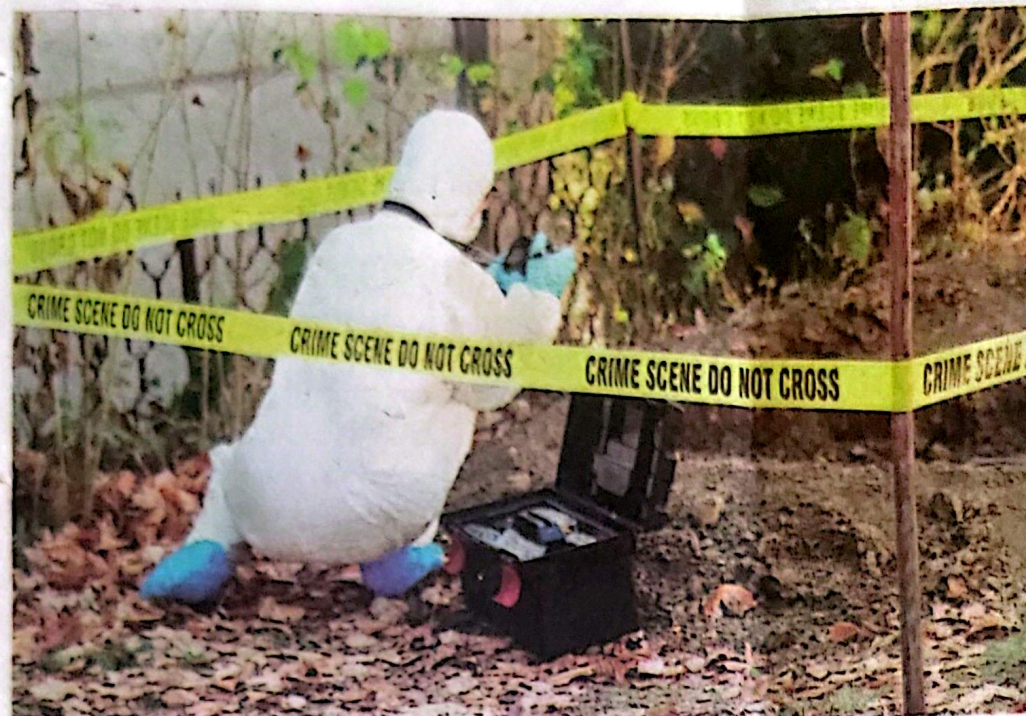


Medicine and the Law



A forensic officer inspects a crime scene. Age estimation is an important feature in identification of human skeletal remains.

How human skeletal remains were identified

A 37-year-old woman who left home for a nearby town on December 30, 1981, vanished without a trace, prompting her twin sister to report her disappearance to police nearly a month later.

BY DR SYLVESTER ONZIVUA

On December 30, 1981, a 37-year-old woman left home for a nearby town on a personal matter. She never returned. On January 28, 1982, her twin sister formally reported the disappearance to the police. And on March 11, 1982, police discovered some human remains that they suspected to be those of the missing woman, in some isolated part of a nearby forest. The human remains comprised of part of the skull and fragments of long bones, along with some hair tufts. A woman's dress was also recovered with the remains.

A medical officer who first examined the remains was of the opinion that the remains were of an adult human female and that they bore signs of ante-mortem injury. He, however, referred the case for a more detailed examination by forensic pathologists and the forensic Analytical Laboratory. A special test known as the Precipitin test was performed on the hair and bones to conclusively establish if these were, indeed, of human origin. It is a crucial forensic serology technique used to determine if blood or human body stains are of human origin. It is based on the antigen-antibody reactions and it involves mixing of a sample extract with human antiserum.

The test is positive when a white precipitate ring is formed. This test is vital in homicide and assault cases to confirm if the issue under investigation is of human origin. The test can also be used on bone fragments from which an extract is got and it is highly specific and effective up to five years post-mortem. The next step was to determine if the remains belonged to the same person. It was concluded that the remains were of the same person as they had the same configuration, and did not demonstrate discrepancies in age or sex and did not show evidence of duplication. It was important to establish if the remains were that of a male or female. Three bones were of importance in establishing whether

a deceased was a male or female and these are the skull bone, the mandible and the pelvis. It has been found that when the entire skeleton is available sex can be determined with 100 percent accuracy. The pelvic bone alone can be used to accurately predict the sex of a deceased in 95 percent of cases while the skull will give an accuracy of 90 percent.

The pelvis is generally agreed to be the part of the skeleton best suited for sex determination, as it is associated with the female structural capacity to bear children.

The male pelvis, also known as the android pelvis, is massive, rugged and has marked sites of muscle attachment. The entrance of the pelvis is heart-shaped, and the cavity of the true pelvis is shallow. The female pelvis is smoother and more rounded and the inlet is circular and the cavity is spacious and deep. The adult male skull is large with a rugged architecture, with prominent ridges above the eyes and the mastoid process is well established. A female skull is well modelled, appears lighter and the ridges above the eyes are rounded. The mastoid process is relatively small. The jawbone of a male is angled while that of the female is rounded. In this particular case, the sex of the deceased was deduced to be female based on the feminine characteristics especially of the skull.

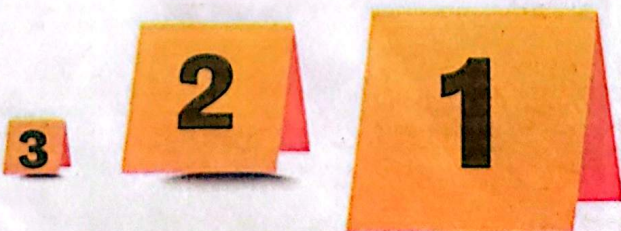
Age estimation is an important feature in identification of human skeletal remains. The age of the deceased was deduced from the skeletal remains to be of a person of between 35 and 40 years old. This conclusion was arrived at by examining the closure of the sutures of the skull and also the mandible characteristics. The characteristics of, and the number of teeth can also be used to estimate the age of a person.

The deceased only had 28 teeth instead of the expected 32 but this was explained by the not uncommon phenomena where the third molar does not erupt. The dentition of the skeletal remains was carefully observed and it was noted that the deceased had an abnormality with one of her teeth. The relatives and friends were later to independently verify this.

In this particular case it was difficult to estimate the height of the deceased as only fragments of the long bones were available. There are statistical methods that can accurately be used to determine the height of the deceased when the person was living. The methods use the length of the long bones.

However, in this case a special method was used and the stature of the deceased was meticulously worked out to be around 5 feet 1 inch (plus or minus 1 inch). The height of the missing woman was in fact 5 feet, 1 inch. Even though the skull was incomplete with some parts missing, a reconstruction exercise was undertaken and superimposed on a life-size photograph the deceased had taken shortly before she disappeared. The match was perfect.

Some bangles, recovered along with the remains, had an average diameter of 5.8 cm. These matched perfectly with bangles recovered from the home of the missing woman. And the black dye used in the tuft of hair recovered was analysed to its constituents and matched with the dye recovered from the home of the missing woman. The forensic pathologists concluded that the remains recovered were those of the missing woman and the cause of death was attributed to blunt force trauma to the skull on the basis of the ante-mortem fractures. This case was solved before the era of DNA. DNA profiling was invented by a British geneticist, Sir Alec Jeffreys, in 1984. And DNA was first used to solve two rape-murder cases in UK in 1986.



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Sex It has found when skeletal remains can be identified by the shape of the skull and the length of the long bones. The accuracy of these methods is 95 percent.