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VIVEKANANDHA MEDICAL CARE HOSPITAL
ALLIED HEALTH SCIENCE

SPOTLIGHT

THE STUDENTS MAGAZINE

THEME:
INTROSSEOUS ACCESS

THIS MONTHS EDITION CURATED BY
THE CODE BLUE CREATIONS OF:
B.SC ACCIDENT AND EMERGENCY CARE TECHNOLOGY
STUDENTS

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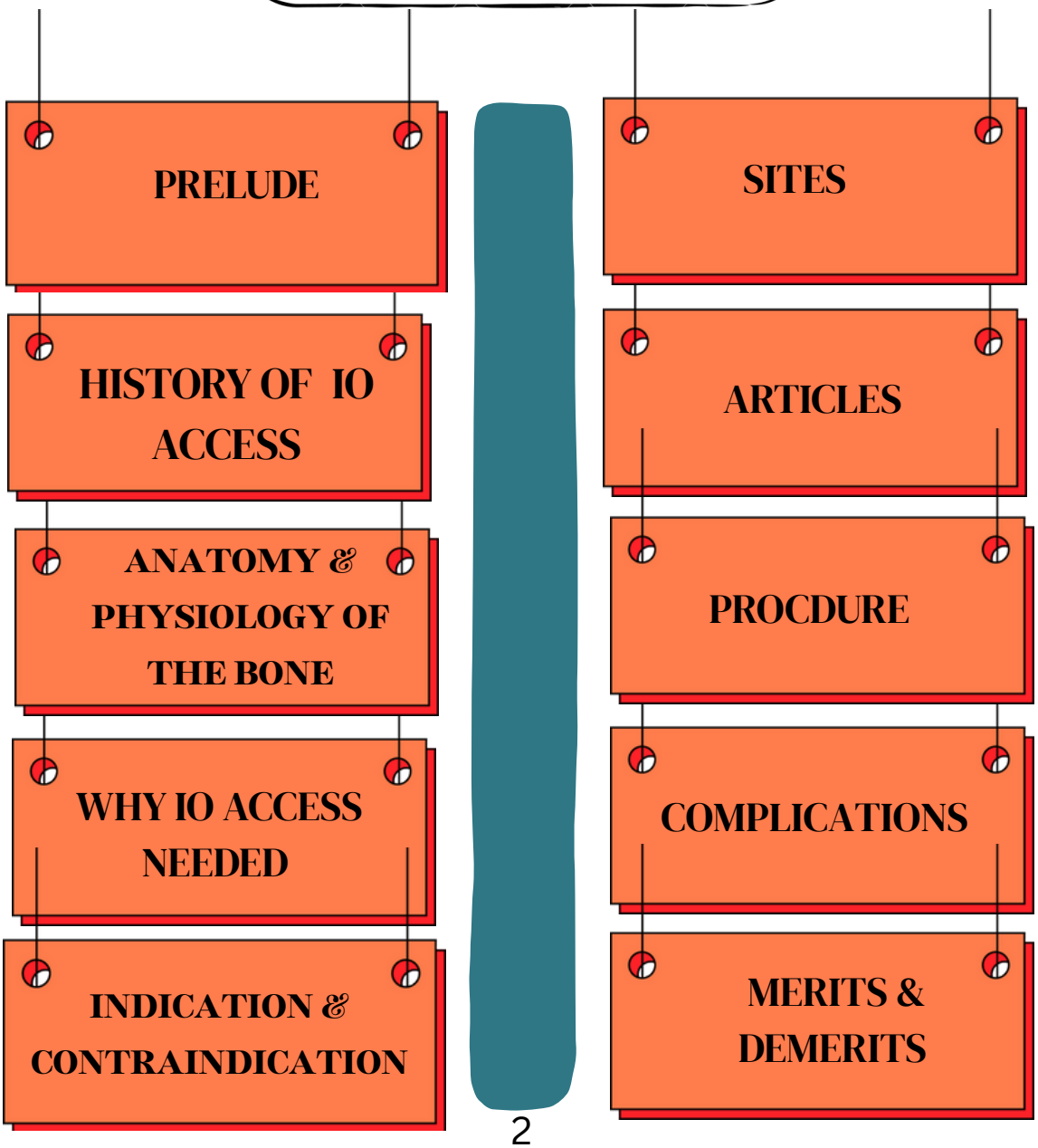
ABSTRACT



PRELUDE

Intraosseous access refers to a medical procedure where a needle is inserted into the bone marrow of a bone. Intraosseous infusion is one of the quickest ways to establish access for the rapid infusion of fluids,drugs and blood products in emergency situations as well as for resuscitation.

