ANORECTAL INJURIES: EXPERIENCE OF 525 CASES

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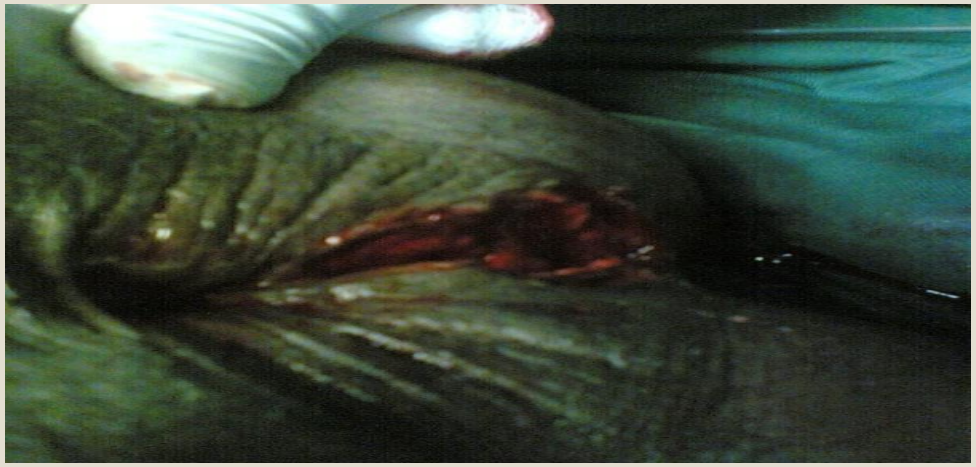
• *Introduction*

- Anorectal injuries are not uncommon in my country "Yemen", with significant morbidity, mortality and surgically challenging conditions.

- The purpose of this study is to present our clinical experience in management and to present our treatment modalities for all types of anorectal injuries we faced in the last 15 years.

- ***Introduction***

- It can be life threatening and surgically challenging condition especially due to gunshot injury.
  - Anorectal trauma may cause a wide spectrum of injuries **ranging from minor perineal skin laceration to severe injury to the genitourinary tract, anal sphincters or pelvic compartment**

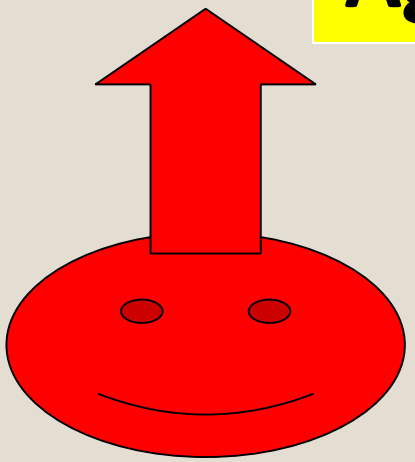


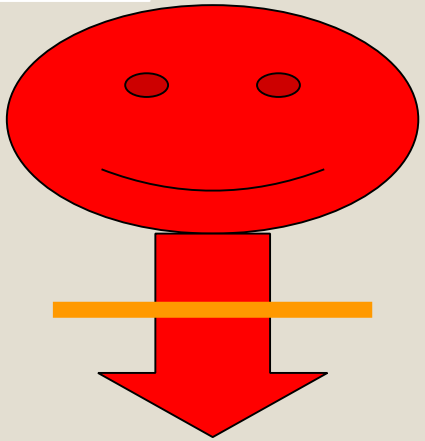
Methods:

- **Retrospectively, between January 2009 and March 2024, 525 patients were included, median 21.4 years.**
- **25 males (%5)were excluded because they had perineal or buttock injuries without anorectal extension.**

Ano-Rectal Injuries

Age 7 - 60 years (21.4 yrs.)





- **310 Pts**

- **210 Pts**

Mechanism of anorectal injuries for 500/ 525 Pts.

PENETRATING

GUN SHOT
FIREARMS
SHRAPNEL
IMPINGEMENT

- **Gunshot 170 (34%)**
  - ❑sharpnel injury 40 (8%).
  - ❑ Landmine 25 (5%).

BLUNT

- **Vehicular accidents 125 (25%)**

RTA
MAJOR TRAUMA

IATROGENIC

OBS, GYNE
UROLOGICAL
ORTHOPEDIC
COLONOSCOPIC
ENEMAS
FOREIGN BODIES

- **Surgical procedures (obstetric, gynecologic, and general surgery 105 (21%)**

Mechanism of anorectal injuries for 500/525 Pts :Others

- Injection of traditional therapy for piles 20 (4%).
- Sexual assaults15 (3%).

Results: The Anorectal injuries attributed to:

- **Urgent intervention was in 80%< 24 hrs.**
- **100 cases (25%) presented late, 50% were females with sphincter defects (3rd/4th perineal tear)**
- **4.8% had major sphincter injuries involving anorectal canal.**
- **In 50 (12.5%) patients blood on PR was the only indication for surgery.**
- **Thirteen cases had abdominal pain as the only presenting sign with positive proctoscopic exam.**
- **37% of patients had associated injuries.**
- **Mortality rate was 1%**

Associated injuries: 39%

Retroperitonea hemstoma	60	12%
Urinary bladder	30	6%
Small intestine	50	10%
Femoral vessels	30	6%
Sacrum	25	5%

Complications encounter in 85 (17%) cases

Complication	Number	Percent
Wound infection	50	9.5%
Fecal fistula	5	0.95%
Pelvic abscess	10	1.9%
Osteomylitis of sacrum	5	0.95%
Incisional hernia	15	2.9%

fistula tract of gunshot, failed to be closed with diverting colostomy.

Be alert

- The magnitude of injury **does not** reflect the severity of injury of the internal structures
- The superficial appearance **does not** reflect the magnitude of the injury
- Lack of external findings **does not** preclude serious rectal perforation

How to manage? Controversies ??

- To do Primary or Delayed sphincter repair
- To do or NOT to do colostomy
- To do presacral drainage or not
- **A standardized therapeutic approach is necessary to avoid major complications in the management of anorectal injuries.**

DIFFICULTIES IN MANAGEMENT OF ANORECTAL INJURIES

- **Aims: to restore anatomy & function of the anorectum and sphincter complex**
- **control of pelvic hemorrhage.**
- **dealing with multiplicity of associated injuries.**
- **prevention and management of post-operative sepsis.**

RECTAL INJURY WAS SUSPECTED WHEN:

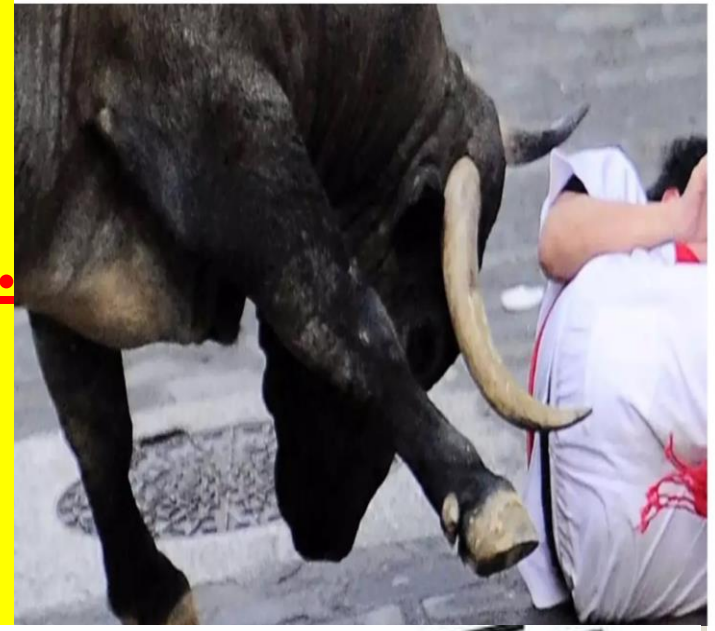
- Presence of penetrating injuries in the buttocks, perineum, or pelvic region.
- Presence of "bleeding per rectum"without proximal colonic injuries.
- Rectal bleeding with a history of trauma suggests a mucosal tear, at the minimum and mandates further step to role out anorectal injuries.

Each patient assigned for management depending on:

- General condition
- Presence or absence of full thickness anorectal injuries
- Severity and extension of anorectal lacerations
- Degree of wound contamination
- Degree of skin loss

Ano-Rectal injuries: Ranging 1 to :4war wounds to Nicolau syndrome.

- **The majority of rectal injuries are due to penetrating trauma, usually firearms.**
  - **war wounds account approximately< 50%.**
- **Traditional injections about 4% of rectal injuries.**
  - **Other causes of penetrating trauma:**
    - **Iatrogenic injuries from urologic and endoscopic procedures.**
    - **Sexual misadventure.**
    - **Anorectal foreign bodies.**
- **Blunt trauma accounts for only 25 % of injuries.**
  - **Usually the result of pelvic fractures or impalement.**



ROCHE Classification

AAST RECTAL INJURY SCALE

Grade I	a) Contusion, hematoma, no devascularization b) Partial thickness laceration
Grade 2	Laceration < 50% circumference
Grade 3	Laceration >50% circumference
Grade 4	Full thickness laceration with extension into perineum
Grade 5	Devascularized segment

*American Association for the Surgery of Trauma (**AAS***

Rectal Organ Injury Scale

TABLE 33-5 AAST Rectal Organ Injury Scale

Grade	Injury Description
I	(a) Contusion or hematoma without devascularization (b) Partial thickness laceration
II	Laceration ≤50% of circumference
III	Laceration >50% of circumference
IV	Full-thickness laceration with extension into the perineum
V	Devascularized segment

The American Association for the Surgery of Trauma (AAST)

1 Intraperitoneal perforation - No sphincter damage

2 Intraperitoneal perforation - With sphincter damage

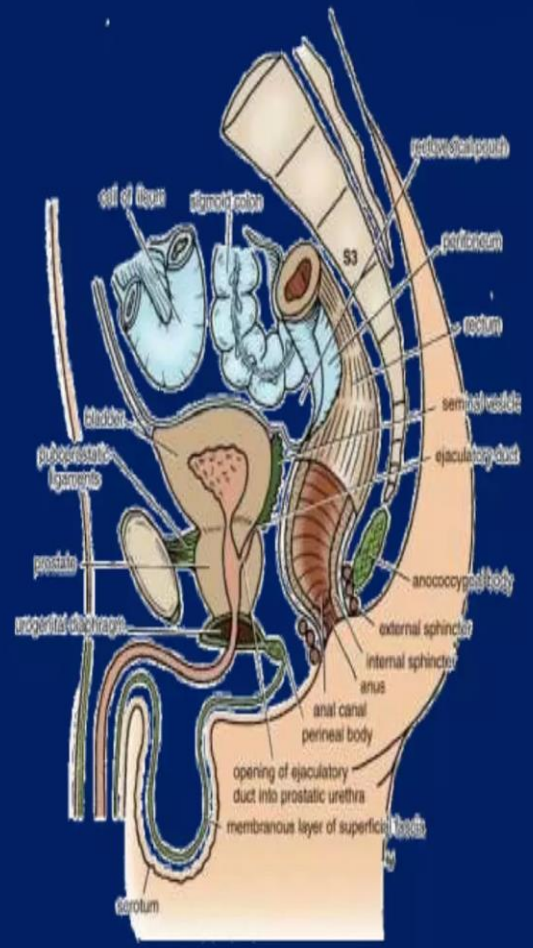
3 Extraperitoneal perforation - No sphincter damage

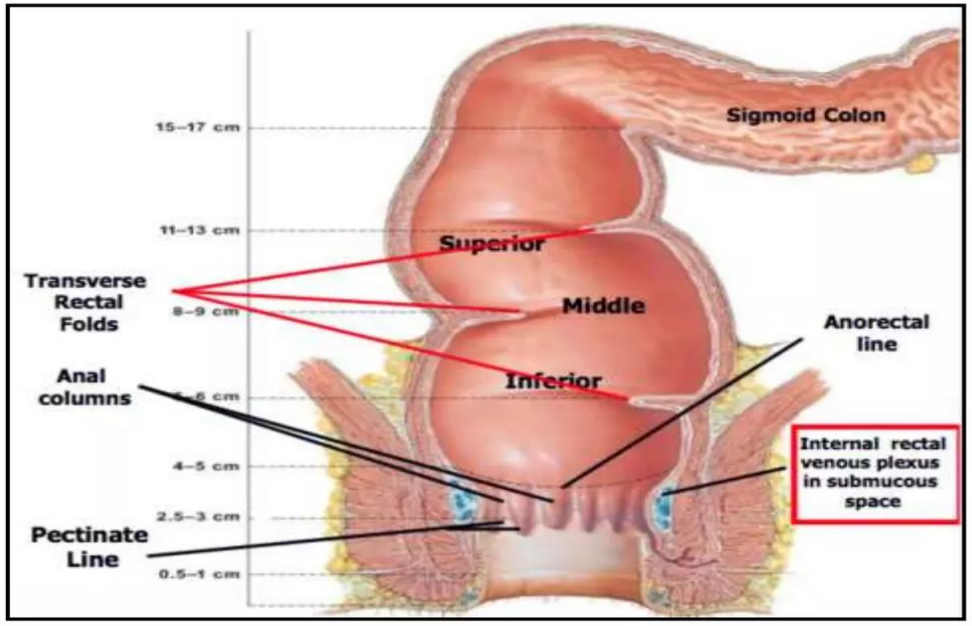
4 Extraperitoneal perforation - With sphincter damage

RECTAL INJURIES: Anatomy

Rectum

- Begins at the rectosigmoid junction – at level of **third** sacral vertebra
- Ends at the anorectal junction – 2-3 cm in front of and a little below the coccyx
- Length – 13 – 15 cm.
- Diameter – 4 cm (in the upper part)
  – Dilated (in the lower part)
- The rectum follows the shape of the sacrum





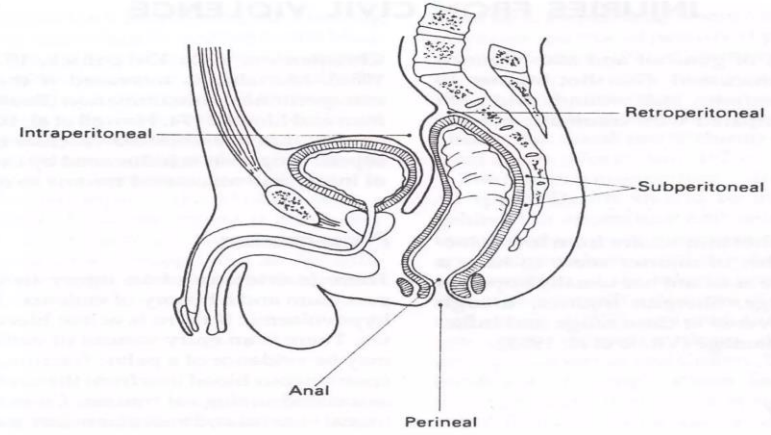
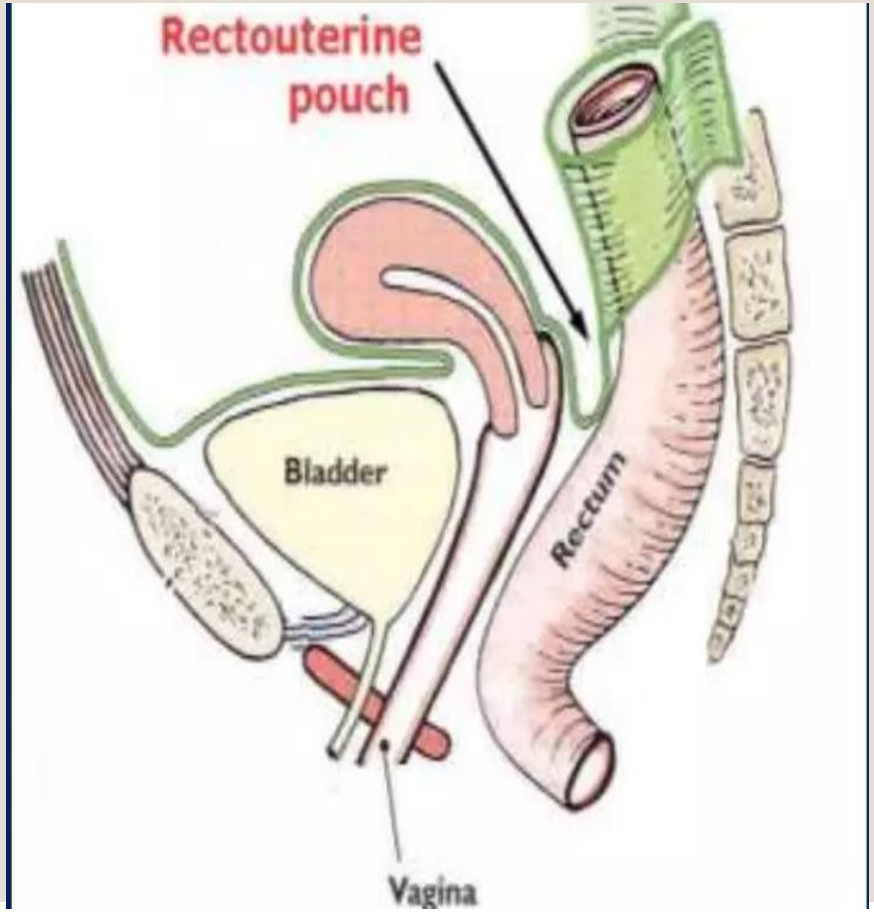


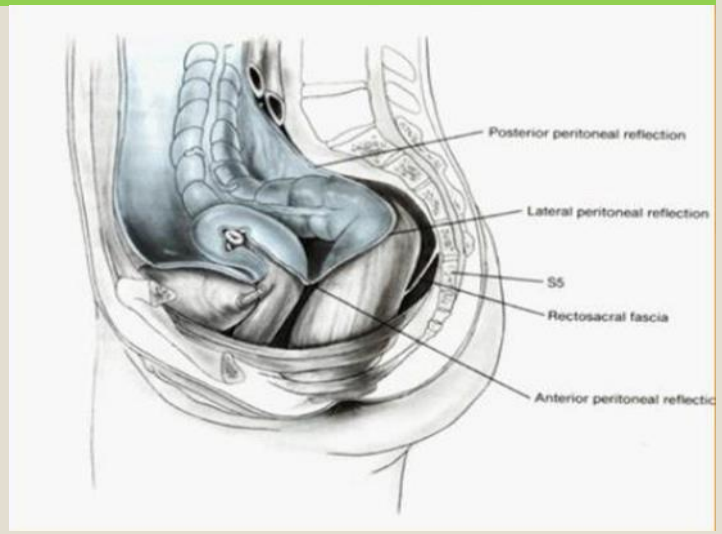
Fig. Sites of injuries to the rectum

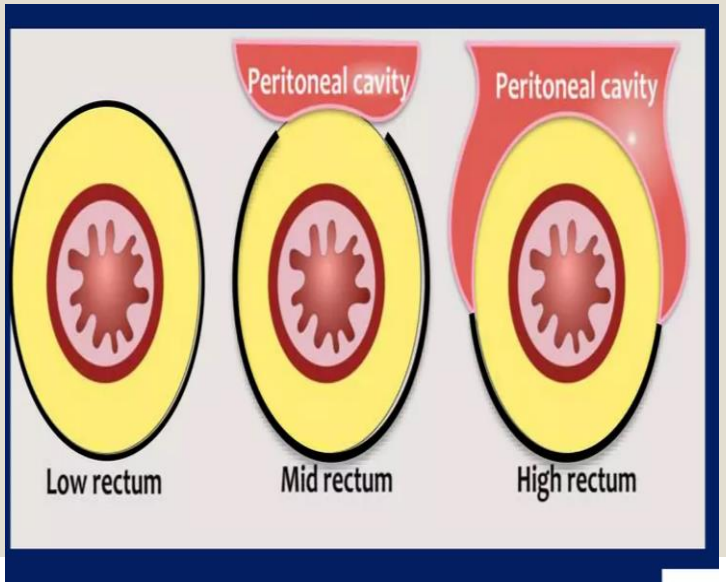
Ano-Rectal injuries: Anatomy

From sacral promontory to anus

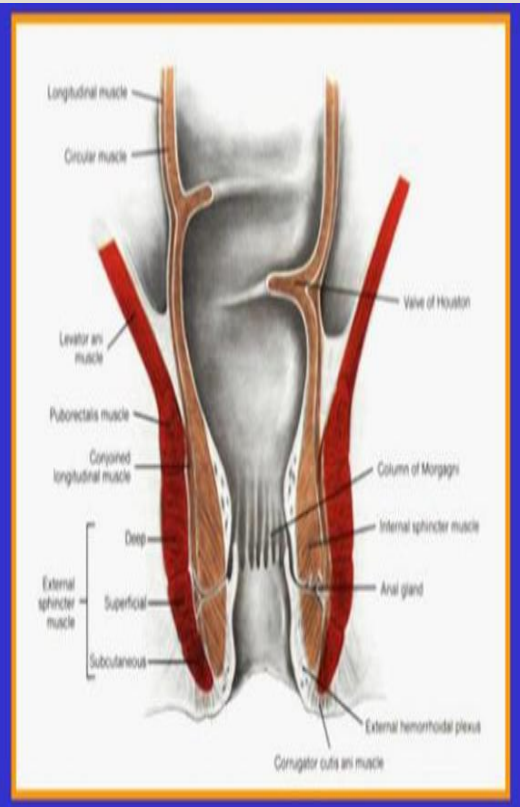
- Only the upper two thirds anteriorly and the upper one third laterally are covered by peritoneum.
- The lower third of the rectum is completely extraperitoneal and makes exposure and repair of any injuries difficult







Anal and sphincter injuries: Anatomy



Anal canal

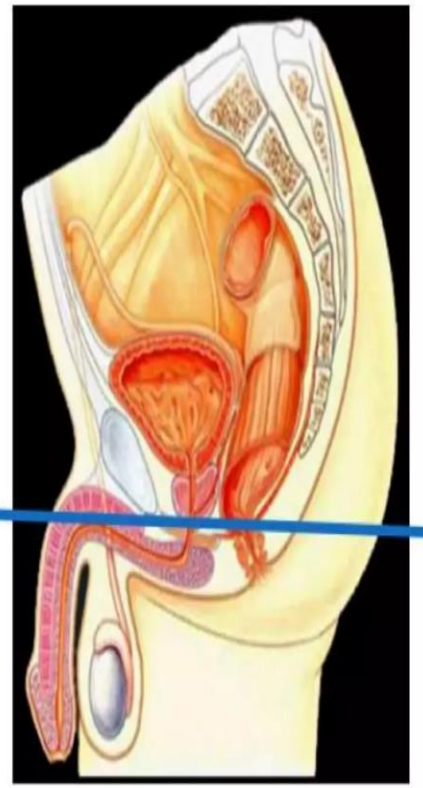
Anorectal ring to anal verge

Sphincter complex

puborectalis muscle

external sphincter

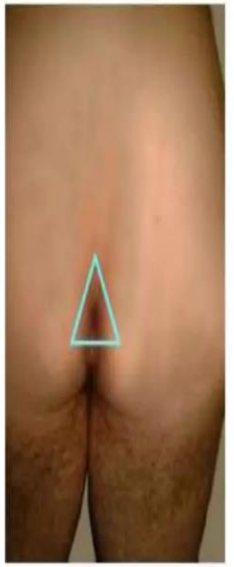
internal sphincter



Ano-rectal junction in male

corresponds to apex of prostate

4 cms in front of tip of coccyx



History

Ample
Associated Sx
Pain Hx
Bowel Hx
Bladder Hx
Bleed Hx
Perforation Hx

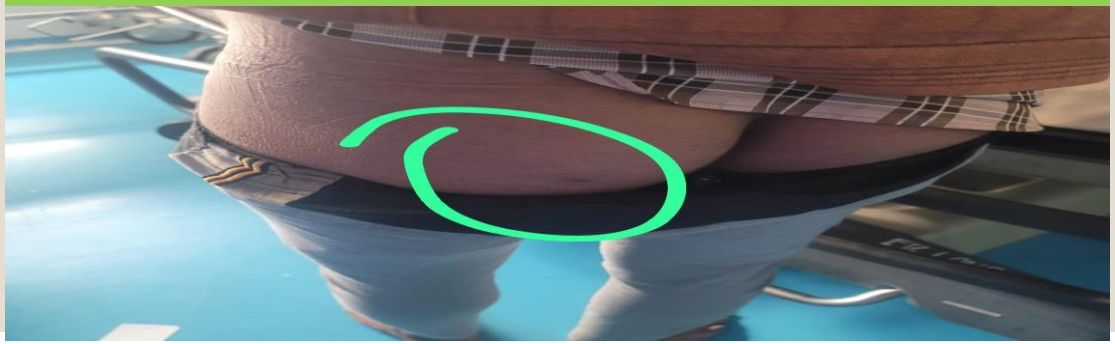
Examination

- **Focus of the examination includes:**
  - ✓**The abdomen**
  - ✓**Inguinal area**
  - ✓**Perianal skin and soft tissue**
  - ✓**Buttocks and gluteal cleft**
  - ✓**Anal canal, and rectum.**

Perianal and Ano-Rectal Trauma

- Blunt (Minority) or Penetrating (Majority)
- GSW, Lacerations predominate
- Can be intra or extraperitoneal

- Management
  - 3 views, CT, endoscopy, Gastrograffin
  - Admission, observation, serial exams
  - Irrigate and close lacerations, tetanus prophylaxis
  - Diverting colostomy if rectal perforation



Preoperative Planning and Treatment Modalities

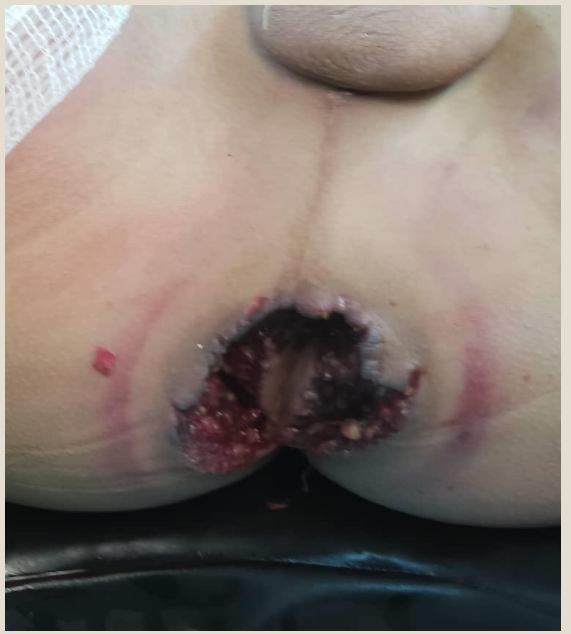
- **Ano-Rectal injuries:**
  - Ø Primary perineal repair
  - Ø Primary Sphincter repair vs. delayed sphincter repair
  - Ø Colostomy
  - Ø Laparotomy
  - Ø Presacral drainage

Hemodynamic stabilization and treatment of any existing life-threatening conditions

Meticulous wound care, irrigation and debridement of the wound tract
Antibiotic therapy

Shall will do for Primary Repair??

- It depends on the followings:
  1. The inflicting agent
     - The severity of the trauma (contusion versus laceration versus devitalization).
  2. The presence or absence of loaded large bowel.
  3. The degree of spillage of contents.
  4. Whether the injury is retro or intra peritoneal.



Rectal injuries

- **Debridement :**
  removed devitalize tissue repair defect if possible severe injury; resection
- **Distal washout :**
  decrease septic complication
- **Extraperitoneal Injuries**
- **• The cornerstone of extraperitoneal rectal injuries was based on a triad consisting of fecal diversion, presacral drainage, and distal rectal washout. This practice was challenged in the 1990s.**

Intraperitoneal

- As colon injures with primary repair
- With or without diversion
- Vast majority amenable for primary repair

Extra-peritoneal

- 4Ds
  - Diversion
  - Debridement
  - ? Distal washout
  - ? Presacral drainage

Mid-rectal injurues

- **Proximal diverting sigmoid loop colostomy only done**
  - **without repairing the rectal perforation**
    - **Males**
      - **difficult exposure**
      - **Narrow pelvis**

Management of Complex Perineal Injuries

Management of Complex Perineal Injuries
Resuscitate
Control of Bleeding
Local debridement and wound irrigation. Repeat prn
Antibiotics
Other injuries - Stabilize pelvis
Divert feces / urine
Enteral feeding
Prevent DVT

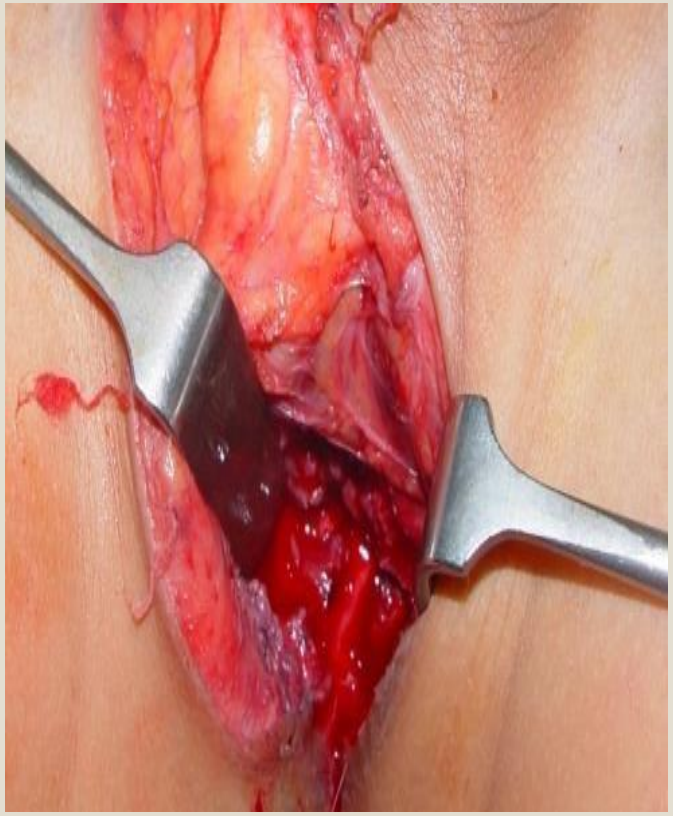
Complex anorectal injuries

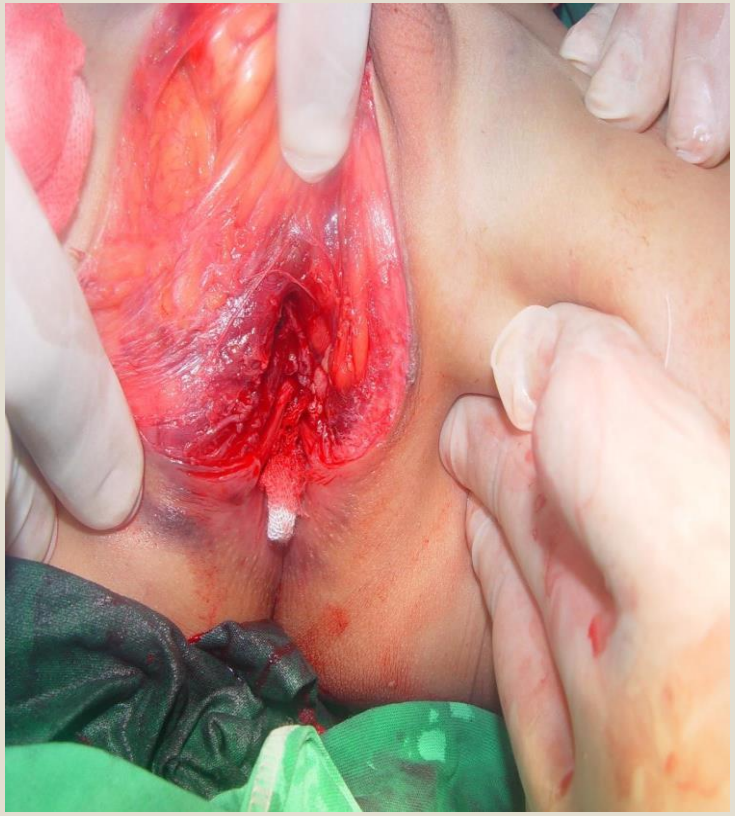
- **Low rectal injuries may be repaired transanally and high rectal injuries can be accessed transperitoneally after dissection of the peritoneum.**

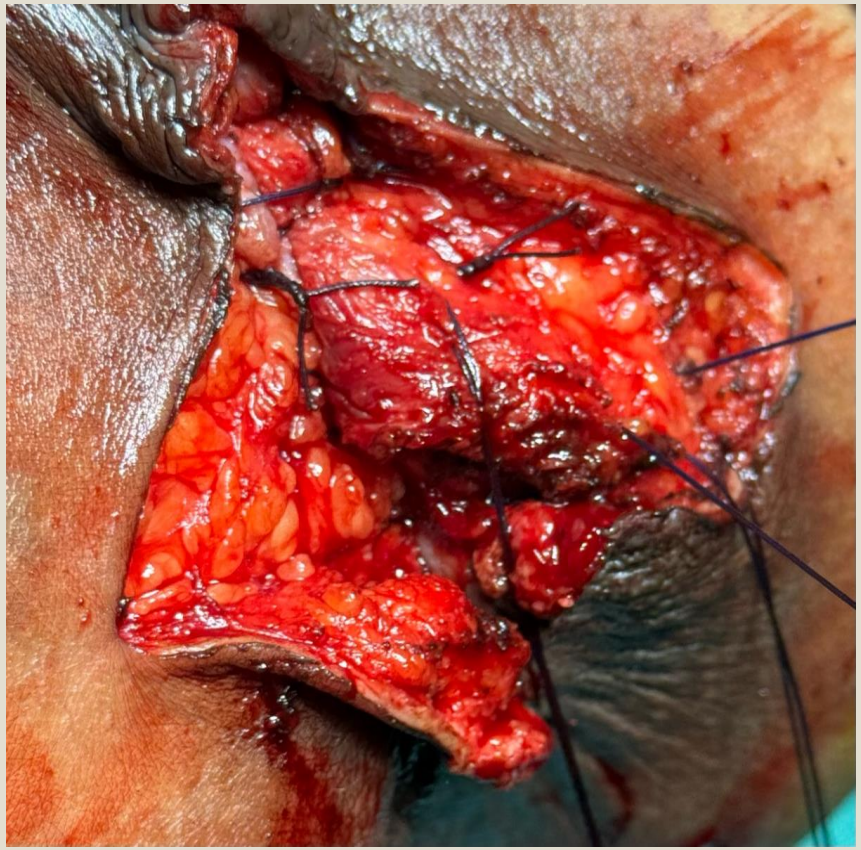
- **As after open pelvic fractures should be managed with hemostasis, wound packing, and a sigmoid colostomy.**

