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# Perineum reconstruction

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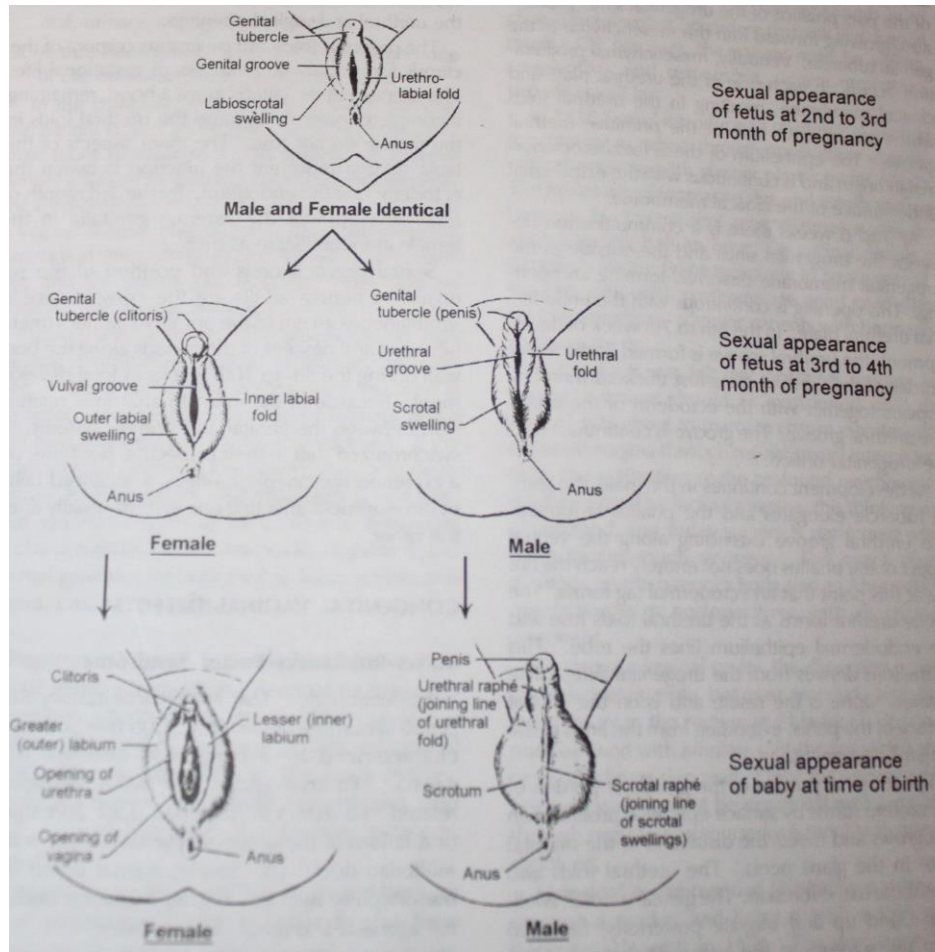
# Overview

- Embryology
- Anatomy
- Aetiology
- What makes the perineum unique?
- Principles of reconstruction
- Management
- Summary

# Embryology

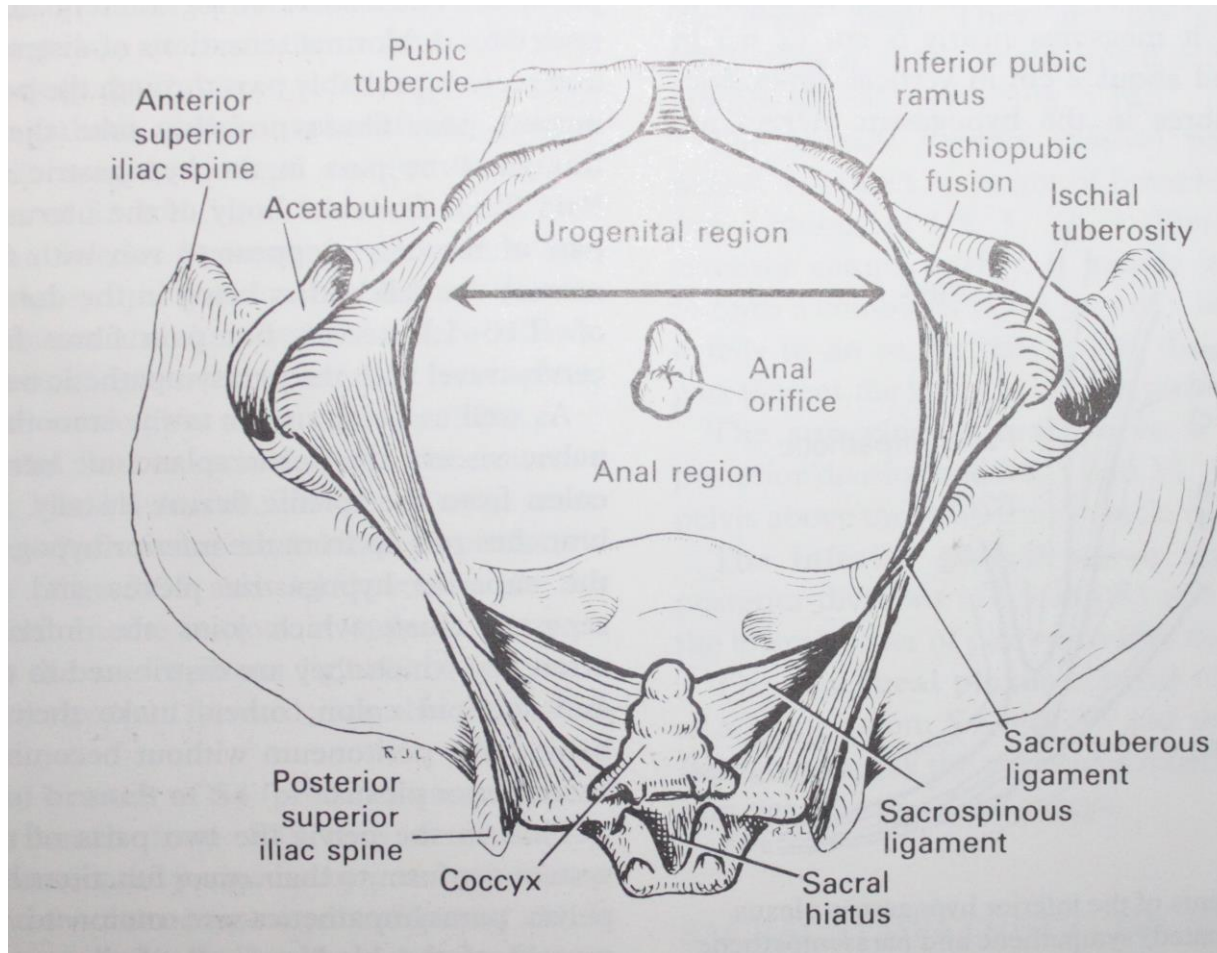
- The genital and urinary tract development is closely associated
- 11<sup>th</sup> week of embryonic development
- External genitalia at the indifferent stage of development
  - Genital tubercle
  - two labioscrotal swellings
  - Two urethral folds surrounds a central urethral groove

