



CO-RELATION OF SUSHRUTOKTA YANTRA-SHASTRA AND MODERN SURGICAL INSTRUMENT: AN ANATOMICAL PERSPECTIVE

Surgery

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ABSTRACT

Ayurveda is the oldest medical system, and anatomy is one of the ayurved's oldest modality of medical system, which made it a little critical to read and understand due to Sanskrit and ayurvedic terminologies used in it. It is believed that the ancient Indian scientists explored important and essential knowledge of practical anatomy. Interestingly, in neither the writing of Acharya Sushrut and Charak there is any indication of animal dissection, they perched about human dissection only and the yantra and shashtra used in it are also specially designed for human dissection only, which are now adapted by modern with different names. The contribution of ancient civilization to our modern understanding are well appreciated, with ancient india being no exception. Nowadays modernization has wrapped the scenario so tightly, that people are more familiar with modern language. Dissection is the first milestone in the journey of BEING A DOCTOR so, this is my special effort to make the 1st year medical student familiar with ayurvedic terminologies with aid of modern language with respect to dissection kit. An appreciation of evolution of anatomical knowledge can be gleaned from reviewing such ancient text with lens of modern language.

KEYWORDS

INTRODUCTION:

Acharya shushrut has contributed immensely in the field of Shalya, Shalakya, and Rachana Sharir majorly. According to the Sushruta Samhita, the ancient Indian text on surgery attributed to Sushruta, dissection was an integral part of surgical education and understanding of human anatomy. Sushruta emphasized the importance of practical knowledge and advocated for dissection as a means to gain a deeper understanding of the human body.

In the Sushruta Samhita, dissection was primarily performed on human cadavers. The text describes the process of dissecting various body parts, including the head, abdomen, thorax, and extremities. The dissection techniques described in the text were intended to reveal the anatomical structures, such as muscles, bones, blood vessels, and organs.(1)

Sushruta emphasized the need for precision during dissection and recommended using specific instruments for different dissection purposes. These instruments included knives, hooks, probes, and saws. The text also described the use of boiling water to separate soft tissues and clean bones during dissection.

The purpose of dissection, according to Sushruta, was to gain a thorough knowledge of anatomical structures and their relationships within the body. This knowledge was seen as essential for surgical practice, as it allowed surgeons to understand the underlying structures they were operating on and perform procedures with greater precision and safety.

It's worth noting that while the Sushruta Samhita provides valuable insights into ancient surgical practices, dissection techniques and anatomical understanding have evolved significantly over time. Modern medical education emphasizes the use of human cadaveric dissection, along with other teaching methods such as imaging techniques and advanced anatomical models, to provide a comprehensive understanding of human anatomy to healthcare professionals.

Furthermore, ethical considerations and regulations surrounding the use of human cadavers for dissection have changed over time. In modern medical education, the use of donated bodies for dissection is guided by ethical principles and strict legal frameworks to ensure respect for the deceased and informed consent.

In summary, the Sushruta Samhita acknowledges the importance of dissection in surgical education and understanding of human anatomy. The text provides descriptions of dissection techniques and

instruments used during ancient times. However, it's important to recognize that contemporary medical education and anatomical knowledge have advanced significantly since then, incorporating a range of modern teaching methods and ethical considerations.

He elaborated on various yantras and shastra used in all types of surgeries and dissections. Till today they are used with the same structure, same function but different modern names. Modern terminologies are versatile and globally accepted as well as adapted.

A detailed description of 121 types of surgical instrument is available in yantravidhi adhyay (101-yantra) and shashtra vidhi adhyay (20-shashtra) in Sushrut Samhita(2)(3)(4).

Anatomy-

It originates from the greek term "anatomē" which means to cut" (5) Traditionally, anatomy has been studied through the process of dissection, which involves the careful dissection and examination of human cadavers or animal specimens.

However, modern anatomical education also incorporates advanced imaging techniques, such as radiography, computed tomography (CT), magnetic resonance imaging (MRI), and ultrasound, which provide non-invasive views of the internal structures of the body.

DISSECTION –

It also means "to cut" or divide. It is the act of cutting opening and dismembering the dead body. Dissection is a method of studying anatomy by carefully cutting and separating tissues, organs, or other structures of a dead organism for examination and analysis. It is a hands-on approach that allows for a direct exploration of the internal structures and their relationships.

