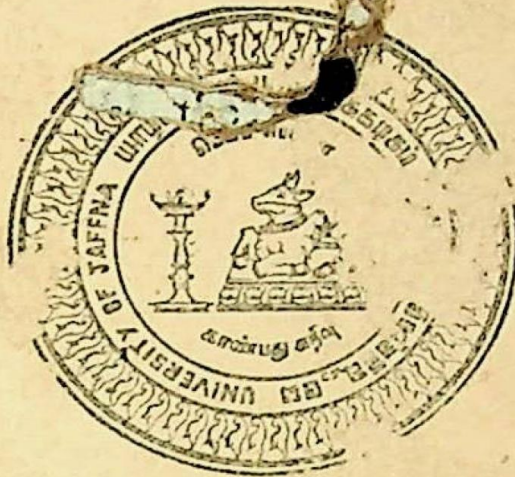


# University of Jaffna



## INAUGURAL LECTURE

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INTRODUCTION

The lecture by Professor N. Saravananarayanan on the Value of Forensic Medicine in the Detection of Crime is the first in the series of inaugural lectures established by the University of Jaffna. The lecture is delivered by the newly appointed Professor to the Academic Community, Faculty of Medicine and the University Council Members.



Professor N. Saravananarayanan in his inaugural lecture delivered in February 1971, with cordiality and the growth, development and the importance of forensic medicine and its role in the curriculum of almost all the Universities in the world.

Prof. A. Thiruvalluvar

Vice-Chancellor  
University of Jaffna

# The Value of Forensic Medicine In The Detection of Crime

## INTRODUCTION

The Lecture by Professor N. Saravanapavananthan on "The Value of Forensic Medicine in the Detection of Crime" is the third in the series of Inaugural Lectures established by the University of Jaffna. The Lecture is delivered by the newly appointed Professor to the Academic Community, special invitees and the University Council Members.

Professor N. Saravanaivananthan in his inaugural lecture delivered in February 1984 speaks with confidence about the growth, development and the importance of Forensic Medicine and its role in the Curriculum of almost all the Universities in the world.

**Prof. A. Thurairajah**

Vice-Chancellor,  
University of Jaffna.  
1991-12-23.

The Value of Forensic Medicine  
In The Detection of Crime

# THE VALUE OF FORENSIC MEDICINE IN THE DETECTION OF CRIME

Legal medicine may be defined as the application of medical knowledge to the administration of law and to the furthering of justice. The earliest recorded medico-legal expert was Imhotep (2980 B. C.). There is no record of medical evidence being given in the courts during the time of Hippocrates. The first forensic pathologist was Antistus who examined the body, of Julius Caesar and pronounced that only one of the 23 wounds was fatal. In 1507 A. D. the penal code of the Bishop of Bamberg officially recognised Forensic Medicine as a separate entity. In 1602 A. D. the first great work on forensic medicine by the Italian physician Fortunato Fedele was published and in 1650 the 1st lecture on Forensic Medicine was delivered at the University of Leipzig by Michaelis. Professorships of legal medicine were founded by the state in Germany in 1720. In 1807 Great Britain began to include Forensic Medicine in the medical curriculum and the 1st chair of Forensic Medicine was founded at the University of Edinburgh. Thereafter this science grew from strength to strength and today it is included in the medical curriculum of almost all the Universities in the world.

As a result of advances and great specialisation medico-legal problems and their solutions depend upon the closer co-operation and the team work of experts both in medicine and in science. Therefore today Forensic Medicine includes many sub specialities like Forensic - Serology, Odontology, Psychiatry, Toxicology, etc. If not for the giant strides this science has made in the recent past it would not have been possible for the state to bring to book criminals like Christie, Evans, Haigh, Heath, and more recently the Yorkshire Ripper.

The investigator, the forensic pathologist and the forensic scientist have all a part to play in the drama of crime detection. They should work as a team. This drama of crime detection starts at the scene of crime. I have found

that a visit to the scene of crime shortly after its commission has helped immensely in the final diagnosis. Accurate measurement and documentation of injuries and a careful post-mortem and laboratory examination are all necessary for the final reconstruction of the crime. I shall illustrate this, by citing some interesting cases handled by me during my career as a forensic pathologist.

