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Historical analysis of surgical techniques in ancient Indian medicine

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Abstract
This paper presents a comprehensive historical analysis of surgical techniques in ancient Indian medicine, primarily focusing on the contributions of Sushruta, often hailed as the 'Father of Surgery'. Employing a range of primary and secondary sources, this study delves into the Sushruta Samhita, an ancient Sanskrit text, to explore its detailed descriptions of surgical procedures, instruments, and principles. A comparative analysis is made with contemporary surgical practices, highlighting the advanced nature of ancient techniques in areas such as cataract surgery, rhinoplasty, and wound healing. The paper also discusses the integration of these techniques into later medical practices and their influence on global surgical knowledge. Through this exploration, the study underscores the sophistication and enduring legacy of ancient Indian surgical methods, challenging Eurocentric narratives in the history of medicine.

Keywords: Sushruta, surgery, techniques, rhinoplasty, instruments

Introduction
The roots of Indian surgery can be traced back to the Vedic period, an era rich in philosophical and scientific advancements (almost 1500 – 500 BCE). During this time, the primary source of medical knowledge was the Vedas, specifically the Atharvaveda. It contains many references to health, diseases, and medicinal plants. During this era, healing was primarily spiritual and ritualistic, often combining medical practices with religious beliefs. In India, manuscripts were commonly composed using materials such as birch bark, palm leaf, and paper. The majority of these manuscripts are in Sanskrit and are almost identical in appearance. A significant portion of these manuscripts deals with medicine either directly or in passing [1].

There are many works on religious medicine, astrological medicine, alchemy, tantra, yoga and there is a substantial literature squarely devoted to the classical system of ayurvedic medicine. The obvious starting places in ayurvedic literature are the compendia of Caraka and Susruta. Traditionally, these two texts are paired with a third, Vagbhata's "Heart of Medicine" forming what is known as Ayurveda's 'great threesome' (brhattrayi). Additionally, there exists a 'lesser threesome', comprising the relatively newer works of Madhava (c. 700), Sarngadhara (c. 1300), and Bhavamisra (16th century) [2]. Over centuries, the Sushruta Samhita has been preserved through various manuscripts, each with its own variations. This diversity reflects the text's transmission across different regions and times. The first complete English translation was done by Kaviraj Kunja Lal Bhishagratna in three volumes in 1907 at Calcutta [3]. Therefore, in essence, the earliest medical literature in India is represented by the Compendia of Caraka and Susruta. It is within these texts that the classical system of Ayurveda is first articulated.

Indian ancient medicine, often referred to as Ayurveda, had some similarities and differences compared to the medical practices of ancient Greek and Egyptian civilizations. When compared with contemporary civilizations like the Greeks or Egyptians, ancient Indian surgery stands out for its detailed classification of surgical procedures and advanced understanding of anatomy [4]. During this period, each of these cultures developed unique approaches to medicine, influenced by their respective philosophies, religious beliefs, and scientific understanding. Indian medicine, particularly through the works of Sushruta, demonstrated advanced surgical techniques. Sushruta's classification of surgical operations into eight heads such as Aharya (extractions of solid bodies), Bhedya (excising), Chhedya (incising), Eshya (probing), Lekhya (scarifying), Sivya (suturing), Vedhya (puncturing)

and Visravaniya (evacuating fluids) [5]. It demonstrates a systematic approach unparalleled in contemporary civilizations. Egyptian medical practices, as recorded in texts like the 'Ebers Papyrus', also known as Papyrus Ebers were heavily involved with their religious and magical beliefs. Greek medicine, especially under Hippocrates, began a more systematic approach to understanding disease and treatment. Their surgical practices were often constrained by the philosophical belief in natural healing [6, 7]. The legacy of these ancient medical systems is profound. Indian surgical techniques, for example, influenced later Islamic medical practices, which in turn were introduced to medieval Europe. The holistic approach of Greek medicine laid the groundwork for modern Western medical ethics, while Egyptian medical texts are among the earliest documented medical knowledge.

The Sushruta Samhita and Charak Samhita are seminal texts in the field of Ayurveda, each playing a pivotal role in the preservation and dissemination of ancient Indian medicinal knowledge. The Charak Samhita is an ancient Ayurvedic text that holds immense importance in the field of traditional Indian medicine [8]. The Charak Samhita, a comprehensive treatise in Sanskrit, is attributed to the sage Charaka, a practitioner of Ayurveda. This text is believed to have risen to prominence during the pre-second century CE. However, scholarly research suggests that its origins trace back to an earlier work by Agnivesha, a legendary sage and one of the six disciples of the Ayurvedic scholar Punarvasu Atreya. The "Agnivesha Samhita" provided the foundational content that was subsequently refined and annotated by Charaka. Charaka's contributions led to the division of this treatise into eight sections: Sutra, Nidana, Vimana, Sharira, Indriya, Chikitsa, Kalpa, and Siddhi. Collectively, these sections encompass eight books and a total of one hundred twenty chapters. The Charak Samhita offers extensive insights into ancient theories regarding the human body, etiology, symptomatology, and therapeutics for various diseases.

