

**DIRECTORATE OF ADVANCED STUDIES
EVENT CATALOGUE
2021**

15TH SEMINAR OF DAS EVENTS CALENDAR – 2021

ADVANCEMENT IN VETERINARY SURGERY



15th Seminar (Online through ZOOM) of DAS Events Calendar - 2021

ADVANCEMENT IN VETERINARY SURGERY

Presenter: Dr. Muhammad Arif Zafar

Associate Professor, Department of Clinical Studies

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ZOOM MEETING ID: 955 408 3170 - PASSCODE: 67890

Organized By: Directorate of Advance Studies, PMAS-AAUR

ACTIVITIES

3

Surgery

- ▶ Derived from Latin word "Chirurgia"
- ▶ Combination of two words;
 - ▶ "Chir (work)" and "Urgia (hands)"
- ▶ Mean "Work done with hand"

Attempts to correct diseased state to the normal with manual, instruments or physical means

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CONTENTS

Historical Perspectives

- ▶ **Ancient Era**
 - ▶ Stone-age
 - ▶ Bronze-age
- ▶ **Medieval Era**
 - ▶ Era of Barber Surgeons
 - ▶ Concept of Anaesthesia & Sterilization

Modern Surgery

- ▶ **Mechanical Era**
- ▶ **Robotic Surgery**



Historical Perspectives

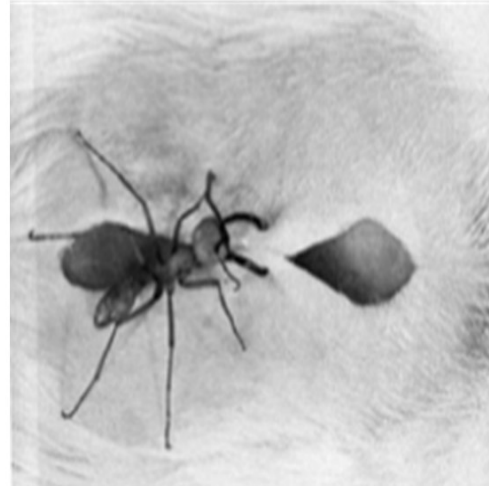
Surgery in Stone-age

- ▶ Trepanation of Skull
- ▶ Involve drilling a hole in the skull
- ▶ 6500 to 10,000 B.C.E.
- ▶ Found at different archeological sites
- ▶ Both kind of skulls found
 - ▶ Healed skulls
 - ▶ Trepanated



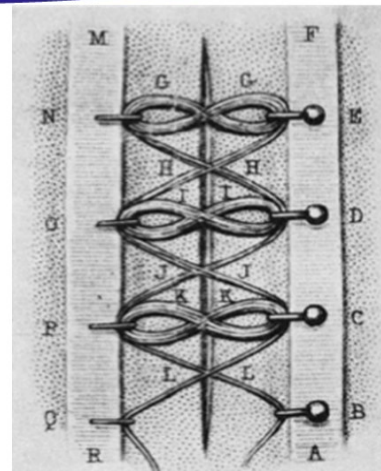
Wound Healing Techniques

- ▶ One of the oldest reference is from Egyptian Literature
 - ▶ Edwin Smith's Papyrus (16th Cent. BC)
- ▶ **The giant ants** (*Eciton burchelli*) used for suturing
- ▶ **Decapitation** was performed
- ▶ Similar practice is mentioned in;
 - ▶ Samhita
 - ▶ Arabic literature



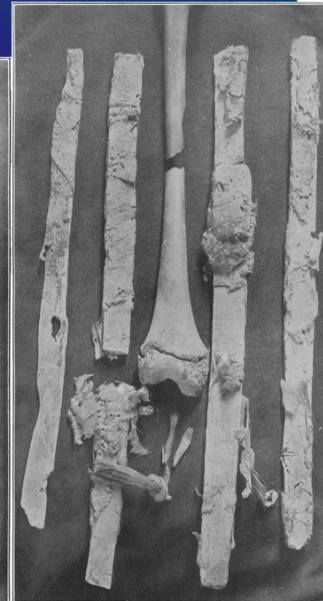
Wound Healing Techniques

- ▶ **Animal spikes** were used
- ▶ **Vegetable thorns** in figure-eight e.g., Acacia
- ▶ **Metal devices** were used by Greeks
- ▶ "Fibulae"; similar to safety pins
- ▶ Animal viscera were used
- ▶ *Silver-thread* suture
- ▶ *Golden-thread* suture
- ▶ Horse tail/mane hair