It is often thought that an ultra modern laboratory is required for the detection of every type of crime but simple gadgets like a measuring tape and a magnifying glass may be all that is required in some cases. In May 1971, I was asked to perform the autopsy examination on the body of a driver of a parliamentarian killed by a political opponent while participating in the May day rally. The victim died shortly after admission to Hospital and at the autopsy I observed an oblique elliptical incised wound  $1\frac{1}{2}$ " long on the left side of chest with a patterned abrasion  $\frac{1}{4}$ " above the stab wound. Internally the injury was directed downwards and medially and had caused an incised wound long on the front surface of the heart and another incised wound  $\frac{1}{2}$ " long on the lower surface of the heart. The total depth of the wound was about five inches. The patterned abrasion on the surface of the chest indicated that the knife had a guard with a particular pattern engraved on it. Since the patterned abrasion was noticed  $\frac{1}{4}$ " above the surface wound, it indicated further that the guard was free from any marking for about a quarter of an inch. The description regarding the knife collected by us at the post mortem tallied accurately with the actual measurements of the alleged weapon. Therefore one could see how such simple articles like a hand lens or a measuring tape could prove useful in crime detection.

Sometimes the injury may portray the real characteristics of the weapon or the agent that caused the injury. The lash marks 17 of them on the breast, torso and back of Margery Gardener were so clearly defined that Prof. Keith Simpson was able to measure them with mathematical precision and at the end of his examination, he told the police, "if you find that whip you have found the man".

If the body had been dismembered purposely so as to destroy identify, one may have to look for the presence of deformities, malunited fractures and diseases in the skeletal remains that may help to identify the body. I was once confronted with this problem.

A dismembered decapitated body, in an advanced state of putrefaction, was brought to me for examination during the early part of 1971 (1). The body was found buried in a jungle in a gunny bag, and the burial was said to have occurred nine days prior to my examination.

The remains consisted of:-

- (i) a head, decapitated at the level of the 4th cervical vertebra;
- (ii) Left upper limb, amputated at the shoulder joint;
- (iii) the trunk and both thighs;
- (iv) the right and left legs each amputated at the knee joint.

The skin was present only on the right side of the face, head and left forearm. On the front aspect of the left forearm there was a tattoo mark of a dragon. Most of the muscles were intact, but none of the internal organs were available for examination. The skin of the right temporal region appeared purplish black, and the same discolouration was noticed in the right temporal muscles. A thin film of clotted blood was noticed under the temporal muscles. Examination of the skull revealed a depressed comminuted fracture of the right temporal bone and the middle fossa. A fissured fracture was seen to run across the base of the skull from the above mentioned depressed fracture towards the left parietal eminence.

In the lower jaw two fractures were seen, the first on the right side  $1\frac{1}{2}$ " in front of the angle, and the second just in front of the left mental foramen.

Decapitation was through the arch and body of the 4th cervical vertebra. The cut portion of the 4th cervical vertebra, which was attached to the head, fitted accurately with the remaining portion of the same vertebra found attached to the trunk, indicating that both belonged to the same body.

The cut in the region of the shoulder-blade had passed through the glenoid fossa. The portion of the shoulder-blade which was attached to the ~~trunk~~ limb fitted accurately with the remaining portion of the shoulder blade on the trunk. There was no evidence of any bleeding around the shoulder blade and the cervical region. The right femur showed a deformity due to a malunited fracture. The deceased was known to walk with a limp, and this deformity of the right femur amply testified to this fact.

The pelvis and the skull were typically male. The height, calculated by means of Trotter and Gleser's formulae was approximately 5' 3".

The deformity of the right femur, the tattoo mark on the front aspect of the left forearm, the calculated height, and the age determined from the examination of the skeletal remains, helped in the identification of the deceased.

The depressed comminuted fracture on the right side of skull indicated that it was caused either by a heavy iron bar or a heavy club. The fissured fracture, which was seen running across the base of the skull indicated that the head was supported when the blow was struck. The presence of blood under the temporal muscles and the purplish discoloration of the overlying skin, suggested that this was an ante-mortem injury.

An extensive depressed comminuted fracture of this type would have necessarily caused death due to serious damage to the brain. The absence of bleeding in the cervical and shoulder blade regions indicated that the decapitation and amputation must have occurred some time after death. The

general fitting together of the cut portions of the cervical vertebra indicated that they belonged to the same body.

