Chapter 6
Ethical and Legal Issues in Craniofacial Superimposition

6.1 Introduction

Methodology in craniofacial superimposition (CFS) relies on the knowledge of the anatomical relationship between the soft tissues of the head and the underlying skeletal and dental structures. This information is also critical to the closely related practice of facial approximation/reproduction. Craniofacial superimposition is usually employed when a skull has been recovered and thought to perhaps be related to a particular missing person for whom ante-mortem facial photographs are available. Facial approximation refers to the process utilized to estimate a person's facial appearance from a recovered skull (Bilge et al. 2003; Pushparani et al. 2012; Al-Amad et al. 2006). Although both techniques can prove to be important in the investigation of missing persons, recovered remains, and events producing mass fatalities, this document specifically addresses ethical issues relating to research in the development of methodology for craniofacial superimposition.

In recent years, as advances in forensic odontology, genetics, and anthropology have improved, so have the chances of identifying victims beyond recognition. According to the Interpol Disaster Victim Identification (DVI) Guide, fingerprints, dental examination, and deoxyribonucleic acid (DNA) are the primary identifiers (Schuliar and Knudsen 2012; Al-Amad et al. 2006). There are unmistakable reasons why these are the most reliable indicators of identity: fingerprints are unique, do not change, and can be classified, which enables them to be identified and registered systematically. Subsequently, the prints are then easily retrieved for purposes of comparison (Puech et al. 1989).

The unique structures and traits of human teeth, dental restorations, and jaws readily lend themselves to use in the identification of living and deceased victims. Dental data can be recovered and recorded at the time of the post-mortem examination and compared to ante-mortem data that is supplied by the generalist and/or

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specialist dentists who treated the victim during their lifetime (Fernándes et al. 2012). While an important and valuable identification method, dental identification is subject to the availability and quality of ante-mortem and post-mortem dental records (Al-Amad et al. 2006).

Deoxyribonucleic acid is a proven source of material for use in identification, as a significant portion of the genetic information contained in a cell is unique to a specific individual and thus differs – except in identical twins – from one person to the next. DNA testing can be performed even in cases involving partial, severely decomposed remains. Additionally, DNA matching is the best way to identify body parts and can be based on profiles from relatives, self-samples, or belongings (Al-Amad et al. 2006).

Secondary means of identification include personal description, medical findings, as well as evidence and clothing found on the body. These contributions serve to support identification by other means and are not ordinarily sufficient as a sole means of identification (Schuliar and Knudsen 2012), unless they have a rare identification potential, such as prosthetic devices, especially when they bear a serial number or an identification (ID) code. Face recognition is a natural human ability and a widely accepted identification and authentication method. In modern legal settings, considerable credence is placed on identifications made by eyewitnesses. However, these are based on human perception, which is often flawed and can lead to situations where identity is disputed.

The craniofacial superimposition technique can contribute to the process of identification especially when there is no reference sample for a forensic DNA analysis, when DNA typing from remaining tissue samples has failed, or when ante-mortem dental records and comparative fingerprints are not available (2012).

The aim of this chapter is to analyze ethical and legal issues involved in the use of craniofacial superimposition, considering the creation of a common multicentric framework that will allow the extensive application of the CFS technique in practical forensic identification scenarios.

6.1.1 What Is Craniofacial Superimposition?

This method consists of the superimposition of the image of the skull and a photograph of a missing person. It involves the comparison of specific landmarks on soft tissue and bone surfaces. The technique is employed in cases when human remains are found and are thought to possibly relate to a particular missing person. The method can be used when a photograph of the missing person taken during life is available, and molecular, odontological, and/or fingerprint data are not available to facilitate identification.

6.2 The Importance of Craniofacial Superimposition in Human Identification

There are various situations in which craniofacial superimposition can be extremely useful. Examples include when a corpse is unrecognizable due to its state of decomposition, soft-tissue mutilation or incineration (2012), and in mass disasters, which are associated with a large number of fatalities, with victims being visually unidentifiable in most cases (Al-Amad et al. 2006).

