

Example checklist

Invasive and destructive sampling of ancient human tissue has become common in bioarchaeology for radiocarbon dating and studying isotopes, DNA, and pathogens. Fragments of human tissue are permanently dislodged from the ancient body and irretrievably destroyed to enable chemical and genetic analyses. This provides an understanding of time period, diet, growth, lifestyle, migratory patterns, genetic history, health, and disease in a more detailed manner than traditional techniques of skeletal biology allow. Particularly with the ability to accurately sequence DNA from ancient tissue, geneticists are beginning to provide new insights into population history and patterns of genetic admixture, which are central to our understanding of past human life. The novelty of the research and results warrant publication in high profile journals. While this is driving research and publication in this area at an unusually fast pace, the ethics of destructive human tissue sampling are not standardised according to any disciplinary suggestions or guidelines, leading to a wide array of acceptable ethical practices among researchers. This has resulted in considerable division among the various investigators in the research. Below I provide checklists and talking points on several issues relevant to setting up guidelines for ethical considerations.

Rigorous ethical guidelines for modern tissue sampling do exist in most institutions, where researchers are required to get ethics clearance before commencing research. I believe that researchers working on ancient tissues should also apply for ethics clearance and permission so that the ethics, science and legal aspects of destructive tissue sampling are considered and approved by an informed committee. Organisations like the AAPA could provide ethical guidelines, which I believe would be useful for research institutions, museums, government and funding bodies, who could adapt them to develop policies and ethics application forms.

Rationale:

Sample sizes are typically limited in archaeological and paleontological context. The issue of destructive sampling should therefore be carefully considered. Questions from modern human tissue ethics clearance forms are just as relevant for sampling of ancient tissue.

For example:

- (1) What is the purpose of the research? Are there well-formulated questions? Do the means of destructive sampling justify the end?

Important to consider whether destructive sampling provides the best means to answer the questions. And that the sample that is collected is put to best use.

When the research is collaborative in nature (for example, archaeologists, biological anthropologists, geneticists working together), it is important to think about research questions relevant to all parties and to make sure that the same sample can be used to answer multiple questions.

Such questions are also relevant for publication. The *AJPA* author guidelines, for example, states, "Genetic research papers submitted to the *AJPA* should not be mere descriptions of marker frequency data from a particular location or locus, but should address testable hypotheses about population history, adaptation, or phylogeny."

- (2) What type of sample is needed? What are the volume/size of samples? What part of the body will be sampled?

Bone, soft tissue, skin, dental plaque, each have role to play in genetic and molecular research. It is important to consider and document the size of the sample (ensuring it is minimally invasive), but also the part of the body the sample comes from, bearing in mind that some body parts may be diagnostic for other research. For example, temporal bone and teeth are sought after for bone collagen, but are also diagnostic for sex and age estimation. In such situations the need for those sample should be properly justified, and if taken from a skeletal individual the sex and age estimates should be done before the samples are permanently destroyed.

(3) Describe the methodology for taking samples and for studying for other morphological features. Have the samples been scanned, cast, photographed before being destroyed? The researchers should provide the methodology and protocol for sample collection (use of rotary saw, dremel drill, avoiding contamination, etc.), ensuring that it is the least intrusive. If they are taking samples from archaeological skeletal individuals they should also detail their methodology for documenting additional information, such as age, sex, health status, etc. Given the scarcity of ancient archaeological/paleontological specimens every care should be taken to document the background contextual detail before the specimen is destroyed. The specimen should be photographed, and if possible a cast should be taken.

(4) Is the researcher proficient? Who will be responsible for collecting the samples? Who is responsible for processing the samples? Where will the samples be processed? The background, credentials and experience of the researcher are relevant. The researcher needs to have training in molecular techniques, but also in methods of skeletal biology and bioarchaeology. Compartmentalization of the discipline where researchers taking samples for molecular studies do not have appreciation of the wider context of destructive sampling or the training to document background/contextual information is causing division in the discipline.

If the researcher is a student, the primary supervisor should be considered the responsible researcher and should be able to verify that the student researcher is responsible and experienced, is proficient in the sampling strategy and methodological techniques, and has good knowledge of the research questions of a multi-disciplinary team. The location where the samples will be processed and the role of the person processing the samples should be clarified to make sure these are properly accredited places/people.

(5) Has appropriate consent been obtained?

Ancient human tissue generally falls in that legal grey area where consent is problematic and generally not obtained.

Volunteers or participants are deceased and therefore not in a position to provide consent. The next of kin are deceased and unknown.

The samples typically fall beyond the time period stipulated by national regulations to require consent prior to obtaining tissue (e.g., 50, 100 years, date of the Human Tissue Act, etc.).

In some cases native or indigenous communities may claim cultural connection and kin status. They may have criteria for providing consent and these need to be properly considered.

The museums or research institutions curating the material should always be consulted for consent and they should ideally have clear guidelines and protocols for minimally invasive and ethical sampling.

Governmental bodies may provide consent and should be aware of issues with regards to destructive sampling.

Funding bodies should ensure that researchers have ethics clearance.

Given the nuanced nature of consent, I understand that it is difficult to design a blanket set of guidelines around consent. However, it is still important that the issue of consent is adequately addressed against these criteria before the research obtains ethical clearance.