Fracture Management

- ▶ Evidenced 5000 years back with Egyptian burial sites
- ▶ Splints are evidenced
- ▶ Made up of;
 - ▶ Bark wrapped in linen
 - ▶ Dressing of vegetable fibers
 - ▶ Linen soaked in lime mixed with egg white
 - ▶ Wet leather strips become stiffen afterwards
- ▶ Hippocrates described bandages smeared with resins



Dental Surgery

- ▶ Esculapius is recognized to be inventor of Tooth extraction in 12th century BC
- ▶ Special class of Egyptian people known as "Phostophori"
- ▶ One of the oldest medical profession in Indus Valley and evidenced back to 7000 BC
- ▶ During 500-300 BC, Hippocrates and Aristotle wrote about;
 - ▶ Eruption pattern of teeth
 - ▶ Treatment of tooth decay and gum diseases
 - ▶ Tooth extraction and braces application
 - ▶ Management of fractured jaws

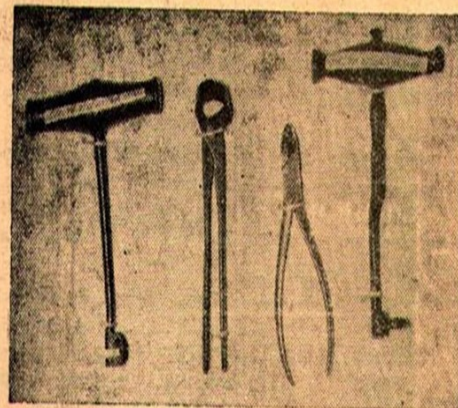


Dental Surgery



Ancient Dental Surgery Tools

Early Dental Tools Used In Pierce



These dental tools may not look so fancy, but they saved many a pioneer an aching tooth,

Medieval Era

- ▶ Decline of surgery by 13th century
- ▶ Barber & Monks
- ▶ Self-qualified surgeons
- ▶ Physicians were considered entirely a different profession



Barber & Monk Surgeons

- ▶ No anaesthesia, no sedation, no analgesia
- ▶ Surgical Therapy
 - ▶ Tooth extraction
 - ▶ Amputations
 - ▶ Setting of bones
 - ▶ Drainage of abscess
 - ▶ Scarification
 - ▶ Blood-letting through Leeches



A Wonderful Man

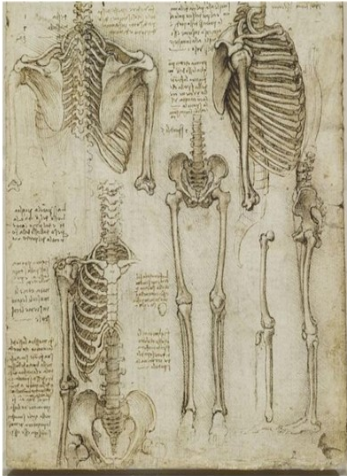
Leonardo Da Vinci
(1452-1519)



Leonardo da Vinci

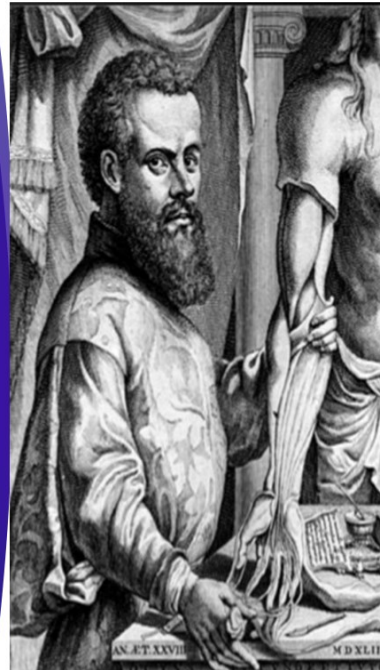
- ▶ An Italian Mathematician, Engineer, Painter
- ▶ He is among greatest painters in the history
- ▶ He made substantial discoveries in anatomy, astronomy, botany, geology, tribology, optics, hydrodynamics
- ▶ He was master of topographic anatomy
- ▶ Drew many studies of muscles, tendons and visible anatomical features
- ▶ Contribution towards human anatomy is by making over 240 detailed drawings
- ▶ He drew, heart, vascular system and other internal organs
- ▶ He drew first scientific drawing of a fetus *in utero*
- ▶ Designed many machines like Helicopter

Da Vinci Anatomical Drawings



Founder of Human Anatomy

Andreas Vesalius
(1514-1564)