In the Charak Samhita, Charaka delves deeply into subjects such as anatomy, physiology, and the malfunctioning of the human body based on the concept of Tridosha --- the three fundamental bodily humors: Vata, Pitta, and Kapha. Additionally, the text emphasizes the importance of diet, hygiene, and preventive care, alongside the underlying logic and philosophy of the Indian medical system. It also highlights the crucial role of teamwork among physicians, nurses, and patients for effective and timely healing. Caraka offers a concise overview of surgical methods, but Susruta who provides a more comprehensive exposition [9]. He details the requisite training for surgeons and meticulously outlines the procedures for various surgeries. Indian surgery, as detailed in the Sushruta Samhita, was highly advanced for its time. Spanning six volumes and 184 chapters, this comprehensive work delineates 1120 diseases, the use of 700 medicinal plants, along with 64 mineral-based and 57 animal-derived drugs. It delves into a variety of surgical procedures tailored for distinct parts of the body and outlines 14 unique bandaging techniques [10]. Predominantly centered on surgery and obstetrics, the text also explores a range of subjects including genetics, psychiatry, embryology, human anatomy, ailments related to aging, and diabetes management. The ancient surgical science was known as Salya-tantra. Surgical science, traditionally termed Salya-tantra11, encompasses various techniques aimed at extracting elements that cause physical or mental distress. In this context, 'Salya' refers to fragments of arrows or similar sharp instruments, which were commonly seen as the most prevalent and perilous sources of injuries necessitating surgical intervention. The term 'tantra' in this regard signifies the methodical approach to dealing with such injuries. Their tools, made from materials such as wood and stone, are surprisingly sophisticated. The 'Sushruta Samhita' describes over 120 surgical instruments and 300 surgical procedures, showcasing a breadth of knowledge remarkable for its time [12]. The recommended skills and tools for a surgeon, as suggested in historical texts, align closely with what is advocated in contemporary times.

'Sushruta Samhita' is the earliest medical manuscripts from India. When they first emerged, they didn't cover surgical topics. This exclusion stemmed from the fact that practitioners were solely from the Brahmin caste, for whom contact with wounds, injuries, and death was deemed impure. Clearly, comprehensive medical treatment would have been unattainable without the inclusion of surgical procedures. The individuals skilled in this domain were typically from a lower social stratum [13]. The convergence of the distinct worlds of military surgeons and Brahmin medical practitioners in civilian life was realized through the influential efforts of Sushruta. His extensive writings were pivotal in integrating surgery as an essential component within the broader spectrum of medicinal arts. The dissected animals used in Vedic sacrifices provided superb resources for developing a framework of comparative anatomy. Sushruta dedicated his entire existence to mastering surgery, enriching the field with his profound insights and comparisons drawn from the anatomical study of various animals [14].

Sushruta Samhita, derived from the Sanskrit language, signifies a systematically organized compilation of verses or a textual work. Samhita segmented into six parts, elaborately covers the different facets of surgery, encompassing military medical practices, principles of medical ethics, pedagogical approaches, anatomical dissection of the human body, techniques for dissection, and surgical training exercises using vegetables and alternative models such as fabric [15]. In the Susruta samhita, it is stated that '… practice can be started only after having read and thoroughly studied the science of medicine; having seen and performed the operations himself; having passed the appropriate tests and thence obtained the permission of the governing authority' [16]. The ancient text, procedures included complex tasks like removing tumors, fixing broken bones, and even performing early forms of plastic surgery like nose reconstruction. Sushruta and his contemporaries also knew how to do cataract surgery for better vision and cesarean sections to safely deliver

babies. Their knowledge of how to stitch wounds and treat many other medical conditions shows the remarkable skill and understanding of the human body they possessed in ancient times.

Rhinoplasty, commonly known as nose reconstruction or nose surgery, holds a significant place in the annals of ancient Indian medical history. The earliest descriptions and practices of this subject date back to 600 BCE, found in the "Sushruta Samhita", a significant work written by the ancient surgeon Sushruta.The technique described in the Sushruta Samhita for reconstructing a nose. It is strikingly similar to techniques used in modern plastic surgery. Sushruta's procedure involved taking a flap of skin from the cheek, which was then carefully shaped and attached to the nose. [17, 18] Cowasjee's surgery was performed by using a flap of skin from the forehead, known as the forehead flap rhinoplasty. This method was adapted by local practitioners, demonstrating a continuity of ancient Indian surgical traditions [19]. The flap remained attached to its original site at one end to maintain blood supply, a method known as the pedicle. Sushruta's descriptions include specific surgical instruments, many of which were made of metal and closely resemble tools used in contemporary surgeries. Moreover, his approach to surgery was remarkably advanced in terms of hygiene and infection control. He recommended the use of wine as an antiseptic to clean the wound and the surgical area, a practice that anticipated modern antiseptic techniques. In ancient Indian society, the nose was considered a symbol of dignity and respect. Disablement of the nose was a common punishment for certain crimes, which may have spurred the development of reconstructive nose surgery. The skill to reconstruct a nose, therefore, held great social and cultural significance, transcending the mere cosmetic and functional aspects of surgery. Remarkably, the principles laid down by Sushruta in rhinoplasty remain relevant and are still in use in modern plastic surgery.

