(SCROTAL INJURIES)

(Location)	(No. of Cases)
Ain-el-Turck, Africa	10
Rome, Italy	26
Leghorn, Italy	18
Total	54

(Type of Wound)	(No.)
Wounds, penetrating	20
" perforating	10
" lacerated	16
Contusions	8
Total	54

Mode of Injury:

Shell fragments	22 cases
Land Mines	9 "
Hand-grenade	3 "
Vehicle accidents	5 "
Blunt injury	4 "
Bullets (2 accidental)	8 "
Bomb fragments	3 "
Involvement of Testicle & Spermatic Cord	38 "

Associated Injuries:

(Penis)	- penetrating and perforating wounds of,	10 cases
	- contusions of,	1 "
(Urethra)	- exposed, but not injured	2 "
(Pelvic)	- perforation of urinary bladder in one case F.C.C. pelvic bones in three cases; pubic ramus exposed in one case	4 "
(Abdomen)	- wound, pent. of wall	5 "
	- perf. of wall with visceral injury (liver)	1 "
(Chest)	- wound, pent. of wall	2 "
(Buttocks)	- wound pent. and perf.	6 "
(Upper Extremity)	- pent. and perf. wounds (In one of these, traumatic amputation of hand) (F.C.C. in two of above)	9 "
(Lower Extremity)	- wounds pent. and perf. (a) Traumatic amputation of foot in 3 of these. (b) F.C.C. in (femur in 4 cases) 5 " " . (c) Sciatic nerve injury in 1 " " . (d) Severe vascular injury (profunda femoris and posterior tibial in 1 of these.)	39 "

(Note): Thigh wounds were present in all 39 of the above cases.

20 - Unilateral
15 - Bilateral
4 - Associated with buttock wounds

Fracture of Spine & multiple rib fractures in (1) case.

Injury to Testis and Spermatic Cord:

(Injury to the Testis) - 29 Cases.

Contusion	6 cases
Laceration	5 "
Wound perforating	3 "
Wound penetrating	6 "
Infarction due to vascular injury	1 "
Perforation of tunica vaginalis - (acute hematocele)	1 "
Traumatic orchitis	1 "

(Injury to Testis Cont'd)

Bilateral injury	4 cases
(a) Severe bilateral lacerations (2)	
(b) Severe left, moderate right laceration (1)	
(c) Bilateral contusion (1)	
Laceration with massive hematoma	1 "
Atrophy of testis due to old injury	1 "

Right (16) Left (9) Bilateral (4)

(Injury to Spermatic Cord) - 9 cases.

Cord exposed	2 cases
(In one case, the tunica vaginalis of the cord was laid open)	
Contusion	2 "
Transection of the cord	4 "
(a) 2 complete	
(b) 2 partial (vas deferens severed in 1)	
Foreign body lodged in spermatic cord	1 "

Surgery: (Testis)

A. Early definitive surgery

(1) Orchidectomy	12 cases
Right (7) Left (4) Bilateral (1)	
(2) Unilateral orchidectomy (left) repair other testes.	1 "
(3) Resection of part of one testes (left) and debridement of other.	1 "
(4) Resection of part of testes and repair, left (1) and right (1).	2 "
(5) Excision of woundtract in tunica vaginalis and bottle operation.	1 "

B. Late Surgery

(1) Secondary orchidectomy	7 cases
(a) Infarction, upper 1/3, (28 days post inj.)	1 "
(b) Wound, perf, w/herination of tesicular tissue (fungus testis). (5 days post inj.)	1 "
(c) Central abscess testis. (14 " " ")	1 "
(d) Central abscess with foreign body.	2 "
(1) was 27 days post injury	
(1) was 35 days post injury	
(e) Atrophy testis	1 "
(f) Fibrotic painful testis (old lac wound) 5 months post injury	1 "
(2) Right orchidectomy - replacement of left testis in scrotum - excision of necrotic scrotal tissue and closure with drainage. 8 days post injury.	1 "
(3) Removal of F.B. from tunica propria testis 36 days post injury.	1 "

Surgery: (Spermatic Cord)

A. Early definitive surgery

(1) Orchidectomy (both right sided)	2 cases
(2) Ligation of vessels	1 "
(3) Ligation of vas deferens	1 "

B. Late Surgery

(1) Removal of F.B. from spermatic cord	1 "

C. Scrotum

(1) Removal of F.B. (One of these was a 2x3x1 cm piece of radio transparent plastic material. (land mine casing)	2 "
(2) Secondary repair of huge avulsive wounds	2 "

