MODULE TITLE:	**POST FELLOWSHIP EDUCATION AND TRAINING PROGRAM IN TRAUMA SURGERY FOR VASCULAR SURGEONS**	**31 JULY 2023**
DEVELOPED BY:	**GSA Trauma Training Committee**	
Module Rationale and Objectives	This document outlines the core curriculum of the PFET Program in Trauma Surgery for Vascular Surgeons. Currently, the program is available to fellows who have completed the Surgical Education & Training (SET) Program in Vascular Surgery, Orthopaedic Surgery and General Surgery. It is intended that the PFET Program in Trauma Surgery will build on the trauma component of the Surgical Education and Training (SET) program in Vascular Surgery. The objective of the PFET Program in Trauma Surgery is to train surgeons to a standard where they are regarded as specialists in the surgical care of the severely injured. It is expected that the surgeon who has successfully completed the PFET Program in Trauma Surgery is able to receive and resuscitate a severely injured patient, perform time-critical resuscitative surgical procedures, deliver definitive surgical and perioperative care relevant to their primary surgical specialty, and to coordinate and facilitate the surgical and perioperative care relevant to other surgical specialties as required. This curriculum module is divided into the following sections, outlining clinical assessment, investigations, and principles of management for the following: - Initial Trauma Management: Resuscitative Phase - ED - Ongoing ICU Management: Definitive care phase - Daily Ward Management: Definitive care phase - Daily Ward Management: ward and rehabilitation - Skin/Soft Tissues - Head/Brain - Face/Neck - Spine - Chest - Abdomen - Pelvis - Extremities - Vascular Injury	
Technical Expertise	The operative procedures listed under Technical Expertise refer to operative experience, not competency. Requirements for competency are dependent on the primary surgical specialty of the trainee. Details can be found in the Core Trauma Competencies on page 7.	
Suggested Reading	The following texts are recommended: (1) American College of Surgeons (2018). *ATLS: Advanced Trauma Life Support (Student Course Manual),* Current Publish Addition. (2) Boffard, K.D. (2015). *Manual of Definitive Surgical Trauma Care*, Current Published Addition. (3) Brain Trauma Foundation (2016). *Guidelines for the Management of Severe Traumatic Brain Injury*, Current Published Addition. Trainees are expected to keep abreast of the current literature, including textbooks, journal articles, consensus guidelines, and other on-line resources.	
Learning Opportunities and Methods	If state-based and/or local hospital courses/meetings are available, trainees are strongly advised to avail themselves of these opportunities. Trainees are encouraged to present their research at national and/or international meetings, in order to fulfil the research requirement.	
How this module will be assessed	In-training assessment forms, Direct Observation of Procedural Skills (DOPS) assessments, core competency forms, and logbooks.	