Cataract surgery, pivotal in the field of ophthalmology, has ancient roots, particularly notable in India. This practice, centuries old, signifies a remarkable understanding of medical science in that era. Sushruta's approach to cataract surgery was known as the 'couching' method. This procedure involved the use of a curved needle, known as the 'Jabamukhi Salaka', to displace the lens and push it back into the vitreous cavity of the eye, thus clearing the visual axis. The Jabamukhi Salaka, a curved needle with its tip designed to resemble a tapering barley corn, is the sole instrument needed for the procedure. The Jabamukhi Salaka, for instance, was a fine, sharp instrument made of metal, showcasing the advanced metallurgy of the period [20]. The patient's head was stabilized, often by an assistant, to prevent any sudden movements. The eye was then exposed, and local anesthesia, typically in the form of herbal preparations, was applied to numb the area. Though this method did not remove the cataract, it helped in restoring partial vision. The instruments described by Sushruta for these procedures were meticulously designed. Following the surgery, antiseptic and healing herbs were applied to the eye to prevent infection and promote healing [21]. The patient was then advised to rest and follow a specific diet and medication regimen to aid in recovery. The ancient Indian approach to cataract surgery significantly influenced Arabic medicine and subsequently European practices. Although the technique of couching is now obsolete, its conceptualization laid a foundation for modern ophthalmological procedures.

Hernia surgery in ancient India involved a combination of section, manipulation, and repair techniques. The use of specific surgical tools, as described in ancient texts, highlights a deep understanding of anatomy and surgical processes. The procedure typically involved a careful incision to expose the herniated tissue, followed by its manipulation back into the correct anatomical position. Sutures, made from materials like flax or hemp, were used to repair the tissue [22]. The Charaka Samhita, an ancient

text, describes these techniques in detail. For piles, the surgical approach varied based on cruelty. Early-stage piles were often treated with herbal applications and dietary changes. In more severe cases, surgical intervention was necessary. Susruta instructs that for a piles examination, the individual should recline on their bed or a plank; similarly, Vagbhata II describes utilizing a plank as a surgical table during procedures. Additionally, a bed of equivalent length from a patient's head top to their knees is referenced in the context of lithotomy surgery [23]. Post-surgical care was emphasized, with the application of herbal pastes to promote healing and prevent infection. The ancient surgical techniques for treating hernias and piles were not only revolutionary for their time but also provided a foundation for modern surgical practices. These methods were documented in texts like the Sushruta Samhita, which influenced medical practices across the world, particularly in the Middle East and eventually in Europe.

Cesarean section, a surgical procedure to deliver a baby through incisions in the abdomen and uterus, has a rich and complex history, with its roots extending back to ancient civilizations, including India. The Sushruta Samhita describes various obstetric procedures, including techniques that can be interpreted as early forms of Cesarean sections [24]. Surgeons in ancient India were aware of the necessity to perform such a procedure in cases where natural childbirth was impossible or could lead to complications for the mother or child. In ancient Indian society, the birth of a child was an event of both medical and religious significance. The decision to perform a surgical intervention like a Cesarean section was likely influenced by cultural beliefs and practices [25]. Hindu texts often emphasized the sanctity of life, which may have encouraged surgeons to undertake life saving procedures like Cesarean sections despite their inherent risks. The use of sharp instruments made from metals like iron and bronze was common. However, the lack of advanced sterilization techniques and an incomplete understanding of infection control posed significant challenges and risks. Pain management and postoperative care in ancient Indian surgery involved the use of herbal medicines. For Cesarean sections, this would have included local anesthetics derived from plants, as well as postoperative treatments to promote healing, reduce infection risk, and manage pain. The extensive pharmacopeia detailed in texts like the Sushruta Samhita included a variety of herbs with medicinal properties that were likely used in these contexts. Cesarean sections in ancient India were not isolated procedures but part of a holistic approach to health and medicine under the umbrella of Ayurveda. This holistic system combined physical treatments with spiritual and dietary guidelines, emphasizing the balance of bodily elements and energies for overall health.

Trepanation in ancient India showcases the advanced level of early medical practices. This procedure, involving drilling or cutting into the skull, was performed for both medical and ritualistic reasons. Trepanation was not unique to India. Jivaka, surgeon to Lord Buddha, is considered as father of ancient neurosurgery in India and is reported to have performed complex surgeries on a routine basis [26]. The Jivaka Sutra describe Jivaka as having performed trephination on a patient and removed intracranial mass. These descriptions of surgical procedures follow the template as laid in works of Charaka and Susruta [27]. The master surgeon Susruta considered as father of Indian surgery is said have performed basic neurosurgery procedures. He considered the head as the centre of all functions and in his works, he describes various surgeries involving the skull such as trephining, excising, probing, puncturing, suturing, and draining of "collected fluids" especially in relation to warfare injuries. In ancient Indian society, trepanation was believed to release evil spirits causing mental illness or neurological disorders [28]. This dual approach to trepanation, both as a physical and spiritual healing method, highlights the holistic view of health in ancient Indian culture. The techniques and instruments developed for trepanation in ancient India laid the groundwork for modern neurosurgical procedures. Although the reasons for surgery have evolved, the basic concept of accessing the brain via the skull has remained a constant in neurosurgery. This historical practice significantly contributed to the development of safer and more effective neurosurgical techniques.