❖**Anorectal reconstruction is usually attempted electively or semielectively.**

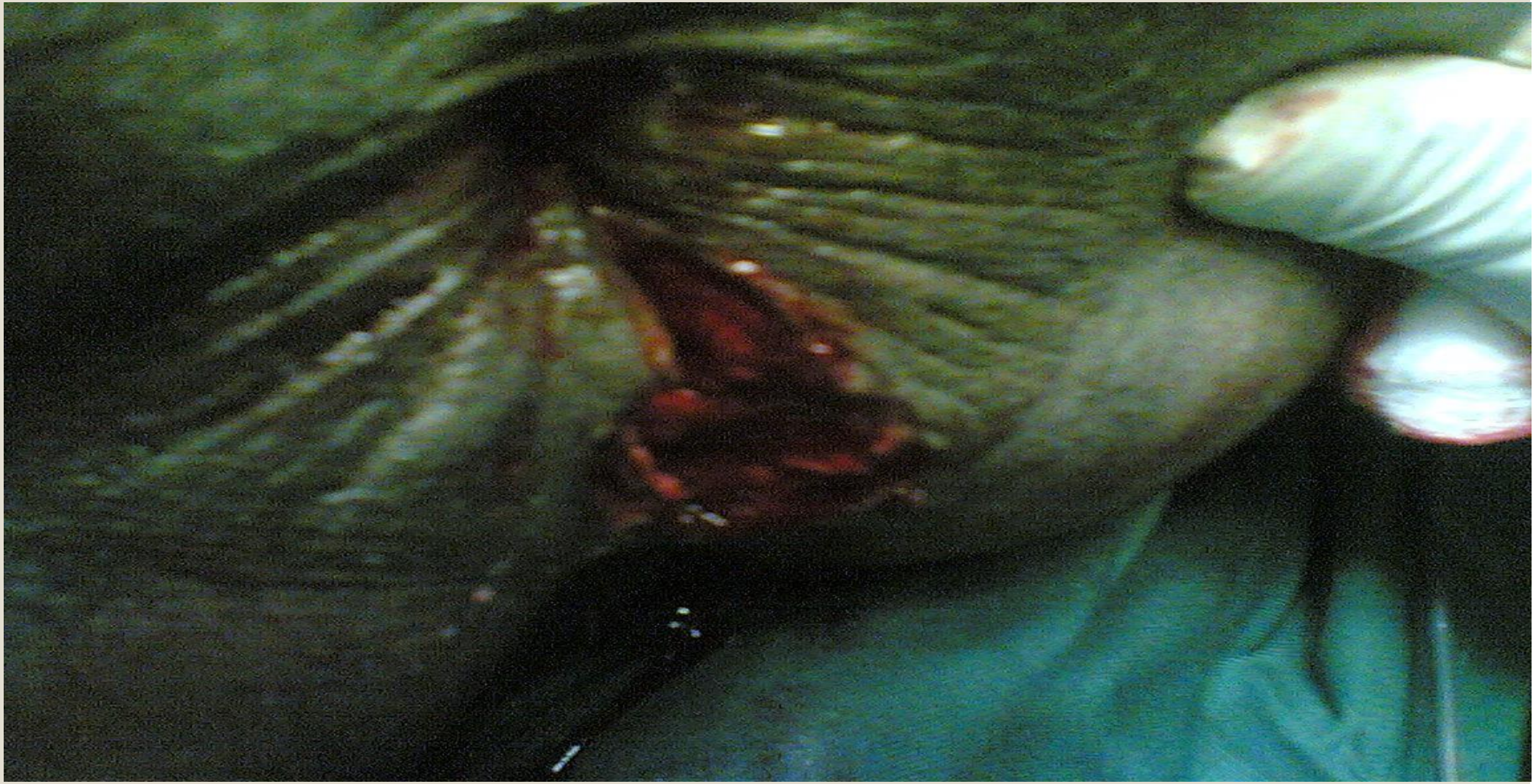
Early repair with no colostomy



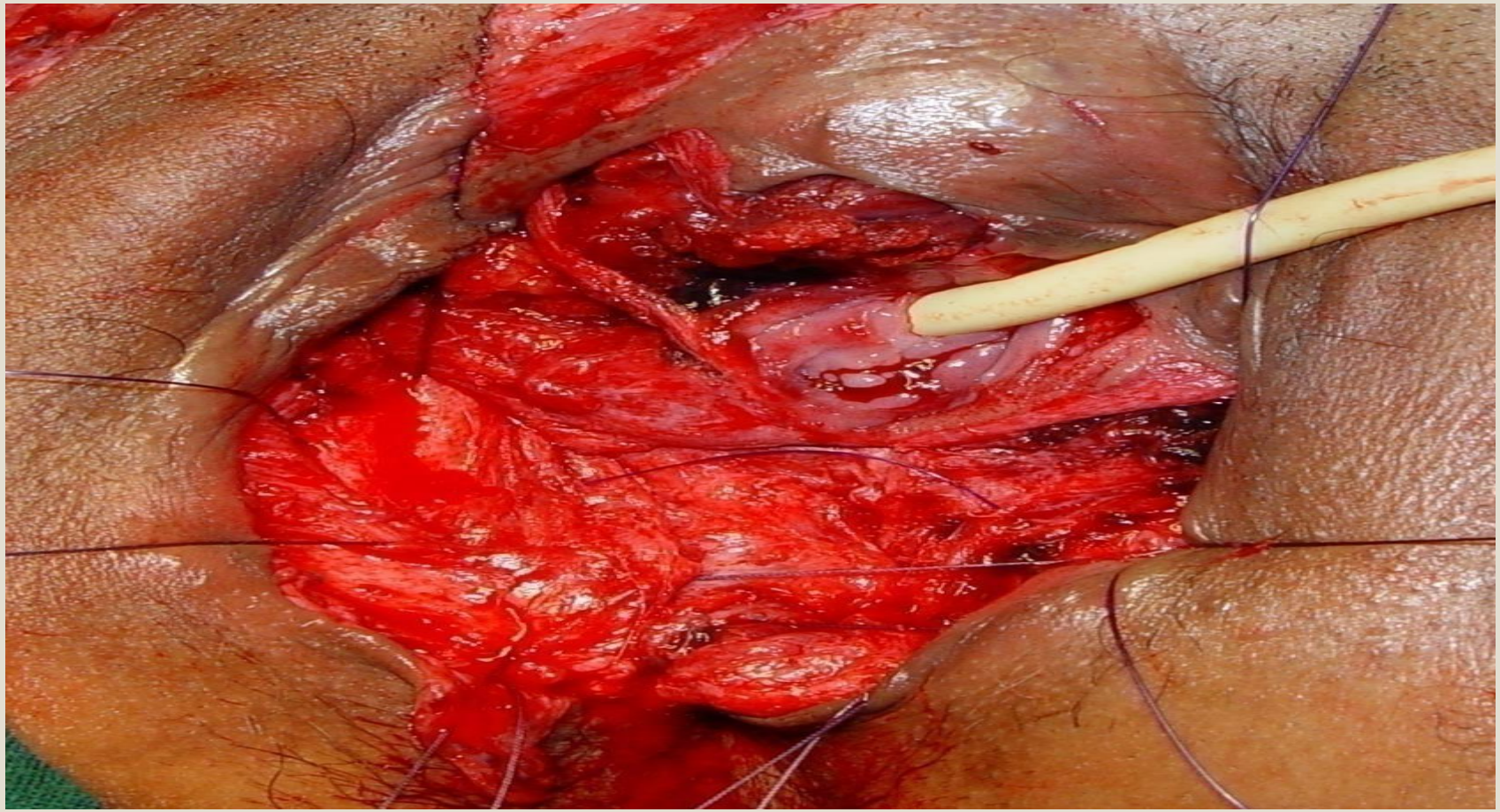




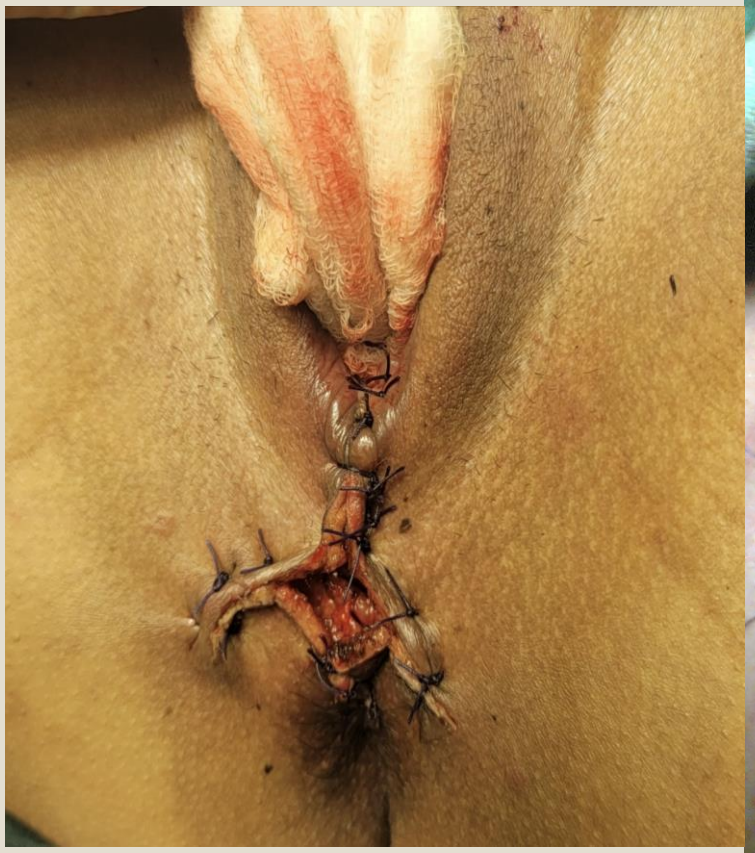
EARLY REPAIR WITH NO COLOSTOMY

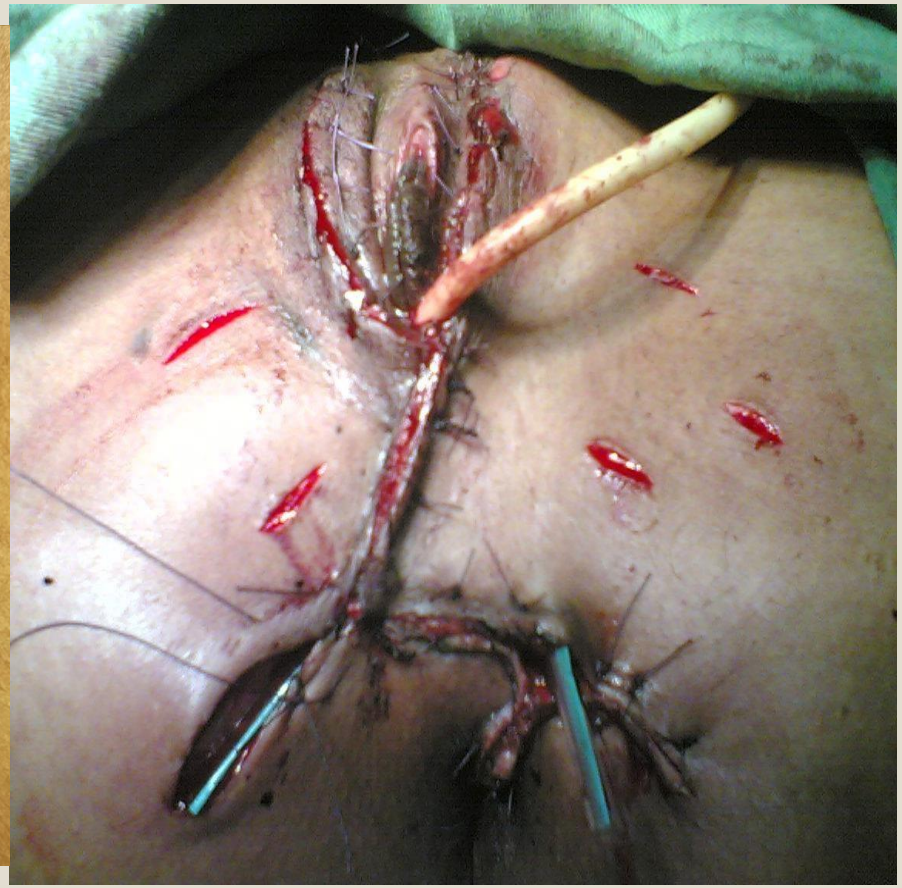


Ealy reapir with colostomy

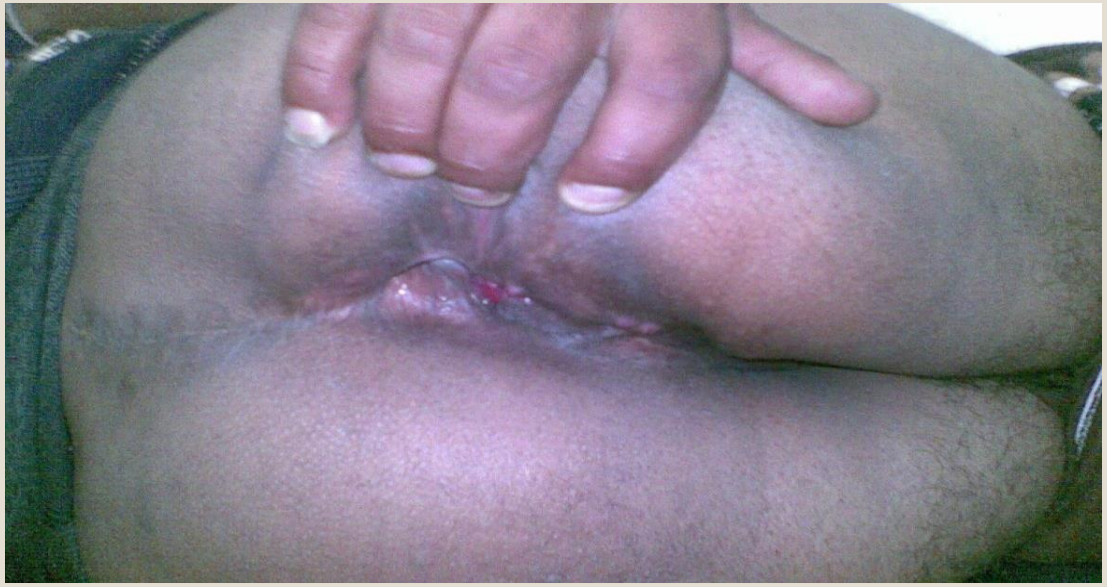


Delayed repair with no colostomy

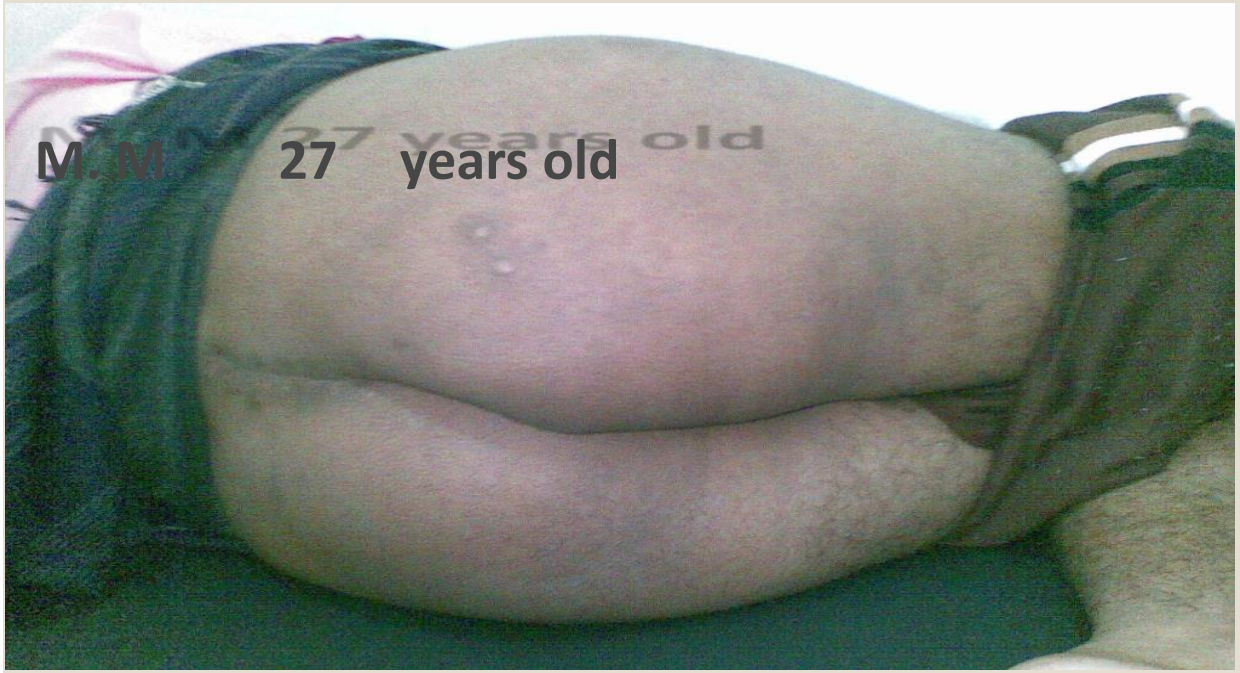


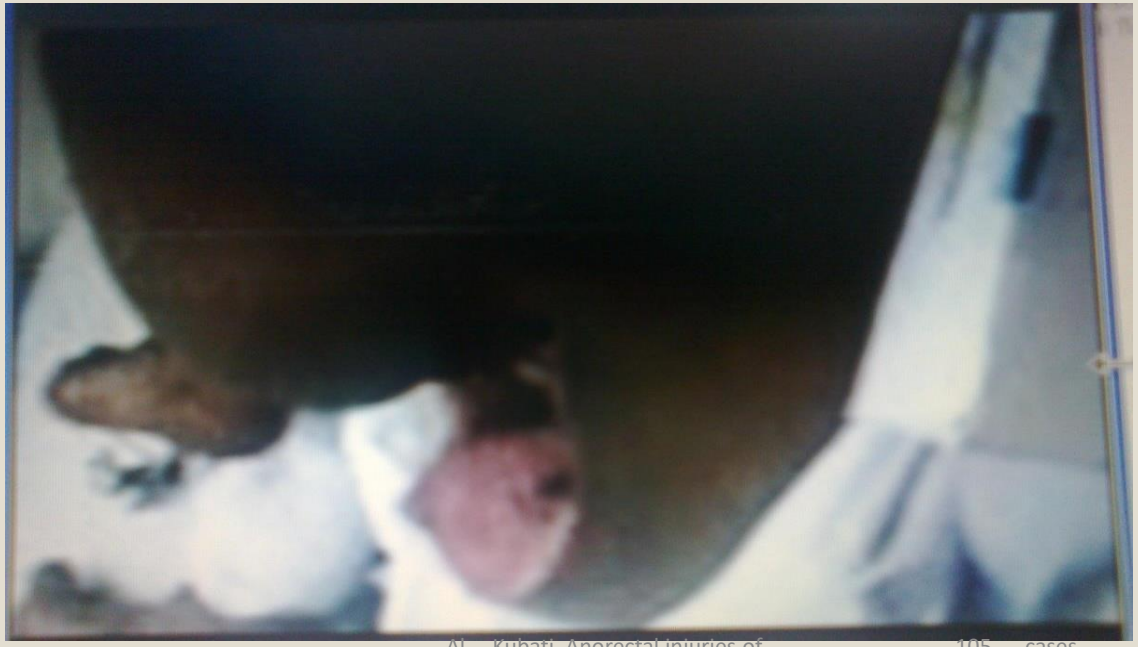


- Colostomy first then delayed repair
- Rectal repair and diverting colostomy



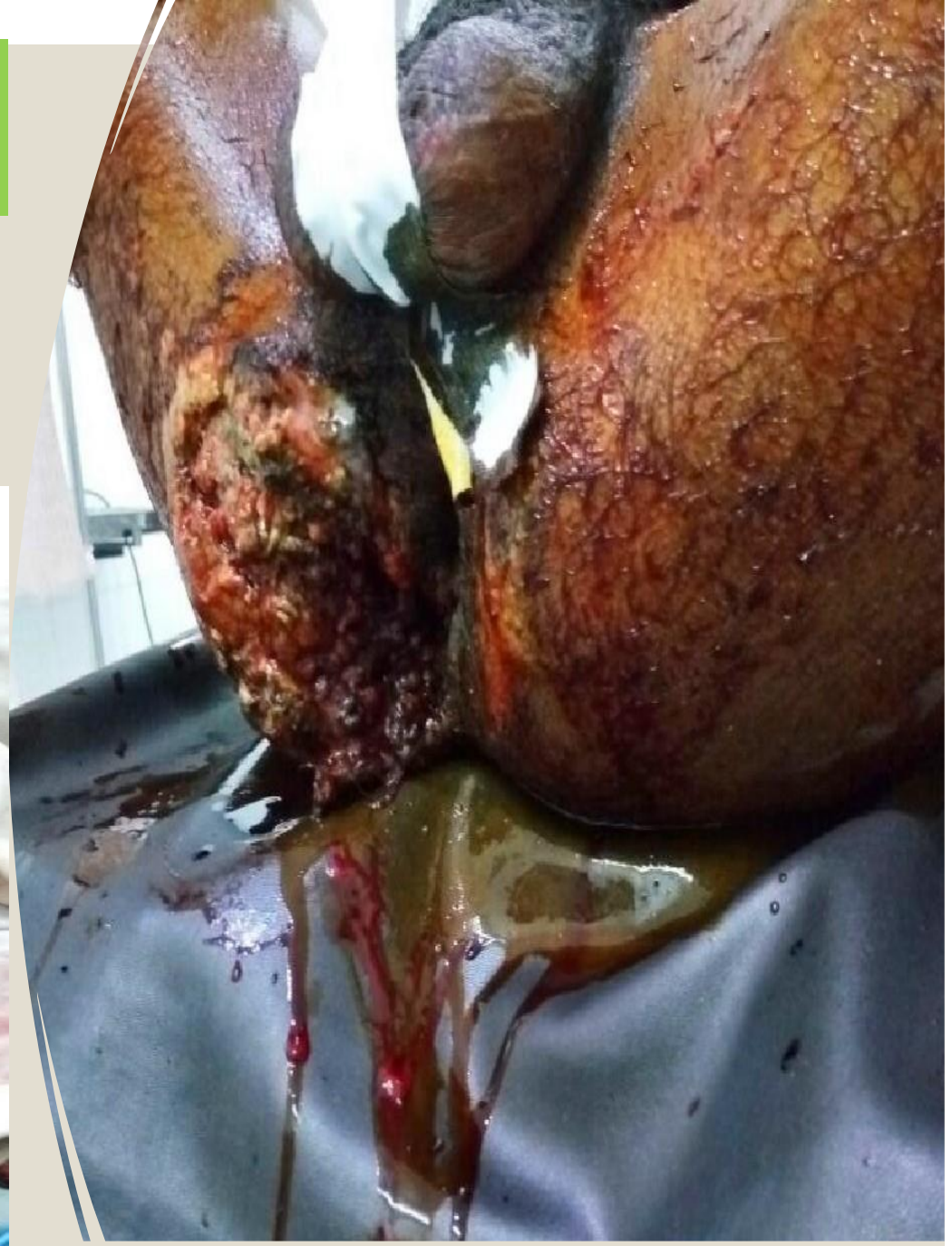
After 3 months of recostruction



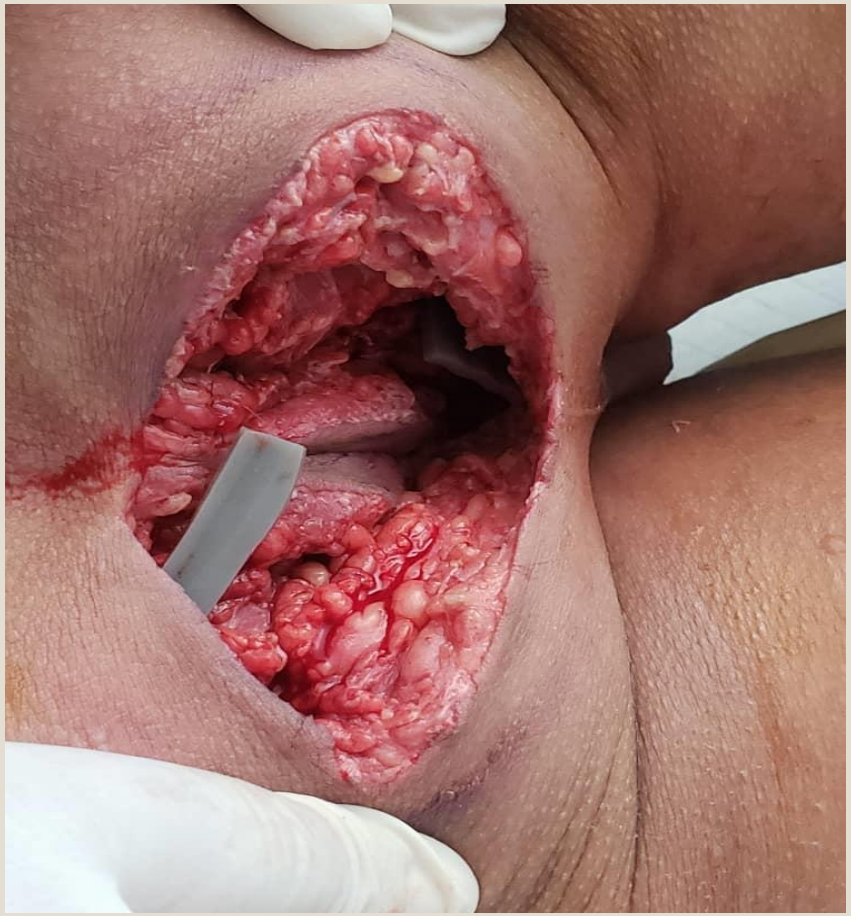


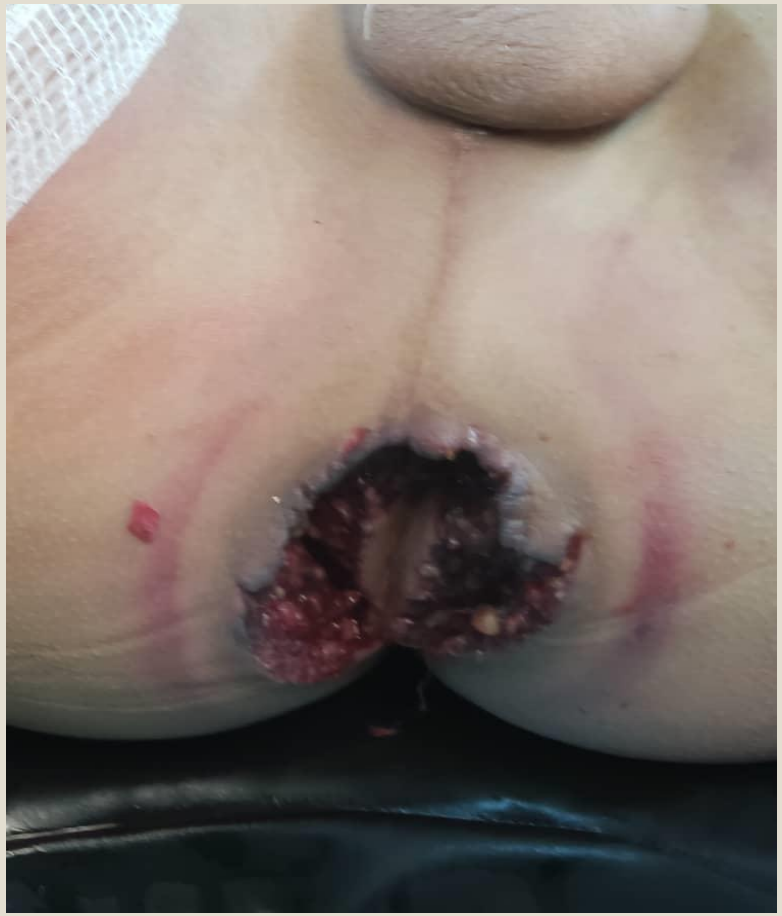
A.M. 25 years Male

Is it for primary repair?



Repair after wound care with good outcome

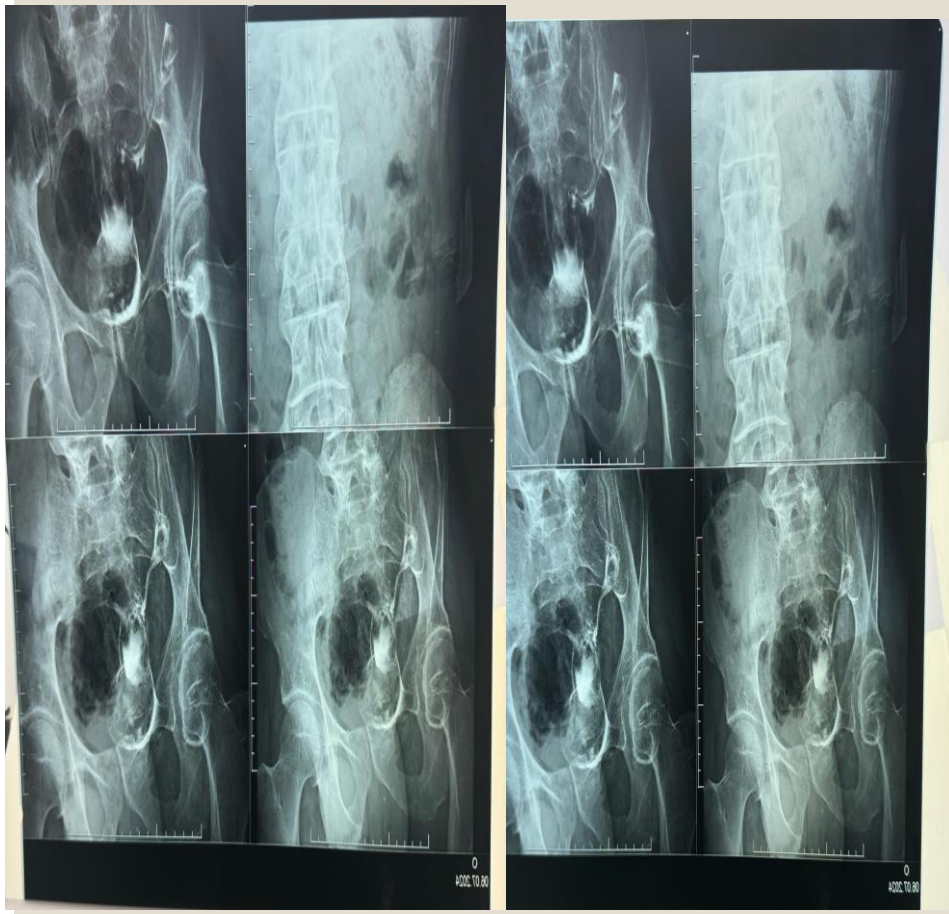


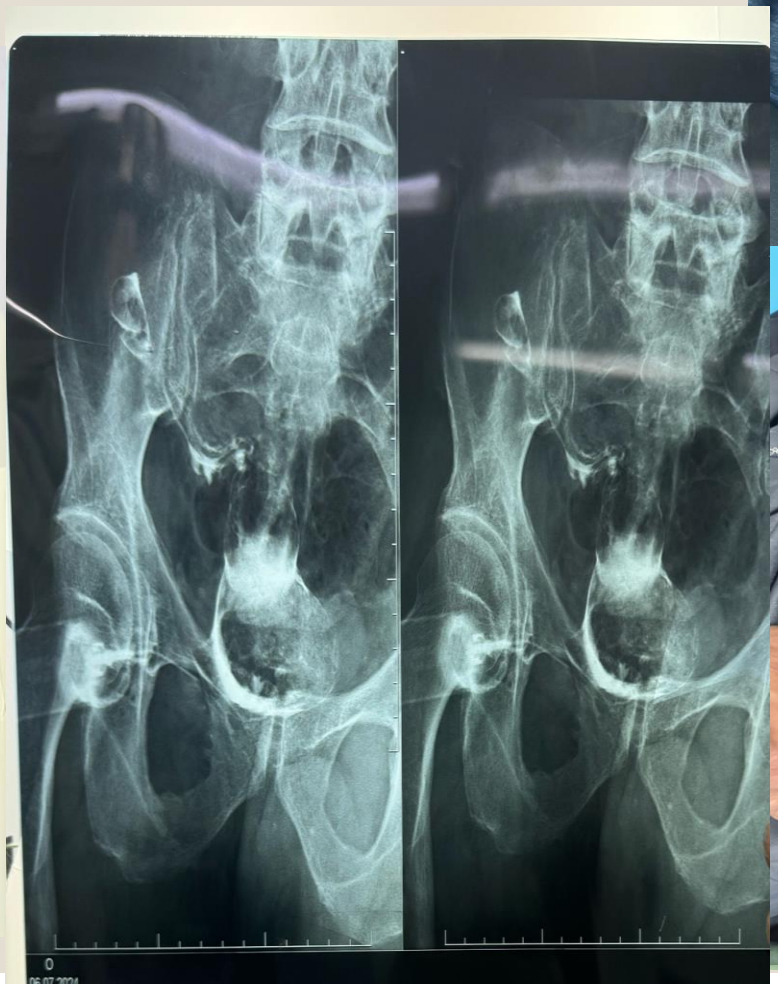


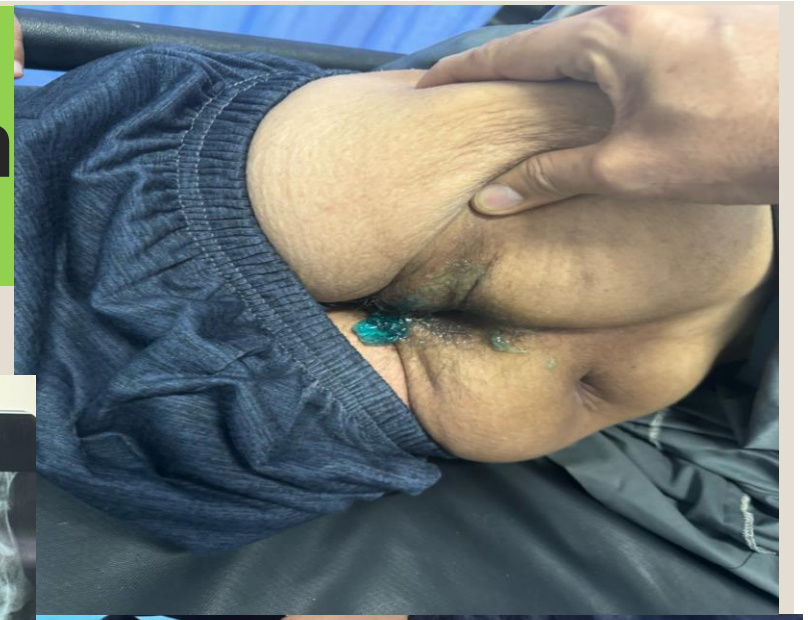
No primary repair if:

- lacerated lesion is more than 2cm after debridement
- multiple sites of injury.
- If spillage is for a distance of more than 5 cm from site of injury.
- presence of associated injuries
- presence of shock
- time lapsed before management > 8 hours

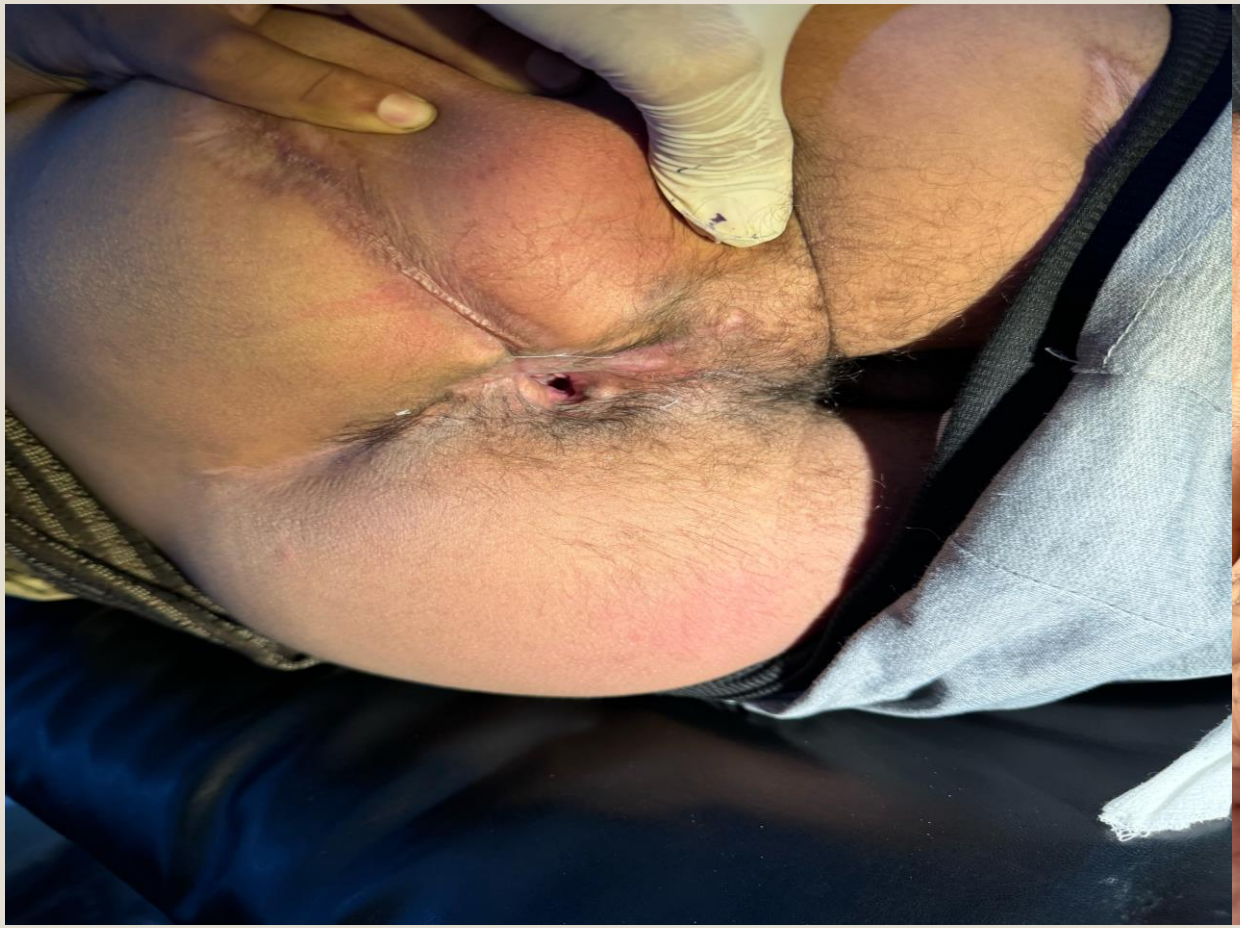
Rectal fistula and obliterated lumen

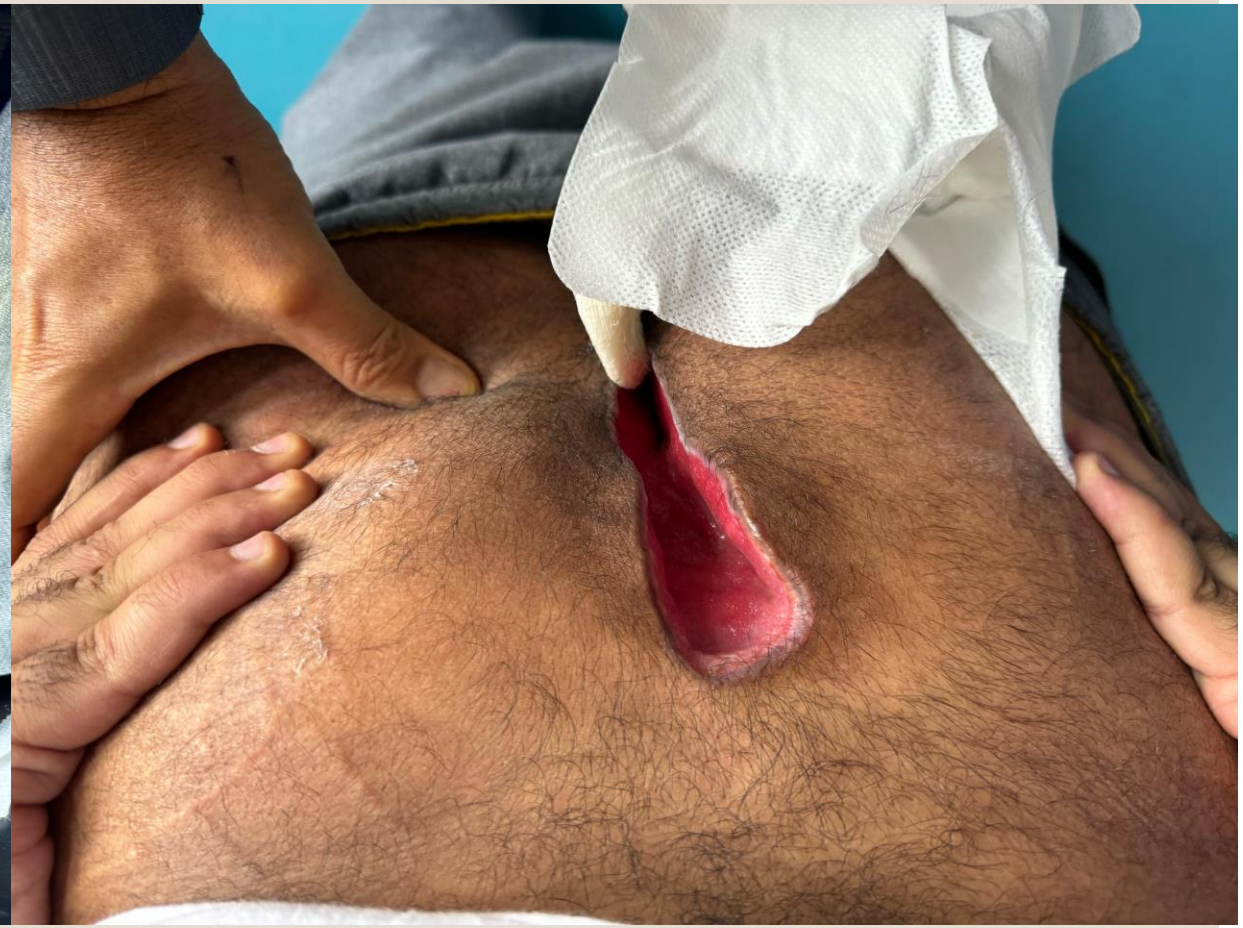




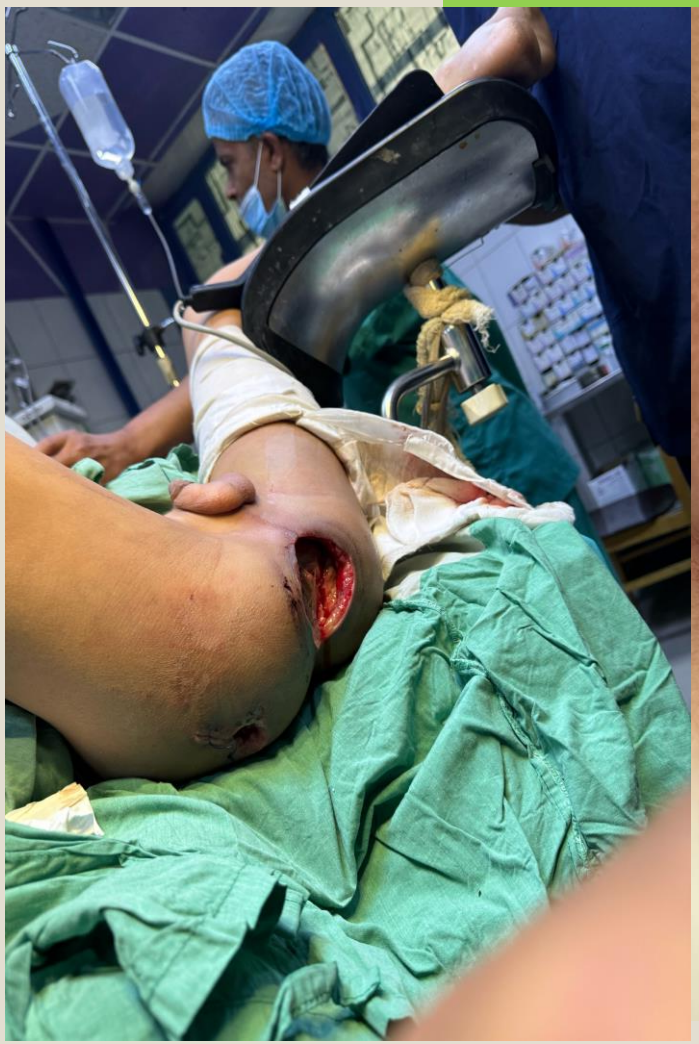


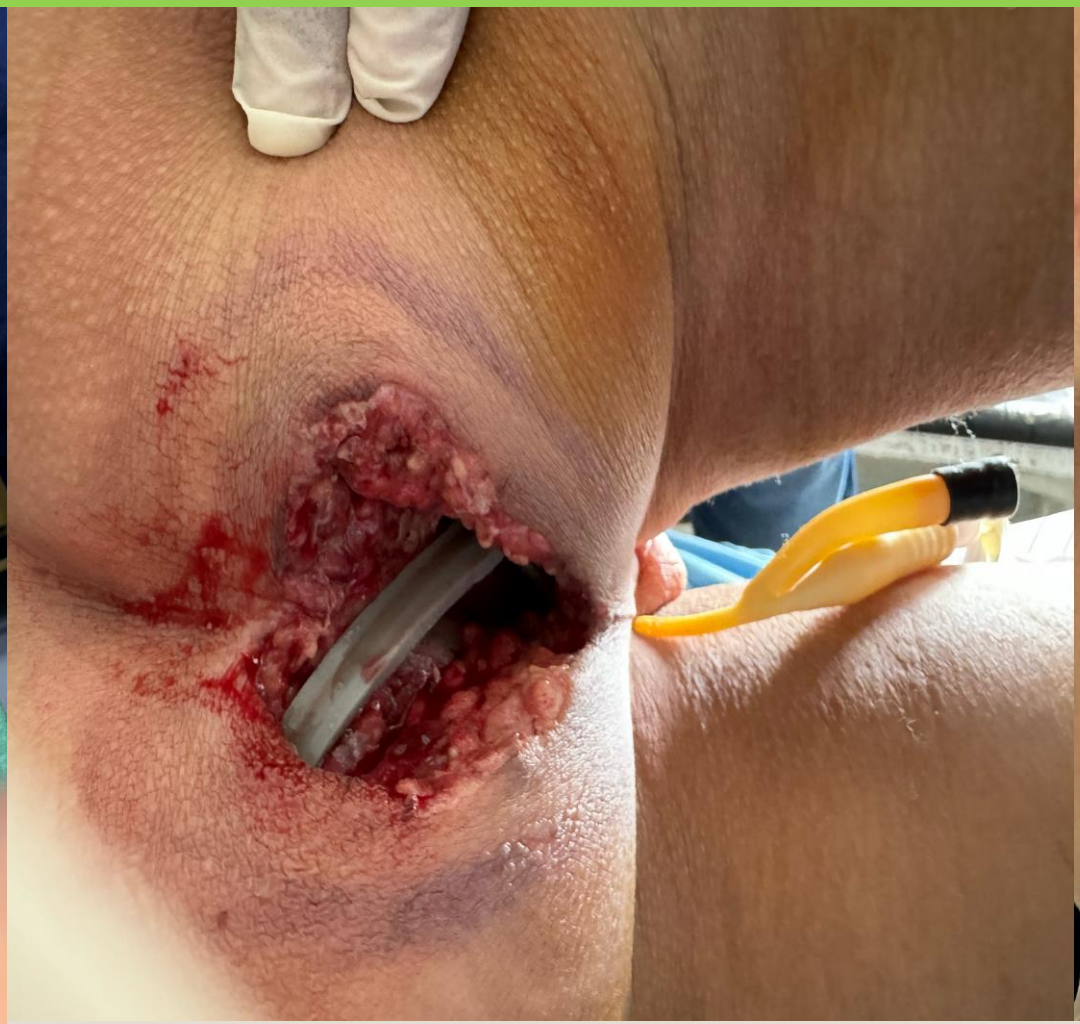
Post gluteoplasty with soiling
Does unilateral gluteoplasty is suitable for??

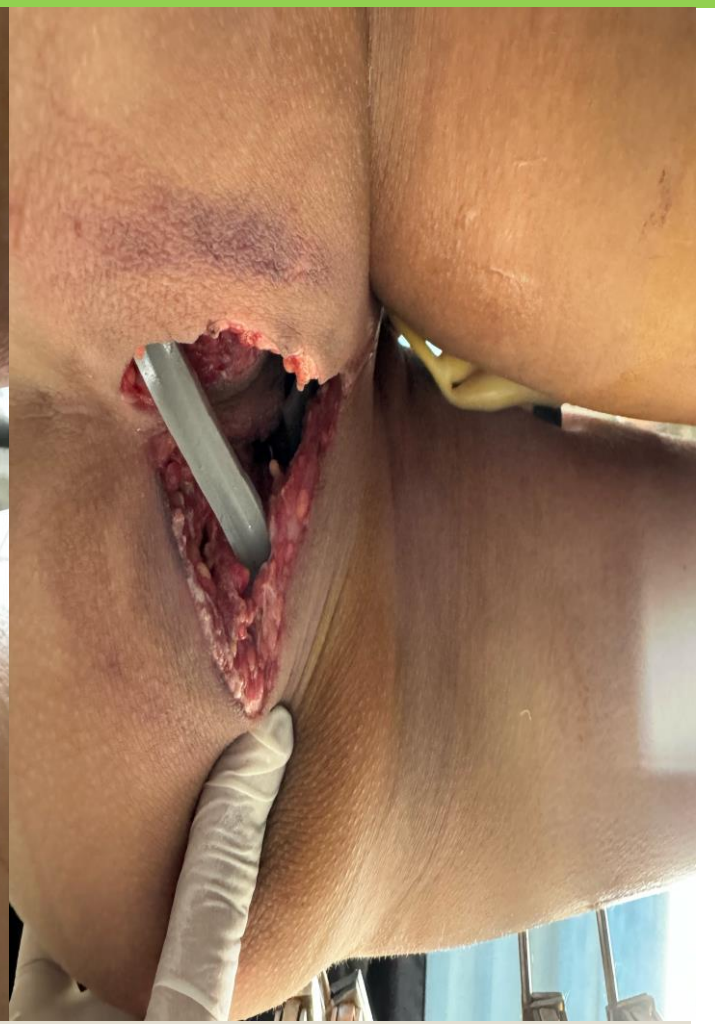




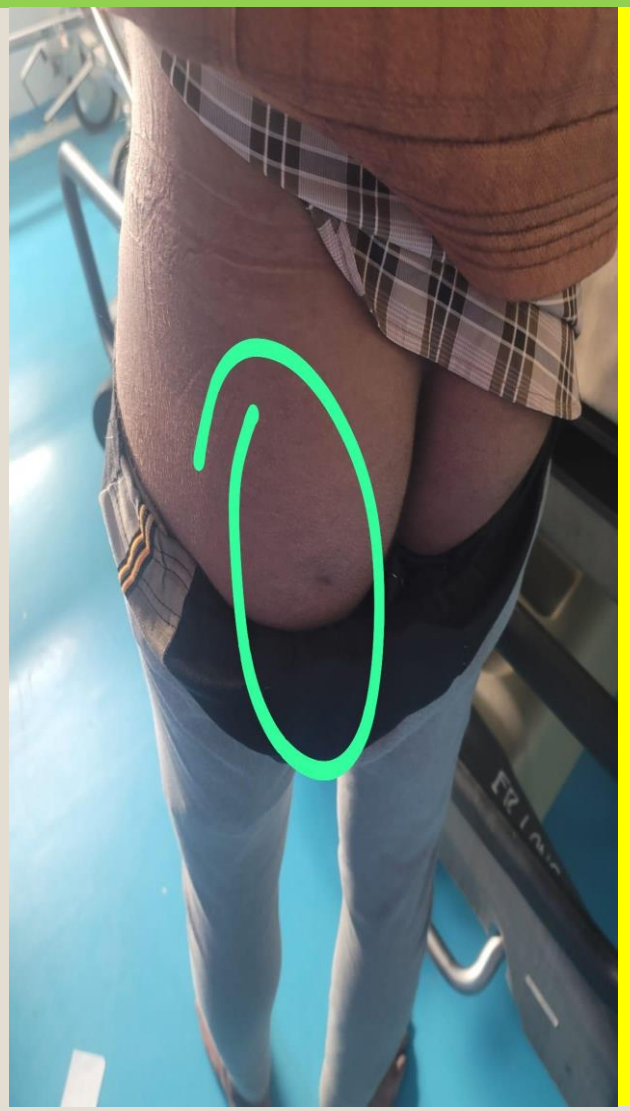
13 years old boy post gunshot injury: bilateral gluteoplasty





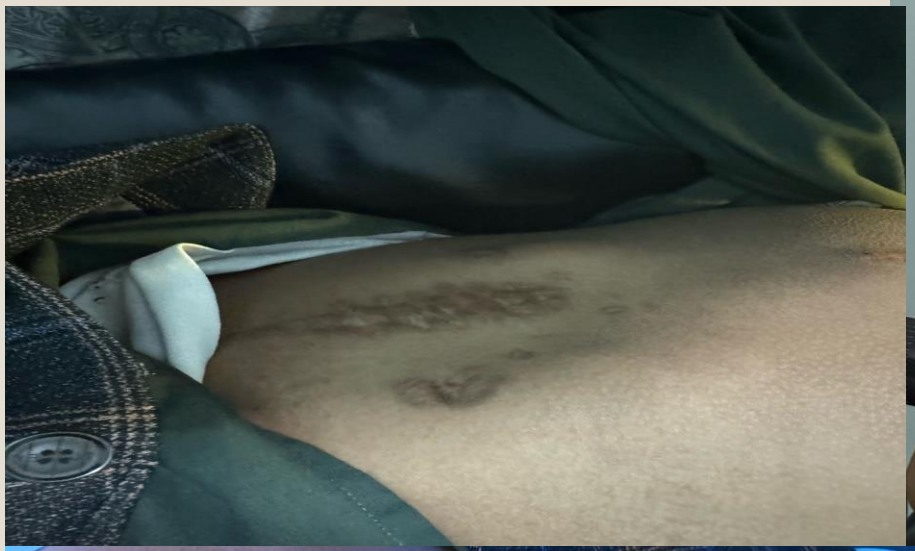


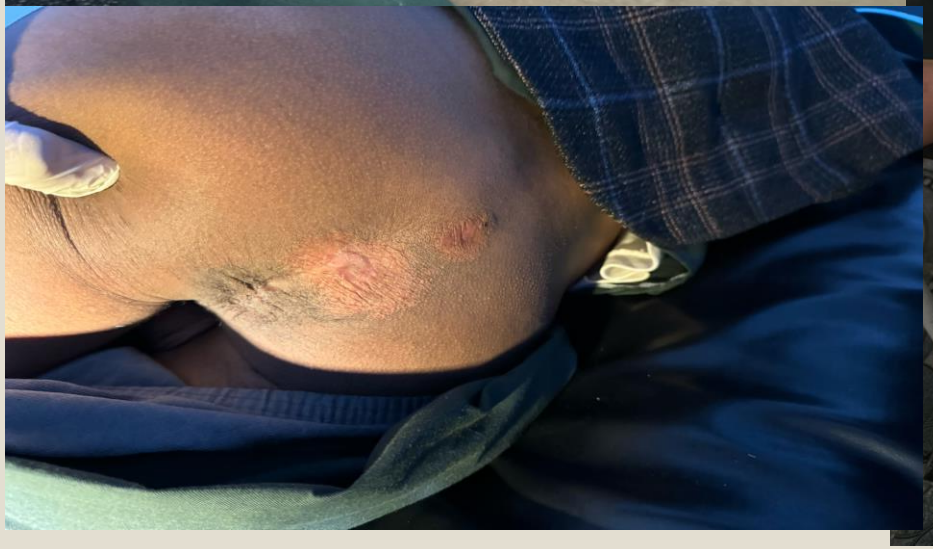
Rectal gunshot tract fistula with local osteomyelitis

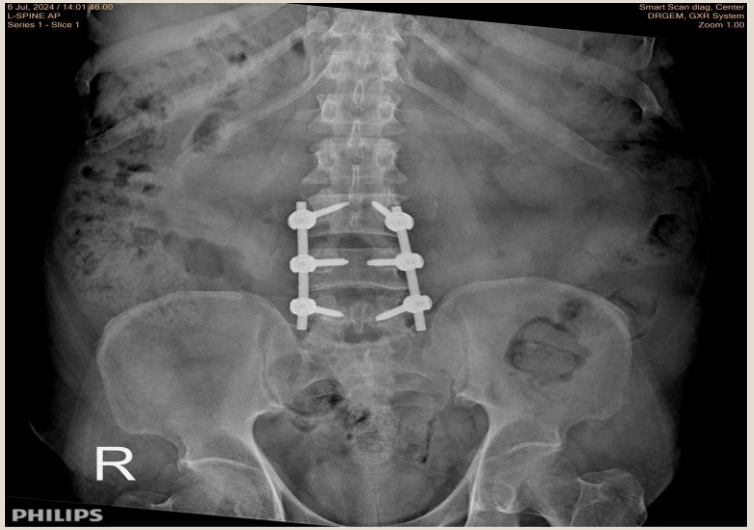


- Partial proctectomy colorectal anastomosis and covering ileostomy.
- Orthopedic???

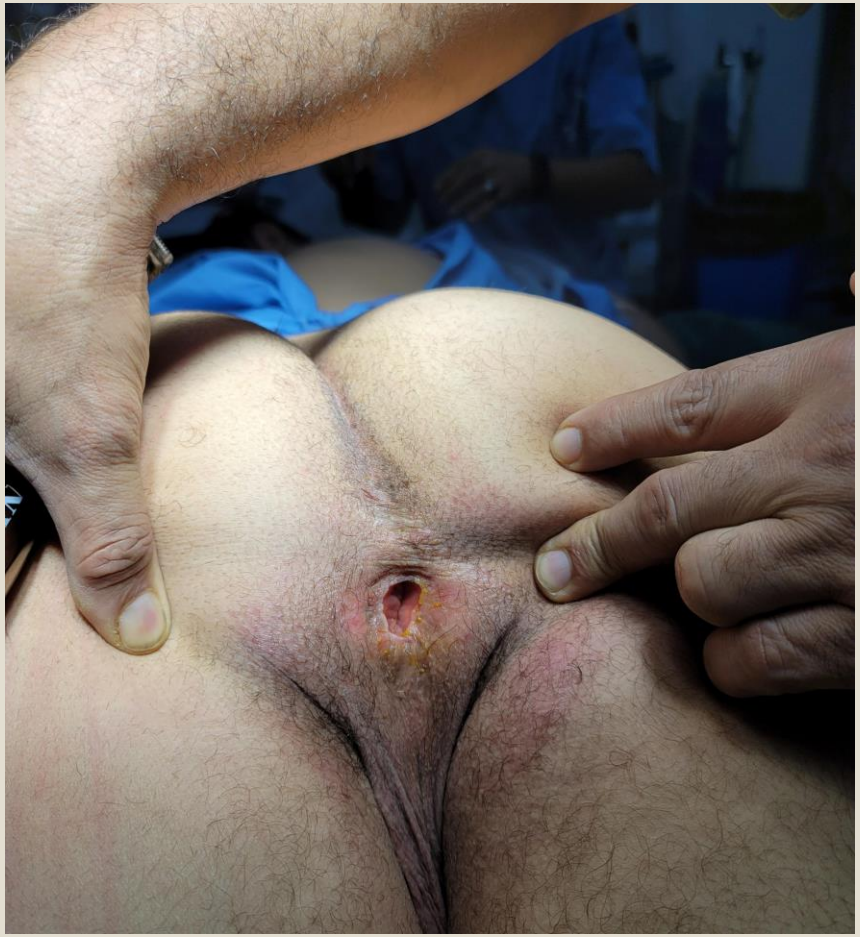
Trans-pelvic gunshot with neuropathic sphincter injury post spinal fixation? No tone! No sensation

