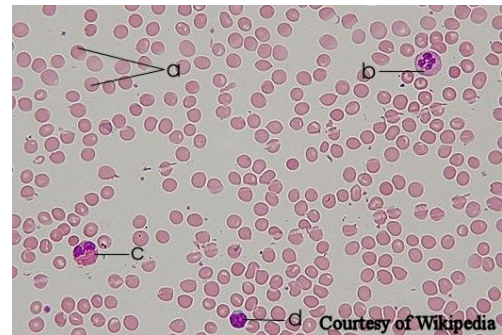


## Embalming Techniques

**Embalming**, in most modern cultures, is the art and science of temporarily preserving human remains to forestall decomposition and make it suitable for display at a funeral. The three goals of embalming are thus preservation, sanitization and presentation (or restoration) of a dead body to achieve this effect.



Embalming has a very long and cross-cultural history, with many cultures giving the embalming processes a greater religious meaning.

### History of Embalming

Embalming has been practiced in many cultures and is one of the earliest surgical procedures humanity undertook. In classical antiquity, perhaps the Old World culture that had developed embalming to the greatest extent was that of ancient Egypt, who developed the process of mummification. They believed that preservation of the mummy empowered the soul after death, which would return to the preserved corpse.

Other cultures that had developed embalming processes include the Incas and other cultures of Peru, whose climate also favoured a form of mummification.

Embalming in Europe had a much more sporadic existence. It was attempted from time to time, especially during the Crusades, when crusading noblemen wished to have their bodies preserved

for burial closer to home. Embalming began to come back into practice in parallel with the anatomists of the Renaissance who needed to be able to preserve their specimens.

Contemporary embalming methods advanced markedly during the American Civil War, which once again involved many servicemen dying far from home, and their families wishing them returned for local burial. Dr. Thomas Holmes received a commission from the Army Medical Corps to embalm the corpses of dead Union officers to return to their families. Military authorities also permitted private embalmers to work in military-controlled areas. The passage of Abraham Lincoln's body home for burial was made possible by his embalming and it brought the possibilities and potential of embalming to a wider public notice.

In 1867, the German chemist August Wilhelm von Hofmann discovered formaldehyde, whose preservative properties were soon discovered and which became the foundation for modern methods of embalming.

In the 19th and early 20th centuries arsenic was frequently used as an embalming fluid but has since been supplanted by other more effective and less toxic chemicals. There were questions about the possibility of arsenic from embalmed bodies later contaminating ground water supplies. There were also legal concerns as people suspected of murder by arsenic poisoning could claim that the levels of poison in the deceased's body were a result of embalming post mortem rather than evidence of homicide.

It is important to differentiate embalming from taxidermy. Embalming actually preserves the intact human body while taxidermy is a recreation of an animal's form using only the creature's skin.

### **Modern Embalming**

Embalming as practiced in the funeral homes of the Western World uses several steps. Modern embalming techniques are not the result of a single practitioner, but rather the accumulation of many decades, even centuries, of research, trial and error, and invention. A standardized version follows below but variation on techniques is very common.



The first thing an embalmer should do is verify the identity of the deceased (normally via wrist or leg tags). At this point embalmers commonly perform basic tests for signs of death, noting things such as clouded-over corneas, lividity, and rigor mortis although in modern times people awakening on the preparation table is largely the province of horror fiction and urban myth. Any clothing on the corpse is removed and set aside; jewelry, also, is inventoried. A modesty cloth is sometimes placed over the genitals. Following this the corpse is washed in disinfecting and germicidal solutions and during this process the embalmer bends, flexes and massages the arms and legs to relieve rigor mortis. The eyes are closed and kept closed with an eyecap that keeps them shut and in the proper expression. The mouth may be closed via suturing with a needle and ligature, using an adhesive, wire or a needle injector, a specialized device most commonly

utilised in North America and unique to mortuary practice. Care is taken to make the expression look as relaxed and natural as possible and ideally a recent photograph of the deceased while still living is used as a template. The process of closing the mouth, eyes, shaving, etc is collectively known as setting the features.

