

Curriculum

DrNB Super Specialty



Vascular Surgery

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I. PREAMBLE

Vascular Surgery is a relatively new specialty in India. It is a demanding, highly specialized and progressively expanding discipline, which is concerned with diagnosis, treatment and prevention of diseases of arteries, veins and lymphatic system in the entire body (neck, trunk and limbs) except within the skull and around the heart. India is witnessing an exponential growth in the patients suffering from vascular disorders, mainly due to demographic increase of diabetes in the entire country. Due to dearth of vascular specialists, there is continued, but unnecessary loss of limb and life. Hence there is a need to have more vascular surgeons across the country and this has driven NBE to start the training courses in this super specialty in accredited hospitals in India, especially since no other training (like CTS, general surgery) offers adequate basic knowledge and training in vascular diseases and their therapies. The aim of Vascular Surgery is preservation of functional tissue, be it a limb, the brain, the gut, the kidneys or other organs. The candidate at completion of training should be a “complete vascular specialist” besides being a comprehensive “Vascular & Endovascular Surgeon”. He/she should be able to provide complete holistic care to all vascular disorders, which includes medical, “open” surgical and minimally invasive endovascular procedures. The Vascular & Endovascular Surgeon should be able to manage and preserve integrity of Aorta/IVC and its branches supplying various organs. He/she should be able to provide skilled care to patients with diabetic foot problems, have expertise in vascular medicine, and preventive measures including life style modifications.

II. INTRODUCTION

The purpose of this curriculum is to train vascular surgeons who, at the end of the program, will be able to work independently and to the standard of a consultant or equivalent. Though most of their training and skills will relate to the management of 'everyday' vascular diseases, elective and emergency, they will be able to evaluate and treat some complex vascular pathologies. This forms the basis of the curriculum, with competence in both non-operative and vascular interventional therapies, be it surgery, endovascular and combined “hybrid” procedures, being completed by the final year of training. This curriculum also allows a degree of flexibility to respond to the changing needs of vascular patients and the development of new models of healthcare delivery, and to incorporate technological advances, particularly in endovascular procedures.

At the completion of Vascular & Endovascular training they should be competent to manage elective and emergency vascular problems, able to address complex vascular pathologies and develop interest to pursue further advanced training in focused fields, which might be outside the realm of this curriculum. The curriculum will also aim to encourage clinical research, and publications in peer reviewed journals, apart from pursuing an “academic” career.

III. OBJECTIVES OF THE PROGRAMME

1. Programme Goal

- i. To provide high quality training in Vascular Sciences at accredited institutions.
- ii. To achieve adequate skills in understanding and performing Duplex scan for screening assessment, intra & post-op evaluation of patients with Arterial/Venous and Chronic Kidney disease patients along with proficiency in using Non-Invasive Vascular Lab.
- iii. To attain proficiency in treating all extra cranial and non-cardiac vascular disorders by non-interventional, surgical, endovascular or hybrid techniques
- iv. To motivate them to conduct epidemiological & clinical research in several vascular problems which are unique to India.
- v. To motivate them to be teachers to the forthcoming generations of Vascular Surgeons/specialists.
- vi. Above all, to maintain high ethical standards and follow one of the essential qualities of the clinician. “... for the secret of the care of the patient is in caring for the patient...” (Dr. Francis Peabody – Harvard Medical School 1927)

At the end of the course the candidate should have acquired knowledge, skills, aptitude and attitude to be able to function as an independent clinician/ consultant and a teacher.

2. Programme Objective: The trainee should achieve such knowledge and receive hands-on experience during the training period that he/she after qualification will be:

- i. Proficient and knowledgeable in thorough clinical examination of the patient, determination and confirmation of clinical diagnosis, need for further diagnostic work up and/or therapy individualized to patient’s requirements.
- ii. Proficient and knowledgeable in physiological, non-invasive diagnostic methods of vascular assessment
- iii. Proficient and knowledgeable in various imaging modalities of vascular system especially in performing Duplex Scans of the Vascular System.