# Embryology



# Anatomy

- Part of the trunk caudal to the pelvic diaphragm (levator ani and coccygeus)
- Diamond shaped region divided into an anterior and posterior half
  - Anal region
  - Urogenital region



# Anal region

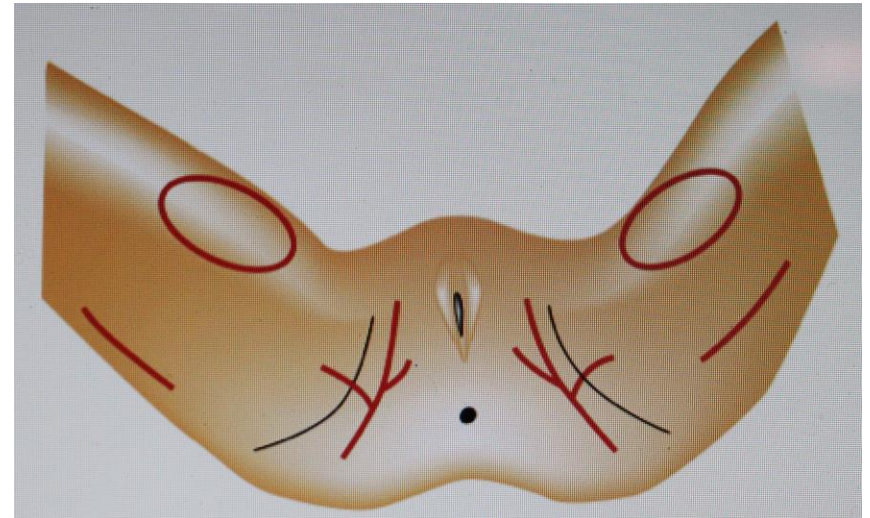
- Anal canal
- External anal sphincter
- Internal anal sphincter
- Ischiorectal (ischioanal) fossa



# Urogenital region

# Vascular anatomy of the perineum

- Internal pudendal artery
  - Perforators course forward in the triangle formed by the urethral opening, the ischial tuberosity and the anus
- The descending br. Of the inferior gluteal on the posterior thigh
- Femoral artery and the anastomotic network formed by this, the profunda and the obturator on the medial aspect of the thigh



# Aetiology

- Congenital
- Acquired vaginal, perineal and pelvic defects
  - Infection
  - Defects post tumour resection
  - Trauma
    - Avulsions / burns / amputations
  - Vascular malformation
  - other

# Fournier's gangrene



# Aetiology

- Congenital
- Acquired vaginal, perineal and pelvic defects
  - Infection
  - Defects post tumour resection
  - Trauma
    - Avulsions / burns / amputations
  - Vascular malformation

# Defects post tumour resection

- Perineal skin
- Vaginal vault
- Penis / scrotum
- Anus / rectum / ischiorectal (AP resection defects)
- Bladder
- Pelvis / hip / hindquater

# Aetiology

- Congenital
- Acquired vaginal, perineal and pelvic defects
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  - Vascular malformation

# Penile trauma





# Aetiology

- Congenital
- Acquired vaginal, perineal and pelvic defects
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  - Vascular malformation

# Congenital deformities

- Vaginal deformities
  - Imperforate hymen
  - Double vagina
  - Introitus obstructed by perineal skin
  - Deformed cloaca
  - Vaginal agenesis

# Congenital deformities

- Congenital penile and scrotal anomalies
  - Hypospadias
- Ambiguous genitalia
  - Congenital adrenocortical hyperplasia
  - Mixed gonadal dysgenesis
  - Male pseudohermaphroditism
  - True hermaphroditism

# Why is reconstruction of the pelvis so difficult?

- Defects are potentially large
- Region is often wet and macerated
- Contamination is likely
- Physical movement
- Many pathologies have a tendency to recur
- Wound contraction is impaired
- Technical problem of accessing the depth of the inner pelvis
- Dead space

