



# EDITORIALS

## CHRISTMAS 2019: LET IT BE

# Skeletons in the closet: towards the dignified disposal of all human bones acquired for medical education

Human bones have long been used for education in medicine, but in modern times this is unnecessary and hard to justify, argue **Jonathan Coman and colleagues**

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Your family is preparing for Christmas. While searching through the cupboard for decorations, you discover an old box. It contains human bones, prompting a battery of questions from the children: Is that a real person? Who? Why are the bones here? What will happen to them? You have few answers.

In this editorial we call for an end to the use of human bones for educational purposes and urge authorities to develop and disseminate legal and ethical pathways for the dignified disposal of any remaining “skeletons in the closet.”

For hundreds of years, grave robbing and body snatching supplied human remains for anatomy students.<sup>1</sup> Into the 20th century, medical students were encouraged to acquire human “bone sets,” often sourced from developing countries. India was a major source, until export bans commenced in 1985 because of concerns about grave robbing.<sup>2</sup> However, evidence shows a persistent illegal trade in human remains.<sup>2</sup>

Buying and selling human bones is prohibited in many jurisdictions.<sup>3</sup> But this is not widely appreciated, and bone sales continue, including through online platforms.<sup>4</sup>

Centuries of organised medical education have resulted in many human skeletons being in private possession—probably thousands in the UK alone. These skeletons can circulate in the community indefinitely, sometimes being passed down in families. This raises some important legal and ethical issues.<sup>5,6</sup>

## Respect

Respect for humans is founded on the ethical principle of respect for autonomy, which asserts that people should have the right to make decisions for themselves. This extends to how their body is disposed of or used after death. Unauthorised taking,

processing, and sale of bones without consent are breaches of this principle.

The principle of justice aims to balance competing claims: in this case, balancing the societal benefit (from the education of health practitioners) with a person’s autonomy. Previously, human bones were considered better for education than artificial options. However, with increasing sophistication of 3D printing and associated technologies, high quality alternatives now exist,<sup>7-10</sup> making the societal benefit argument moot. Continued holding and circulation of existing bones for educational purposes is therefore difficult to justify. Similar concerns have been raised regarding the display of human remains in museums<sup>11</sup> and popular exhibits.<sup>12</sup>

Educational use of human bones is ethically acceptable, provided people give explicit and valid consent to donate their remains to a university or similar institution.

Coordinated programmes for managing the legacy of human bone use in education are long overdue. Important aspects include research to understand the extent of the problem, identify appropriate solutions, and navigate the barriers to implementation.

In the UK, the Medical Defence Union provides advice regarding disposal of privately held human skeletons, including incineration, burial, or gifting to medical schools or medical students.<sup>13</sup>

Human bones should be treated in a way that respects the dignity of the person. Bones should not be obtained to be used as teaching aids in universities or similar settings, or to be held for private study, without valid consent. Tackling this requires leadership by health authorities and professions: solutions will require awareness campaigns about the relevant legal and ethical

issues, as well as consideration of possible sanctions for non-compliance.

## Dignified disposal

The disposal of existing collections of human bones is not straightforward and is subject to considerable jurisdictional variation. Unauthorised burial, or disposal in household waste, risks triggering an unnecessary homicide investigation<sup>5,6</sup> and fails to respect the donor's dignity. Surrendering bones to authorities, however, potentially risks criminal prosecution in some jurisdictions, and amnesties should be strongly considered in these circumstances.

Other possibilities include authorised burial or cremation. Both usually require permission from relevant authorities, along with procedures to establish the name of the person and identify his or her origin.<sup>14</sup> However, this information is usually impossible to provide. The fact that the bones are unidentified also prevents the disposal of remains in a culturally or religiously appropriate manner. Even if burial were possible the costs would be borne by the "owner" and may be an additional barrier to disposal.

To tackle this problem, health authorities in all jurisdictions must review legislation and develop a sensible, ethical, and locally feasible process for the dignified disposal of educational human bone sets. Specific information for doctors or surviving relatives should then be made freely available and widely publicised. Finally, health professionals and health authorities should start a campaign to encourage disposal of privately held human remains.

## The skeleton in your closet

Sale, mistreatment, or casual disposal of human bones is clearly inappropriate. As legal processes vary between countries, we recommend seeking advice from a local authority such as a coroner's office or from a university. In the UK, a respectful cremation or a donation to a university health science faculty is probably appropriate. In universities, a plaque could be added

to any display to express respect for people whose bones have been used to educate health professionals, for the benefit of wider society.

