

Review Article

Bones of contention. The supply of temporal bones for dissection: the legalities, problems and solutions

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Abstract

Temporal bone dissection is considered to be an important aspect of the otological training of the Specialist Registrar with dissection skills being formally assessed in the Intercollegiate Fellowship Examination. However the procurement of cadaveric specimens suitable for dissection may be fraught with difficulties. The authors take an historical perspective to clarify the existing legal issues and outline the means available to improve supply.

Key words: Temporal bone; Dissection; Training, support

Introduction

It is an essential requirement for the trainee otologist to become familiar with the topographical anatomy of the temporal bone. Few other regions exist where the penalty for anatomical ignorance may have such devastating consequences for the patient (Golding-Wood, 1994).

The Intercollegiate Fellowship Examination ORL-HNS, which has become mandatory for those wishing to work as Consultants in the United Kingdom, presently includes a practical session where dissection of a temporal bone is assessed. The most recent guidelines propose a 'major change in the year 2000' when, following the demise of the F.R.C.S. in Otolaryngology, the Intercollegiate Specialty Examination will become the only post-graduate qualification in the speciality (Dale, 1998). The new examination, which will be considerably more comprehensive than at present, will consist of a full half hour practical session on temporal bone dissection and head and neck surgery.

Many teaching hospitals have established temporal bone dissection courses to teach anatomy and operative technique and although attendance is not yet compulsory, both the British Association of Otorhinolaryngologists – Head and Neck Surgeons and the Specialist Advisory Committee in Otorhinolaryngology recommend trainees to attend such courses (personal communication). Following such instruction it is equally important that skills are consolidated by further dissection when trainees return to their own units. Most Consultants are keen

for their trainees to have demonstrated a confident appreciation of normal anatomy through the dissection of a number of temporal bones before undertaking supervised mastoid surgery.

Most hospitals have laboratory space which could be made suitable for temporal bone dissection and there have been numerous innovative suggestions to reduce the equipment costs of setting up such a facility (Lindsey and Hopper, 1993; Kirkland and Tostevin, 1997). However, the means of acquiring a regular supply of cadaveric bones for dissection has not been confronted.

The authors perceive a nation-wide problem in the procurement of temporal bones by ENT higher surgical trainees and have found the medical literature lacking in advice regarding methods of improving temporal bone supply. Most authors reiterate the theoretical importance of temporal bone dissection yet fail to impress that without adequate provision of suitable cadaveric specimens there can be no further dissection.

Historical note (French, 1993)

In the early 19th century, the only legally recognized supply of cadavers for anatomical study was from the gallows, for the penalty for murder was not only hanging but subsequent dissection. As private anatomy schools flourished the need for dissection material soon exceeded supply and these demands were met by so-called 'resurrection men'. The practice of grave-robbing caused a surge of public ill-feeling leading to rioting and the destruc-

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tion of a number of dissection rooms. Suppliers found the task of providing bodies increasingly difficult reflected by an increase in the price of their services. By the late 1820's it was as cheap for an undergraduate to travel to France for anatomy tuition, where post-revolutionary legislation permitted a supply of bodies from the destitute classes, as to stay and study at home.

Acknowledgement of this unacceptable situation and an appreciation of the benefits to all of allowing surgeons to study anatomy by legally acquiring cadavers for dissection was realized by the utilitarian law reformer Jeremy Bentham (1748–1832). Shortly after a parliamentary select committee reported in favour of his proposals, the sixteenth victim of the now infamous William Burke (1792–1829) and William Hare (fl 1829) was found in the dissection rooms of Robert Knox (1791–1862). It is a reflection of the scarcity of cadavers at this time that Knox was paying £700 per annum to secure his supply! The Anatomy Act became law in August 1832 and established an Anatomy Inspectorate.

In practice, although the Act reduced the influence of the resurrection men, it was powerless to prevent private arrangements between parish authorities, who had a responsibility for the workhouses and the care of the sick poor, and charitable hospitals which would offer beds for the sick poor in return for a supply of cadavers from the workhouses.

The law

Human tissue for education and research can be obtained legitimately from three sources: hospital post-mortem examinations, coroner post-mortem examinations and university departments of morbid anatomy. The lawful acquisition of cadaveric tissue from these sources is provided for by two Acts of Parliament.

Hospital post-mortem examination

The Human Tissue Act of 1961 controls the removal of parts of bodies for medical purposes from hospital post-mortem examinations. The act has two main constituents: 'to make provision with respect to the use of parts of bodies of deceased persons for therapeutic purposes and purposes for medical education and research' and to cover the circumstances in which post-mortems are undertaken. A third part providing for the cremation of bodies after anatomical examination was repealed by the Anatomy Act of 1984, Section 13(2).