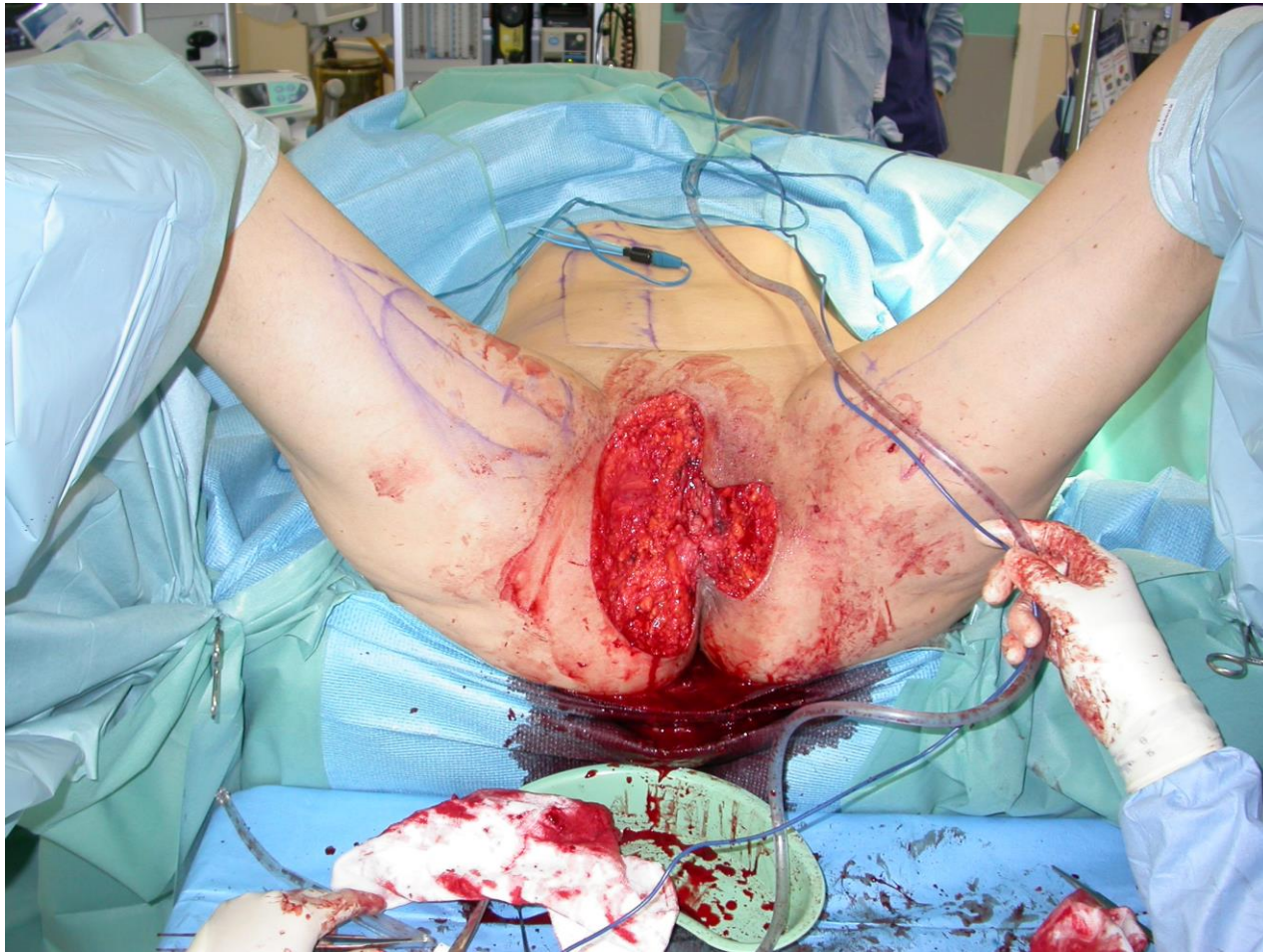
# Principles of management

- Character of the defect
- Clear pathology
- Available donor sites
- Urinary and bowel diversion
- Perineal defects best covered with fasciocutaneous flaps
  - Size and location of the defect
- Pelvipерineal
  - Bulk and reliable

# Principles of reconstruction

- Form and function
- Like with like
- Wound closure with durable tissue
- Urinary and bowel competence
- Sexual function
- Close off the internal pelvis from the outside (peritoneal fluid, hernia's)
- Aesthetic concerns
- Revisionary surgery and recurrence

# Perfect environment for the plastic and reconstructive surgeon

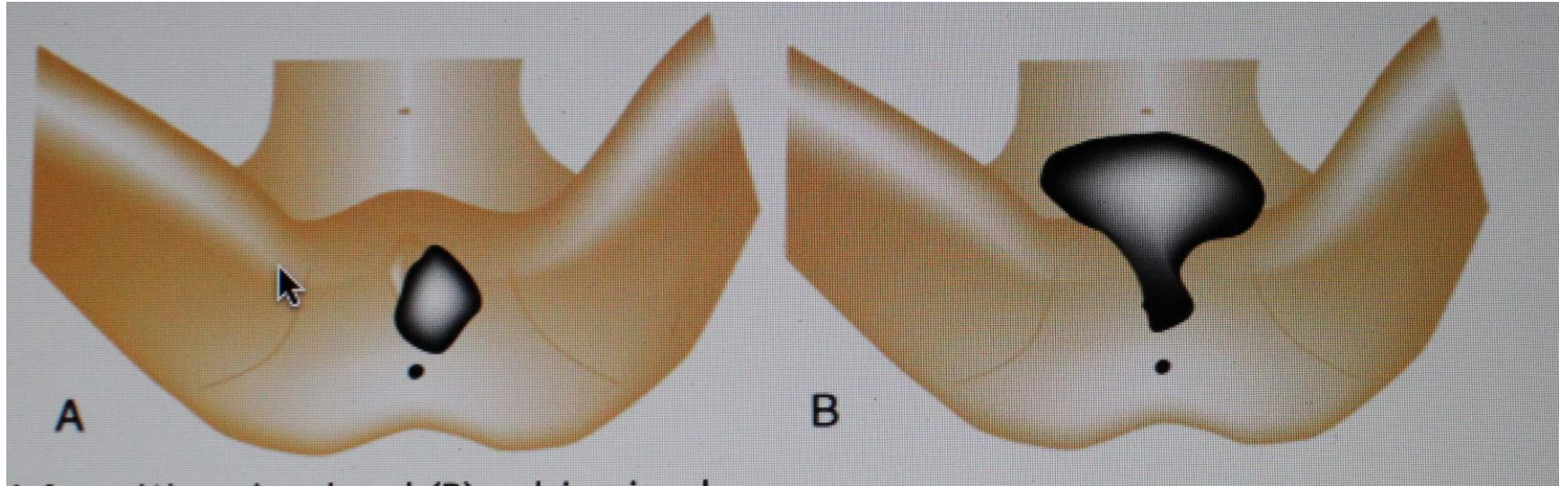


# Defects

- Simple
  - Perineum only
  - Limited dead space
  - Unilateral or bilateral
- Complex
  - Pelvipерineal
  - Extensive dead space
  - Multiple layers and depth of injury
  - continence