MEDICAL EXPERTISE	JUDGEMENT / CLINICAL DECISION MAKING		
	CLINICAL ASSESSMENT	INVESTIGATIONS	PRINCIPLES OF MANAGEMENT
GENERIC TRAUMA CURRICULUM			
Initial Trauma Management: Resuscitative Phase - ED			
▪ Thorough understanding of the various mechanisms of injury: - Blunt trauma (high and low energy transfer) - Penetrating injury (stab, low velocity, high velocity, shotgun) - Blast injury ▪ Sound understanding of the physiological response to: - Haemorrhagic shock - Obstructive shock - Compartment syndrome - Blast injury - Severe burn ▪ Understand the physiological response to resuscitation in different age groups, after trauma ▪ Understand the pathophysiology of coagulopathy of trauma ▪ Recognition of the pathophysiology of trauma as presented in different age groups ▪ Able to coordinate mass casualty triage and resource allocation	▪ Initial assessment of trauma patient as either a single practitioner or as part of a multi-disciplinary team ▪ Anticipates the specific injury patterns associated with blunt, penetrating and blast injury ▪ eFAST (Perform and interpret) ▪ Burn assessment ▪ Assess possible exposure to toxins, chemicals and radiological contaminates	▪ Able to interpret imagining in relation to immediate and potentially life-threatening injuries	▪ Effective team leader in trauma reception and resuscitation ▪ Able to initiate and coordinate blood component resuscitation including damage control resuscitation and massive transfusion ▪ Understand the indications for embolisation and its limitations and able to initiate intervention in a timely manner ▪ Able to initiate and coordinate resuscitation of the severely burned patient
Ongoing ICU Management: Definitive care phase			
▪ Sound understanding of the physiological response to: - Traumatic shock - Ischaemia-reperfusion - Post-injury SIRS (including MOF and sepsis) ▪ Anticipate the ongoing critical care support required after severe trauma, including nutritional requirements ▪ Basic understanding of the principles of mechanical ventilation in injured patients ▪ Sound understanding of the principles of medical management of severe TBI	▪ Clinical assessment for compartment syndrome, including measuring compartment pressure ▪ Clinical assessment for abdominal injury in the sedated and ventilated patient	▪ Able to initiate and interpret appropriate imaging based on identified injuries and clinical response to treatment	▪ Able to anticipate physiological response to injury and subsequent resuscitation and surgical intervention, in order to formulate a coordinated management plan ▪ Core-rewarming ▪ Correction of coagulopathy ▪ Able to appropriately prioritise definitive management of multiple injuries ▪ Anticipation and prevention of common post-injury complications

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	CLINICAL ASSESSMENT	INVESTIGATIONS	PRINCIPLES OF MANAGEMENT
GENERIC TRAUMA CURRICULUM			
Daily Ward Management: Definitive care phase- ward and rehabilitation			
▪ Anticipate the ongoing needs of the injured patient in relation to: - Pain relief - Nutrition - VTE prophylaxis - GIT function - Mobility - Advanced care directives ▪ Able to attend to the psychosocial needs of the patient and their family	▪ Appropriate assessment of patient and relevant imagining, in relation to cervical spine clearance ▪ Systematic approach to the daily clinical assessment of injured patients ▪ Clinical assessment for compartment syndrome, including measuring compartment pressure ▪ Clinical assessment for abdominal injury ▪ Understanding of the process of assessment for Post-Traumatic Amnesia (PTA) ▪ Understanding of the principles of cognitive assessment	▪ Judicious use of regular blood tests and imaging ▪ VTE surveillance	▪ Able to prioritise and coordinate the care of the patient with multiple injuries ▪ Anticipation and prevention of common post-injury complications ▪ Understand and facilitate the role of allied health practitioners in the assessment and treatment of injured patients ▪ Engage in discharge planning including to home or rehabilitation and post-discharge follow-up ▪ Principles of wound/drain care ▪ Tracheo(s)tomy care ▪ VTE prophylaxis
Skin / Soft Tissues			
▪ Able to anticipate and assess soft-tissue injury based on mechanism of injury ▪ Able to accurately assess soft tissue injury ▪ Able to identify significant soft-tissue injury that will require specialist intervention (e.g. large degloving, morel Lavallee lesions)			▪ Recognition of the need to involve plastic / reconstructive and other surgical specialists early in the patient's care ▪ Optimisation of wound healing by attention to mobility restrictions, nutrition, and comorbidities ▪ Anticipation, prevention and recognition of wound complications ▪ Wound care management plan development
Head / Brain			
▪ Sound understanding of the mechanisms of TBI and the various clinical presentations ▪ Sound understanding of the principles of medical management of severe TBI - Resuscitation - Acute intra-cranial hypertension - Ongoing ICU management ▪ Understand the relevance of extra-cranial injuries	▪ Clinical assessment of a patient with possible mild to moderate TBI ▪ Ongoing surveillance of the patient with TBI including identification of deterioration in GCS	▪ Able to initiate and interpret CT scans of the brain	▪ Timely diagnosis of mild, moderate and severe TBI ▪ Mild-Mod TBI: - Cognitive function assessment - Diagnosis and management of PTA ▪ Severe TBI ▪ Minimisation of secondary injury in line with Brain Foundation Guidelines (4th Edition) ▪ Recognition of signs of deterioration with timely initiation of treatment ▪ Appropriate prioritisation and timing of definitive management of extracranial injuries