In Sushruta Samhita, oral diseases appear in two separate sections viz. Nidana sthanam and Chikitsa sthanam. Diseases affecting seven anatomic locations - the lips, gums, teeth, tongue, palate, throat and oral cavity - are listed separately with clinical features. Sixty-five oral diseases are listed of which eight belong to lips, fifteen to gums, eight to teeth, five to tongue, nine to palate, seventeen to throat and three to oral cavity [29]. Procedures for managing tooth decay involved removal of the decayed tooth material, followed by treatments to alleviate pain and prevent further decay. Methods included the application of herbal preparations with antiseptic properties to the decayed area [30]. The texts describe various treatments for gum diseases, including herbal rinses and pastes made from medicinal plants known for their healing properties. Special emphasis was placed on maintaining oral hygiene to prevent the onset of gum diseases. While less commonly mentioned, there were references to rudimentary restorative techniques, possibly including the use of prosthetics made from materials like wood. Ancient Indian dental surgeons used a variety of forceps for extraction, designed to grasp the tooth firmly without causing undue pressure. Probes, often made of metal, were used to examine teeth and gums, and to remove decayed tooth material. Evidence suggests the use of basic drills, possibly powered by bowstrings, for more intricate procedures like removing decayed tooth material. These drills were likely made from iron or bronze and required skilled handling. Scalpels made of sharp metals were used for incisions in gum surgeries. Scissors or similar cutting instruments were mentioned for trimming or shaping the gums in certain procedures [31]. Although detailed descriptions are scarce, there were likely rudimentary materials used for dental restoration, such as wooden prosthetics. A variety of herbal preparations were used both as local anesthetics and antiseptics during and after surgical procedures. These medicines were crucial for pain management and infection control.

The wide array of surgical instruments used in ancient Indian surgery highlights the advanced and intricate nature of their medical practices. These ranged from simple scalpels and needles to more complex devices like forceps, speculums, and catheters. Notably, the instruments were made primarily from metals such as iron, bronze, and occasionally gold, indicating a sophisticated understanding of metallurgy [32]. Scalpels, known as shastra, were the

primary cutting instruments. They varied in shape and size, tailored to different types of surgeries.

1. Circular Knife (Mandalagra Sastra) - Used for circular incisions or excisions, especially in procedures requiring precision around a curved area.
2. Bone Saw (Karapatra) - Designed for cutting through bone, typically used in amputations or surgical removal of bone segments.
3. Scalpel (Vrddhipatra) - A small and sharp blade used for making precise cuts in tissue, a fundamental tool in various surgical procedures.
4. Nail Parer (Nakhasastra) - Utilized for trimming and shaping nails or small bony structures with precision.
5. Ring Knife (Mudrika) - A knife with a circular blade, used for cutting circular areas with accuracy, often in dermatological or ophthalmological surgeries.
6. Lancet (Utpalapatra) - A small, sharp instrument used for making punctures or small incisions, such as in bloodletting or draining abscesses.
7. Single Edged Knife (Ardhadhara) - Features a single sharp edge, used for slicing or incising tissue with control and precision.
8. Suturing Needle (Suci Sastra) - A needle designed specifically for passing suture material through tissue, enabling wound closure.
9. Bistoury (Kusapatra) - A narrow-bladed surgical knife used for making incisions in tight or delicate areas, often with a slightly curved blade.
10. Hawk Bill Scissors (Atimukha) - Scissors with a curved blade resembling a hawk's bill, ideal for cutting circular or curved shapes in tissue.
11. Scissors (Sararimukha) - General surgical scissors used for cutting tissue or sutures, available in various shapes for specific applications.
12. Curved Bistoury (Amtaramukha) - A bistoury with a curved blade, enhancing precision in curved incisions or in hard-to-reach areas.
13. Three Edged Knife (Trikurcaka) - A knife with three sharp edges, designed for puncturing or incising with minimal effort, often used in abscess drainage.
14. Chisel (Kutharika) - Used for cutting or carving hard materials like bone, often in orthopedic surgeries to reshape or remove bone.
15. Trocar (Vrihimukha) - A sharp, pointed instrument enclosed in a tube, used to puncture the body to drain fluid or gas from cavities.
16. Awl (Ara) - A pointed tool for piercing or making small holes in bone or tough tissue, used in procedures requiring precision anchoring.
17. Scalpel of Different Type (Vetasapatraka) - A variant of the traditional scalpel, possibly designed for specific types of tissue or surgical needs.
18. Sharp Hook (Badisa) - A hook with a sharp point, used for lifting or holding parts of tissue during surgery or dissection.
19. Tooth Scaler (Dantasanku) - Used in dental procedures to remove plaque and calculus from teeth, maintaining oral hygiene.
20. Sharp Probe (Esani Sastra) - A pointed instrument used for exploring wounds or body cavities, often to locate foreign objects or to assess the extent of tissue damage.33