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- Magee R. Art macabre: resurrectionists and anatomists. *ANZ J Surg* 2001;71:377-80. 10.1046/j.1440-1622.2001.02127.x 11409024
- Carney S. Inside India's underground trade in human remains. *Wired* 2007. <https://www.wired.com/2007/11/ff-bones/>.
- Human Tissue Act 1982 (Victoria, Australia). Part VIII: Prohibition of trading in tissue. Updated 30 Oct 2014. [http://www.legislation.vic.gov.au/Domino/Web\\_Notes/LDMS/LTObject\\_Store/LTObjSt9.nsf/DDE300B846EED9C7CA257616000A3571/8F3302C40B5C1396CA257D810080D5D9/\\$FILE/82-9860aa044%20authorised.pdf](http://www.legislation.vic.gov.au/Domino/Web_Notes/LDMS/LTObject_Store/LTObjSt9.nsf/DDE300B846EED9C7CA257616000A3571/8F3302C40B5C1396CA257D810080D5D9/$FILE/82-9860aa044%20authorised.pdf).
- Halling CL, Seidemann RM. They sell skulls online?! A review of internet sales of human skulls on eBay and the laws in place to restrict sales. *J Forensic Sci* 2016;61:1322-6. 10.1111/1556-4029.13147. 27373546
- Bhardwaj DN, Millo T, Lalwani S. Skeleton used for anatomical study brought for medico-legal autopsy: a case report. *Med Sci Law* 2007;47:86-7. 10.1258/rsmmsl.47.1.86. 17345897
- Chisholm A. Bones used for teaching by Warrantye doctor subject of coronial inquest. *Herald Sun Leader* 2014 Dec 16. <https://www.heraldsun.com.au/leader/east/bones-used-for-teaching-by-warrantye-doctor-subject-of-coronial-inquest/news-story/beb8a4fb6045fb4b630165338b34e261>.
- Hochman JB, Rhodes C, Wong D, Kraut J, Pisa J, Unger B. Comparison of cadaveric and isomorphic three-dimensional printed models in temporal bone education. *Laryngoscope* 2015;125:2353-7. 10.1002/lary.24919. 26256951
- Huang Z, Song W, Zhang Y, et al. Three-dimensional printing model improves morphological understanding in acetabular fracture learning: A multicenter, randomized, controlled study. *PLoS One* 2018;13:e0191328. 10.1371/journal.pone.0191328. 29342198
- Lozano MTU, Haro FB, Diaz CM, Manzoor S, Ugidos GF, Mendez JAJ. 3D digitization and prototyping of the skull for practical use in the teaching of human anatomy. *J Med Syst* 2017;41:83. 10.1007/s10916-017-0728-1. 28386686
- Thomas DB, Hiscox JD, Dixon BJ, Potgieter J. 3D scanning and printing skeletal tissues for anatomy education. *J Anat* 2016;229:473-81. 10.1111/joa.12484. 27146106
- Licata M, Monza F. Ethical issues in paleopathological and anthropological research experiences. *Acta Biomed* 2017;88:315-8. 10.23750/abm.v88i3.5653. 29083337
- Redman S. Reconsidering Body Worlds: why do we still flock to exhibits of dead human beings? *Conversation* 2016 Apr 8. <https://theconversation.com/reconsidering-body-worlds-why-do-we-still-flock-to-exhibits-of-dead-human-beings-57024>.
- Brooks ST. Human or not? A problem in skeletal identification. *J Forensic Sci* 1975;20:149-53. 10.1520/JFS10251J 1117264
- Cemeteries and Crematoria Act 2003 (Victoria, Australia). Part VIII: Application for interment authorisation. Updated 1 Aug 2016. [http://www.legislation.vic.gov.au/domino/Web\\_Notes/LDMS/LTObject\\_Store/ltobjst9.nsf/DDE300B846EED9C7CA257616000A3571/D0F92091DC359377CA258002000459FA/\\$FILE/03-80aa030%20authorised.pdf](http://www.legislation.vic.gov.au/domino/Web_Notes/LDMS/LTObject_Store/ltobjst9.nsf/DDE300B846EED9C7CA257616000A3571/D0F92091DC359377CA258002000459FA/$FILE/03-80aa030%20authorised.pdf).

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