

Annexure 1

The conversion of the MCQ numeric mark to a closed mark

MCQ Percentage Numeric Mark for each Subject	Closed Mark
<36	10
37-42	10.5
43-49	11
50-57	11.5
58-64	12
65-72	12.5
73-79	13
80-86	13.5
>87	14

Annexure 2

5 point marking scale for theory, oral and clinical components – descriptors developed for oral components

	Theory, oral and clinical marks (Closed Mark)
Bad Failure	7
Borderline failure	8
Pass	9
Good pass	10
Excellent pass	11

Surgery theory/ oral / clinical examination guidelines for the award of a closed mark

Grade	General descriptors	Specific descriptors
Bad Failure (Major deficiencies/ unsafe to practice independently)	<ul style="list-style-type: none"> - Major deficiencies in knowledge - Application of knowledge and practical aspects have the potential to cause serious morbidity to the patient - Deficiencies are sufficient for the examiner to conclude that it is unsafe to practice unsupervised as a surgeon 	<p>Patient care – demonstrated incompetence in the diagnosis and clinical management to a level that caused serious concerns to the examiner</p> <p>Knowledge and judgment – poor basic knowledge and judgment/understanding to a level of concern</p> <p>Quality of response – disorganized and confused; prompts do not work (unpersuadable)</p>
Borderline failure (Minor deficiencies/ causes morbidity, but not mortality)	<ul style="list-style-type: none"> - Minor deficiencies in knowledge - Application of knowledge and practical aspects may cause morbidity, but not sufficient to cause significant morbidity - At least two areas that the examiner considers weak and/or - Overall ability (knowledge or application of knowledge) not up to the mark 	<p>Patient care – failed to demonstrate competence in the diagnosis and clinical management</p> <p>Knowledge and judgment – gaps in knowledge/difficulty in prioritizing/struggled to apply knowledge</p> <p>Quality of response – hesitant and indecisive answers; frequent prompting</p>

<p>Pass (Deficiencies can be self corrected)</p>	<ul style="list-style-type: none"> - No obvious knowledge deficiency - Application of knowledge and practical aspects are acceptable - Deficiencies are such that the examiner could reasonably conclude that the candidate can self-correct with time 	<p>Patient care – demonstrated competence in the diagnosis and clinical management</p> <p>Knowledge and judgment – good knowledge and judgment of common problems/ability to prioritize</p> <p>Quality of response – methodical approach to answering; minimal prompting</p>
<p>Good pass (No deficiency, suitable for independent practice)</p>	<ul style="list-style-type: none"> - Knowledge definitely sufficient to be successful - Confident and safe in application of knowledge and in practical aspects - Considered safe to allow unsupervised practice 	<p>Patient care – demonstrated competence and confidence in the diagnosis and clinical management</p> <p>Knowledge and judgment – coped with difficult problems/strong interpretation and judgment</p> <p>Quality of response – logical answers with good supporting evidence; prompting limited to aspects related to the literature</p>
<p>Excellent pass (Shows extra ability)</p>	<ul style="list-style-type: none"> - Above average - Shows some extra ability in knowledge, application of knowledge, and in practical aspects - Outstanding - Ability to clearly vocalize the thought process 	<p>Patient care – demonstrated confidence and competence in the diagnosis and clinical management to a level which would inspire confidence in the patient</p> <p>Knowledge and judgment – flawless knowledge, insight and judgment/understanding of breadth and depth of a topic and quoted from literature</p> <p>Quality of response – confident, clear, logical and focused answers; no prompting necessary</p>

Annexure 3

Marking Sheet for MD Surgery Part I – in Anatomy (of a single candidate)

					Overall Marks
MCQ		Raw Mark (out of 100)		Closed Mark	
		Ex 1	Ex 2	Average	
SEQ	Q1				
	Q2				
	Q3				
	Q3				
Orals	Panel 1				
	Panel 2				

Annexure 4. Core curriculum / syllabus for all trainees

Introduction

The curriculum /syllabus described in this section is the framework document for systematic training in surgery for all trainees. The document details the conditions referred to as **topics**. Under each topic, **learning objectives** are given and the level of performance / competence to be achieved are described under the domains of

- Core knowledge
- Clinical skills
- Procedural skills

Topics

Topic	Page numbers
Assessment of the acute abdomen	viii
Peritonitis	ix
Gastrointestinal haemorrhage	x - xi
Acute presentation of gynaecological disease	xi - xii
Acute intestinal obstruction	xii - xiii
Mesenteric ischaemia	xiii - xiv
Strangulated hernia	xiv - xv
Superficial sepsis including necrotizing infection	xv - xvi
Emergency / Trauma <ul style="list-style-type: none">• Immediate management of the critically injured• Head injury / Cervical spine injury• Acute airway obstruction and chest injuries	xvi - xvii

<ul style="list-style-type: none"> • Abdominal / Pelvic injuries / Spinal injuries • Limb injuries • Vascular injuries 	
Vascular emergencies	xviii
Elective vascular conditions	xix
Conditions affecting the scrotum	xx - xxi
Conditions affecting the bladder and urethra	xxi - xxii
Conditions affecting male genitalia	xxii - xxiii
Conditions affecting kidneys and ureters	xxiii - xxiv
Elective hernia	xxiv - xxv
Conditions affecting reticulo-endothelial and haemopoietic system	xxv - xxvi
Endoscopy	xxvi - xxvii
Oesophago- gastric disease	xxvii - xxviii
Diseases of the small bowel	xxviii - xxix
Hepato-pancreato-biliary disease	xxix - xxx
Colonic and ano rectal disease	xxxi - xxxii
Endocrine glands and their diseases	xxxii - xxxiii
Conditions affecting the breast	xxxiii - xxxiv
Diseases affecting the oral cavity and salivary glands	xxxv - xxxvi
Nutrition in surgery	xxxvi - xxxvii
Common skin and soft tissue conditions of surgical importance	xxxvii - xxxviii

Elective orthopaedic conditions	
<ul style="list-style-type: none"> • Congenital and developmental anomalies of the musculoskeletal system • Diseases of the spine • Degenerative and inflammatory conditions affecting the joints • Miscellaneous topics in orthopaedics • Metabolic and endocrine disorders • Bone and joint infection • Bone and soft tissue tumours 	<p>xxxix – xl</p> <p>xl – xli</p> <p>xli</p> <p>xlii – xliii</p> <p>xliii – xliv</p> <p>xliv – xlv</p> <p>xlv</p>
Orthopaedic trauma	
<ul style="list-style-type: none"> • Limb trauma • Pelvic trauma • Spinal trauma • Hand injuries 	<p>xlvi – xlviii</p> <p>xlviii – xlix</p> <p>xlix – l</p> <p>li</p>
Paediatric surgery	li - lii
Oncosurgery	lii - liii
Management of the dying patient	liv

1. ASSESSMENT OF THE ACUTE ABDOMEN

Learning objectives

- Assessment, resuscitation and management of patients with acute abdomen

Core knowledge

- Anatomy of abdomen and pelvis
- Differential diagnosis
- Patho-physiology, sequelae and treatment of intraperitoneal sepsis
- Principles of management of bowel perforations including the indications for exteriorization of the bowel
- Principles of damage control surgery
- Conditions that do not need immediate surgery and their management

Clinical skills

- Clinical diagnosis
- Resuscitation, antibiotic therapy and decision making regarding intensive care
- Management of associated medical conditions
- Recognition of the indications for surgery
- Timing of intervention
- Recognition and management of complications
- Recognition of patients who do not need immediate surgery

Procedural skills

- Insertion of intravenous cannulae
- Central venous cannulation
- Laparoscopic assessment
- Emergency laparotomy
- Damage control laparotomy

2. PERITONITIS

Learning objectives

- Diagnosis and management of peritonitis

Core knowledge

- Anatomy of the abdomen and pelvis
- Causes
- Patho-physiology and natural history
- Complications
- Treatment of intraperitoneal sepsis, systemic sepsis and shock
- Principles of abdominal drainage
- Indications and principles of exteriorization of bowel

Clinical skills

- History, examination and eliciting/interpreting physical signs
- Clinical assessment of severity of the illness, localized or generalized
- Interpretation of investigations
- Indications / role for non-operative management, re-assessment, indications for intensive care and indications for intervention
- Timing of intervention
- Diagnosis of complications of peritonitis and decision making regarding intervention

Procedural skills

- Emergency laparotomy
- Repair of perforated viscus, removal of septic focus, exteriorization of viscus
- Use of drains to make a “controlled fistula”
- Hartmann’s procedure

3. GASTROINTESTINAL HAEMORRHAGE

Learning objectives

- Diagnosis and emergency management of patients with acute and chronic gastro intestinal haemorrhage
- Selection of patients who need specialized care
- Recognition of causes, diagnostic endoscopy, treatment and referral to subspecialists if needed

- Surgical treatment of GI bleeding and post-operative management
- Management of complications of GI bleeding

Core knowledge

- Assessment of severity
- Management of blood loss
- Identification of the aetiology
- Patho-physiology of coagulation disorders
- Patho-physiology of hypovolaemia
- Treatment options, role and timing of endoscopic treatment and interventional radiology
- Indication for surgical management
- Post operative care, complications and their management

Clinical skills

- Recognition of the degree of blood loss and severity of co-morbid disease
- Decision making regarding need for high dependency/intensive care and need/timing of endoscopic / surgical treatment
- Need for analgesia, nutritional support, cardio-respiratory support
- Recognition of re-bleeding and complications

Procedural skills

- Diagnostic endoscopy / colonoscopy
- Injection sclerotherapy for oesophageal varices
- Band ligation for oesophageal varices
- Laparotomy for bleeding peptic ulcer

4. ACUTE PRESENTATION OF GYNAECOLOGICAL DISEASE

Learning objectives

- Recognition and emergency management of patients presenting with gynecological emergencies to surgical casualty

Core knowledge

- Anatomy and physiology of female pelvic organs
- Varying clinical profiles of ectopic pregnancy
- Infective intra-abdominal / pelvic conditions and their management
- Principles of management of ovarian cancer including the management of obstructed colon

- Principles of management of haemorrhage due to ruptured ovarian cyst; ectopic pregnancy
- Principles of management of twisted ovarian cyst
- Principles of management of ureteric obstruction due to cervical carcinoma
- Recognition and emergency management of iatrogenic injury to other organs during gynaecological surgery in consultation with appropriate specialists

Clinical skills

- History, examination and eliciting/interpreting physical signs
- Diagnosis of ectopic pregnancy and referral / emergency operative management if indicated
- Diagnosis of pelvic sepsis of gynaecological origin and referral / emergency operative management if indicated
- Assessment of acute abdomen, recognition of peritonitis, recognition of haemorrhage and assessment of blood loss
- Interpretation of pregnancy test, abdomino-pelvic ultrasound, CT scan, tumour markers
- Recognition of nature and extent of iatrogenic injury

Procedural skills

- Emergency laparoscopy / laparotomy
- Ligation of internal iliac artery for postpartum haemorrhage
- Drainage of pelvic abscess
- Appropriate life saving surgery for bleeding ectopic pregnancy
- Repair of iatrogenic bladder injuries
- Ureteric stenting
- End to end repair of ureter and ureteric reimplantation / Boari flap repair
- Hartmann's procedure/ left iliac loop colostomy for iatrogenic injury and for ovarian cancer

5. ACUTE INTESTINAL OBSTRUCTION

Learning objectives

- Diagnosis and management of acute intestinal obstruction

Core knowledge

- Surgical anatomy of the gastrointestinal system
- Aetiology
- Classification

- Patho-physiology of shock and sepsis
- Differential diagnosis
- Treatment options, non operative / operative
- Principles of surgery

Clinical skills

- Clinical diagnosis and assessment (Identification of strangulated from simple, adynamic from mechanical, large bowel from small bowel obstruction; specific causes i.e adhesions, volvulus)
- Clinical assessment of fluid loss, resuscitation, recognition of those who need intensive care
- Interpretation of radiographs, laboratory investigations
- Role of contrast CT scan
- Decision making and timing of laparotomy

Procedural skills

- Laparotomy, division of adhesions, excision and anastomosis of bowel, exteriorization, bowel decompression, resection of tumour / stricture, by pass, stricturoplasty.

6. MESENTERIC ISCHAEMIA

Learning objectives

- Diagnosis and management of acute and chronic mesenteric ischaemia

Core knowledge

- Surgical anatomy of aorta and mesenteric vessels
- Causes, clinical features, investigation and treatment of acute mesenteric ischaemia and chronic mesenteric ischaemia
- Management of co-morbidity, nutritional requirements and organ failure

Clinical skills

- Clinical diagnosis
- Investigations and exclusion of other pathology
- Operative decision making and timing of surgery / referral
- Recognition of complications including continuing ischaemia following surgery

Procedural skills

- Emergency small bowel/large bowel resection and anastomosis / exteriorization
- Hartmann's procedure

7. STRANGULATED HERNIA

Learning objectives

- Management of strangulated hernia
- Management of acute gastric volvulus

Core knowledge

- Surgical anatomy of the inguinal region, femoral canal, abdominal wall and sites of internal herniation i.e diaphragm, paraduodenal fossae
- Patho-physiology of strangulated hernia
- Principles of surgery
- Post operative complications

Clinical skills

- Clinical diagnosis and assessment of strangulated herniae of all types and acute gastric volvulus
- Appropriate investigations
- Resuscitation
- Timing of surgery and operative treatment

Procedural skills

- Emergency laparotomy for strangulated hernia
- Reduction of acute gastric volvulus and repair of diaphragmatic defect
- Small bowel resection and anastomosis
- Large bowel resection / exteriorization
- Hernia repair

8. SUPERFICIAL SEPSIS, NECROTIZING INFECTIONS AND TETANUS

Learning objectives

- Diagnosis and treatment of simple and complicated soft tissue infections including life threatening soft tissue sepsis and tetanus

Core knowledge

- Recognition and management infective conditions of the skin i.e. infected sebaceous cyst, carbuncle, superficial abscess, cellulitis, infected ingrown toe nail, paronychia, pilonidal sinus, intermammary sinus and hydradenitis suppurativa
- Aetiology and natural history
- Microbiology and pathogenesis
- Vulnerable individuals / Predisposing factors
- Recognition and management of gas gangrene, other necrotizing infections and tetanus
- Management of diabetes mellitus
- Patho-physiology of septic shock
- Appropriate antibiotic therapy

Clinical skills

- History, examination
- Recognition of the early warning features of life threatening soft tissue infections and tetanus
- Resuscitation, antibiotic therapy and recognition of the need for intensive care for life threatening soft tissue infections and tetanus
- Decision making regarding excisional surgery / amputations / secondary closure

Procedural skills

- Drainage of abscess
- Excision of infected skin lesions
- Wedge resection of toe nail and lunule, complete avulsion of toe nail and lunule / phenolisation of lunule
- Debridement of Fournier's gangrene / need for radical debridement / orchidectomy
- Major amputations
- Tracheostomy

9. EMERGENCY / TRAUMA

Learning objectives

- Initial management of critically injured patient and selection of patients who need referral for specialized care
- Co-ordination of team work with other specialists to enhance the care of the trauma patient

Core knowledge

- Mechanism of injury, causation, injury patterns
- Pathogenesis of shock
- Patho-physiology of head injury, chest injury, haemorrhage, septic shock, spinal shock
- Complications of bone and joint injury
- Complications of vascular injury
- Hypothermia, electrocution, burns
- Legal aspects of trauma
- Early management of all forms of trauma and definitive management of abdominal trauma

Clinical skills

- Initial assessment and resuscitation based on ATLS / NTMC principles
- Interpretation of data
- Transfer protocols
- Appropriate investigations
- Recognition of the need for intervention
- Triage in mass casualty situations

Procedural skills

- Emergency airway establishment
- Chest tube insertion
- Diagnostic peritoneal lavage
- Emergency Burr holing / Craniectomy
- Conduct of emergency laparotomy, thoracotomy, exploration of blood vessels
- Compartmental fasciotomy
- Immobilization of fractures
- Protection of spine
- Damage control surgery

10. VASCULAR EMERGENCIES

Learning objectives

- Diagnosis and management of peripheral vascular emergencies
- Prevention, diagnosis and management of DVT

Core knowledge

- Aetiology and natural history of common vascular emergencies and emergency and definitive management, peripheral vascular injuries, thrombo-embolism, thrombosis and superficial thrombophlebitis
- Clinical features, investigations and treatment of DVT, prevention and follow up

Clinical skills

- Resuscitation
- Interpretation of investigations, use of hand held Doppler
- Decision making regarding need for intervention / indications for non-operative management
- Recognizing the limitations in a generalist setup
- Referral and transfer protocols
- Decision to amputate - life versus limb

Procedural skills

- Closed reduction of fractures
- Compartmental fasciotomy
- Embolectomy under local anaesthesia
- Exploration of blood vessels, proximal / distal control, thrombectomy, repair, reverse saphenous vein graft / vein patch graft, end to end anastomosis , ligation, temporary shunt
- Major amputations

11. ELECTIVE VASCULAR CONDITIONS

Learning objectives

- Diagnosis and management of congenital vascular malformations, varicose veins, chronic ischaemia of limbs, aneurysmal disease, arterio-venous fistulae and their complications

Core knowledge

- Clinical features, natural history, investigation and treatment of common congenital vascular malformations
- Venous drainage of lower limb, clinical features, complications, investigations and treatment of varicose veins
- Vascular anatomy of the limbs, clinical features, complications, investigations and treatment of chronic occlusive vascular disease of the limbs
- Anatomy of the major vessels, incidence of aneurysms, clinical features, complications, investigations and treatment of aneurysms and arterio-venous fistulae

Clinical skills

- Clinical diagnosis
- Interpretation of investigations
- Assessment of the extent and severity of the disease
- Non operative management
- Operative decision making / referral

Procedural skills

- Sclerotherapy for varicose veins
- Sapheno femoral ligation, stripping of long saphenous vein / multiple stab avulsions
- Sapheno popliteal ligation and multiple stab avulsions

12. CONDITIONS AFFECTING THE SCROTUM

Learning objectives

- Diagnosis and treatment of the conditions affecting the scrotum

Core knowledge

- Anatomy of the Scrotum and testis
- Embryology, development and physiology of testis
- Causes of acute scrotal pain
- Anatomical variations, predisposing factors and patho-physiology of torsion of the testis
- Pathogenesis and clinical features of hydrocoele, cyst of the epididymis, varicocoele, spermatocele and haematocele and chronic granulomatous conditions affecting testis
- Applied anatomy and patho-physiology of the undescended testis
- Pathology of testicular tumours
- Aetiology and differential diagnosis of epididymo-orchitis
- Indications for male sterilization, consent, surgical techniques

Clinical skills

- History, examination and eliciting/interpreting physical signs
- Clinical diagnosis of torsion and decision making for surgical exploration
- Interpretation of investigations, imaging and tumour markers
- Diagnosis and management of testicular malignancies
- Indications for referral
- Counseling prior to male sterilization
- Clinical diagnosis of obstructed / strangulated groin hernia

Procedural skills

- Hydrocoelelectomy
- Open inguinal hernia repair including mesh
- Paediatric inguinal herniotomy
- Orchidopexy
- Orchiectomy
- Hydrocoelelectomy
- Excision of cyst of the epididymis

- Varicocelectomy
- Orchiectomy for testicular tumour
- Vasectomy

13. DISEASES AFFECTING THE BLADDER AND URETHRA

Learning objectives

- Diagnosis and management of acute and chronic retention of urine
- Recognition and management traumatic injuries to bladder and urethra
- Principles of management of bladder neoplasms