According to the evidence collected by the police, the deceased, a 65 year - old male was struck with a heavy club while sleeping and a few hours after the death, the body was decapitated and dismembered put in a sack and buried. During the trial the accused pleaded guilty and was convicted and sentenced to 10 years rigorous imprisonment.

In the Ruxton case the precise fitting of the broken-off pieces of the lumbar vertebra helped Professor Glaister to reconstruct the second body. Sometimes the material available to the pathologist may be very scanty but a careful study is bound to yield good results as in this case.

Three bones which were found at the bottom of a well were sent to Prof. Sydney Smith for routine examination (2). After looking at the bones he gave the police something to work on. His report ran thus. "They are the bones of a young woman, short and slim aged between 23 - 25 years, when she died which was atleast three months ago. Her left leg was shorter than her right and she walked with a pronounced limp. She probably had polio as a child. She was killed by a shot gun loaded with slugs fired in an upward direction from a range of three yards. The killer was standing or sitting in front of her and slightly to her left. She was not killed outright but died 7 - 10 days later probably from septic peritonitis due to the shooting. Two of them were the hip bones and the third a sacrum". The three bones when fitted together gave clear evidence of sex which in this case was female. Since the crest of the hip bone was incompletely united the age was estimated to be between 23 - 25 years. The right hip bone was larger and heavier than the left with a bigger acetabulum. This meant that the right hip bone had borne most of the weight of the body for a long time which implied that she had been lame in her left leg from childhood.

An irregular lead slug was found embedded in her right hip bone which meant that it was home made. In addition



there was a grooved injury and a triangular fracture in other parts of the same bone indicating that these had been caused by similar slugs, from a shot gun. The spacing of the injury gave some indication regarding the dispersion of the shot and from this the range was deduced as 3 yards. The grooved injury also gave some indication regarding the direction and angle of the shot. The margins of this injury showed a good deal of erosion which is characteristic of suppuration. The position of the injury also indicated that at least one of the shots must have penetrated the abdomen. This and the definite evidence of infection made septic peritonitis the most likely cause of death.

Sometimes trivial injuries which are of no significance to a surgeon may be of paramount importance to the pathologist. The following case illustrates this point.

In *Reg vs Sathasivam*, (3) Sathasivam was charged with the murder of his wife. According to the prosecution witness William, who was a servant of Mr. Sathasivam and an accomplice to the crime, Mrs. Sathasivam was strangled on the floor of the bedroom by the accused. Sir Sydney Smith who gave evidence for the defence convincingly proved to the satisfaction of the Jury, that the strangulation did not take place in the bedroom, but it took place in the passage between the kitchen and the garage of the house.

He based his opinion on a finding of a bruise on the back of the abdomen about 3' 6'' above the heel, A projecting object was identified on the wall between the kitchen and the garage at the same height. His finding was further strengthened by the presence of urine on the petticoat right up to the hem. This trickling of urine could only take place while in an upright position, and not while lying on her back as suggested by the prosecution.

A superficial bruise behind the left ear due to the pressure of an ear stud which was bent, presumably by a blow was another important finding in this case. A pearl that had been mounted in it had dropped out. Twelve days

after this gruesome murder this pearl was found in the garage about 1' away from where the body was found lying. If the murder had taken place in the bedroom the pearl loosened by the blow would almost certainly have fallen either in the bedroom or on the way while carrying the body down.

Sometimes one may have to spend long hours to find the cause of death. I was once asked to exhume the body of a man who was believed to have died of gunshot injuries during the insurgency in 1971. When I exhumed the body about two months after burial, I found the body in an advanced state of putrefaction. There were no soft tissues on the body but when I examined the skeleton I noticed a semi circular perforation in the 4th rib and another perforation in line with the above perforation in the left shoulder blade. The spicules of bone which were around the margin of the perforation were directed outwards indicating that something had passed through the chest cavity. When the vertebrae were cleaned, I noticed a pellet embedded in the 1st lumbar vertebra on the left side anteriorly. These made me to come to the irresistible conclusion that death was due to gunshot injuries.