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	CLINICAL ASSESSMENT	INVESTIGATIONS	PRINCIPLES OF MANAGEMENT
GENERIC TRAUMA CURRICULUM			
Face / Neck			
▪ Understand the mechanism of blunt cervical vascular injury (BCVI) ▪ Understand the importance of trajectory in penetrating neck and face injury	▪ Assessment for BCVI ▪ Assessment for penetrating neck injury	▪ Able to recognise signs of major vascular and upper aerodigestive tract injury on contrast CT scan and plain films ▪ CT-angiogram for BCVI	▪ Attention to airway assessment and control, ventilation and haemorrhage control early in trauma resuscitation ▪ Use of imaging to aid surgical decision making ▪ Prevention of stroke in BCVI
Spine			
▪ Recognise the physiological consequences of spinal cord injury and the relevant considerations for resuscitation of the multiply injured patient	▪ Clinical assessment of spinal cord injury based on ASIA guidelines ▪ Assessment for bony spinal column injury	▪ Recognition of high-risk mechanisms and injury patterns in the appropriate use of imaging for spinal column injury ▪ Able to interpret CT scans when performed for assessment for spinal column injury	▪ Prevention of further injury by limitation of mobility, optimisation of perfusion and fracture-dislocation reduction and/or decompression when appropriate ▪ Appreciate the potential time-critical nature of incomplete spinal cord injury, and the need for urgent specialist involvement ▪ Timely assessment and clearance in patients subsequently found not to have a significant spinal column injury ▪ Attention to bowel and bladder function, and VTE prophylaxis in patients with spinal cord injury
Chest			
▪ Implications of chest injury in relation to severity of injury, extra-thoracic injuries and age of the patient ▪ Physiological consequences of: - Flail chest wall injury - Tension pneumothorax - Cardia tamponade - Severe pulmonary contusions - Barotrauma ▪ Recognition of the evolution of the pathophysiology of chest injury and the implications this has for intensive care and ward care		▪ Able to interpret eFAST, plain film and CT scan to identify life-threatening (or potentially life-threatening) injuries	▪ Attention to: - Analgesia - Pulmonary toilet - Mobility and chest physiotherapy - Nutrition - Management of extra-thoracic injuries - Co-morbidities ▪ Ventilation support: both invasive and non-invasive techniques ▪ Early diagnosis of blunt aortic injury and initiation of appropriate management

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	CLINICAL ASSESSMENT	INVESTIGATIONS	PRINCIPLES OF MANAGEMENT
GENERIC TRAUMA CURRICULUM			
Abdomen			
▪ Recognition of patterns of injury seen in blunt, penetrating and blast abdominal injury ▪ Understand the evolving nature of hollow-viscus perforation and devascularisation in blunt trauma and the clinical symptoms and signs that may develop ▪ Understand the pathophysiology or abdominal hypertension and compartment syndrome ▪ Abdominal organ injury scaling (AAST)	▪ Clinical assessment for abdominal injury in the sedated and ventilated patient as well as in the awake patient	▪ Initiate and interpret appropriate imaging in patients with suspected or confirmed abdominal injury ▪ Able to use FAST in the initial assessment and subsequent assessments to guide surgical decision making	▪ Indications for non-operative management of solid organ injury ▪ Limitations and complications of non-operative management of solid organ injury ▪ Early recognition and surgical treatment of hollow viscus injury ▪ Prevention of abdominal compartment syndrome ▪ Prevention of abdominal wall hernia (incisional) ▪ Initiation of early enteric feeds when possible
Pelvis			
▪ Classification of pelvic fractures ▪ Recognition of pattern of injury and potential for major vascular and pelvic/abdominal organ injury		▪ Initiation and interpretation of appropriate imaging in patients with pelvic injury ▪ Urethrogram: procedure and interpretation	▪ Able to lead and participate in the multi-disciplinary team required for patients with exsanguination from pelvic fractures ▪ Fracture reduction, embolisation and operative control of bleeding ▪ Recognition of associated pelvic, abdominal and extra-abdominal injuries ▪ Longer-term management of patients with pelvic floor disruption: - Continence - Wound care - Sexual function
Extremities			
▪ Able to assess and grade severe limb injury (MESS)		▪ Use of doppler to calculate ankle-brachial index (ABPI)	▪ Coordination of the management of limb-threatening injuries including the early involvement of relevant specialties ▪ Able to participate in decision making regarding prioritisation of severe limb injury and the use of damage control techniques ▪ Decision making regarding the viability of limbs in conjunction with other specialties