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- iv. Proficient and knowledgeable in the “Best Medical Care” for all the vascular patients, whether they require intervention or not, using multifaceted approach
 - v. Able to recognize and assess the risk factors, stratify them and provide comprehensive care, with other specialties when indicated
 - vi. Adept at providing appropriate preoperative care, selection and accomplishment of appropriate operative procedures, direction of postoperative care and accomplishment of sufficient follow-up management of vascular patients.
 - vii. Proficient and knowledgeable in the indications for and the technical skills to carry out the procedures requiring catheter-based endovascular technologies.
 - viii. Proficient and knowledgeable in the indications for and technical skills to carry out the procedures requiring traditional open vascular surgical techniques.
 - ix. Conversant with care of chronic venous diseases – conservative management, open and endogenous ablations, sclerotherapy for varicose veins
 - x. Proficient in diagnosis and treatment of Venous Thromboembolism in different areas, not just lower limbs; need to have expertise in anticoagulation and thrombolytic therapies, venous interventions
 - xi. Able to assess and manage acute thrombotic/embolic/ other forms of occlusive arterial diseases including limbs, mesenteric and other visceral vessels, great vessels and supra aortic arteries;
 - xii. Thoroughly proficient in recognizing chronic limb arterial disease/ischemia, especially lower limbs at various stages – asymptomatic, symptomatic, critical limb threatening ischemia and well-structured, targeted therapy of each. This proficiency should also extend to occlusive disease of all extra cranial and non-cardiac vessels
 - xiii. Possess ability to diagnose through clinical evaluation, Non Invasive Vascular Lab & Duplex Scan and provide varied therapeutic options (non-interventional, surgical, endovascular, hybrid) to patients with asymptomatic, symptomatic arterial aneurysms of various etiologies and types, including Aortic, Peripheral and Visceral vessels along with aortic dissections
 - xiv. Competent to diagnose and treat extra cranial cerebro vascular disease– carotid, vertebral, innominate pathologies and therapies including medical, surgical and endovascular
 - xv. Able to address all diabetic foot related problems (neuropathic, neuro ischemic, ischemic).
 - xvi. Able to evaluate and treat acute and chronic foot wounds, foot and leg infections, perform required debridement’s and amputations; also, familiarity with rehabilitation techniques.

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- xvii. Adroit in assessing and providing care to traumatized patient – assess multiply injured patient, which should be carried over from general surgical training and provide specialized care for vascular (arterial/venous) injuries, which should also include iatrogenic injuries
 - xviii. Skilled in vascular access procedures for hemodialysis
 - xix. Accomplished in treating all forms of non-atherosclerotic vascular diseases, including vasospastic disorders, vascular malformations/arterio-venous fistulae, congenital vascular diseases, TOS, lymphedema etc. This list is not exhaustive.

IV. TEACHING AND TRAINING ACTIVITIES

1. The fundamental components of the teaching program should include:
 - i. Case presentations & discussion along with assessment of OPD cases in consultation with faculty - Periodically as per dept.
 - ii. Seminar – Periodically as per dept
 - iii. Journal club- Periodically as per dept.
 - iv. Faculty lecture teaching- Periodically as per dept.
 - v. Clinical Audit/Morbidity & Mortality meeting: Periodically as per dept.
 - vi. Every candidate is recommended to present one “poster” and/or an oral/virtual presentation (accepted/presented) per year in one of the following recognized vascular conferences:
2. Vascular Society of India Annual Conference
3. Vascular Society of India – Midterm Conference: Acceptance/presentation of one poster/oral presentation per year in one of the following conferences:
 - i. Society of Vascular Surgery (USA) Annual Conference
 - ii. European Society of Vascular Surgery
 - iii. Asian Society of Vascular Surgery
 - iv. Annual Charing Cross symposium
 - v. Annual LINC conference
 - vi. Annual Veith conference
 - vii. Any other recognized Indian/International Conference.

Note: This list is open to future amendments

4. Virtual training program under the auspices of NBE/VSI will be conducted periodically, as per schedule promulgated.

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- i. One publication/acceptance per candidate per year in a peer reviewed journal including Indian Journal of Vascular and Endovascular Surgery
5. The rounds: should include bedside sessions, file rounds & documentation of case history and examination, progress notes, round discussions, investigations and management plan interesting and difficult case unit discussions.