Notes on Trajectory:

(1) Fragments may enter scrotum directly from below or from in front, with the following possibilities:
  (a) Lodge in the scrotum
  (b) Lodge in testis or spermatic cord
  (c) Emerge from lateral aspect of scrotum and penetrate or perforate the thigh
  (d) Emerge from scrotum, enter upper medial aspect of thigh and emerge from buttock
  (e) Lodge at base of penis
(2) Fragments may perforate anterior aspect of upper thigh, perforate scrotum, and penetrate or perforate other thigh.
(3) Fragments may enter buttock and produce scrotal injury in one of the following ways:
  (a) Fragment enters buttock and emerges from upper, medial, anterior aspect of thigh and then penetrates or perforates the scrotum on the same side.
  (b) Fragment enters buttock on one side and emerges from upper medial thigh on same side, perforates scrotum on opposite side and penetrates or perforates opposite thigh.
  (c) Fragment enters buttock, perforates pelvis, perforates urogenital diaphragm and lodges in scrotum, or emerges from latter. In the former possibility the fragment may enter the scrotum without perforating the scrotal skin.
  (d) Fragment enters buttock and without emerging through skin of buttock, or thigh, travels along perineum and enters scrotum subcutaneously.
  (e) Fragment enters upper medial thigh and travels on into scrotum subcutaneously.

To Summarize: - The above trajectories can be clearly traced in the case of a single fragment or a bullet. In wounds due to a grenade, land-mine, artillery or mortar shell, numerous fragments may produce multiple wounds. It is then difficult to outline trajectories or to determine which fragments are responsible for which wounds.

Size of Fragments:

Fragments may vary in size from a minute metal shaving the size of a lead pencil point to a thumb-sized metal slug, or even larger.

Injuries of the Penis: (20 cases)

(1) Wounds, penetrating (1 multiple)	4 cases
(2) Wounds, perforating	3 "
(3) Wounds, lacerating	10 "
(4) Fracture	1 "
(5) Traumatic amputation	1 "
(6) Partial transection	1 "
Total	20 cases

Mode of Injury to the Penis:

(1) Shell fragments (artillery)	7 cases
(2) Shell fragments (mortar)	2 "
(3) Grenade fragments	2 "
(4) Land-mines	1 "
(5) Bullets (2 accidental)	4 "
(6) Vehicle accident	1 "
(7) Intercourse	1 "
(8) Bomb fragments	2 "
Total	20 cases

Part Injured:

(1) Prepuce alone	2 cases
(2) Glans involved (all minor lac. wounds except one which was perf. wound.)	7 "
(3) Shaft involved in	16 "

Structures Involved:

(1) Skin alone	3 cases
(2) Colles fascia involved	13 "
(3) Bucks fascia (4 questionably)	11 "
(4) Corpora cavernosa involved	5 "

Urethra: (7 cases)

(1) Exposed but not injured	1 case
(2) Transected near junction of penile & scrotal	1 "
(3) Lacerated in penile portion	1 "
(4) Lacerated just anterior to bulb and just posterior to cororal sulcus	1 "
(5) Lacerated just proximal to cororal sulcus	1 "
(6) Lacerated just anterior to bulb	1 "
(7) Scrotal urethra lacerated	1 "

Associated Genital Injuries:

(1) Scrotal	12 cases
(2) Testicle- (2 bilateral)	6 "
(3) Spermatic cord (transected)	1 "
(4) Perineum	4 "

Other Associated Injuries:

(1) Wounds, penetrating, abdominal wall	3 cases
(2) Chest wall, severe lacerating wound, posterior	1 "
(3) Lower extremity	16 "
(a) 12 were thigh wounds (5 bilateral)	
(b) 1 femur fracture	
(c) 1 traumatic amputation of foot	
(4) Upper extremity	6 "
(a) 3 were penetrating wounds	
(b) 1 was B.B. fracture	
(c) 1 burns on forearm	
(d) 1 traumatic amputation of hand	
(5) Head & Neck - pent. wound left eye	1 "

Surgery:

(1) Partial transection (truck accident) penis hanging by shred - sutured.	1 cases
(2) F.B.S. removed from penis	3 "
(3) Suture of penis	3 "
(4) Repair of traumatic amputation (suture of tunica of corpora, urethra sutured to skin)	1 "
(5) In cases of urethral injury:	
(a) Suprapubic cystostomy	4 "
(b) Urethra sutured over lying catheter	3 "
(6) Dorsal slit and late debridement & excision Later perineal urethrostomy & split thickness, graft.	1 "
(7) Fracture - hematoma under Buck's fascia, followed by abscess I plus D.	