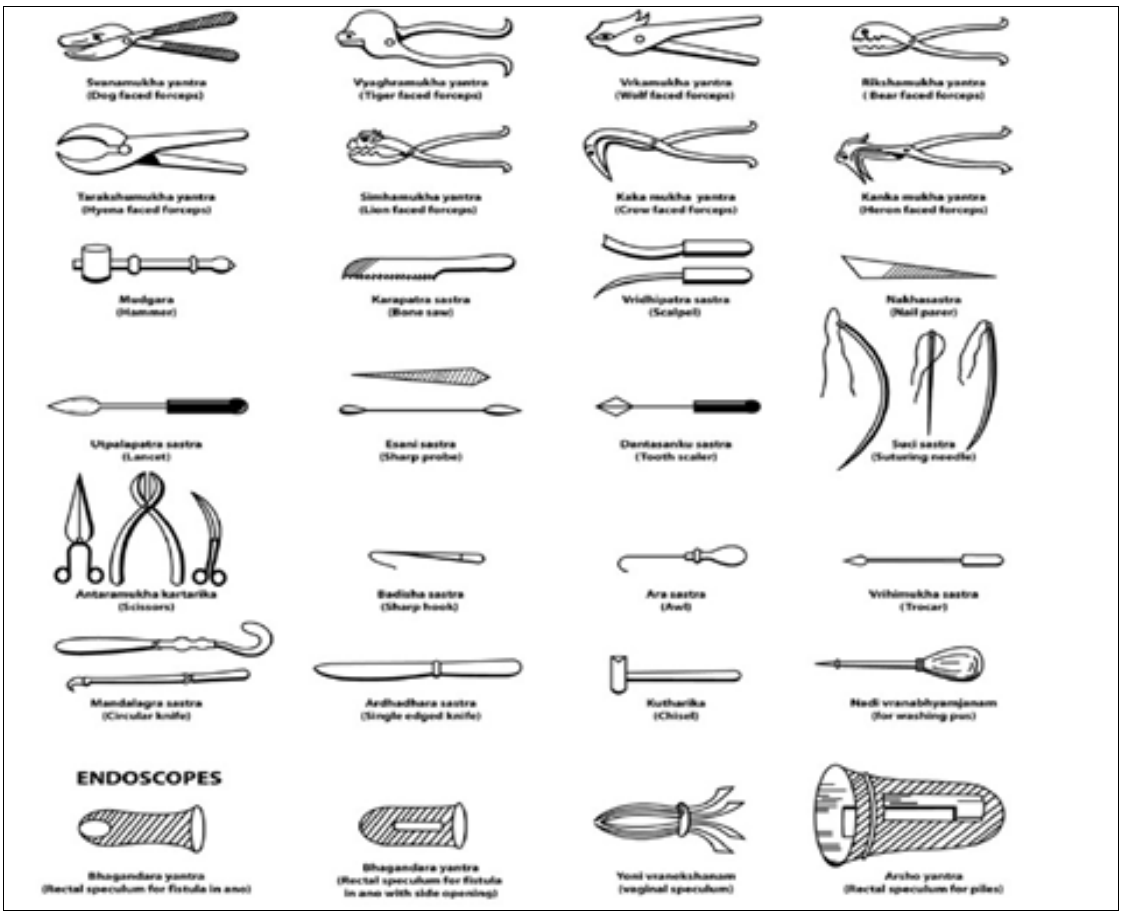

Fig 2: Pictures of some of the instruments including endoscopes

Each instrument has been tailored to specific surgical or medical tasks, reflecting the advanced understanding of anatomy and surgical techniques in historical medical practices. These instruments came in different shapes and sizes, often with a locking mechanism to maintain a secure grip. The use of speculums for procedures involving body cavities illustrates the advanced state of ancient Indian medical practice. Ancient surgeons used needles made of gold or silver.34 The Sushruta Samhita describes various types of sutures, from simple interrupted stitches to more complex mattress sutures, indicating a nuanced understanding of wound healing. Suture materials included plant fibers, animal sinew, and even human hair, showcasing resourcefulness in utilizing natural materials.