Dissection has been a fundamental technique in anatomical education from centuries. Both terminologies depict the same meaning so many learners thought them to be same but "ANATOMY IS A SCIENCE, WHEREAS DISSECTION IS A TECHNIQUE TO UNDERSTAND THIS SCIENCE DEEPLY."

Cadaver used for dissection is worshiped respected and even designated as the "first anatomy teacher", you can estimate the importance of cadavers by knowing that we have a proper "cadaveric oath ceremony", Which depicts the importance, respect and faith we show to cadaver for their contribution. It gives the first-hand experience in seeing the subject matter and a open platform to visualize, practice, and experiment the human anatomy with shashtra and yantra



The respect and ethical treatment of cadavers have evolved over time, reflecting changing societal values, cultural practices, and advancements in medical education and research.

Older Practices: In ancient times, such as during the period of Sushruta (around 600 BCE), cadavers were commonly obtained from unclaimed bodies, criminals, or slaves. The handling of cadavers was often less respectful, with limited consideration for the dignity of the deceased. However, ancient texts like the Sushruta Samhita emphasized the importance of learning from human dissection and recognized the value of practical knowledge gained through cadaveric dissection.

Middle Ages and Renaissance: During the Middle Ages and Renaissance periods, the understanding of anatomy grew significantly. However, the availability of cadavers was limited, and dissections were often conducted clandestinely. Grave robbing and illegal procurement of bodies were prevalent practices. The treatment of cadavers during this time was generally lacking in respect and dignity.

Modern Practices: In the modern era, ethical considerations and regulations surrounding the treatment of cadavers have significantly changed. The principles of respect, dignity, and consent are now paramount. Here are some key aspects:

1. **Consent and Voluntary Donation:** The use of human cadavers for medical education and research now relies on the informed consent of individuals before their death or the consent of their next-of-kin after death. Many countries have established body donation programs, allowing individuals to willingly donate their bodies for scientific and educational purposes.
2. **Confidentiality and Privacy:** The identity and personal information of the deceased individuals are protected. Medical institutions maintain strict confidentiality to ensure privacy and respect for the donor and their family.
3. **Ethical Oversight and Regulations:** Various laws and ethical guidelines govern the handling, storage, and disposal of cadavers. These regulations ensure that the use of cadavers in medical education, research, and anatomical dissection is conducted ethically and with respect.
4. **Professionalism and Sensitivity:** Medical schools and institutions emphasize professionalism and sensitivity in the handling and treatment of cadavers. Students are taught to approach dissections with reverence, recognizing the gift that has been given for educational purposes. Cadavers are often referred to as "silent teachers" and are treated with dignity and respect throughout the learning process.
5. **Memorial and Final Disposition:** Many institutions hold memorial services or ceremonies to honor the donors and express gratitude for their contribution to medical education. After dissection, the remains are respectfully returned to the donors' families or cremated, depending on their wishes.

Overall, the respect and treatment of cadavers have significantly improved in modern times. Ethical considerations, legal frameworks, and cultural sensitivity now guide the practices surrounding cadaveric dissection, emphasizing the importance of treating the deceased with dignity and ensuring their contribution to medical education and research is recognized and honored.

Dissection Hall,

also known as the anatomy laboratory or dissecting room, holds significant importance in medical and anatomical education. It is a dedicated space where students, under the guidance of experienced instructors, engage in the hands-on exploration of human anatomy through cadaveric dissection. Here are some key reasons why the dissection hall is important:

1. **Hands-on Learning:** The dissection hall provides a unique opportunity for students to engage in hands-on learning. By

directly interacting with human cadavers, students can observe, touch, and manipulate anatomical structures in three dimensions. This practical experience enhances their understanding of the complexities and variations of the human body, far beyond what can be learned from textbooks or two-dimensional images.

2. **Anatomical Knowledge:** The dissection hall allows students to develop a comprehensive knowledge of human anatomy. By dissecting and exploring the cadaver, students can identify and study anatomical structures, understand their relationships, and appreciate the variations that may exist between individuals. This knowledge is fundamental for medical professionals, providing the foundation for clinical practice, surgical procedures, and diagnostic interpretation.
3. **Teamwork and Communication:** Dissection halls often involve group-based learning, fostering teamwork and communication among students. Working collaboratively, students share their observations, insights, and challenges, which enhances their learning experience and encourages effective communication skills—essential qualities for healthcare professionals who often work in interdisciplinary teams.
4. **Critical Thinking and Problem-Solving:** Dissection requires students to think critically and solve problems in real-time. They encounter anatomical variations and unexpected findings, requiring them to analyze and adapt their dissection techniques accordingly. This process enhances their ability to think analytically, develop a systematic approach, and make informed decisions—a valuable skill set for medical practice.
5. **Ethical and Professional Development:** The dissection hall provides a unique opportunity for students to develop ethical and professional attitudes. They learn to approach the human cadaver with respect, sensitivity, and humility, recognizing the gift of knowledge bestowed upon them. Students also develop a sense of responsibility, ensuring the privacy and confidentiality of the donors and treating the cadavers with the utmost dignity.