Human tissue may be used for 'medical education' under certain circumstances: firstly, if the deceased has expressed in writing or verbally in the presence of two or more witnesses, during his last illness, that his body or any parts of his body may be used for anatomical study or research, the person lawfully in possession of the body after death may comply with these wishes and secondly, in the absence of the above (the majority of cases) the person lawfully in possession of the body may authorize the removal of

tissue providing the deceased had not made known any objection or the surviving spouse or relative does not disagree.

Until the body is claimed, the manager of the hospital is in lawful possession of the body. The relatives must identify the corpse in order to claim such possession and, having done so, informed consent is given by the 'appropriate personal representative' who must sign a consent form. If there is a will the executor of the estate is that representative. If there is no will this duty falls to the next-of-kin in the sequence, spouse, child, parent.

Coroner post-mortem examinations

A coroner's post-mortem does not require prior consent to be given as this authority is provided for by Section 8 of the Coroners' Act 1988. The coroner's enquiry is limited in its scope and one of the principal purposes is to determine the medical cause of death. Once that has been determined or at least, when the coroner is satisfied that all those concerned have had the opportunity of examining the body for that purpose, he/she will release the body, and can therefore issue a burial order. Although the coroner may not give permission for any special examination to be carried out (as for experimental or research purposes), once the body has been released, tissue may be removed or retained with the consent of the person(s) entitled to possession of the body. Such consent must therefore comply with the same requirements as that necessary for hospital post-mortem examination.

University Departments of morbid anatomy

These bodies have been bequeathed in accordance with the wishes of the deceased and their treatment must comply with the Anatomy Act (1984) and the Anatomy Regulations (1988) which are attendant upon the Act. Both the Act and the Regulations came in to effect in February of 1988 and outline issues relating to the preparation, care and subsequent disposal of a body and its parts.

Legal differences across the British Isles

The above legislation applies in England, Scotland and Wales. Similar provision is made in Northern Ireland by the Anatomy (Northern Ireland) Order (1992). However in the Irish Republic, the Anatomy Act of 1832 and its 1871 Amendment are used in their original form.

Problems and solutions

A national reduction in the number of requests for hospital post-mortem examinations has caused a major depletion in the number of cadavers available. Our own hospital records have shown an average of just four hospital post-mortems per month over the preceding year. Despite these findings, it has been suggested that this resource is currently under-used by ENT trainees (Jeannon, 1996). Reduced numbers of examinations are compounded by inadequately

worded, poorly presented or ambiguous post-mortem consent forms. Medical and mortuary staff may be unable to proceed with the removal of temporal bones if it is felt that the consent form does not appropriately inform the relatives of the deceased.

To improve this situation we have found it most useful to review and subsequently change the presentation of our existing consent form. It is important that not only those who approach the relatives for such consent, but also histopathology and mortuary staff and the appropriate departmental managers and legal representatives are satisfied with the new format. This is a sensitive matter requiring tactful handling and close inter-departmental co-operation. The amended consent form must be both simple and informative and allow relatives the option to decline should they wish to do so (Figure 1).

Most of the post-mortem examinations performed in this country are arranged at the request of Her Majesty's Coroner. Despite suggestions to the contrary, (Jeannon, 1996) relatives may be approached to give consent for tissues to be removed for educational purposes after the coroner has released the body for burial. Good communication with the coroner, his/her officers and the mortuary technicians is essential if this source of temporal bones is to be accessed. A supply of the amended consent forms should be available to ensure that relatives willing to allow tissue removal have the opportunity to give such consent.


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Post-Mortem Consent Form



**Salford
Royal
Hospitals**

NHS TRUST

I, the undersigned, give consent for a post-mortem examination on the body of:
_____ and I am not aware that he/she had expressed any
objection during life or that any other relatives object.

I understand that the purpose of this examination is to verify the cause of death and to study
the effects of disease and treatment. This will usually involve the retention of small amounts
of tissue for laboratory studies including microscopy.

I understand that additional amounts of tissue, which may include whole organs, may be used
or retained for medical education and research. (Please delete this paragraph if you do not
wish to consent to this).

Signed _____ Relation to deceased _____

Witnessed by _____ Date _____

Please insert here any specific comments which you wish to record:

FIG. 1
Revised consent form.