# Perineal and pelvic/perineal defects



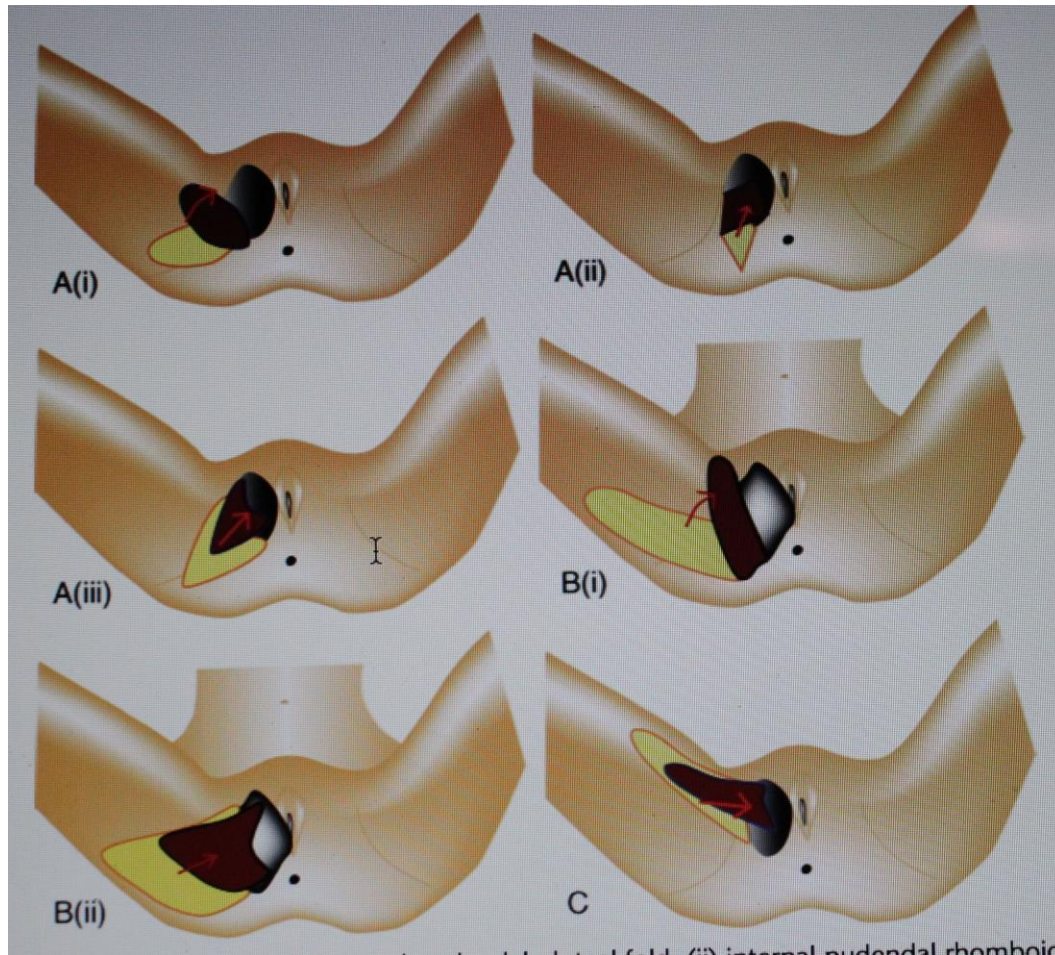
# Local fasciocutaneous flaps

- Internal pudendal system
  - Various designs
  - Good quality skin
  - Concealed scars
  - V-Y, transposition, Rhomboid