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GENERIC TRAUMA CURRICULUM			
Vascular Injury			
▪ Types of vascular injury: - Direct - Indirect (shearing, distraction, joint dislocation, acceleration and deacceleration) - Compression ▪ Evolution and sequalae of vascular injury: - Haemorrhage (overt and covert) - Dissection, flap, occlusion, thrombosis, ischaemia, pseudoaneurysm, AVMF - Wallerian degeneration of nerves - Muscle cell necrosis ▪ Predictors of outcome: - Pre-injury factors - Injury factors - Treatment factors (including ischaemia time <3 hrs vs 6 hrs)	▪ Bleeding, ischaemia or both ▪ Hard and soft signs of vascular injury ▪ MESS score	▪ ABPI/IEL ▪ Plain imaging ▪ Duplex ultrasound ▪ CT-angiogram ▪ MR-angiogram ▪ Catheter angiogram	▪ ATLS/EMST principle of <C>ABCDE in catastrophic bleeding ▪ Consideration of best place for assessment and resuscitation: ED vs theatre, vs hybrid suite ▪ Priorities in ischaemia vs haemorrhage ▪ Junctional zones: - Cervical - Axillary - Groin - Thoracoabdominal ▪ Temporary control vs definitive control ▪ Temporary revascularisation vs definitive revascularisation ▪ Understanding of common pitfalls ▪ Recognition of complications: - Thrombosis - Ischaemia - Compartment syndrome ▪ Anticoagulation and antiplatelet treatment ▪ Blunt aortic injury: management ▪ Post-amputation rehabilitation

SUMMARY:	**CORE TRAUMA COMPETENCIES - VASCULAR SURGERY.**	**31 JULY 2023**
DEVELOPED BY:	**GSA Trauma Training Committee**	
Objectives	This table outlines the technical expertise (operative experience) listed in the Generic Trauma Curriculum, for Vascular Surgeons.	
Key	(M) Mandatory Competency (E) Operative Experience only (observation, assisting, being assisted) (K) Operative Knowledge only Some experience may be from elective surgery, e.g. hepatic resection surgery, pulmonary resection surgery	

	REQUIRED LEVEL OF COMPETENCY:
Definitive Surgical Trauma Care (DSTC)	
DSTC Course	M
Initial Trauma Management: Resuscitative Phase - ED	
Basic airways skills	M
Vascular access (RIC)	M
Central venous access	M
Intraosseous access	M
Intercostal catheter insertion	M
Splinting of extremities	M
Application of skin traction	M
Control of external haemorrhage	M
Pelvic binder application	M
Emergency cricothyroidotomy	M
Nasophyaryngeal packing	M
DPA/DPL	M
Resuscitative thoracotomy	M
Escharotomy	E
REBOA	E
Endotracheal intubation	K
Cricothyroidotomy	M
Ongoing ICU Management: Definitive Care Phase	
Compartment pressure measurement	M
Enteral feeding access (e.g. PEG)	E
Laparosotomy	M
Surgical tracheostomy	E
Percutaneous tracheostomy	K

