

A Cut Above the Rest: The Historic Perspectives of Circumcision and Anesthesia

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Introduction: Circumcision is the oldest known recorded surgical procedure dating to at least 4000 BCE and held religious, cultural, and military significance. Preputial resection connoted contrasting meanings among different cultures; in some, circumcision was and remains an important transition into infancy and then adulthood. In Bronze Age and early Egyptian cultures, however, circumcision was performed on vanquished enemies and improved upon the morbidity and mortality of phallic resection as a war trophy. The circumcision of Jesus was a significant subject for many Medieval and Renaissance artists who often portrayed the event as an allegorical commentary on contemporary socio-political events. While there has been much literature, anthropological analysis, and art on circumcision, little is known about the anesthesia provided to those undergoing the procedure, especially those for whom the act was not a punitive militaristic procedure. We aimed to identify descriptions of the anesthesia provided to patients or victims undergoing circumcision and how the anesthesia may have evolved into the modern techniques used in the modern era.

Sources and Methods: We performed a literature review via PubMed journal articles, texts, and historical discussions detailing the evolution of circumcision and accompanying anesthesia throughout history.

Results: Earliest records of circumcision described religious rather than scientific rationale, marking a boy's ascension to manhood. Documentation of the earliest practices of anesthesiology are relevant to urology through these traditions. Circumcision is first noted in Egyptian temple hieroglyphics dated to 4000 BCE, depicting young men restrained with a priest performing the cut wielding a knife. As early as 2500 BCE, circumcision in ancient Egypt was the first known surgical procedure utilizing anesthesia. A mixture rendered from calcium carbonate and acetic acid formed carbon dioxide on the prepuce resulting in the first rendition of cryo-analgesia. Egypt was not the only culture performing circumcision during this time period. Assyrian records dating back to 400 BCE describe a similar methodology, but also transcribed another primitive method of anesthesia. Assyrians utilized digital compression of the carotid arteries to produce anesthetic effects of both altered consciousness and decreased procedural pain. Carotid compression was commonplace enough that it influenced the language for which the carotid blood vessels are described in both Greek and Russian with translation as "The Artery of Sleep." The Jewish tradition of brit milah utilizes a few drops of wine in the mouth of the infant, both as a form of analgesia and symbolic of the sealed covenant. It is hypothesized that the sugar interacts with the opiate receptors in the brain which is enhanced by the suckling action, providing comfort.

Conclusions: Since their earliest documented history, anesthetic techniques have contributed to and been intertwined with the practices of circumcision.

Keywords: Circumcision; Anesthesia; History

The practice of ritual circumcision predates recorded history as one of the oldest surgical procedures practiced by mankind, hypothesized to have originated as a modification of penile amputation.(1, 2) In many ancient cultures, the erect penis was symbolic of fertility, wealth, and power; royal wands carried by kings were symbols of such, and represented the authority of

the governing patriarch.(2) In ancient times, victors in battle customarily brought back part of the body of the vanquished, the most prized part being the phallus, proving the virility of the victor and the emasculation of the vanquished.(3) The phallus was considered the most conclusive proof of the nature of the vanquished, and therefore conferred a greater title of bravery and skill

than collecting hands or scalps, which would not denote the sex of those slain.(4) According to wall inscriptions at the Karnak temple (dating back to 1212 BCE), it was estimated that Pharaoh Merneptah collected more than 13,000 penises as war trophies during his reign, proof of his many victories.(2) There are many references among bas-reliefs in the tombs of various Pharaohs, including that of Rameses II and those referencing The First Libyan War, that note the wartime tradition of collecting severed body parts of the slain, including hands, fingers, and phalli, as trophies of their victory. (5, 6)

Penile amputation and castration were later adopted as a method by which the Ancient Egyptians emasculated their captured enemies, serving as a physical sign of their subjugation as slaves.(4, 5) Such radical mutilation had a high mortality rate among those captured related to risks of hemorrhage, infection, and urethral stenosis; however, there was inherent value in keeping those conquered alive and enslaved. The practice of penile amputation was therefore modified to cutting the foreskin of slaves in primitive circumcision, to create a permanent mark of slavery.(2,3,5,7) At this point in history, circumcision served as the permanent and distinctive feature of the slave.(4) Our objective is to explore the origins of circumcision and the use of anesthesia as the procedure developed historically.