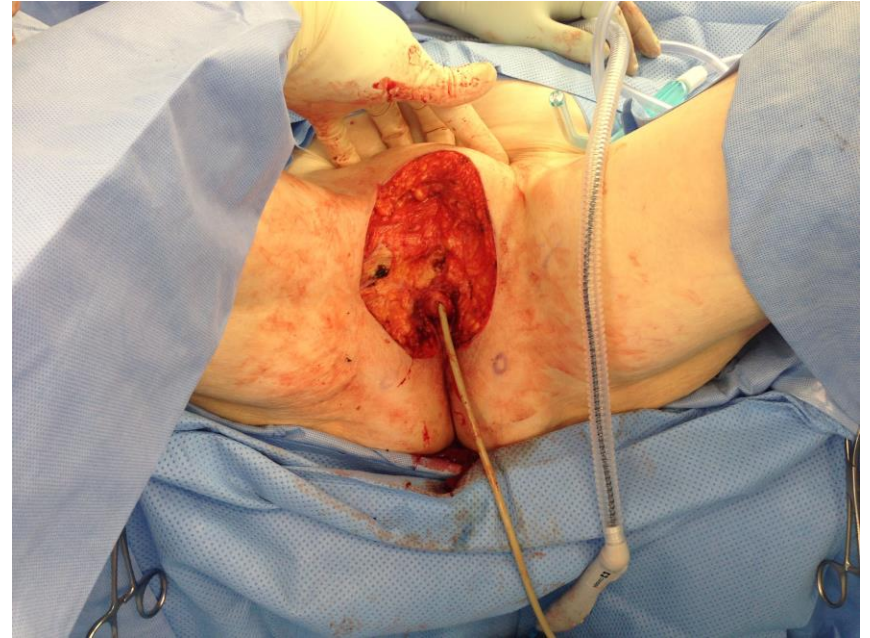
# Local fasciocutaneous flaps

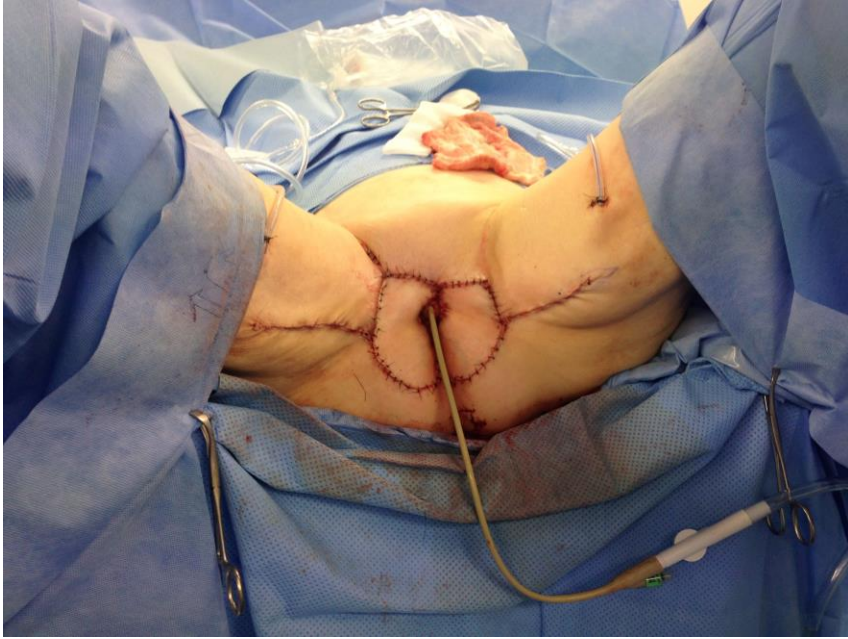
- Inferior gluteal system
  - Large area of available skin
  - Advancement or transposition
- Medial thigh system
- Anterior lateral thigh flap

