I. Brief History of Gastro-Intestinal Surgery
   a. First successful canine anastomosis reported in 1812 by Travers.
   b. Important advances by Lembert, Lister, Halstead and others during the 1800’s.
   c. “Murphy Button” in 1892 = suture-less anastomosis
   d. Basic tenets of human intestinal surgery established by early 1900’s
      i. Serosal apposition around full bowel circumference (inversion)
      ii. Inclusion of submucosa in suture bites
      iii. Suturing only healthy tissues
      iv. Aseptic surgical technique
      v. Maintaining blood supply
      vi. Avoiding suture line tension

II. Veterinary Advances
   a. No published reports before 1940’s – prognosis always “grave”
   b. Parker-Kerr closed, inverting technique – Canine Surgery (1949)
   c. Gambee technique – 1951
   e. 1970’s the single-layer, interrupted, full-thickness, approximating suturing techniques
   f. Biofragmentable anastomosis ring – primarily experimental
   g. Auto-stapler for anastomosis – first reported by Hess (1981)

III. Anatomy of GI tract
   a. Mucosa – epithelial lining covered with villi for absorption
   b. Submucosa – primarily collagen = “holding layer” for GI sutures
   c. Muscularis – inner circular layer and outer longitudinal layer
   d. Serosa – thin layer of connective tissue that covers the gut wall

IV. Healing of Intestinal Wounds
   a. Primary Healing = layers heal directly with less fibroplasia
   b. Secondary Healing = indirect bridging of the wound with increased amounts of collagen
      and vascular ingrowth (most common type of healing with all suture patterns)

V. Phases of Wound Healing
   a. Lag Phase
      i. Begins immediately after injury
      ii. Normally lasts up to 4 days
      iii. Vascular constriction -> fibrin clot formation -> inflammation -> epithelial migration
      iv. Prolonged by wound inflammation
b. Proliferation/Reparative Phase  
   i. Begins about day 3 and lasts until about day 14  
   ii. Logarithmic proliferation of fibroblasts = collagen/CT  
   iii. Rapid increase in wound strength to near normal by 14 days  

c. Maturation Phase  
   i. Begins about day 10 and lasts about 180 days  
   ii. Slow increase in wound strength and remodeling of the scar tissue  

VI. Factors Affecting Intestinal Wound Healing  
   a. Inflammation = prolongs lag phase, weakens the suture line, collagenase activity  
   b. Infection/Peritonitis = up to 20x higher rate of dehiscence  
   c. Blood supply = essential for healing  
   d. Surgical Technique = tissue handling, prevention of contamination, decision making  
   e. Suture material = synthetic, absorbable, monofilaments  
   f. Suture pattern  
      i. Inverting vs. Everting tendency  
      ii. Continuous vs. Interrupted pattern  
      iii. Single vs. Double layer  
   g. Age of patient – no effect  
   h. Nutritional status – only after 15-20% body weight loss  
   i. Early enteral feeding - positive effect on GI wound healing  
   j. Anemia – severe anemia may impair O2 transport at wound site  
   k. Hypoproteinemia – keep serum albumin above 2 g/dl  

VII. Current recommendations for intestinal surgery in small animals  
   a. Single layer closure  
   b. Snug apposition of tissue  
   c. Monofilament sutures, continuous or interrupted patterns, 3-0 or 4-0  
   d. Engage sub-mucosa  
   e. Approximating all layers = “Appositional”… is it really???
   f. Peri-operative antibiotic guidelines  

VIII. Surgical Stapling Techniques  
   a. Auto-staplers developed in Soviet Union after WWII  
   b. First used in USA in 1960’s  
   c. First small animal and equine reports in 1980’s  
   d. “GIA”, “TA”, and “EEA” auto-staplers  
   e. Skin staples for bowel closure described by Coolman, 2000  

References:  
Coolman BR, et al. “Historical Perspective of Intestinal Anastomosis in Veterinary Surgery,”  
Common Surgical Disorders of the Gastro-Intestinal Tract in Small Animals

I. Esophagus
   a. Foreign Bodies
      i. Non-surgical management
         1. Endoscopy
         2. Stomach tube advancement
         3. Foley catheter retrieval
      ii. Surgical = Esophagotomy or Resection
         1. Cervical
         2. Thoracic – avoid if possible
         3. Gastrostomy
   b. Strictures – treated by dilation
   c. Vascular Rings – cause megaesophagus
   d. Gastro-esophageal Intussusception

II. Stomach
   a. Gastrostomy – gastric foreign bodies
   b. Gastric Dilatation-Volvulus
   c. Gastric resection vs. Gastric inversion
   d. Gastropexy techniques
   e. Gastrostomy tube placement
   f. Neoplasia
   g. Gastric Ulcers
   h. Pyloric Surgery

III. Small Intestine
   a. Enterotomy
      i. Solitary foreign bodies
      ii. Linear foreign bodies
   b. Intestinal Resection and Anastomosis
      i. Tumors
      ii. Trauma
   c. Intussusception => Enteroplication
   d. Intestinal Volvulus and Torsion
   e. Feeding tubes
   f. Intestinal Biopsy

IV. Large Intestine
   a. Feline Megacolon = subtotal colectomy
   b. Colopexy for rectal prolapsed
   c. Tumors = resection and anastomosis

V. Clinical Case Studies...