The training program would focus on knowledge, skills and aptitude, all essential components of education. It is being divided into theoretical, clinical and practical in all aspects of the delivery of patient care, including methodology of research and teaching.

- i. **Theoretical:** The theoretical knowledge would be imparted to the candidates through discussions, journal clubs, symposia and seminars, but mostly by encouraging them to study the prescribed text books. The students are exposed to recent advances through discussions in journal clubs. These are considered necessary in view of an inadequate exposure to the subject in the undergraduate and surgical postgraduate curriculum.
- ii. **Symposia:** Trainees would be required to present a minimum of 20 topics based on the curriculum in a period of three years to the combined class of teachers and students. A free discussion would be encouraged in these symposia. The topics of the symposia would be given to the trainees with the dates for presentation.
- iii. **Clinical:** The trainee should be able to work with all teachers – attached to a member only for a thesis to be able to pick up methods of history taking, examination, prescription writing and management in rehabilitation practice.
- iv. **Bedside:** The trainee would work up patients; learn management of cases by discussion with faculty of the department.
- v. **Journal Clubs:** This could be a weekly academic exercise. A list of suggested Journals is given towards the end of this document. The candidate would summarize and discuss the scientific article critically. A faculty member will suggest the article and moderate the discussion, with participation by other faculty members and resident doctors. The contributions made by the article in furtherance of the scientific knowledge and limitations, if any, will be highlighted.
- vi. **Dissertation:** Every student is expected to publish their dissertation in a peer reviewed journal after the acceptance of the dissertation by NBE in part or full.
- vii. **Research:** The student would carry out the clinical research project and write a thesis/ dissertation in accordance with NBE guidelines. He/ she would also be encouraged to take part in ongoing and planned clinical research projects in the

departments to learn their planning, methodology, execution and other aspects of research.

V. SYLLABUS

1. GENERAL SYLLABUS

The candidates selected to this course would have already completed 3 years General Surgical (GS) training in accredited institutions in India and have completed their certification (DNB/MS) successfully. It is assumed they have attained accepted levels of relevant knowledge and skills in general surgery. Since exposure to diagnosis and treatment of vascular diseases is very limited in most of GS programs (or other related programs like CTS), the following assumptions exclude any vascular skills and knowledge. Following are the basic competence required by a vascular surgeon/specialist, but the list is not comprehensive.

The candidates selected to undergo three (3) years training are expected to be already proficient in:

i. Basic Surgical Knowledge:

- a. Anatomy – structural and applied, embryological, anatomical anomalies and their clinical significance
- b. Physiological principles in surgical patients in normal and diseased patients, including acid-base balance, electrolyte balance and management of fluids, blood products
- c. Pathological principles of surgical diseases, including microbiology
- d. Pharmacology and usage of various drugs, their prescriptions in acutely and chronically ill surgical patients
- e. Principles of diagnostic and imaging modalities

ii. Evaluation of Surgical patients:

- a. Comprehensive clinical assessment including history, physical examination and arriving at a provisional and differential diagnosis
- b. Obtaining further diagnostic work up and formulating a management plan
- c. Able to “triage” the patient requiring routine, chronic, acute, immediate and urgent care
- d. Patient risk stratification and appropriate referral/or obtaining support from other services
- e. Evaluation and early treatment of patients with multiple trauma and other emergencies

iii. Basic surgical skills:

- a. Follow OT protocols and etiquette for logistic functioning and maintenance sterile environment
- b. Basics in anesthesia – local, regional and general
- c. Preparing the patient and oneself for the scheduled procedure
- d. Handling of tissues and instruments safely
- e. Able to assist and /or perform basic to some advanced surgical procedures commensurate with the level of training
- f. Hemostasis and handling of blood vessels
- g. Peri/postoperative patient management

iv. Post-operative Care & Follow up:

- a. Composite of above principles to be continued in post-operative period
- b. Appropriate postoperative-, mid- and long-term pharmacotherapy dictated by patient's procedures, comorbidities, including incision and wound care
- c. Assess complications and appropriate approach to these
- d. Appropriate long term post procedural follows up dictated by patient's diagnosis and therapy

v. Ethics & Inter-personal relationships

- a. Consummate in ethical practice in all aspects of patient assessment, diagnostic work up, referral pattern to other doctors, prescription of medications and offering therapeutic options to patient and family, prudent use of resources (financial and otherwise), maintenance of patient-doctor confidentiality.
- b. Careful and caring counseling of patient and family about diagnostics, procedures, outcomes and complications.
- c. Maintaining excellence in interpersonal relationship with colleagues, peers and the staff.