Since the aorta lies over the 1st lumbar vertebra, the 2nd pellet would have necessarily caused injury to the aorta. The former is very likely to have injured the heart. The position of the pellet and the direction of the spicules indicated that shot was fired from in front. Since there were two accused persons in this case, the court was interested in knowing whether the injuries were caused by one shot or two shots. Since the distance between the two injuries was about 6" medical opinion was that one shot could have caused these injuries if it was fired from a close range, but if it was from a distance it was more likely to have been caused by two shots. According to the chief prosecution witness, two men fired one after the other at the deceased from a distance of 100 feet. The man died within a few minutes of receiving the injuries. Both men were found guilty and sentenced to death.

It is natural for a murderer to make his crime look like suicide or accident in order to escape detection. Such attempts have been going on from time immemorial.

Although homicidal hanging is rare but murder staged to appear as suicide by hanging is by no means uncommon. Distribution of hypostasis and the injuries on the body should be studied carefully. Unacceptable distribution of hypostasis should arouse the suspicion of the medical examiner.

A person may be murdered by hanging when he is incapacitated by drink, drug or injury. The latter possibility is illustrated by the following case.

On 08-06-1975 a woman aged 26 years was found on the floor of a kitchen with a rope round her neck. According to her husband (the first accused) she was found alive at 5.30 a. m. and when he walked into the kitchen at 6.30 a. m. he found the deceased hanging from a beam. He further stated that when he touched the body the rope snapped and the body fell down. He also admitted of having assaulted her the previous night at about 10 o' clock.

When the police visited the scene of crime at 8.00 a. m. on 19 06 1975 the deceased was found lying on the floor with the legs bent underneath her buttocks. The upper limbs were rigid and flexed at the elbows. At the first autopsy which was done at 3.00 p. m. on the same day rigor mortis was found to be well established in all joints. Externally ten ante-mortem injuries and two post-mortem injuries were noticed and most of the injuries were in the region of the head and face. A horizontal constriction mark and well marked asphyxial haemorrhages were also noticed.

At the second post-mortem examination fourteen ante-mortem injuries were noticed, by the author, of which five were in the region of the head and face. A linear oblique fracture measuring two inches in length was noticed over the left parietal region underneath a large contusion. The doctor who performed the first post-mortem examination was not

certain as to whether it was created by him during the removal of the skull cap.

Since the possibility of concussion is extremely great if the fracture was ante-mortem it was examined carefully and it was concluded to be an ante-mortem fracture for more than one reason. Firstly, the fracture was underneath a large contusion. Secondly, it was a linear oblique fracture 2'' in length over the thickest part of the skull. Thirdly, although it terminated close to the sawn edge the fracture did not extend up to the edge. Fourthly, it is difficult to create a fracture on the outer table during the process of levering the skull cap after cutting the outer table and the diploe of the skull. The height of the deceased was 5' 4'', her arm reach was 18'', the height of the beam from the floor was 7' 2'', the height of the prop which was alleged to have been used was about 1' 8'' and it was two feet away from the point of suspension. If she had attempted self suspension using the same prop, the point of suspension would have been inaccessible to her.

This was confirmed by the construction of a model and utilising the services of a lady of the same height and having the same arm reach. The length of the rope was 56 inches. The circumference of the beam was 14 inches. The slip knot which was on the victim's neck had consumed 6'' of the rope. The circumference of the victim's neck was 14 inches. Even if she had reached the beam with difficulty the length of the rope was insufficient to tie a knot after winding round the beam. Further if self suspension had taken place at the same spot using the same rope it would have been a complete suspension and the feet would have been 7 inches above the ground level. A horizontal constriction mark and well marked asphyxial signs are a rarity in complete suspension.

Histological examination of the injuries did not reveal any evidence of vital reaction. When the police first visited the scene of crime the upper limbs were rigid and flexed at the elbows and it takes about 4-6 hours for rigor mortis to

set in the upper limbs. The absence of vital reaction and the presence of rigor mortis in the upper limbs indicated that it was unlikely for the death to have occurred between 5.30 and 6.30 am on 19-06-1975.

The medical opinion in this case was that the suspension took place while in an unconscious or sub-conscious state and the noose was placed around the neck and tightened, before the victim was hanged.