SOURCES We performed a literature review via PubMed of journal articles, texts, and historical discussions detailing the evolution of circumcision and accompanying anesthesia throughout history (Table 1). A MediData search of archives of the British Museum (London), Jewish Museum (New York), and the Metropolitan Museum of Art (New York) was conducted to analyze works on circumcision and determine whether any objects or materials were included that could be interpreted as part of the provision of anesthesia. The archives of the American Urological Association (AUA) (Linthicum) were contacted to provide evidence of early American and European urological instruments for circumcision under anesthesia.

RESULTS

Ancient Egypt:

Archeologic findings reveal that the Egyptian practice of circumcision date back to the 23rd century BCE with a depiction observed in a wall relief in the tomb of a minister of Pharaoh Teti, who ruled from 2393 to 2345 BCE.(3, 8) In Egyptian tradition, circumcision involved the individual undergoing the procedure while standing, sustaining a V-shaped dorsal cut that left the prepuce in place, allowing the foreskin to hang freely.(3) It was

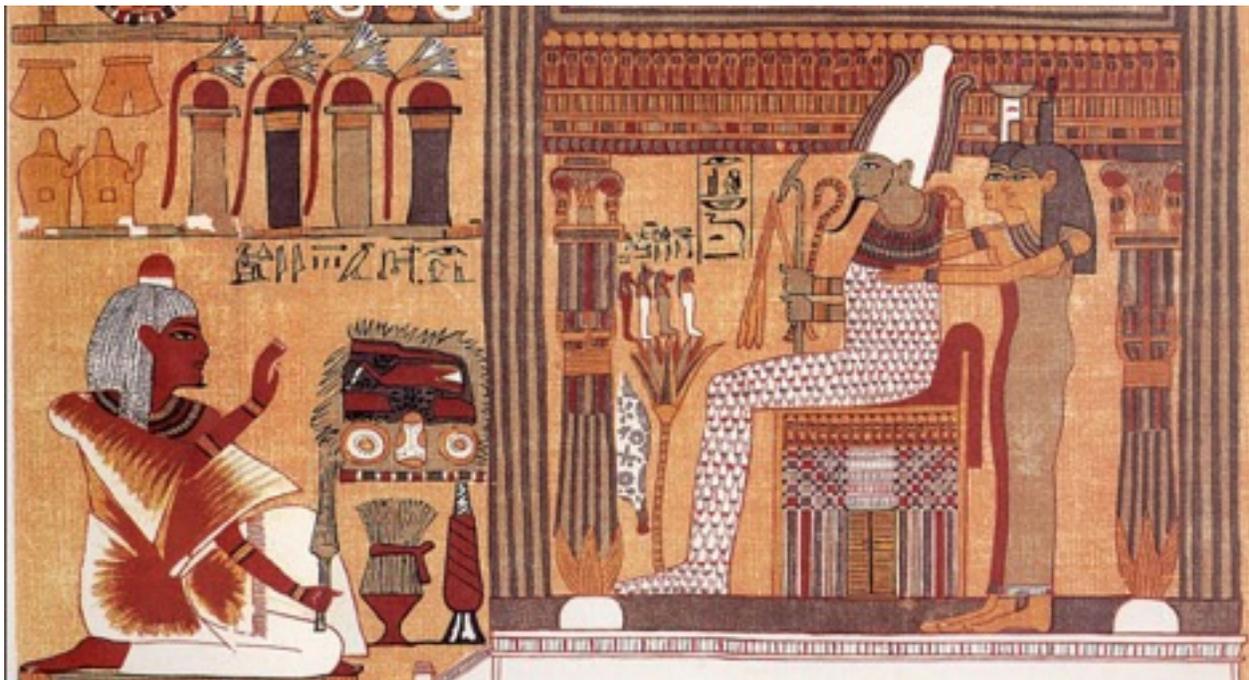


Figure 1. Osiris, judge of the dead, sits in a throne holding a scepter symbolic of his authority. Behind Osiris stand Isis and Nephthys. (Image: British Museum/Public domain, <https://www.thegreatcoursesdaily.com/isis-and-osiris-death-and-rebirth-in-ancient-egypt/>)