2. CORE VASCULAR SYLLABUS (covered in vascular surgery training)

“A Surgeons Skills Are Measured by The Way He Handles Blood Vessels”

William Halsted

The Syllabus outlined below should satisfy the Program goal & Objectives detailed earlier in this document. This is structured to assure that the trainee will gain exposure to entire expanse of vascular diseases in a progressive manner starting with basics in patient care in the beginning to treating complex vascular problems at the time of completion. The Syllabus has flexibility to allow changing trends in disease pattern and therapies, especially in rapidly progressing endovascular techniques. Care of vascular diseases is indeed challenging because of systemic involvement of variable degrees and the Syllabus

encourages exposure to other specialty fields impacting the vascular patients. Since the range of vascular diseases is quite wide, it is likely the trainee will develop special interest in an area in this vast specialty and he/she might seek further training in these chosen fields, even after completion of this course.

The following lists the “other” specialties the trainee preferably should possess at least basic knowledge. These can be in the same hospital or through another, preferably a teaching institution. The “postings” and the recommended length of posting can be varied at discretion of the course director. These can be spread over the three (3) years, again at the discretion of program director.

- i. Cardio thoracic surgery: mostly to gain experience in sternotomy, thoracotomy and surgical repair of intra thoracic and thoraco abdominal aneurysms and other problems relating to these vessels – 2 weeks
- ii. Radiology: To obtain basic knowledge and principles of CT and MR imaging including angiogram. It is assumed that conventional angiogram/DSA are a part vascular departmental training - 2 weeks
- iii. Proficiency in wound care, especially diabetic foot, venous ulcers, non-specific foot ulcers as these percolates towards vascular surgeons and most of the revascularization procedures are performed for ischemic foot. Able to perform amputations and rehabilitation of patients suffering from gangrene/limb loss due to vascular pathologies This could be within the vascular department itself or if sent for “outside posting” for the recommended duration – 2 weeks
- iv. Intensive Care: Exposure general (surgical) intensive care unit is very desirable as most vascular patients need ICU monitoring because of multisystem involvement – 2 weeks
- v. Rotation through other Vascular Units: Optional – rotation through another vascular Center of Excellence across the country – 4 weeks

The total time spent in the above would be maximum 12 weeks over the 3- year program, if some of the above rotations are utilized. To reiterate, some of these are already part of vascular units and may not need outside postings.

Interdepartmental Interactions with the following disciplines are recommended:

Cardiology, Radiology, Cardiac Surgery, Anesthesia/Pain management and all other super specialties.

VI. STRUCTURED, TIER SYSTEM OF TRAINING, EDUCATION AND COMPETENCE

This curriculum is formulated to provide the trainees with progressive, layered exposure and hands-on experience in treating vascular diseases. Required knowledge, competence and skills are graded as outlined below. The expected grades for each of the 3 years of training (divided in to 6 halves) are tabulated against subjects and areas in evaluation and therapy of vascular disease. This grading might also help in evaluating/assessing them at different stages of their training. It is assumed all are performed under guidance/presence of a Consultant Vascular Surgeon, who will also determine the scope and definition of simple, advanced and complex procedures. Grading also defines the level of knowledge required in other clinical and nonclinical aspects.