Ancient Indian surgeons extensively used herbal medicines as part of their medical practices. These included roots, leaves, fruits, and bark, often used in combination to enhance their therapeutic effects. The preparation of these medicines was an intricate process, involving grinding, boiling, or fermenting the raw materials to extract their medicinal properties3536. For example [1] Turmeric (Curcuma longa): Widely used for its antiseptic properties, turmeric was applied to wounds to prevent infection and promote healing. Its active compound, curcumin, is known for its anti-inflammatory effects [2]. Neem (Azadirachta indica): Neem leaves and oil were used for their antimicrobial properties. They were particularly effective in treating skin infections and enhancing wound healing [3]. Ginger (Zingiber officinale): Ginger was extensively utilized in surgery for its anti-inflammatory and analgesic properties. It was applied both internally and externally to reduce inflammation, alleviate pain, and enhance healing post-surgery. Employed for its analgesic properties, ginger was used in poultices and pastes to alleviate pain and inflammation [4]. Indian Gooseberry (Amla, Emblica officinalis): Known for its high vitamin C content, amla was used to boost immunity and overall health, aiding in the patient's recovery post-surgery. In the Charaka Samhita, medicinal substances derived from plants are categorized into 50 distinct groups based on their pharmacological or therapeutic properties. Following this significant work in Ayurvedic tradition, the Sushruta Samhita emerged as another cornerstone text. Despite its particular focus on surgical techniques and principles, the Sushruta Samhita also provides extensive details on 395 medicinal plants, 57 animal-derived drugs, and 64 minerals or metals, highlighting their use as therapeutic agents.37 Herbal medicines were applied in various forms– pastes, poultices, oils, and decoctions. The holistic approach of ancient Indian medicine

emphasized treating the patient's entire well-being, not just the surgical ailment. In many cases, herbal materials were integrated directly into the surgical techniques. For example, plant-based sutures were used for closing wounds, and leaves or leather were utilized as natural bandages or splints. This integration showcases a deep understanding of the medicinal properties of natural resources and their practical applications in surgery. The knowledge of these herbal medicines and their applications in surgery was meticulously documented in ancient texts. This documentation ensured the transmission of knowledge through generations, forming the basis of traditional Indian medicine, known as Ayurveda [38].

India's traditional medicinal systems-Ayurveda, Siddha and Unani-are referenced in ancient texts like the Vedas. Ayurveda particularly flourished in India between 2500 and 500 BC.39 Ancient Indian scholars like Sushruta made ground breaking contributions to areas like plastic surgery, cataract surgery, and surgical instrumentation, influencing contemporary medical practice even today. Sushruta firmly believed that skilled surgeons required in-depth anatomical knowledge. This emphasis is reflected in the Sarirasthana, a 10-chapter section of his work dedicated to the study of human anatomy. Susruta Samhita said: 'A strong foundation in anatomy is essential to correctly describe the various parts of the body, including the skin. Those seeking in-depth anatomical knowledge should dissect a cadaver for detailed observation and study.'

[tasmat nihsamsayam jnanam harta salyasya vanchata／
Sodhayitva mrtam samyag drastavyah anga-vinisccayah／／
Pratyaksatah hi yat drstam sastra-drstam ca yat bhavet／
Samasatah tat ubhayam bhuayh jnana-vivardhanam／／]40

Sushruta detailed a cataract removal technique called "couching," which involved dislodging a cloudy lens with a needle-like instrument. Notably, this method predates recorded European innovations in cataract surgery by centuries [41]. The Sushruta Samhita describes over 100 highly specialized surgical instruments. Different shapes and sizes for various surgical procedures, echoing the meticulous classification found in contemporary surgical toolkits [42]. Ancient Indian surgeons developed specialized tools for grasping, as well as setting complex fractures, demonstrating sophisticated anatomical knowledge [43]. Ancient Indian medical knowledge made its way to Western civilization through the translation of works like the Sushruta Samhita during the 18th and 19th centuries. Influenced by these techniques, European surgeons incorporated and refined practices in rhinoplasty and cataract removal. This knowledge exchange emphasizes the interconnectedness of global medical progress.44 Contemporary India grapples with complex healthcare needs requiring both technological advancements and a nuanced understanding of traditional healing wisdom. Ayurvedic and traditional medicine practitioners often work alongside modern physicians in India. This integrated approach offers patients a more comprehensive range of treatment options [44]. The Indian government recognizes the value of traditional medicine and funds initiatives to validate and promote research on ancient healing practices. This underscores the continued relevance of traditional knowledge in addressing modern health challenges. India's ancient surgical heritage is an irreplaceable contribution to global medicine. Procedures honed by figures like Sushruta form the foundational knowledge that drives modern medical innovation. Embracing the principles of traditional medicine alongside technological advancements allows modern India to create a robust and well-rounded healthcare system deeply rooted in its rich history. Ancient Indian medical and surgical knowledge presents a compelling avenue for modern research. While these practices connect us to the past, they also hold valuable insights relevant to contemporary healthcare goals [46].

While ancient Indian medicine, particularly its surgical practices, achieved notable advancements, inherent limitations shaped their development. These multifaceted limitations stemmed from cultural, technological, and knowledge-based constraints, ultimately influencing the scope and complexity of surgical procedures performed.