Figure 2. Bas relief of a circumcision scene from the tomb of Ankh-ma-Hor at Saqqara, depicting one of the men restrained by another participant while undergoing the procedure. (Available at <https://www.bibleodyssey.org/en/tools/image-gallery/a/ankmahor-tomb> (Public Domain))

unlikely that these earliest circumcisions were performed with any attempt at ancient anesthetic given the class of people it was routinely used to mark; however, the Ebers Papyrus, one of the most comprehensive accounts of Egyptian medical practice written around 1550 BCE, describes an antidote for bleeding as a result of circumcision.(3) The remedy is described a mixture of honey, cuttle-bone, sycamore, and an unknown fruit applied to the prepuce.(8)

The practice of circumcision did not remain limited to conquest and marking captured slaves. Over time it was adopted by the priesthood and nobility in ancient Egypt, perhaps inspired by the mythology of Osiris and his dismemberment by his brother and enemy, Seth. According to lore, Osiris' wife, Isis, attempted to reconstruct him but could not find Osiris' phallus as it had been eaten by a mythical fish in the Nile. Isis instead ordered that a separate golden replica be made of her husband's penis, inspiring the origin of the phallic scepters of Egyptian royalty, symbolic of god-like authority.(2)(Figure 1)

The earliest known depiction of this rite of passage is described in a bas relief on the sarcophagus of Ankh-ma-Hor at Saqqara dating back to 2345–2182 BCE, illustrating what has been interpreted as male

circumcision in practice as a ritual prior to entry into the priesthood.(9) In this depiction, seen in Figure 2, one of the men appears to be forcibly restrained.(7) From this detail, it is unlikely that the circumcision illustrated was performed with any attempt at anesthesia; however, it is possible to imagine that the adoption of the practice of circumcision by the more esteemed religious class resulted in some of the most ancient development and use of anesthesia in the ritual process.

As early as 2500 BCE, circumcision in ancient Egypt was the first known surgical procedure utilizing anesthesia. Included among a bas-relief from the necropolis of Saqqara (circa 2400 BCE) is the depiction of a series of medical scenes, including a flint-knife circumcision with the inscription reading, "the ointment is to make it acceptable."(10) One source speculates that the famous 'Memphis stone' might be the key to the form of seemingly topical anesthetic described.(11) Composed of carbonates of lime and an acid, such as acetic acid or vinegar, upon contact between the stone and the moist skin, carbon dioxide would be released to act as a local anesthetic, the first rendition of cryo-analgesia.(11,12)



Figure 3a. (Left) Kenyan ceremonial circumcision gourd containing purportedly anesthetic powder from the Kikuyu peoples of the 19th century. (British Museum, Af1908,0616.18) **Figure 3b. (Right)** bamboo circumcision guide or knife, 19th century, 1.4 x 6.7 cm from the Maldives. (British Museum, As1972,Q.3159)

Africa

The ancient Egyptians were not the only culture to adopt circumcision practices, nor to utilize some form of anesthesia. Much of the earliest records of circumcision across cultural lines describe religious rather than medical rationale; in a time before aseptic surgical technique, any cutting of the flesh would have been extremely unhygienic, carrying a high risk of bleeding, infection and death. Various African tribes, as well as the Arabs, Jews, Muslims and Aborigines have themes of divine command, tribal identification, social role, respect for the ancestors, promotion of chastity and ascension to manhood prominently documented as explanation for the practice.(13) Male circumcision almost uniformly represented a rite of passage, typically performed shortly after birth or at any time up to and including early adulthood, related most frequently to ceremonies celebrating puberty or marriage.(13)