Core knowledge

- Anatomy and embryology of the bladder, prostate and urethra
- Aetiology, clinical features, patho-physiology and complications of acute and chronic retention of urine
- Conditions affecting the bladder and urethra presenting with haematuria including transitional cell tumors and other rare affiliations such as tuberculosis
- Causes and natural history of urethral stricture
- Treatment of acute and chronic urinary obstruction

Clinical skills

- History, examination
- Decision making regarding early management
- Interpretation of investigations, imaging
- Referral / decision making of definitive management

Procedural skills

- Urethral catheterization
- Diagnostic cystoscopy / biopsy of bladder neoplasm
- Suprapubic cystostomy
- Prostatic biopsy
- Open prostatectomy
- Vesicolithotomy

14. DISEASES AFFECTING THE MALE GENITALIA

Learning objectives

- Assessment and treatment / referral of conditions affecting the glans penis and foreskin

Core knowledge

- Anatomy and embryology of the foreskin
- Aetiology, pathology, clinical features, complications and management of congenital phimosis, balanitis xerotica obliterans and carcinoma of the penis

Clinical skills

- Clinical diagnosis
- Interpretation of investigations, imaging
- Decision making / counseling prior to surgical treatment
- Indications for referral

Procedural skills

- Reduction / dorsal slit for paraphimosis
- Circumcision / Frenuloplasty
- Biopsy

- Meatotomy / meatoplasty
- Partial / total amputation of penis, inguinal lymph node dissection
- Decompression of priapism

15. DISEASES AFFECTING THE KIDNEYS AND URETERS

Learning objectives

- Diagnosis and management of upper and lower urinary tract obstructions / infections
- Diagnosis and management urinary stone disease
- Diagnosis of urological malignancy and treatment

Core knowledge

- Surgical anatomy and physiology of the kidney and ureter
- Congenital abnormalities
- Aetiology, Clinical features, microbiology and complications of urinary tract infections
- Investigations
- Antibiotics and relevant pharmacology
- Aetiology, clinical features, natural history, patho-physiology, complications and management of urolithiasis
- Classification and staging of renal and urothelial tumours, clinical features, investigations, and treatment / follow up

Clinical skills

- Diagnosis of obstructed / infected kidney
- Emergency treatment
- Interaction with other specialists
- Emergency management of renal / urothelial tumours
- Referral for definitive management

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Procedural skills

- Nephrectomy
- Nephrolithotomy
- Open nephrostomy
- Open ureterolithotomy and placement of double J stent
- Open pyelolithotomy, pyeloplasty and double J stent placement
- Cystoscopy and ureteric stenting

16. ELECTIVE HERNIA

Learning objectives

- Diagnosis and management of primary and recurrent abdominal wall hernia

Core knowledge

- Anatomy of inguinal and femoral region, abdominal wall and related structures
- Natural history, presentation of abdominal herniae and complications
- Treatment options
- Current methods of operative repair including open mesh, laparoscopic mesh, and plication of the posterior wall to include the underlying principles, operative steps, risks benefits, and complications

Clinical skills

- Diagnosis, assessment of patients presenting with herniae including inguinal, femoral, incisional, paraumbilical, obturator, spigelian, lumbar hernia
- Post operative and long term follow up

Procedural skills

- Open / laparoscopic repair of inguinal, femoral, epigastric, paraumbilical, incisional, lumbar, obturator herniae

17. CONDITIONS AFFECTING THE RETICULO-ENDOTHELIAL AND HAEMOPOIETIC SYSTEM

Learning objectives

- Provision of surgical support in the management of disorders of haemopoetic system, lymphatic system and spleen

Core knowledge

- Pathology of lymphadenopathy, non-Hodgkins lymphoma, Hodgkins disease
- Classification
- Staging
- Indications for elective splenectomy
- Indications for emergency splenectomy
- Sequelae of splenectomy
- Pathological conditions of the spleen

Clinical skills

- Liaising with haematologists, oncologists and physicians to make operative decisions
- Assessment and optimization of patients before surgery
- Follow up and prevention / treatment of complications

Procedural skills

- Open / laparoscopic liver biopsy
- Lymph node biopsy
- Open / laparoscopic splenectomy

18. ENDOSCOPY

Learning objectives

- Safe performance of upper and lower GI endoscopy including colonoscopy

Core knowledge

- Structure and function of endoscopes, processors and accessories, including diathermy
- Cleaning, sterilization, drying, safe handling and safe storage of equipment
- Indications for flexible oesophagoduodenoscopy, rigid oesophagoscopy, proctoscopy, rigid / flexible sigmoidoscopy, rigid / flexible cystoscopy
- Indications for colonoscopy
- Consenting for endoscopy
- Medical and legal issues pertaining to consent and provision of information
- Sedative and analgesic drugs and side effects
- Monitoring during endoscopy
- Recognition and management of complications of endoscopy

Clinical skills

- Recognizing indications, risks and benefits of endoscopy and endotherapy

Procedural skills

- Oesophagoduodenoscopy / biopsy
- Oesophagoduodenoscopy / injection / banding of varices
- Oesophagoduodenoscopy / injection of bleeding peptic ulcer
- Percutaneous Endoscopic Gastrostomy (PEG)
- Proctoscopy and treatment of haemorrhoids
- Rigid sigmoidoscopy / biopsy
- Flexible sigmoidoscopy / polypectomy
- Colonoscopy / polypectomy

19. OESOPHAGO-GASTRIC DISEASE

Learning objectives

- Diagnosis, management and indications for referral of peptic ulcer disease, gastritis, gastro-oesophageal reflux disease, oesophago-gastric neoplasms and other common pathological conditions affecting the oesophagus and stomach including paediatric conditions

Core knowledge

- Aetio-pathogenesis, clinical features, complications and treatment of peptic ulcer, gastro-oesophageal reflux disease and gastritis including *Helicobacter pylori*
- Aetiology, epidemiology, pathology, clinical features and natural history of oesophageal and gastric malignancies
- Investigations
- Indications for surgery
- Non surgical treatment

Clinical skills

- History, examination
- Investigations
- Decision making regarding appropriate intervention and need for referral
- Recognition of complications and decision making of intervention / referral

Procedural skills

- Oesophagogastroduodenoscopy and biopsy
- Placement of oesophageal stents
- Oesophagectomy
- Gastrectomy
- Gastrojejunostomy
- Open control of bleeding peptic ulcer

20. DISEASES OF THE SMALL BOWEL

Learning objectives

- Diagnosis and management of benign and malignant conditions of the small bowel

Core knowledge

- Embryology, developmental anomalies, anatomy, and physiology of the small bowel
- Clinical features and treatment of congenital hypertrophic pyloric stenosis, duodenal atresia, malrotation of gut, midgut volvulus in infants
- Clinical features, pathology and management of intussusception in children and in adults
- Pathology, natural history, clinical features, complications and treatment of typhoid, ileo-caecal tuberculosis, Crohn's disease
- Clinical features, pathology, complications and management of small bowel adhesions (congenital and acquired) polyps and diverticulae
- Usefulness and limitations of investigations

Clinical skills

- Clinical diagnosis
- Interpretation of investigations
- Decision making regarding laparotomy / referral

Procedural skills

- Ramstedt's pyloromyotomy, reduction of midgut volvulus
- Hydrostatic reduction of intussusception in children
- Open reduction of intussusception
- Excision of mesenteric cyst, Meckel's diverticulum, and end to end anastomosis of small bowel
- Adhesiolysis, stricturoplasty, right hemicolectomy and end to side ileo-transverse anastomosis
- Making a Roux - en Y loop

21. HEPATO-PANCREATO -BILIARY DISEASE

Learning objectives

- Diagnosis and management of gallstones and its complications
- Diagnosis and management of extrahepatic biliary obstruction
- Diagnosis and management of acute pancreatitis, chronic pancreatitis, and their complications
- Diagnosis and management of benign and malignant pancreatic tumours
- Diagnosis and management of benign and malignant liver tumours / infections

Core knowledge

- Embryology, development, applied anatomy and physiology of liver, biliary system, pancreas and duodenum
- Aetiology, pathology, clinical features, complications and management of gallstones
- Causes, natural history, complications and management of obstructive jaundice
- Aetiology, clinical features, patho-physiology ,complications and management of acute pancreatitis and chronic pancreatitis
- Aetiology, pathology, clinical features natural history and management of benign and malignant pancreatic tumours
- Aetiology, natural history, pathology, clinical features and management of liver tumours and non-neoplastic benign conditions of the liver

Clinical skills

- Clinical diagnosis
- Investigations
- Assessment of severity of acute pancreatitis, recognition of patients needing intensive care, antibiotics, laparotomy for necrosectomy, drainage of abscess
- Decision making regarding palliation / referral of obstructive jaundice, and neoplasms
- Prognostication, liaising with relatives

Procedural skills

- Open cholecystectomy, laparoscopic cholecystectomy, cholecystostomy, subtotal cholecystectomy
- Hepatico jejunostomy, choledocho-duodenostomy, cholecystojejunostomy
- Surgery for complications of acute pancreatitis
- Distal pancreatectomy
- Pancreaticoduodenectomy

22. COLONIC AND ANO RECTAL DISEASES

Learning objectives

- Diagnosis and management of acute appendicitis, colonic infections, infestations, diverticular disease, sigmoid volvulus, ano-rectal suppuration, inflammatory bowel disease, functional disorders of colon, megacolon, faecal incontinence, rectal prolapse, haemorrhoids, anal fissure, solitary rectal ulcer, fistula in ano, and sexually transmitted diseases of the anus.
- Diagnosis and management of colorectal neoplasia

Core knowledge

- Anatomy and physiology of the colon, rectum, anus, including sphincters and the pelvic floor
- Aetiology, pathology, clinical features and complications of acute appendicitis, diverticulitis, and ano-rectal suppuration and fistulous disease
- Clinical features ,diagnosis and medical management of colonic infections, infestations and indications for surgical intervention
- Pathology, and clinical features complications of inflammatory bowel disease, medical management and indications for surgery

- Epidemiology, aetiology, pathology, natural history, genetics and management of colorectal and anal neoplasia, pre malignant conditions and polyps and including screening for colorectal cancer
- Aetiology, clinical features, pathology and management of anal fissure, haemorrhoids, rectal prolapse, and incontinence

Clinical skills

- Clinical diagnosis
- Investigations
- Staging of neoplastic disease / referral
- Assessment and identifications of patients with complicated ano-rectal fistulous disease needing referral
- Decision making for emergency and elective surgical interventions / referral
- Recognition of limitations of institutions, training and experience

Procedural skills

- Proctoscopy, flexible sigmoidoscopy, colonoscopy,
- Loop ileostomy, transverse defunctioning colostomy, sigmoid loop colostomy
- Right hemicolectomy
- Extended right hemicolectomy
- Left hemi colectomy
- Hartmann's procedure
- Sigmoid colectomy
- Anterior resection
- Abdomino-perineal excision of the rectum
- Haemorrhoidectomy
- Lateral sphincterotomy, manual anal dilation, fissurectomy
- Drainage of abscess
- Fistulotomy for low anal fistulae
- Seton insertion cutting / drainage for complex fistulae

23. ENDOCRINE GLANDS AND THEIR DISEASES

Learning objectives

- Diagnosis and management of diseases of the thyroid gland, parathyroid glands, adrenal glands, and pancreatic islets

Core knowledge

- Aetiology, pathology, patho-physiology, clinical features, complications and management of diseases affecting the thyroid gland
- Clinical features, natural history and management of parathyroid, adrenal, and pancreatic islet cell tumours

Clinical skills

- Clinical diagnosis
- Interpretation of investigations
- Operative decision making / referral

Procedural skills

- Hemi-thyroidectomy
- Total thyroidectomy with parathyroid preservation
- Surgery of the pancreas and adrenal gland - Approaches and exposure/excision

24. CODITIONS AFFECTING THE BREAST

Learning objectives

- Diagnosis and management of benign breast disease, borderline lesions and breast cancer including screening for breast cancer

Core knowledge

- Anatomy, development and physiology of breast
- Effect of hormones and age related changes
- Care of breast during lactation
- Clinical features, pathology, natural history and management of breast infections, benign breast disease, and breast cancer.
- Clinical features, pathology and management of premalignant and borderline conditions of the breast

Clinical skills

- Clinical diagnosis
- Interpretation of biochemistry, imaging , cytology and histopathology reports
- Operative decision making / referral

Procedural skills

- FNAC / Core biopsy
- Placement of cosmetic incisions
- Drainage of breast abscess, wide excision of chronic breast abscess
- Excision of breast lumps
- Microdochectomy
- Wide local excision and cavity biopsy
- excision of bulky axillary tails
- Total mastectomy and axillary clearance
- Axillary clearence

25. DISEASES AFFECTING THE ORAL CAVITY AND SALIVARY GLANDS

Learning objectives

- Management of benign and malignant diseases of the salivary glands
- Common benign pre malignant and malignant conditions of the oral cavity

Core knowledge

- Surgical anatomy of the oral cavity ,tongue and salivary glands
- Spectrum of diseases that affect the oral cavity ,tongue and salivary glands
- Classification, pathology, clinical features, natural history, investigation and treatment of benign and malignant tumours of the salivary glands
- Classification, pathology, clinical features, natural history, investigation and treatment of benign and malignant tumours of the tongue and the oral cavity

Clinical skills

- Clinical diagnosis
- Interpretation of investigations
- Referral

Procedural skills

- Removal of calculi from the submandibular duct
- Submandibular sialadenectomy
- Superficial conservative parotidectomy / total conservative parotidectomy
- Excision of mucous retention cysts
- Release of tongue tie

26. NUTRITION IN SURGERY

Learning objectives

- Nutritional requirements of adults and children during health and illness and methods of delivery

Core knowledge

- Nutritional requirements of healthy adults and children
- Metabolic response to trauma and altered nutritional requirements
- Conditions that affect intake, digestion, absorption, assimilation of nutrients
- Malignant cachexia
- Clinical / biochemical methods of assessment of nutritional status
- Role of normal intestinal flora and effect of antimicrobials
- Dietary supplements including probiotics
- Routes of delivery and advantages / disadvantages
- Complications of enteral / parenteral nutrition

Clinical skills

- Anticipation of nutritional deficiencies in surgical patients and clinical diagnosis
- Interpretation of anthropometric and biochemical investigations
- Liaise with other specialists, nutritionists, nurses and relatives regarding provision of optimum nutritional support and selection of appropriate route
- Recognition of complications of nutrition, management and measures for prevention of such complications
- Recognition of complications and management of central venous feeding lines and enteral feeding devices

Procedural skills

- Insertion of intravenous lines, central venous lines and maintenance
- Insertion of nasogastric tubes, and placement of percutaneous endoscopic gastrostomy (PEG)
- Construction of a feeding jejunostomy, feeding gastrostomy

28. COMMON SKIN AND SOFT TISSUE CONDITIONS OF SURGICAL IMPORTANCE

Learning objectives

- Diagnosis and management of common skin and soft tissue conditions of surgical importance

Core knowledge

- Aetiology, clinical features, pathology, complications and natural history of sebaceous cyst, hydradenoma, implantation dermoid, callosity, ganglion and tumoural calcinosis, squamous papilloma of the skin and, pilomatrixoma
- Aetiology, clinical features and pathology of nerve entrapment syndromes, tenosynovitis, overuse injuries and bursitis
- Aetiology, natural history, pathology, clinical features and complications of pigmented naevi, malignant melanoma, senile keratoses, squamous cell carcinoma of skin and basal cell carcinoma
- Aetiology, clinical features, pathology, natural history of subcutaneous / subfascial / intermuscular / intramuscular/ subperiosteal / retroperitoneal / mediastinal / abdominal wall / other locations soft tissue lumps such as lipoma / fibroma / neurofibroma / leiomyoma, / rhabdomyoma / giant cell tumour and malignant sarcomatous tumors liposarcoma, fibrosarcoma, neurofibrosarcoma, leiomyosarcoma, rhabdomyosarcoma , synovial sarcoma

- Incidence, clinical features, pathology, complications of capillary haemangioma, cavernous haemangioma, cystic hygroma, branchial cyst and congenital dermoids

Clinical skills

- Clinical diagnosis
- Investigations
- Referral / liaison with other specialists i.e dermatologists, clinical oncologists, plastic surgeons, orthopaedic surgeons and orthotists

Procedural skills

- Split skin grafting
- Decompression of nerves and tendons
- Placement of cosmetic incisions according to Langer's lines
- Excision / wide excision / compartmental excision / amputations

28. ELECTIVE ORTHOPAEDIC CONDITIONS - CONGENITAL AND DEVELOPMENTAL ANOMALIES OF THE MUSCULOSKELETAL SYSTEM

Learning objectives

- Diagnosis and management of developmental dysplasia of hip
- Diagnosis and management of congenital talipes equino-varus, congenital vertical talus, congenital angular deformities of the leg, congenital pseudo-arthritis of the tibia and fibula, congenital constriction bands, congenital deficiencies of long bones
- Diagnosis and management of congenital dislocation of the knee / patella
- Diagnosis and management of Erb's palsy, Klumpke's paralysis, congenital elevation of scapula, congenital disorders of the radial head, congenital radio-ulnar synostosis, congenital constriction bands, congenital anomalies of hand, congenital deficiencies of long bones
- Diagnosis and management of congenital fractures / osteogenesis imperfecta, congenital torticollis / sternomastoid tumour, congenital spinal conditions, spina bifida, meningomyelocoele, sacral agenesis.
- Diagnosis and management of arthrogryposis

Core knowledge

- Surgical anatomy and development of the musculo-skeletal system
- Aetiology, incidence, clinical features, natural history and complications of congenital abnormalities
- Principles of investigations (ultrasound scans, radiographs, nerve conduction studies)
- Treatment methods

Clinical skills

- Diagnosis of the above conditions and differentiation from physiological variants
- Examination of the hip in the newborn, clinical diagnosis of the spectrum of hip disorders
- Examination of the foot, spine, upper limb, lower limb and major joints in the new born and in children.
- Neurological examination of the limbs
- Interpretation of radiological findings, ultrasonic findings with relevant radiological landmarks and/or guidelines.

