Course Objectives:

Understand and perform, deep dermal sutures with horizontal and vertical suture techniques, running subcuticular sutures, half-buried horizontal sutures
Understand and perform layered closure of wounds.
Understand excision of standing cones of tissue “dog ears.”
Understand local flaps
Understand the application of tissue adhesives.
Discuss and demonstrate topics requested by students as time permits.

I. Suture materials:
Ideal suture material:
- Has good handling characteristics
- Does not induce significant tissue reaction
- Allow secure knots
- Has adequate tensile strength
- Are sterile
- Non-allergenic
- Non-electrolytic
- Inexpensive
- Do not cut through tissue.

II. Choosing suture:
1. Determine type of needle, size of suture, properties of material, absorption rate, handling characteristics
   - Non-Absorbable: Silk, linen, stainless steel wire, polyamide (Nylon), polyester (Dacron), polypropylene (Prolene).
   - Absorbable: Polyglycolic acid (Dexon) polyglactin (Vicry), polydioxone (PDS), polyglyconate, (Maxon) Catgut

2. Tensile Strength: The maximum stress that a material can withstand while being stretched or pulled before failing or breaking. Tensile strength decreases over time. Examples.
   - Plain gut = 7 days
   - Chromic=10 to 14 days
   - Poliglecaprone (Monocryl) = 20 to 30% at 2 weeks
   - Polyglactin (Vicryl)= 75% at two weeks
   - Polyglycolide (Dexon) = 84% at 2 weeks
3. Suture size: Sutures are sized by the USP (United States Pharmacopeia) scale.
   Sizes: 12-0 to #3
   Examples:
   8-0 is very small and is used in microsurgery for nerves and smaller vessels
   6-0 commonly used in vascular repair and grafting
   3-0 use for skin closure with tension.
   4-0 used commonly for skin closure minimal tension.
   0 often used for plication of abdominal fascia.
   1 is used for fascial closure and hip surgery.
   2 is large (about 0.5mm) and is used to secure drains.

4. Needles:
   Shape of tip:
   1. Cutting needle - used for bone and skin to make it easier to pass the needle.
   2. Reverse cutting needle
   3. Round taper point needle - taper often chosen for bowel, fascia, muscle to avoid cutting
      the tissue.
      Example:
      Cutting is Shape of needle. ¼ circle, 3/8 circle, ½ circle, 5/8 circle and straight.
      Attachment of suture to needle. Either ”pop off” or swage.

5. Braided or non-braided suture.

III. Selection and use of needle holders
   1. The needle holder must be an appropriate size instrument for the size of needle
      selected.
   2. Needles should be grasped in an area about 1/3 to ½ of the distance from the back of
      the needle.
   3. Place the needle securely in the tip of the needle holder’s jaws.
   4. Do not take excessively large bites of tissue.
   5. Do not force or twist the needle in effort to bring the point out through the tissue.
   6. Do not force dull needle through tissue; obtain a new one.
   7. Do not damage the taper points or cutting edges when using the needle holder to pull
      the needle out through the tissue. Grasp the needle as far back possible.
   8. Follow the curve of the needle when running through tissue.

IV. Common errors with suturing:
   1. Not tying square knots. Resulting that the knot may unravel and the wound opens.
   2. Too many throws, Increases size of knot which may cause stitch abscess.
   3. Grabbing the monofilament sutures with an instrument which reduces tensile strength by
      over 50%.
4. Not getting correct depth and adequate bite of the deep dermis with the subdermal sutures.
5. Holding the needle with the driver in the incorrect position. Example, butt of the needle causing needle bending or suture breakage.
6. Forcing the needle through the tissue without arching the throw.
7. Excessive manipulation and crushing of the tissue with the forceps.

V. Staples
Advantages: Placed quickly and are easier to remove in hair bearing areas. Good choice in a contaminated area. Good sterile option
Disadvantages: Leave track marks.

VI. Glues
Advantages: Provides a water tight dressing. May be easier to glue than suture in children.
Disadvantages: Wounds need to be clean it will entrap bacteria. Avoid near eyes.