The earliest practices of anesthesiology were also relevant to the description of these traditions. (14) Assyrian records dating back to 400 BCE describe their traditional practice of circumcision including another primitive method of anesthesia, utilizing digital compression of the carotid arteries to alter consciousness and decrease pain. The use of carotid compression was so commonplace that it influenced the language with which the carotid blood vessels are described in both Greek and Russian, translating as "The Artery of Sleep."(15,16)

Among various African tribal nations, circumcision historically has been documented as a rite of passage from childhood to manhood. The Niger–Congo speaking peoples have circumcision traditions that occurred in young warrior initiation schools as a part of the ancestral society's culture.(17) Amongst the Gikuyu (Kikuyu) people of Kenya and the Maasai people of Kenya and Tanzania, historically circumcision has been considered

the graduation from an educational program that taught tribal culture, religion and history to youth on the verge of becoming full-fledged members of society. These circumcisions traditionally were performed in public ceremonies, requiring a display of courage to maintain a young man and his family's honor; the only form of anesthesia described was a bath in a cold river and a ceremonial "powder" to increase bravery (Figure 3a). The ceremony required youths to maintain a stoic expression, unflinching from any pain related to the procedure.(17) The circumcision was symbolic of the young men's obligation to each other and to their tribe. Upon completion, they were considered members of the warrior class, and allowed to date and marry. In the modern era there are still tribes that do not accept more modernized practices of circumcision, insisting on traditional group ceremony without anesthesia. This more traditional approach is common amongst the Meru and the Kisii tribes of Kenya.(17)

Judaism and Islam

From its earliest practice in Egyptian religion, circumcision was eventually adopted as part of the religious practices of Judaism and Islam as well.(2,9) Circumcision was a common practice in pre-Islamic Arabia. The language describing circumcision in Arabic has its roots in primitive Semitic language, leading to the conclusion that circumcision was a primitive custom of old Arabian tradition, and not initially introduced by Islam. In fact, there is no mention of circumcision in the Holy Quran; the practice is attributed first to the Prophet Abraham, the same roots as the origin of the practice of circumcision in Judaism.(18,19)

Islam

In Muslim culture, circumcision is symbolic again as a rite of passage.(13) Traditionally Muslim men have



Figure 4a. "Circumcision of Jesus", by Hendrick Goltzius (1558-1617), a masterpiece woodcut in the style of his contemporary, Albrecht Durer. Such scenes of allegorical realism were popular subjects throughout Renaissance Europe and in addition to the traditional onlookers of Mary and Joseph, in the doorway is Goltzius himself. (Metropolitan Museum of Art (MET), New York; Catalogue: H.12; D.IV.408.18-iii)

been required to be circumcised before they are allowed to complete their pilgrimage to Mecca, one of the five pillars of Islam.(9) In a footnote of the Arabian Nights, Sir Richard Burton makes note of the Islamic tradition, describing that "the varieties of circumcision are immense." He describes a particularly harsh variant "practiced in the province of Al Asir where it is called salkh."(7) The procedure itself was performed on a boy between ten and twelve years old holding a spear in

their hand, involving multiple small incisions in the lower abdomen and genitals culminating in foreskin removal. This tradition was one that specifically withheld any form of anesthesia: in a show of manhood, it was described that "the spear must not tremble." (7)

According to historical records referencing the circumcision of several sons of Islamic Sultans, the tradition of the circumcision of princes in Islamic culture involved celebrations that could last anywhere



Figure 4b. Inset of figure 3, showing ceremonial wine flask and serving cup on left, with a caption that reads, in part, "Cernis ut octava sit circumciscus Jesus..." or "See here how Jesus is circumcised on the eighth day...according to law... received and observed for many years." (MMA, New York)

from 10 to 55 days long. During these festivities, up to 10,000 boys of poor families also were circumcised by the surgeons, with the festivities culminating in the circumcision of the princes.(20) A treatment for the wound was described by Serafeddin Sabuncuoglu in 1465, consisting of egg yolk cooked in rosewater and ground with the oil of roses that was applied and kept on until the following day, after which it was dressed with other medicaments until it healed.(20) While it is unknown whether these medicaments included some form of pain control, his writing included a description of a primitive anesthesia containing mandrake root, which has similar properties to belladonna and was formerly used as a narcotic and sedative.(21)