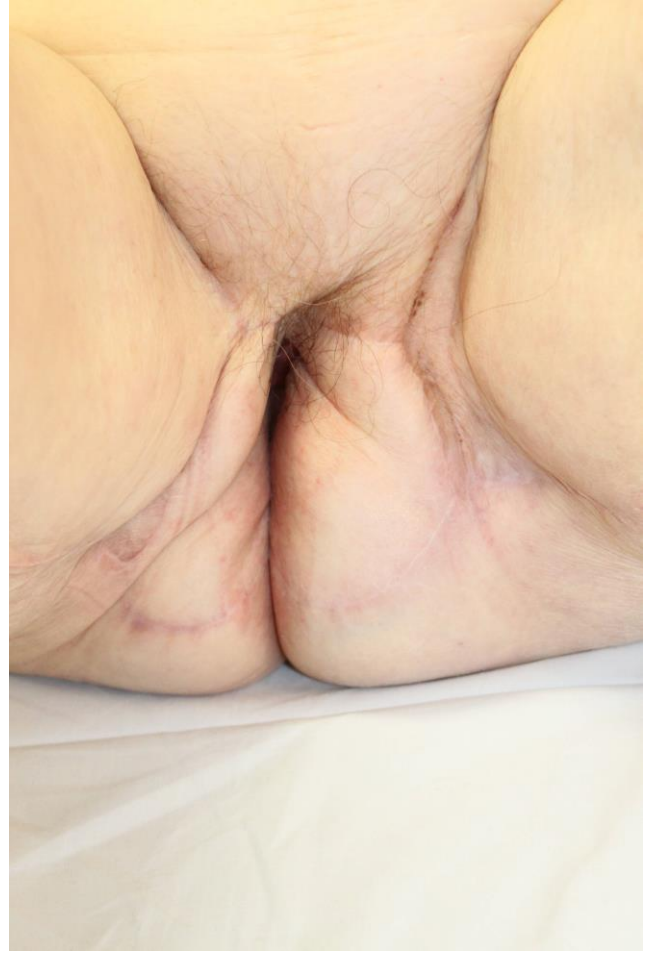
# Fasciocutaneous flaps



# Internal pudendal perforator flap







# Pelvic/perineal defects



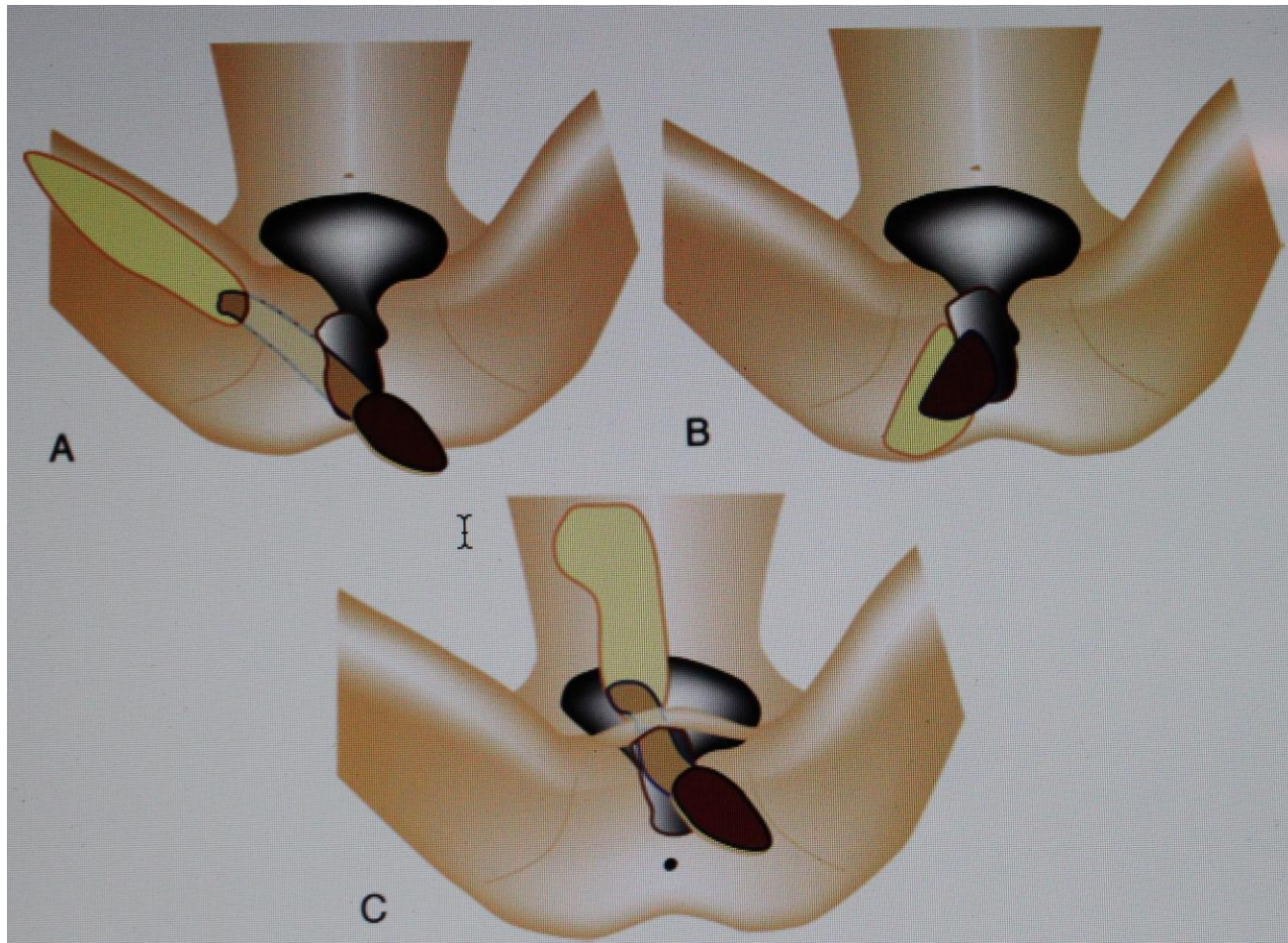
# Muscle / musculocutaneous flaps

- Provide good bulk
- Well vascularised muscle to fill dead space and prevent small bowel herniating through the abdomino-pelvic wound
- Radiation affected wounds
- Readily available local regional donor sites

# Options

- Gracilis as musculocutaneous flap
- Rectus abdominus (VRAM)
- Gluteus maximus
- Omentum
- Free flaps
- Historically
  - Sigmoid colon
  - Ileum
  - caecum

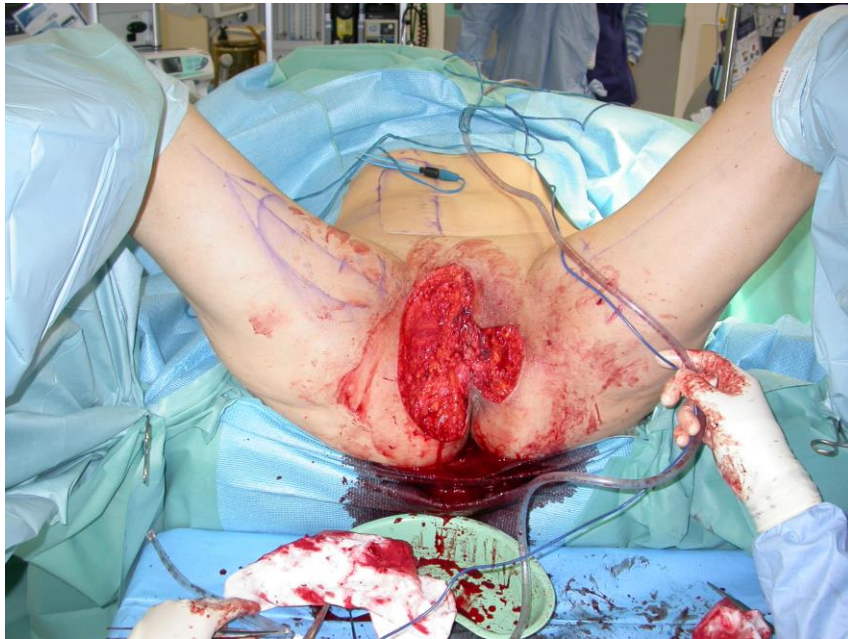
# Pelvic/perineal defects



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# Right gracilis musculocutaneous flap Left rhomboid fasciocutaneous flap