Procedural skills

- Application of different types of splints/ braces for hip dysplasia and follow-up schedule for patients on splints
- Manipulation of foot and application of plaster cast for CTEV

29. ELECTIVE ORTHOPAEDIC CONDITIONS - DISEASES OF THE SPINE

Learning objectives

- Diagnosis and management of diseases of the spine

Core knowledge

- Anatomy, stability and function of the vertebral column
- Classification of common spinal deformities
- Aetiology, clinical features, and management of prolapsed intervertebral disc and cauda equina syndrome
- Aetiology, clinical features, pathology, complications and management of degenerative conditions affecting the spine, including spondylosis, spondylolysis, spondylolisthesis and neurogenic claudication
- Aetiology, clinical features, pathology, complications and management of primary and secondary osteoporosis

- Aetiology, clinical features, pathology, complications and management of inflammatory conditions affecting spine including ankylosing spondylitis
- Aetiology, clinical features, microbiology, pathology, complications and management of infections of the spine.
- Aetiology, clinical features, pathology, and management of primary and secondary tumours affecting the spine
- Principles of investigation of the spine (haematology, microbiology, mantoux, PCR, radiographs, USS, CT, MRI, myelography, DEXA scan)

Clinical skills

- Diagnosis of spinal cord compression / nerve root compression
- Interpretation of investigations
- Initiation of early management and appropriate referral

Procedural skills

- Application of spinal braces and plaster of Paris jacket
- Open drainage of psoas / paravertebral abscesses

30. ELECTIVE ORTHOPAEDIC CONDITIONS - DEGENERATIVE AND INFLAMMATORY CONDITIONS AFFECTING THE JOINTS

Learning objectives

- Diagnosis of primary osteoarthritis, secondary osteoarthritis and management
- Diagnosis of rheumatoid arthritis, ankylosing spondylitis, transient synovitis, crystal arthropathies, reactive arthritis, and management

Core knowledge

- Structure of a joint with reference to its articular cartilage and synovium
- Classification of diseases/ disorders that can give rise to secondary degeneration of a joint
- Classification and patho-physiology of inflammatory arthropathy
- Modalities of treatment available – medical (medications / physiotherapy) and surgical and appropriate time of referral
- Types of surgical procedures and their indications, contraindications, complications and limitations

Clinical skills

- Examination of a joint with ability to differentiate inflammatory, degenerative, and infective conditions affecting the joint
- Ability to assess the extent of joint damage and instability
- Evaluation of investigations (haematology, x-rays, ultrasound, CT, MRI)

Procedural skills

- Aspiration of a joint +/- intra-articular steroid injection
- Ability to perform arthrotomy
- Ability to perform synovial biopsy

31. ELECTIVE ORTHOPAEDIC CONDITIONS - MISCELLANEOUS TOPICS IN ORTHOPAEDICS

Learning objectives

- Diagnosis and management of impingement syndromes, rotator cuff tears, frozen shoulder, bicipital tendinitis, subacromial bursitis, calcific supraspinatus tendinitis, spontaneous rupture of the long head of biceps
- Diagnosis and management of tennis elbow, golfers elbow, olecranon bursitis, myositis ossificans and tardy ulnar nerve palsy
- Diagnosis and management of ganglion, trigger finger/ thumb, De Quervain's tenosynovitis, Dupuytren's contracture, mallet finger, Boutonniere deformity, algodystrophy, Volkmann's ischaemic contracture
- Diagnosis and management of costochondritis
- Diagnosis and management of idiopathic avascular necrosis of the femoral head including Perthe's disease, Trochanteric bursitis, Slipped Upper Femoral epiphysis
- Diagnosis and management of Osgood-Schlatter's disease, Supra patellar bursitis, Infra patellar bursitis, prepatellar bursitis, Semimembranosus bursa, Baker's cyst, habitual dislocation of patella, synovial chondromatosis, discoid lateral meniscus, cyst of the meniscus, loose body in knee, genu valgum and varus
- Diagnosis and management of retrocalcaneal bursitis, plantar fasciitis, Sever's disease, tenosynovitis of tibialis posterior and peroneus longus tendons , accessory navicular bone, neuropathic joints, hallux valgus, bunion, flat foot, pes cavus, claw toe, hammer toe, in toe gait.
- Diagnosis and management of carpal tunnel syndrome, ulnar tunnel syndrome, tarsal tunnel syndrome

Core knowledge

- Anatomy of shoulder joint, elbow joint, wrist joint, hand, hip joint, knee joint, ankle joint, foot
- Aetiology, pathology, clinical features and natural history of above conditions

Clinical skills

- Clinical examination and investigation of the painful shoulder, elbow, hip, knee and ankle joint, hand and foot
- Neurological examination of hand and foot
- Assessment of the ruptured tendons
- Interpretation of investigations

Procedural skills

- Correct injection techniques where steroids are indicated
- Median nerve decompression, decompression of abductor pollicis longus tendon, decompression of long flexor tendons in the hand, excision of superficial bursae
- Excision of ganglion

32. ELECTIVE ORTHOPAEDIC CONDITIONS - METABOLIC AND ENDOCRINE DISORDERS

Learning objectives

- Diagnosis and management of osteoporosis and its complications
- Diagnosis and management of osteomalacia and rickets
- Diagnosis and management of Paget's disease of bone

Core knowledge

- Anatomy and physiology of bone, composition of bone, and changes associated with age in males and females
- Classification of metabolic bone diseases
- Metabolism of vitamin D and disorders of the same

- Common endocrine disorders and the bone lesions caused by them i.e hyperparathyroidism
- Aetiology, clinical features, pathology, complications and treatment of osteoporosis, rickets, osteomalacia, and Paget's disease.

Clinical skills

- Interpretation of haematological investigations, radiographs, DEXA scan, measurement of bone mass
- Recognition of osteoporotic fractures and deformities
- Medical management of above conditions
- Referral

Procedural skills

- Application of skin traction, splints
- Application of plaster of Paris casts in osteoporotic fractures
- Ability to take bone biopsy – Iliac crest, any relevant bone

33. ELECTIVE ORTHOPAEDIC CONDITIONS - BONE AND JOINT INFECTION

Learning objectives

- Diagnosis and management of acute bone and joint infection.
- Diagnosis and management of tuberculosis and other unusual infections of bone and joint
- Diagnosis and management of the infected implant
- Prevention of bone and joint infection in implant surgery

Core knowledge

- Aetiology, clinical features, microbiology and pathology of bone and joint infection
- Investigations
- Treatment options
- Principles of management of infected implant
- Prevention of bone and joint infection with reference to theatre design, airflow, skin preparation and prophylactic antibiotics etc.

Clinical skills

- Clinical diagnosis of acute and chronic bone and joint infection, infected implant
- Interpretation of haematological tests, radiographs, Ultrasound scan, bone scan, MRI,
- Liaison and referral

Procedural skills

- Aspiration of joints for diagnosis
- Arthrotomy of the hip and the knee
- Decompression of the infected bone
- Immediate surgical management of the infected implant

34. ELECTIVE ORTHOPAEDIC CONDITIONS - BONE AND SOFT TISSUE TUMOURS

Learning objectives

- Diagnosis and management of benign and malignant tumours of bone and joint origin
- Diagnosis and management of skeletal metastases
- Diagnosis and management of uncomplicated soft tissue sarcomas

Core knowledge

- Classification of bone and joint tumours
- Aetiology, clinical features, pathology, natural history, and complications of bone and joint tumours and tumour like conditions
- Investigations
- Treatment modalities and prognosis

Clinical skills

- Clinical diagnosis, staging and grading of bone and joint tumours
- Interpretation of haematological tests, radiographs, ultrasound scan, bone scan, CT, MRI
- Detection of impending fracture
- Early detection of complications; pathological fracture and spinal involvement
- Referral

Procedural skills

- Excision of an uncomplicated exostosis
- Biopsy of soft tissue tumours

35. ORTHOPAEDIC TRAUMA - LIMBS

Learning objectives

- Diagnosis and management of closed and open fractures
- Diagnosis and management of traumatic and recurrent dislocation or subluxation of joints
- Diagnosis and management of ligament sprains and ruptures
- Diagnosis and management of muscle sprains and ruptures
- Diagnosis and management of closed ruptures or avulsions of tendons
- Diagnosis and management of meniscus injuries of the knee

Core knowledge

- Mechanisms of causation, clinical features, investigation, radiological anatomy and description of deformity, classifications, associated soft tissue injuries, treatment, early/late complications, local / systemic complications, and rehabilitation of closed traumatic fractures and dislocations
- Aetiology, clinical features, investigations, and treatment of stress fractures
- Aetiology, clinical features, complications, investigations and treatment of pathological fractures
- Classification of open fractures according to inside out / outside in mechanism of causation and Gustillo-Anderson classification
- Mechanism of causation, clinical features, investigation, Salter-Harris classification, treatment, and complications of injuries to the physis
- Mechanisms of causation, clinical features, investigation, treatment and follow up of plastic deformation, greenstick fractures and impacted fractures
- Mechanisms of causation, clinical features, clinical grading, investigation, treatment, complications and rehabilitation of ligament injuries
- Pathology of fracture healing, Indirect and direct healing, and factors affecting healing of fractures, Process of soft tissue healing and factors affecting.
- Investigation of limb injuries, place of plain radiographs, stress radiographs, post reduction radiographs, ultrasound, CT, MRI, angiography, haematological investigations
- Principles of management of closed fractures
 - Conservative methods of reduction and methods of maintenance of reduction of fractures and dislocations
 - Safe closed manipulative reduction and immobilization methods, how to use soft tissues to stabilize a reduced fracture

- Complications of closed reduction, complications of plaster casts, complications of traction and their management including prevention of complications.
 - Absolute and relative indications for open reduction and internal fixation and contraindications
- Principles of management of open fractures
 - Recognition of open fractures as surgical emergencies
 - Wound debridement and methods of soft tissue cover
 - Antibiotic policy and immobilization methods
- Principles of management of dislocated and subluxated joints
 - Recognition as a surgical emergency
 - Safe techniques of reduction
 - Methods of maintaining reduction
 - Rehabilitation
- Principles of management of ligament injuries REST, ICE, COMPRESSION, ELEVATION, place of braces, periodic reassessment, indications for surgical management
- Principles of management of muscle and closed tendon injuries, conservative / symptomatic treatment, indications for surgical treatment

Clinical skills

- Clinical diagnosis of fractures, dislocation, ligament, muscle and tendon injuries
- Recognition of early complications
- Interpretation of investigations, full radiological description of the fracture / dislocation, assessment of bone texture and recognition of underlying bone pathology, comparison of epiphyses with the normal side, post reduction radiograph status, stress radiographs for ligament injury
- Early and appropriate referral when indicated after attending to first aid management
Three 'P's, Preserve life and limb, Prevent further injury, Promote pain relief and recovery

Procedural skills

- Closed manipulative reduction of displaced fractures and dislocations
- Safe and effective application of plaster of Paris cast or slab with three point fixation
- Safe application of
 - Plaster of Paris casts, slabs, and Scotch casts
 - Slings- Collar and cuff, triangular broad arm sling, arm pouch
 - Strapping- Arm-chest strapping, buddy strapping
 - Splints- Thomas splint, cock-up splint, finger splint,allet splint
 - Fixed and balanced traction
 - Skin traction - Gallows, Dunlop, Buck's
 - Skeletal traction
- Aspiration of tense haemarthrosis of knee under aseptic conditions and application of Jones' compression bandage
- Wound debridement of open fractures

36. ORTHOPAEDIC TRAUMA - PELVIC INJURIES

Learning objectives

- Diagnosis and management of pelvic fractures and complications

Core knowledge

- Anatomy of bony pelvis, it's visceral and vascular contents
- Mechanism of injury
- Tile's classification of pelvic fractures
- Complications of pelvic fractures
 - a) Haemorrhage
 - b) Injuries to the urethra, bladder, bowel and diaphragm
 - c) Vascular and neural injuries
- Principles of management of pelvic fractures

Clinical skills

- Recognition of clinical features of haemorrhagic shock
- Recognition of clinical signs which have specific importance in pelvic fractures
 - Destot's sign, Roux sign, Earle's sign
 - Bleeding per urethra, vagina, rectum
 - Morel – Lavelle lesion
 - Compression test
- Request pelvic and chest radiographs, abdominal and pelvic ultrasound scans
- Resuscitation and life saving measures
- Decision making regarding multidisciplinary approach
 - Therapeutic embolisation
 - Central venous line
 - Pelvic stabilization

Procedural skills

- Application of pelvic binder / C-clamp
- Suprapubic cystostomy
- Emergency laparotomy

37. ORTHOPAEDIC TRAUMA - SPINAL INJURY

Learning objectives

- Diagnosis and initial management of
 - Cervical spine injury
 - Thoraco lumbbar spine injury
 - Intervertebral disc prolapse
- Structures that impart stability to spinal column
- Functions of the spinal column
- Dennis three column concept
- Mechanisms of spinal injuries

Indirect

- Flexion
- Flexion-rotation
- Hyperextension
- Vertical compression

- Shearing
- Flexion distraction

Direct

- Penetrating injuries

Whiplash injuries

- Types of spinal cord injuries
 - Complete
 - Incomplete
 - Anterior cord syndrome
 - Central cord syndrome
 - Brown-Sequard's syndrome
 - Cauda equina lesion
- Spinal nerve root injuries
- Initial management of spinal injuries
- Management of established paralysis and rehabilitation

Clinical skills

- Neurological examination to determine the level of spinal cord injury, nerve root injury and spinal shock
- Examination of the injured spine
- Obtaining appropriate radiographs to determine the level and type of vertebral fracture and stability
- To identify associated thoracic, abdominal, and limb injuries in the presence of spinal cord injury

Procedural skills

- Immobilisation methods of injured spine
- Log rolling
- Catheterisation of the bladder
- Treatment of spinal shock
- Method of transportation of a spinal injury patient
- Application of skull calipers

38. ORTHOPAEDIC TRAUMA - HAND INJRIES

Learning objectives

- Management of open nerve injuries
- Management of open tendon injuries
- Management of open hand injuries
- Management of fractures of the hand
- Management of hand infections

Core knowledge

- Anatomy of the hand, course of nerves and relations, and the arrangement of tendons
- Common nerve / tendon injury patterns and resultant functional deficit
- Investigations, radiographs, Doppler, nerve stimulator
- Immediate treatment, rest, elevation, vaccines, antibiotics, wound cleaning, dressings
- Choice of anaesthesia, techniques of local anesthesia, safe use of tourniquet
- Placement of skin incisions, techniques of tendon repair and nerve repair, indications for delayed repair
- Methods of safe, appropriate and adequate immobilization
- Rehabilitation of the injured hand, minimizing stiffness
- Complications of hand injuries, and prevention / treatment of complications

Clinical skills

- Clinical assessment of the injured hand and clinical diagnosis of tendon, nerve, ligament, bone and joint injury
- Interpretation of investigations
- Accurate documentation and appropriate referral / liaison with plastic surgeons

Procedural skills

- Manipulative reduction of fractures, dislocations and safe and appropriate immobilization
- Wound debridement, haemostasis, primary tendon repair, primary nerve repair,

39. PAEDIATRIC SURGERY

Learning objectives

- Diagnosis and management of cleft lip, cleft palate, oesophageal atresia, trachea-oesophageal fistula, intestinal atresia, intestinal stenosis, malrotation of intestines and midgut volvulus, anorectal anomalies, Hirschprung's disease
- Diagnosis and management of exomphalos, gastroschisis, exstrophy of bladder, umbilical hernia, inguinal hernia, congenital hydrocoele
- Diagnosis and management of congenital diaphragmatic hernia, diaphragmatic eventration, cystic disease of the lung, congenital lobar emphysema
- Diagnosis and management of congenital biliary atresia, choledochal cyst
- Diagnosis and management of cryptorchidism, hypospadias, epispadias, pelviureteric junction obstruction, posterior urethral valves, vesicoureteric reflux
- Diagnosis and management of tongue tie, infantile hypertrophic pyloric stenosis, acute appendicitis, umbilical discharge in an infant/child, intussusceptions, rectal bleeding, constipation, problems of the prepuce, acute scrotum

Clinical skills

- Handling of children who are irritable, frightened, crying and in pain
- Clinical diagnosis of above conditions
- Appropriate investigations and interpretation
- Counseling, reassurance of and liaison with parents of sick children, obtaining information, obtaining informed consent, breaking bad news
- Appropriate referral, liaison with specialist colleagues and decision making
- Leadership and teamwork in a paediatric surgical team

Procedural skills

- Excision of superficial lump, lymph node biopsy
- Neonatal inguinal herniotomy, non-neonatal inguinal herniotomy, ligation of patent processus vaginalis, hydrocoelectomy, umbilical hernia repair
- Circumcision, orchidopexy, emergency scrotal exploration
- Pyloromyotomy, appendicectomy, hydrostatic reduction of intussusceptions, laparotomy for intussusceptions,
- Laparotomy with transverse incisions(opening and closing)

39. ONCOLOGY

Learning objectives

- Screening for cancer, early detection of cancer, functioning of special clinics i.e breast clinics
- Multidisciplinary approach to management of cancer
- Principles of surgical oncology, and comparative evaluation of different cancer treatments

Core knowledge

- Surgical pathology, modes of cancer spread, staging / grading methods, restaging of malignant disease
- Cancer biology, cell kinetics, proliferation, apoptosis, balance between normal cell death / proliferation, angiogenesis and lymphangiogenesis, genome maintenance mechanisms to prevent cancer, intercellular and intermolecular adhesion mechanisms and signaling pathways, potential effects of surgery and surgery related effects on cancer biology
- Tumour immunology, cellular and humoral components of the immune system, tumour antigencity, immune mediated antitumour cytotoxicity, effects of cytokines on tumours, effects of tumours on anti-tumour immune mechanisms, potential adverse effects of surgery, surgery related events (i.e.blood transfusion) on immunologic responses.
- Basic principles of cancer treatment curative intent / palliative intent, indications / contraindications for surgery, radiotherapy, chemotherapy, immunotherapy, adverse effects of treatment, neo-adjuvant /adjuvant therapy
- Reconstructive surgery of all parts of the body, preservation of vascular pedicles during surgery for future flaps, principles of tissue transfer including microvascular free flaps
- Counseling of cancer patients and their relatives, functioning of counseling centers

Clinical skills

- Staging/ grading of cancer with appropriate investigations
- Prognostication
- Multi disciplinary discussions and decision making re treatment strategies
- Liaise with multi disciplinary teams, patients and relatives,
- Pre-treatment preparation, post treatment management
- Follow up of patients and investigative detection of occult metastases

Procedural skills

- Intravenous access including Hickman's lines

40. MANAGEMENT OF THE DYING PATIENT

Learning objectives

- Appropriate palliative care of the dying patient and counseling of the relatives

Core knowledge

- Methods of effective pain relief, anti-emesis and purgation
- Principles of nursing care
- Diagnosis of brain death
- Role of the coroner and certification of death
- Legal issues pertaining to last will and fitness to stand trial

Clinical skills

- Prognostication
- Issue of 'do not resuscitate' order (DNR)
- Counseling of patients and relatives, development of communication skills
- Liaise with palliative care team / pain team / clergy / legal officers

Annexure 5

MD Surgery Part II – Marking Sheet (single candidate)

			Ex 1	Ex 2	Average	Final (rounded off)		
Theory	Paper 1	Q1						
		Q2						
		Q3						
		Q4						
	Paper 2	Q1						
		Q2						
		Q3						
		Q4						
Orals	Operative Surgery	Panel 1						
		Panel 2						
	Principles of Surgery and Critical care	Panel 1						
		Panel 2						
	Surgical Path and Radiology	Panel 1						
		Panel 2						
	Clinicals	Long Case	Panel					
		Short Cases	Bay 1 /2					
Bay 3/4								
Overall Total			(Total Raw Marks)			(Final Mark)		

Annexure 6 Curriculum / syllabus for higher (post MD) training in General surgery

Special interest area	Pages
Upper gastrointestinal	lvi - lxvii
Hepatopancreatobiliary	lxvii - lxxix
Lower gastrointestinal	lxxx - cxii
Vascular	cxiii - cxxvi
Breast	cxxvii - cxxxvi
Endocrine	cxxvi - cxlvi
Trauma	cxlvi - clx

SURGICAL CURRICULUM LEADING TO THE AWARD OF BOARD CERTIFICATION IN GENERAL SURGERY WITH A SPECIAL INTEREST IN UPPER GASTROINTESTINAL SURGERY

Introduction

The surgical curriculum leading to the award of board certification in general surgery with a special interest in upper gastrointestinal surgery is the framework document systematic training to practice as a consultant surgeon with a special interest in this field.