The actual embalming process usually involves four parts:

- Arterial embalming, which involves the injection of embalming chemicals into the blood vessels, usually via the right common carotid artery. Blood is displaced from the right jugular vein. The embalming solution is injected through a mechanical pump and the embalmer massages the corpse to ensure a proper distribution of the embalming fluid. In case of poor circulation, other injection points are used.
- Cavity embalming, the suction of the internal fluids of the corpse and the injection of embalming chemicals into body cavities, using an aspirator and trocar. The embalmer makes a small incision just above the navel and pushes the trocar in the chest and stomach cavities to puncture the hollow organs and aspirate their contents. He then fills the cavities with concentrated chemicals that contain formaldehyde. The incision is either sutured closed or a "trocar button" is screwed into place.
- Hypodermic embalming, the injection of embalming chemicals under the skin as needed.
- Surface embalming, which supplements the other methods, especially for visible, injured body parts.

Most good embalmings are completed in two or three hours, although an easy case may take less time and complicated cases can take days.



After the body is rewashed and dried, a moisturizing cream is applied to the face. The body will usually sit for as long as possible for observation by the embalmer. After being dressed for visitation/funeral services, cosmetics are applied to make it appear more lifelike and to create a "memory picture" for the deceased's friends and relatives. In the United States and Philippines baby powder or other deodorizers are sometimes used on the body for a pleasing fragrance. For babies who have died, the embalmer may apply a light cosmetic massage cream after embalming to provide a natural appearance; massage cream is also used on the lips to prevent them from dehydrating, and the infant's mouth is often left open a bit for a more natural expression. If possible, the funeral director uses a light, translucent cosmetic; sometimes, heavier, opaque cosmetics are used to hide bruises, cuts, or discoloured areas.

Makeup is applied to the lips to mimic their natural color. Sometimes a very pale or light pink lipstick is applied on males, while brighter coloured lipstick is applied to females. Hair gels or hair spray is applied to style the hair, especially for deceased who are male. Mortuary cosmetizing is not done for the same reason as make-up for living people; rather, it is designed to add depth and dimension to a person's features that the lack of blood circulation removes. Warm areas, where blood vessels in living people are superficial, such as the cheeks, chin and knuckles have subtle reds added to recreate this effect, while browns are added to the palpebrae (eyelids) to add depth, especially important as viewing in a casket creates an unusual perspective rarely

seen in everyday life. During the viewing, pink-coloured lighting is sometimes used near the body to lend a warmer tone to the deceased's complexion.

A photograph of the dead person in good health is often sought in order to guide the embalmer's hand in restoring the corpse to a more lifelike appearance. Blemishes and discolorations (such as bruises, in which the discoloration is not in the circulatory system and cannot be removed by arterial injection) occasioned by the last illness, the settling of blood, or the embalming process itself are also dealt with at this time (although some embalmers utilize hypodermic bleaching agents, such as phenol based cauterants, during injection to lighten discoloration and allow for easier cosmetizing).

The foregoing describes the usual process for "cosmetic" embalming, wherein long-term preservation is not the goal; rather the natural appearance of the body is paramount. As for clothing the body, tradition has been for the deceased to wear semi-formal clothing (a suit jacket and tie for men; a dress for women, commonly a communion dresses, wedding dresses or bride's maid dresses and the less skin showing the better). In more recent years, the family often chooses to dress the decedent in more casual wear (such as a T-shirt and blue jeans), especially if the deceased was young. If a person is a member of the clergy of some religions, the person is often buried in religious vestments; as well, a member of the military, a police officer or firefighter is often dressed in his/her uniform.

As for undergarments, which are chosen by the family or parents, panties, bras, etc are simple and conservative unless chosen by the next-of-kin. Stockings are usually chosen over pantyhose

and garter belts are not required unless the next of kin desires it. Depending on the height of the deceased, it's very seldom people get buried with their shoes on simply because shoes sometimes don't fit on swollen feet or if the person is tall there may not be clearance for the shoes to fit on.

In many areas of Asia and Europe, the custom of dressing the body in a specially designed shroud rather than in clothing used by the living is preferred. After the deceased has been dressed, it is placed in the casket (the term casket is derived from older usage to refer to a "jewel box", it is called a coffin when the container is anthropoid in form) for the various funeral rites. It is common for photographs, notes, cards and favorite personal items to be placed in the casket with the deceased. Even bulky and expensive items, such as electric guitars, are occasionally interred with a body. In some ways this mirrors the ancient practise of placing grave goods with a person for the afterlife. In traditional Chinese culture paper substitutes of the goods are cremated with the deceased instead and Hell Bank Notes specifically purchased for the occasion.