Dissection hall is the first place where medical student first encounter with the primary yantra and shastra (dissection kit).

Dissection Kit

is a collection of specialized tools and instruments used for the purpose of dissecting and exploring anatomical structures during dissection procedures. These kits typically contain a variety of instruments designed to facilitate the dissection process and provide precision in handling tissues and organs. While the specific contents of a dissection kit may vary, here are some commonly included instruments:

1. **Scalpel:** A surgical knife with a sharp, narrow blade used for making incisions and precise cuts during dissection. The blade may be detachable or retractable, and multiple blade sizes may be included in the kit.
2. **Dissecting Scissors:** Different types of scissors are used for various dissection tasks, such as fine-pointed scissors for delicate dissection, blunt-blunt scissors for blunt dissection, and sharp-blunt scissors for cutting tissues.
3. **Forceps:** Fine-tipped forceps, also known as dissecting forceps or tweezers, are used for grasping and manipulating tissues during dissection. They come in various lengths and tip shapes, such as straight or curved.
4. **Probes:** Probes are slender, pointed instruments used for exploring anatomical structures, separating tissues, or identifying anatomical landmarks during dissection.
5. **Seekers:** Seekers are similar to probes but have a hooked or curved tip. They are used for lifting or separating structures during dissection.
6. **Bone Chisels and Bone Cutters:** These instruments are used when dissecting bones, allowing for controlled bone cutting or chiseling to access deeper anatomical structures.
7. **Bone Saw:** A small, handheld saw with a thin blade used for cutting through bones during dissection.
8. **Rongeurs:** Rongeurs are specialized instruments used for removing or biting away small pieces of bone or tissue during dissection.
9. **Dissection Pins:** These are slender, pointed pins used to secure and hold back tissues during dissection to provide better visibility of underlying structures.
10. **Dissection Tray:** A shallow, flat tray or pan used to hold the cadaver or specimen during dissection to contain fluids and provide a clean work surface.

It's worth noting that the specific instruments included in a dissection

kit may vary based on the educational institution, the level of dissection being performed (basic or advanced), and the specific requirements of the dissection procedure. The instruments in a dissection kit are typically made of stainless steel or other materials that can withstand repeated use, be easily cleaned, and maintain sharpness.

There are various shastra as well as yantra used in surgery and anatomy to remove shalya and dissection of cadaver respectively :

Shalya-(foreign material)which affects both manas and sharir(6)

Shastra-(sharp)They cut body for beneficiary purpose(7).

Yantra-(blunt)They are used to adharan(help)



Various shashtra according to sushrut Samhita:

Comparitive Terms Used In Anatomy Realted To Dissection:

SUSHRUTOKTA SHABDAVAALI	MODERN TERMINOLOGIES
1. शरीर रचना विज्ञान/ प्रत्यक्ष शारीर	1. ANATOMY
2. शरीर रचना विज्ञान/ प्रत्यक्ष शारीर	2. PRACTICAL ANATOMY
3. व्यवहार शारीर	3. APPLIED ANATOMY
4. शव	4. CADAVER
5. शव संरक्षण	5. EMBALMING
6. मृतशोधन	6. CADAVER STERILIZATION
7. शवच्छेदन	7. DISSECTION
8. यन्त्र- शस्त्र	8. SURGICAL INSTRUMENT
9. अभिरंजन विधि	9. STAINING
10. महामातृका	10. COMMON CAROTID
11. सूक्ष्मदर्शन यन्त्र	11. MICROSCOPE
12. शवच्छेदन कक्ष	12. DISSECTION HALL

Dissection kit-

Collection of specialized tools and instruments used for the purpose of dissecting and exploring anatomical structures during dissection procedures