In many countries,where children are victims of war trauma,road traffic accidents or severe dehydration and need good circulatory access,this technique can be life saving.

The technique of intraosseous infusion was first described in humans in 1934 and it became increasingly popular in the 1940s. In recent years it has regained popularity in both adults and paediatric resuscitation.

HISTORY OF IO ACCESS

Cecil K. Drinker , first described the bone marrow cavity as a "non-collapsible vein" for vascular access → 1920s

Arnold Josefson used IO access for treating pernicious anemia, demonstrating its effectiveness and ease of use → 1930s

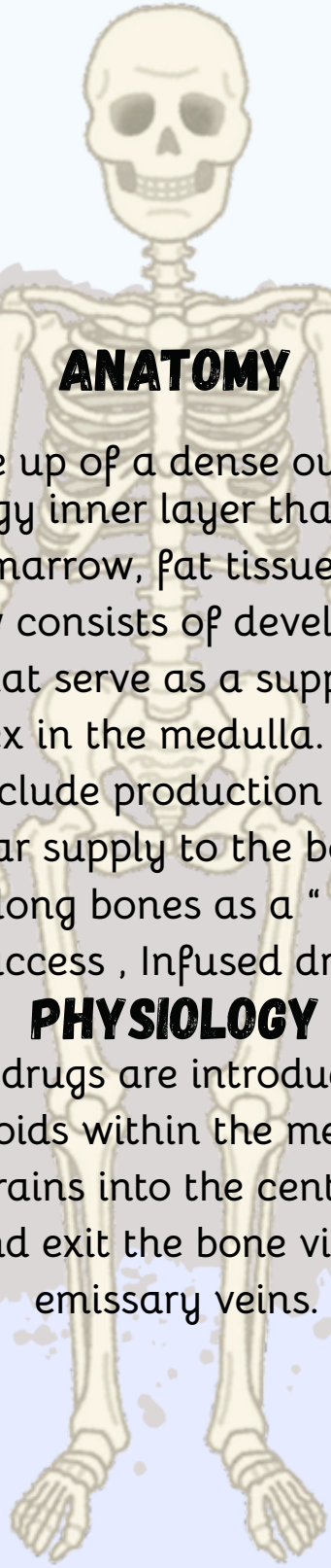
IO access gained popularity for rapid fluid resuscitation for injured soldiers, as reported by Springer. → World War II

IO access was reintroduced into pediatric resuscitation protocols → 1980s

The American Heart Association and the European Resuscitation Council recognized IO access as a valuable tool in adult and pediatric emergency care → 2000s

IO access is a widely accepted and utilized method for rapid fluid and medication administration in a variety of emergency settings, including cardiac arrest, shock, and traumatic injuries → Current

ANATOMY AND PHYSIOLOGY OF BONE



ANATOMY

Bone is made up of a dense outer layer surrounding a spongy inner layer that forms a meshwork occupied by bone marrow, fat tissue, nerves, and blood vessels. Bone marrow consists of developing blood cells and a network of fibers that serve as a supporting framework for the vascular complex in the medulla. The purposes of the medullary complex include production of red blood cells and provision of a vascular supply to the bone itself. IO uses the medullary cavity of long bones as a " noncollapsible vein " for parental access , Infused drugs or fluids.

PHYSIOLOGY

Fluids and drugs are introduced into the venous sinusoids within the medullary cavity , which drains into the central venous channel, and exit the bone via nutrient or emissary veins.

WHY IO ACCESS ?

RAPID VASCULAR ACCESS

IO access provides a fast and reliable route for delivering fluids, medications, and blood products directly into the central circulation.

EMERGENCY RESUSITATION

It is a vital tool in emergency situations, especially when rapid resuscitation is needed, during cardiac arrest or in trauma patients.