Andreas Vesalius

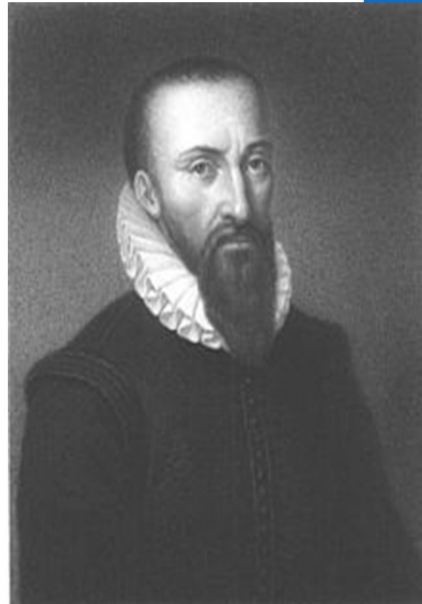
- ▶ Flemish anatomist and physician
- ▶ Referred to as Founder of Human Anatomy
- ▶ Wrote a book on groundbreaking work of human anatomy named "On the Fabric of Human Body" (at the age of 28 years)
- ▶ His contributions towards modern anatomy are establishment of;
 - ▶ Skeletal system
 - ▶ Muscular system
 - ▶ Vascular and circulatory system
 - ▶ Nervous system
- ▶ He also disproved the common belief "men had one rib fewer than women"

Andreas Vesalius



Haemorrhage Controlling Techniques

Ambroise Pare
(1510-1590)

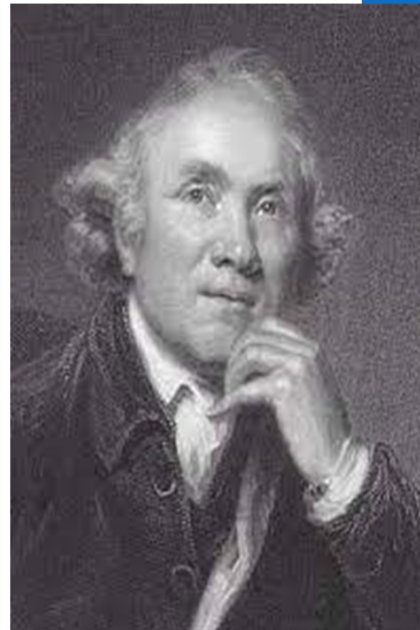


Ambroise Pare

- ▶ French surgeon
- ▶ Considered one of the Fathers of Surgery
- ▶ He is pioneer of modern forensic pathology
- ▶ He was also an anatomist
- ▶ He invented several surgical instruments
- ▶ He designed limb prostheses, ocular prostheses
- ▶ He worked on haemorrhage control
- ▶ Introduced haemorrhage controlling technique like haemostats, septics etc.

Understandings in Surgical Diseases

John Hunter
(1728-1793)



John Hunter

- ▶ Scottish Surgeon
- ▶ Pioneer of small pox vaccine and leading authority in venereal diseases
- ▶ He was also an anatomist
- ▶ Carried out first artificial insemination
- ▶ He described pathophysiological basis of surgical diseases
- ▶ Hunter helped to improve understanding of;
 - ▶ Human teeth
 - ▶ Bone growth
 - ▶ Fracture management
 - ▶ Gunshot wound management

Napoleon's Surgeon-in-Chief

Dominique Larrey
(1766-1842)



Dominique Larrey

- ▶ Studied Medicine
- ▶ Trained in surgery
- ▶ French Surgeon and military doctor
- ▶ Napoleon's Surgeon-in-Chief
- ▶ His writings are still regarded as valuable sources for surgical and medical knowledge

Discoverer of Anaesthesia

Sir Humphry Davy
(1778-1829)