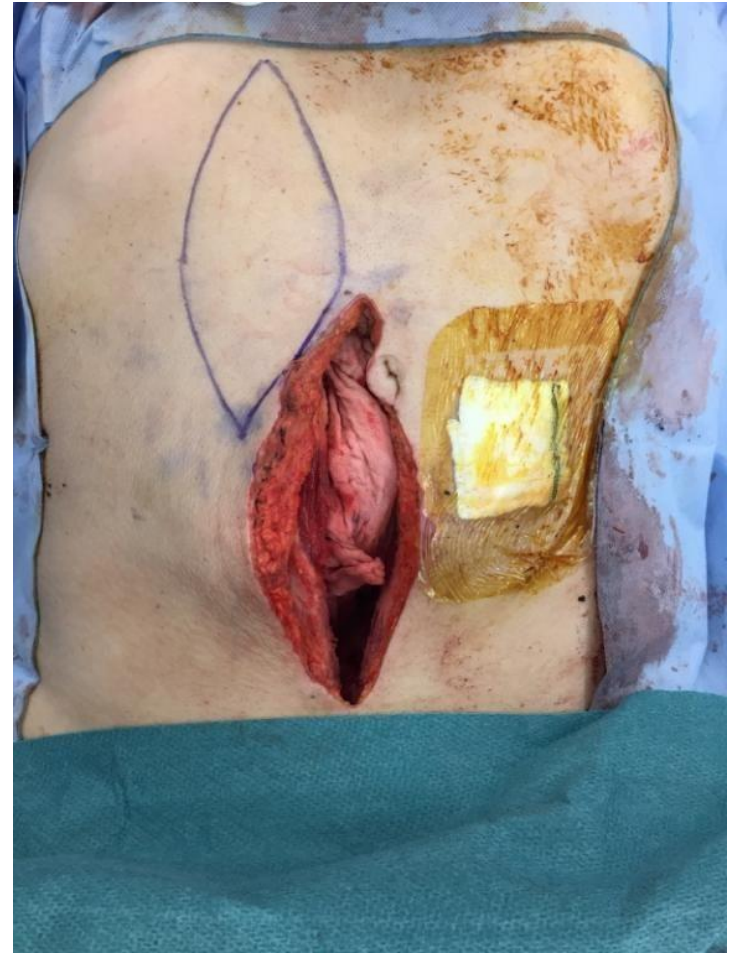




# Options

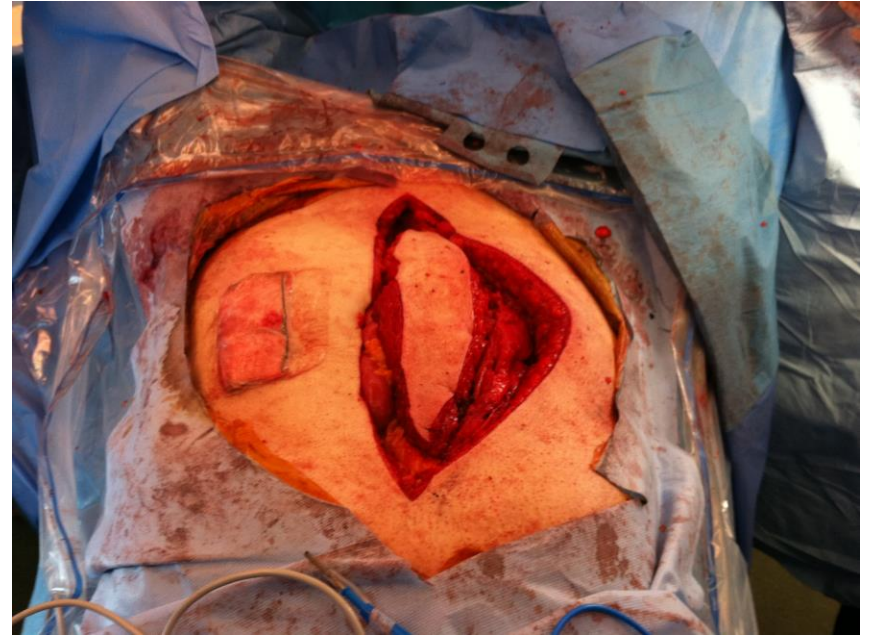
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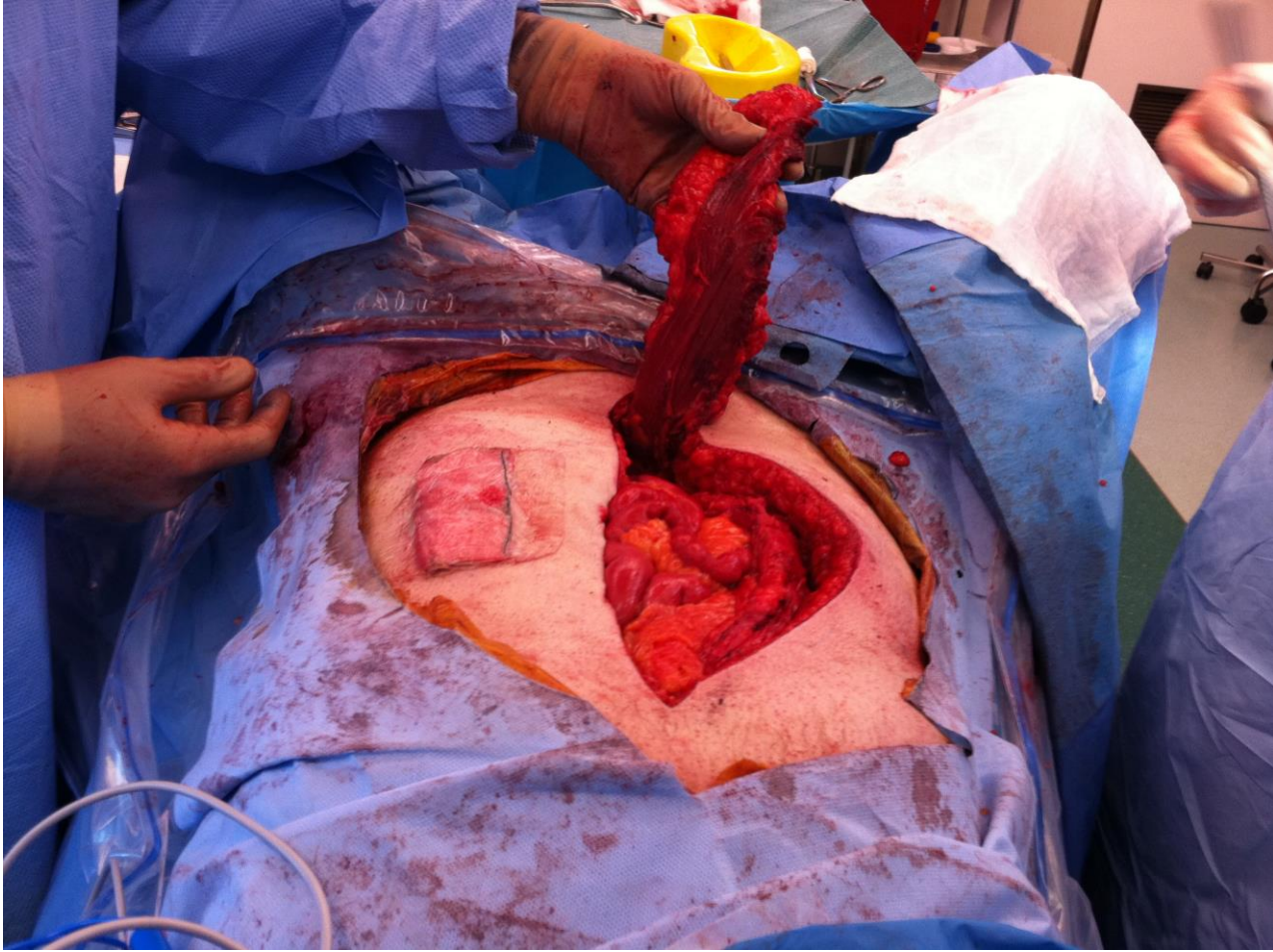
# VRAM for pelvic / perineal defect