The syllabus given below details the conditions referred to as **topics** that a consultant is expected to manage independently. Under each topic, **learning objectives** are given and the level of performance / competence to be achieved is described under the domains of

- **Core knowledge**
- **Clinical skills**
- **Procedural skills**

Topics

1. Benign strictures of the oesophagus
2. Carcinoma of the oesophagus
3. Foreign body in the oesophagus
4. Oesophageal perforation
5. Oesophageal motility disorders and GORD
6. Peptic ulcer disease
7. Carcinoma of the stomach
8. Upper GI haemorrhage
9. Gastric volvulus
10. Bariatric surgery

11. BENIGN STRICTURES OF THE OESOPHAGUS

Learning objectives

- Aetiology
- Clinical presentation
- Diagnostic modalities
- Management - Endoscopic dilation
- Surgical correction

Core knowledge

- Surgical anatomy of the oesophagus
- Pre operative and post operative management

Clinical skills

- History, examination
- Investigation
- Pre operative management
- Decision making-operative / non operative
- Post operative management
- Management of complications

Procedural skills

- Upper GI endoscopy & different techniques of dilation
- Oesophago-gastric bypass
- Colonic bypass surgery

12. CARCINOMA OF THE OESOPHAGUS

Learning objectives

- Clinical presentation
- Diagnosis
- Management - palliative
- curative

Core knowledge

- Surgical anatomy of the oesophagus and stomach
- Preoperative and postoperative management

Clinical skills

- History, examination
- Investigation
- Pre operative management

- Decision making - operative / non operative
- Role of neoadjuvant therapy
- Postoperative management
- Management of complications

Procedural skills

- Upper GI endoscopy and placement of stent
- Oesophago-gastrectomy through left thoraco-abdominal approach
- Ivor- Lewis oesophagectomy
- Transhiatal (Orringer) oesophagectomy
- Mckeown three stage oesophagectomy
- Radical oesophagectomy with three field lymphadenectomy

13. FOREIGN BODIES IN THE OESOPHAGUS

Learning objectives

- Diagnosis
- Appropriate investigations
- Management
- Management of complications

Core knowledge

- Surgical anatomy of the oesophagus and cardia
- Mechanism of obstruction
- Investigation
- Management options
- Complications and their management

Clinical skills

- History, examination
- Assessment of acute presentation
- Interpretation of appropriate investigations

Procedural skills

- Flexible / Rigid endoscopic extraction of foreign bodies
- Operative management - Lateral thoracotomy

14. OESOPHAGEAL PERFORATION

Learning objectives

- Diagnosis
- Appropriate investigation
- Management
- Postoperative care and management of complications

Core knowledge

- Surgical anatomy of oesophagus and cardia
- Mechanism of iatrogenic and spontaneous rupture
- Investigations
- Management options
- Complications

Clinical skills

- History, examination
- Assessment of acute presentation
- Interpretation of appropriate investigations
- Resuscitation

Procedural skills

- Insertion of chest drains
- Lateral thoracotomy and repair
- Cervical oesophagostomy
- Feeding jejunostomy

15. OESOPHAGEAL MOTILITY DISORDERS AND GORD

Learning objectives

- Diagnosis
- Appropriate investigations
- Management options

Core knowledge

- Surgical anatomy of oesophagus and cardia
- Patho-physiology of achalasia of cardia and other motility disorders
- Role and interpretation of oesophageal manometry and pH studies
- Investigations
- Management options including the role of botulin toxin in achalasia of cardia
- Complications

Clinical skills

- History, examination
- Interpretation of investigations
- Preoperative management
- Decision making – operative / non operative
- Postoperative management
- Management of complications

Procedural skills

- Endoscopic dilation
- Heller's myotomy - open and laparoscopic
- Fundoplication - open and laparoscopic
- Revisional anti-reflux surgery-

16. PEPTIC ULCER DISEASE

Learning objectives

- Diagnosis
- Diagnosis of complications
- Management of complications – bleeding / perforation

Core knowledge

- Surgical anatomy of the stomach and duodenum
- Aetiology and pathogenesis of peptic ulcer disease
- Management of peptic ulcer bleeding and the role of endotherapy
- Management of peptic ulcer perforation
- Management of complications

Clinical skills

- History, examination
- Assessment of acute abdomen
- Identification, interpretation of appropriate investigations
- Resuscitation

Procedural skills

- Gastroscopy and endotherapy
- Closure of perforation
- Pyloroplasty
- Gastro jejunostomy
- Antral gastrectomy

17. CARCINOMA OF THE STOMACH

Learning objectives

- Clinical presentation
- Diagnosis
- Management – curative / palliative

Core knowledge

- Surgical anatomy
- Pathophysiology
- Treatment options available
- Indications for surgery
- Postoperative care
- Management of postoperative complications

Clinical skills

- History, examination
- Investigation
- Preoperative management
- Decision making – operative / non operative
- Postoperative management
- Management of complications

Procedural skills

- Gastroscopy
- Gastrectomy
 - D2 subtotal
 - D2 total

18. UPPER GASTRO INTESTINAL HAEMORRHAGE

Learning objectives

- Diagnosis and assessment of severity
- Non operative management including endotherapy
- Operative management
- Postoperative management

Core knowledge

- Surgical anatomy
- Pathophysiology
- Treatment options
- Indications for surgery
- Post operative care
- Management of postoperative complications

Clinical skills

- History, examination
- Investigation
- Preoperative management
- Decision making-operative / non operative
- Postoperative management
- Management of complications

Procedural skills

- Gastroscopy / Endotherapy
- Under running of bleeders
- Gastrectomy

19. ACUTE GASTRIC VOLVULUS

Learning objectives

- Diagnosis
- Appropriate investigations
- Early management options
- Surgical management
- Postoperative care and management of complications

Core knowledge

- Surgical anatomy of hiatus
- Pathophysiology
- Investigations
- Preoperative management
- Postoperative care and management of complications

Clinical skills

- History, examination
- Assessment of acute abdomen
- Interpretation of appropriate investigations
- Resuscitation

Procedural skills

- Volvulus reduction & gastropexy
- Volvulus reduction, hiatus hernia repair and fundoplication
- Gastrectomy, total / subtotal

20. BARIATRIC SURGERY

Learning objectives

- Diagnosis of morbid obesity
- Appropriate investigations
- Non operative management options
- Surgical management - open
- laparoscopic
- Postoperative care and management of complications

Core knowledge

- Surgical anatomy of the oesophageal hiatus, stomach and the small bowel
- Problems associated with obesity surgical / medical
- Preoperative assessment and investigations
- Postoperative complications and their management

Clinical skills

- History, examination
- Investigations and interpretation of results
- Decision making-operative / non operative
- Postoperative management
- Management of complications

Procedural skills

Open / laparoscopic

- Vertical banded gastroplasty
- Sleeve Gastrectomy
- Roux-en-Y gastric bypass
- Biliopancreatic bypass
- Jejunioileal bypass
- Revisional surgery

SURGICAL CURRICULUM LEADING TO THE AWARD OF BOARD CERTIFICATION IN GENERAL SURGERY WITH A SPECIAL INTEREST IN HEPATO - PANCREATO - BILIARY SURGERY

Introduction

Surgical curriculum leading to board certification in general surgery with a special interest in hepato-pancreato-biliary surgery is the frame work document for systematic training to practise as a consultant surgeon with a special interest in hepato-pancreato-biliary surgery.

The syllabus given below details the conditions referred to as **topics** that a consultant is expected to manage independently.

Under each topic, **learning objectives** are given and the level of performance /competence to be achieved are described under the domains of

- **Core knowledge**
- **Clinical skills** (clinical judgment, clinical decision making)
- **Procedural skills**

Topics

1. Gallstone disease
2. Extra hepatic biliary obstruction due to malignancy
3. Injuries to the biliary tract
4. Acute pancreatitis
5. Chronic pancreatitis
6. Endocrine tumours and neoplasms of the pancreas
7. Liver trauma
8. Hepatocellular cancer and liver metastases
9. Benign surgical diseases of the liver / liver infections

1. GALLSTONE DISEASE

Learning objectives

- Diagnosis and management of symptomatic gall bladder stones
- Management of asymptomatic gall bladder stones
- Causes, presentation and management of acalculous cholecystitis
- Clinical presentation , diagnosis, complications and treatment of bile duct stones

Core knowledge

- Surgical anatomy of the extrahepatic biliary system
- Aetiological factors, pathogenesis and microbiology of gall stones
- Clinical presentations diagnosis and management of symptomatic gallbladder stones including biliary colic, acute cholecystitis, mucocoele of the gallbladder, empyema of the gall bladder, gall bladder perforation and gall stone ileus
- Complications of gallbladder stones and bile duct stones
- Clinical presentation, diagnosis and management of suppurative cholangitis
- Open / laparoscopic and endo-therapeutic surgical options in the management of gall bladder stones and bile duct stones
- Post operative complications of gallbladder / bile duct stones and complications of endotherapy for bile duct stones

Clinical Skills

- History and examination
- Investigations
- Resuscitation
- Decision making- Conservative Vs surgical management and early Vs delayed management
- Non interventional management of symptomatic gallstones
- Indications for dissolution of gallstones

- Role of ERCP, stone extraction techniques – Advantages / limitations
- Operative options
 - Laparoscopic and open cholecystectomy
 - Subtotal cholecystectomy
 - Cholecystostomy
 - Laparoscopic and open explorations of the bile duct
- Decision making in the management of patients with gall bladder stones and bile duct stones
- Postoperative management
- Management of complications

Procedural skills

- Laparoscopic cholecystectomy
- Open cholecystectomy
- Open exploration of the bile duct / Transduodenal sphincteroplasty
- ERCP
- Endoscopic sphincterotomy
- Balloon and basket extraction of bile duct stones
- Mechanical lithotripsy
- Bile duct stenting

2. EXTRA HEPATIC BILIARY OBSTRUCTION DUE TO MALIGNANCY

Learning objectives

- Causes of extra hepatic malignant biliary obstruction
- Initial work up to establish a diagnosis(level, cause and the extent of obstruction)
- Investigative modalities
- Value and limitations of preoperative biliary drainage
- Curative intent treatment and palliation of malignant extrahepatic bile duct obstruction

Core knowledge

- Surgical anatomy of the extrahepatic biliary system and pathology in relation to extrahepatic biliary malignancies
- Physiological derangements related to extrahepatic biliary obstruction
- Causes of painless obstructive jaundice (Klatskin's tumour, distal cholangio carcinoma, pancreatic head cancer, ampullary and periampullary cancer, hilar lymph nodes)
- Role of investigative modalities of painless obstructive jaundice (Ultrasound, CT, MRI, MRCP, ERCP, Endoscopic ultrasound)
- Treatment options of extra hepatic biliary malignancies
- Indications for curative intent surgery
- complications of surgery including hepato-renal syndrome
- Surgical and medical palliation of extra hepatic biliary malignancies
- Complications of palliative interventional procedures
- Principles of endotherapeutic techniques and the knowledge of the armamentarium of endo-therapeutic equipments (guidewires, cannulae, knives, balloons, dilators, lithotripters, stents)

Clinical Skills

- History and examination
- Recognition of the level and the cause of malignant biliary obstruction
- Identification of patients for pre operative biliary drainage / curative intent surgery / palliative procedures
- Preoperative, peri-operative and postoperative management
- Management of complications

Procedural skills

- ERCP
- Endoscopic sphincterotomy
- Brush cytology
- Stricture dilation

- Placement of plastic and metal stents
- Mechanical Lithotripsy
- Endoscopic cysto gastrostomy / cysto duodenostomy
- Pancreatoduodenectomy
- Radical cholecystectomy for cancer of the gall bladder
- Open biliary drainage
- Cholecyst / choledocho jejunostomy
- Hepaticojejunostomy

3. INJURIES TO THE BILIARY TRACT

Learning Objectives

- Causation, injury recognition ,initial and definitive management and prevention of iatrogenic bile duct injury

Core knowledge

- Surgical anatomy of the extrahepatic biliary tree
- Causative factors
- Prevention
- Classifications, microbiological aspects and complications of bile duct injury
- Varying clinical presentations
- Investigative modalities – ERCP,MRCP, PTC, Isotope scan
- Treatment options and timing of treatment
- Role of open / percutaneous drainage of bile collections
- Treatment of sepsis
- Role of endotherapy / stenting
- Methods of definitive treatment and timing of treatment
 - Primary repair over a T tube
 - Roux- en -Y reconstruction

Clinical Skills

- History and examination
- Resuscitation
- Planning of investigations (role of ERCP, role of Endoscopic ultrasound, CT and MR scan)
- Management options- timing of interventions
- Management of postoperative complications

Procedural skills

- Laparotomy for biliary peritonitis with placement of drains
- ERCP, identification of the level and severity of injury, sphincterotomy and stenting
- Hepatico-jejunostomy
- Porto-enterostomy

1. ACUTE PANCREATITIS

Learning objectives

- Diagnosis and management of all patients with acute pancreatitis

Core knowledge

- Surgical anatomy of the pancreas
- Differential diagnosis
- Aetiology and pathogenesis
- Clinical presentation
- Scoring systems and severity stratification
- Initial management
- Investigations – role of ultrasound, contrast CT, needle aspiration, MRCP
- Role of systemic antibiotics / nutrition
- Treatment options

- Management of severe acute pancreatitis
- Indications for ,ERCP and endoscopic sphincterotomy
- Management of pancreatic necrosis

Clinical skills

- Resuscitation
- Identifications of patients who need high dependency care
- Timing and nature of intervention
- Surgical and endotherapeutic procedures
- Insertion of nasojejunal tube
- Management of complications including pancreatic fistulae
- Re-laparotomy for complications

Procedural skills

- CVP insertion
- ERCP, Endoscopic sphincterotomy, stone extraction, naso biliary drainage
- Laparotomy
- Laparoscopic / open drainage of peripancreatic abscess
- Laparoscopic / open pancreatic necrosectomy
- Endoscopic pancreatic duct stenting for ductal disruptions
- Laparoscopic / open cholecystectomy
- Drainage of pancreatic pseudocyst – endoscopic / laparoscopic / open

5. CHRONIC PANCREATITIS

Learning objectives

- Diagnosis and management of patients with chronic pancreatitis

Core knowledge

- Aetiology (alcoholic, tropical, hereditary, idiopathic, divisum, metabolic)
- Pathogenesis (obstructive / non- obstructive)
- Clinical presentation, causes of pancreatic pain
- Investigations
 - Pancreatic exocrine and endocrine function
 - Imaging
- Management options for pancreatic pain (open drainage / endoscopic drainage of the main pancreatic duct, coeliac plexus block, pancreatic enzyme supplements , resectional surgery)
- Management of complications (biliary obstruction, duodenal obstruction, pseudocyst, ascites, bleeding)

Clinical skills

- Resuscitation
- Timing and nature of intervention / need for referral
- Differentiation between pancreatic inflammatory head mass from pancreatic head cancer
- Indications for surgical and endotherapeutic procedures
- Management of complications

Procedural skills

- ERCP
- Pancreatic duct cannulation

- Selective pancreatic sphincterotomy
- Pancreatic stenting
- Stricture dilation
- Endoscopic / laparoscopic/open drainage of pancreatic pseudocyst
- Open drainage and pancreaticoenterostomy
- Duodenum preserving pancreatic head coring
- Pancreatoduodenectomy

6. ENDOCRINE TUMOURS AND CYSTIC NEOPLASMS OF THE PANCREAS

Learning objectives

- Diagnosis, assessment and management of pancreatic endocrine tumours and cystic neoplasms

Core Knowledge

- Symptoms and investigations of neuroendocrine tumours
- Treatment options
- Postoperative care and management of complications
- Distinguishing cystic neoplasm from pseudocyst

Clinical skills

- History and examination
- Organizing investigations
- Treatment options
- Preoperative preparation

Procedural skills

- ERCP
- Local resection
- Distal pancreatectomy
- Pancreatoduodenectomy

7. LIVER TRAUMA

Learning objectives

- Diagnosis and management of liver trauma including the principles of resection and damage control surgery

Core knowledge

- Applied anatomy of the liver
- Patho - physiology of the liver trauma
- Complication of liver trauma
- Treatment options
- Indications for packing ,debridement ,suture ligation and resection

Clinical skills

- History and examination
- Resuscitation
- Recognition of the severity – Decision making in haemorrhage control-small problem/big trouble
- Principles of liver packing
- Decision making in damage control surgery for liver injury
- Understanding the limitation of the options and outcome of retrohepatic venous injury
- Damage control solutions for biliary injury in liver trauma

Procedural skills

- Techniques of haemorrhage control
 - Manual compression
 - Packing
 - Pringle's maneuver
 - Deep liver sutures
 - Selective vascular ligation
 - Resectional debridement

- Hepatic resection

8. NEOPLASMS OF THE LIVER

Learning objectives

- Assessment and management of hepatic neoplasms

Core knowledge

- Benign neoplasms
 - Aetiology, pathogenesis and pathology of
 - Haemangioma
 - Focal nodular hyperplasia
 - Hepatic adenoma
 - Other benign lesions of the liver, fatty change
- Primary malignancies
 - Epidemiology, risk factors, staging, pathogenesis and pathology, natural history, management including surgery and chemoembolisation, and complications of hepatocellular carcinoma and intrahepatic cholangiocarcinoma
- Liver metastases
- Role of FNAC in the diagnosis of liver lesions, extent of hepatic involvement, significance of co-morbid disease of the liver (cirrhosis), tumour markers, natural history, management and complications
- Non surgical management including radio frequency ablation
-

Clinical skills

- History, examination
- Investigation
- Pre-op management

- Decision making, indications for surgery, indications for non-operative management including referral for interventional radiology.
- Post-op management
- Management of complications

Procedural skills

- Laparoscopy and biopsy
- Peroperative ultrasonic assessment of hepatic lesions
- Assessment of resectability at laparoscopy / laparotomy
- Nonanatomic resection, segmental resection, lobectomy, extended lobectomy and staged resection
- Resection combined with ablation
- Vascular control in hepatic resection including Pringle's manoeuvre, total vascular isolation, and vascular reconstruction
- Various parenchymal dissection techniques, including finger fracture, diathermy, argon plasma coagulation

9. INFECTIONS OF THE LIVER

Learning objectives

- Diagnosis and management of hepatic infections of surgical importance

Core knowledge

- Epidemiology, aetiology, microbiology, pathogenesis, diagnosis, management and complications of pyogenic / amoebic / fungal liver abscesses
- Hydatid disease; terminology and classification, aetiology, life cycle development, serological testing, management and complications

Clinical skills

- History, examination
- Interpretation of appropriate investigations
- Management options

Procedural skills

- Technique of drainage of liver abscess / Hydatid cyst

SURGICAL CURRICULUM LEADING TO THE AWARD OF BOARD CERTIFICATION IN GENERAL SURGERY WITH A SPECIAL INTEREST IN SURGERY OF THE LOWER GASTROINTESTINAL SURGERY

Introduction

The surgical curriculum leading to board certification in general surgery with a special interest in colorectal surgery is the frame work document for systematic training to practice as a consultant surgeon with a special interest in this field.

The syllabus given below details the conditions referred to as **Topics** that a consultant is expected to manage independently.