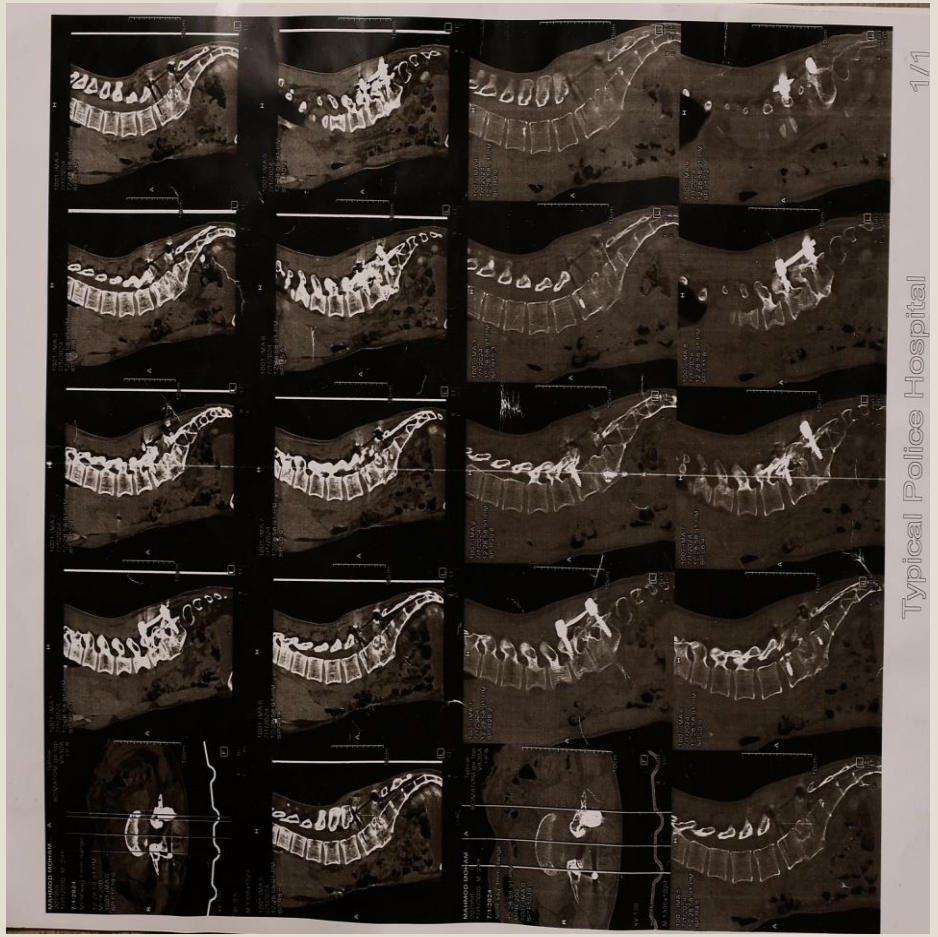




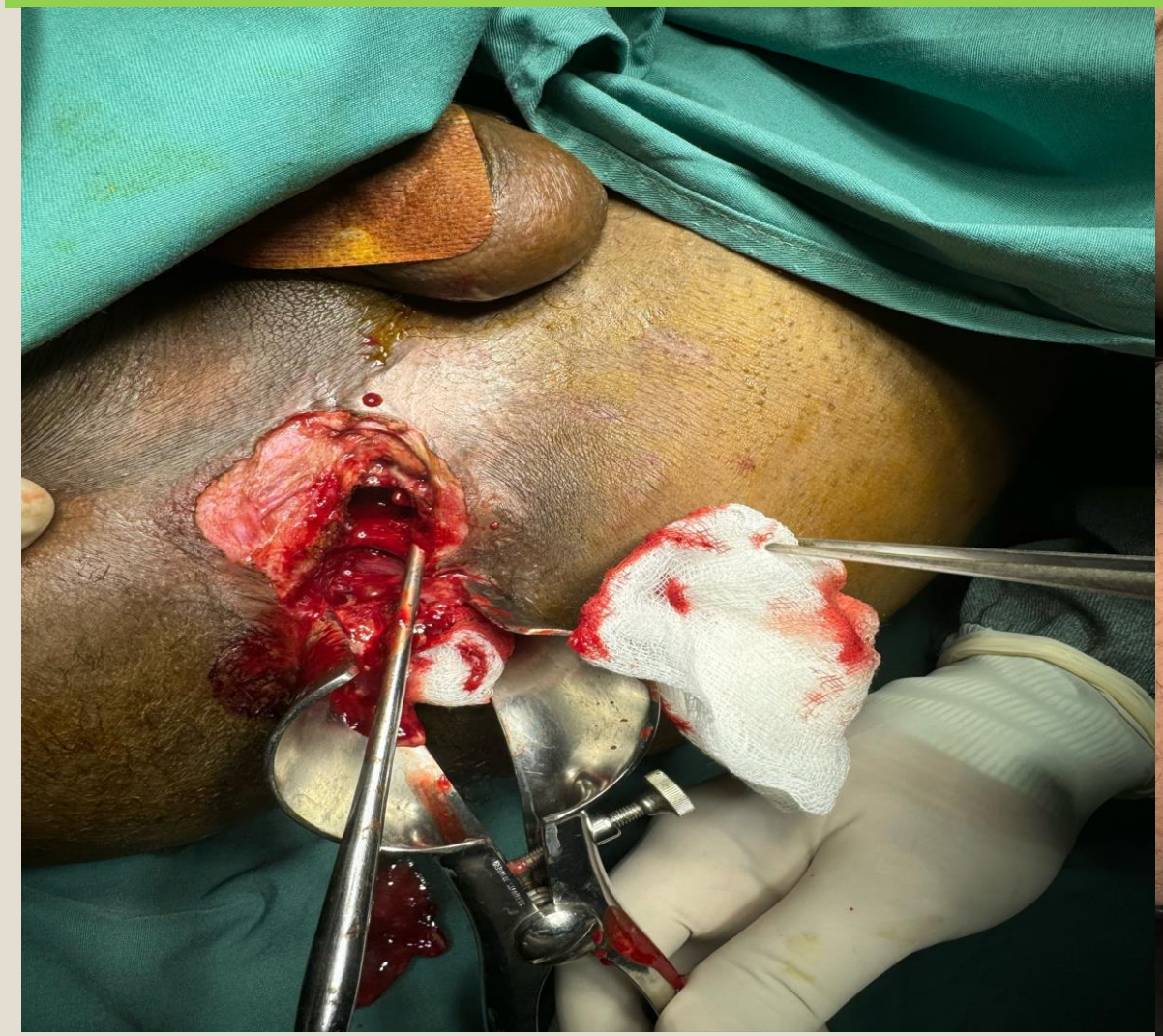


Neuropathic sphincter injury :No repair

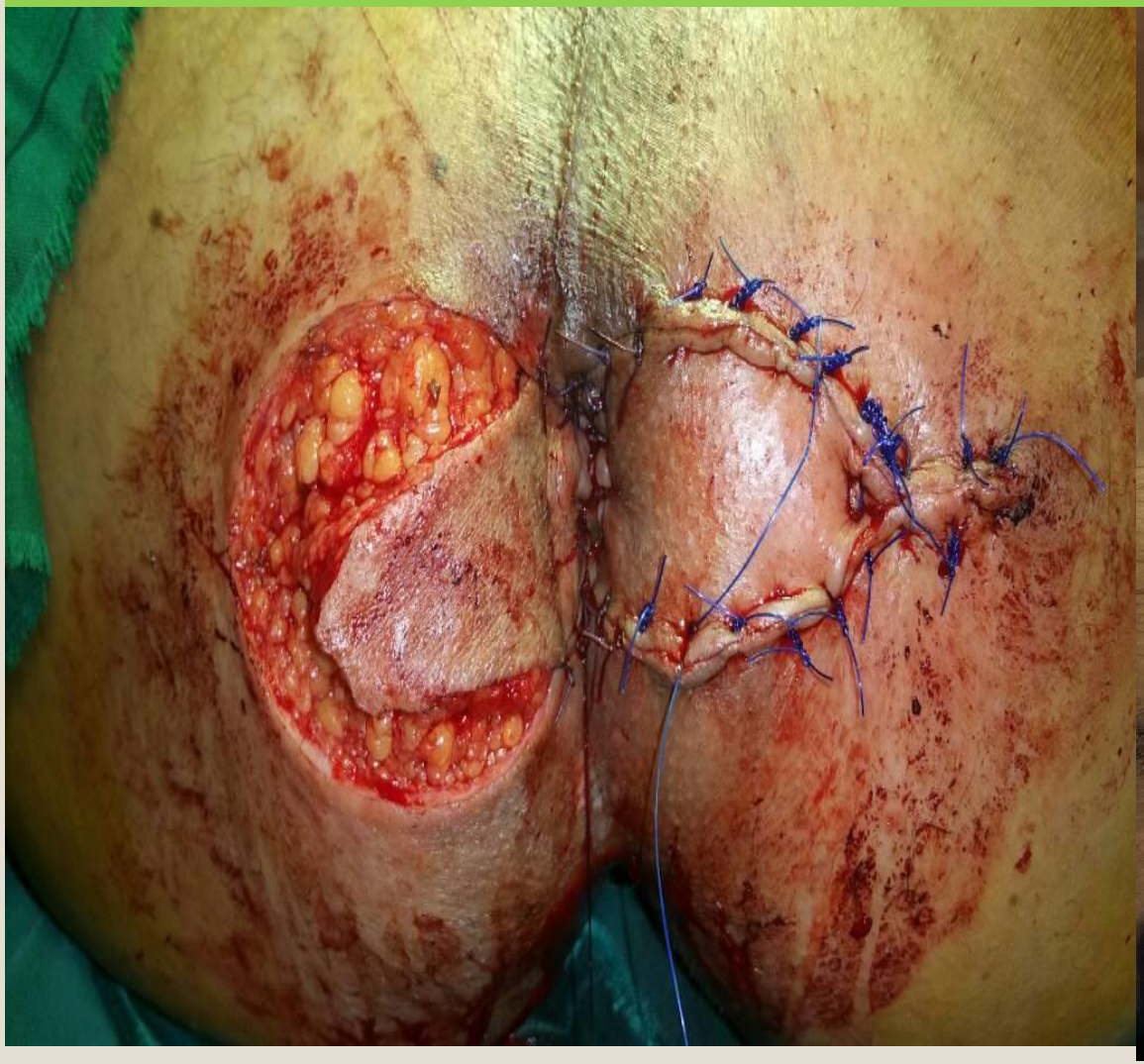


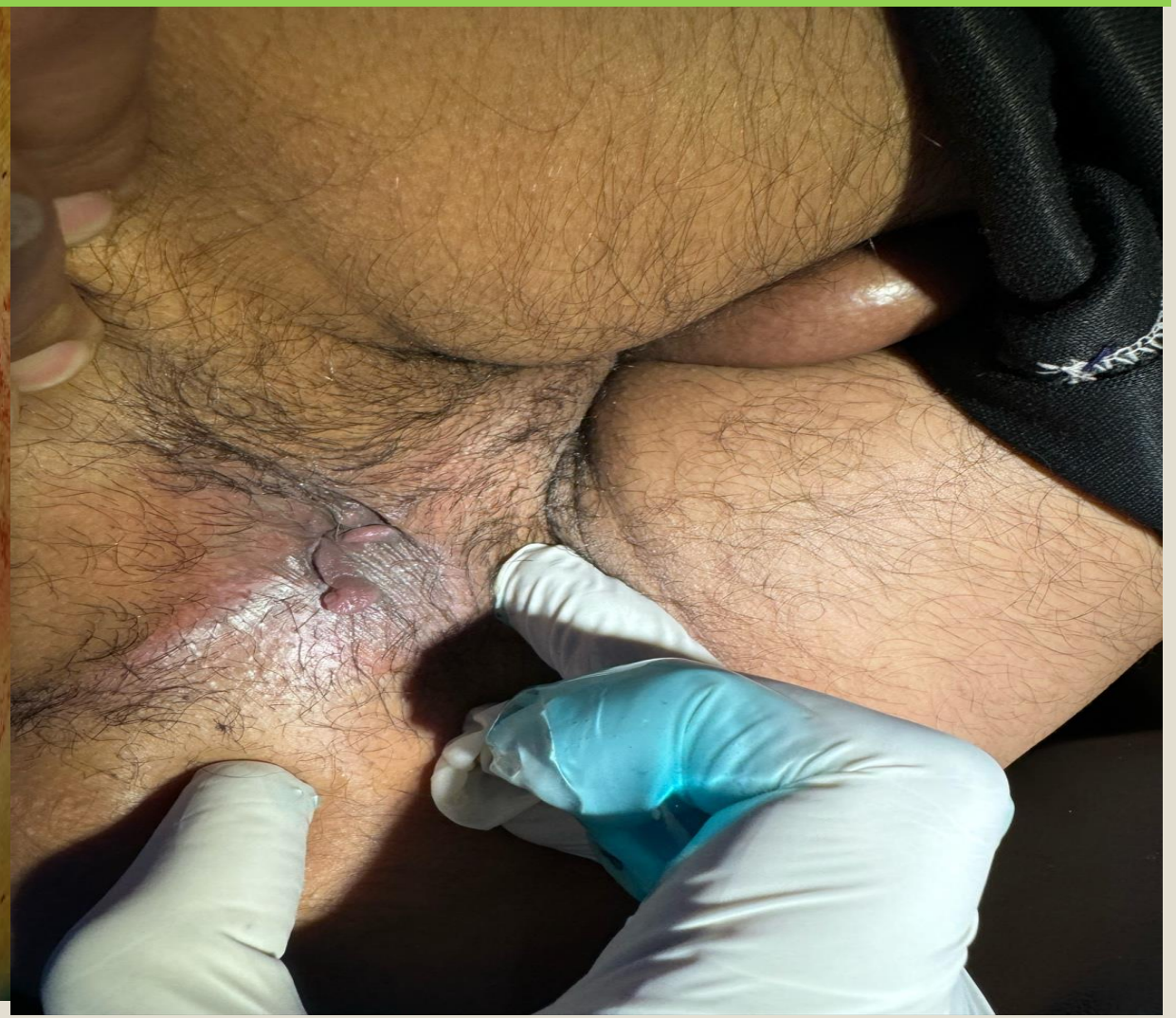


Gun shot from thigh with Rt sided sphincter defect

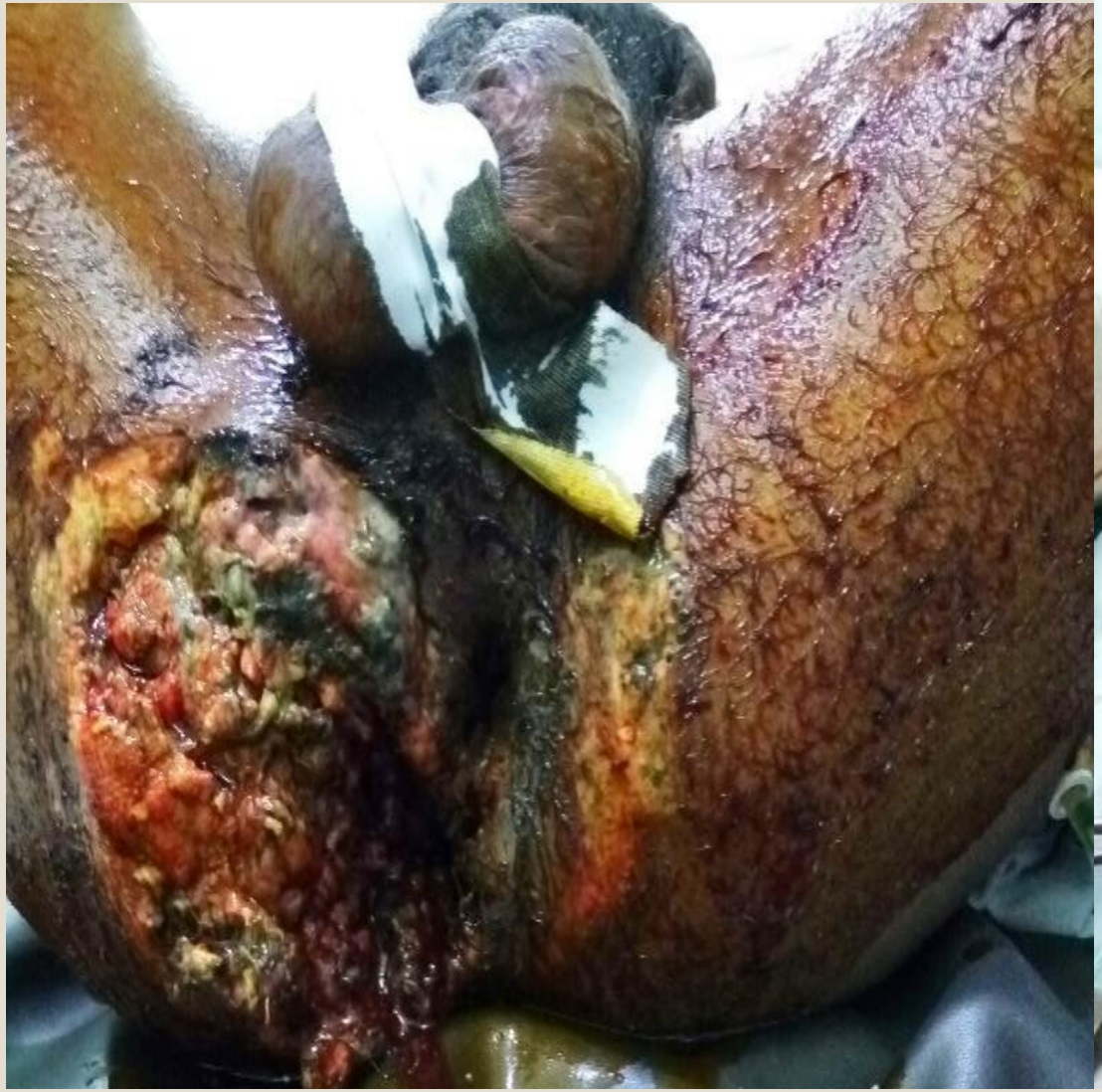


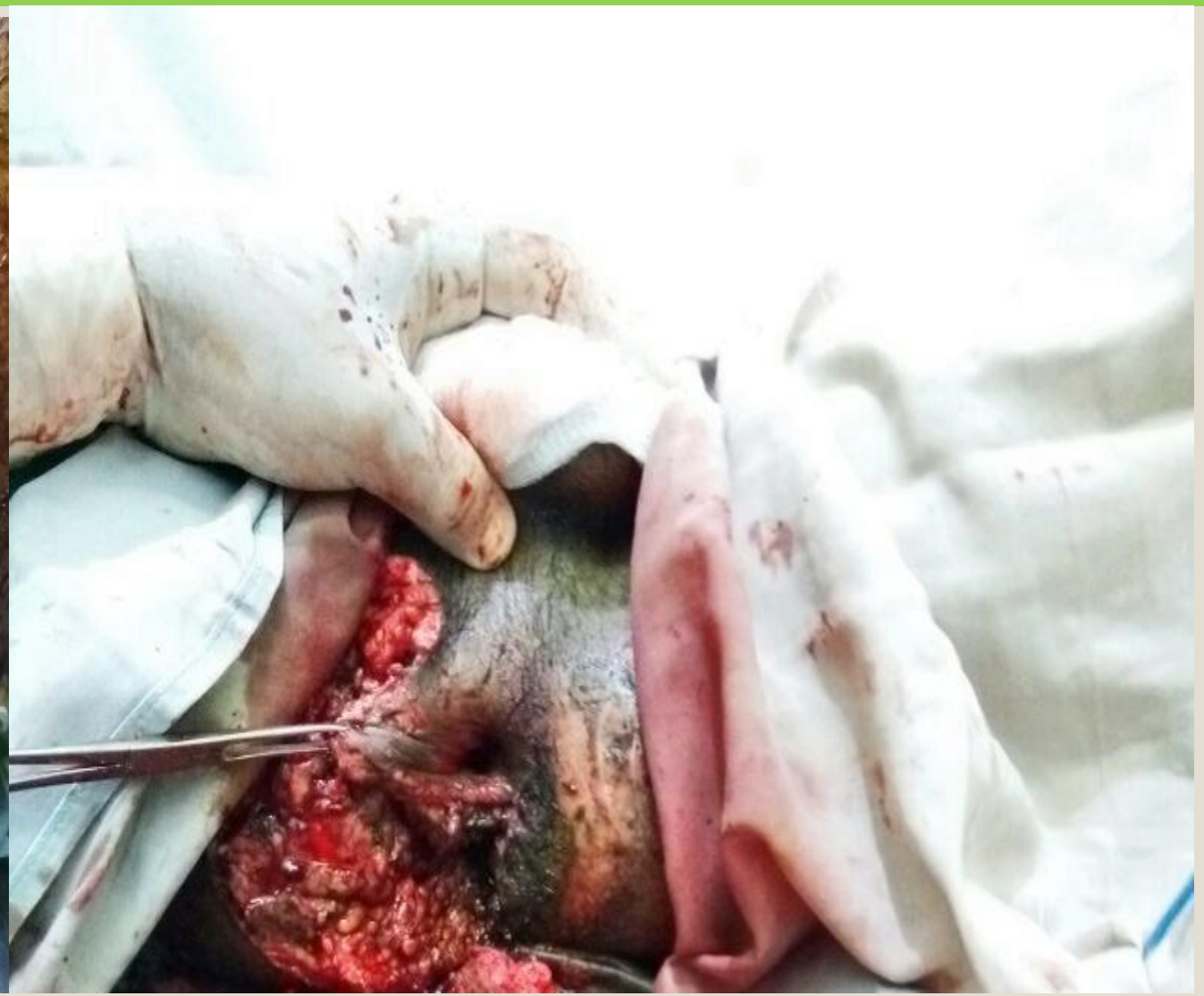
Post sharpnel pentrating rectal stenosis and fibrosis



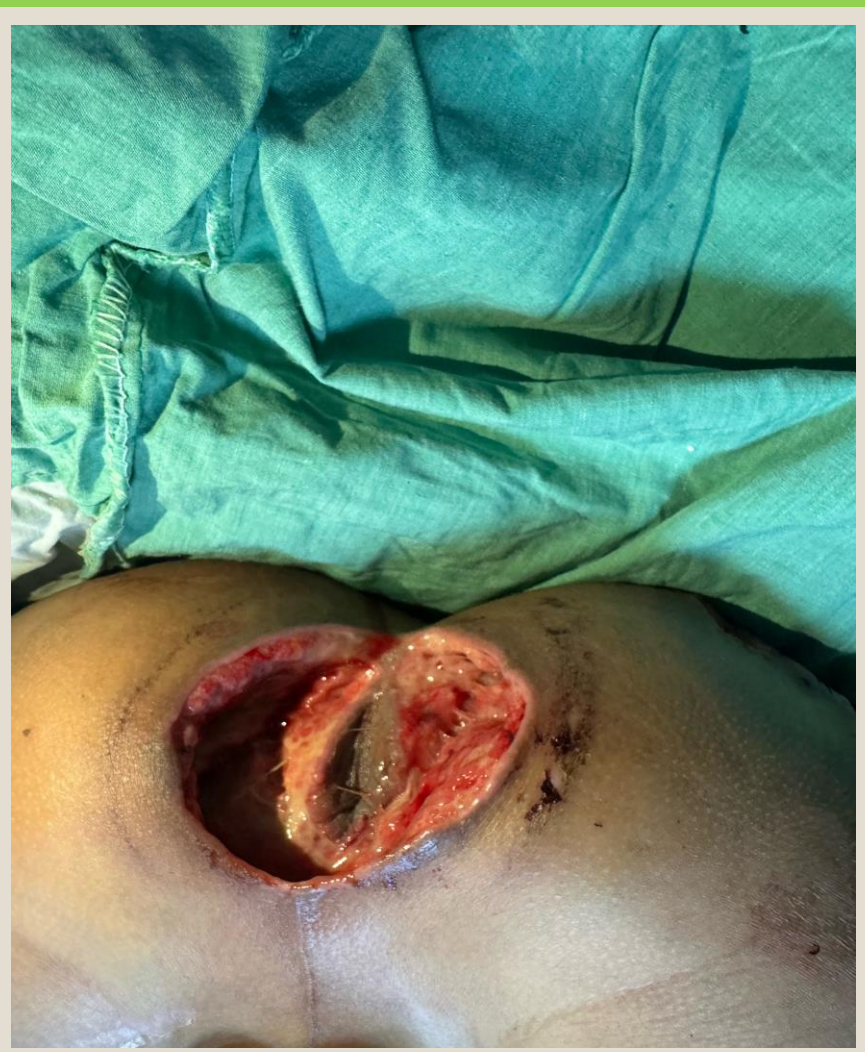


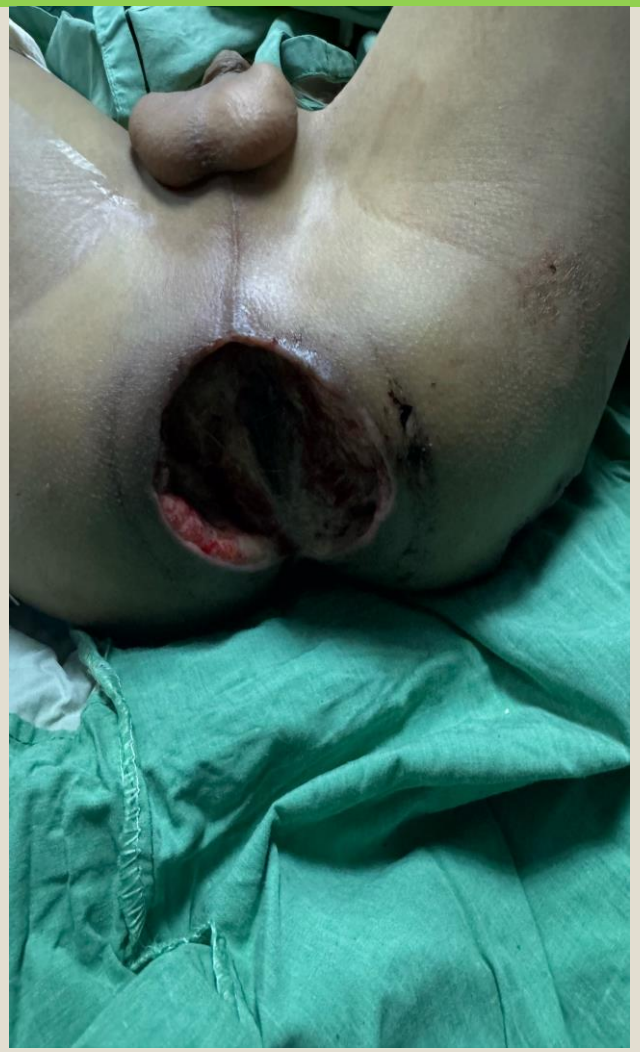
Healed without sphincter repair

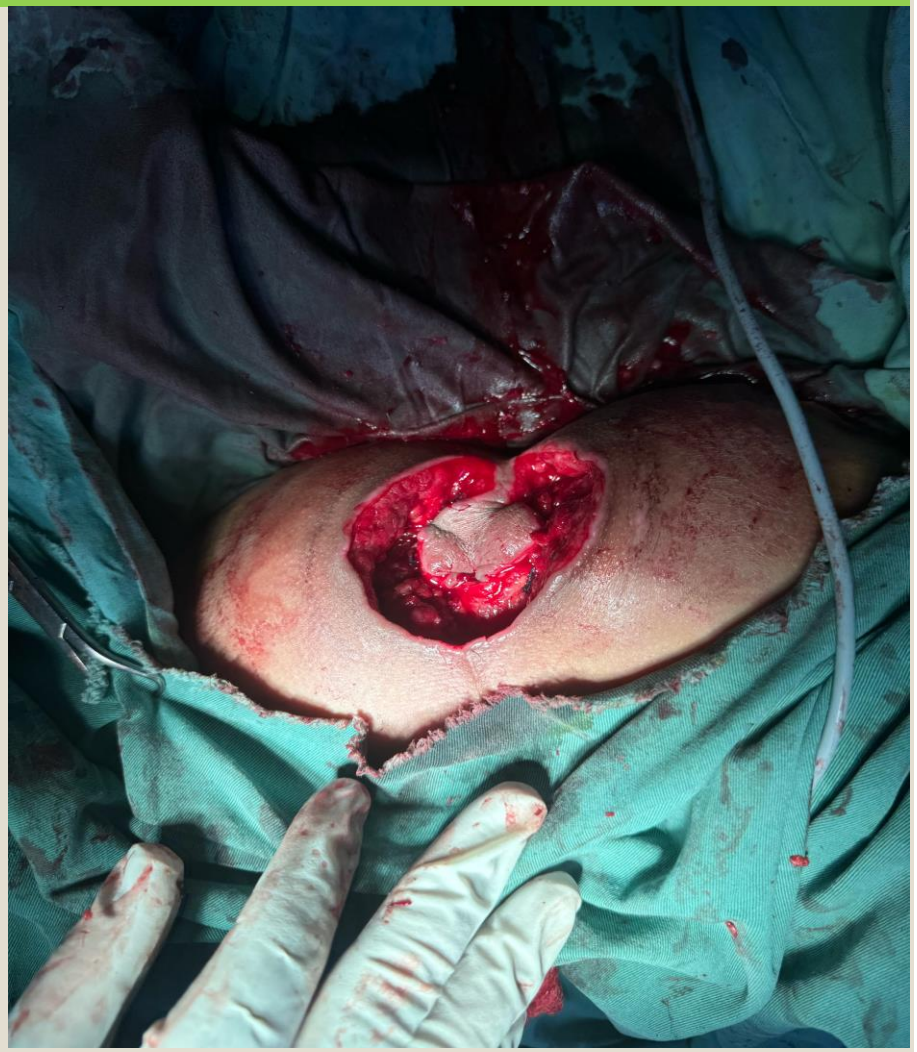




Dislocated anal canal and circumferential sphincter injury post gunshot: re-joining the parts







Operative management: Colostomy

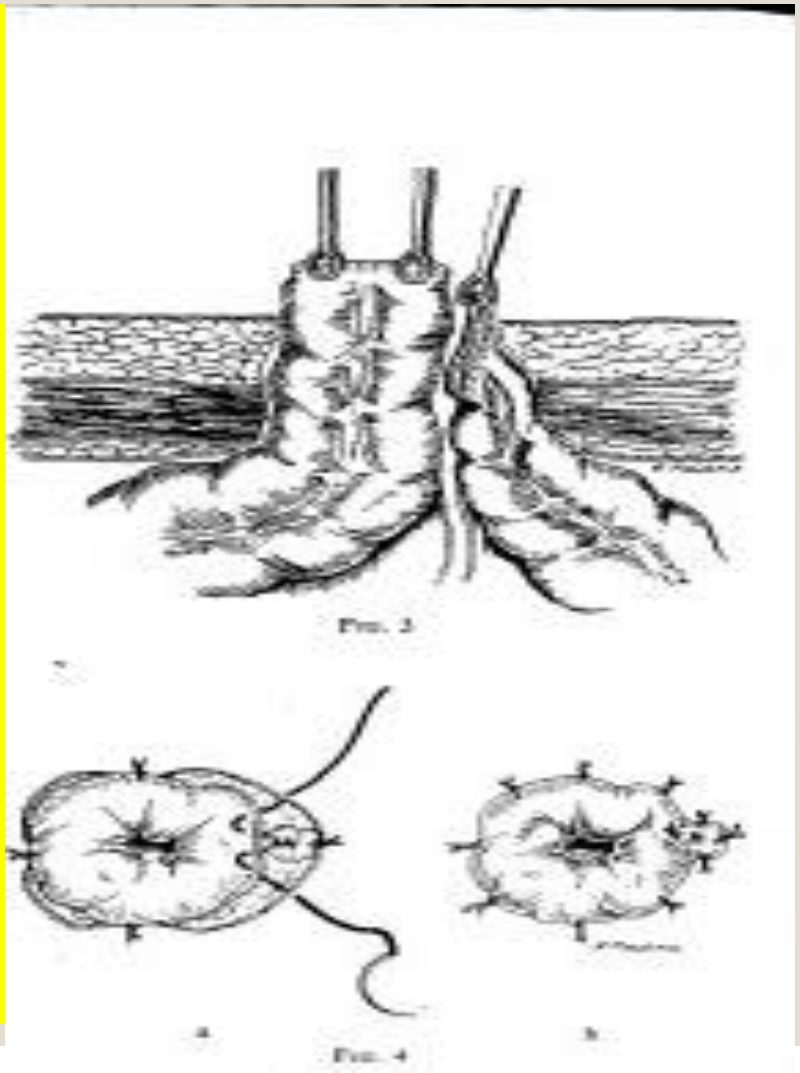
❖**Historical Perspective**

The history of the management of rectal trauma parallels that of colon trauma with many of the therapeutic principles evolving from lessons learned from wartime experiences.

- ***Mortality from rectal gunshot wounds was as high as more than 60% in the early part of World War II, until the Army Surgeon General mandated colostomy for all colon and rectal injuries.***

Operative maanagement: Sigmoid Colostomy

- • END-LOOP COLOSTOMY in 30 cases. • LOOP SIGMOID COLOSTOMY in 70 cases
- (Stepwise technique with distal mucosal exclusion at performing the loop sigmoid colostomy proved to be safe to protect the distal end of rectum from soiling).



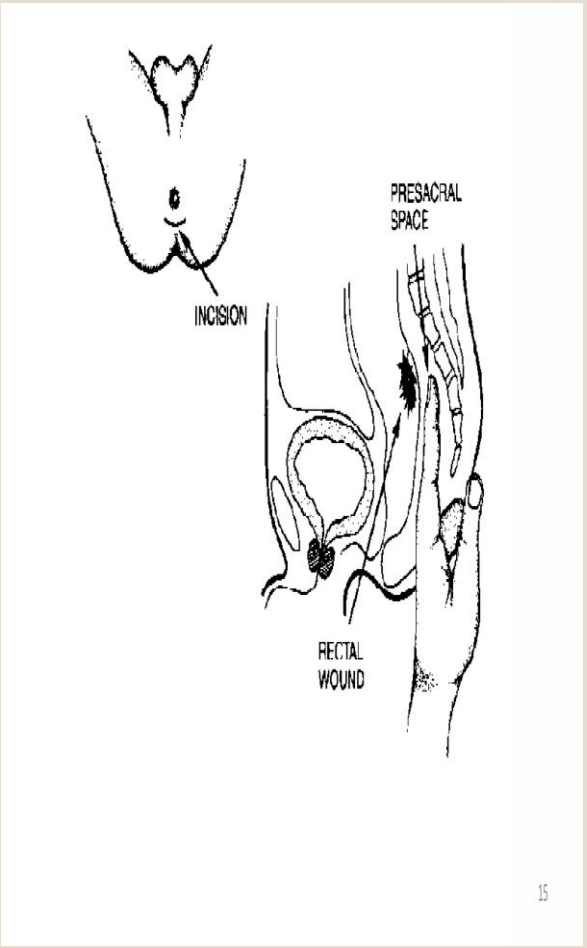
Operative management: presacral drainage

❖**Presacral drainage was added in 1943, and appeared to further improve mortality.**

Shortly *after World War II, distal rectal washout became part of the routine management.*

The triad of colostomy, presacral drainage, and rectal washout remained the standard of care of these injuries over the next several decades, despite the lack of any solid scientific evidence.

The *validity of these principles however was challenged in the 1990s with new studies suggesting that routine colostomy may not be necessary, presacral drain may have little or no value, and rectal washout may be harmful.*



Perineal and anal canal injuries

- **Delay sphincteric or tissue repair**
- **Initially, debridement and hemostasis and diversion were done.**
- **Diversion**
  - **In extensive and involving the sphincteric complex of the anal canal.**
  - **After the perineal wound control, sphincteric repairs performed**
  - **we closed colostomy 3 months later when the repair wound healed**

Distal washout

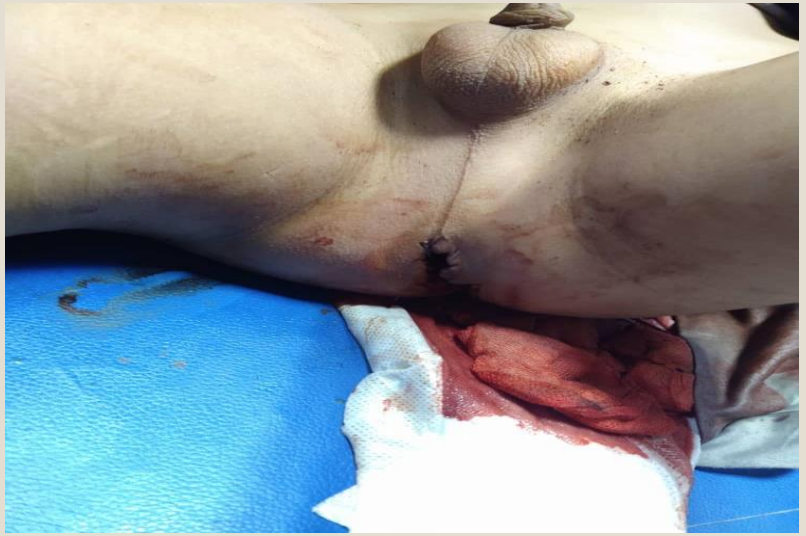
- **Distal rectal irrigation was added to the management of rectal injuries during the Vietnam War.**
- **There is no evidence that it is of any value in reducing morbidity.**
  - **It has been suggested that washout may liquefy the rectal contents and facilitate fecal spillage into the surrounding extrarectal soft tissues.**

Anal sphincter injury

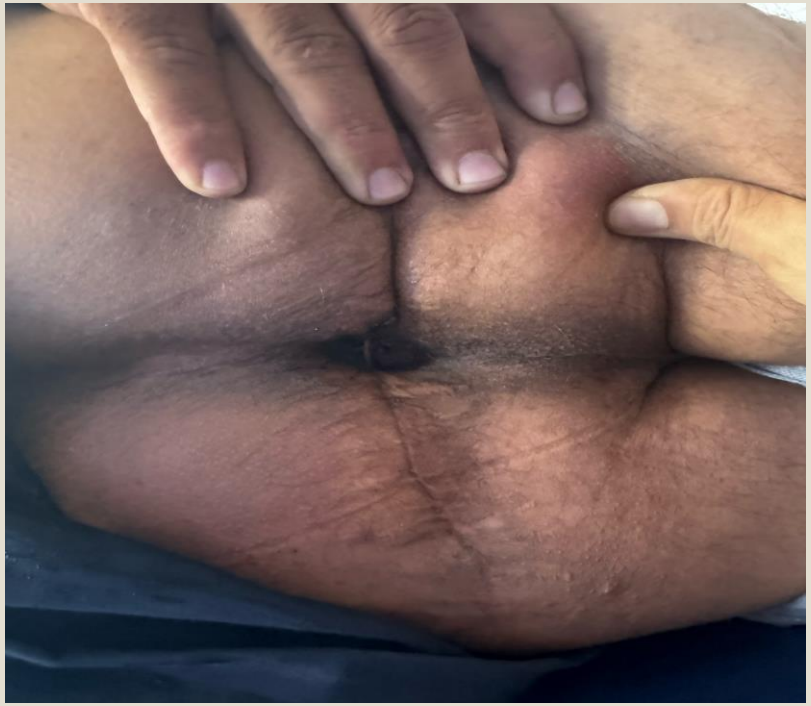
- **Primary Repair:**
  - ✓ **Accurate identification and reconstruction of the ruptured external sphincter with suturing.**
  - ✓ **No local sepsis**
  - ✓ **Colostomy if extensive.**
    - ❑ **Loop stoma**
      - ❑ **Stepwise technique and distal mucosal closure**
- **Secondary Repair:**
  - **Mayo's repair vs direct (better results)**
  - ✓ **Repair later on with reconstruction**
    - ❑ **Gluteus maximum muscle done for 28 male patients**
      - ❖ **Adynamic**
      - ❖ **Unilateral**

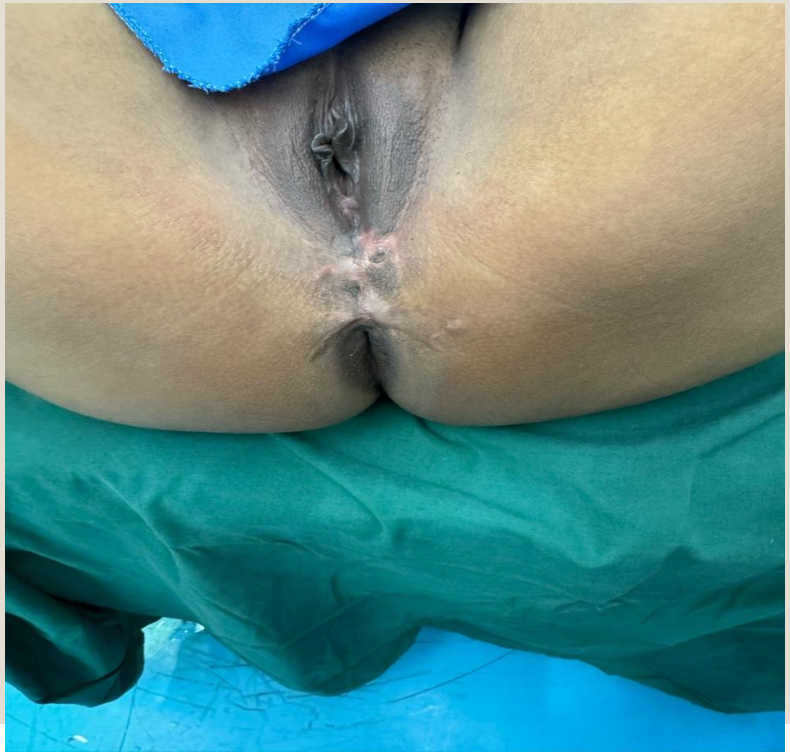
Wound care

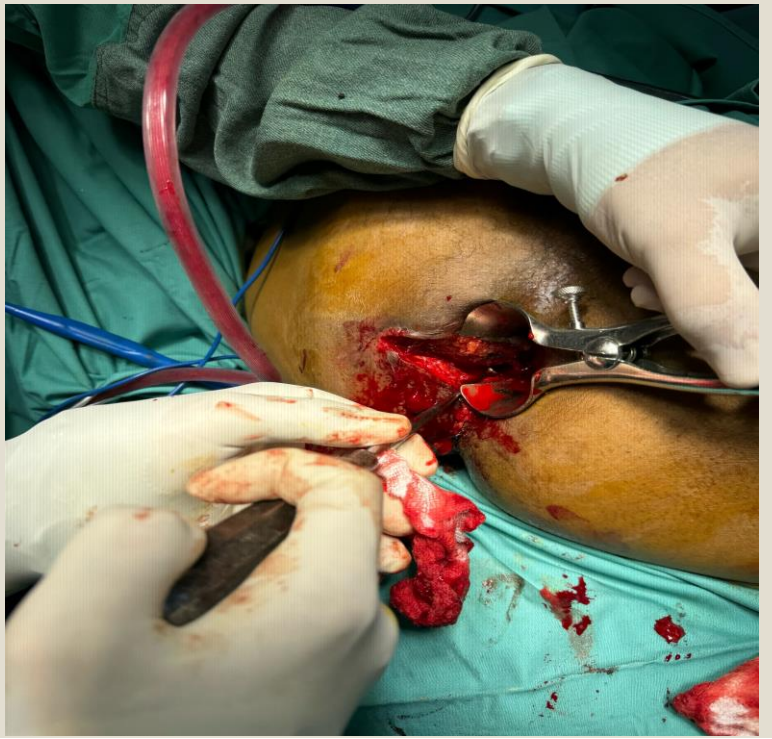
- Irrigation of the wound with saline and betadine (1cc with 9cc NS)
  - Left open
  - dressed twice daily
  - Secondary closure after 4 to 5 days