# Options

- Gracilis as musculocutaneous flap
- Rectus abdominus (VRAM)
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- Omentum
- Free flaps
- Historically
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  - caecum

# Vaginal vault

- Immediate reconstruction
  - Primary healing
  - Decreased fluid loss from the pelvis
  - Reduced infection rate
  - Decreased nutritional demands
  - Earlier rehabilitation
  - Neovascularization of the pelvis
  - Psychological wellbeing

# Vaginal vault

- Ideally the reconstructed neovagina
  - Soft
  - Sensible
  - Durable
- Requirements
  - Epithelial lining
  - Soft tissue bulk
  - Reliable vascular pedicle
  - Acceptable donor



# Penis and scrotal reconstruction

- Testis and soft tissue coverage
- Urethral reconstruction / diversion
- Erectile function
- Aesthetic concerns
- Reimplantation
- Psychological issues in the perioperative period

# Penis / scrotum and perineum



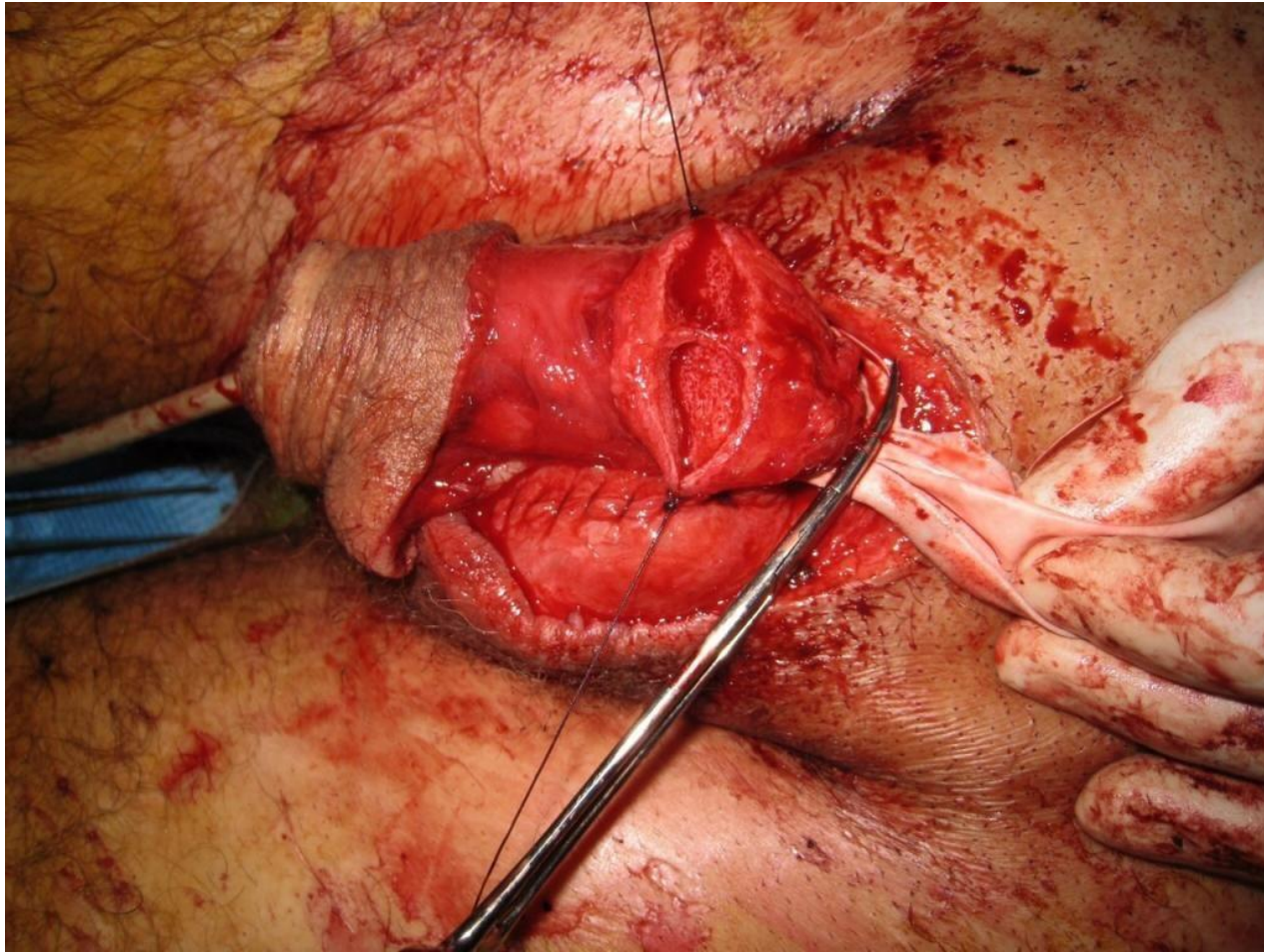




# Penile trauma



# reimplantation



# Complex defects



# Complex defects

- Compartmentalize
- Reconstruct each subunit on its merits
- Local and free options



# Management

- Preoperatively
  - Address comorbidities
  - Nutrition
  - Cross match
  - Diagnosis
  - Clear understanding of the oncology and likely defect post resection

# Management

- Intraoperatively
  - Stable soft tissues / adequate debridement
  - Control of infection
  - Clear surgical margins / frozen section
  - Meticulous closure
  - Drains
  - Prophylactic AB

# Management

- Postoperatively
  - Dressings
  - Mobility
  - Suture removal
  - Revisionary surgery
    - Scar revision / contracture
    - Flap debulking
    - Tumour recurrence

# Complications

- Wound healing problems
- Fistula
- Hernia
- Tumour recurrence
- Scar contracture
- Failure of function (genitourinary / bowel)
- Failure of form

# SSG



# Summary and take home points

- Perineal versus pelvic / perineal defects
- Attention to detail
- Perforator flaps