MEDICATIONS AND FLUIDS

IO access allows for the administration of medications and fluids , such as in CPR for epinephrine administration or for fluid resuscitation in trauma.

BLOOD SAMPLE COLLECTION

IO access can be used to obtain blood samples, although it's not ideal for acid-base analysis after sodium bicarbonate administration.

PEDIATRICS

IO access is commonly used in pediatric patients, particularly in an emergent situations.

TRAUMA

In critical trauma patients, IO access is often faster and easier to establish than IV access, especially when blood pressure is low.

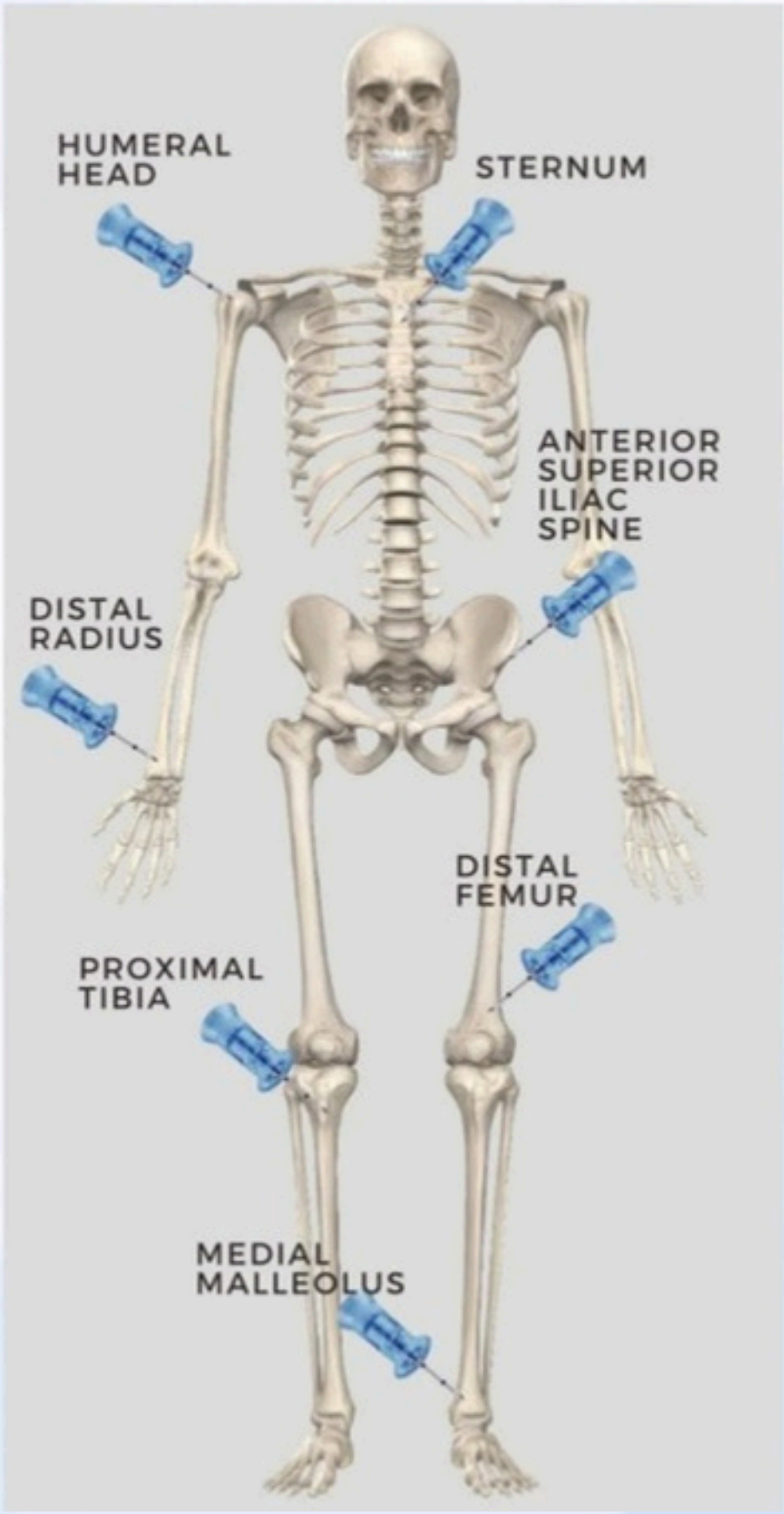
INDICATION

- Failure to gain intravenous access and urgent vascular access required .
- Cardiac arrest situations where IV access is not feasible or IV access