Urethral Injury in Pelvic Fracture: (12 cases)

Ain-el-Turck, Africa	5 cases
Rome, Italy	4 "
Leghorn, Italy	3 "

(Manner in Which Injured): (All suffered severe crushing injury of pelvis)

(1) Run over by a truck while sleeping in a field	1 case
(2) Vehicle overturned pinning patient beneath	5 "
(3) Fell out of truck when door opened and rear wheel ran over him.	1 "
(4) Truck went off road and rear wheel ran over thigh	1 "
(5) Hit by truck	2 "

(Manner in Which Injured Cont'd):

(6) Pinned against tree while riding on running-board of truck 1 case
(7) Crushed between guard rail and parked truck, when latter was struck by another truck. 1 "

(Type of Fracture):

(1) Simple fracture of pelvis 12 cases
(2) Pubic fractures 11 "
(3) Separation of symphysis 1 "

Description of Fractures:

(1) Both inferior rami of pubis. Separation of symphysis.
(2) Fracture complete, both pubic rami, left.
(3) Complete fracture of both rami, bilateral.
(4) Fracture complete superior and inferior pubic ramus, left.
Fracture complete of body of right pubis.
Compression fracture left anterior sacral wing.
(5) Separation of symphysis - 2 cm.
Fracture inferior, left border of sacrum.
Separation of left sacro-iliac synchondrosis with dislocation of left ilium with 1½ cm downward and backward displacement.
(6) Fracture complete, descending rami both pubes, both ischial tuberositis. Bilateral fracture of ilium.
(7) Fracture superior and inferior ramus pubis, right.
(8) Fracture complete, inferior ramus, right.
Incomplete linear fracture, left ischium.
Separation of right sacro-iliac synchondrosis.
(9) Fracture complete superior right pubis, involving symphysis. Fracture complete, inferior ramus left ischium.
(10) Multiple fractures both rami - both pubes
(11) F.S. body of right pubis.
F.S. both rami left pubis, with downward displacement of medial fragment.
Linear fracture of crest of left ilium.
Vertical fracture thru right side of sacrum. Linear fracture left half in anterior portion of wing.
Separation of left sacro-iliac synchondrosis.
(12) F. S. superior ramus right pubis.
F. S. at junction of right pubis and ischium.
F. S. right ala, 1st sacral segment.

Associated Injury:

(1) Fracture, simple, femur 1 case
Fracture, compound, femur 1 "
(both middle 1/3 of shaft)
(2) Skull fracture 1 "
(3) Shock 12 "
(4) Part of urethra injured (membranous) 12 "
(5) Bladder perforated by lone fragments 2 "
(bladder neck (1)
(anterior wall (1)
(6) Urethral Injury 12 "
(lacerations (7)
(complete transections (5)

Surgical Treatment:

(1) Inlying catheter alone 3 cases
(2) Inlying catheter followed by cystostomy 2 "
(a) Immediately (1 case) The drainage from the catheter almost pure blood and clotted. There was also a huge pre-vesical hematoma which was evacuated at operation.
(b) 24 hours later - (1 case)
(3) Cystostomy alone 3 "

Surgical Treatment Cont'd:

(a) In one case the patient was seen 18 hours after injury. There was a severe skull fracture and the pelvic fracture was overlooked at first. The bladder was palpable far above the umbilicus and there was a considerable perivesical and preperitoneal urinary extravasation. The para-vesical spaces were drained and a cystostomy was performed under local anaesthesia. In no condition for further surgery. Patient died.

(b) In a second case- cystostomy alone had been performed. A catheter could not be passed beyond the bulb of the urethra. Taken to operating room with intention of doing perineal repair, but catheter inserted with ease by retrograde method. (20 days after injury).