The method is mostly useful for exclusion. In such cases, observations of hard tissue landmarks on the recovered remains are sufficiently inconsistent with those on the ante-mortem photograph to suggest that the individual in the photograph could not be the person represented by the skeletal remains.

In the application of this technique, an initial assessment involves comparison of all available features of the recovered remains with the superimposed ante-mortem photograph. If major differences are apparent, an exclusion can be concluded. If no significant differences are found, the examiner then must determine the uniqueness of the features compared. The extent to which a positive comparison contributes to the identification process depends upon the uniqueness of those features and the probabilities involved.

The supporters of this method report that up to 96% of positive correlations can represent correct identifications, when both frontal and lateral superimposition views are utilized. However, anthropologists have varied opinions regarding the reliability and probabilities involved in this type of investigation. In our opinion, this method is best used in conjunction with others for identification, as there are several problems to overcome in the comparison between a soft tissues structure (face) and a structure made of hard tissue (skull). The SWGANTH document for best practices in facial approximation (Al-Amad et al. 2006) provides valuable commentary on the strengths and weaknesses of facial approximation methodology in its current state. While limited in scope, it can be useful for excluding identity if gross incompatibilities are present.

6.3 Ethical Issues in Craniofacial Superimposition Methods Research

Ethical issues relate to proper consent for the acquisition of documented data from known individuals, protection and proper storage of data, and appropriate scientific utilization of the data.

The ethical issues in CFS methods vary according to their aim. First of all, it is necessary to find and develop the best method, which implies research using skulls (from both deceased and living individuals) to improve the technique and to create a database that will allow the future application of these methods. In fact, it is an altruistic contribution, without any benefits for those people who participate. In the future, CFS will be used to assist in identification when recognition by other resources has failed, and thus will benefit society as a whole.

6.3.1 The Groups Involved (Victims, Families, Professionals, and Societies)

The primary groups of ethical concern are living individuals who contribute data, and the families of the deceased whose remains and photographs are utilized. Other groups of ethical interest include professional researchers, scientific organizations, project organizers, administrators, and those involved with data entry and the computer programming of the database.

When we are analyzing the ethical issues of the CFS application, we must consider all the groups involved: the victims, their families, all the professionals, and, finally, society.

6.3.1.1 The Victims

The Universal Declaration on Bioethics and Human Rights aims "to promote respect for human dignity and protect human rights" (2012). According to the Convention on Human Rights and Biomedicine, "Parties to this Convention shall protect the dignity and identity of all human beings. . ." (2012). Additional declarations suggest similar ethical approaches when working with human subjects (Smeets et al. 2010; Claes et al. 2010; Al-Amad et al. 2006). Given these issues, we can say that victims are to be treated with dignity and respect, as human dignity persists beyond death. Everyone, dead or alive, deserves to be identified.

6.3.1.2 The Families

The family is essential in this whole process, through the cooperation they can provide by making available photographs, personal details, and otherwise assisting in the identification process. It is undoubted that cooperation on the part of relatives in the collection of ante-mortem data enhances the quality and speed of identification measures. However, we must not forget that they may need psychological support, and we must be able to provide it in every situation. They also deserve to pay a last tribute to their dead, so we should do our best to enable it in every situation.

6.3.1.3 The Professionals

All participants in this project should demonstrate a scientific competence and adhere to ethical guidelines. Participants shall not misrepresent themselves or their work products, inappropriately utilize tangible or intellectual property, or through their actions or words indicate disrespect to the deceased, their family members, or others contributing data to this project. Participants should refrain from conduct adverse to the best interests of the professional scientific community. Participants should properly and accurately present their education, training, experience, and expertise. Participants should comply with all relevant laws, regulations, and policies that relate to the acquisition, security, and use of data in this project, especially in relation to human remains. Participants should ensure that all scientific procedures meet professional standards. All professional activity should be carried out in a manner that inspires confidence in the project and the professional forensic science community.