CONTRAINDICATION

- Long bone fracture
- Inability to accurately identify landmarks at the chosen anatomical site
- bone fragility disorder
- Overlying skin infection
- Metastatic disorder of bone

SITES OF IO ACCESS



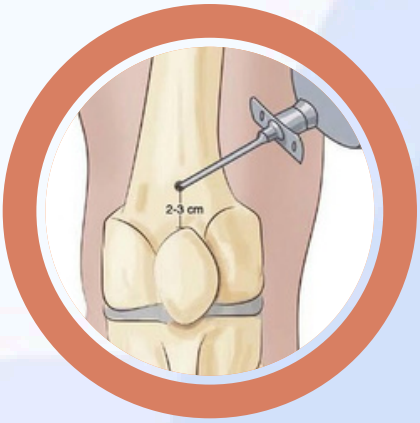
MOST COMMON SITES

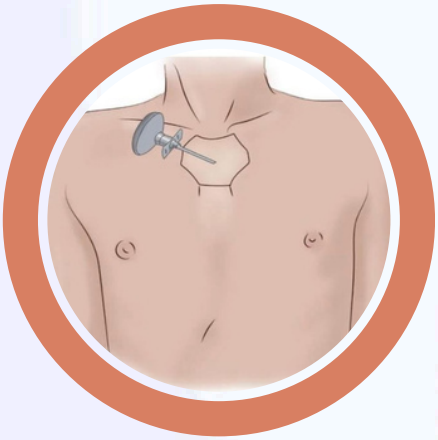
PROXIMAL HUMERUS

It is located 1 to 2 cm above the surgical neck of humerus. The needle tip is inserted at 45° , to the anterior plane and posteromedial of humerus.

DISTAL FEMUR

The leg straightened and Centered in the anterior plane, 1cm proximal to the patella , 1 to 2 cm medially to the femur.





STERNUM

The needle is inserted at a 90 ° angle . This ensures the needle passes perpendicularly , through the skin and into the bone marrow cavity.1 cm below the sternal notch.

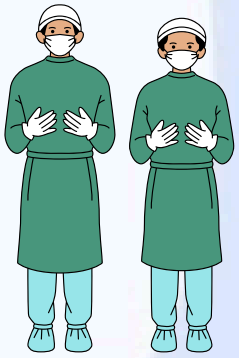
PROXIMAL TIBIA

Site is approximately 2cm medial to the tibial tuberosity; 3cm below the patella and approx 2cm medially along the flat aspect of the tibia.

DISTAL TIBIA

2cm proximal to the medial malleus in the flat portion of the tibia.

ARTICLES REQUIRED FOR IO ACCESS

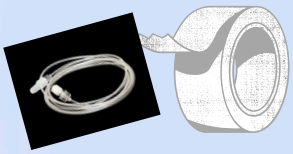


PERSONAL PROTECTIVE EQUIPMENT

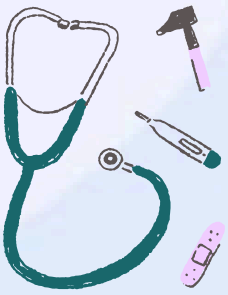
ANTISEPTIC SOLUTION , COTTON SWABS , KIDNEY TRAY

SYRINGE , LOCAL ANAESTHESIA

INFUSION PUMP , INFUSION FLUID



EXTENSION SET , ADHESIVE TAPE



INTRAOSSEOUS NEEDLE, INTRAOSSEOUS DRIVER , STABILIZING DEVICE

SPECIAL DEVICES USED FOR IO ACCESS

BONE INJECTION GUN

EZ-IO MANUAL NEEDLE SET

BATTERY DRIVEN INTRAOSSEOUS VASCULAR ACCESS DEVICE

FAST 1 INTRAOSSEOUS INFUSION DEVICE

PROCEDURE

1. RECONFIRM INDICATIONS AND SITES

- Ensure the patient requires IO access.
- Double check for contraindications at the selected site.