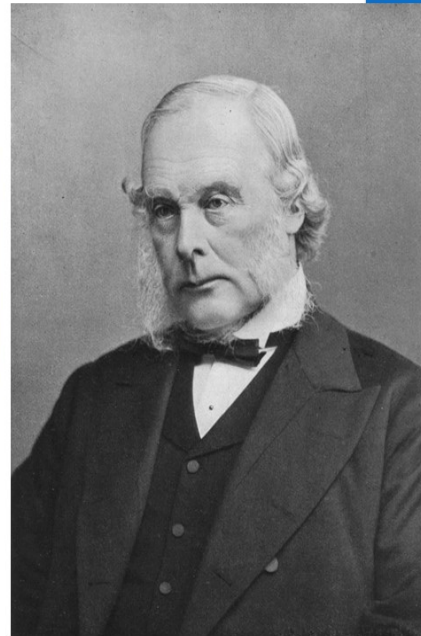


Sir Humphry Davy

- ▶ A Cornish Chemist and inventor
- ▶ He invented new field of Electrochemistry
- ▶ He invented Davy lamp and Arc lamp
- ▶ In 1799, he discovered that Nitrous oxide and named it "Laughing gas"
- ▶ He realized its potential anaesthetic properties in relieving pain during surgery
- ▶ It was truly a revolution in the field of surgery
- ▶ It gave surgeons a freedom to operate and go deeper in the body for interventions

Pioneer of Surgical Sterile Techniques

Joseph Lister
(1827-1912)



Joseph Lister

- ▶ Pioneer of Antiseptic Surgery
- ▶ He was not an exceptional surgeon
- ▶ Basic research was on infection in wounds after operative techniques
- ▶ He used carbolic acid and phenol as antiseptics for the first time
- ▶ His work and research led to a reduction in post-operative infections
- ▶ His sterile techniques revolutionised the surgery throughout the world
- ▶ His work helped to make surgery safer than ever before
- ▶ His famous quote is not only accepted but still practiced by the surgeons;

"It is as important to wash your hands before surgery as it is afterwards"

Father of Modern surgery

William Halsted
(1852-1922)



William Halsted

- ▶ He was champion of newly discovered anaesthetic agents
- ▶ He introduced new surgical techniques and interventions
- ▶ He was one of "Big Fours" (as a surgeon) of medical field in USA
- ▶ His operation theater was famous as "Place of Miracles"
- ▶ He was the first surgeon who introduced "Radical Mastectomy"
- ▶ Harvey and Walter were his students who were Founder of Neurosurgery
- ▶ He also introduced surgical procedures of hernia, enterectomy, biliary duct, thyroid
- ▶ He also introduced suture patterns
- ▶ He laid 8 basic tenets of Surgery which are still part of curriculum in modern surgery

Modern Surgery

- ▶ Era of modern surgery started from mid 20th surgery
- ▶ Organ transplantation in humans
- ▶ Organ transplants from animals
- ▶ Surgeons worked with biomechanical engineers
- ▶ Use of Machines for diagnosis and surgical intervention
- ▶ MRI, CT scan, ultrasonography, etc.

Concept of Minimal Invasive Surgery

- ▶ Emerged in 1980s
- ▶ Surgical procedure performed through small incision
- ▶ Less pain and low risk of infection
- ▶ More comfortable in healing
- ▶ Short stay at hospital
- ▶ Reduced blood loss
- ▶ Less or no scarring
- ▶ Quicker recovery time



Laparoscopy

- ▶ Surgery is performed with smaller cuts
- ▶ Also called "Keyhole Surgery"
- ▶ A slender tool having tiny camera and light on it
- ▶ Long instruments are used
- ▶ Previously used for biopsy, gallbladder surgery
- ▶ Now liver and intestines are also operated with laparoscopy
- ▶ It fulfills all requirements of concept of minimal invasive surgery
 - ▶ Small cuts with less pain and low risk of infection
 - ▶ Quicker and comfortable healing
 - ▶ Less scarring



First Artificial Heart (Jarvik-7)

- ▶ On December 2, 1982, Dr. William DeVries removed a ravaged heart of Dr. Clark
- ▶ He replaced his heart with first permanent artificial heart known as Jarvik-7
- ▶ This surgery took 7 hours for completion
- ▶ This artificial heart was made up of aluminum and polyurethane accompanied by air compressor
- ▶ At that time this effort was just like putting a man on moon
- ▶ Dr. Clark passed away after this surgery on March 23, 1983 due to circulatory collapse



Baboon Heart Transplant to Baby Fae

- ▶ Pioneering surgery happened on October 26, 1984
- ▶ Stephanie Fae was born 3 weeks premature with hypoplastic heart syndrome
- ▶ Dr. Bailey was the leader of surgeon's team
- ▶ Fae was 12-day-old when her heart was replaced surgically with baboon's heart
- ▶ Heart was transplanted successfully
- ▶ **This was really an adventure in medical ethics**
- ▶ Fae survived three weeks with the heart of baboon



