SUMMARY

There is an increasing interest in Forensic Sciences. This is due to many reasons such as the application of modern technology to forensic principles. The identity of an individual from birth, throughout life and in death could be considered a fundamental right. The advances in Forensic Sciences have simplified the identification process through primary and secondary data of far greater scope than ever before.

Natural disasters and those disasters due to criminal and terrorist activities continue to occur worldwide. People from all walks of life of either sex and of different age groups could be the victims of these disasters. It has not always been possible to identify the victims due to a multitude of reasons. This warrants not only the establishment of universally viable and useable international disaster victim identification programs, but also requires programs that are uniform in principle, to cater to disasters involving deaths of multiple nationalities, common in air traffic accidents. This explains why the Disaster Victim Identification protocol of Interpol is gaining increasing acceptance, to cater to the needs of individual countries. The unavailability of ante-mortem records is the primary difficulty and the main reason for the lack of success with this method.

After a criminal act or a disaster, the human remains are presented to forensic practitioners in different forms, ranging from an easily identifiable body to a set of burnt remnants. The methods to be adopted for the identification obviously vary from case to case. The less the available data, the more difficult the identification and the more extensive will be the methods. In order to identify a dead body, the most useful clues are primarily race sex and age. These may be adequate, depending on the number and distribution among race, sex and age of the victims. However when the number of victims increases, the forensic experts have to depend on more specific extensive information and at this point the dental tissues become an encyclopaedia of information.

Identification on a dental basis depends on a variety of factors increasing with the number of man-made and natural changes to the human dentition. In the human body, the most noticeable changes, particularly for recognition, are above the neck. This makes it more important for the forensic experts to be familiar with the measurements of features above the neck and their relationships to one another.

Measurements of distances between accepted landmarks of the skull and the face could be used to establish proportions. These proportions become the basis on which a face is built. This is why, in addition to the tissue thickness with racial variations, these standard ratios of facial dimensions are used for the reconstruction of faces. This is basically done in four ways: from photographs, from plasticine, from video-superimposition, and from computer based programs.

In all these methods, the common links between the skull and the face are ratios, of which some are standard and some are not. Standard ratios are those that are documented where similarities occur in a larger percentage of people. The non-standard ratios are those which are undocumented and have wider variation among individuals, the latter is the thrust of this study.

Therefore the research component of this thesis is to:

1 Identify non-standard ratios,
2 Assess the feasibility of their use for identification,
3 Examine the degree of their sensitivity for an initial identification by elimination
4 Document the degree of their specificity.

Data from a set of non-standard facial ratios, based on distances measured between documented landmarks, from a series of samples of different sizes have been selected for this study. These data have been analysed from different statistical perspectives such as analysis of variation, regression analysis, student's t and Chi square tests. The statistical analysis establishes the specificity and the uniqueness of a group of facial ratios. A feature emerging from the statistical study of these non-standard ratios is that, it establishes the uniqueness and the specificity of non-standard vertical and horizontal facial ratios when considered collectively. This supports the hypothesis.