In modern Muslim culture, the age of circumcision is not unanimous. In Pakistan, children born in hospitals are typically circumcised within a few days of discharge, while the procedure is typically performed in other children anywhere from 3–7 years of age, and commonly even after adolescence in more rural areas.(18) While circumcision is a practice that Islam has observed throughout history, it is not mentioned in the Quran and therefore does not constitute a part of a formal religious ceremony; therefore, it can be carried out by any appropriately qualified personnel.(19) In the modern era, 90–95% of circumcisions in Pakistan are performed by traditional circumcisers, village barbers, paramedical theatre staff and technicians; only 5–10% have access to medical facilities where the procedure is performed by a physician.(18) The technique most commonly used describes the child held in a seated position with both legs apart. In one analysis, the most frequently performed circumcision in this setting involves an open method using a blade with no suturing and no general anesthesia.(22) To this day, this open operation is commonly performed in more rural areas with no anesthesia, no sutures, and with unsterilized instruments, with the ashes of burnt wood used to stop any bleeding. The next most common method described is Plastibell circumcision, involving a disposable clamp.

(22) Keeping with tradition, the procedure is followed by a celebration of relatives and guests, varying in specifics according to the region and culture of different Muslim countries.(18)

Judaism

Judaism adopted the practice of circumcision as well, incorporated as part of their formal religious rites.(2) This tradition, similar to Islam, began with the circumcision of Abraham. According to the Torah (Genesis 17: 9–14), Abraham was commanded by God to circumcise himself and all male members of his household, including his descendants and slaves, symbolic of a covenant between God and Abraham. While it was written that Abraham circumcised himself at ninety-nine years of age, the Israelites adopted the practice of infant circumcision on the eighth day of life, differing from the Egyptian tradition of circumcision at puberty.(3)(Figure 4a and b) The transformation of this tradition is believed to be due to the risk of infant mortality, prioritizing the religious covenant before death, while precluding the risk of hemorrhagic death of the newborn.(23) Judaism acknowledges that God's ordinances were given such that one should live by them (Leviticus 18:5); therefore, the operation can be rightfully postponed for reasons of health, including familial history of a bleeding disorder.(23) One of the reasons cited for the earlier timing of this procedure includes the belief that the infant circumcision is less traumatic than adolescent circumcision in spite of more modern scientific evidence quite to the contrary.(24) However, we consider another possibility, that this shift originally may have been in part related to a pubescent male's ability to refuse the religious covenant on the basis of it being a painful procedure, while an infant is unable to object.

Sigmund Freud posited that Judaic circumcision might have been adopted from the Egyptians.(25) He hypothesized that Moses might have been based upon an Egyptian, possibly of noble birth, who adopted an Egyptian monotheistic religion that he passed to the



Figure 5. Circumcision Set, Netherlands, 1809-1814, showing ceremonial wine flask (back right) with middle cup specifying in Hebrew the "goblet for wine" and, the cup on the left, for the 'spitting' or *metzitzah*. Also shown are three matching *bris* 'shields' (middle of field), part of the *brit milah* ceremony still in use today. (The Jewish Museum, New York. Accession Number: JM 55-61a-l)

Jews. This form of monotheism, dedicated to the god Aton, existed for a brief seventeen-year period at the end of the Eighteenth Dynasty, ending in 1350 BCE after the death of the Pharaoh Ikhnaton in 1358 BCE, who had changed his name from Amenhotep to incorporate part of his new god's name. After his death, Egypt's traditional polytheistic system was re-established. Freud further considered that circumcision might have been adopted by the Jewish people to establish their equality to the Egyptians as well as for the biblical reasoning to "make them a holy nation." He admits that if this were true and if Judaic religious customs stemmed from Egyptian customs handed down by Moses, "the Jews had good reason to deny the fact; therefore, the truth about circumcision had also to be contradicted." (25)