At the end of the trial the Jury unanimously found all the accused guilty of murder. (4)

Although murder by burning is rare, deliberate concealment of crime by burning the body is not at all uncommon. Fire may not destroy all evidence of identity. Webster failed to destroy the identity of Dr. Parkman when he tried to dispose of the body in a laboratory furnace. Rouse endeavoured to destroy the body of his victim by setting fire to the body, but here too arson failed to destroy all the evidence of the crime. Although the body was found charred beyond recognition Sir. Bernard Spilsbury was able to demonstrate soot in the respiratory passages and carbon mono-oxide in the blood.

Suspicion of murder may occur when there are marks of violence, such as stab wounds, gunshot wounds, (RVS-Furnace) or fracture of bones. If the distribution of burns cannot be explained by the accidental ignition of the clothes, one will have to be very careful before pronouncing an opinion.

On the 22nd of October, 1975 at about 2.00 p.m. the deceased, a thirty year old wife of an Army Corporal raised cries for help. The neighbours who rushed towards the house, found the outside door locked. When they looked through the open window they found the victim in flames standing in the centre of the living room and crying for help. The husband of the deceased was by her side and he warned the crowd which had gathered outside not to enter the house. They however forced open the door, gained entry into the house and put off the fire by removing the clothing from the body of the victim. The clothing consisted of a partially

bunt nylex saree, satin underskirt, satin blouse and a cotton brassiere. She was thereafter admitted to the General Hospital, Colombo. She was conscious and rational at the time of admission. The husband who accompanied her to the hospital gave a history of accidental burns while lighting a kerosene cooker. He too had superficial burns on both hands. In the ward she gave an entirely different history to the consultant who was treating her, to the effect that her husband splashed kerosene on her body and set fire to her apparel. On the third day, she died of toxæmia due to extensive burns. A dying declaration was recorded.

At autopsy the body was that of a well nourished middle aged female. She had burns, varying from 1st to 2nd degree on the front aspect of the lower part of her right leg, the upper parts of both the thighs, the front of the abdomen the inner aspects of both the breasts, the front of the neck and the chin. The intervening area on the front aspect between the lower part of the right leg, and upper part of the right thigh showed only erythema. The front aspect of the lower part of the left lower limb was free of burns. The front aspect of the lower part of the body was burnt and deep burns were noticed over the upper part of the right thigh, buttocks and rear of the chest. The arms and hands were burnt, lesions varying from 1st to 2nd degree were noticed.

When the author visited the scene, a kerosene, cooker was noticed on the floor of the kitchen. The cooker did not have a kerosene container. The receptacle on which the container rests had water instead of kerosene. Particles of rust were noticed on the wick of the cooker. There was a glass half filled with kerosene on the kitchen table. Soot was present on the floor of the kitchen and the living room.

In this case the entire rear aspect of the body was burnt and deep burns were present on the rear aspect of the chest, buttocks and upper part of the right thigh indicating that the burning had occurred over these areas for a comparatively

longer time. If, as suggested by the husband (accused), the deceased had sustained these burns while handling the cooker resting on the kitchen floor, the distribution of the burns should have been consistent with a spread of the fire from below upwards. The burning should have been also more on the front aspect of the body than on the rear.

The Government Analyst who conducted experiments with the nylex saree the deceased was wearing at the time of the fire, concluded that the material would only melt when heated. It would go up in flames only in the presence of an inflammable fluid like kerosene. Therefore the deceased's clothing must have had sufficient amount of kerosene for it to go into flames particularly on the rear aspect. Normally it takes less than 5 seconds for a woman to remove her saree. (The time required was recorded by the author on volunteers). She could not have sustained such extensive burns if she was free to use her hands. The presence of burns on the hands of the accused would seem to confirm, that he had prevented the deceased from using her hands. The presence of rust particles on the wick and water in the receptacle that holds the kerosene container suggested that the cooker had not been in use for sometime. At the end of the trial the accused was sentenced to 10 years rigorous imprisonment. (5)

Poisoning is a small man's weapon not only because small men are not given to violence, but also because they often suffer from a sense of inferiority. Further the prolonged action of the poison gives them a sense of power. They can sit back like gods and see it work. This may be true of Crippen, Armstrong, Pritchard Radford and the Seddons.