### **Embalming Chemicals**

Embalming chemicals are a variety of preservatives, sanitising and disinfectant agents and additives used in modern embalming to temporarily prevent decomposition and restore a natural appearance for viewing a body after death. A mixture of these chemicals is known as embalming fluid and is used to preserve



deceased individuals, sometimes only until the funeral, other times indefinitely.

Typical embalming fluid contains a mixture of formaldehyde, methanol, ethanol and other solvents. The formaldehyde content generally ranges from 5 to 29 percent and the ethanol content may range from 9 to 56 percent.

### **Specialist Embalming**

Decomposing bodies, trauma cases, frozen and drowned bodies, and those to be transported for long distances also require special treatment beyond that for the "normal" case. The recreation of bodies and features damaged by accident or disease is commonly called restorative art or demisurgery and is a sub-speciality inside embalming, although all qualified embalmers have some degree of training and practise in it. For such cases, the benefit of embalming is startlingly apparent. In contrast, though, many people have unreal expectation of what a dead body should look like due to seeing many "dead" bodies on television shows. Viewers unreasonably expect a body two weeks decomposed or having crashed in an airplane from 30,000 feet to look as it did in life. Ironically, the work of a skilled embalmer often results in the deceased appearing natural enough that the embalmer appears to have done nothing at all.

Embalming autopsy cases differs from standard embalming because the nature of the post mortem irrevocably disrupts the circulatory system with the removal of organs for examination. In these cases, a six-point injection is made through the two illiac or femoral arteries, subclavian or axillary vessels, and common carotids, with the viscera treated separately with cavity fluid or a special embalming powder in a viscera bag. In many morgues in the United States (such as the Los Angeles County Coroners Office) and New Zealand, these necessary vessels are carefully preserved during the autopsy; in countries in which embalming has been less common, such as



Australia and Japan, they are routinely excised. This inhibits the type of embalming that families prefer and is a common source of conflict between government pathologists and embalmers.

Long-term preservation requires different techniques, such as using stronger preservative chemicals and multiple injection sites to ensure thorough saturation of body tissues. It should be remembered that embalming is only meant to temporarily preserve the body of a deceased person. Regardless of whether embalming is performed, the type of burial or entombment, and the materials used — such as wood or metal caskets and vaults — the body of the deceased will eventually decompose. Modern embalming is done to delay decomposition so that funeral services may take place or for the purpose of shipping the remains to a distant place of disposition.



### **Embalming for Anatomical Purposes**

A rather different process is used for cadavers embalmed for dissection by medical and funeral service students. Here, the first priority is for long term preservation, not presentation. As such, medical embalmers use embalming fluids that are nearly pure formaldehyde (37–40%, known as formalin), made without dyes or perfumes. Many embalming chemical companies make specialized anatomical embalming fluids. Instead of using an embalming machine, anatomical embalmers may use gravity-feed embalming, where the container dispensing the embalming fluid is elevated above the body's level and fluid is slowly introduced over an extended time, sometimes as long as several days. Unlike funeral home embalming, no drainage occurs and the

body distends with fluid that eventually reduces, leaving a normal appearance. There is no separate cavity treatment of the internal organs. Anatomically embalmed cadavers have a typically uniform grey colouration due both to the high formaldehyde concentration and to the lack of red colouration (added normally to standard, non-medical embalming fluids).

### **Embalming and Different Religions**

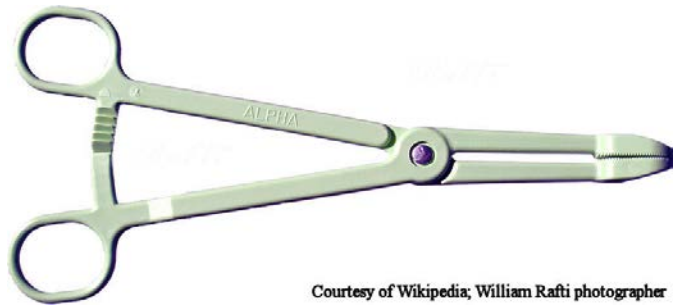
There is much difference of opinion amongst different faiths as to the permissibility of embalming. A brief overview of some of the larger faiths positions are examined below