1. The Grading will be in 5 levels, L1 to L5
 - i. Level 0/1 (L-0/1): Not required to possess adequate knowledge, skills and proficiency, but desirable.
 - ii. Level 1 (L-1): Should possess basic knowledge, skills and proficiency to evaluate a patient, formulate basic therapeutic plan under supervision and perform minor procedures with assistance. Able to recognize complications
 - iii. Level 2 (L-2): Should possess complete "text book" theoretical knowledge of the disease, skills and proficiency to completely evaluate the patient, risk stratification, formulate appropriate diagnosis/differential diagnosis, order appropriate diagnostic tests in consultation with senior colleagues, able to perform listed procedures some independently and others with assistance/supervision, as determined by the consultant staff depending on individual skills. Able to recognize complications and provide initial diagnostic evaluation and therapy
 - iv. Level 3 (L-3): Should be adept in thorough evaluation of patients, thorough knowledge of the diseases, risk stratification. Advanced theoretical knowledge including recent advances from Journal and updates from national/international conferences. Able to order diagnostic work up independently, formulate treatment plan for the patient and present it to consultants. Able to perform procedures (simple and advanced) independently and assist in complex procedures. Able to assist junior colleagues with listed procedures. Able to treat complications, interventional or otherwise, along with senior staff.
 - v. Level 4 (L-4): In addition to level 3, able to perform parts of complex procedures and assist younger colleagues with advanced procedures.
 - vi. Level 5 (L-5): Proficiency in all of the above levels, to the level of a newly qualified consultant vascular surgeon i.e. Skills and knowledge adequate to be a vascular

specialist as an independent practitioner. However, it is understood that some complex interventions need continued training and mentoring even after completion of the DNB program and may continue to be performed under the supervision of an experienced Vascular Surgeon (>10 years' experience).

Period	0 to 6 months	6 to 12	12 to 18	18 to 24	24 to 30	30to 26	Comments
Section I	L2	L2	L2	L2	L2	L2	L2 in this category means full knowledge
Section II History of Vascular Surgery	L1	L2	L2	L2	L2	L2	L2 in this category means full knowledge
Section III Embryology of Vascular System	L1	L2	L2	L2	L2	L2	L2 in this category means full knowledge
Section IV Anatomy, physiology, pharmacology of vascular wall	L1	L2	L2	L2	L2	L2	L2 in this category means full knowledge
Section V Applied anatomy and surgical exposures of vascular system	L1	L2	L3	L4	L4	L5	
Section VI Epidemiology, general screening, surveillance and clinical analysis	L1	L2	L2	L2	L2	L2	L2 in this category means full knowledge
Section VII Hemostasis and thrombosis, hyper coagulable states	L1	L2	L2	L2	L2	L2	L2 in this category means full knowledge
Section VIII Pathology, pathogenesis, patho-physiology							L2 in the above category means full knowledge
Congenital anomalies	L1	L2	L2	L2	L2	L2	
Arteriogenesis, angiogenesis	L1	L2	L2	L2	L2	L2	

Atherosclerosis and thermogenesis	L1	L2	L2	L2	L2	L2	
Smoking & vascular diseases	L1	L2	L2	L2	L2	L2	
Diabetes vascular diseases, neuropathies	L1	L2	L2	L2	L2	L2	
Lipid metabolism & hyperlipidemia	L1	L2	L2	L2	L2	L2	
Hypertension	L1	L1	L1	L1	L1	L1	
Venous diseases- varicose veins, CVI, VTE	L1	L2	L2	L2	L2	L2	
Lymphedema	L1	L2	L2	L2	L2	L2	L2 in the above category means full knowledge
Section IX Medical management of vascular diseases	Each trainee should reach highest level of proficiency at the end of the program						
Diabetes& hypertension	L1	L1	L1	L1	L1	L1	
Smoking cessation	L1	L2	L3	L3	L3	L3	
Lipid lower in gagents	L1	L2	L3	L3	L3	L3	
Antiplatelets	L1	L2	L3	L3	L3	L3	
Anticoagulants thrombolytic	L1	L2	L3	L3	L3	L3	
Circulation enhancing drugs, exercise therapy	L1	L2	L3	L3	L3	L3	
Conservative management of venous disease	L1	L2	L3	L3	L3	L3	
Conservative therapy for Lymphedema	L1	L2	L3	L3	L3	L3	
Section X Hemodynamics of venous and arterial systems	L1	L2	L2	L2	L2	L2	L2 in the above category means full knowledge
Section XI Non-invasive	L1	L2	L2	L2	L2	L2	L2 in the above