2. ENSURE STERILE FIELD

- Perform hand hygiene.
- Wear Personal protective equipments.

3. PREPARE THE INSERTION SITE

- Clean the site with antiseptic solution .
- Allow to dry
- Apply drape sheet

4. IDENTIFY ANATOMICAL LANDMARKS

- Eg: proximal tibia , especially in pediatrics 2cm below the tibial tuberosity medial on flat part of the tibia.

5. INSERT IO NEEDLE

- Choose the appropriate needle size for age/weight/site.
- Use a manual or battery- powered drill and remove the stylet

6. CONFIRM PLACEMENT

- Attempt to aspirate bone marrow, flush 5-10 ml of NS.
- Resistance should be minimal, observe for swelling or extravasation, which may indicate misplacement.

7.SECURE THE NEEDLE

- Apply a stabilization device to secure the needle.

8.START INFUSION

- Use a pressure bag or infusion pump if needed .
- Administer fluids, medications or blood products as indicated.

9.PAIN MANAGEMENT(IF PATIENT IS CONSCIOUS)

- Inject 2% preservative - free lidocaine (20-40mg), slowly into the IO space before flushing,
- Wait 1-2 mins before starting infusion.

10. DOCUMENTATION

- Document date / time of insertion , site , and medication administered.

AFTER CARE

Monitor the site frequency

Pain management (for awake patient)

Confirm proper functioning

Document the procedure

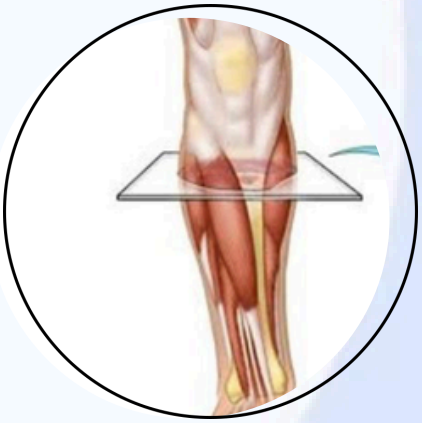
Remove the io needle (when no longer needed)

Dispose of equipment safely

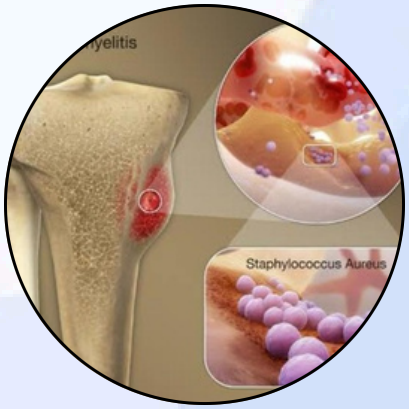
COMPLICATION

EXTRAVASATION

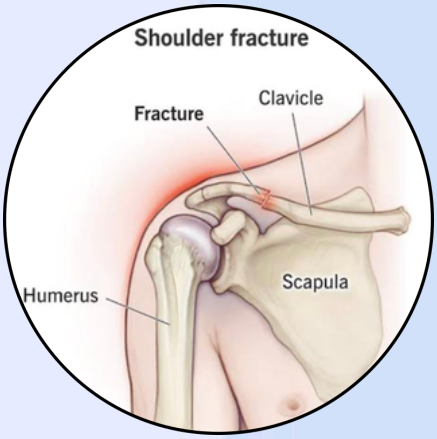
COMPARTMENT SYNDROME



OSTEOMYELITIS



BONE FRACTURE



MERITS

1.RAPID VASCULAR ACCESS

Provides quick vascular access in critical situations, especially during cardiac arrest, trauma or shock.

2.ADMINISTARATION OF FLUIDS

Medications , fluids and blood products administered via IO, reach the central circulation effectively and rapidly as with IV access.

3.HIGH SUCCESSFUL RATE

It has a high fast - attempt success rate , even in patients with collapsed veins or difficult IV access.

DEMERITS

1.LIMITED DURATION OF TIME

IO access is temporary - typically recommended for use less than 24 hours must be replaced with more important access (like IV) as soon as possible.

2.RISK OF INFECTION

Osteomyelitis is potential demerits , especially with prolonged use or improper technique.