Under each topic, **learning objectives** are given and the level of performance /competence to be achieved are described under the domains of

- **Core knowledge**
- **Clinical skills** (clinical judgment, clinical decision making)
- **Procedural skills**

Topics

1. Colorectal and intestinal polyps
2. Colorectal cancer
3. Inflammatory bowel disease; ulcerative colitis, Crohn's disease
4. Rectal prolapse

5. Faecal incontinence
6. Small and large bowel trauma
7. Diverticulosis of the large bowel
8. Lower gastrointestinal haemorrhage
9. Intestinal stomas
10. Haemorrhoids
11. Anal abscess and fistula
12. Anal fissure
13. Anal cancer
14. Anorectal physiology testing
15. Anal sphincter and pelvic floor imaging
16. Imaging the large bowel
17. Miscellaneous conditions

Pruritus ani, solitary rectal ulcer, melanosis coli, proctalgia fugax and perineal pain, pre-sacral tumours, volvulus, megacolon and pseudo-obstruction, radiation proctitis, anal melanoma, Paget's disease

18. Laparoscopic large bowel surgery
19. Endoscopy and endotherapy
20. Large bowel infections ; acute bacterial, viral and parasitic disease and tuberculosis of the intestinal tract
21. Constipation and obstructed defaecation

1. COLORECTAL AND INTESTINAL POLYPS

Learning objectives

- Diagnosis and management of colorectal polyps

Core knowledge

- Clinical presentation of polyps
- Diagnosis
- Management
- Screening for polyps and cancer
- Familial cancer including polyposis syndromes
- Prevention
- Obtaining a family history / Amsterdam criteria
- Genetics of colorectal polyps and cancer
- Maintaining a polyposis registry

Clinical skills

- History and examination

Procedural skills

- Flexible sigmoidoscopy
- Upper GI endoscopy
- Technique of conscious sedation and the limitations for colonoscopic procedures
- Colonoscopy
- Colonoscopic polypectomy
- Colonoscopic submucosal resection

2. COLORECTAL CANCER

Learning objectives

- Clinical presentation and management of colon and rectal cancer, and follow up
- Screening for colorectal cancer
- Diagnostic modalities
- Work-up and treatment of colon cancer

- Work-up and treatment of rectal cancer
- Management of recurrent cancer
- Role of neo-adjuvant and adjuvant therapy for colorectal cancer and their side effects
- Basic knowledge of anti-cancer medication, including the biological agents such as vascular endothelial growth factor (VEGF) and epithelial growth receptor factor (EGFR)

Core knowledge

- Surgical anatomy and physiology of the large intestine and rectum
- Management of large bowel obstruction including postoperative strictures
- Preoperative and intraoperative bowel preparation
- Assessment and risk stratification of the patient awaiting large bowel surgery
- Prevention and management of postoperative ileus
- Surgical intensive care management
- Surgical nutrition
- Antibiotic prophylaxis

Clinical skills

- History and examination
- Investigations
- Resuscitation in intestinal obstruction and peritonitis
- Decision making - conservative versus surgical and early versus delayed
- Role of non-operative management
- Operative options
- Preoperative and postoperative management
- Management of complications

Procedural skills

- Colonoscopy and biopsy
- Segmental large bowel resection
- High, low, and extended low anterior resection
- Straight versus pouch colo-anal anastomosis

- J versus Transverse coloplasty pouch
- Trans-anal resection including trans-anal endoscopic micro-surgical techniques
- Re-resection for rectal cancer, abdominal hysterectomy
- Re-resection with sacrectomy and cystectomy with ileal conduit (in collaboration with urology)
- Trans-colonoscopy stenting and balloon dilation of strictures

3. INFLAMMATORY BOWEL DISEASE - IBD (ULCERATIVE COLITIS, CROHN'S DISEASE)

Learning objectives

- Natural history and clinical presentations of ulcerative colitis and Crohn's disease
- Differences between ulcerative colitis and Crohn's disease
- Diagnosis and management of UC and Crohn's disease and management of complications

Core knowledge

- Surgical anatomy and physiology of the large intestine, rectum and anal canal
- Aetiology, pathology and pathogenesis of IBD
- Clinical presentations of IBD and appropriate investigations
- Medical management of IBD (pharmacokinetics and side effects of sulphasalazine, 5-ASA preparations, corticosteroids, azathioprine and 6-mercaptopurine, anti-TNF alpha agents i.e.-Infliximab)
- Indications for emergency and elective surgery for IBD
- Management of complications (massive GI bleed, perforation, fulminant colitis, toxic megacolon, strictures, abscesses, internal, enterocutaneous and anal fistulae)
- Management of appendicitis in a patient with IBD
- Assessment and risk stratification of the patient awaiting colectomy for IBD
- Cancer risk and screening for colorectal cancer in pan-colitis, subtotal and left sided colitis

- Workup of a new patient with colitis
- Principles of operation in restorative proctocolectomy with an ileal pouch for ulcerative colitis
- The indications for an ileal J pouch versus S pouch for ulcerative colitis
- Principles of surgical management of Crohn's disease
- Surgical intensive care management
- Surgical nutrition including the importance of assessment of serum electrolytes, serum albumin, serum iron indices and serum magnesium and calcium levels in the patient with long-standing ulcerative colitis and Crohn's disease
- Role of antibiotics in the management of UC and Crohn's disease
- Antibiotic prophylaxis in surgery for IBD
- Intestinal staplers, design and construction, principles of use and the various available staplers

Clinical skills

- History and examination and recognition of extra-intestinal manifestations of IBD
- Investigations
- Resuscitation in fulminant colitis and peritonitis
- Decision making- conservative versus surgical and early versus delayed
- Role of non-operative management
- Operative options
- Pre operative and post operative management
- Management of complications – bleeding, perforation, toxic dilatation, abscess, stricture and fistula

Procedural skills

- Emergency colectomy
- Hartmann's procedure
- Emergency ileostomy – open and laparoscopic
- Emergency colostomy

- Restorative proctocolectomy with pouch
- Restorative proctectomy with pouch
 - Double stapled pouch-anal anastomosis
 - Stapled and hand sewn ileal pouch construction
 - Endo-anal mucosectomy
 - Endoanal ileal pouch-anal anastomosis
 - Ileo-caecal resection – open and laparoscopic approaches for Crohn’s disease
 - Small bowel stricturoplasty
 - Take-down of Crohn’s fistulas
 - Management of Crohn’s fistulas of the anal margin (See under anal fistulas)
 - Assessment of anal sphincters before pouch surgery. (See under anal incontinence)

4. RECTAL PROLAPSE

Learning objectives

- Diagnosis and management of rectal prolapse

Core knowledge

- Aetiology and pathogenesis of rectal prolapse
- Differences in rectal prolapse between patients from the West and Asia
- Mechanism of constipation and incontinence in rectal prolapse
- Rectal prolapse as a part of global pelvic floor failure
- Principles of surgery for rectal prolapse; perineal versus abdominal
- Management of rectal prolapse in children

Clinical skills

- History and examination of the patient with rectal prolapse
- Detailed examination of the perineum

- Examination for uterovaginal prolapse
- Selection of appropriate procedure for rectal prolapse (perineal versus abdominal procedure)

Procedural skills

- Colonoscopy
- Goodsall's procedure for rectal mucosal prolapse
- Abdominal suture rectopexy with / without sigmoid colon resection
- Perineal rectosigmoidectomy
- Delorme's operation for prolapse
- Laparoscopic rectopexy

5. FAECAL INCONTINENCE

Learning objectives

- Management of a patient with faecal incontinence

Core knowledge

- Aetiology of faecal incontinence
- Knowledge of obstetric trauma and faecal incontinence
- Evaluation of faecal incontinence
- Faecal incontinence scoring systems
- Anatomy of the pelvic floor; cadaver, ultrasound anatomy, magnetic resonance and operative surgical.
- Methods of biofeedback
- Drugs in faecal incontinence and mechanism of action

Clinical skills

- Focused history and examination of a patient with faecal incontinence
- Focused digital examination of the anorectum and its sphincter complex
- Ability to decide on non-operative versus operative management
- Ability to decide on optimal surgical approach for patients requiring operative intervention
- Interpretation of anorectal physiology data
- Interpretation of ultrasound anatomy of the anal sphincter complex and understand the differences between western patients and south Asian patients
- Correlate incontinence scores with quality of life and the need for intervention
- Follow up protocol in patients with faecal incontinence.
- Knowledge of defaecating proctography

Procedural skills

- Anal sphincteroplasty
- Pelvic floor repair
- Neo-anal sphincter operations; biological and artificial sphincters
- Sacral nerve stimulation for faecal incontinence

6. TRAUMA OF THE SMALL AND LARGE BOWEL

Learning objectives

- Diagnosis and treatment of patients with blunt, penetrating and iatrogenic trauma to small bowel, colorectum and anus

Core knowledge

- Mechanisms and patho-physiology of intestinal trauma
- Iatrogenic trauma ; electrocautery, laparoscopic port insertion, colonoscopic, colo rectal and small bowel injuries during difficult pelvic gynecological procedures
- Resuscitation and management
- Conservative versus operative management

- Post-operative management
- Intestinal stomas and indications
- Role of radiology
- Septic complications following intestinal trauma

Clinical skills

- Resuscitate a trauma patient
- Decision regarding emergency laparotomy
- Decision to perform damage limitation surgery
- Management of intestinal fistulae

Procedural skills

- Perform focused assessment by sonography in trauma (FAST) scan
- Insertion of a central venous line
- Emergency laparotomy for intestinal trauma
- Techniques of damage limitation surgery
- Site a stoma in an emergency operation
- Techniques of laparostomy and vacuum assisted closure (VAC) of the anterior abdominal wall

7. DIVERTICULOSIS OF THE COLON

Learning objectives

- Diagnosis and treatment of a patient with symptomatic diverticular disease and its complications

Core knowledge

- Understand the essential differences in aetio-pathology and clinical profiles of patients with left and right colon diverticulosis
- Understand the mechanism / theories of left colonic diverticulosis
- Presenting features

- Methods of diagnosis
- Complications of diverticulosis
- Hinchey classification in diverticular sepsis
- The role of interventional radiology in diverticular sepsis
- Non-operative management including dietary advice
- Diverticulosis in young individuals

Clinical skills

- Recognize complications in diverticulosis
- Recognize fistulating disease in diverticulosis
- Manage peritonitis in diverticular perforation
- Manage acute bleeding in diverticulosis
- Differentiate between mass of diverticular origin versus cancer
- Understand guidelines (American colorectal society, British society of coloproctology) for operative excision of diverticulosis
- Be aware of the extent of resection required to prevent recurrence of symptoms
- Recognize complications of operation early
- Be able to decide on diversion if required intraoperatively

Procedural skills

- Colonoscopy
- Open / laproscopic drainage of diverticular abscess
- Segmental resection for diverticulosis, open and laparoscopic
- Resection of diverticular fistula –rectovesical, rectovaginal
- Partial resection of the urinary bladder
- Methods to locate and protect ureters from injury in operation on a diverticular mass
- Hartmann's operation

8. LOWER GASTROINTESTINAL HAEMORRHAGE (LGIH)

Learning objectives

- Recognition of the site and the severity of lower gastrointestinal haemorrhage
- Resuscitation , and initial management of massive lower gastrointestinal haemorrhage and definitive treatment of lower gastrointestinal haemorrhage

Core knowledge

- Causes of rectal bleeding including massive lower gastrointestinal haemorrhage
- Differences in clinical presentations between upper and lower gastrointestinal
- Role and limitations of colonoscopy
- Radiology, angiography and nuclear medical investigations in lower gastrointestinal
- Role and limitations of interventional angiography
- Vascular anatomy of the intestinal tract including Dieulafoy lesions
- Investigation of anaemia of unknown origin

Clinical skills

- Obtain a focused history and examine the patient with lower gastrointestinal haemorrhage
- Resuscitation of patients with lower gastrointestinal haemorrhage
- Be sensitive to timing of operation when interventional radiological facilities are not available
- Be aware of and interpret capsule endoscopy
- Be sensitive to lowering of core body temperature, methods of preventing fall in temperature
- Stay updated on current guidelines in management of lower gastrointestinal haemorrhage

Procedural skills

- Upper GI endoscopy
- Lower GI endoscopy in an acute situation on unprepared bowel
- Injection sclerotherapy

- Argon-laser photocoagulation techniques
- Endoscopic clipping
- Laparotomy, bowel resection, anastomosis
- Intra-operative endoscopy, lavage and transillumination
- Intraoperative recognition of diverticulae of small bowel, Meckel's diverticulum and angiodysplasia

9. INTESTINAL STOMAS

Learning objectives

- The need, the types and placement of intestinal stomas

Core knowledge

- Anatomy of the intestinal tract
- Anatomy of the anterior abdominal wall
- Sites of bowel used in stoma construction
- Physiology and alteration in physiology of the intestinal tract associated with stomas
- Indications for a stoma
- Complications specific to stomas
- Pharmacology of agents like somatostatin analogues, loperamide, opiates, diphenoxylate.
- Stoma care and the role of stoma care nurse
- Counseling and quality of life in patients with a stoma
- Stoma care societies

Clinical skills

- Recognize the site of origin of a stoma
- Recognize and differentiate between end-stomas and loop - stomas
- Recognize complications of a stoma

- Develop the art of counseling an individual receiving a stoma
- Be able to consider individual life situations, personal needs, occupational needs and quality of life issues, including dress, in deciding the optimum site of a stoma
- Be up to date with current stomal appliances, the use of transparent versus opaque stomal appliances, the use of drainable pouches, one versus two piece systems, the management of base plates and wafers, the use of stomal adhesive pastes and techniques to enable re-use of some components
- Recognize the following complications; Stomal ischaemia, retraction and stenosis. Para-stomal hernia, prolapse of a stoma. Skin complications – excoriation, ulceration, product allergy, dermatitis, fungal infection
- Manage and treat ileostomy flux

Procedural skills

- Construction and closure of an end-colostomy
- Construction and closure of a loop colostomy
- Construction and closure of an end-ileostomy
- Construction and closure of a loop ileostomy
- Construction of a Malone stoma / antegrade irrigating stoma
- Construction of an ileal conduit
- Construction of a Koch's continent pouch of ileum
- Construct a feeding jejunostomy
- Insert a percutaneous endoscopic gastrostomy (PEG) tube
- Correctional / revisional surgery for stomal complications such as re-site a stoma, surgery for prolapse, stenosis, retraction

10. HAEMORRHOIDS

Learning objectives

- Management of symptomatic haemorrhoids

Core knowledge

- Anatomy of the anal canal and anal cushions
- Anatomy of the anal sphincter complex
- Vascular anatomy of anal cushions
- Ultrasound anatomy of the anal canal
- The origin of haemorrhoids
- Classification of haemorrhoids
- Complications of haemorrhoids
- Principles of management
- The role of microflavanoids
- Understand the significance of “alarm” symptoms
- The physics of ultrasound, lasers and Doppler flowmetry in assessment and treatment

Clinical skills

- Obtain a focused history and examine the patient with haemorrhoidal symptoms
- To understand the need to exclude cancer of the colo-rectum in a patient with rectal bleeding
- Possess knowledge of when to investigate an individual for other proximal sources of bleeding
- Be aware of the disorders of coagulation before undertaking operative treatment
- Differentiate between bleeding haemorrhoids and ano-rectal varices
- Differentiate thrombosed haemorrhoids from external plexus haematoma and a sentinel tag

- Manage complications of injection and banding
- Post-operative care of the patient after anoscopic injection or banding
- Management of prolapsed thrombosed piles
- Prevention of urinary retention in treatment of haemorrhoids
- Manage post-haemorrhoidectomy pain

Procedural skills

- Position and preparation of the patient for examination on a couch
- Proctoscopy
- Proctoscopy + injection sclerotherapy, band ligation
- Open and closed haemorrhoidectomy
- Stapled haemorrhoidopexy
- Doppler guided ligation of haemorrhoidal arteries (HAL)
- Proctoscopic ligation of the haemorrhoidal vessels
- Management of anal stenosis / cicatrisation

11. ANAL ABSCESS AND FISTULA

Learning objectives

- Aetio-pathogenesis, types and management of perianal and ano-rectal suppurations , fistulae, and sinuses including the management of complex fistulae

Core knowledge

- Developmental anatomy of the anal canal and anal glands
- Histology of anal glands
- Ultrasound and magnetic resonance anatomy
- The origin of anal abscess
- Pathogenesis of anal abscess
- Classification of anal abscess

- The origin of primary anal fistula
- Secondary causes / association of anal fistula
- Anatomical classification of fistulae in relation to the sphincter complex and its relevance to management
- Principles of investigations
- Indications for placement of setons and for staged procedures
- Principles of management
- Complications
- Quality of life issues

Clinical Skills

- History and focused examination of the patient with anal abscess and fistula
- Determine the location of an anal abscess
- Know when to investigate individuals further
- Determine the internal opening of a fistula and correlate its path with the corresponding external opening
- Identify a horse-shoe track
- Perform terminal ileal endoscopy in a patient suspected of Crohn's fistula
- Interpret contrast fistulograms
- Differentiate soiling associated with fistula from true anal incontinence
- Understand the indication for and use of anal fistula plugs
- Understand the principles and execution of tissue glue for anal fistulas

Procedural skills

- Drainage of an anal abscess, including principles of managing a concomitant fistula and prevention of anal sphincter injury
- Position and examine a patient under anaesthesia for fistula disease
- Administer an anal field block
- Drainage of an anal inter-sphincteric, ischio-anal abscess and supra-coccygeal abscess
- Identify the anatomy of an anal fistula track using peroxide, methylene blue, intra-operative anal ultrasound

- Be able to perform core anal fistulotomy
- Insert drainage and cutting setons
- Perform seton fistulotomy
- Perform muscle flap advancement for complex anal fistulas with cavitation and tissue loss
- Prevent iatrogenic injury to the anal sphincter complex during fistulotomy
- Perform ligation of an inter-sphincteric fistula tract (LIFT)
- Use of the trans-anal advancement flap for high fistula
- Undertake concomitant anal sphincter repair with fistulotomy

12. ANAL FISSURE

Learning objectives

- Aetio-pathology and principles of management of acute and chronic anal fissures

Core knowledge

- Anal canal anatomy and mucosal blood supply
- The role of nitric oxide in pathogenesis of anal fissure
- The internal anal sphincter in anal fissure
- Principles of medical management of anal fissure
- Complications of surgical management of anal fissure
- Pharmacology of medication used to treat anal fissure
- The diminishing role of anal manipulation for anal fissure
- Understand the nitric oxide and calcium channel pathways in smooth muscle relaxation in the gut

Clinical skills

- Focused history, examination, able to recognize elevated resting anal tone
- Differentiate between normotensive and hypertensive anal canals
- Identify fissure due to low nitric oxide levels versus Crohn's disease
- Identify fissure related fistula disease
- Identify features of underlying occult anal sphincter damage

Procedural skills

- Application of topical anaesthesia, examination of fissure
- Anal field block
- lateral internal anal sphincterotomy
- Advancement flap repair for normotensive anal fissure
- The use of 0.5 -1% GTN paste and 2% diltiazem cream as chemical sphincterotomy
- The use of warm Sitz baths in reducing anal sphincter tone
- Techniques of internal anal sphincter augmentation in post-sphincterotomy incontinence

13. ANAL CANCER

Learning objectives

- Management of anal cancer

Core knowledge

- Surgical anatomy of the anal canal including the definition of anal margin and cloagenic zone
- Aetio- pathology of the cancer of the anal canal and other anal margin neoplasms
- Understand the aetiology and pathogenesis of anal cancer
- Histological types of anal cancer and staging
- Association between human papilloma virus infection and anal cancer, and intraepithelial neoplasia
- Principles of diagnosis
- The role of irradiation
- Management by surgical excision
- Management of inguinal nodes
- Follow up of anal cancer

Clinical skills

- Focused history and examination of the anal canal and groin nodes
- Recognize Paget's disease of the anal margin
- Recognize leukoplakia
- Work-up of the patient with anal cancer

Procedural skills

- Perform biopsies of the anal margin
- Local excision of localized anal cancer
- Abdomino-perineal excision and end-colostomy
- Inguinal lymphadenectomy

14. TESTS OF ANORECTAL PHYSIOLOGY

Learning objectives

- Principles of ano-rectal physiology

Core knowledge

- The basis of tests of anorectal physiology
- Anal canal anatomy, anal sphincters, physiology of anal and rectal sensation
- Anatomy of sacral nerve roots, formation of the pudendal nerve and its branches
- Anatomy of the neural reflexes in the anal canal including the autonomic nerves and nitrergic nerves
- Physiology of defaecation and pathophysiology of disorders of defaecation
- The physiology of colonic and intestinal transit
- Types of manometry catheters and optimum dimensions
- Electrophysiology of the anal sphincter complex, including neurophysiology of the pudendal nerve
- Cortical evoked responses and the value of assessment in disorders of the anal canal
- Tests of rectal compliance and principles of the barostat