The professionals working in this area have to bear in mind that the most important requirement for victim identification work is the application of International standards (The Scientific Working Group for Forensic Anthropology 2012c). In this context, it is indispensable that the highest possible quality standards will be applied, not only for procedures and equipment, but also with regards to human resources (1997, 2005). It means that everyone has to be well trained and has to strictly follow all the procedures. As the team is frequently the point of contact for relatives within the context of family assistance, they also have to be trained to provide this kind of support.

In the CFS research, the professionals involved must act according to the “four principles” approach, postulated by (1964):

- The respect for autonomy—by which the patient has the right to accept or refuse any procedure; in this particular case, no images can be used unless informed consent is provided.
- Beneficence—every practitioner should act in the best interest of those providing data. As discussed above, in the initial research phase, the benefits we can achieve are the reliability and accuracy of this technique, in order to be safely used in the future. When CFS is used as a tool to help identify nameless individuals, all the professionals should do their best, not only technically, but also by providing psychological support to the victims’ families.
- Non-maleficence—the “first, do no harm” principle can be applied as a way to minimize the possibility of a misrecognition, which carries tough legal, social, and religious issues.
- Justice—it generally concerns the distribution of scarce health resources, and the decision of who gets what treatment (fairness and equality). In this particular field, efforts must include widely informing all concerned individuals about the MEPROCS framework, and in the last step, this technique should be equally available to every partner.

Another value which is sometimes discussed includes the respect for persons—the individuals providing data have the right to be treated with dignity. In addition, families of the deceased have the basic human rights for the identification of their loved ones.

6.3.1.4 Society

Society increasingly wants to be up to date, seeking information about missing persons and requiring that every effort should be undertaken to find them. It is extremely important to know how to deal with media, and share only useful information, without risking the success of the investigation. When CFS is used to assist in the identification of criminals, it can also be considered an important matter of safety.

Another important point we have to consider is the cost-effectiveness of the project. The costs of building an image database can be high, and the proportionality issue facing the benefits of its use has to be considered. On the other hand, the method's limitations and the misidentification consequences make this technique itself an ethical issue.

6.3.2 Databases for Craniofacial Superimposition Methods Research and Data Protection

Databases raise ethical questions, and many reasons exist both for and against their creation. Two main advantages of their use are the possibility of accelerating the process of identification (in mass disaster situations), and of enhancing the efficacy of identification of a guilty or an innocent person. On the other hand, they risk violating the right to privacy, human dignity, the right to physical and moral integrity, the right to not testify, the innocence presumption, the right to health, and the right to freedom (Board 2012).

Databases must be constructed in a manner to facilitate the research that is expected to be performed. The primary ethics issues in such database construction and maintenance involve protection of the data from improper use and viewing, limiting access to only those approved individuals and institutions and defining research protocols that limit applications. These ethical issues apply not only to the construction and initial research use of the database but also to its maintenance when the primary research is complete.

A long-term goal should be the maintenance of the database, since scientific research represents an ongoing process as new problems and approaches are identified. When we consider the creation of a database for CFS research, protocols of registration, collection, storage, and sharing data are needed. It is crucial to define what images should be inserted, how they should be stored, how long they should be maintained in storage, as well as how and when this data should be shared.

Considering all these issues, the MEPROCS' database should be built after defining all previous issues. By using the principle of precaution, we have to prevent the slippery slope effect, as well as the risk of discrimination that the power of the organizations can exercise on the minor partners. It is essential to have a quality control system for this image database.

6.3.2.1 Database Accessibility

All the participants and partners in the proposal must obey national laws and European directives of privacy and data protection by ensuring that their employees and collaborators fulfill the appropriate procedures to handle sensitive electronic data.