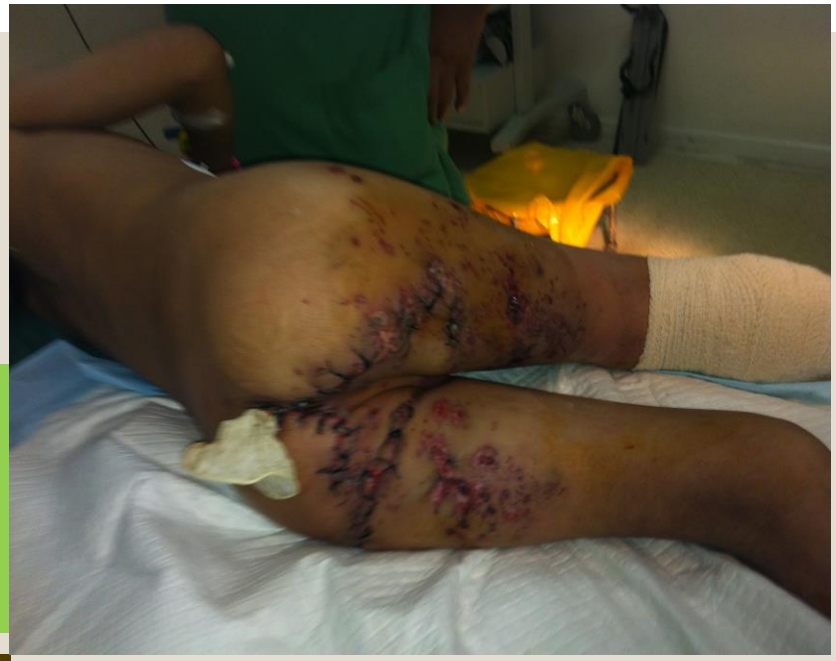
Delay sphincteric repairs with good results

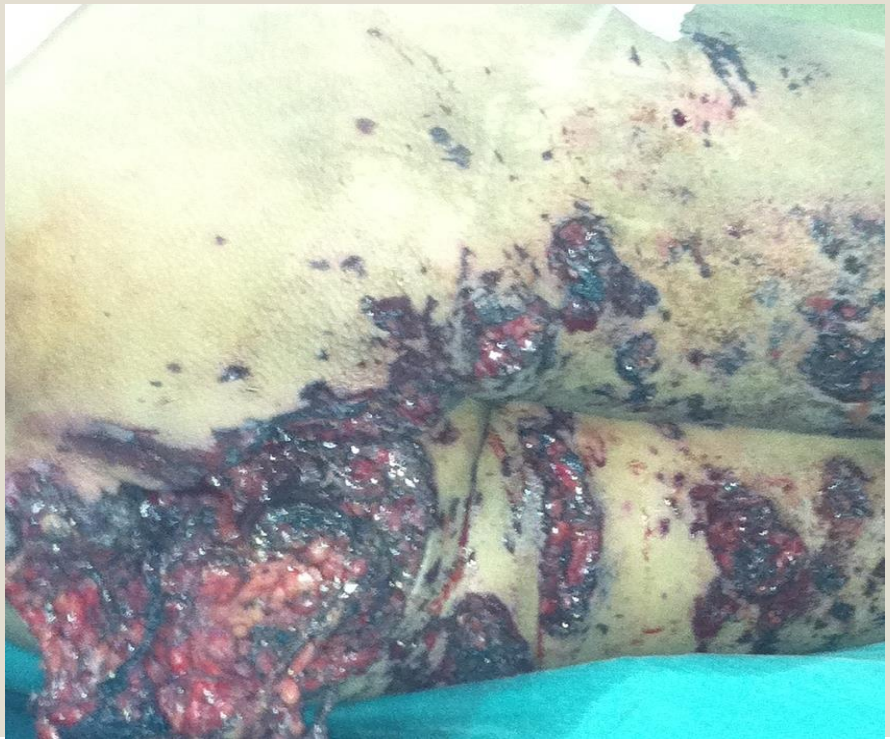


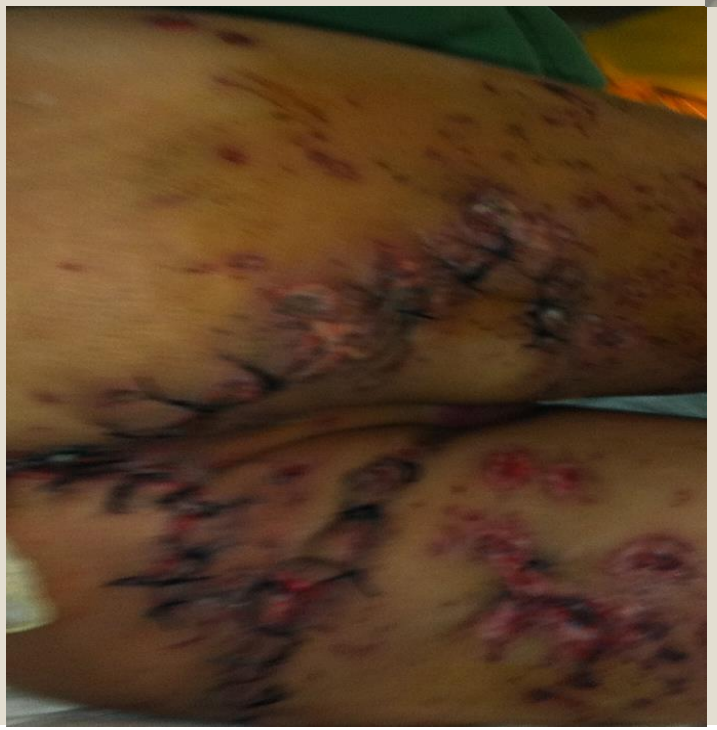


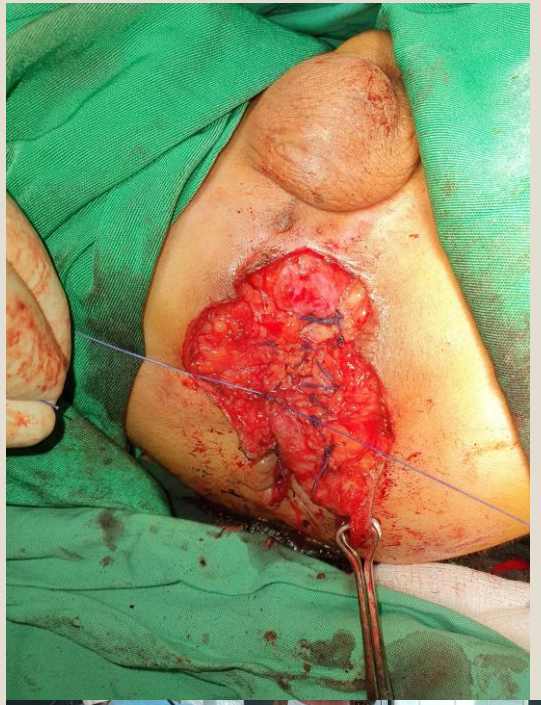
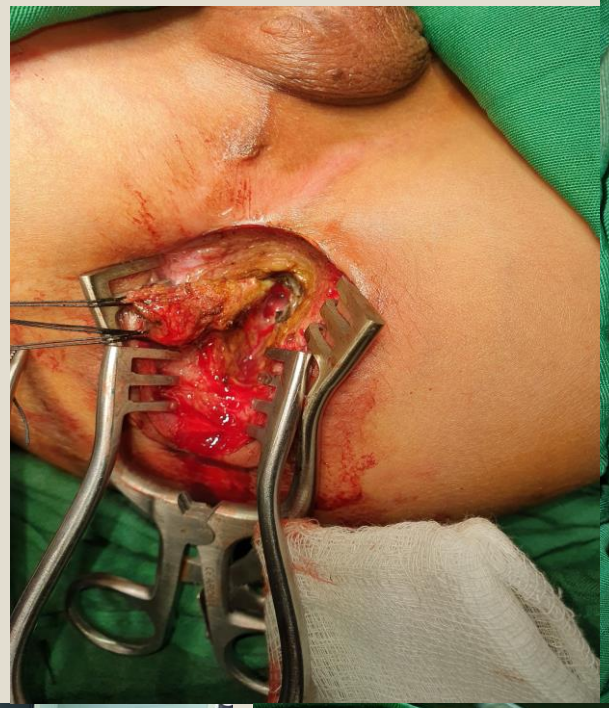
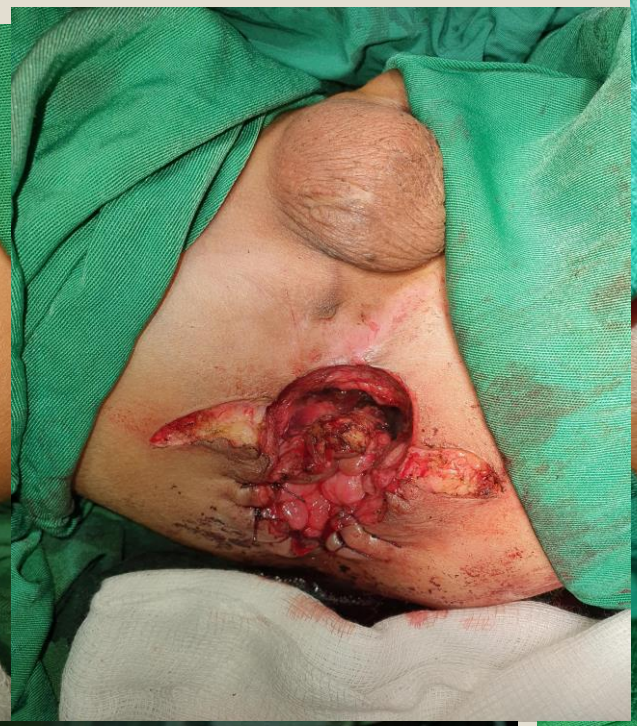
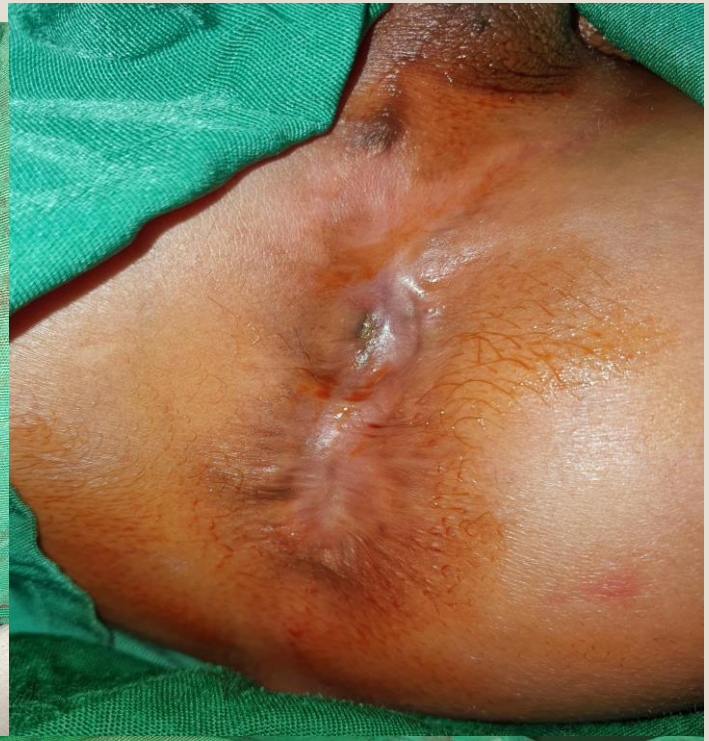
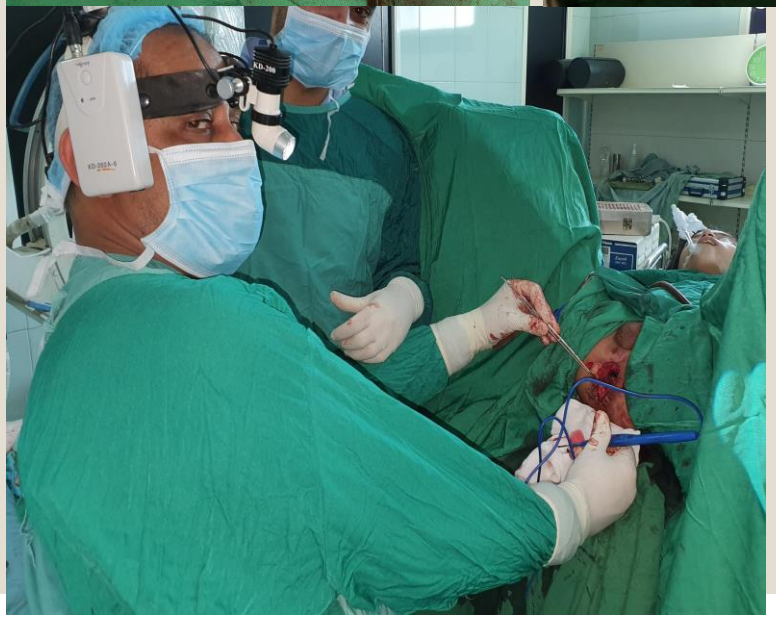
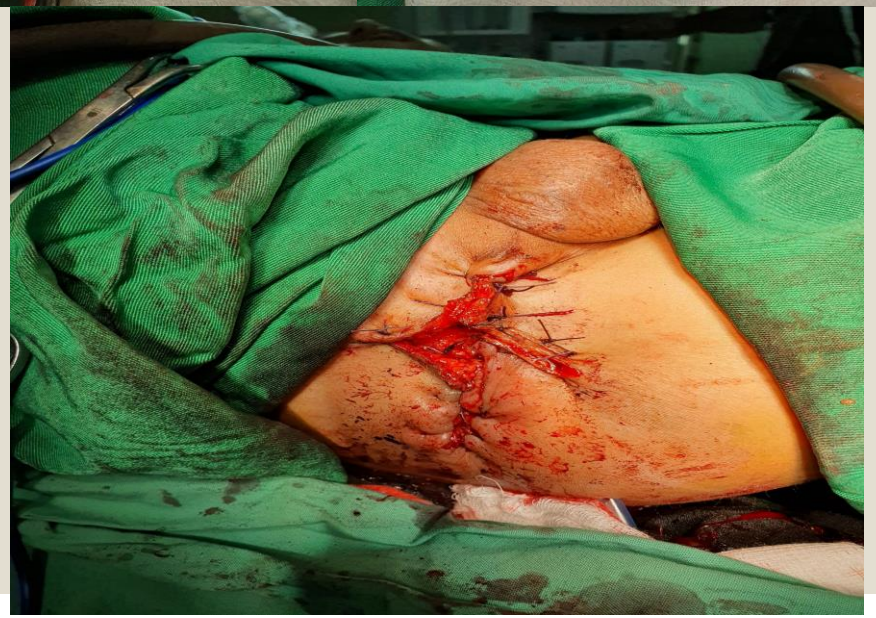
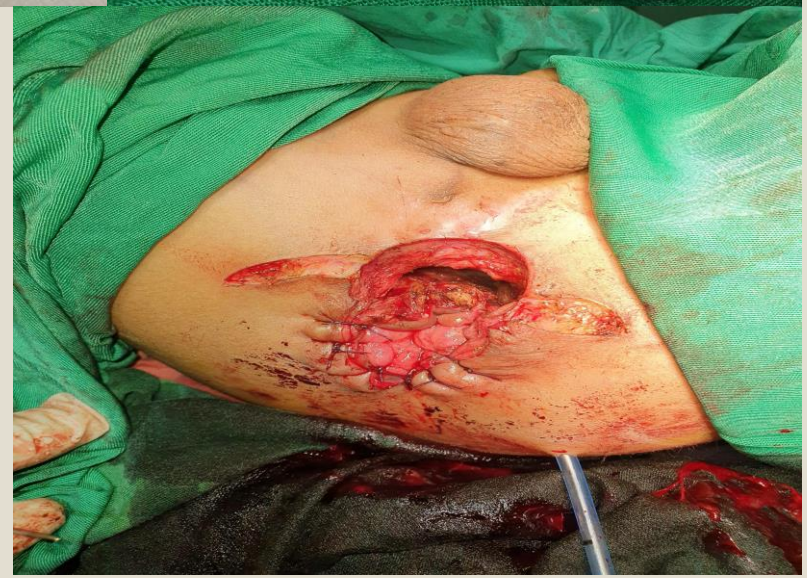


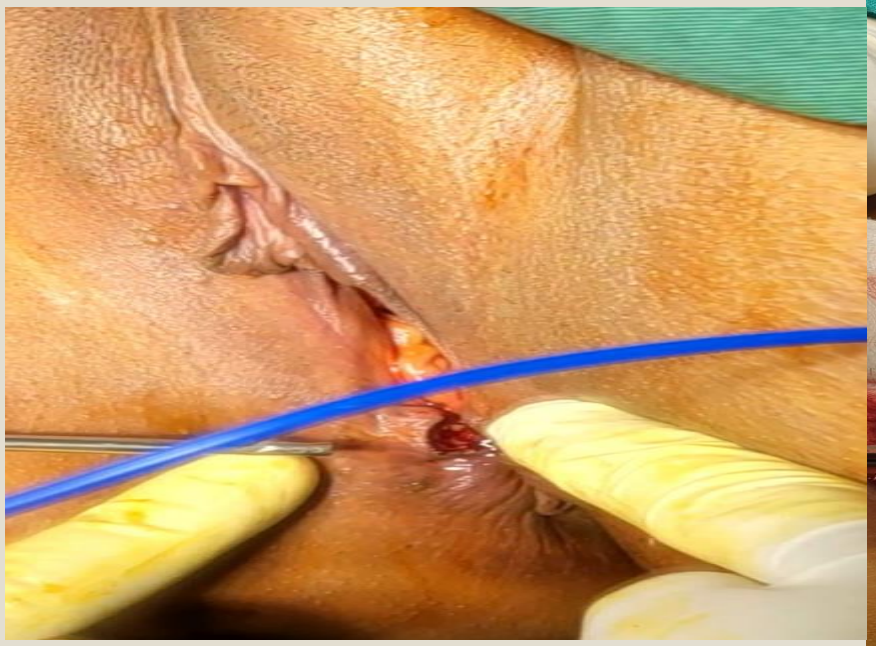
Delay closure with no stoma no sphincter repairs