There is also argument that the initial motivation for circumcision per Judaic tradition originated, similarly to that of the ancient Egyptians, during wartime. Remondino's "History of Circumcision from the Earliest Times to the Present" accounts one argument to this end, which cites the biblical incident when David brought two hundred prepuces to Saul as a mark of his being a worthy son-in-law, and evidence of his having slaughtered that number of Philistines. (4) Remondino notes, however, that Judaic religion is strictly opposed to any other form of bodily mutilation, which would seem antagonistic to this perspective on the origin and symbolism behind the religious tradition. Judaism considered emasculated animals imperfect, unclean, and unfit as religious sacrifice; emasculated men similarly were not allowed to enter the

priesthood or assist at sacrifices. Per Remondino, Judaic opposition to such mutilations proves that their tradition of circumcision could have in no way developed from practices in war. He hypothesizes instead that its origin was purely religious in nature, as symbolic of the covenant between God and man. (4)

In Judaism, circumcision is performed by a religious officiant with the title of *mohel*, derived from the term *milah*, meaning circumcision. (26) In a description from the 1500's, the *metzitzah b'peh*, or *brit Milah*, is practiced in which the *mohel* places his mouth on the infant's penis following circumcision to suck blood from the wound. (9, 23) This is known as *metzitzah* and is still practiced in ultra-Orthodox Jewish communities (Figure 5). In this case, the *mohel* first takes some wine or vinegar into his mouth before sucking the bleeding penis. In a slight variation, occasionally the *mohel* will place a sterile cottonwool-filled glass tube on the bleeding penis and give a perfunctory suck on the other side. (23) The Jewish tradition of *brit milah* additionally utilizes a few drops of wine in the mouth of the infant, both as a form of analgesia and symbolic of the sealed covenant. (27) The *mohel* typically places a drop or two of wine on the infant's lips reciting a blessing from Ezekiel 16:6, "I said unto thee, in thy blood live. Yea, I said unto thee, in thy blood live." (23)

This ritual practice involving wine may have some anesthetic effect. There is research to evaluate the hypothesis that the sugar interacts with the natural opiates in the brain, enhanced by the suckling action to provide comfort. (27) One study found that a concentrated

glucose solution administered orally does not provide significant analgesia for neonatal circumcision; however, it did reinforce the efficacy of a dorsal penile nerve block (DPNB) in infants undergoing circumcision.(28) Another trial demonstrated significantly decreased pain in infants undergoing circumcision with a sucrose solution administered using a pacifier.(29) Based on these findings, it is likely that the suckling was responsible for a degree of pain relief rather than the sucrose, meant to mimic the traditional wine. This hypothesis is supported by a third study, demonstrating that non-nutritive suckling (NNS) significantly decreases crying time and salivary cortisol levels of neonates during circumcision in addition to DPNB and oral analgesics.(30) However, this study demonstrated that there was no appreciable change in heart rate during the procedure between study arms.(30) These findings demonstrate that NNS may be useful as a comfort measure rather than analgesia in its own right. Beyond the use of ceremonial wine, circumcision is usually performed without anesthesia, in the home surrounded by family followed by a celebratory meal.(31) In modern times, many mohelim permit the parents to apply EMLA cream. Some qualified mohelim use dorsal penile nerve block anesthesia, especially in the USA where many are pediatricians or have medical training.(31)

Modern Era

In 2016, it was estimated that 37-39% of males aged 15+ worldwide were circumcised.(32) In the United States from 1979 through 2010, the national rate of newborn circumcision declined 10% during a period of changing medical guidelines regarding routine newborn circumcision.(33) In a religious ceremonial setting, circumcisions are not always performed by a medical professional, and the use of any form of anesthetic depends on the tradition in practice. Even when performed by a physician as a medical procedure, the use of anesthesia is not uniformly agreed upon. In one survey, only 45% of physicians performing medical circumcision in neonates chose to utilize anesthesia.(34) The 55% of physicians who chose not to utilize anesthesia most commonly cited concern over adverse drug effects, and the perception that the procedure did not warrant anesthesia.(34) However, attitudes with regards to the subject currently are under scrutiny by the medical community, with more information becoming apparent regarding infant perception of pain, the long term sequelae of the lack of use of anesthesia on the development of pain pathways in infants, as well as the development of efficient circumcision procedures that allow for convenient local anesthesia.(35-37)

CONCLUSIONS: Circumcision is an ancient procedure whose origins likely grew out of the practice of phallotomy of vanquished enemies. It has evolved into the various culturally appropriated procedures of today, used in many religious or tribal events to mark covenants or rites of passage. Some of the earliest documentation of anesthesia was for circumcision. While many neonatal procedures are still performed without anesthesia, this is rapidly changing in the western world.