- All of the major branches of the Christian faith, including Catholic rites, allow embalming, with the exception of Eastern Orthodoxy, which only allows embalming if required by law or other necessity.
- The Book of Mormon and The Church of Jesus Christ of Latter-day Saints do not profess against embalming. Often, due to the custom of church members dressing the deceased, embalming is given preference.
- Buddhism and Taoism beliefs accept embalming as a valid practice.
- Many authorities hold Hinduism does not accept embalming. In practice, this is not an adamant prohibition and embalmings for those of Hindu faith are known to happen, generally for repatriation to India or the South Pacific and for the purposes of viewing and funerary rites at the family home.
- People of Bahá'í Faith are not embalmed. The body is instead washed, and then placed in a shroud of white clothes (cotton, linen or silk). The body must be buried in a cemetery that is no more than one hour's travel from the place of death and within 24 hours of death. The body is interred facing Bahji (the final resting place of the founder of the

Bahá'í Faith). Specific prayers for the dead are pronounced to support the progress of the soul.

- Zoroastrians traditionally hold a type of sky burial within structures known as Towers of Silence in which the body is exposed to weathering and predation to dispose of the remains, and thus embalming the body is contrary to their funeral designs. This is due to the Zoroastrian belief that the dead body is unclean and the pure elements of earth and fire should not be allowed to come into contact with it. This practice is not universally performed anymore, and many Iranian Zoroastrians perform traditional cremations and burials instead.

- Muslims are required to be buried within 24 hours of death if possible. Embalming is forbidden. The body is still washed and



Courtesy of Wikipedia; William Rafti photographer

prepared specifically for interment. This procedure is to be done according to the last will of the deceased, preferably by the spouse, or by a close relative of the deceased who is of the same gender. He or she is then dressed in a plain white burial shroud (for women, the hair, ears and neck are covered as they were in life, preserving her dignity before men who are not closely related; men are buried in their ihram, or pilgrim garb, as worn during the Hajj in Mecca). Muslims believe that the spirit remains with the body from death until after burial, which is the reason for same-day burial, as well as the aforementioned procedures; the body is treated with the same care and respect as in life so as to not cause undue stress to the deceased. For the same reason, cremation is also forbidden. Prayers and readings of the Qur'an are spoken aloud to give comfort to the

deceased, and the body is not left alone even for a time following the burial, during which the deceased is buried (preferably without a casket) on his or her right side, facing Mecca.

- Traditional Jewish law generally forbids embalming, and burial is to be done as soon as possible - preferably within 24 hours. However, under certain circumstances, embalming may be permitted if it is impossible to bury a person immediately (such as a crime victim), or to permit the deceased to be buried in Israel. Guidance of a Rabbi or the local *chevra kadisha* (Jewish Burial Society) should be sought regarding any questions, as particular circumstances may justify leniencies. Notably the Biblical Joseph was embalmed (Genesis 50:26).

### **Embalming in Popular Culture**

Fictional works tend to portray the fantastic, extraordinary and often dysfunctional aspects of any profession or activity with which the public has little contact, and to ignore the mundane or routine. Embalming is no exception.

- The television show *Six Feet Under*, set in a funeral home, has brought embalming and funeral practice back into the public eye and is noted for its reality and dark humour. The character Hector Federico "Rico" Diaz is a full-time embalmer employed by the funeral home in the show. Most of the fantastic restorations that Frederico performed were far beyond the scope or ability of most embalmers and do not reflect the true goings on in a preparation room.
- The reality TV show *Family Plots*, shown on the A&E Network, often gives viewers a behind-the-scenes look into the embalming room. The embalmer, Shonna Smith (nee

Wissmiller), has become a minor celebrity known for her sarcasm and chutzpah when dealing with her eccentric family. This show portrays a group of dysfunctional people and doesn't reflect the entire industry. Most funeral directors comport themselves with professionalism, not the sensationalized melodrama of "Family Plots".

- In the episode of the cartoon South Park entitled Pinkeye Kenny is transformed into a zombie when worcestershire sauce is used as embalming fluid.

- Many horror films dealing with animate mummies focus on gruesome aspect of Ancient Egyptian embalming practises, frequently having them embalmed alive as punishment for some transgression.