Timeline.....Medieval Era

- ▶ First transfusion of human blood was done in 1818
- ▶ First hysterectomy was performed in 1843 in England
- ▶ Ether was recognized as anaesthetic agent in 1843
- ▶ First public use of ether was performed in 1846
- ▶ First surgery of tumour growth was also performed on that patient
- ▶ In 1867, Joseph Lister published antiseptic principles in surgery
- ▶ First successful appendectomy was performed in 1885 in Iowa.
- ▶ In 1890, carbolic acid was used as antiseptic to minimize infection rate

Timeline.....Medieval Era

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Timeline.....Medieval Era

- ▶ First successful pericardium (sac around heart) surgery was performed in 1893 in Chicago
- ▶ In 1896, stab wound in right ventricle of the heart was repaired successfully in Germany thus considered first cardiac surgery in the history
- ▶ In the same year (1896), X-rays were discovered by Roentgen
- ▶ In 1905, first corneal transplant was performed
- ▶ In 1917, plastic surgery was introduced
- ▶ Antibiotic was discovered in 1928
- ▶ First sex change was done through surgical intervention in Germany in 1930

Timeline.....Modern Era

- ▶ First blood bank was established in 1937 to help making more surgeries
- ▶ In 1940, First metal hip replacement was performed
- ▶ In 1950, first organ transplant was performed. Kidney was transplanted successfully, however, it was rejected by the recipient after 8 months (Donor was not alive)
- ▶ First LASIK eye surgery was performed in Columbia in 1950s
- ▶ In 1952, heart surgery was performed in which heart was stopped once and then restarted.
- ▶ First living donor kidney transplant was performed in Twin brothers. The recipient lived 8 years after surgery.
- ▶ In 1966, First successful transplantation of pancreas was performed

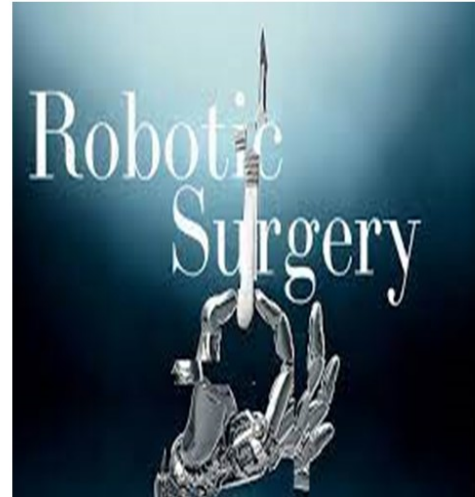
Timeline.....Medieval Era

- ▶ In 1967, liver was transplanted successfully for the first time
- ▶ In the same year (1967), first heart transplant surgery was performed. Patient survived for 18 days and died due to pneumonia
- ▶ Soft tissue surgery was performed with Laparoscopy or minimal invasive technique in 1975
- ▶ In 1982, artificial heart (JARVIK-7) was transplanted
- ▶ Baby Fae was successfully transplanted with heart of a Baboon in 1984 and survived for 21 days
- ▶ **In 1985.....surgeons gave another breakthrough**

Introduced Robotic Surgery

Robotic Surgery

- ▶ 1985-First documented use of Robot-assisted procedure
- ▶ Neurosurgical biopsy was performed with precision
- ▶ First surgical procedure was Cholecystectomy was performed in 1987
- ▶ In 1990, FDA approved endoscopic robotic surgery
- ▶ In 2000, da Vinci Surgery System developed robots for surgical interventions
- ▶ FDA approved all-encompassing robotic system



Robotic Surgery



Robotic Surgery

- ▶ Cutting-edge precision technology
- ▶ Procedures performed with robots are;
 - ▶ Neurological procedures
 - ▶ Urological surgeries
 - ▶ Gynecological procedures
 - ▶ Cardiothoracic surgeries



Robotic Surgeries in Animals

- ▶ Successful surgeries performed in;
 - ▶ Horses
 - ▶ Dogs
 - ▶ Pigs
- ▶ Procedures performed successfully are;
 - ▶ Superficial surgeries
 - ▶ Ovariohysterectomy
 - ▶ Cholecystectomy
 - ▶ Cardiac surgery



Robin Heart Robotic Surgery in pig (2017)



The journey
continues.....



NOBEL LAUREATE SURGEONS

1. THEODORE KOSCHER (1909)
2. ALEXIS CARREL (1912)
3. ANTONIO EGAS MONIZ (1949)
4. THEODOR FORSSMANN (1956)
5. JOSEPH E. MURRAY (1990)

SURGEONISM

***"IT TAKES 5 YEARS TO KNOW WHEN TO OPERATE,
AND 20 YEARS TO LEARN WHEN NOT TO"***