	REQUIRED LEVEL OF COMPETENCY:
Skin / Soft Tissues	
Wound exploration and debridement	M
Foreign body removal (with use of image intensifier)	M
Wound closure or open management	M
VAC therapy application	M
Split skin grafting	M
Wound management in specific areas	M
Fasciotomy	M
Escharotomy *(as above)*	E
Local-flap coverage	E
Free-flap coverage	E
Head and Brain	
Control of haemorrhage from scalp lacerations	M
ICP monitor insertion	E
EVD insertion	E
Burr hole for EDH and SDH	E
Craniotomy and craniectomy for EDH and SDH	E
Face and Neck	
(Surgical airways - see above)	
Control of severe maxilla-facial bleeding	M
Nasal packing	M
Surgical exploration of penetrating neck wounds	M
Proximal and distal control of vascular injury	M
Lateral canthotomy	K
Definitive management of head/face/orbit wounds	K
Repair of carotid injury	M
Assessment and repair of oesophageal injury	K
Assessment and repair of laryngeal and upper tracheal injury	K
Spine	
Application of semi-rigid collar	M
Application of halo-thoracic brace	E
Reduction of cervical spine dislocation	K
Chest	
(Intercostal catheter insertion - see above)	
(Resuscitative thoracotomy - ED see above)	
Resuscitative thoracotomy - theatre (including clamshell)	M
Diaphragm repair: from chest and abdomen	K

	REQUIRED LEVEL OF COMPETENCY:
Chest (continued)	
Repair of simple cardiac wounds	M
Pericardial window- extra- and intra-peritoneal	M
Surgical stabilisation of rib fractures	E
VATS for retained HTHx	M
VATS for empyema	E
Vascular control in the chest	M
Peri-clavicular approaches to the thoracic outlet	M
Abdomen	
Damage control laparotomy	M
Retroperitoneum: left and right medial visceral rotation	M
Control of major vessels	M
Temporary abdominal closure	M
Trauma laparoscopy	M
Anatomical liver packing	M
Pringle manoeuvre	M
Splenectomy	M
Nephrectomy	M
Repair and resection of hollow viscus	E
Repair of traumatic abdominal wall hernia	E
Vascular isolation of the liver	K
IVC repair	M
Shunting of essential arteries (e.g. SFA)	M
Abdominal wall reconstruction	E
Pelvis	
(Application of binder - see above)	
Insertion of suprapubic catheter	M
Extraperitoneal pelvic packing	M
External fixation of pelvis	K
Access to and control of iliac arteries	M
Extremities	
(Realignment and splinting - see above)	
(Wound exploration and debridement - see above)	
(Compartment pressure measurement - see above)	
(Fasciotomy - see above)	
Proximal control for junctional vascular injury (groin, axilla)	M
Exploration for haemorrhage in upper and lower limbs injury	M

	REQUIRED LEVEL OF COMPETENCY:
Extremities(continued)	
External fixation of extremities	K
Below knee amputation	M
Above knee amputation	M
Through knee amputation	M
Hip disarticulation/Hind Quarter	E
Upper limb amputation	E
Shoulder disarticulation	K
Vascular	
Abdominal aorta control	M
External iliac artery exposure	M
Intra-thoracic aortic clamp	M
Intra-thoracic control of outlet vessels	M
Carotid artery exposure	M
Brachial artery exposure	M
Femoral artery exposure	M
Arterial repair: primary anastomosis	M
Arterial repair: patch angioplasty	M
Arterial repair: interposition graft	M
Arterial temporary shunting	M
Bypass graft	M
Vein repair	M
Endovascular: balloon occlusion	M
Embolisation	M
Stenting	M
TEVAR	M