Clinical skills

- Focused history and psychological evaluation of a patient with a defaecation disorder
- Interpret results of anorectal physiology
- Recommend management in patients with abnormal physiology tests

Procedural skills

- Perform continuous pull-through and station pull-through manometry
- Understand and perform vector manometry and sphincter fatigue indices
- The recto-anal inhibitory reflex
- Anal sensory testing
- Assessment of rectal volumes
- Saline continence testing, Surface and needle electromyography of the anal sphincters
- Pudendal nerve motor latency testing
- Tests of defaecography including dynamic MRI of the pelvic floor
- Capsule radio-opaque marker study of intestinal transit

15. IMAGING THE ANAL SPHINCTERS AND THE PELVIC FLOOR

Learning objectives

- Role of imaging of the ano rectum

Core knowledge

- Anatomy of the anal sphincters and the pelvic floor
- Principles of anal ultrasound
- Types of transducers – linear vs. sector vs. rotating
- Frequency of ultrasound transducers vs. focal length of image
- Ultrasound anatomy of the anal sphincters
- Magnetic resonance anatomy of the anal sphincters and the pelvic floor

- Principles of magnetic resonance; T1 versus T2. Fat suppression, fat saturation. Use of gadolinium contrast. Other types of contrast such as ultrasound gel. The endorectal coil. Static vs. dynamic MR and the limitations of MR

Clinical skills

- Indications for assessment of the anal sphincters and pelvic floor by anal ultrasound and by magnetic resonance imaging
- Be able to correlate digital examination findings with anal ultrasound images

Procedural skills

- Prepare an individual for anal endosonography
- Position the patient for anal endosonography
- Orientation of anal ultrasound images with the individual in the left lateral and lithotomy position. Identify the following; external anal sphincters, internal anal sphincter, inter-sphincteric plane with strip of longitudinal circular muscle, perineal body and the anal cushions
- Techniques of maintaining acoustic contact
- Normal ultrasound anatomy of the anal sphincters in Asians versus white Caucasians
- Anal ultrasound for fistulas including image enhancement with hydrogen peroxide
Interpretation of images of anal ultrasound in the following conditions;
 - Faecal incontinence
 - Anal fistula
 - Inter-sphincteric, ischio-anal and abscesses above the anococcygeal raphe
 - Obstructed defaecation and internal sphincter hypertrophy
- Understand the principles, uses and limitations of colonic ultrasound
- Endorectal ultrasound for rectal cancer
 - Rectal ultrasound anatomy –the five layer model
 - Recognize T0, T1,T2,T3 and T4 images
 - Identify mesorectal fat and lymph nodes

- Know the limitations of lymph node assessment by endosonography
- Know the principles of and how to perform ultrasound guided biopsy
- CT and MR imaging of rectal cancer – Most of the learning guides follow the principles of ultrasound. In addition, you must be aware of the special ability of MR in detection of the mesorectal margin and be aware of the importance of measurement of the advancing edge of rectal tumour from the mesorectal margin. Also, be aware of how such imaging could guide the use of pre-operative chemoradiation for rectal cancer

16. IMAGING THE LARGE AND SMALL BOWEL

Learning objectives

- Principles, role and limitations of large and small bowel imaging

Core knowledge

- Understand sagittal, coronal and cross sectional anatomy of the large and small bowel
- Barium contrast studies
- The role of Barium studies
- Small bowel imaging, including small bowel enteroclysis
- Indications for radionuclear imaging of the intestinal tract
- Limitations of each of these investigations
- CT colonography – technique and image interpretation
- Understand the indications and limitations of CT and MR angiography
- The indications and limitations of therapeutic embolisation for GI bleeding
- The role of imaging liver secondaries in large bowel cancer, triphasic contrast and planning liver resection

17. MISCELLANEOUS CONDITIONS

Only the more significant learning objective / clinical skill and performance skill will be included here. Further training in these areas must be prompted by individual enthusiasm and will.

Pruritus ani- Aetiology, appropriate history, treatment schedules including advice, steroid based topical agents and injection of methylene blue intra-cutaneous.

Solitary rectal ulcer – Aetiology, appropriate history, endoscopic diagnosis, management of complications such as haemorrhage, diagnostic biopsy and histopathologic features, non-operative treatment after appropriate investigation, surgical excision.

Melanosis coli – Aetiology, diagnosis by endoscopy and biopsy and treatment of constipation and laxative abuse.

Proctalgia fugax – Classical history, diagnosis by clinical exam and investigation of defaecation, counseling patient and biofeedback techniques.

Perineal pain – Aetiology and examination based on focused history, referred pain, pre-sacral lesions, appropriate targeted investigation and treatment.

Pre-sacral tumours – Sacral dermoid, chordoma, liposarcoma. Focused history, examination evaluation by anal ultrasound, MRI and CT. Targeted biopsy, and preparation for surgical excision and surgical excision which may involve sacral resection too. One must understand the upper limit of sacral resection, techniques of preventing pre-sacral haemorrhage, management of pre-sacral haemorrhage and prevention of a neuropathic urinary bladder.

Volvulus, megacolon and pseudo-obstruction – Aetiology and diagnosis based on history and examination, interpretation of the plain abdominal radiograph, the value of serum biochemistry and control of diabetes in megacolon, the role of contrast study of the large bowel and the technique of endoscopic decompression of a sigmoid volvulus. Be aware of the role of prokinetics and stimulants of large bowel contractility and the pharmacokinetics of these agents. Develop the skill to know when to operate on patients with volvulus. In volvulus, be guided by the principles of large bowel resection in an emergency setting, the effects of revascularization of

a previously ischaemic segment of large bowel, the limits of resection in prevention of anastomotic leakage which are higher than conventional large bowel anastomosis, be aware of the mortality rate associated with surgical treatment of volvulus and the role of endoscopic guided two-point fixation of the sigmoid colon volvulus in individuals not deemed fit to undergo operation. In megacolon and megarectum, the practitioner should be able to make a diagnosis and request supportive investigations to assist in diagnosis. Be able to interpret anorectal physiology related to Hirschsprung's disease and to perform anorectal strip biopsy, including correct specimen orientation to help a pathologist in diagnosis. Be familiar with colo-anal pull through operations for Hirschsprung's disease. Be familiar with techniques of antegrade lavage. In pseudo-obstruction, make a diagnosis, look for aetiology and treat with prokinetics or be familiar with colonoscopic decompression. Be familiar with the "blow-hole" stoma in management of impending perforation. Be familiar with the diagnosis and principles of initial management of neonatal intestinal obstruction.

Radiation proctitis – Be aware of the pathological changes in radiation proctitis, symptomatology and diagnosis made by endoscopy and biopsy. Familiarize yourself with 4% formalin contact therapy and the effects after contact therapy. Be aware of the role of argon plasma coagulation in radiation proctitis. Understand that a proximal diverting stoma has little, if not, no role in treatment.

Paget's disease – Recognize the clinical appearance of perianal Paget's, biopsy technique under local anaesthesia and the management of Paget's disease including surveillance.

Anal melanoma – Aetiology and presentation of melanoma of the anal canal. Be aware of amelanotic melanoma. Staging melanoma, the principles of surgical excision, the role of adjuvant therapy and the poor prognosis associated with late stage melanoma.

18. LAPAROSCOPIC LARGE BOWEL SURGERY

Learning objectives

- Principles, indications safety and limitations of laparoscopic large bowel surgery

Core knowledge

- Laparoscopic systems, types of cameras, the physics of insufflation, setting up in laparoscopy
- Ports, port designs, self retaining ports and methods of securing ports
- Basics of laparoscopic instrument and port placement, prevention of “sword-fighting” and general concepts of target organ oriented placement of ports
- Patient positions in laparoscopic surgery
- Anaesthetic complications of laparoscopic surgery, early recognition and corrective steps
- Ensuring equipment safety during use
- Electrocautery, indications, safety procedures, diathermy machines and electrocautery settings
- Use of ultrasound shears during laparoscopic surgery and troubleshooting
- Contra-indications of laparoscopic surgery
- Laparoscopic anatomy of the peritoneal cavity including the pelvis
- Laparoscopic anatomy of the large bowel , rectum and small bowel
- Techniques of intra-corporeal and extra-corporeal knot placement.
- Placement of clips including clip sizes, use of clip applicator and haemolock clips
- Appropriate and correct use of intra-corporeal suction
- Techniques of anti-fogging during laparoscopic surgery
- Be familiar with laparoscopic staplers and the mechanisms of open, closure, fire and re-load.

Clinical skills

- Understand the indications for laparoscopic large and small bowel surgery including its limitations
- Be able to recognize contra-indications to laparoscopic surgery
- Be able to recognize post-operative complications early and take appropriate corrective action

Pre procedural skills

Before undertaking laparoscopic large bowel surgery, it is recommended that the trainee should have performed a minimum of 20 laparoscopic appendectomies, 15 laparoscopic cholecystectomies and assisted in at least 10 laparoscopic large bowel operations.

It is also recommended that the individual attend a hands-on laparoscopic course and be mentored during the first 5 laparoscopic large bowel operations taken on as principle operator and that the practitioner should have good hand skills at intra-corporeal knotting on the bench.

A recommended step-wise approach to achieving skills at laparoscopic large bowel surgery would be as follows

- Laparoscopic appendectomy (Mobilization of the caecum, identifying retroperitoneal structures, intra-corporeal knot placement +/- intra-corporeal suture placement).
- Laparoscopic cholecystectomy (Fine dissection, recognition of important structures safely, judicious use of suction, safe use of electrocautery)
- First assistant in large bowel laparoscopic surgery (Strategic placement of ports, securing port placement, methods of introducing swabs into the peritoneal cavity, technique of safe traction and counter-traction, retraction and extra-corporeal suture retraction of pelvic organs, eg: the uterus, and retroperitoneal anatomic relations of the right colon, left colon and the rectum.)
- Step-wise approach as principle operator;
- Re-learning fascial planes in laparoscopic surgery

- Technique of medial to lateral dissection, anatomic landmarks in the right colon, left colon and the rectum, take-down of hepatic and splenic flexures.
- Laparoscopic segmental colonic mobilization.
- Laparoscopic intra-corporeal vascular clipping and / or suture ligation.
- Laparoscopic suture rectopexy of rectal prolapse.
- Laparoscopic assisted segmental resection of the ileo-caecal region and/ or the sigmoid colon for benign disease including safe delivery of a specimen, extra-corporeal anastomosis.
- Hand-assisted laparoscopic surgery may be undertaken at anytime now on the learning curve if you feel this way inclined to help your skills progress.
- Laparoscopic intra-corporeal anastomosis.
- Laparoscopic total mesorectal excision and colorectal anastomosis. You may undertake hybrid procedures at this point, including laparoscopic mobilization of the left colon and splenic flexure followed by open resection and anastomosis via a Pfannensteil approach.
- Laparoscopic restorative proctocolectomy

Acquisition of skills must be accompanied by frequent audit, evaluation of technique after operation, preferably by review of procedure videos and discussion and attending up-date lectures and courses.

19. ENDOSCOPY AND ENDOTHERAPY

Learning objectives

- Principles and safe practice of diagnostic and therapeutic endoscopy

Core knowledge

- Indications and contra indications for upper and lower GI endoscopy and small bowel enteroscopy including capsule study
- Techniques of bowel preparation for each

- Local anaesthesia, conscious sedation and guidelines in inducing, managing and reversing conscious sedation during endoscopy
- Guidelines for patient monitoring during endoscopy with conscious sedation
- Understand the differences between conscious sedation and general anaesthesia.
- Familiarize yourself with flexible endoscopes, sterilization of scopes and the guidelines for safe sterilization in low and high risk patients.
- Safe practice in endoscopy of patients with tuberculosis, HIV and hepatitis B.
- Be aware of hazards to endoscopy room staff from use of sterilizing and cleansing solutions, including care of skin, mucus membranes, eye care and long-term inhalational hazard
- Be familiar with electrocautery equipment in the endoscopy unit, safe electrocautery techniques, hazards of electrocautery and settings with various machines.
- Be familiar with minimum standard guidelines in upper and lower GI endoscopy
- Be familiar with dye spray techniques, narrow band imaging and confocal microscopic colonoscopy

Procedural skills

- Upper GI endoscopy
- Proctoscopy
- Rigid sigmoidoscopy
- Flexible sigmoidoscopy
- Colonoscopy
- Colonoscopy with ileal intubation
- Colonoscopic polypectomy
- Endoscopic tattooing, cold and hot biopsy
- Advanced techniques – Balloon dilatation, stent placement, sub-mucosal resection, endoscopic clipping and suture techniques
- Haemorrhoidal injection, banding, thermo and photocoagulation
- Insertion of a PEG feeding tube
- Endoscopic ultrasound

- Be familiar with dye spray techniques, narrow band imaging and confocal microscopic colonoscopy
- Writing accurate and concise endoscopy reports

20. LARGE BOWEL INFECTIONS; ACUTE BACTERIAL, VIRAL AND PARASITIC DISEASE AND TUBERCULOSIS OF THE INTESTINAL TRACT

Learning objectives

- Recognition and management of acute and chronic infective conditions of the intestinal tract

Core knowledge

- Understand the microflora of the small and large intestine
- Understand how colonic mucosal nutrition differs from small bowel nutrition
- Understand mechanism of colonization and invasion of pathogens in the gut
- Be aware of emerging knowledge of intestinal helminthic infection
- Be aware of antibiotic induced colitis including *C difficile* infection
- Be aware of common viral infections of the gut including cytomegalovirus infection in transplant recipients on immune suppression and in those with HIV aids
- Tuberculosis of the gut, mechanism of infection and the granuloma

Clinical skills

- Historical differentiation between infection and inflammation
- Examination of the abdomen and general status of a patient
- Be able to differentiate the “surgical abdomen” from gut infection
- Assess and treat hydration and monitor improvement in patients with gut infection
- Be able to identify perforation in gut infection
- Identify the haemolytic - uraemic syndrome
- Identify portal pyaemia
- Investigate the patient with abdominal tuberculosis

Procedural skills

- Obtain stool for analysis
- Stool cultures
- Colonoscopy and biopsy
- Laparoscopy and biopsy in a patient with abdominal TB

21. CONSTIPATION AND OBSTRUCTED DEFAECATION

Learning objectives

- Diagnosis and management of a patient with obstructed defecation

Core knowledge

- Large and small bowel motility
- Gastric motility
- Whole gut and large bowel transit, Western versus. Asian subjects
- Physiology of defaecation
- Metabolic causes of constipation
- Diabetes and constipation
- Pseudo-colonic obstruction
- Spinal cord injury and alteration in large bowel motility
- Clinical presentation
- Drugs in the causation and management of constipation
- Knowledge of biofeedback training, both motor and sensory
- Knowledge of the brain – gut axis
- Colonic and anorectal physiology testing

Clinical skills

- Focused history and examination of the individual with slow transit
- History and examination in the individual with obstructed defaecation
- Detailed examination of the perineum
- Differentiation between failure of anal canal relaxation and puborectalis paradox
- Examination for spinal cord injury and its effects on the perineum
- Recognize faecal impaction
- Investigation of the individual with constipation
- Be aware of methods of psychometric testing
- Perform and analyze a dietary survey

Procedural skills

- Perform and interpret images of defaecating proctography
- Understand the method of and interpret images of dynamic magnetic resonance imaging
- Understand and interpret studies of colonic transit
- Perform colonoscopy and lavage in pseudo-colonic obstruction
- Manual evacuation of faecal impaction
- Use of warm oil retention enemas, technique
- Perform and supervise biofeedback for constipation
- Subtotal versus segmental colectomy for slow transit, advantages and disadvantages
- Repair of a rectocele – trans-anal, trans-vaginal, perineal
- The STARR procedure (Stapled Trans Anal Resection of Rectocele)
- Mesh fixation sacro-colpopexy – open and laparoscopic
- Botulinum injection for puborectalis paradox- dose, site, frequency, maximum dose
- Internal anal sphincter augmentation ; collagen, injection of microsphere
- Malone antegrade irrigating stoma construction
- Repair of rectovaginal fistula

SURGICAL CURRICULUM LEADING TO THE AWARD OF BOARD CERTIFICATION IN GENERAL SURGERY WITH A SPECIAL INTEREST IN VASCULAR SURGERY

Introduction

Surgical curriculum leading to board certification in general surgery with a special interest in vascular surgery is the framework document for systematic training to practise as a consultant surgeon with a special interest in vascular surgery

The syllabus given below details the conditions referred to as **topics** that a consultant is expected to manage independently.

Under each topic, **learning objectives** are given and the level of performance /competence to be achieved are described under the domains of

- **Core knowledge**
- **Clinical skills** (clinical judgment, clinical decision making)
- **Procedural skills**

Topics

1. Acute limb ischaemia
2. Chronic lower limb occlusive disease
3. Diabetic foot
4. Upper limb ischaemia
5. Aneurysms
6. Carotid artery disease
7. Reno vascular disease and mesenteric ischaemia
8. Arterio-venous fistula
9. Arterio-venous malformations
10. Varicose veins
11. Venous thromboembolism
12. Lymphoedema

1. ACUTE LIMB ISCHAEMIA

Learning objectives

- Clinical presentations of acute limb ischaemia.
- Aetiology –trauma, embolism, acute on chronic ischaemia
- Diagnostic modalities-emphasis on clinical diagnosis, the uses and limitations of imaging.
- Treatment –emphasis on emergency / early management, vascular repair, reverse venous grafting, embolectomy, management of emboligenic focus and thrombolysis
 - Compartment syndrome-identification, fasciotomy
 - .Reperfusion injury-recognition and management

Core knowledge

- Surgical anatomy of the vascular system and pathophysiology of acute ischaemia, compartment syndrome , reperfusion injury and postoperative complications

Clinical skills

- History and examination
- Using hand held doppler
- Investigations
- Decision making - Type of intervention, need for fasciotomy, revascularization
- Indications for primary amputation of an acutely ischaemic limb, the issue of life versus limb
- Operative options
- Vascular trauma-direct repair, reverse venous graft
- Embolism-embolectomy
- Post operative management
- Management of complications

Procedural skills

- Exposure of major arteries
- Embolectomy
- Repair of arteries
- Harvesting and preparing (saphenous) vein graft
- Vein patch graft
- Anastomosis of venous graft

2. CHRONIC LOWER LIMB ISCHAEMIA

Learning objectives

- Causes of chronic lower limb ischaemia
Atherosclerosis, Buerger's disease, vasculitis
- Aetiology of chronic arterial occlusion-risk factors
- Initial work up to establish the diagnosis of chronic occlusive arterial disease and probable level of occlusion. Recognize the degree of disability (Fontaine level); assess the entire cardio-vascular system. Identify risk factors. Assess the relative pressure index.
- Investigative modalities
- Conservative management
- Open and endovascular interventions and indications

Core knowledge

- Surgical anatomy of the vascular system
- Pathophysiology of chronic occlusive arterial disease
- Clinical presentations and Fontaine classification

- Investigative modalities –relative pressure index, duplex scan, digital subtraction angiography, CT angiography, MR angiography. Identify indications, advantages and disadvantages
- Treatment options – conservative and interventional. Interventional-surgical and endovascular. Types of surgical by pass and indications. Types of grafts used-artificial and venous. Types of artificial grafts. Advantages and disadvantages of different types of grafts.
- complications of surgery and endovascular procedures

Clinical Skills

- History , examination and plan out investigations
- Recognition of the level and length of occlusion and distal run off.
- Decision making regarding management-conservative or interventional. Method of follow up in conservative management
- Pre operative, perioperative and post operative management
- Management of complications

Procedural skills

- Exposure of major arteries
- Arterial anastomosis
- Aorto-bifemoral, femoro-popliteal and femoro-distal by pass procedures.
- Lumbar sympathectomy