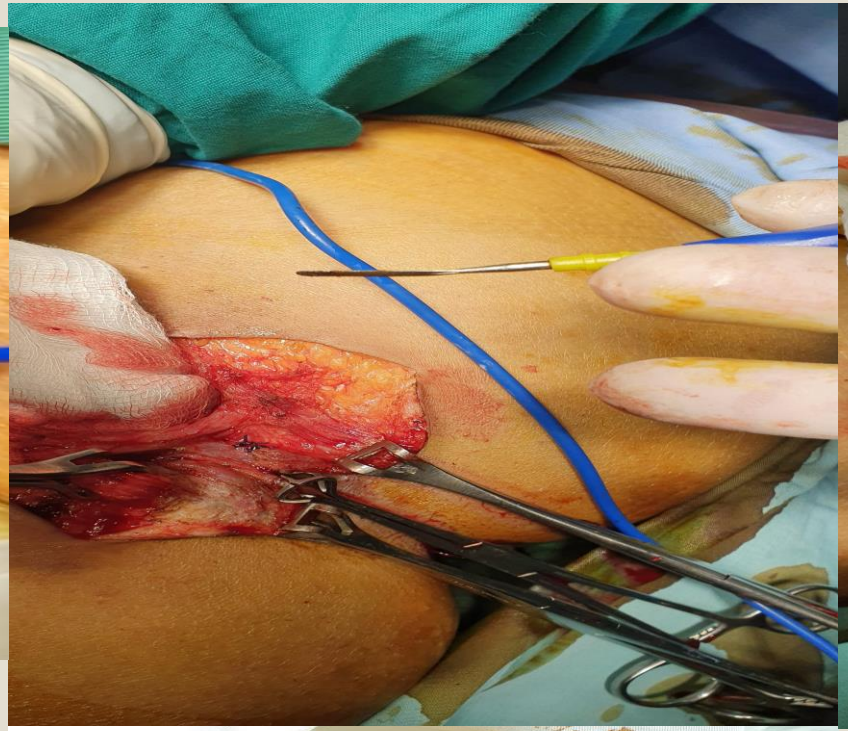


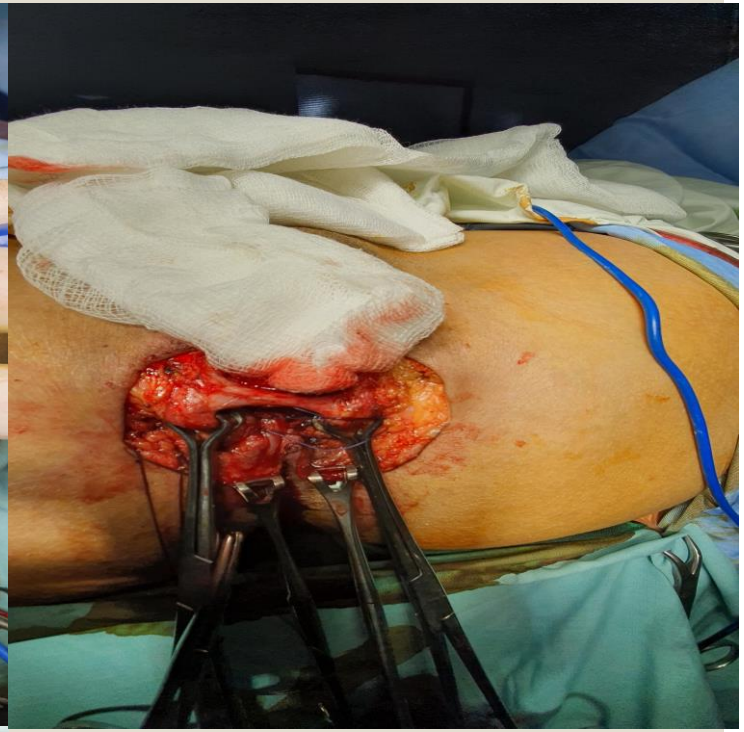


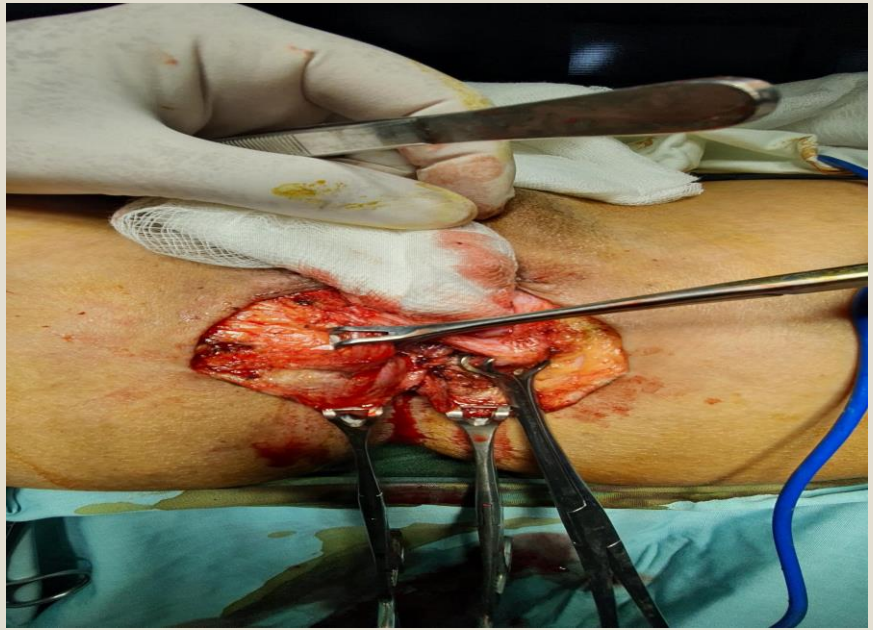


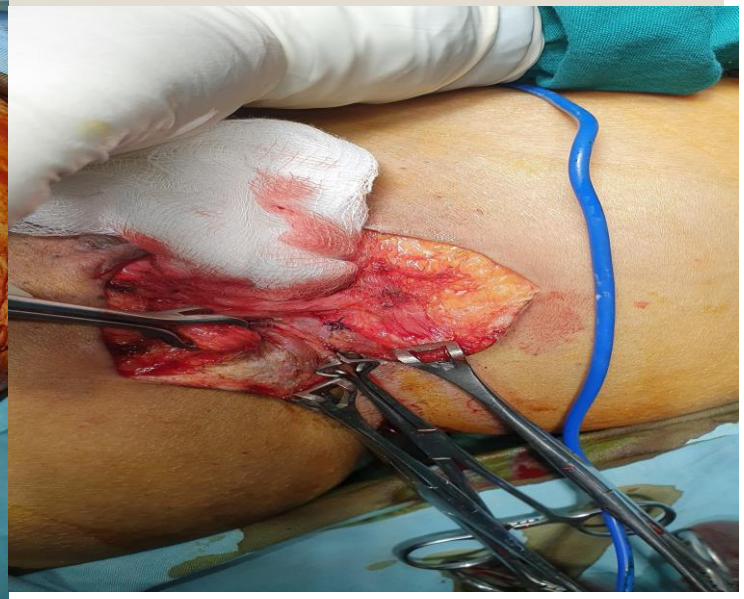










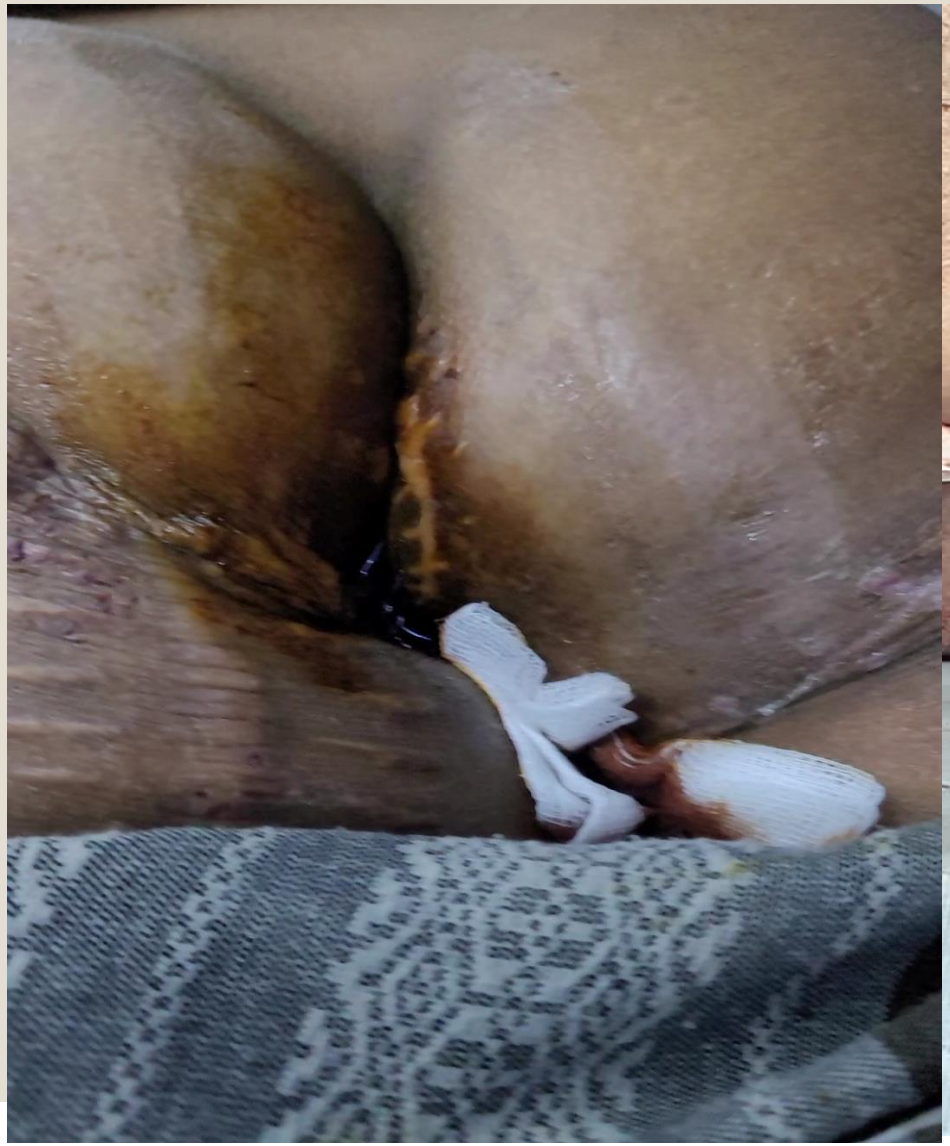


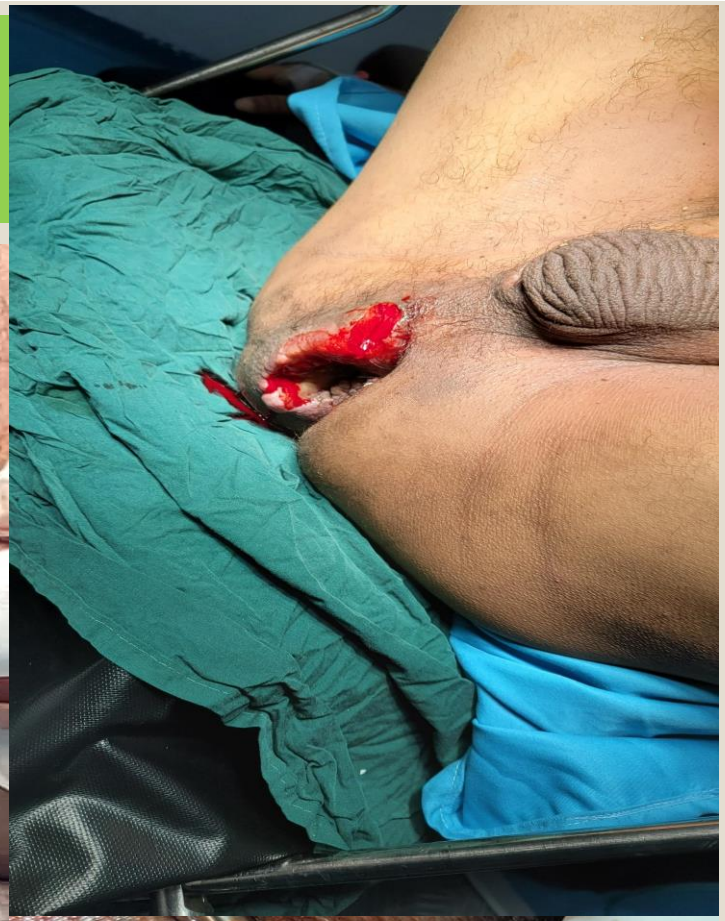


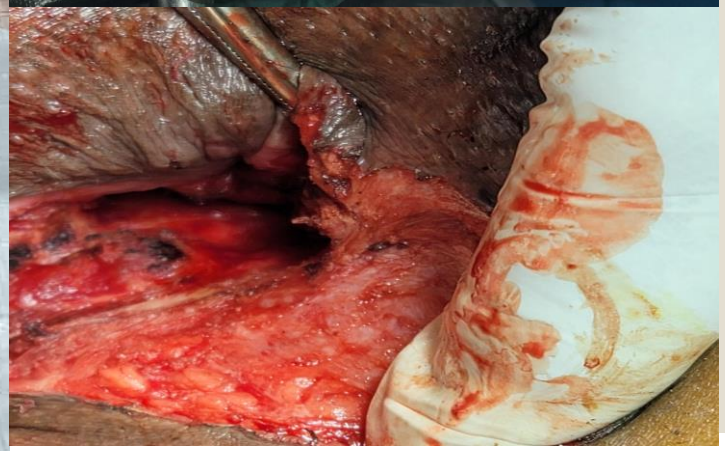




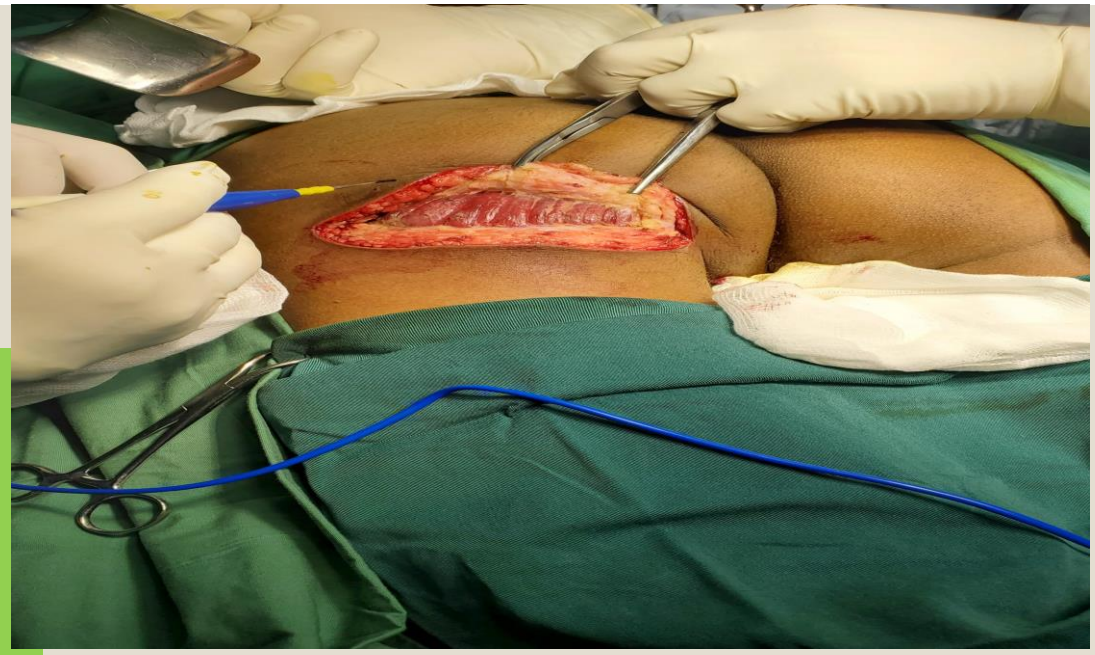
30 Y male pt

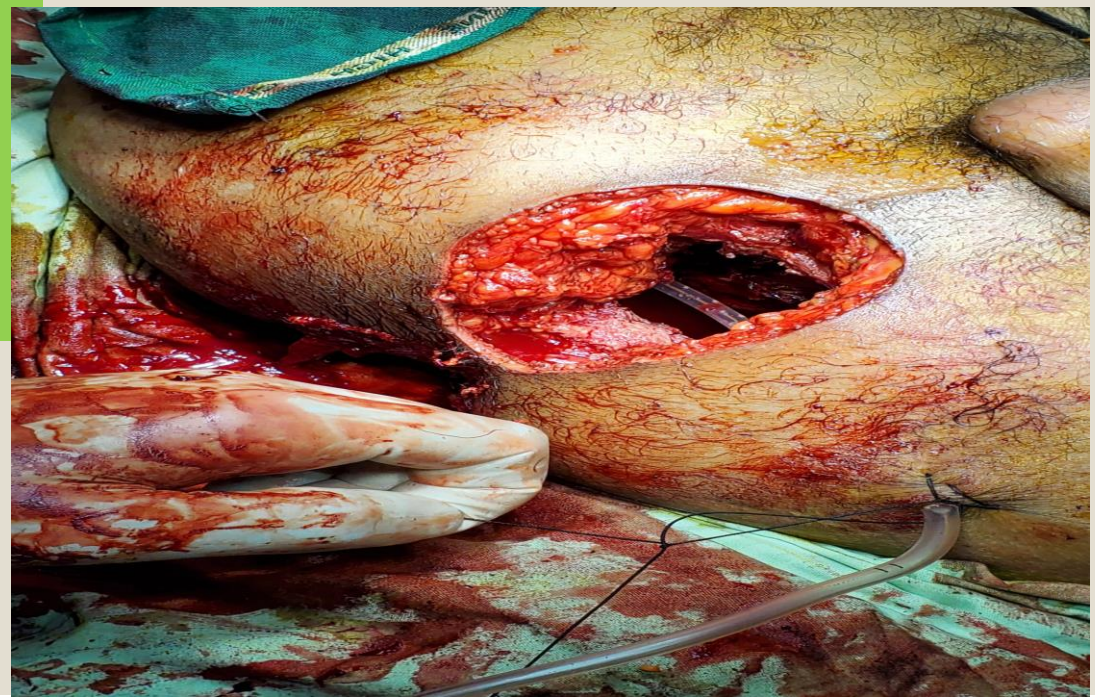




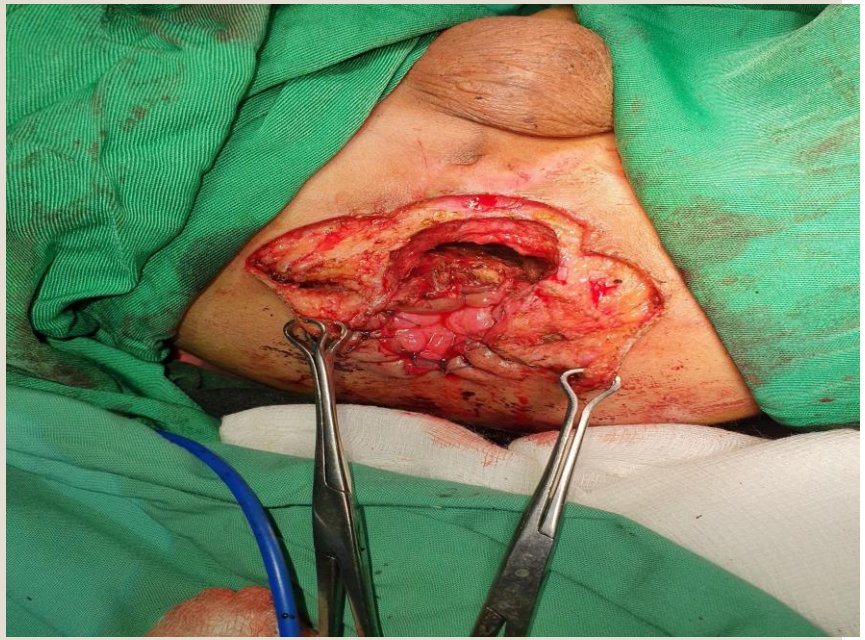


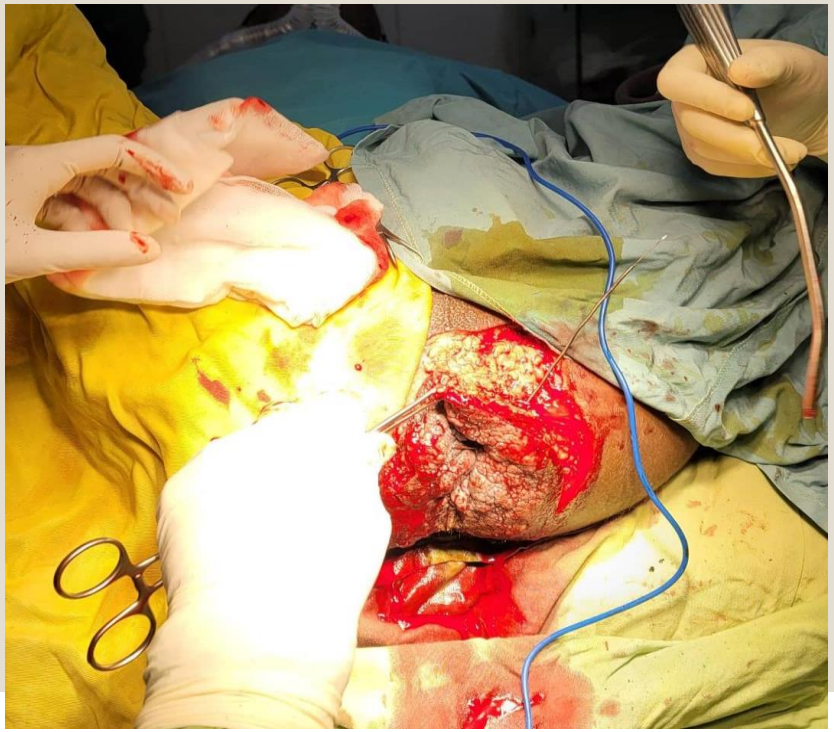
Gluteoplasty and smooth muscle plasty through abdominal

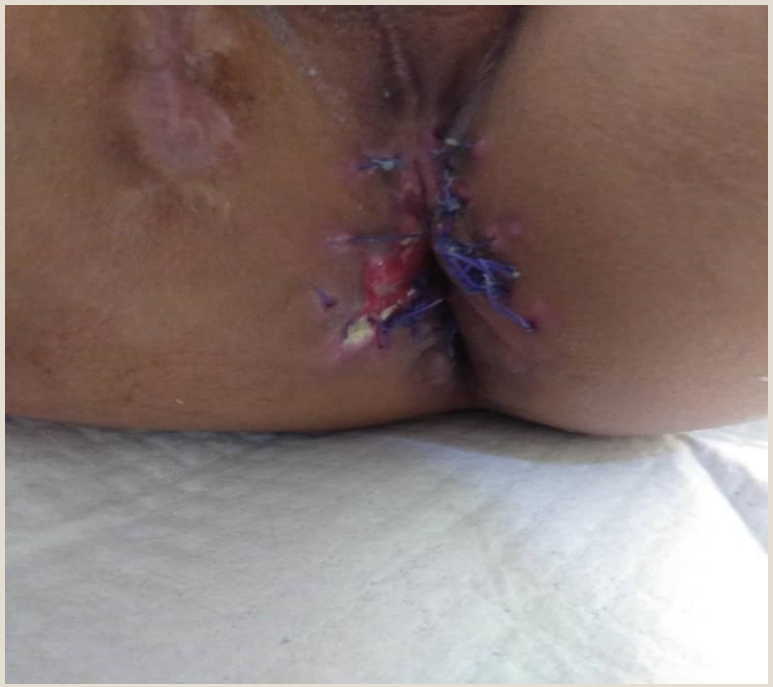


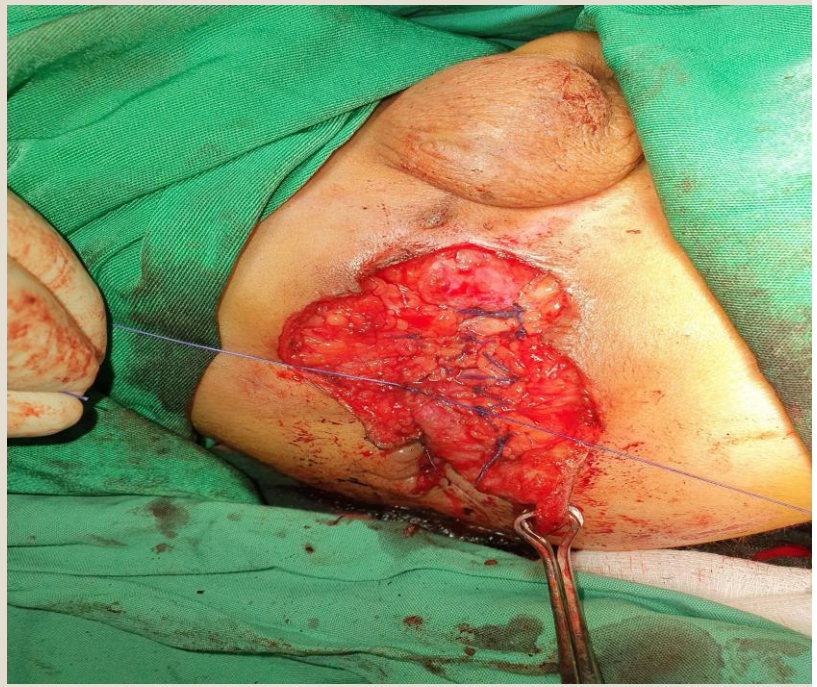


Sphincter overlapping

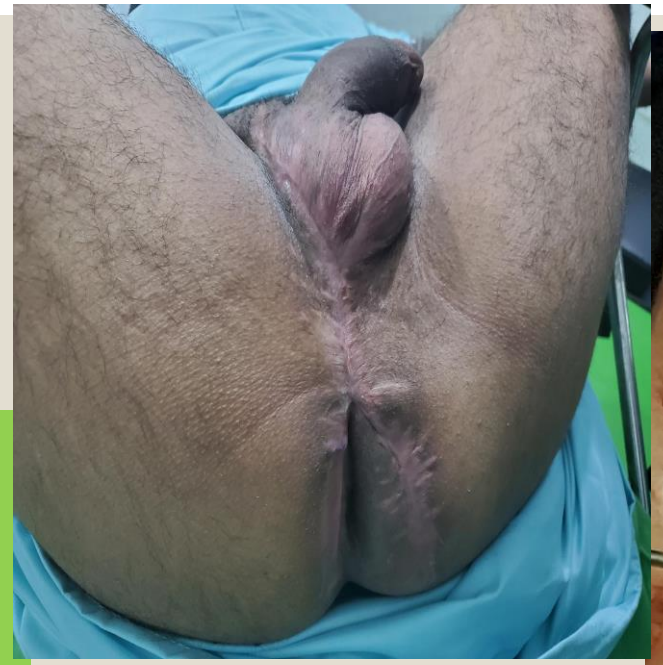


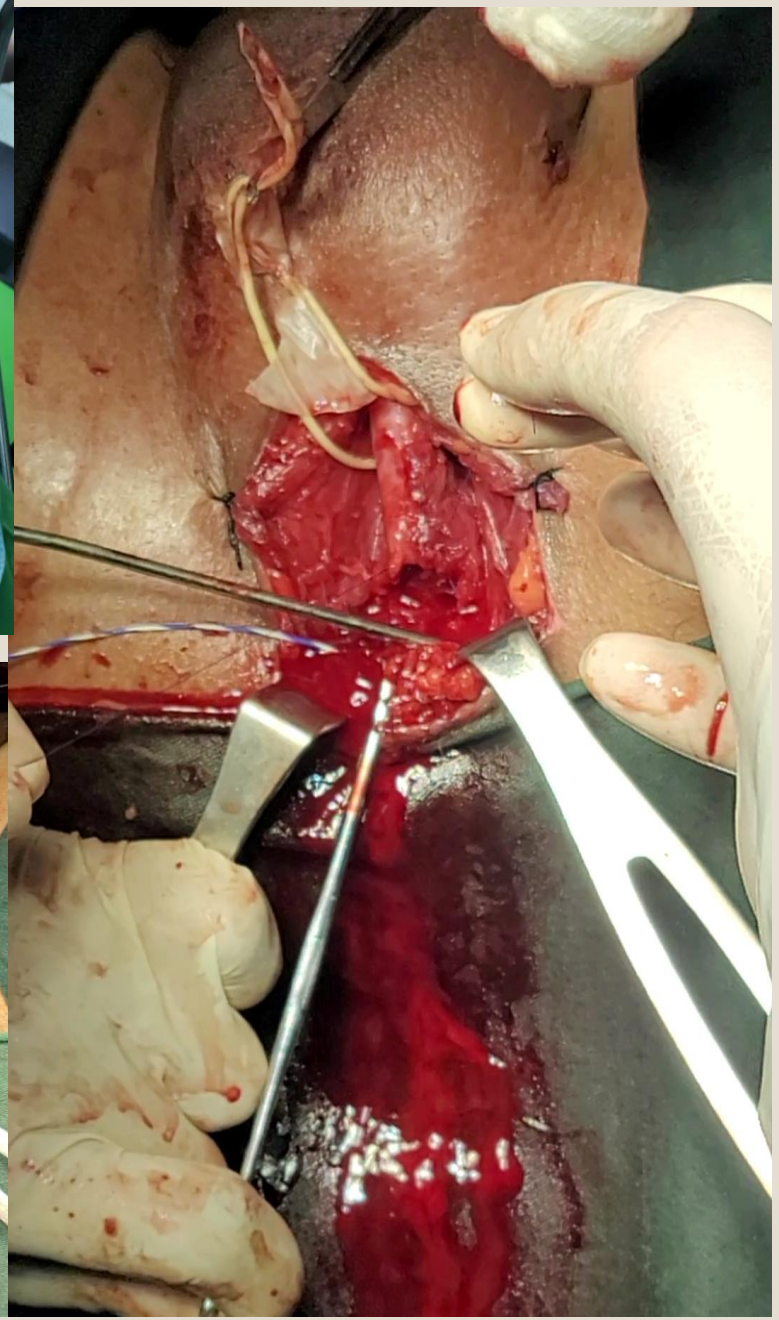


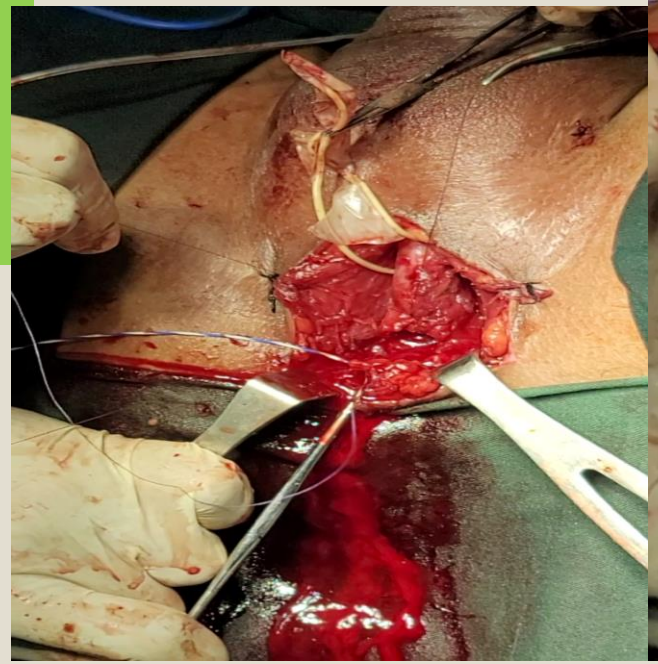


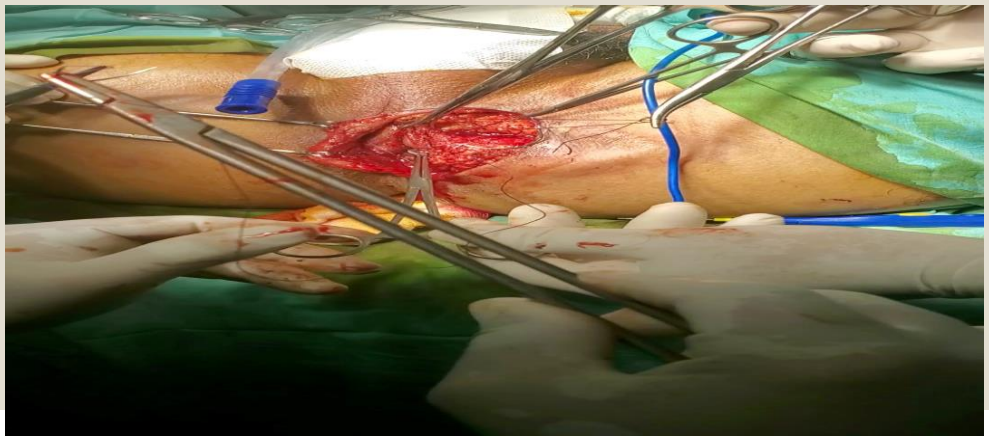


24 y Male Pt. with Gunshot injury. Compined urethral and sphincter complex reconstruction

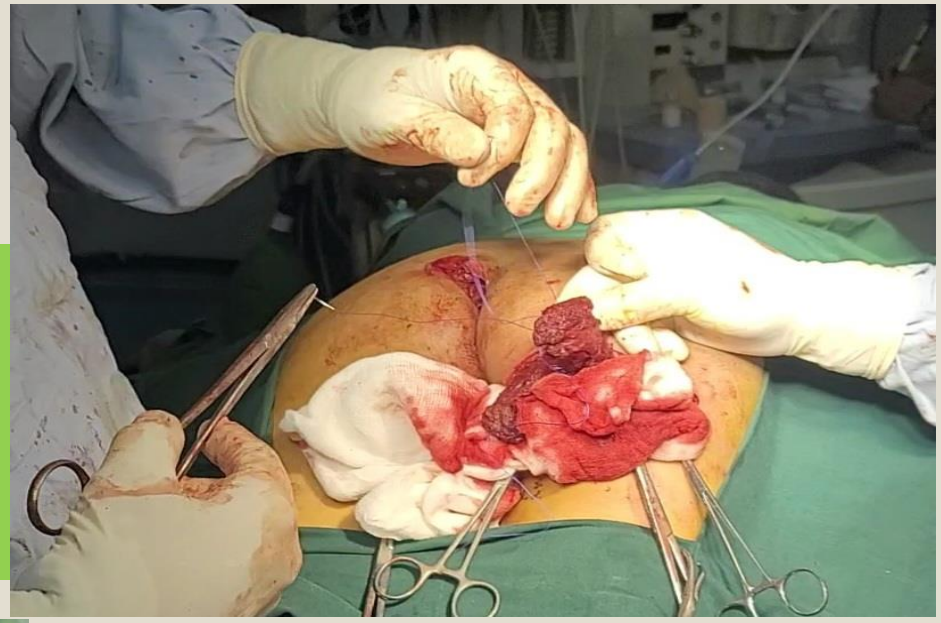


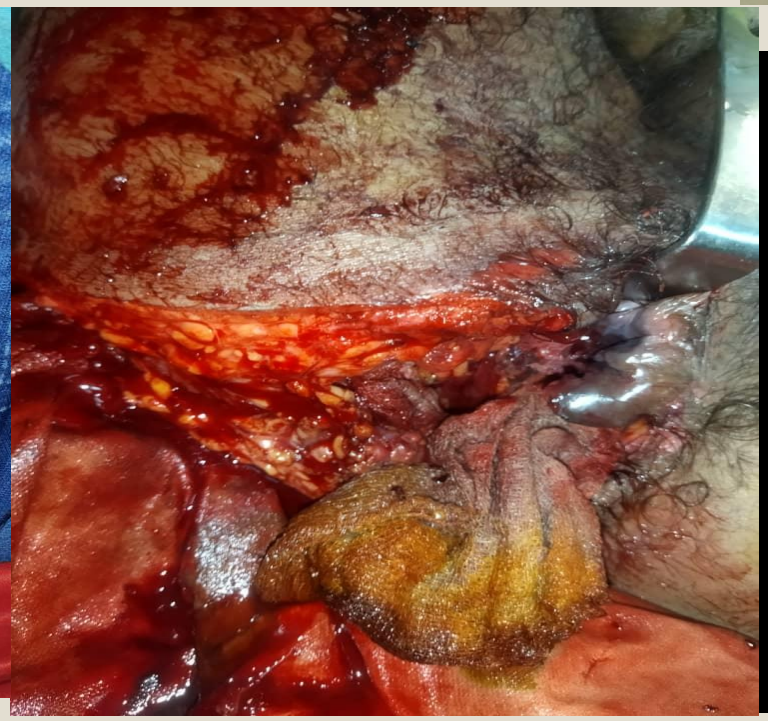


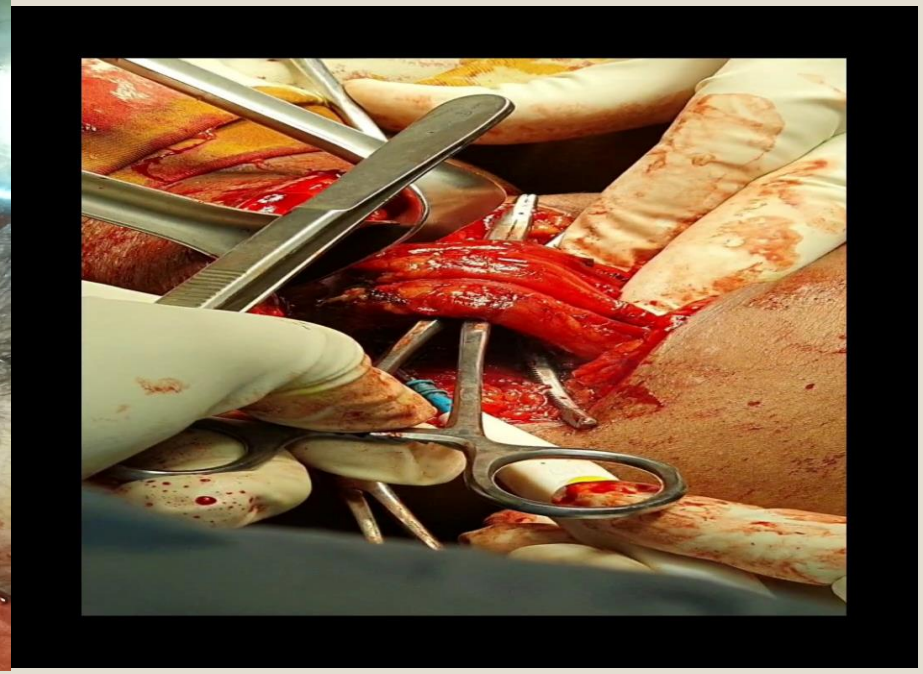




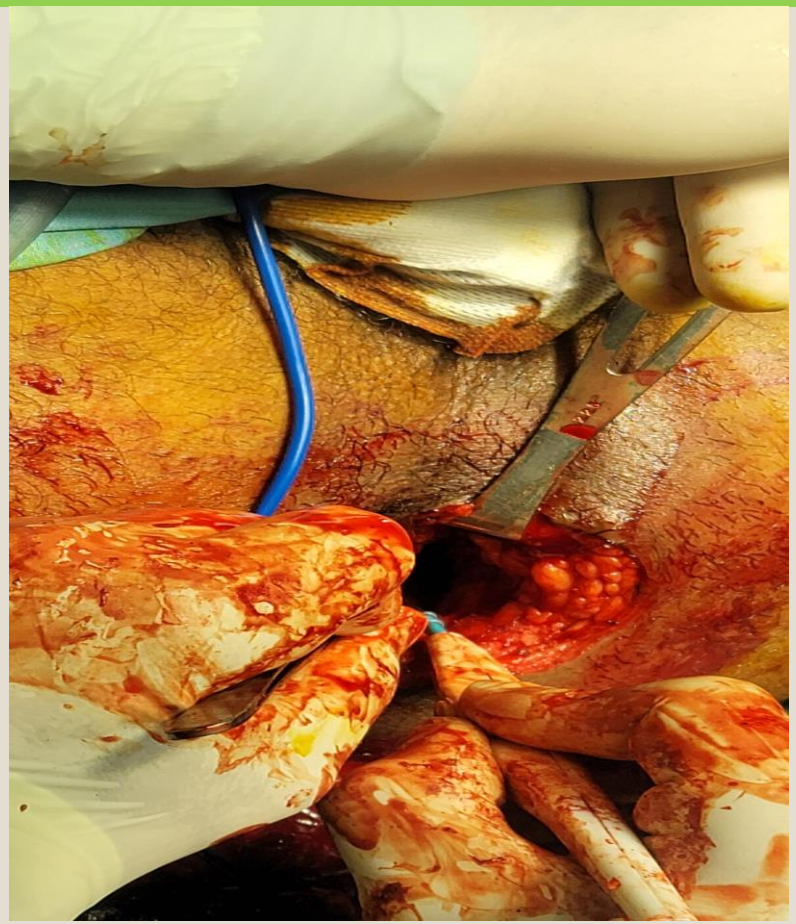
Male with gunshot post gluteoplasty.