The materials and fabrication techniques available then imposed significant limitations. Instruments were primarily made from metals like iron, bronze, and copper, which, while functional, did not offer the same precision or durability as modern materials.47 The lack of sterilization techniques also posed a significant risk of infection, a challenge that was not fully understood or addressed in ancient times. While ancient Indian surgeons possessed a commendable understanding of anatomy, gleaned from methods like dissection and direct observation, there were notable gaps in their knowledge. For instance, the circulatory system's complexities were not entirely understood, which impacted the efficacy of procedures involving blood vessels [48]. Similarly, a limited understanding of microbial pathogenesis meant that postoperative infections were common and often fatal. These gaps in anatomical and physiological knowledge sometimes led to practices that, by modern standards, would be considered rudimentary or ineffective.

The cultural and religious milieu of ancient India also posed significant barriers to surgical practice. For instance, certain religious and social beliefs discouraged dissection of human bodies, which limited the opportunities for detailed anatomical studies and practical training.49 Moreover, the caste system and associated societal norms often dictated who could practice surgery or seek surgical treatment, further restricting the development and dissemination of surgical knowledge. Another challenge in ancient Indian surgery was the lack of standardization in surgical techniques and procedures. While texts like the Sushruta Samhita provided detailed descriptions, there was considerable variation in how these procedures were interpreted and implemented by different practitioners. This lack of standardization was compounded by the oral tradition of knowledge transmission, which, despite its merits, could lead to inconsistencies and variations in practice.

Despite these challenges, the influence of ancient Indian surgery extended beyond its geographical confines, significantly impacting later Islamic medical practices and, through them, the medical traditions of medieval Europe [50]. This cross-cultural transmission underscores the global significance of ancient Indian surgical techniques. In contemporary times, there is a growing interest in ancient medical practices, including those from ancient India. Modern medicine, with its emphasis on evidence-based practices, is beginning to explore the potential of these ancient techniques, especially in areas like herbal medicine and holistic healing. The principles laid down in ancient Indian texts continue to find relevance, offering alternative perspectives and approaches to healing.

The historical journey of surgical techniques in ancient India is a testament to the dynamic nature of medical science. It highlights the importance of continual learning, adaptation, and integration of new knowledge. Understanding the challenges and limitations of the past not only offers valuable insights into the evolution of medical practices but also guides future advancements in surgical techniques and medical education. The legacy of ancient Indian surgery, with its blend of innovation and tradition, continues to inspire and inform. As we navigate the complexities of modern medical practices, the lessons from this rich medical heritage serve as a reminder of the enduring quest for healing and the importance of integrating diverse medical knowledge for the betterment of humanity [51].

Image Sources

Fig: 1 - The Gentleman's Magazine of 1794, (Longmate 1794), Wellcome Institute Library, London.

Fig: 2 - Ramachandra Rao, Encyclopedia of Indian Medicine, Popular Prakashan Pvt. Ltd., Bombay, 1987

References

1. Wujastyk D. The roots of Ayurveda: selections from Sanskrit medical writings. New Delhi: Penguin Books; 1998. p. 10–11.
2. Wujastyk D. The roots of Ayurveda: selections from Sanskrit medical writings. New Delhi: Penguin Books; 1998. p. 13.
3. Bhishagratna KL. An English translation of the Sushruta Samhita. Vol. 1. Calcutta: Kaviraj Kunja Lal Bhishagratna; 1907. p. 152–154.
4. Zimmerman LM, Veith I. Great ideas in the history of surgery. San Francisco: Norman Publishing; 1993. p. 8–9.
5. Bhishagratna KL. An English translation of the Sushruta Samhita. Vol. 1. Calcutta: Kaviraj Kunja Lal Bhishagratna; 1907. p. 16.
6. Draper JW. History of the intellectual development of Europe. London: George Bell & Sons; 1910. p. 142.
7. Ball JM. The practice of medicine among the Greeks prior to the age of Hippocrates: a contribution to the history of medicine. J Am Med Assoc. 1887;8:309.
8. Sharma RK. Charak Samhita. Vol. 1. Varanasi: Chowkhamba Sanskrit Series Office; 2012. p. 1.
9. Loukas A, Ferrauiola A. Anatomy in ancient India: a focus on the Susruta Samhita. J Anat. 2010;217:646–650.
10. Wikipedia. Sushruta Samhita [Internet]. Available from: https://en.wikipedia.org/wiki/Sushruta_Samhita
11. Shalya Tantra - वेद Veda [Internet]. Available from: http://veda.wikidot.com/shalya-tantra
12. Saraf S, Parihar RS. Sushruta: the first plastic surgeon in 600 BC. Indian J Plast Surg. 2007;40(2):2.
13. Zimmerman LM, Veith I. Great ideas in the history of surgery. San Francisco: Norman Publishing; 1993. p. 56.
14. Bhishagratna KL. An English translation of the Sushruta Samhita. Vol. 1. Calcutta: Kaviraj Kunja Lal Bhishagratna; 1907. p. 15–16.
15. Singh V. Sushruta: the father of surgery. Natl J Maxillofac Surg. 2017;8(1):1–3. doi:10.4103/njms.NJMS_33_17
16. Bhishagratna KL. An English translation of the Sushruta Samhita. Vol. 1. Calcutta: Kaviraj Kunja Lal Bhishagratna; 1907. p. 18–19.
17. Wujastyk D. The roots of Ayurveda: selections from Sanskrit medical writings. New Delhi: Penguin Books; 1998. p. 111.
18. Bhishagratna KL. An English translation of the Sushruta Samhita. Vol. 1. Calcutta: Kaviraj Kunja Lal Bhishagratna; 1907. p. 142.
19. Cowasjee's rhinoplastic operation. Gentleman's Magazine. 1794. Wellcome Institute Library, London.
20. Dutt KC. Archives of Ophthalmology. Calcutta: 1938;20:4.
21. Woods M, Woods MB. Ancient medical technology:

from herbs to scalpels. Minneapolis: Twenty-First Century Books; 2010. p. 68–69.
22. Mukhopadhyay G. The surgical instruments of the Hindus. Calcutta: Wellcome Library; 1907. p. 332–333.
23. Mukhopadhyay G. The surgical instruments of the Hindus. Calcutta: Wellcome Library; 1907. p. 86.
24. Woods M, Woods MB. Ancient medical technology: from herbs to scalpels. Minneapolis: Twenty-First Century Books; 2010. p. 67.
25. Poleman HI, Roche PQ. Aspects of Caesarean section in India. J Am Orient Soc. 1939;59:17.
26. Jivaka KA. The great surgeon and physician of ancient India. Indian J Colorectal Surg. 2019;2(2):77–79.
27. Roy Chowdhury AK. Trepanation in ancient India. J Asiat Soc Bengal. 1973;203–204.
28. Jorgenson JB. Trepanation as a therapeutic measure in ancient (Pre-Inka) Peru. Acta Neurochir. 1988;3–5.
29. Nair KC. Acharya Sushruta - the patron saint of dentistry. Acta Sci Dent Sci. 2022;6(3):71–78.
30. Singhal GD. Anatomical & obstetric considerations in ancient Indian surgery. Banaras: Banaras Hindu University Press; 1973. p. 25.
31. Bhishagratna KL. An English translation of the Sushruta Samhita: Nidana-Sthana, Sarira-Sthana, Chikitsita-Sthana and Kalapa-Sthana. Vol. 2. Calcutta: Kaviraj Kunja Lal Bhishagratna; 1911.
32. Mukhopadhyaya G. Surgical instruments of ancient Hindus. Delhi: New Bharatiya Book Corporation; 2008. p. 43.
33. Natarajan. Surgical instruments and endoscopes of Susruta, the sage surgeon of ancient India. Indian J Surg. 2008;70(4):220–221. doi:10.1007/s12262-008-0063-3
34. Mukhopadhyaya G. Surgical instruments of ancient Hindus. Delhi: New Bharatiya Book Corporation; 2008. p. 46.
35. Singh KK. Studies on native medicine of Jaunsari tribe of Dehradun district: Uttar Pradesh, India. Int J Pharmacogn. 1997;35(2):105–110. doi:10.1076/phbi.35.2.105.13289
36. Indianetzone. Rigveda [Internet]. Available from: http://www.indianetzone.com/2/rig%20veda.htm
37. Singh RK, Vyas MK. Surgical procedures in Sushruta Samhita. Int J Res Ayurveda Pharm. 2012;3:1444–1450.
38. Ayurvedic medicine [Internet]. Available from: http://egofelix.com/7963-ayurvedic-medicine
39. Subhose V, Srinivas P, Narayana A. Basic principles of pharmaceutical science in Ayurveda. Bull Indian Inst Hist Med. 2005;35:83–92.
40. Chattopadhyaya DP. Science and society in ancient India. Calcutta: Research India Publications; 1933.
41. Agarwal RK. Ancient Indian ophthalmology. Curr Sci. 1968;37:616–617.
42. Singh V. Sushruta: the father of surgery. Natl J Maxillofac Surg. 2017;8(1):1–3.
43. Bhishagratna KK. An English translation of the Sushruta Samhita. Calcutta: Kaviraj Kunja Lal Bhishagratna; 1907. p. 16.
44. Deswani NH. The history of medicine in India-medical education. Kathmandu Univ Med J. 2004;2(4):384–400.
45. Patwardhan B, Warude D, Pushpangadan P. Ayurveda and traditional Chinese medicine: a comparative overview. Evid Based Complement Alternat Med. 2005;2(4):465–473.
46. LinkedIn. Ancient Indian medicine [Internet]. Available from: www.linkedin.com/pulse/ancient-indian-med
47. Kansupada KB, Sassani JW. Sushruta: the father of Indian surgery and ophthalmology. Doc Ophthalmol. 1997;93:159–167.
48. Raju VK. Susruta of ancient India. Indian J Ophthalmol. 2003;51:119–122.
49. Zysk KG. Asceticism and healing in ancient India: medicine in the Buddhist monastery. New York: Oxford University Press; 1998.
50. Savage-Smith E. Attitudes toward dissection in medieval Islam. J Hist Med Allied Sci. 1995;50(1):67–70.
51. Balasubramanian D, Unni BG. Ayurveda: a historical perspective. Hyderabad: Universities Press; 2000. p. 12–14.