physiological vascular testing (Vascular Lab)							category means full knowledge
Section XII Duplex Ultra-sonography	L1	L2	L3	L3	L3	L3	
Section XIII Vascular Imaging							
Conventional angiography, DSA, Radiation Safety & Physics	L1	L2	L3	L3	L4	L5	
MRI & angiography	L1	L2	L3	L3	L3	L3	
CT and angiography	L1	L2	L3	L3	L3	L3	
Section XIV Diabetic Foot Care & wound management							
Assessment – clinical (including classification) radiological, neuropathic, ischemic	L1	L2	L3	L3	L4	L5	
Biomechanics, orthotics, offloading techniques, prosthetics, rehabilitation	L1	L2	L2	L2	L2	L2	
Wound care of limbs-arterial, venous, other wounds	L1	L2	L3	L3	L3	L3	
Section XV Preoperative / procedural and follow-up care	Each trainee should reach highest level of proficiency at the end of the program						
Pre procedure assessment and management; regional blocks/local anesthesia	L1	L2	L3	L3	L4	L5	
Intra operative/procedural care	L0/1	L1	L2	L3	L4	L5	
Post-operative care	L1	L2	L3	L4	L5	L5	

Long term follow up (beyond 30 days) and surveillance	L1	L2	L3	L4	L5	L5	
Section XVI							
Vascular Complications							
Systemic complications: Cardiac, Respiratory, Renal, Others	L1	L2	L3	L3	L3	L3	
Local complications surgery: Infection, bleeding, thrombosis, anastomotic aneurysms, fistula	L1	L2	L3	L3	L3	L3	
Local complications: Endovascular- puncture site complications, thrombosis, dissection and other	L1	L2	L3	L3	L3	L3	
Local/regional complications- General: Intimal hyperplasia, Ischemia-reperfusion, aeroembolism compartment syndromes	L1	L2	L3	L3	L3	L3	
Vascular Conduits: Autologous venous/ arterial grafts, Allografts, Synthetic /pro esthetic grafts	L1	L2	L3	L3	L3	L3	
Endovascular Tools: Arterial access, guide wires, catheters, balloons, stents grafts	L1	L2	L3	L3	L3	L3	
Section XVII Vascular Techniques:	Each trainee should reach highest level of proficiency at the end of the program						

Open surgical - vein harvesting, suturing, anastomotic techniques, thrombo- embolectomy, bypass procedures, endarterectomy	L0/1	L1	L2	L3	L4	L5	
Endovascular – diagnostic, therapeutic	L0/1	L1	L2	L3	L4	L5	
Hybrid procedures	L0/1	L1	L2	L3	L4	L5	
Section XVIII Venous Diseases:	Each trainee should reach highest level of proficiency at the end of the program						
Venous thromboembolism: 1. Patho-physiology, natural history Diagnosis, prevention and all aspects of therapies	L1	L2	L3	L3	L4	L5	
Interventional therapy for VTE- thrombolytic, mechanical, surgical (including IVC filters)	L0/1	L1	L2	L3	L4	L5	
Section XIX Chronic Venous disorders & occlusion	Each trainee should reach highest level of proficiency at the end of the program						
Non operative treatment	L1	L2	L3	L3	L3	L3	
Varicose veins- surgical, edovenous other ablative procedures	L1	L2	L3	L4	L5	L5	
Venous obstruction- surgical, endovascular therapies	L0/1	L1	L2	L3	L4	L5	
Portal, mesenteric and other visceral venous	L0/1	L1	L2	L3	L4	L5	