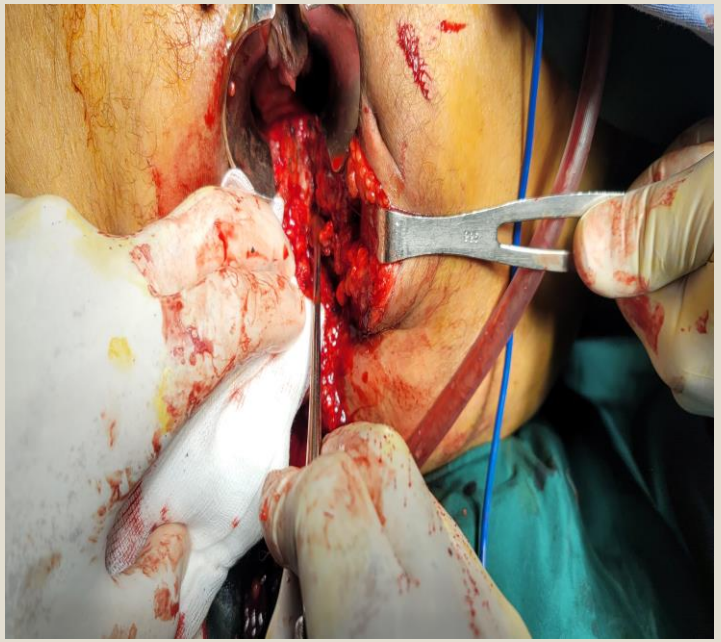




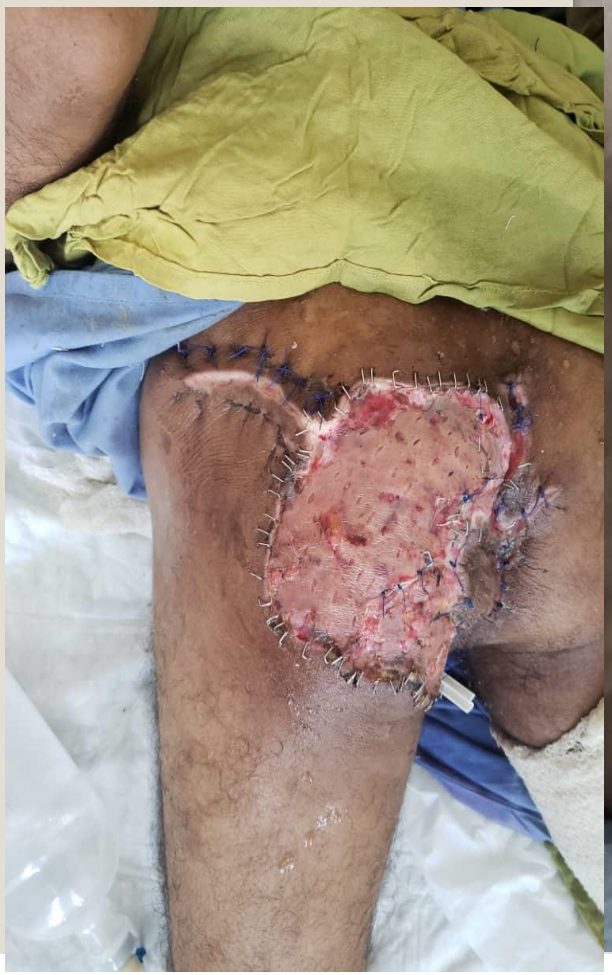


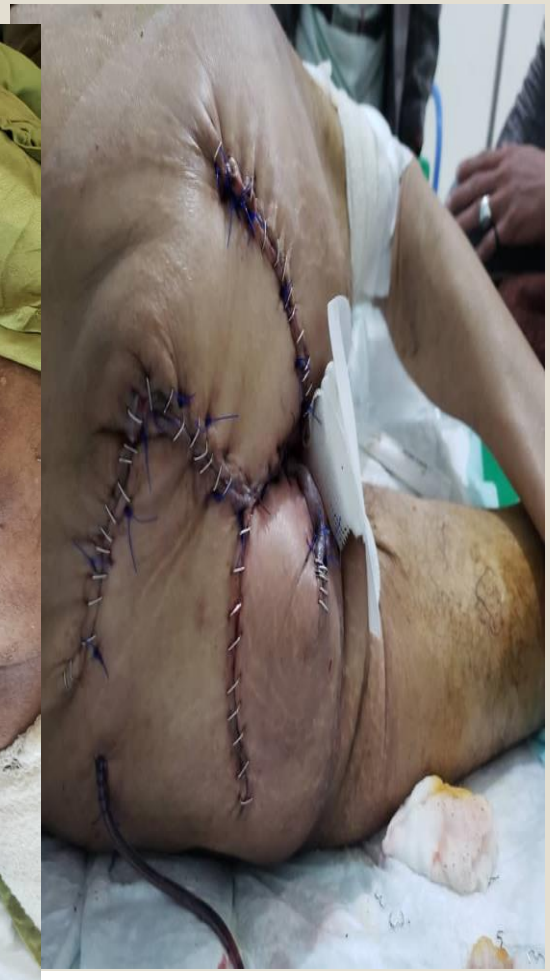
Overlap sphincteroplasty

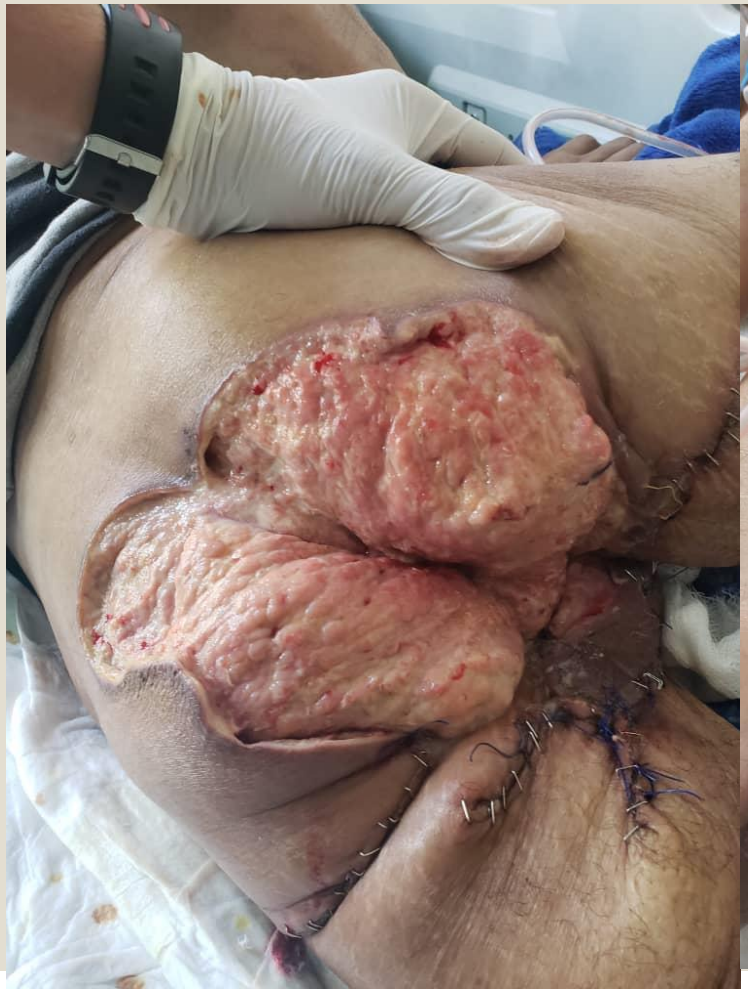


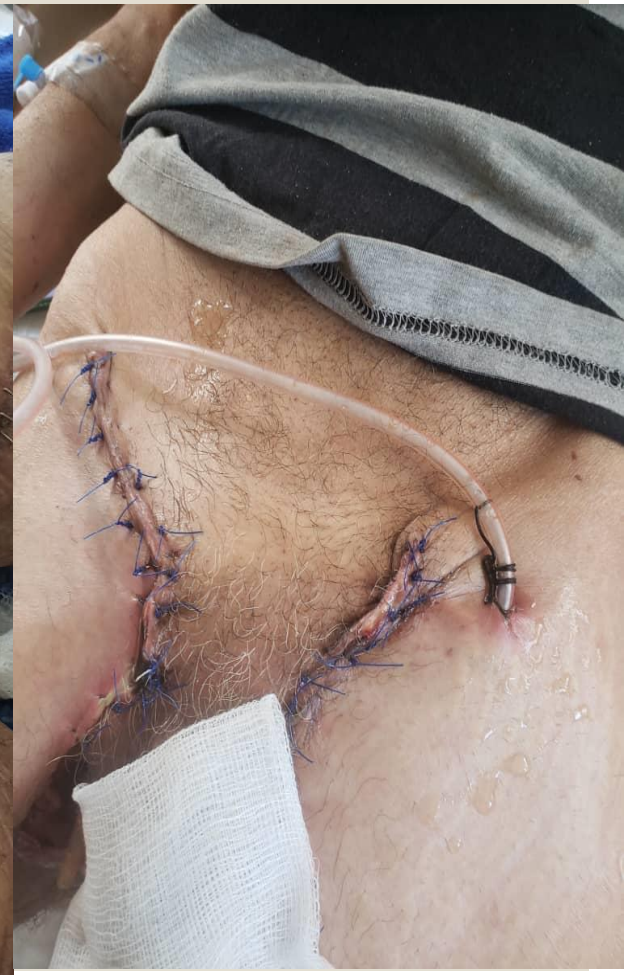


Pudendal and advancement flaps: for skin defect closure

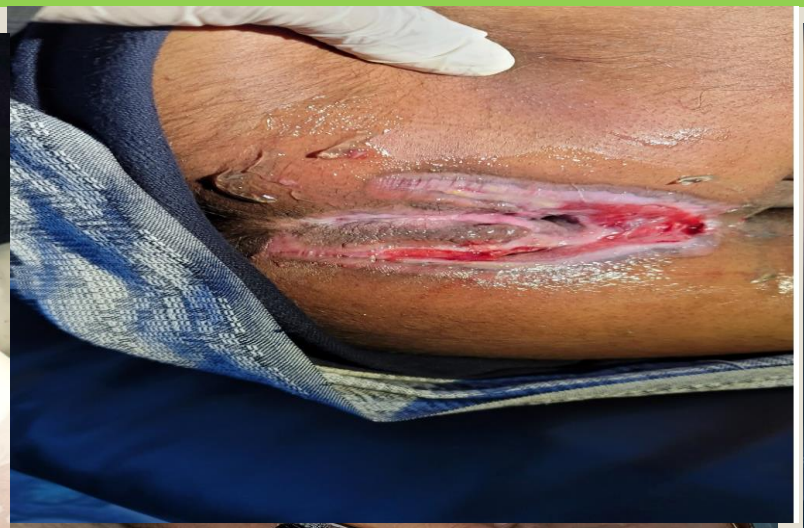


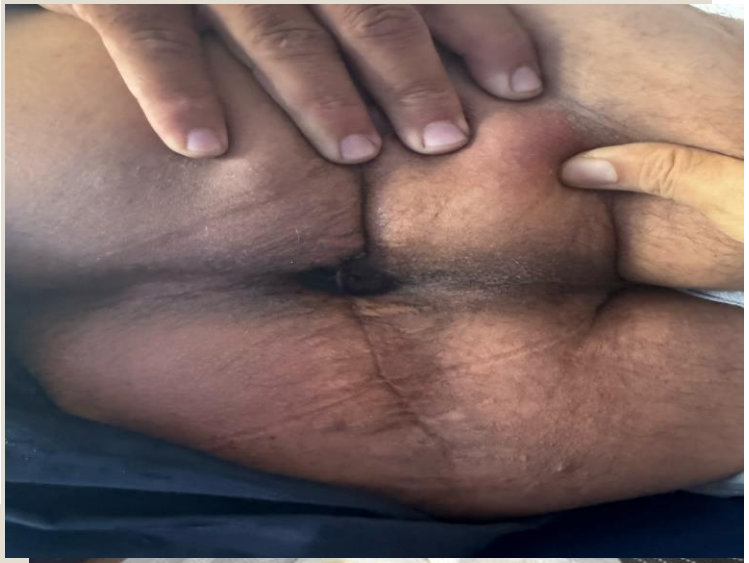


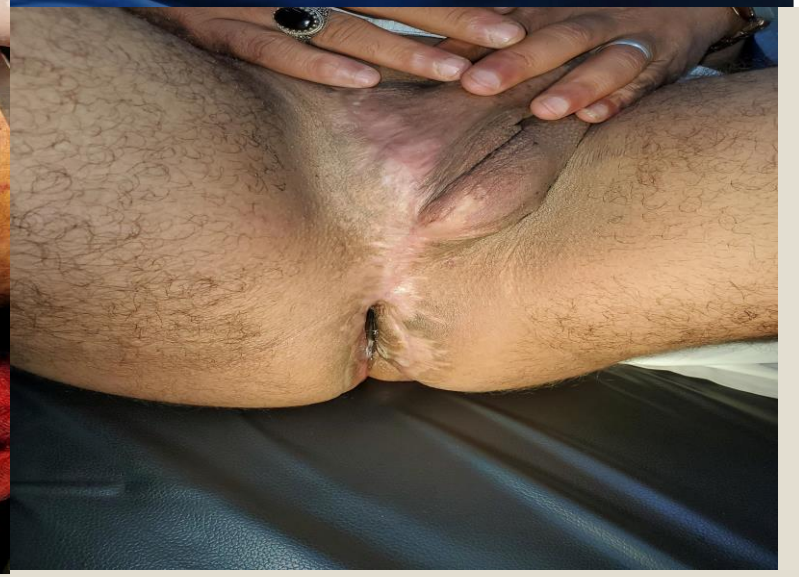




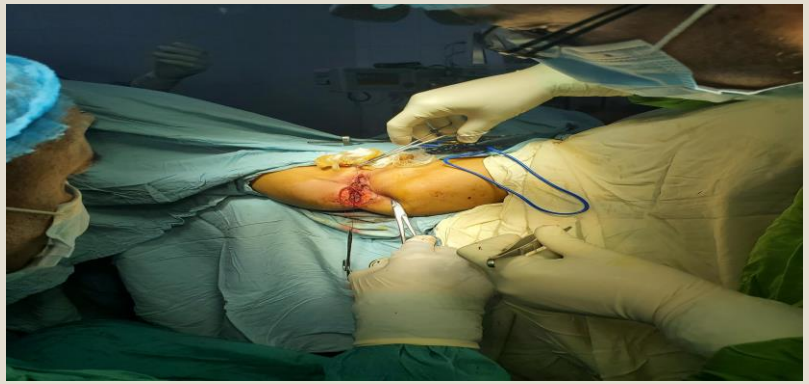
Post operatively: different cases snd techniques

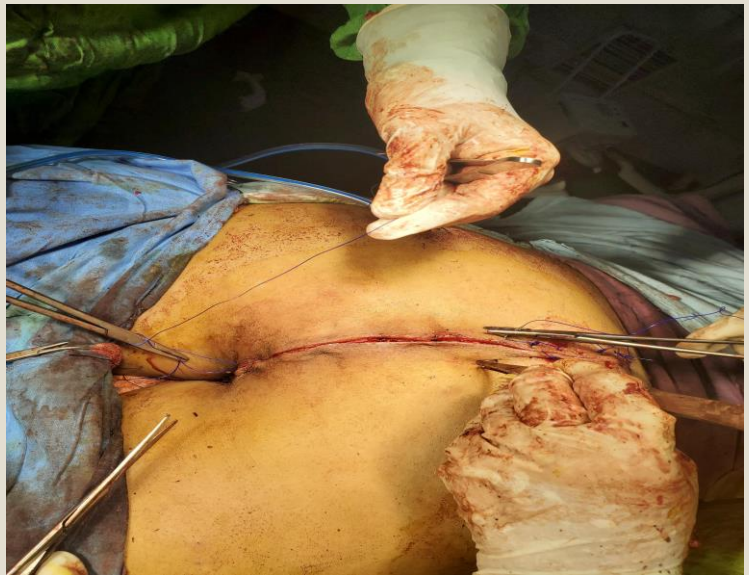


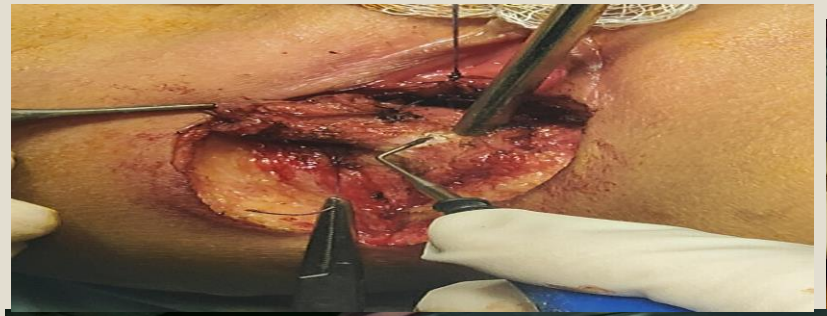


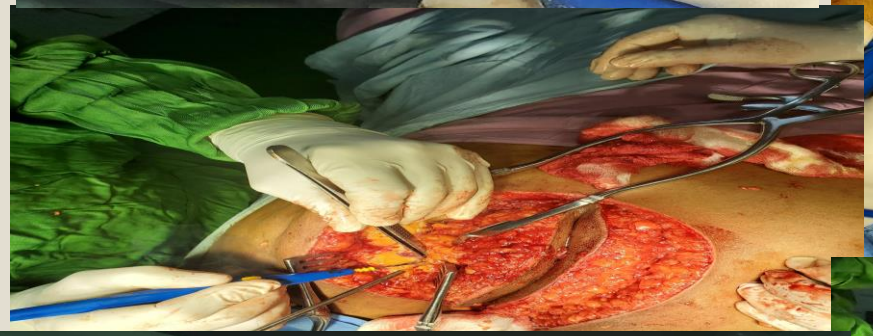


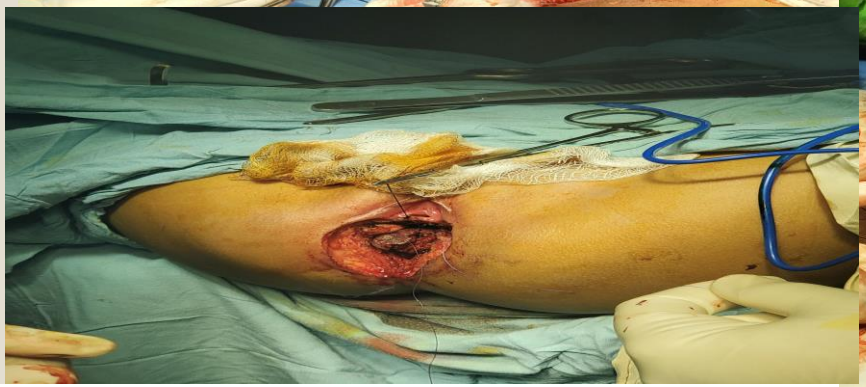
Two cases with complete anorectal reconstruction? 3 components

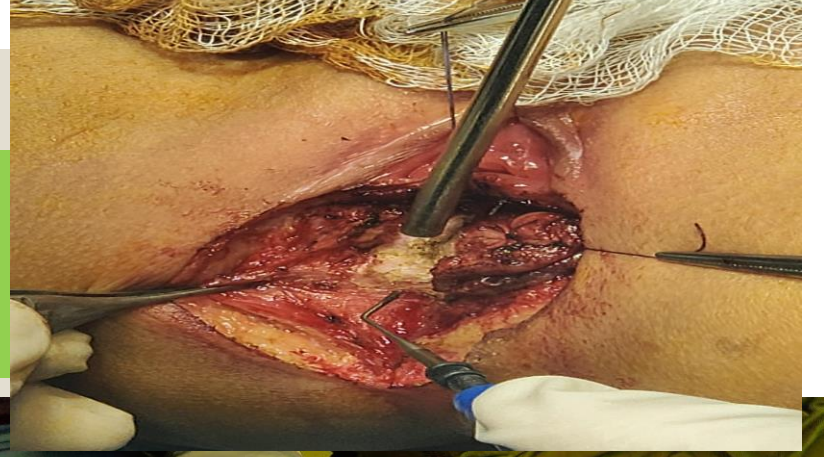


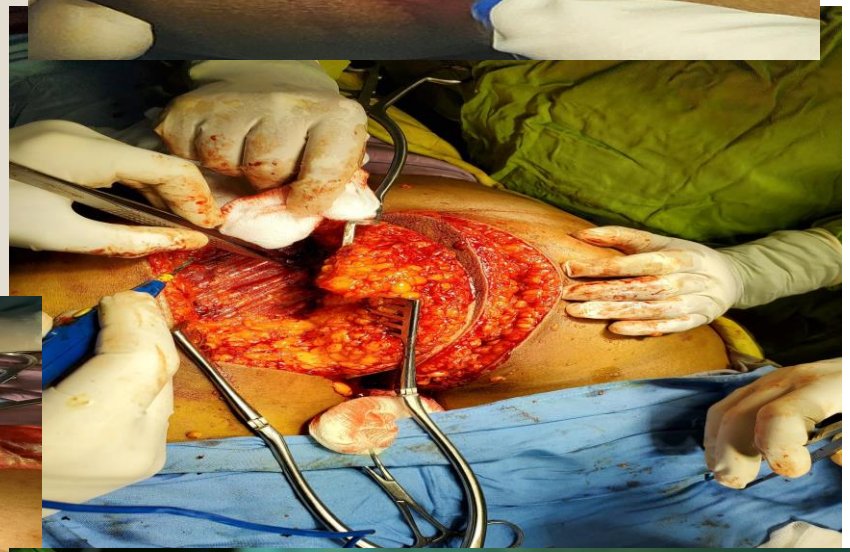


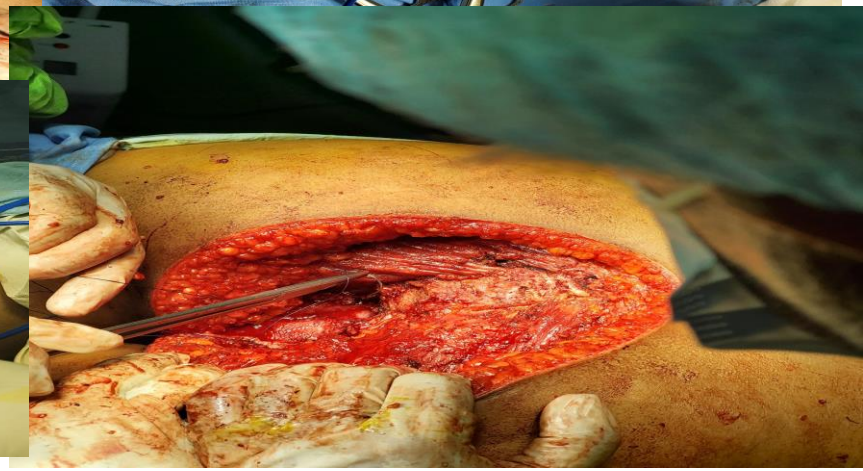




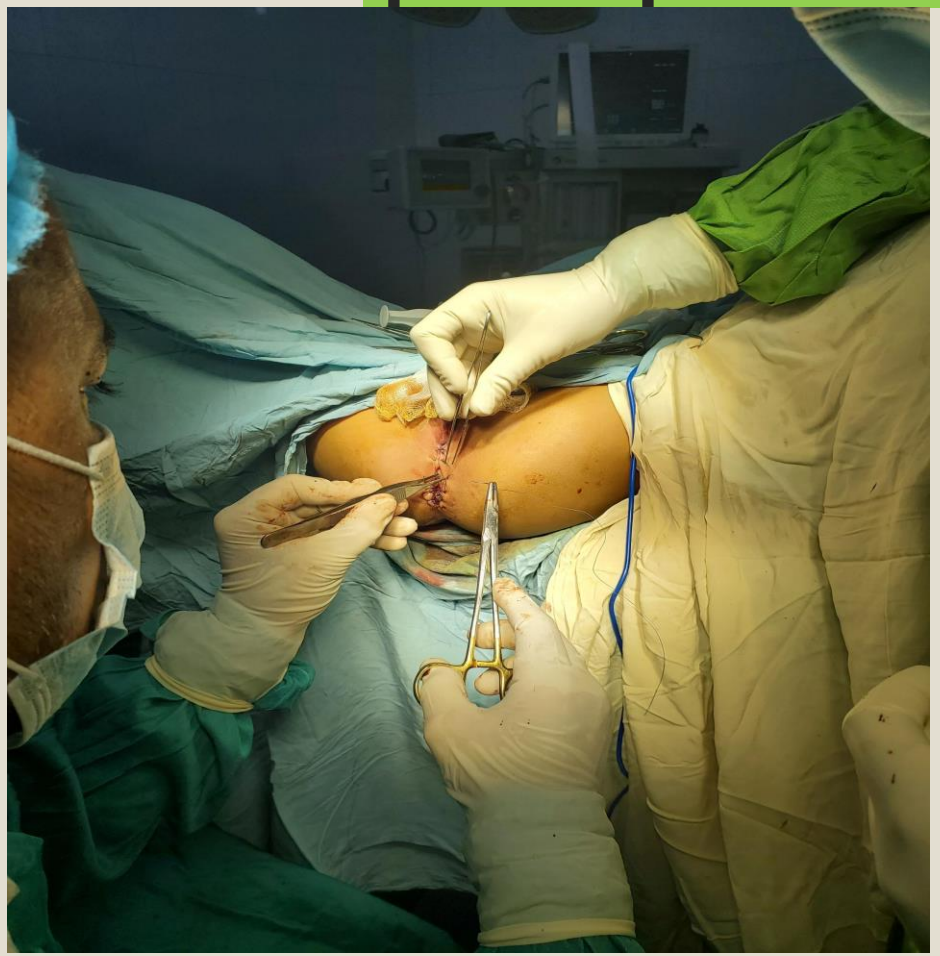


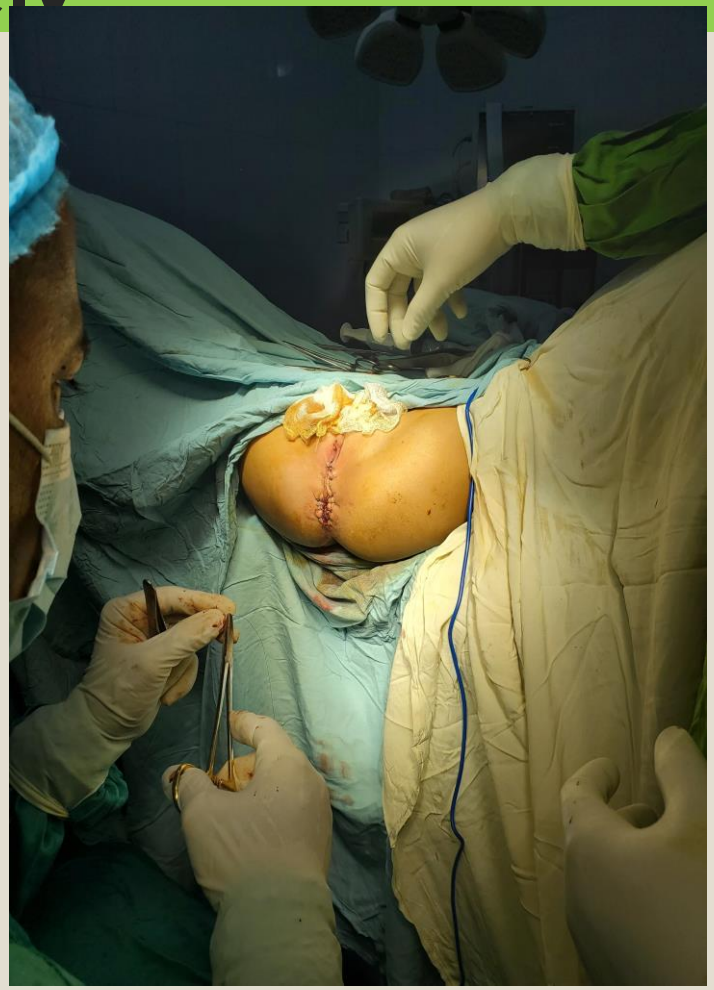


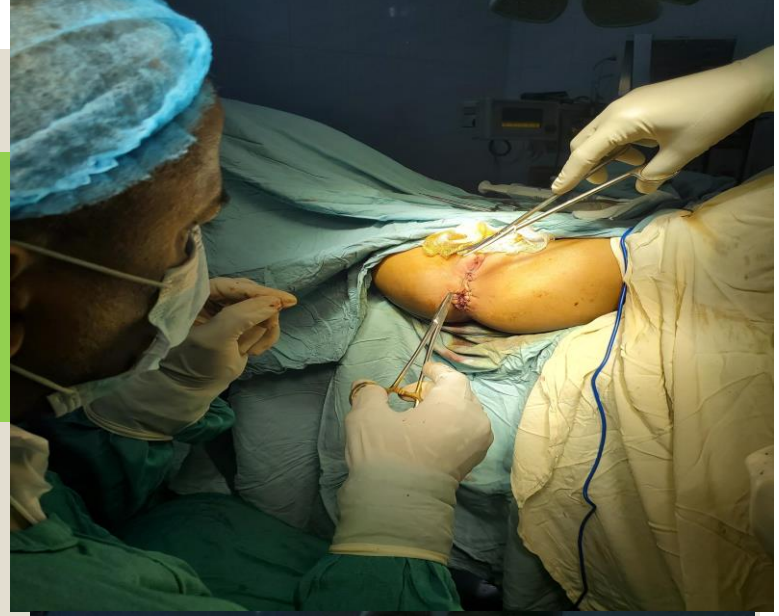


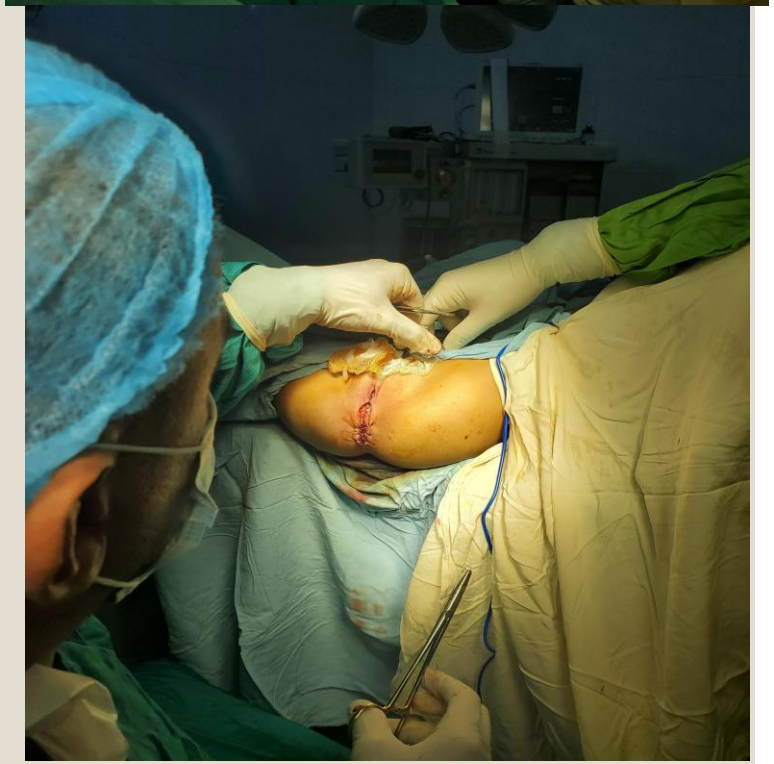


Anorectal/ RVS and perianal reconstruction: Immediate post operatively

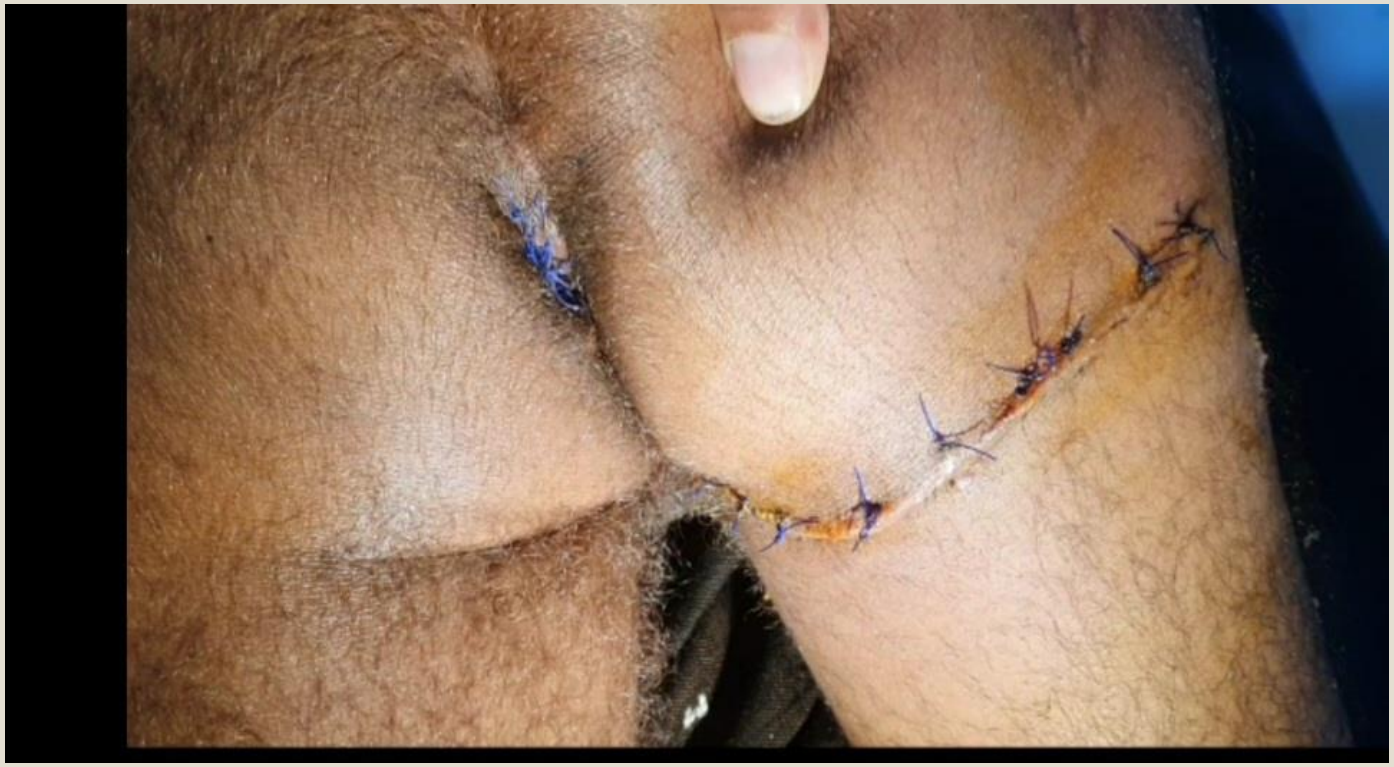


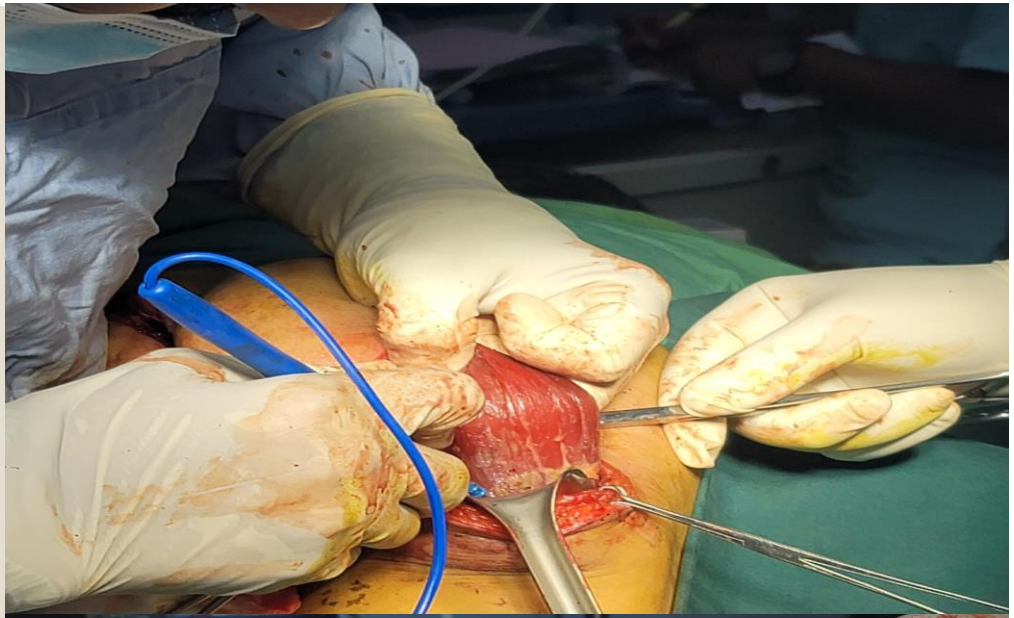


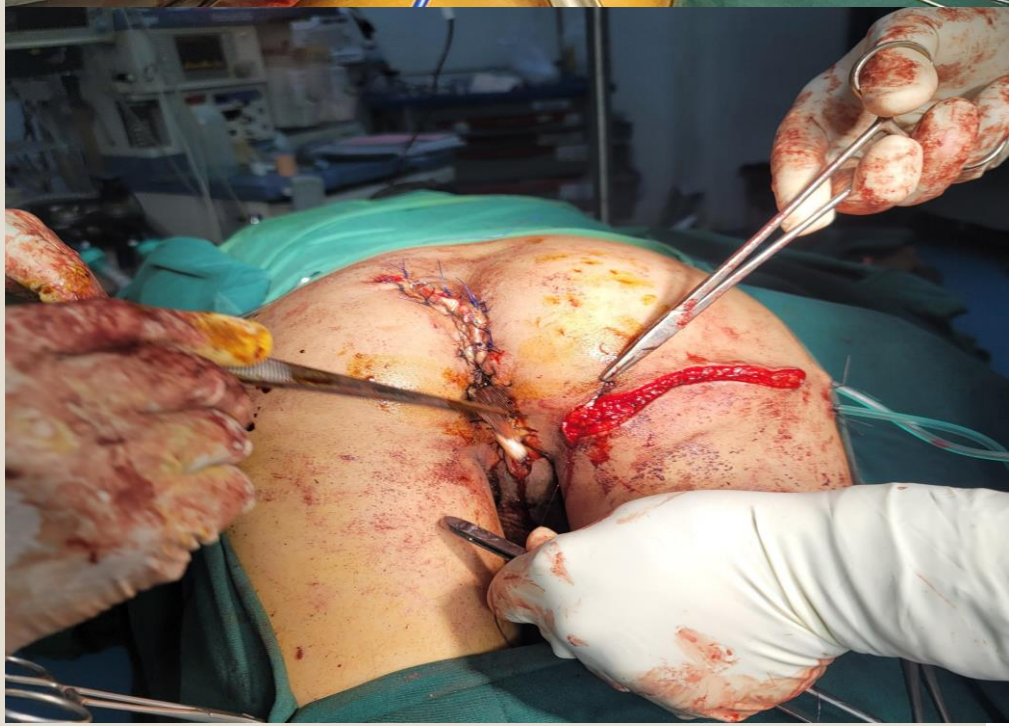




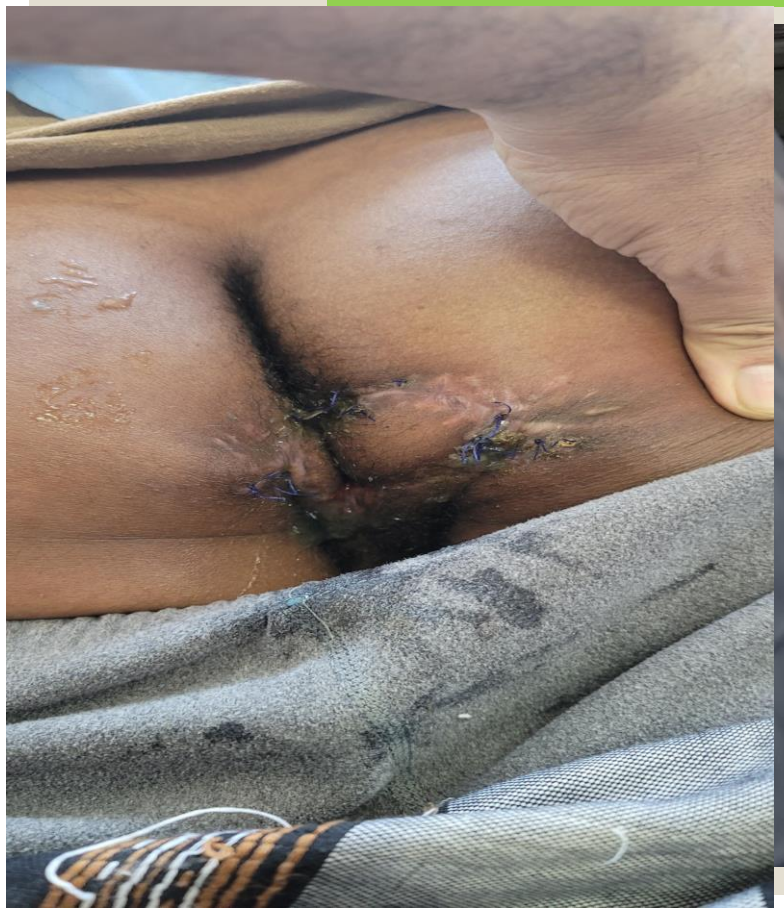
27 M Pt. Post gunshot Gluteoplasty

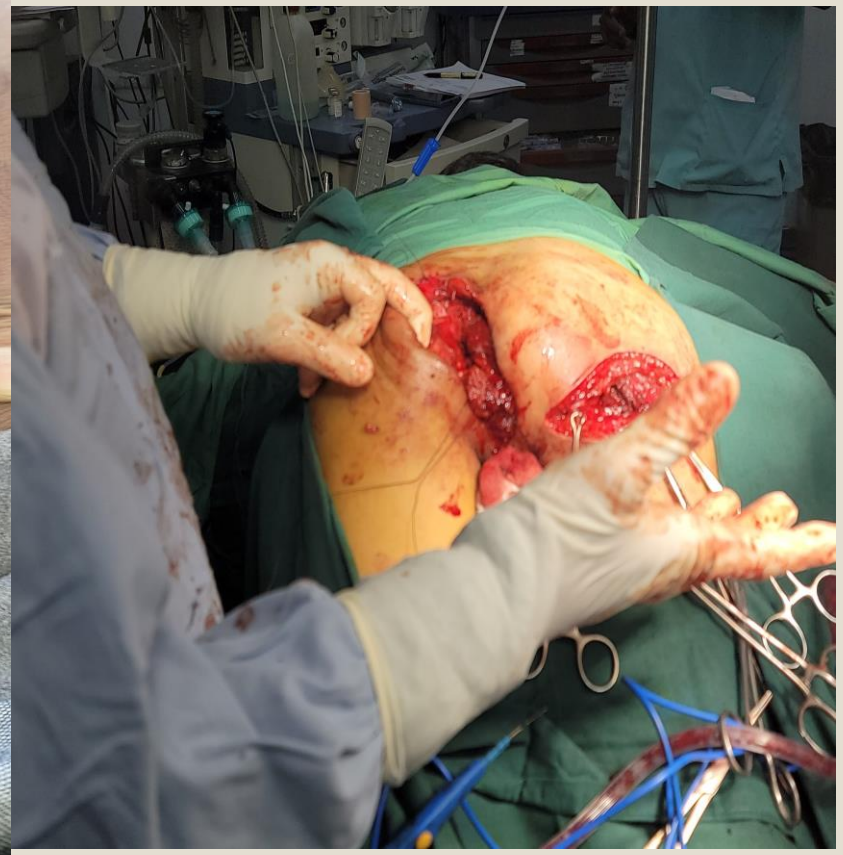


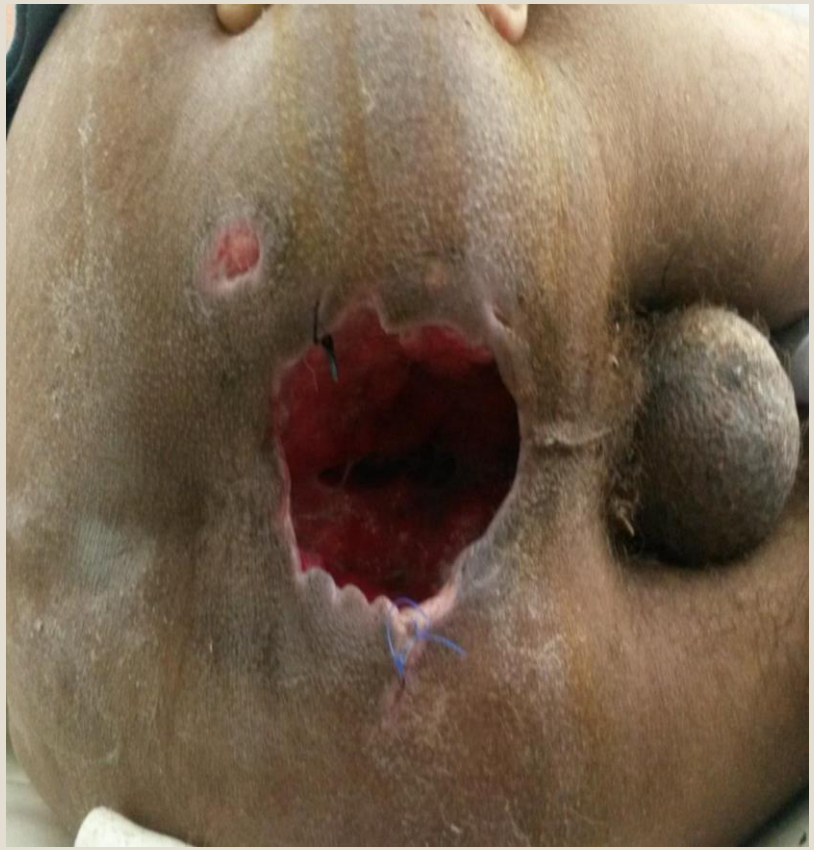




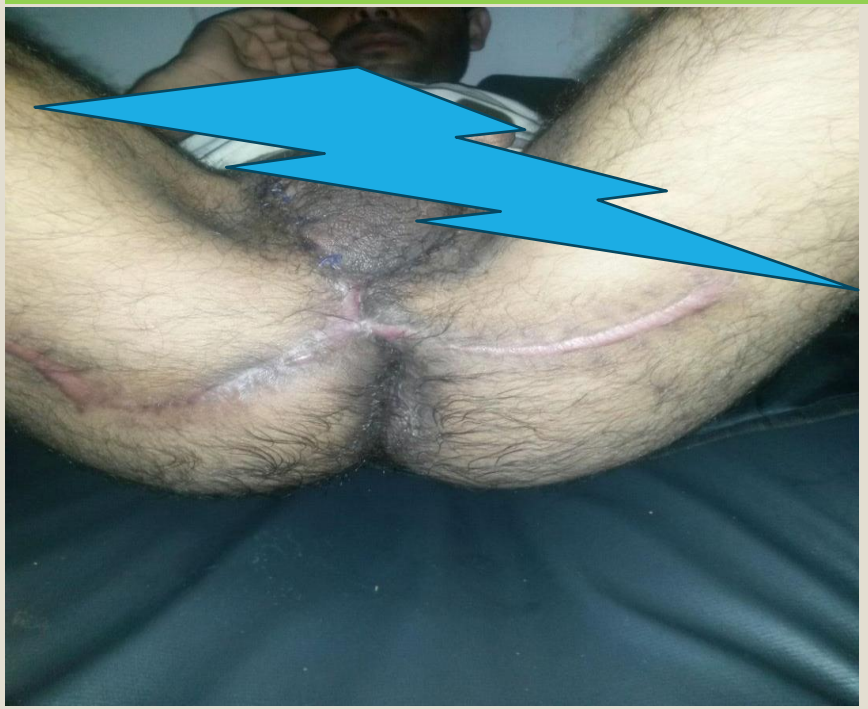
30 y Male post gunshot: rectal anal sphincter reconstruction with smooth muscle plasty