The personal information used during the project should be coded and encrypted following the practices approved by their respective local/national ethical committees. The data will be accessible only for the participants involved in the project and a security policy should be generated and communicated to all the participants in the network. This security policy should also state the protected data transfer protocols, preferably by European secure network (as S-TESTA) that will be used to transmit confidential data. Such data will not be transferred to any person outside the network. The implementation of the security policy should be monitored by the ethics committee (EC). It is important to note that anonymous data is not considered personal data and the processing of this anonymous data requires less special safeguards. The data will be anonymous for the participants. Irreversible *anonymization* of data will be assured using a secured procedure to permanently delete the electronic data. Once data is anonymous, it does not require specific processing apart from the standard data protection procedures. Data will not be kept in an identifiable form in the resources of the partners.

6.3.2.2 Privacy: Data Anonymity

The Data Protection Act 1998 (the DPA) applies only to information, which falls within the definition of "personal data." European data protection authorities have been considering what is meant by "personal data" in Directive 95/46/EC on the protection of individuals with regard to the processing of personal data and on the free movement of such data (the European Data Protection Directive, or the Directive). This work has culminated in Opinion 4/2007 on the concept of personal data (01248/07/EN—WP136) adopted by the Article 29 Data Protection Working Party on June 20, 2007.

The Data Protection Act (DPA) is concerned with "personal data." Personal data means data that relates to a living individual who can be identified from the data or from the data and other information, which is in the possession of, or is likely to come into the possession of, the data controller.

In order to determine if the data under study is considered personal data, the following questions have to be answered (The Scientific Working Group for Forensic Anthropology 2012a):

- Can a living individual be identified from the data, or, from the data and other information in the possession of, or likely to come into the possession of, the data controller?
- Does the data "relate to" an identifiable living individual, whether in personal or family life, business, or profession?

If the answer to any of the previous questions is yes, the data can be considered personal data in most of the cases.

In the particular case of the data needed to perform CFS, neither the skull (the actual physical skull, photographs, or 3D models of it) nor the anthropological profile can be considered as personal data. Contrary to that, face photographs of living persons are considered personal data in the CFS scenario so they have to be treated as confidential data. Those photos will be processed to learn something about the individual. In addition, as mentioned before, face recognition is a natural human ability.

The partners will make available anonymous data together with a unique coding, which falls short of actually identifying the individual to the MEPROCS participants. By making data anonymous, the privacy of individuals will be maintained. Converting personal data into a form in which the individuals to whom it relates are no longer identifiable will be only possible in the case of the skull and anthropological profile. It is not possible to anonymize face photographs for CFS purposes since the task to be performed is exactly the contrary, individual identification. However, it is clearly legitimate to use personal data for particular purposes where the intention is to inform decisions about particular individuals, or to provide services to them, as is the goal of the current research study (2012).

The process of anonymization (The Scientific Working Group for Forensic Anthropology 2012b) starts once a relative of the deceased decides to allow the use of data in the study. At this moment, the responsible person designated by the MEPROCS EC to carry out this process has to access the database, in which he/she will add files containing the reference of the data that is going to be introduced. These references and the file name will be a random code obtained using certified and secured commercial anonymization software. Then, the MEPROCS EC will ensure that the privacy supervisor designated in each center has verified that the files have been codified properly and that they comply with privacy rights. At this time, files can be transferred to the rest of the partners. Organizations holding the data are the guardians and should exercise due diligence with its protection.

Finally, special attention will be given to the images that might be needed for dissemination outside the network (project reports, scientific papers, etc.). The research intending to use images in open dissemination publication and activities should seek explicit permission from the EC. A second check will be performed on the medical images to ensure that it remains impossible for the public to identify the deceased from the data.

6.4 The Problems of European and National Legislation and the Implications of Conventions and Declarations

Every effort should be made to acquire data in a manner that is consistent with existing European and national legislation and policies.

The MEPROCS international framework must respect international conventions and declarations, as well as the legal issues of all involved countries. It should be important that a legal expert from each country compiles his/her national legislations, and assure that all MEPROCS' documents comply with them.

Participants must abide by the national legislation and regulations of the countries in which the project will be carried out. Furthermore, each participant will seek the approval of the relevant local or national ethics committee to start the research activities.

