, two out of three examiners would have reached crucially different conclusions in a case concerning alleged occupational noise-induced damage to the hearing of three claimants.^{60,61}

Fourthly, we have what might be termed the ultimate supplement – histopathological examination. This was the particular contribution of the 20th century's eminent audiological physician (he had the title 'aural physician'), CS Hallpike CBE FRCP FRS.^{62–64} As a 19th century US otolaryngologist wrote: 'The most conclusive solution of these important problems is to be found in ... that positive demonstration which the dead-house alone can furnish'.⁶⁵

Many of the differences between the approaches of audiological physicians and otologists to a matter relate to applications of the principles of evidence-based medicine.

Since Ancient Greece, medicine has been 'evidence-based'. Physicians have always familiarized themselves with science and have tried to keep abreast of the literature. A century ago, William Osler was training physicians to cite supporting literature to justify their views on proper tests and treatments.⁶⁶

In the 19th century the leading London physician was Sir William Withey Gull (1816–1890). He was a polymath and a naturalist: 'Even the habits of the London sparrows attracted his attention'.¹⁴ He provided physicians with a head-start on their surgical colleagues by implementing what may well have been the first controlled trial. Gull used mint-water as a control in the treatment of rheumatic fever.⁶⁷ There are cogent reasons for the lack of evidence-based treatment in the surgical specialties.^{68,69} However,

'evidence-based medicine' comprises both 'evidence-based treatment' and 'evidence-based diagnosis'. The principles of evidence-based diagnosis are those which are relevant to the examples cited above.

- **In the UK, there are several specialties and disciplines involved in the investigation, management and care of patients with disorders of auditory communication, equilibration and spatial orientation. Audiological medicine is one of these**
- **This paper clarifies the role and scope of audiological medicine and corrects a number of misconceptions**

It has been suggested that all this reflects differences on the technical plane between the major skill groups. The physicians have a primary interest in the technical aspects of diagnosis and overall management, the scientists in the technical aspects of mensuration, and the surgeons in the technical aspects of anatomical engineering.

Thus, the last 25 years of the last millennium witnessed the inception and development of a recognized medical specialty devoted to the care and management of patients with disorders of auditory communication, equilibration and spatial disorientation. However, it was also a period that was plagued with misconceptions, misunderstandings and missed opportunities. These fuelled baseless fears of demarcation disputes whereby ethology's conflict and aggression model of interdisciplinary relationships might prevail.

Audiological medicine in the UK now has its established Chair (currently occupied by Linda Luxon FRCP), a postgraduate degree, its journal, its textbooks,^{70,71} its Specialist Advisory Committee and a forum (the Hallpike Symposia). But that is not enough. It is still without its Section in the Royal Society of Medicine. Otology has had its Section for nigh on 100 years.⁷² That for audiological medicine can no longer be delayed.

Many, including those in adjacent specialties and disciplines, are surprisingly ill-informed about audiological medicine. Much is misunderstood. Even frank dissemination of disinformation occurs.

Let us now hope that these first 25 years of the new millennium will witness a move towards multidisciplinary collaborations and co-operations in which the ethological model of relationships is replaced by the sociobiological model of reciprocal altruism, without the need for a formal Committee of Truth and Reconciliation.

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