3.PAIN AND DISCOMFORT

Can be painful , especially when infusing fluids and medications.

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CAMPUS LIFE

On 28th April 2025, a community health awareness program was conducted at Papampalayam Village with the theme "We Care for Everyone." The session focused on key health issues such as dehydration, heat stroke, and chickenpox, which are especially common during the summer months.

As part of the program, a door-to-door health initiative was also carried out. Our students visited homes across the village to check the vital signs of residents, including blood pressure, pulse, temperature, and respiratory rate.

The program was well-received by the community, and the villagers expressed appreciation for the personalized care and attention.

VIVEKANANDHA MEDICAL CARE HOSPITAL

ALLIED HEALTH SCIENCES

Affiliated to the Tamil Nadu Dr.M.G.R. Medical University
Elayampalayam-637205, Tiruchengode - TK, Namakkal Dt

S.NO	PROGRAMMES OFFERED UG	DURATION
01	BSc.ACCIDENT AND EMERGENCY CARE TECHNOLOGY	4 YEARS
02	BSc.RADIOGRAPHY AND IMAGING TECHNOLOGY	4 YEARS
03	BSc.OPERATION THEATRE AND ANESTHESIA TECHNOLOGY	4 YEARS
04	BSc.CARDIAC TECHNOLOGY	4 YEARS
05	BSc.PHYSICIAN ASSISSTANT	4 YEARS
06	BSc.MEDICAL LABORATORY TECHNOLOGY	4 YEARS
07	BSc.DIALYSIS TECHNOLOGY	4 YEARS

KRISHNA INSTITUTE OF OPTEMETRY AND RESEARCH

01	BSc.OPTOMETRY	4 YEARS

VIVEKANANDHA EDUCATIONAL INSTITUTIONS

"Vidhya Rathna"
Prof. Dr. M. KARUNANITHI, B.Pharm., M.S., Ph.D., D.Litt.,

TIRUCHENGODE CAMPUS

- SWAMY VIVEKANANDHA MEDICAL COLLEGE HOSPITAL AND RESEARCH INSTITUTE
- VIVEKANANDHA DENTAL COLLEGE FOR WOMEN
- SWAMY VIVEKANANDHA COLLEGE OF PHARMACY
- VIVEKANANDHA COLLEGE OF NURSING
- VIVEKANANDHA SCHOOL OF ANM
- SWAMY VIVEKANANDHA PHYSIOTHERAPY COLLEGE
- VIVEKANANDHA ALLIED HEALTH SCIENCE COLLEGE (Co-Ed)
- KRISHNA INSTITUTE OF OPTOMETRY AND RESEARCH
- VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN (AUTONOMOUS)
- VIVEKANANDHA COLLEGE OF TECHNOLOGY FOR WOMEN
- VIVKANANDHA INSTITUTE OF INFORMATION AND MANAGEMENT STUDIES
- VIVEKANANDHA COLLEGE OF ARTS AND SCIENCE FOR WOMEN (AUTONOMOUS)
- VIVEKANANDHA COLLEGE FOR WOMEN
- VIVEKANANDHA COLLEGE OF EDUCATION FOR WOMEN
- KRISHNA COLLEGE OF EDUCATION FOR WOMEN
- KRISHNASHREE COLLEGE OF EDUCATION FOR WOMEN
- VIVEKANANDHA VIDHYA BHAVAN MATRIC HIGHER SECONDARY SCHOOL
- VIVEKANANDHA MEDICAL CARE HOSPITAL (VMCH)
- SANKAGIRI CAMPUS
- SWAMY VIVEKANANDHA NATUROPATHY AND YOGA MEDICAL COLLEGE (Co-Ed)
- VIVEKANANDHA PHARMACY COLLEGE FOR WOMEN
- VIVEKANANDHA NURSING COLLEGE FOR WOMEN
- VIVEKANANDHA ANM SCHOOL
- VIVEKANANDHA ARTS AND SCIENCE COLLEGE FOR WOMEN
- RABINDHARANATH TAGORE COLLEGE OF EDUCATION FOR WOMEN
- VISWABHARATHI COLLEGE OF EDUCATION FOR WOMEN

SANKAGIRI CAMPUS

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