Of all the murderers, poisoners are the worst. Poisoning cases are the most difficult cases to tackle. Usually the poisoner plans elaborately and studies the properties of the poison before he administers it to his victim, which in some cases are done over a period of time. Many of the poisons produce symptoms, after an interval giving enough time for the criminal to cover his track. Some-times the symptoms resemble natural illness, which makes diagnosis, more difficult. It is comforting to note that they rarely succeed in their attempts.


Due to the great advances made in toxicological chemistry the criminal poisoners have little hope of escaping detection today. At this stage it is worth mentioning the case of Dr. Crippen. Dr. Crippen like other poisoners Palmer, Armstrong and Simethurst was a very small man was known to be gentle and well-mannered. He was dominated and tyrannized by his wife, He endured her domination for years. When his wife who was tired of him and knew about his intimacy with Ethel-le-Neve threatened to leave him, there was a crisis in the family. Dangerous thoughts passed through Crippen's mind before he ordered five grains of hyoscine hydrobromide for the murder of his wife. He lied foolishly about her disappearance and he was caught when he attempted to escape the law by an ocean liner to America with his girl friend. Willcox isolated  $\frac{2}{5}$ th of a grain of hyoscine hydrobromide from the viscera about 6 months after burial. Thanks to Sir Bernard Spilsbury whose evidence regarding the operation scar on a piece of skin from the lower part of the abdomen went a long way to establish identity. An expert witness is sometimes considered to be capable of giving evidence with certain amount of mathematical accuracy. If one could do so, it would resolve all difficulties. A judge or a counsel who irritably demands facts and not possibilities and probabilities is one who cannot appreciate the opinion of a bona fide expert. In some instances an expert can voice an opinion with certainty for example in a case of disputed paternity.

In conclusion I wish to state that it is not necessary that a high powered laboratory is required to solve every crime. Simple gadgets like a measuring tape or a hand lens may be all that is required to solve a crime. But one should not run away with the idea that laboratories are not useful in crime detection. A careful post-mortem done by an expert with meticulous care is bound to yield good results even when the material available is scanty.



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*Mahathma Printing Works, Erlalai.*



*Professor:*

**Navaratnam Saravanapavananthan**

MBBS., MRCP (U. K.),  
FRCP (Edin.), DMT (Lond.)

was born on 18th April 1935

After a successful career at Manipal Hindu College and Ananda College, Colombo, he entered the University of Ceylon in 1955 and graduated in August 1961.

He worked as Judicial Medical Officer, Badulla for about a year and thereafter functioned as a Temporary Lecturer in Forensic Medicine, at the University of Peradeniya for a period of two years from January 1966.

In 1968, he proceeded to England to obtain postgraduate qualifications in Forensic Medicine and obtained his training at the University of Edinburgh. He passed the D. M. J. (Lond.) in 1969 and M. R. C. P. (U. K.) in 1970. Thereafter he worked as a Temporary Lecturer in Forensic Medicine at the University of Leeds for a period of six

months. After returning from the United Kingdom, he worked as a Judicial Medical Officer in Galle and Batticaloa.

1 He was appointed as Deputy Judicial Medical Officer, Colombo in 1973, which post he held till 1977 July. In 1977 July he was appointed as Acting Judicial Medical Officer, Colombo for a period of one year.

He joined the University of Jaffna, Sri Lanka in 1980 as Senior Lecturer and was appointed as Professor in 1982.

He has a number of publications in both local and foreign journals. He has presented papers pertaining to forensic Medicine at International Conferences held in Singapore, Bhopal, Trivendram, Madras, Colombo Vancouver, Sydney and Wichita, (U. S. A.)

He was also an author of a book entitled Medico - Legal Aspects of Injuries.

He received an Award of Merit at the first World Meeting of the Police Surgeons and Medical Officers held in Wichita, Kansas, U. S. A. (Aug. 1987) in recognition of the contributions to Forensic Sciences in Sri Lanka and through out the world.

During his career as Forensic pathologist he has tackled many complicated cases in which medical evidence was of paramount importance. In this connection the "Getangama" case is worth mentioning, where the medical evidence was very helpful to establish the time of death and in determining whether it was a case of suicide or homicide.

The conviction of the accused was challenged in appeal and the Supreme Court expressed its approval of his evidence.

Elected as a Fellow of the Royal college of Physicians (Edinburgh) in recognition of his contribution to Forensic Medicine.