Where possible, close links should be forged with university departments of morbid anatomy. If dissection sessions cannot be arranged to take place within such departments and temporal bones are to be removed for examination elsewhere, it is important to note that a premises licence must then be purchased. The cost of the licence is a single payment of £50 to the Department of Health and the licence must be held by an 'appropriately qualified person' within the ENT department. No such licence is needed if the temporal bone is obtained from a post-mortem examination.

The question of record-keeping in the temporal bone laboratory is a relatively simple matter. Records must be kept for cadavers bequeathed to medical schools for dissection (Anatomy Regulations, 1988). Temporal bones removed from them are subject to the same legislation. However, although considered good practice, there is no legal requirement for documentation to be held for bones removed from post-mortem examinations.

The disposal of the temporal bones following dissection may give rise to a further cause for concern. There is no present legislation to dictate the means by which 'parts' removed from post-mortem examinations should be disposed. Temporal bones obtained from medical school cadavers however are covered by the Anatomy Regulations 1988 which states: 'after anatomical examination of a body has been concluded, its disposal shall, so far as practicable, be in accordance with any wishes expressed by the deceased or any surviving spouse or surviving relative of his and that separated parts of the body, other than those parts which are held by virtue section 6 of the Act, are, so far as practicable, disposed of with the body from which they were removed'. Section 6 of The Anatomy Act 1984 allows body parts to be retained after removal if permission was given by the deceased prior to death or was subsequently obtained from the next of kin.

Where disposal of tissues from the body from which they were removed is not practicable, whether they be from post-mortem examinations or from medical school departments, H.M. Inspector of Anatomy considers that hygienic disposal for incineration as for other clinical waste is entirely appropriate (personal communication).

At present there has not been a widespread acceptance of alternatives to cadaveric temporal bone dissection. The development of computer-generated simulation both to create synthetic three dimensional models, (Levy *et al.*, 1994) and to produce the 'virtual temporal bone' (Alusi *et al.*, 1997) are particularly challenging concepts. However, the obvious advantages of cadaveric bone dissection and the establishment of its place in the Intercollegiate Fellowship Examination ensure that it will remain a cornerstone of otological higher surgical training for the foreseeable future.

Conclusion

The supply of cadaveric temporal bones for educational study and dissection may be optimized by an appreciation of the above historical and legal issues, a tactful and sensitive approach to the relatives of the deceased, and the establishment of good lines of communication between medical and non-medical staff.

Central to the issue of good communication is the introduction of a well-presented post-mortem examination consent form, with which all parties are familiar.

It is hoped that the above guidelines will clarify some of the existing questions regarding the acquisition, dissection and disposal of cadaveric temporal bones. Improved access should encourage the development of temporal bone dissection facilities to the benefit of our specialist training.

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References

Alusi, G. H., Tan, A. C., Campos, J. C., Linney, A., Wright, A. (1997) Tele-education: the virtual medical laboratory. *Journal of Telemedicine and Telecare* **3(Suppl.1)**: 79–81.

- Dale, B. (1998) Intercollegiate Board in Otolaryngology: Memo from the outgoing chairman. British Association of Otolaryngologists – Head and Neck Surgeons (BAO) Newsletter 98/1.
- French, R. (1993) The anatomical tradition. In *Companion Encyclopaedia of the History of Medicine*, 1st Edition vol. 1. (Bynum, W. F., Porter, R., eds.), Routledge, London, pp 81–101.
- Golding-Wood, D. G. (1994) Temporal bone dissection for display. *Journal of Laryngology and Otology* **108**: 3–8.
- Jeannon, J.-P. (1996) Temporal bones for dissection. A diminishing asset? *Journal of Laryngology and Otology* **110**: 219–220.
- Levy, R. A., Guduri, S., Crawford, R. H. (1994) Preliminary experience with selective laser sintering models of the human temporal bone. *American Journal of Neuroradiology* **15(3)**: 473–477.
- Lindsey, L. A., Hopper, I. (1993) Temporal bone dissection using a low cost miniature electric drill. *Journal of Laryngology and Otology* **107**: 721–722.
- Kirkland, P. M., Tostevin, P. (1997) A new alternative to the operating microscope in the temporal bone laboratory. *Journal of Laryngology and Otology* **111**: 958–959.
- The Anatomy Act (1984) HMSO.
- The Anatomy Regulations (1988) HMSO.
- The Coroner's Act, Section 8 (1988) HMSO.
- The Human Tissues Act (1961) HMSO.
- Personal Communication with the Honorary Secretary of BAO-HNS (1998).
- Personal Communication with H.M. Inspector of Anatomy (1998).

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