3. DIABETIC FOOT

Learning objectives

- Pathophysiology of the diabetic foot
- Diagnosis and assessment of the diabetic foot
- Management of diabetes in the acutely ill patient
- Principles of treatment of the diabetic foot and its complications

Core knowledge

- Vascular anatomy , nerve supply, and musculoskeletal system of the of the foot
- Prevention of neurovascular complications in diabetics
- Clinical features of macrovascular / microvascular disease
- Clinical features of sensory/motor / autonomic neuropathy
- Structural changes of the diabetic foot
- Knowledge of appliances available for offloading, general foot care, different dressings, antiseptic solutions
- Knowledge of related systemic vascular disease and prognostication

Clinical skills

- History, examination
- Use of hand held Doppler, filament, tuning fork, proprioception meter, Ankle/ Brachial pressure index
- Interpretation of laboratory, Vascular laboratory, Angiography data
- Surgical decision making

Procedural skills

- Revascularization techniques
- Amputations

4. UPPER LIMB ISCHAEMIA

Learning objectives

- Clinical presentations
- Aetiology-Buerger's disease, Reynaud's phenomenon. Thoracic outlet syndrome.
- Management

Core knowledge

- Anatomy of upper limb arteries
- Causative factors
- Investigative modalities –Duplex scan, various forms of angiography
- Treatment options and timing of treatment

Clinical Skills

- History and examination
- Management options
- Management of Post operative complications

Procedural skills

- Excision of cervical rib
- Thoracic sympathectomy

5. ANEURYSMS

Learning objectives

- Diagnosis and assessment of patients with symptomatic and asymptomatic Abdominal Aortic Aneurysms
- Assessment of operative risk
- Conservative and interventional management and indications
- Intervention-operative repair and endovascular repair
- Management of leaking abdominal aortic aneurysms

Core knowledge

- Surgical anatomy of the aorta and branches
- Differential diagnosis
- Aetiology and pathogenesis
- Clinical presentations

- Investigations – Ultrasound and computerized tomography.
- Management of asymptomatic aneurysms
- Management of symptomatic aneurysms
- Management of leaking aortic aneurysms.
- Open repair of abdominal aortic aneurysms and endovascular repair.
- Post operative complications
- Post operative care

Clinical skills

- Diagnosis - history, examination and investigations
- Decision making with regards to the need to intervene in asymptomatic and symptomatic aneurysms
- Management of complications

Procedural skills

- Emergency surgical management of leaking aortic aneurysms
- Exposure of abdominal aorta
- Surgical and endovascular repair of abdominal aortic aneurysms

6. CAROTID ARTERY DISEASE

Learning objectives

- Diagnosis and management of carotid artery occlusions, carotid artery aneurysms and carotid body tumours

Core knowledge

- Clinical presentations of cerebrovascular ischaemia
- Pathophysiology of cerebrovascular ischaemia
- Surgical anatomy of the carotid and vertebrobasilar arterial system and cerebral circulation

- Imaging of the cerebral circulation-Duplex scanning and angiography
- Indications for open / endovascular intervention of the carotid arteries
- Pathophysiology, clinical features and management of carotid body tumours
- Management of carotid artery aneurysms

Clinical skills

- Diagnosis of carotid artery disease - history and examination
- Interpretation of imaging
- Indications for intervention / conservative management
- Postoperative care and management of complications

Procedural skills

- Exposure of carotid arteries
- Using intra operative shunts
- Carotid endarterectomy
- Excision of carotid body tumour
- Repair of carotid artery aneurysms

7. RENOVASCULAR DISEASE AND MESENTERIC ISCHAEMIA

Learning objectives

- Diagnosis, assessment and management of renovascular disease and mesenteric ischaemia

Core Knowledge

- Surgical anatomy of the renal and mesenteric vascular territories
- Pathophysiology of renal artery stenosis and mesenteric vascular occlusion and clinical presentations
- Imaging visceral arteries
- Imaging of kidneys to assess functional capacity-ultrasonography and isotope scanning
- Angioplasty and open surgical revascularization of visceral arteries

Clinical skills

- History and examination
- Interpretation of investigations
- Treatment options-medical management and indications for intervention
- Pre operative preparation
- Post operative care

Procedural skills

- Exposure of visceral arteries
- Bypass procedures for visceral artery occlusion

8. ARTERIO-VENOUS FISTULA

Learning objectives

- Diagnosis and management of A-V fistula
- Imaging for A-V fistula
- Management of A-V fistula-surgical and endovascular

Core knowledge

- Patho-physiology and clinical features of A-V fistula
- Treatment options-surgical and endovascular procedures

Clinical skills

- History and examination
- Interpretation of imaging and planning intervention
- Preoperative care and postoperative management

Procedural skills

- Exposure of A-V fistula
- Repair / ligation of A-V fistula

9. ARTERIO-VEINUS MALFORMATIONS

Learning objectives

- Diagnosis and management of A-V malformations

Core knowledge

- Clinical presentation of A-V malformations
- Imaging in A-V malformations
- Management of A-V malformations-conservative and interventional (surgical/endovascular)

Clinical skills

- Diagnosis of A-V malformations
- Interpretation of imaging and planning management

Procedural skills

- Surgical excision of A-V malformations
- Embolization of A-V malformations (need to refer for endovascular intervention)

10. VARICOSE VEINS

Learning objectives

- Diagnosis of varicose veins
- Complications of varicose veins
- Imaging in varicose veins
- Management of varicose veins- conservative and interventions

Core knowledge

- Surgical anatomy of the (Lower Limb) venous system
- Pathophysiology of varicose veins-primary and secondary
- Clinical features of varicose veins
- Imaging in varicose veins
- Management of varicose veins- conservative/ intervention
- Methods of intervention-sclerotherapy, surgery
- Management of complications of varicose veins with special emphasis on venous ulcers

Clinical skills

- History and examination
- Identifying secondary varicose veins (i.e pregnancy, pelvic tumours, DVT)
- Interpretation of hand held doppler findings and Duplex scanning reports
- Planning management-conservative / intervention

Procedural skills

- Using hand held doppler to assess superficial and deep veins
- Sclerotherapy of varicose veins
- Surgical procedures for varicose veins-ligation of valvular incompetence, stripping, stab avulsions, foam injection

11. VENOUS THROMBOEMBOLISM

Learning objectives

- Prevention, diagnosis and management of deep vein thrombosis and complications

Core knowledge

- Mechanisms of haemostasis and action of anticoagulants
- Risk factors, pathogenesis, and complications of deep vein thrombosis
- Clinical features, investigative modalities of deep vein thrombosis and complications
- Methods of prevention of deep vein thrombosis.
- Treatment of deep vein thrombosis and complications

Clinical skills

- Recognition of high risk patients and implementation of a DVT prevention strategy appropriate to the institution
- Clinical diagnosis of deep vein thrombosis, pulmonary embolism, impending venous gangrene
- Interpretation of investigations, Duplex scan, venogram, D-dimer, chest radiograph, ventilation-perfusion scan
- Liaise with haematologist / radiologist regarding anticoagulation and insertion of vena cava filter respectively
- Recognition of patients who need intensive monitoring and supportive care

Procedural skills

- Venous thrombectomy
- Pulmonary embolectomy

12. LYMPHOEDEMA

Learning objectives

- Diagnosis of lymphoedema
- Management of lymphoedema and its complications
- Indications and types of cosmetic surgery

Core knowledge

- Patho-physiology, aetiology and clinical presentations
- Conservative management
- Management of complications
- Advantages and limitations of surgery

Clinical skills

- Diagnosis of lymphoedema
- Interpretation of imaging
- Conservative management
- Management of complications
- Indications for cosmetic surgical interventions

Procedural skills

- Surgical techniques including excision and skin grafting

SURGICAL CURRICULUM LEADING TO THE AWARD OF BOARD CERTIFICATION IN GENERAL SURGERY WITH A SPECIAL INTEREST IN BREAST SURGERY

Introduction

The surgical curriculum leading to board certification in general surgery with a special interest in breast Surgery is the framework document for systematic training to practise as a consultant surgeon with a special interest in this field.

The syllabus given below details the conditions referred to as **topics** that a consultant is expected to manage independently.

Under each topic, **learning objectives** are given and the level of performance /competence to be achieved are described under the domains of

- **Core knowledge**
- **Clinical skills (clinical judgment, clinical decision making)**
- **Procedural skills**

Topics

1. Benign breast lumps
2. Breast pain and nodularity
3. Conditions affecting the nipple
4. Congenital, developmental and aesthetic problems of the breast
5. Infections and inflammatory conditions of the breast
6. Borderline and premalignant conditions of the breast
7. Breast cancer
8. Oncoplastic and reconstructive surgery

1. BENIGN BREAST LUMPS

Learning objectives

- Assessment and management of discrete benign breast lumps.

Core knowledge

- Anatomy and physiology of the breast
- Development and involution of the breast
- Effect of hormonal medications
- Role of imaging
- Reading mammograms
- Pathology of benign breast conditions, breast cyst, galactocoele, fibroadenoma, Phyllodes tumour, fibrocystic disease,

Clinical skills

- History and examination
- Needle aspiration of breast cyst

Procedural skills

- Biopsy
- Biopsy-core
- Breast lump excision

2. BREAST PAIN AND NODULARITY

Learning objectives

- Assessment and management of breast pain and nodularity

Core knowledge

- Anatomy and physiology of the breast
- Hormonal medication
- Imaging in assessment
- Medical treatments

Clinical skills

- Obtaining relevant history
- Clinical examination

3. CONDITIONS AFFECTING THE NIPPLE

Learning objectives

- Assessment and management of conditions affecting the nipple

Core knowledge

- Normal anatomy and physiology
- Changes in pregnancy and lactation
- Causes of nipple discharge, nipple inversion, nipple eczema, recurrent nipple sepsis
- Mammary duct fistula
- Role of imaging
- Pathology of duct ectasia and intraduct papilloma

Clinical skills

- History and examination
- Nipple smear cytology preparation
- Nipple biopsy

Procedural skills

- Mammary ducts-microdochectomy
- Mammary duct fistula-treatment

4. CONGENITAL, DEVELOPMENTAL AND AESTHETIC PROBLEMS OF THE BREAST

Learning objectives

- Assessment and management / referral of congenital, developmental, and aesthetic problems of the breast

Core knowledge

- Normal and abnormal breast development
- Mammary hypoplasia, Poland syndrome, accessory breasts and breast asymmetry
- Mammary hypertrophy
- Paediatric and adolescent problems
- Male breast lumps and gynaecomastia
- Effects of injury
- Effects of medication
- Patho-physiology of male breast enlargement
- Role of imaging

Clinical skills

- History and examination

Procedural skills

- Biopsy
- Biopsy-core
- Gynaecomastia excision
- Excision of accessory breast

5. INFECTIONS, INFLAMMATORY AND TRAUMATIC CONDITIONS OF THE BREAST

Learning objectives

- Diagnosis and management of infections, non infective inflammatory, and traumatic conditions of the breast

Core knowledge

- Pathology and management of bacterial mastitis
- Pathology and management of mastitis of infants
- Pathology and management of acute and chronic breast abscesses
- Pathology and management of tuberculosis, actinomycosis, granulomatous mastitis and Mondor's disease
- Pathology and management of duct ectasia and periductal mastitis
- Pathology and management of traumatic fat necrosis

Clinical skills

- History and examination

Procedural skills

- Fine needle aspiration cytology
- Core biopsy
- Incision biopsy.
- Excision biopsy
- Incision and drainage of breast abscess
- Mammary ducts-total duct excision (Hadfield's operation)

6. BORDERLINE AND PREMALIGNANT CONDITIONS OF THE BREAST

Learning objectives

- Assessment and management of atypical and precancerous diseases of the breast

Core knowledge

- Natural history and presentation of papillomatosis, Phylloides tumours, adenomyepithelioma, typical ductal hyperplasia, ductal carcinoma in situ, lobular carcinoma in situ
- Pathology
- Role of imaging and screening in detection
- Diagnostic procedures and their place (core biopsy and wide local excision)
- Surgical treatment options and their place

Clinical skills

- History and examination

Procedural skills

- Breast lump excision
- Interpretation of a mammogram
- Image guided biopsy
- Image guided wide local excision
- Role and interpretation of other imaging techniques – MRI and PET scans

7. BREAST CANCER

Learning objectives

- Diagnosis, assessment, and management of breast cancer

Core knowledge

- Natural history and presentation
- Epidemiology and risk factors
- Assessment and management of family history and genetic risk
- Breast cancer screening
- Role of triple assessment
- Pathology, staging and prognostic factors
- Diagnosis and management options for early (screen detected) breast cancer
- Diagnosis and management options of the axillary involvement (sentinel node biopsy, axillary sampling, axillary clearance)
- Indications and role of adjuvant therapy (hormonal, chemotherapy, radiotherapy)
- Diagnosis and management of metastatic breast cancer
- Palliative care
- Multi disciplinary team (MDT) approach to breast cancer
- Organization and functioning of dedicated breast clinics

Clinical skills

- History and examination
- Identification of patients for reconstructive surgery

Procedural skills

- Fine needle aspiration cytology
- Core biopsy
- Needle localization excision biopsy of clinically impalpable mammographic / ultrasound detected breast lesion
- Wide local excision of a breast lesion and cavity biopsy
- Total mastectomy

- Axillary node sampling
- Axillary clearance
- Sentinel node biopsy
- Image guided biopsy
- Image guided wide local excision

8. ONCOPLASTIC AND RECONSTRUCTIVE SURGERY

Learning objectives

- Assessment of patients for oncoplastic and reconstructive breast surgery
- Appropriate selection of patients and procedures
- Post-operative care and follow-up of patients after oncoplastic procedures

Core knowledge

- Assessment of patients who might be suitable for oncoplastic or plastic surgical procedures on the breast
- Indications and contraindications for breast reconstruction
- Indications and contraindications for breast augmentation and reduction
- Assessment for risk-reducing mastectomy
- Indications and contraindications for breast conservation and oncoplastic procedures
- Types of congenital and developmental abnormalities
- Approaches to treatment of gynaecomastia

Operative oncoplastic and breast surgery

- Anatomy relevant to breast plastic surgery and reconstruction
- Basis of tissue expansion and implant techniques
- Basis of pedicle and microsurgical techniques

Post-operative Care

- Management and avoidance of complications of breast reconstruction
- Follow up of breast cancer patients after oncoplastic and reconstructive procedures

Clinical skills

Assessment of patients who might be suitable for oncoplastic or plastic surgical procedures on the breast

- Integration of reconstruction with cancer therapy
- Selection of suitable patients for oncoplastic and plastic surgical techniques
- Choice of appropriate technique
- Ability to advise on expected outcomes and complications

Operative oncoplastic and breast surgery

- Planning and sequencing of procedures
- Integration of cancer resection and axillary surgery with reconstruction
- Choice of flap – unipedicle / bipedicle / free
- Integration of other procedures such as areola tattooing and liposuction
- Marking for surgery
- Ability to raise previous mastectomy flaps
- Selection of implants
- Microsurgical techniques
- Other more rarely performed procedures such as superior gluteal artery perforator flap
- Different methods of performing flaps – unipedicle / bipedicle / free flap

Post-operative Care

- Recognition of post-operative complications, both early and late
- Recognition of local recurrence of cancer
- Indications for seeking further oncological advice
- Second stage adjustments and liposuction

Procedural skills

Operative oncoplastic and breast surgery

- Mastectomy-skin-sparing
- Reconstruction-LD flap
- Reconstruction-TRAM flap

- Nipple-areolar reconstruction
- Correction of nipple-eversion
- Gynaecomastia excision

SURGICAL CURRICULUM LEADING TO THE AWARD OF BOARD CERTIFICATION IN GENERAL SURGERY WITH A SPECIAL INTEREST IN ENDOCRINE SURGERY

Introduction

The surgical curriculum leading to board certification in general surgery with a special interest in endocrine surgery is the framework document for systematic training to practise as a consultant surgeon with a special interest in this field.

The syllabus given below details the conditions referred to as **topics** that a consultant is expected to manage independently.

Under each topic, **learning objectives** are given and the level of performance /competence to be achieved are described under the domains of

- **Core knowledge**
- **Clinical skills (clinical judgment, clinical decision making)**
- **Procedural skills**

Topics

1. Benign diseases of the thyroid
 - a. Developmental abnormalities of the thyroid gland
 - b. Multi-nodular goiter / endemic goitre
 - c. Toxic goitre
 - d. Autoimmune thyroiditis
2. Malignant diseases of the thyroid
3. Benign and malignant diseases of the parathyroids
4. Adrenal disease
5. Diseases of the pancreatic islets

1. BENIGN DISEASES OF THE THYROID

Learning objectives

- Clinical presentation, diagnosis and management of developmental abnormalities of the thyroid, thyroid swellings and thyrotoxicosis

Core knowledge

- Developmental anatomy of thyroid gland including anatomical variations
 - Development from the primitive pharynx – foramen caecum and the descent
 - Thyroglossal tract and pyramidal lobe
 - Abnormalities and variations in the recurrent laryngeal nerves, external branch of the superior laryngeal nerve and thyroid vessels
- Developmental abnormalities of the thyroid gland
 - Thyroglossal cyst / complications of thyroglossal cyst – clinical features and surgical management
 - Management of lingual thyroid
 - Absence of thyroid / hemi agenesis
- Surgical treatment of the developmental abnormalities of the thyroid gland
 - Diagnosis & treatment of above
 - Diagnosis of thyroglossal cyst – clinical and radiological / FNAC
 - Excision of the thyroglossal tract (Sistrunk operation) and complications
 - Identification / preservation / surgery of lingual thyroid
 - Recognition of absence of thyroid / hemiagenesis
- Pathophysiology and investigations of endemic / multinodular goitre
 - Different clones of thyrocytes – response to external stimuli
 - Investigation of nodular goitres

- Ultrasound scan of thyroid gland and limitations
- Fine needle cytology of thyroid and limitations including occult carcinoma in multinodular goitre
 - Hormone assay and interpretation - Changes in hormone levels in different ages and special situations like acute illness / pregnancy
 - Thyroid antibodies and their use in clinical practice- TsAb, TG TPA
- Evidence based knowledge of various options for management of nodular goitres including surgical management
 - Use of thyroxine in benign goitres / limitations and problems such as iatrogenic hyperthyroidism
 - Role of total thyroidectomy
 - Limitations of subtotal surgery
- Toxic goitres
 - Pathophysiology of toxic goitres e.g. Graves' disease, Toxic nodular goitre (Plummers disease)
 - Role of antibodies in Graves' disease/ Graves' ophthalmopathy
 - Other associated autoimmune conditions of Grave's disease
 - Investigation of toxic goitres
 - Recognition of normal values, clinical and subclinical dysfunction
 - Isotope scans and other imaging modalities
 - Management options of toxic goitres including surgical management
 - Drugs used in management of toxic goitres
 - Use and limitations of radioiodine in toxic goitres
 - Role of surgery in toxic goitres
 - Management of Graves' ophthalmopathy
 - Management of autonomous toxic nodule - role of hemithyroidectomy
 - Management of toxic goiters in pregnancy
 - Autoimmune thyroiditis

- Pathophysiology of autoimmune thyroiditis (Hashimoto's thyroiditis and other forms of thyroiditis)
 - Papillary thyroid carcinoma in the setting of Hashimoto's thyroiditis
 - Cytological features
 - Role of antibodies and their interpretation
 - Role of fine needle cytology
 - Role of imaging
 - Management of autoimmune thyroiditis / role of surgery in autoimmune thyroiditis

Clinical skills

- History and examination
- Investigations
- Selecting patients for surgical management
- Emergency management of an obstructed airway
- Operative options
- Pre –and post operative management
- Management of complications