(c) In third case merely a cystostomy had been performed. Membranous urethra blocked. Because of fracture of femur present and callus forming, it was felt that attemptat perineal repair not possible at the time, because patient would have to be placed in perineal position. Hence it was decided to evacuate to Z. I. for further care and eventual perineal repair

(4) Cystostomy and retrograde catheterization	3 cases
(5) " " " " and perineal repair of urethra.	1 "

Urethra: (Straddle Injuries and Injuries Due to Blunt Violence) (4 Cases)
Mode of Injury:

(1) Fell on stump on marshy ground during patrol.	1 case
(2) Car ran over groin in civilian life.	1 "
(3) Truck in which he was riding rolled over embankment	1 "
(4) Fractured penis during intercourse	1 "

Early Symptoms:

(1) Flow of blood from urethra	4 cases
(2) Retention of urine	3 "

Portion of urethra injured:

(1) Bulb	3 "
(2) Penile urethra - (4th case above)	

Associated Injuries:

(1) Fracture compound, left ilium)
(2) " simple, left clavicle) in case three above

Surgical Treatment:

(1) Above- Supra-pubic cystostomy plus retrograde catheterization.
(2) Above- No treatment. Followed by severe traumaticstricture in bulb.
(3) Above- Inlying catheter.
(4) Inlying catheter. Incision and drainage of abscess under Buck's fascia. Supra-pubic cystostomy - 3 weeks after injury.

Urethra: (Penetrating and Perforating Wounds) (18 cases)

Cause of Injury:

Bullet	7 cases
Shell fragments	9 "
Bomb fragments	1 "
Blast injury	1 "

Wound of Entrance:

Buttock	4 "
Scrotum	3 "
Thigh	3 "

Wound of Entrance Cont'd:

Inguina scrotal	1 Case
Penis	3 "
Upper sacral	1 "
Perineum	1 "
Supra-pubic	1 "
Blast	1 "

Part of Urethra Involved:

Penile	3 cases
Scrotal	4 "
Bulb	5 "
Membranous	3 "
Prostatic	2

Type of Injury:

Contusion	1 cases
Lacerations	10 "
Transections	5 "
Exposed but lumen not pen~~t~~.	2

Associated Injury:

(Fracture of Pelvic Bones)

(1) Pubis	2 cases
(2) Pubis and ischium	1 "
(3) Ischium	1 "
(4) Buttock wounds	5 "
(5) Thigh (3 bilateral)	9 "
(6) Upper extremities	2 "

(Femur) - F.C.C.	2 cases
(Other) - Fibula, F.C.C.	1 "
Tibia, F.C.C.	1 "

Associated Genital Injury:

(1) Penis	7 cases
(2) Scrotum	7 "
(3) Testis	4 "
(4) Transection of vas deferens	1 "

Bladder Injury	3 cases
Rectum	2 "
Small bowel (ileum)	1 "

Surgery:

Early Definitive:

(1) Cystostomy and suture of urethra over inlying catheter	5 cases
(a) In one of these a left sigmoid colostomy was also performed because of associated rectal injury.	
(2) Cystostomy - no inlying catheter	1 "
(a) Urethral atresia developed.	
(3) Inlying catheter alone	3 "
(a) In one of these the urethra was sutured over catheter.	
(4) Cystostomy and retrograde catheterization	4 "
(a) In ONE of these the scrotum was drained because of urinary extravastion and a large F.B. was removed.	
(5) No urethral surgery nor cystostomy.	5 "
(a) Urethra was exposed, but lumen not penetrated in two cases.	
(b) In one case, merely a contusion	

Surgery: (Early Definitive Cont'd)

(c) Traumatic amputation of penis in one case. Tunica albuginea of corpora sutured and urethra sutured to skin.

(d) Small laceration of penile urethra just proximal to coronal sulcus. (1 case) Urethral fistula developed.

Late Surgery:

(1) In cases in which cystostomy and suture of urethra over inlying catheter was performed. 5 cases

(a) Drainage of peri-urethral abscess. (1 case)

(2) In case where cystostomy alone performed. 1 "

(a) Patient evacuated for surgery for urethral atresia.

(3) In cases where inlying catheter alone used. 3 "

(a) In one case abdominal distention occured and laparotomy performed 48 hours after injury. Suture of perforations in ilium. Cystostomy and drainage of perivesical space for pericystitis - 21 days after injury.

(b) In second case urethra had been sutured over catheter. Cystostomy 3 weeks after injury because of blocking of catheter.

(c) In third case catheter blocked. Cystostomy 9 days post injury. Recurrent severe hemorrhage from urethra. Perineal exposure, ligation of bleeding, deep, transverse perineal artery. Suture of urethra.

(4) Cases in which cystostomy and retrograde catheterization performed. 4 "

(a) In one case sigmoid colostomy for associated rectal injury, 5 days post injury. Subsequent drainage of periproctic abscess.

(b) In a second case a huge pelvic abscess developed as result of inadquate debridement. Delayed debridement plus pelvic drainage.