Participants must conform to relevant EU legislation: Charter of Fundamental Rights, Decision N° 1982/2006/EC of the European Parliament and of the Council of 18 December 2006 concerning the 7FP for research, technological and demonstration activities (2007–2013), the Directive 95/46/EC, and the Council of 24 October 1995 on the protection of individuals with regard to the processing of personal data and of free movement of such data.

Participants must abide by International conventions and declarations: Helsinki Declaration 1996/2000, UN Convention on the Rights of the Child, Convention of the Council of Europe on Human Rights and Biomedicine (1997), UNESCO Universal Declaration on Bioethics and Human Rights (2005), and W.H.O./C.IO. M.S. International Ethical for Biomedical Research Involving Human Subjects (1993, reviewed 2001).

In addition, each MEPROCS full partner shall provide the Research European Agreement (REA) with written confirmation that it has received favorable opinion (s) from the relevant ethics committee(s) and, if applicable, the regulatory approval (s) of the competent national or local authority (ies) in the country in which the research is to be carried out, before beginning any REA-approved research requiring such opinions or approvals. The copy of the official approval from the relevant national or local ethics committees must also be provided to the REA.

6.5 Proposed Guidelines for Craniofacial Research

During the research process, all the participants must adhere to the proposed guidelines:

- In the acquisition of individual data, proper informed consent must be secured.
- Procedures for obtaining informed consent should follow the guidelines and regulations of the countries and institutions involved.
- Once properly obtained, individual data must be protected against inappropriate use. Such protection must include not only the usual computer firewalls but also clear procedures for screening access.
- Use of the data should follow guidelines regarding the type of research conducted as well as defining those individuals/institutions with access.
- Procedures should safeguard the identities of all individuals in the database.

Research methods resulting from utilization of the database should relate the appropriate probabilities involved, including appropriate and adequate statistical procedures.

6.6 Consent Forms for Craniofacial Superimposition Methods Research

Informed consent represents an essential ethical cornerstone of database construction. Protocols must be followed to ensure that data are properly acquired and that the necessary approvals are in place. As indicated above, the uses of CFS techniques vary according to particular project goals: research or real practice. In both cases, the use of official consent forms is mandatory.

Although there are various models internationally for consent forms and procedures, attached are consent forms that the ethics committee feels will meet the goals of this project (see Appendices A–C).

To authorize the acquisition of individual data, there are two different MEPROCS Informed Consent Forms: one to be provided to the relatives of the deceased person that we will include in the study (Appendix A) and a second one regarding data collection from living individuals (Appendix B). These forms have been evaluated and approved by the Ethical Committee, as they comply with the ethical values and individual rights. They include a clause with the right to cancel the authorization at any time and state that the proposer will then erase any previous data or images.

The process of obtaining informed consent is basic in the tasks of this project. First, a detailed explanation of how the project will be developed and what its objectives are has to be given to the victims' relatives, or the living individuals. With this aim, the persons in charge should show, in their respective center and using simple and a clear language, a PowerPoint presentation, explaining the details and the social benefits of the MEPROCS project. In order to help people in their understanding of the contents, they should also be provided with a short explanatory document. The next step should include personal interviews with each person to detail the most relevant aspects of MEPROCS.

The principles of this practice are universal: people need to be adequately informed and they must clearly understand the information. Finally, they have to make their own decision regarding the authorization to include their images in the database, freely and without coercion. In the case of children, incapable persons, or the deceased, the informed consent is usually given by a close relative or a procurator, always following the rules previously listed.

Once all this information has been transmitted, they should be provided with an informed consent form so that they can accept, freely and without any kind of constraint, to participate in the project.

In the event that data is imported, either from within the MEPROCS consortium, or from an external center/institution, the protocols must adhere to the general ethical guidelines provided in this document.

When there are remains from individuals deceased for more than 15 years, and the national laws allow their sharing and use, the MEPROCS EC approves their inclusion in this study, after the signing of the "Informed Consent form for scientific material sharing" (Appendix C).