Procedural skills

- Fine needle aspiration cytology
- Emergency /elective tracheostomy
- Hemithyroidectomy (total lobectomy)
- Total /Near total thyroidectomy
- Re-exploration of the neck for post operative haematoma
- Revision/completion thyroidectomy
- Excision of thyroglossal cyst

2. MALIGNANT DISEASE OF THE THYROID

Learning objectives

- Clinical presentations, diagnosis and management of different types of thyroid cancers

Core knowledge

- Classification and staging of thyroid malignancies
 - Cytological staging (Thy 1 -5)
 - Histological classification – papillary, follicular etc
 - TNM staging
 - WHO classification
- Pathology of thyroid malignancies including special features of each type (e.g papillary carcinoma multi focal - lymphatic spread, Psammoma bodies; follicular carcinoma unifocal, invasion, blood borne metastasis; medullary carcinoma not a true epithelial tumour , C cells calcitonin, Congo red staining)
- Hurthle cell tumours and their management
- Genetics of thyroid malignancies - genetics of MTC – RET proto-oncogene etc, PTC
- Management of medullary thyroid carcinoma including recognition and screening for Multiple Endocrine Neoplasia
- Investigation of thyroid malignancies
 - FNAC and interpretation of cytology reports
 - Imaging techniques including CT / MRI & PET scanning
 - Measurement of thyroglobulin and use of it in follow up of cancer
 - Measurement of calcitonin and use of it in follow up of medullary cancer
- Management of each type of thyroid malignancy with evidence based knowledge of various options
- Role of radioiodine in differentiated cancer
- Other forms of therapy including newer drugs

Clinical skills

- Clinical diagnosis
- Interpretation of investigations
- Recognition of complications
- Recognition of special problems such as MEN 2 families
- Liaison with endocrinologists and geneticists and planning treatment strategy
- Counseling of patients and families

Procedural skills

- Fine needle cytology - sampling and preparation of slides
- Hemithyroidectomy +/- Completion thyroidectomy
- Total thyroidectomy
- Total thyroidectomy with central node dissection
- Total thyroidectomy with central and lateral node dissection
- Node dissection in medullary cancer
- Median sternotomy for retrosternal goitre

3. PARATHYROID DISEASE

Learning objectives

- Diagnosis and management of benign and malignant diseases of the parathyroid glands

Core knowledge

- Developmental anatomy of the parathyroid glands
- Developmental abnormalities of the parathyroid
 - Ectopic and supernumerary parathyroid glands
 - The clinical implications of ectopic and supernumerary parathyroid glands
- Hypercalcaemia / hypocalcaemia ; causes, investigations and medical management

- Problems encountered in surgery due to developmental abnormalities of the parathyroid gland
- Pathophysiology of primary hyperparathyroidism
 - Adenoma
 - Hyperplasia
 - Carcinoma
- Investigation of primary hyperparathyroidism
 - Serum calcium estimation/ urinary calcium estimation
 - Serum PTH levels
 - Sestamibi scan
 - Use of ultrasound scan to localize – on table ultrasound scan
- Normocalcaemic primary hyperparathyroidism
- Evidence based knowledge of various options in the management of primary hyperparathyroidism
- Clinical presentation and diagnosis of parathyroid cancer
- Pathophysiology of secondary and tertiary hyperparathyroidism

Clinical skills

- History and examination
- Investigations
- Selecting patients for surgical management
- Operative options – gland exploration, single gland excision, sub total resection
- Pre-operative and post operative management
- Management of complications

Procedural skills

- Four gland open exploration of parathyroids
- Parathyroidectomy
- Re- operative parathyroidectomy

4. ADRENAL DISEASES

Learning objectives

- Diagnosis and principles of management of the diseases of the adrenal gland

Core knowledge

- Surgical anatomy of the adrenal gland (differences between left and right) and pathological conditions
 - Hyperplasia
 - Pheochromocytoma
 - Conn's syndrome
 - Cushing's syndrome
 - Adrenal incidentalomas
 - Adrenal carcinoma
- Investigation of a patient with adrenal disease- hormone assay & imaging
- Appropriate pre-operative preparation of patients with hormone producing tumours in consultation with the endocrinologists and anaesthetists (pheochromocytoma and Cushing's syndrome)
- Surgical approach to the adrenal – open / laparoscopic
- Different operative approaches to the adrenal gland (anterior, posterior, laparoscopic)
- Post operative management following adrenalectomy

Clinical skills

- History and examination
- Investigations
- Selecting patients for adrenal surgery
- Pre-operative and Post-operative management
- Immediate management of acute adrenal insufficiency during post-operative period
- Post-operative management of patients with hormone producing tumours
- Management of other post-operative complications
- Long term follow up of patients who has had surgery for hormone producing tumours

Procedural skills

- Open / laparoscopic adrenalectomy

5. DISEASES OF THE PANCREATIC ISLETS

Learning objectives

- Clinical presentation, diagnosis and management of patients with pancreatic islet cell diseases

Core knowledge

- Anatomy and physiology of pancreatic islet cells
- Knowledge of commoner pancreatic islet cell tumours (Insulinoma, Glucagonoma, Nesidioblastosis, Gastrinoma, PPoma, VIPoma, Non functioning neuroendocrine tumours)
- Investigation of a patient with pancreatic islet cell disease
 - Biochemical assay - blood
 - Imaging – CT and MRI scan
 - Localization techniques
 - Role of intra-operative ultrasound scan
 - Recognition of MEN 1 syndromes – Multiple insulinomas
- Surgical approach to the pancreas
- Problems in operating on endocrine pancreatic tumours including intra-operative identification

Clinical skills

- History and examination
- Investigations
- Selecting patients for surgery
- Pre-operative and post-operative management
- Management of metastatic disease
- Immediate management of acute adrenal insufficiency during post operative period

- Post-operative management of patients with hormone producing tumours
- Management of other post-operative complications
- Long term follow up of patients who has had surgery for hormone producing tumours
- Recognition of Whipple's triad
- Management of leak / Image guided aspiration / ERCP stenting
- need for re-operation
- Recognition and management of hypoglycaemia

Procedural skills

- ERCP
- Endoscopic ultrasound and biopsy
- Exposure of the pancreas and surgery for a pancreatic lesion
- Pancreaticoduodenectomy
- Total pancreatectomy
- Distal pancreatectomy

SURGICAL CURRICULUM LEADING TO THE AWARD OF BOARD CERTIFICATION IN GENERAL SURGERY WITH A SPECIAL INTEREST IN TRAUMA SURGERY

Introduction

Surgical curriculum leading to board certification in General surgery with special interest in trauma surgery is the framework document for systematic training to practise as a consultant surgeon with a special interest in trauma surgery.

The syllabus given below details the conditions referred to as essential **topics** that a consultant is expected to manage independently.

Under each topic, **learning objectives** are given and the level of performance / competence to be achieved are described under the domain of

- **Core knowledge**
- **Clinical skills**
- **Procedural skills**

Topics

1. Organization of trauma care systems
2. Definitive surgical trauma care
3. Neck trauma
4. Chest injuries
5. Abdominal pelvic injuries
6. Head trauma
7. Spinal trauma
8. Extremity trauma (soft tissues, vascular and fractures)
9. Rehabilitation

1. ORGANIZATION OF TRAUMA CARE SYSTEMS

Learning Objectives

- Chain of trauma care
- Initial assessment and treatment of poly trauma patients including children

Core knowledge

- Chain of trauma treatment (prevention, pre-hospital care including triage, hospital care including triage and rehabilitation)
- Principles of major casualty incident management
- Disaster preparedness
- Mechanisms of low and high velocity injuries
- Acceleration / deceleration injuries
- Thermal, electrical and radiation injuries
- Military trauma

- Pathophysiology of major trauma including shock, SIRS and MODS including differences in children
- Tri-modal pattern of death due to trauma
- Golden hour and platinum ten minutes of trauma

Clinical skills

- Principles of ATLS or National Trauma Management Course (NTMC)
- Primary survey (initial assessment and resuscitation)
- Identification and treatment of immediate life threatening injuries
- Secondary survey
- Physiological assessment of burns patients
- Interpretation of blood gas analysis
- Application of oxygen therapy
- Use of mechanical ventilators
- ECG interpretation
- Referral to relevant surgical and other special

Procedural skills

- Establishment, protection and maintenance of air way with cervical spine control and neck stabilization
 - Insertion of oro-pharyngeal / naso-pharyngeal air way
 - Endotracheal intubation
 - Cricothyroidotomy
 - Tracheostomy
- Log rolling
- Inter-costal tube insertion
- IV access
- Central venous line insertion and monitoring
- Control of catastrophic external haemorrhage including nasal packing
- Closed and open cardiac resuscitation

- Urethral and supra-pubic catheterization
- Diagnostic peritoneal lavage
- Immobilization of limb fractures
- Focused Abdominal Sonography of Trauma patients (FAST)

2. DEFINITIVE SURGICAL TRAUMA CARE

Learning objectives

- Recognition of injuries of poly-trauma victims: secondary survey
- Principles of definitive management of the trauma patients
- Emergency approaches to body cavities and major vessels

Core Knowledge

- Detailed knowledge of regional anatomy and surgical approaches to injured organs
- Principles of damage control Surgery

Clinical skills

- Secondary survey
- Diagnosis of injuries
- Suspicion of non apparent injuries
- Plan and interpret investigations
- Surgical decision making
- Communication skills

Procedural Skills

- Emergency thoracotomy
- Techniques of trauma laparotomy and approach to massive bleeding
- Surgical exploration of large blood vessels

3. NECK TRAUMA

Learning objectives

- Recognition of vascular, aerodigestive, skeletal and neurological injuries
- Repair of vascular, aerodigestive, and brachial plexus injuries

Core knowledge

- Anatomical zones of the neck – Zone 1, 11, 111
- Mechanisms of injuries – Blunt and penetrating
- Principles of trauma management (NTMC, ATLS)
- Principles of neck exploration in penetrating injuries - mandatory and selective exploration

Clinical skills

- Diagnosis of vascular, aero-digestive tract, and neurological injuries
- Selection of appropriate imaging and endoscopic studies
- Monitoring of unexplored neck injuries
- Surgical decision making

Procedural skills

- Surgical incisions of the neck - Oblique and supra-clavicular + / - Median sternotomy
- Carotid artery bypass and vascular repairs
- Repair and management of aero-digestive tract injuries
- Repair and management of brachial plexus injuries

4. CHEST INJURIES

Learning objectives

- Recognition and management of immediate and potential life threatening chest injuries

Core Knowledge

- Anatomy of chest organs and surgical exposure
- Physiology of breathing, circulation and physiological derangements in injury
- The mechanism and patterns of injury associated with blunt, penetrating and deceleration injuries to the chest
- Pathophysiology of tension / open pneumothorax, haemothorax / massive haemothorax, flail chest, cardiac tamponade, diaphragmatic injuries
- Pathophysiology and management / outcome of aero-digestive injuries
- Principles of cardio-pulmonary resuscitation
- Post ATLS definitive care of above injuries
- Indications and use of appropriate investigations in thoracic trauma
- Pain relief in chest trauma including epidural anaesthesia
- Indications for immediate, urgent, and delayed thoracotomy in trauma
- Surgical approaches to chest cavity and repair of chest injuries
- Post operative care of chest injuries including management of complications

Clinical skills

- Initial assessment and treatment of airway, breathing, and circulation
- Protection of cervical spine/cord
- Recognition and management of immediate life threatening injuries: obstructed airway, tension pneumothorax, massive haemothorax, open chest wound, flail chest, and cardiac tamponade
- Interpretation of chest X rays, ECG, arterial blood gases, echocardiography and CT films, bronchoscopic evaluation

- Establishment of appropriate monitoring
- Recognition and management of potential life threatening injuries: lung contusion, bronchial rupture, blunt cardiac injury, intra-thoracic bleeding, oesophageal injury, simple pneumothorax, major vascular injuries and abdominal injuries
- Management of cardiac arrhythmias
- Management of widened mediastinum and multi- disciplinary consultation
- Assessment and management of pain and anxiety
- Communicating with relatives

Procedural skills

- Establishment of non surgical and surgical airway
- Insertion and management of thoracic drains
- Establishment of venous access and monitoring
- Management of cardiac tamponade: pericardiocentesis and subxiphoid window
- Posterolateral and anterolateral thoracotomy, thoraco-laparotomy, bilateral anterior thoracotomy, and median sternotomy
- Exposure and repair of cardiac injuries
- Exposure and repair of thoracic vascular injuries
- Pulmonary resections
- Exposure and repair of tracheo-bronchial and lung injuries
- Repair of diaphragmatic injuries
- Exposure and repair of oesophageal injuries
- Management of retained effusions and empyema

5. ABDOMINAL AND PELVIC TRAUMA

Learning objectives

- Recognition, decision making and management of abdominal / pelvic trauma

Core knowledge

- Surgical anatomy of the abdominal and pelvic wall and intra abdominal and pelvic organs
- Segmental anatomy of liver
- Mechanisms of abdominal trauma
- Control of intra abdominal and retroperitoneal haemorrhage
- Indications for and principles of bowel exteriorization
- Indications for and principles of primary repair and reconstruction of GI tract in bowel trauma
- Anatomy, diagnosis and principles of management biliary tract injuries
- Classification and principles of management of pancreatic trauma
- Urinary tract anatomy and diversion / repair techniques and principles of Management of urinary tract injuries
- Principles of repair of intra abdominal vessels
- Coagulopathy, acidosis and hypothermia
- Indications for enteral and parenteral feeding
- Pathophysiology of peritonitis and sepsis

Clinical skills

- Initial assessment and recognition of the severity of abdominal and pelvic trauma
- Decision making
- FAST US assessment
- Interpretation of radiographs, contrast studies and CT films
- Prevention / recognition / monitoring and management of abdominal compartment syndrome
- Choice of the routes of feeding (enteral versus parenteral)
- Appropriate referral for specialist management

Procedural skills

- Diagnostic peritoneal lavage
- Damage control techniques
- Management of splenic injuries and splenectomy
- Hepatic packing technique for haemorrhage
- Hepatic resections
- Bowel exteriorization
- Bowel resection; anastomotic techniques
- Exposure and management of abdominal and pelvic vascular injuries
- Gastric resections and restoration of continuity
- Gastrostomy and jejunostomy
- Management of pancreatic and duodenal injuries
- Pancreatic resections: pancreato-duodenectomy, distal pancreatectomy
- Methods of bile duct repair: repair over a T tube, hepaticojejunostomy with Roux-en-Y anastomosis
- Compression of bony pelvic ring and retroperitoneal packing of pelvic haematoma
- Suprapubic cystostomy
- Nephrectomy
- Repair, reconstruction, diversion and anastomosis of ureters
- Repair of bladder and catheter management
- Management of injuries to female reproductive tract
- Laparostomy

6. HEAD TRAUMA

Learning objectives

- Initial management of head trauma according to ATLS / NTMC protocol
- Definitive management of immediate life threatening injuries including perioperative care
- Operative management of head-injured patients

Core knowledge

- Pathophysiology of head injury and of multiple trauma including an understanding of: cerebral perfusion and oxygenation, raised intracranial pressure, impaired intracranial compliance, intracranial herniation
- Tools for assessment of severity of head trauma (Glasgow, AVPU)
- Prevention of secondary brain damage
- Medical management of acutely raised intracranial pressure
- Indications for intervention including the use of pressure monitoring
- Indications and principles of intensive care of head injured patients
- Principles of spinal stabilization and radiological assessment in head injured patients
- Natural history of recovery from head injury including neurological, cognitive and behavioural disability and post- traumatic epilepsy
- Role of neurological rehabilitation principles
- diagnosis and confirmation of brain death

Clinical skills

- Initial assessment of the multiply-injured patient
- Neurological assessment of the head-injured patient including Glasgow coma scale and AVPU
- Recognition and interpretation of focal neurological deficits

- Interpretation of CT scans and plain radiology
- Use and interpretation of intracranial pressure monitoring techniques
- Ability to assess and advise on the transfer of head-injured patient including image transfer and telemedicine
- Assessment of CNS viability (brain death)
- Appropriate referral for specialist management

Procedural skills

- Insertion of ICP monitor
- Burr hole evacuation of extradural haematoma
- Elevation of depressed skull fractures with dural repair
- Craniotomy for supratentorial traumatic haematoma. In particular, planning and siting of craniotomies for evacuation of extradural and subdural haematomas, handling the "tight" brain, achieving haemostasis
- Delayed cranioplasty of skull vault

7. SPINAL TRAUMA

Learning objectives

- To achieve competence in all aspects of the non-operative management of spinal injury patients

Core knowledge

- Patho-physiology of spinal cord injury
- Mechanisms of injury
- Classification of spinal fracture dislocations
- Biomechanics of spinal instability

Clinical skills

- Indications for halo traction and external stabilization
- Indications for and principles of open reduction and stabilization
- Clinical assessment of the spinal injury patient
- Management of spinal shock
- Interpretation of plain radiology, CT and MRI scans
- Liaison with spinal injury units

Procedural skills

- Use of external immobilization including cervical collars and spinal boards
- Application of halo traction
- Application of a halo-body jacket

8. EXTREMITY INJURIES

Learning objectives

- Management of soft tissue injuries
- Management of fractures

Soft Tissue Injuries

Core knowledge

- Mechanism of injury
- Compartment syndrome
- Principles of management of soft tissue injuries
- Indications for amputations (life versus limb)

Clinical skills

- Diagnosis of compartment syndrome
- Assessment of limb viability
- Detection of vascular trauma
- Interpretation of exclusion / characterization angiography
- Usage of anticoagulants
- Referral for specialist management

Procedural skills

- On table arteriography
- Techniques of fasciotomy
- Debridement and suturing of wounds
- Exposure, repair and management of vascular injuries
- Damage control techniques including temporary shunts
- Repair and rehabilitation of nerve injuries
- Skin grafting procedures
- Amputations

Simple fractures and dislocations

Core knowledge

- Anatomy of the locomotor system
- Understanding of imaging techniques X rays, MRI, CT, USS
- Patho-physiology of bone healing
- Principles of management of open and closed fractures
- Principles of management of joint dislocations

Clinical skills

- Examination of limb and joints

- Interpretation of plain radiographs
- Ability to describe a fracture / dislocation from an x ray
- Classification of closed and open fractures
- Complications of fracture treatment including compartment syndrome
- Arrange rehabilitation
- Appropriate referral for specialist management

Procedural skills

- Reduction of simple fractures and dislocations
- Techniques of immobilization – external fixation, casts, splints, skeletal traction
- Wound debridement and immobilization of open fractures

9. REHABILITATION

Learning objectives

- Recognition and assessment of temporary and long term / permanent disability

Core knowledge

- Assessment methodology of the degree of short term and long term disability of trauma victims
- Multi disciplinary approach to the short and long term rehabilitation of trauma victims including the contribution of physiotherapists, occupational therapists, specialist care nurses and social workers

Clinical skills

- Assessment of neurological deficit – Cognitive, motor and sensory
- Assessment of locomotor disability
- Assessment of visual and hearing impairment
- Assessment of bladder and bowel dysfunction
- Surgical counseling including reassurance of continuity of care and installing hope
- Appropriate referral to specialists and special nursing care services
- Recommendations for alternative occupations
- Recommendations for life style adjustments
- Advice and referral to obtain special appliances (orthopaedic, visual and hearing aids, communication equipments)
- Assessment of loss of earning capacity and recommendation for workman compensation
- Arrangement of long term institutional care
- Arrangement of home nursing services
- Introduction to social welfare organizations

The curriculum and the syllabus is only a broad educational guideline for surgical training. However it is expected that the trainees will develop the desire to update their knowledge and skills on recent advances in surgery and are aware of the internationally accepted best practice guidelines, changing practices and newer surgical techniques