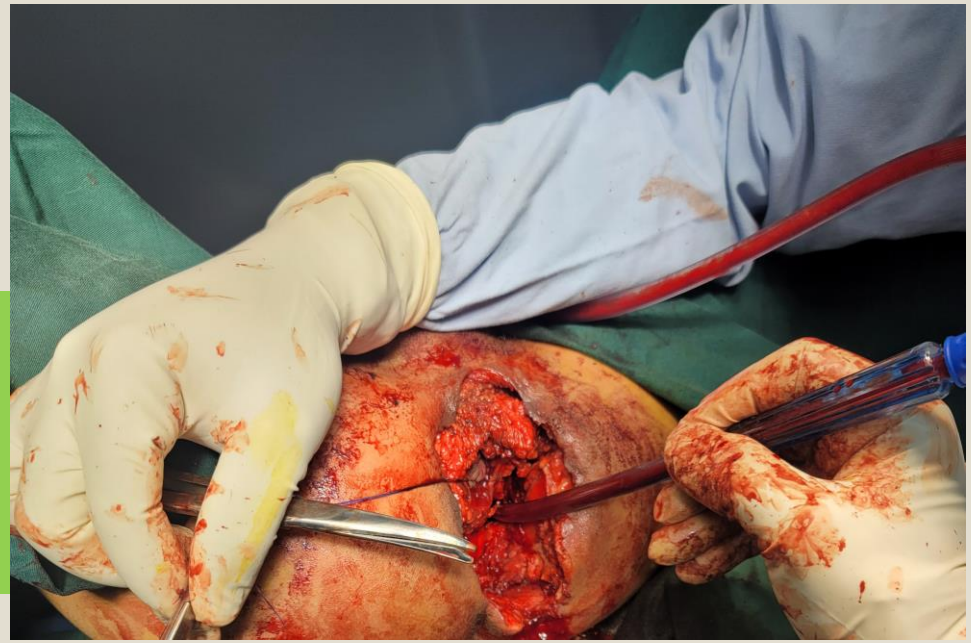


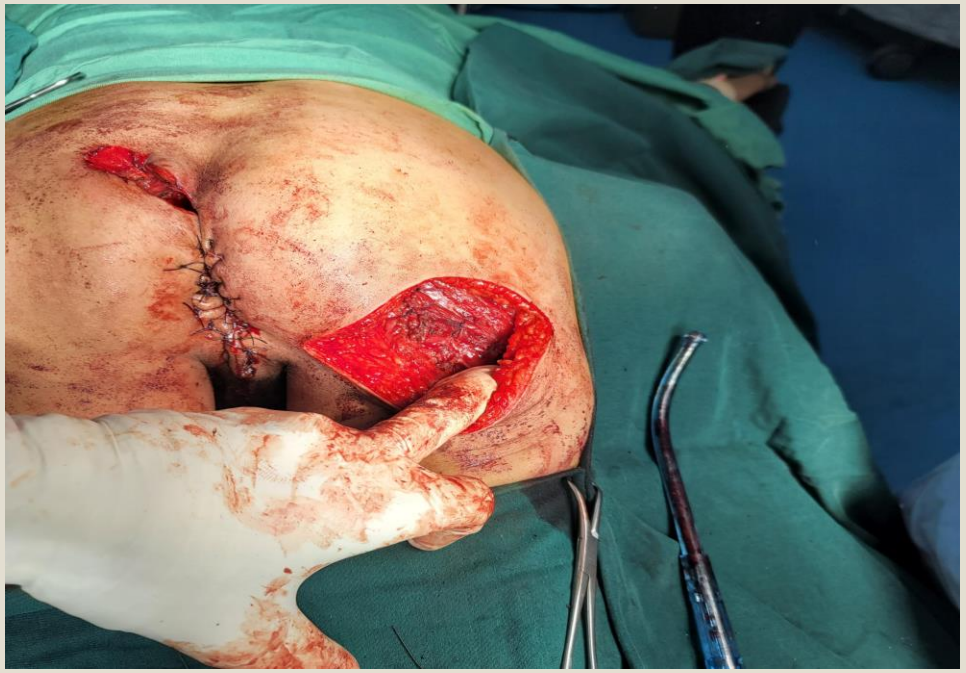




Bilateral gluteoplasty: if sensation intact, smooth muscle plasty for internal sphincter



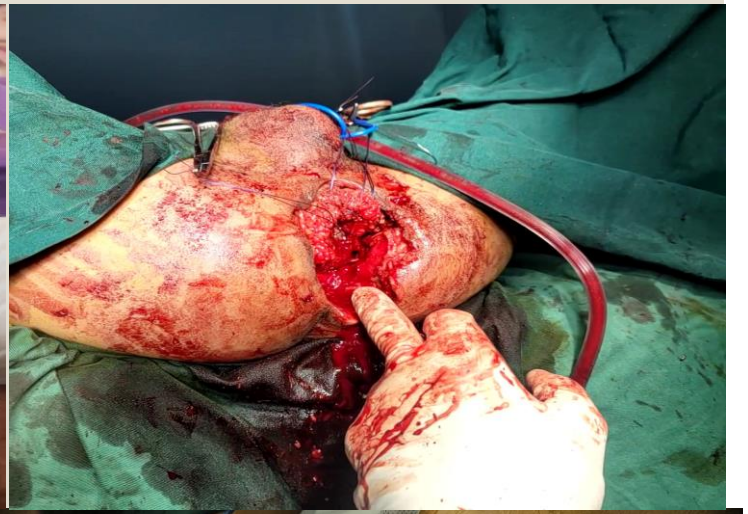


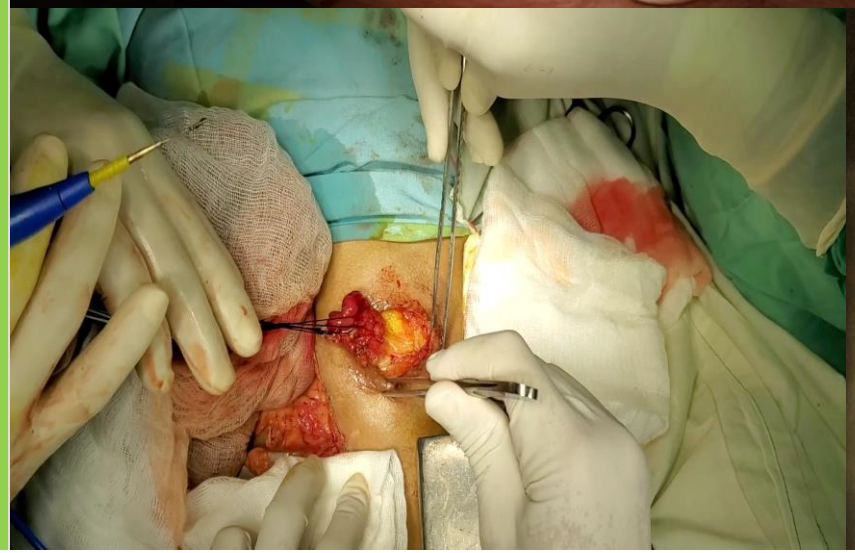


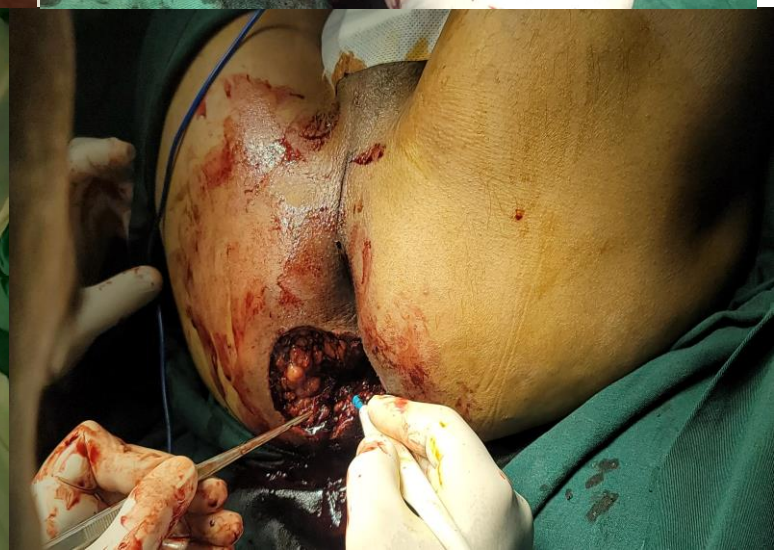
My Patients in Yemen

When we need stoma preoperatively?

Delayed repair: if preoperative ~~continent~~ no stoma







Traditional injection: H_2SO_4 in concentration of 35% _ 15PH 0.8

Initial phase: 1-3 days

Intense pain.
Paresthesia
Paleness
Buish discoloration
livedolike dermatitis.

Acute phase: 5-10 days

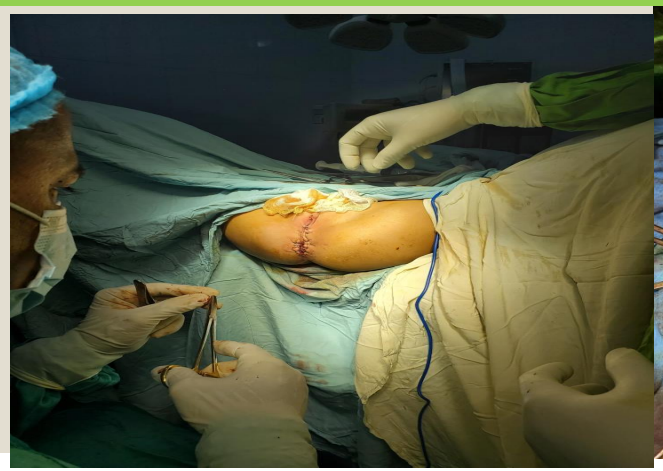
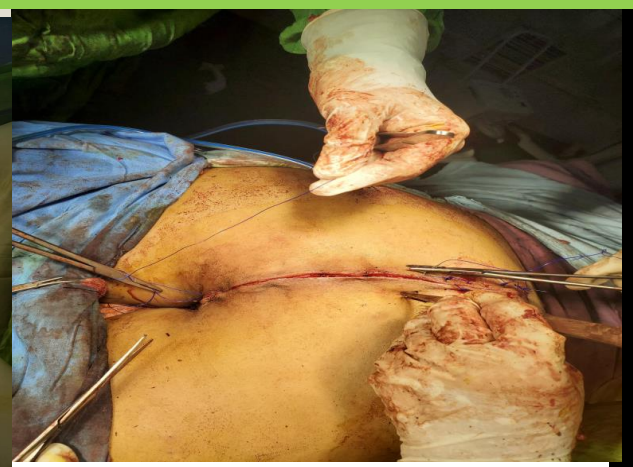
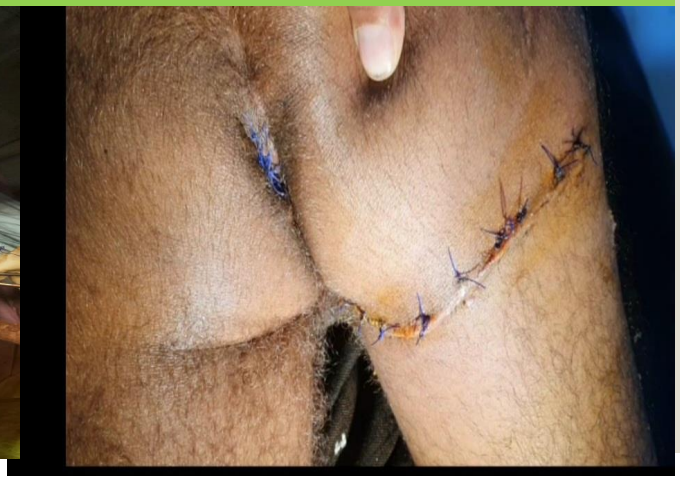
Rigidity and tenderness.
Swelling.
Eryphematous
Hemorrhagic lesion.
livedoid violaceous plaque.
Spasm and coldness and mottling of the limb.

Necrotic phase: 5-14 days

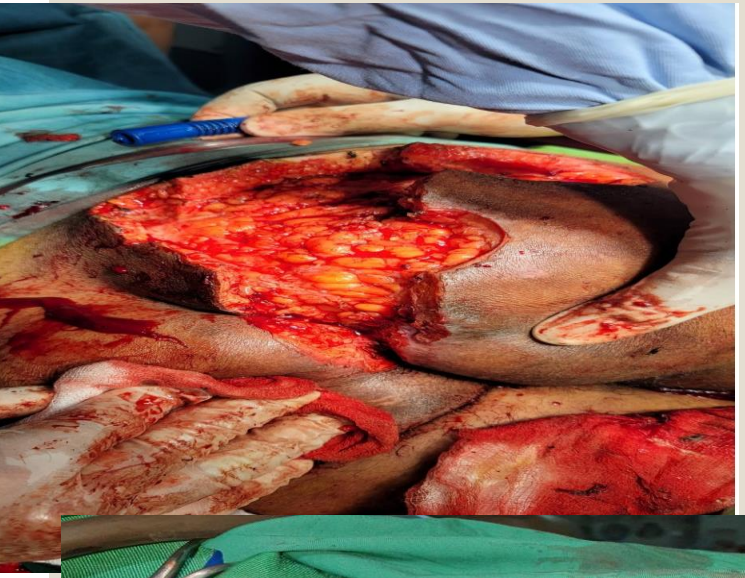
- Indurated and necrotic plaque Infection.

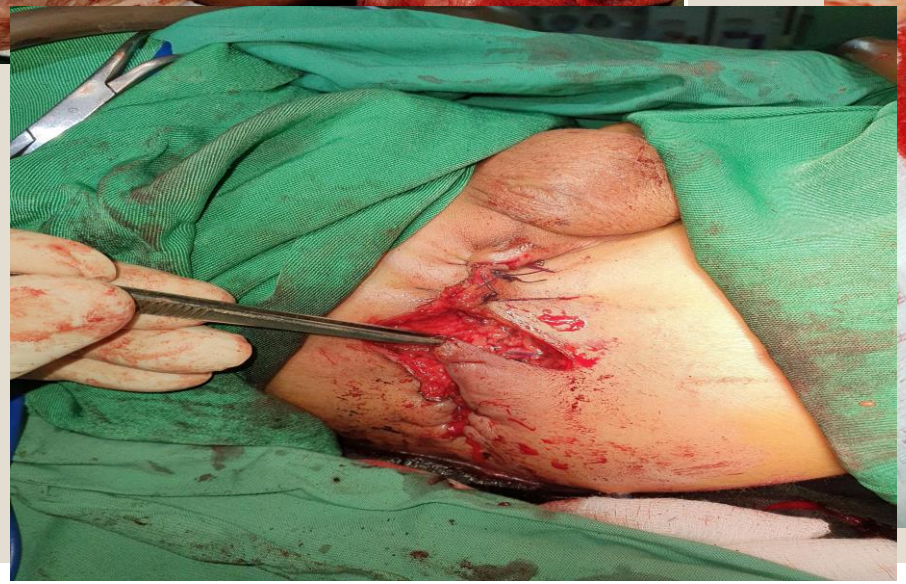
Outcomes

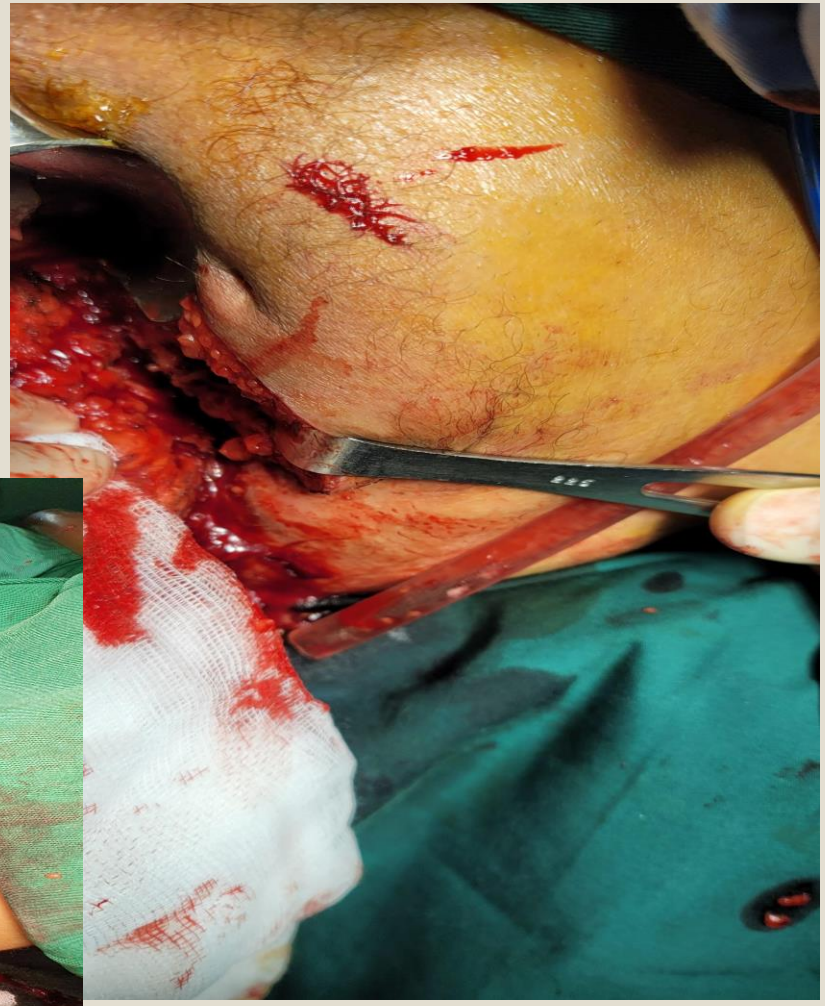
- **Anorectal repair: stool continence was noted in > (78%). However, 16 % had flatus incontinence and mild mucous leak.**
- **6% remains incontinence**

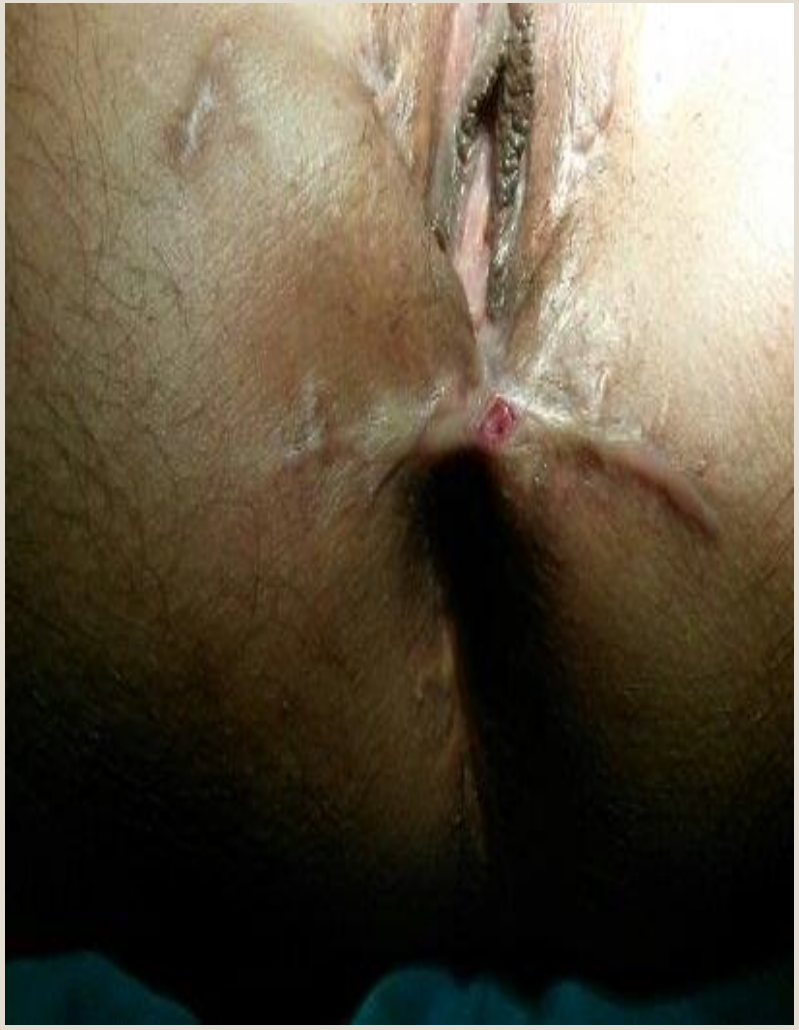




Outcomes : long term benefit varies

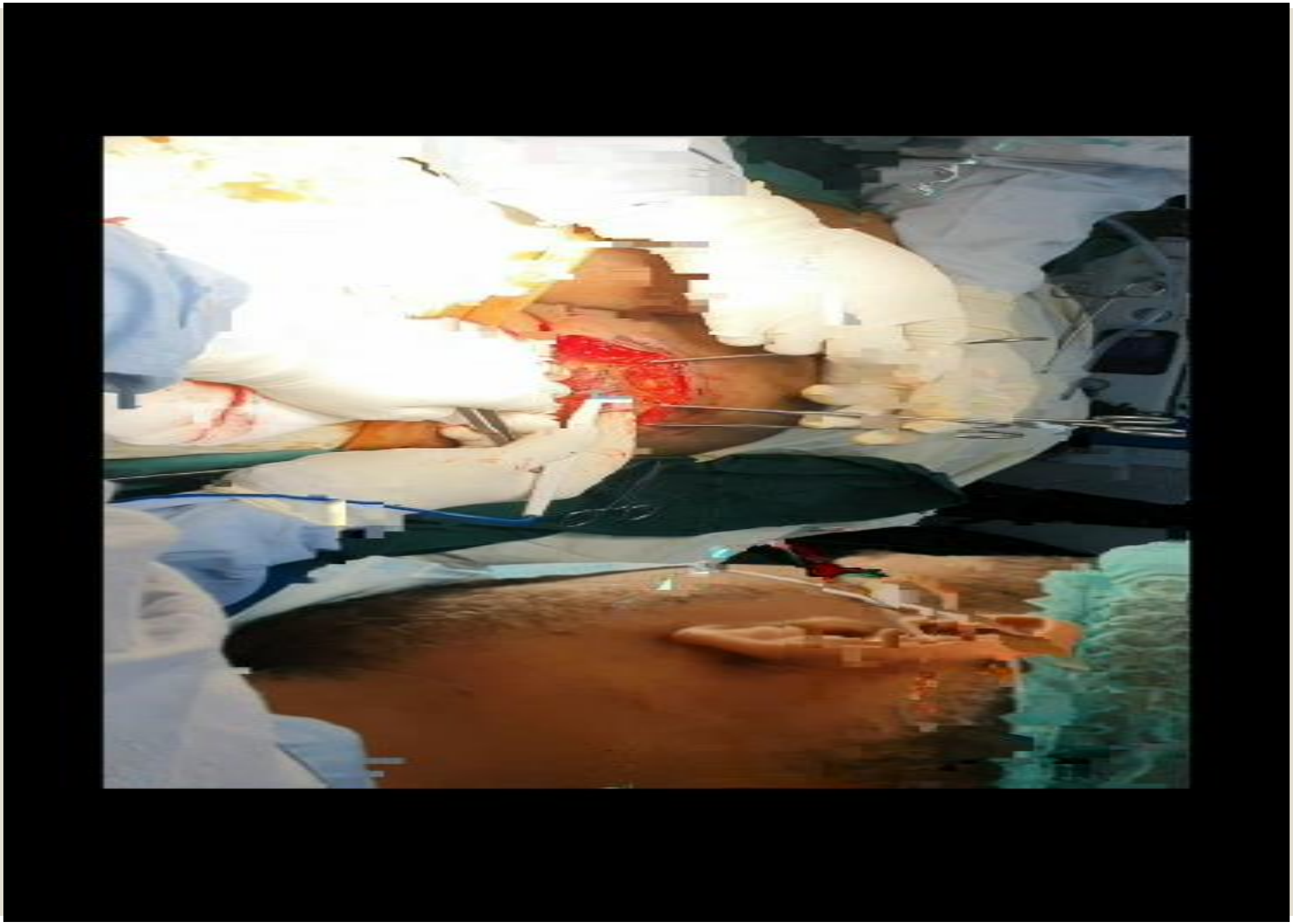






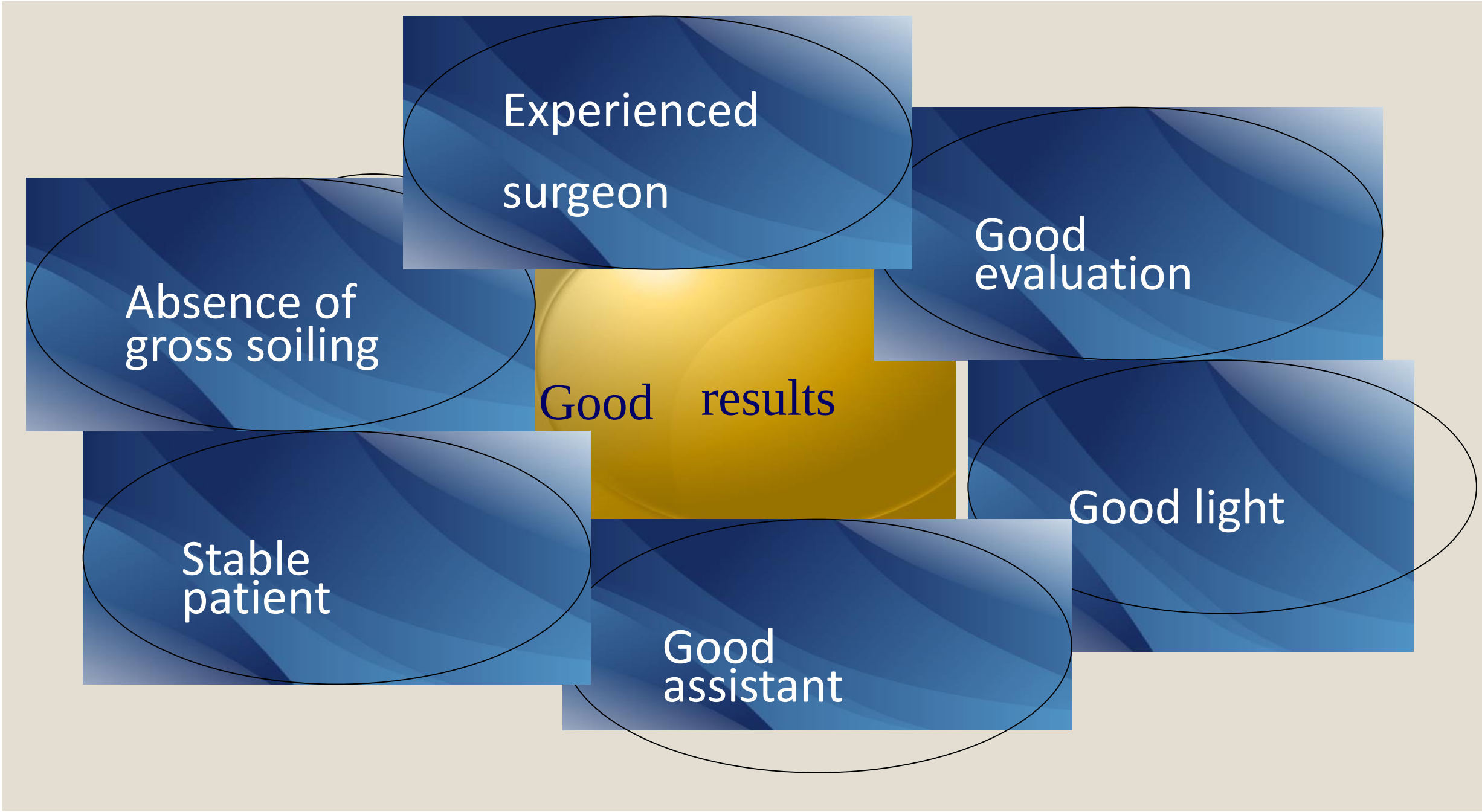


Movie



Ano-Rectal injuries: treatment modalities

Primary wound repair ±Sphincter repair if needed No colostomy	Primary anorectal repair + primary sphincter repair +colostomy	Laparotomy, perineal drainage + delayed sphincter repair + Colostomy
No Colostomy	Colostomy	Colostomy
No or minimal contamination	+ Severe contamination	Minimal or moderate contamination
Isolated perineal wound + sphincter injury Partial thickness anorectal injury.	Sphincter injury+ full thickness anorectal injury	Extra peritoneal full thickness anorectal injury + sphincter injury


Experienced surgeon
Absence of gross soiling
Good evaluation
Good results
Stable patient
Good light
Good assistant

Take home messages

- Management of perineal injuries should be individualised according to the severity of injury.
- Rectal bleeding with a history of trauma suggests a mucosal tear, at the minimum& mandates further step to role out anorectal injuries.

- For patients with gunshot wounds of the buttocks clinical examination and sigmoidoscopy are safe methods for selecting those patients suitable for non operative treatment.

◦Conclusion 1

- **Presacral space drainage can be omitted without any serious consequences in majority of cases of extra-peritoneal injuries.**
- **Loop sigmoid colostomy with stepwise technique& distal mucosal exclusion proved to be safe to protect the distal end of rectum from soiling.**

Conclusion 2

- Colostomy remains an important consideration in presence of rectal injury and/ or gross soiling.
- diversion without sphincter repair should be reserved to cases with significant anorectal lacerations associated with gross contamination.

- Thank you