- In the end of the Vincent Price film *The Abominable Dr. Phibes* the central villain rather ludicrously embalms himself to be forever with his dead wife in the final sequence. This does not stop his resurrection for the sequel.
- There is a horror movie titled *The Embalmer* whose movie posters read "...beauty after beauty dragged to a sunken crypt...petrified play-captives of THE EMBALMER".
- In the film *Kissed* the lead female character is a necrophiliac who is training to become an embalmer.

### **Notable Embalmings**

- It was rumoured that after her death Diana, Princess of Wales was hastily embalmed to cloud tests that she may have been pregnant. However if this were the case an autopsy

would still have easily been able to determine such an obvious condition and the rumour is just urban myth.

- Contrary to media reports John Paul II (pope 1978-2005) was not embalmed before lying in state and photographs of him clearly show the blotchiness and discolouration that is characteristic of lividity and the early stages of decomposition. It's speculated however that myrrh may have been rubbed on the body.
- Having died in the summer when heat would hasten decomposition, Paul VI (pope 1963-1978) decomposed at his lying in state, prompting Vatican officials to install fans around the body to disperse the odour.
- Pius XII's (pope 1939-1958) botched embalming by a charlatan doctor -- which only speeded up the rate of decomposition -- led to his body turning black and his nose falling off while lying in state, and the body disintegrated in the coffin. The Swiss Guards stationed around Pius XII's body were forced to change shifts every ten to fifteen minutes since the body's odor caused some guards to pass out. The doctor who performed the embalming had also taken photos of the Pontiff in his death throes and intended to sell them to tabloids. The Italian tabloids refused to buy the photos, and the doctor was banned from entering the Vatican City-State by John XXIII, who furthermore prohibited any photography of a deceased Pope until the body is properly vested and laid out.
- John XXIII's body is on display in an altar on the main floor of the Basilica of Saint Peter after having been exhumed from the grottoes beneath the main altar and has retained an extremely well-preserved state. If a body's remains do not decompose and this cannot be explained by science, it is often treated as a miracle. However, the case of John XXIII's

body did not enjoy the same acclamation, as it may have merely been due to embalming and adipocere formation.

- Murdered civil rights activist Medgar Evers was so well embalmed it allowed for a viable autopsy to be performed on his corpse decades after his death and this helped secure the conviction of his killer.
- Perhaps the most famous embalmed body



- of the 20th century is that of Vladimir Lenin, which continues to draw crowds decades after his death.
- Eva Perón ("Evita") was embalmed at the request of her husband, Argentine President Juan Perón, in order to make a Lenin-like shrine to her memory. A coup d'état toppled Perón, and his plan did not come to fruition. Sixteen years after her death, Eva Perón's body was exhumed and found to be in perfect condition, leading some sectors of Argentine society to call for her canonization.
- When Abraham Lincoln's body was embalmed, the embalmer preserved it for the long term. A century later, it was disinterred for forensic study. The body was perfectly preserved, with no sign of decomposition, but the skin had been oxidized by the chemicals and was nearly black in color.
- Arterial embalming began in the Netherlands in the 17th century. Embalming is no longer allowed in the Netherlands, except in the case of international transport of the corpse and in the case of members of the royal family, who choose individually for or against it.

- Plastination makes it possible to preserve individual tissues and organs that have been removed from the body of the deceased as well as the entire body itself. It is not achieved via arterial injection like embalming but by a much longer and more complicated process. Water and fat in tissue are replaced with silicone in a process which, for most specimens, takes about one month. Preserved tissue is first dissected and then dehydrated with acetone. It is immersed in a silicone bath under vacuum until the replacement of acetone is completed. After plastination, the resulting tissue is safe to handle (i.e., toxic fixatives are eliminated), the tissue has no odor, is extremely durable and intact even to the microscopic level. Thus, the anatomical specimens are safer to use, more pleasant to use, and are much more durable and have a much longer period of use. Plastination is not used for funerals due to time, cost and feasibility restraints.
- On Friday, February 16, 2007 Broward, Florida Circuit Judge Larry Seidlin decided to allow the body of Anna Nicole Smith to be embalmed. The procedure was done under heavy security at the Broward County Medical Examiner's office in nearby Dania Beach. The former Playboy playmate, model and actress died mysteriously at the Hard Rock Hotel & Casino in Florida on Thursday, February 8, 2007.