Surgical instrument used in dissection

Yantra-shashtra	Dissection tools
वृद्धिपत्र शस्त्र	Scalpel
शरीरमुख शस्त्र	Scissors
करपत्र शस्त्र	Bone saw
अनिग्रह (कीलरहित/Without handle)सन्दर्शयन्त्र	Forceps
सनिग्रह (कीलयुक्त With handle) सन्दर्शयन्त्र	Artery forcep
त्रिकूर्चकशस्त्र	Brush

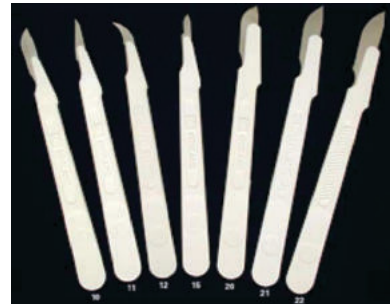
वृद्धिपत्र शस्त्र/Scalpel(8(3)):

Vridhhi Patra:It is Kshurakara (razor like) and is used for chedana (excision)and Bhedana (incision)karma.

It is of two types

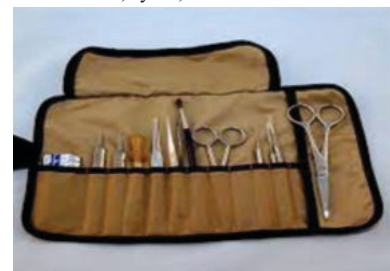
- Rriju (Praayatagra) : It is straight
- Natagra (Anchitagra) : It is curved

Being sharp edged its used for making skin incision ,tissue dissection and variety of surgical approaches. Sushruta while describing operation for Mudagarbha, has restricted the use of Vridhhipatra



त्रिकूर्चकशस्त्र/Dissection brush:

Tools designed for cleaning, surface finishing, and other general-purpose applications in dissection labs. Bristles may be fabricated from either stainless steel, nylon, or wire.



करपत्र शस्त्र/Bone saw

करपत्र छेदन और लेखन कर्म में प्रयुक्त होती है

It is used to cut small and large bones in a way that enables the best and clean dissection of cadaver.



शरीरमुख शस्त्र /Scissor(8)

Shararimukha Shastra: It resembles the long beak of a bird – Sharari It is pointed at one end and broad at other end.

It is of 2 types

- Straight scissors.-cut body tissues near the surface or deeper site
- Curved Scissors are termed as Aattimukha– resembling the beak of Aatti bird.. It is used to cut delicate and curved surface , tissue.they are used in fine dissection.



सन्दंशयन्त्र/forceps(8)(3)

Samdansa Yantra: Samdansa means to catch or hold.

These are of two types:-

1. Sanigraha (With Catch)
2. Anigraha (Without Catch)

These are used to extract Shalya from Twak, Mamsa, Sira, Snayu and do the same to hold in dissection.

Forceps, used these days, can be considered under the category of Samdanshayanttra:-

1. Sanigraha (With catch): They are also called Locking Forceps e.g. Dressing forceps, Artery forcep.
2. Anigraha (Without catch): They are also called Thumb Forceps or Dissecting Forceps

Anigraha is of two types:

- Plain forceps (used to catch tissue, mucosa and delicate muscle).
- Toothed forceps (used to catch or hold skin)

**Importance:**

“अत्र हस्तमेव प्रधानतमं यन्त्राणामवगच्छ” (9) ACCORDING TO AYURVEDA- HANDS ARE THE BEST DISSECTING INSTRUMENT

According to modern-Fingers are the first and best dissecting instruments.

This represents that the sushrut grand legacy is accepted and pursued harmonally in present era too with slightly innovation. It's important to recognize that the Sushruta Samhita and modern surgical instruments are separated by thousands of years of medical advancements. Modern surgical instruments have evolved significantly in terms of materials, ergonomics, precision, and sterilization techniques. While there are correlations between the ancient and modern tools from an anatomical perspective, the specific instruments used in contemporary surgical practice are products of ongoing scientific and technological developments.

Overall, studying the Sushrutokta Yantra-Shastra provides valuable historical context and showcases the remarkable knowledge and surgical techniques of ancient civilizations. However, it is essential to rely on modern evidence-based medicine and contemporary surgical instruments for safe and effective surgical procedures in the present day. Sushrut considered surgery the first and foremost branch of ayurved and stated that the surgery has the superior advantage of producing instantaneous effects by means of surgical instruments described by him and by the same mean dissection is done that help to investigate organs, bone, fascia, plexus, omentum and many many more exclusively fascinating stuctures that works unanimously everyday, ever second only for you.

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