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TIME PERIOD	Use and Methodology of Anesthesia	Ref.
c 1212 BCE	Before circumcision is adopted into religious tradition in Ancient Egypt, penile amputation and castration are used to mark enslaved enemies, depicted in wall inscriptions at the Karnak temple showing Pharaoh Merneptah and more than 13,000 penises collected as war trophies. No evidence for use of anesthesia.	2
c 1550 BCE	An antidote for bleeding is described in the Ebers Papyrus specifically to be used after circumcision, including mixture of honey, cuttle-bone, sycamore, and an unknown fruit applied to the prepuce.	3,8
c 2345–2182 BCE	After circumcision is adopted into religious tradition in Ancient Egypt, males are forcibly restrained while undergoing ritual circumcision prior to entry into priesthood, depicted in a bas relief on the sarcophagus of Ankh-ma-Hor at Saqqara. No evidence for use of anesthesia.	7
c 2400 BCE	A bas-relief from the necropolis of Saqqara depicts a series of medical scenes, including a flint-knife circumcision with the inscription reading “the ointment is to make it acceptable,” hypothesized to be the first rendition of cryo-analgesia utilizing the famous ‘Memphis stone.’	10-12
c 400 BCE	Assyrian records describe their traditional practice of circumcision, utilizing digital compression of the carotid arteries as anesthesia.	15,16
Ancient-modern tradition: Africa	Circumcision as described as a rite of passage into manhood amongst the Gikuyu (Kikuyu) people of Kenya and the Maasai people of Kenya and Tanzania traditionally allows only the anesthetic provided by a bath in a cold river.	17
c 700 BCE	Per Islamic tradition described by Sir Richard Burton in a footnote of Arabian Nights, circumcision as practiced in the province of Al Asir is performed on an adolescent boy holding a spear in his hand, and involves multiple small incisions in the lower abdomen and genitals culminating in foreskin removal; this tradition specifically utilizes no anesthesia, and a show of bravery.	7
1465	Documentation of festivities celebrating circumcision of Islamic prince’s described by Serafeddin Sabuncuoglu include treatment for the wound consisting of egg yolk cooked in rosewater and ground with the oil of roses that was applied and kept on until the following day, after which it was dressed with other medicaments until it healed; this potentially contained mandrake root as primitive anesthesia	20,21
1500’s	The Jewish tradition of <i>brit milah</i> additionally utilizes a few drops of wine in the mouth of the infant, both as a form of analgesia and symbolic of the sealed covenant.	27
Modern Era: Islam	90-95% of circumcisions in Pakistan are performed by traditional circumcisers, village barbers, paramedical theatre staff and technicians, and in a rural setting most commonly involves an open technique with no anesthesia, only utilizing the ashes of burnt wood to stop any bleeding. The next most common method described is Plastibell circumcision, involving a disposable clamp.	18,22
Modern Era: Judaism	In modern times, many mohelim permit the parents to apply EMLA cream to anesthetic effect. Some qualified mohelim use DPNB anesthesia, especially in the USA where many are pediatricians or have medical training	31
Modern Era: West	An estimated 45% of physicians performing medical circumcision in neonates choose to utilize anesthesia, including DPNB* or EMLA cream. Physicians who chose not to utilize anesthesia most commonly cited concern over adverse drug effects, and the perception that the procedure did not warrant anesthesia	34

Table 1. Use and Methodology of Anesthesia for Circumcision throughout History.
*DPNB: dorsal penile nerve block

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