disorders							
Section XX Vascular Malformation/anomalies							
Congenital: Classifications, natural history	L1	L2	L3	L3	L3	L3	
Therapeutic options- Conservative, surgical, endovascular	L1	L2	L3	L3	L4	L5	
Acquired AV fistula patho physiology, treatment	L1	L2	L3	L3	L4	L5	
Section XXI Hemodialysis access	Each trainee should reach highest level of proficiency at the end of the program						
General considerations, dialysis catheters	L1	L1	L2	L3	L3	L3	
Dialysis access procedures- techniques, complications, salvage of failing access	L1	L1	L2	L3	L4	L5	
Section XXII Non-atherosclerotic vascular diseases – vasculitis and uncommon arteriopathies, arteritis	L1	L1	L2	L3	L4	L5	
Section XXIII TAO/Buergers disease:	Each trainee should reach highest level of proficiency at the end of the program						
Classifications, risk factors, general considerations	L2	L3	L4	L5	L5	L5	
Surgical / interventional therapies, including	L2	L3	L4	L5	L5	L5	

thoracic and lumbar sympathectomies							
Medical (including vasoactive drugs, prostinoids) and cell-based therapies for TAO and other arterial diseases	L1	L2	L3	L4	L5	L5	
Section XXIV 1. Lower Extremity chronic arterial occlusive disease	Each trainee should reach highest level of proficiency at the end of the program						
General considerations- epidemiology, natural history including limb and patients, systemic risks and stratifications, classifications	L1	L2	L3	L3	L3	L3	L3 in this category means full knowledge
Diagnostic modalities, decision making, follow up protocols, outcome predictors and analysis	L1	L2	L3	L3	L3	L3	L3 in this category means full knowledge
Medical therapies- local, systemic, exercise programs, other including cell-based therapies	L1	L2	L3	L3	L3	L3	L3 in this category means full knowledge
Aorta iliac reconstruction- surgical, endovascular	L0/1	L1	L2	L3	L4	L5	
Femoral popliteal reconstructions- surgical and endovascular	L0/1	L1	L2	L3	L4	L5	
Infra popliteal reconstruction, including pedal vessels- surgical and endovascular	L0/1	L1	L2	L3	L4	L5	
Multilevel	L0/1	L1	L2	L3	L4	L5	

reconstructions							
Hybrid- combined surgical and endovascular procedures	L0/1	L1	L2	L3	L4	L5	
Post procedural surveillance, medical therapy, re-interventions	L1	L2	L3	L4	L5	L5	
Lower extremity debridement's and amputations at all levels	L1	L2	L3	L4	L5	L5	
Newer/Adjuvant therapies including hyperbaric oxygen, drug therapy, Art assist, emerging techniques etc.	L1	L2	L3	L4	L5	L5	
Section XXV Upper limb arterial diseases, including TOS							
General consideration including pathogenesis	L1	L2	L3	L4	L5	L5	
Revascularization- Surgical, Endovascular	L1	L2	L3	L4	L5	L5	
Vasospastic and other disorders	L1	L2	L3	L4	L5	L5	
TOS- Arterial, Venous, Neurogenic	L1	L2	L3	L4	L5	L5	
Section XXVI Vascular Trauma:							
Epidemiology, natural history, early evaluation in isolated and multiply injured patient, resuscitation	L0/1	L1	L2	L3	L4	L5	
Vascular trauma lower and upper extremities	L1	L2	L3	L4	L5	L5	

Vascular trauma head and neck	L0/1	L1	L2	L3	L4	L5	
Vascular trauma- trunk	L0/1	L1	L2	L3	L4	L5	
Section XXVII Acute limb ischemia	Each trainee should reach highest level of proficiency at the end of the program						
Clinical evaluation, assess etiology, diagnostic, staging, early therapy	L1	L2	L3	L4	L5	L5	
Surgical, endovascular, combined therapy, including intra procedural angiogram	L1	L1	L2	L3	L4	L5	
Prevention, diagnosis and treatment of reperfusion syndromes	L1	L2	L3	L4	L5	L5	
Post procedural therapy, surveillance	L1	L2	L3	L4	L5	L5	
Section XXVIII Abdominal aortic aneurysms	Each trainee should reach highest level of proficiency at the end of the program						
General consideration, evaluation and decision making	L0/1	L1	L2	L3	L4	L5	
Open surgical treatment	L0/1	L1	L2	L2/3	L2/3	L2/3	
Endovascular, hybrid procedures	L0/1	L1	L2	L2/3	L2/3	L2/3	
Emergency repair	L0/1	L1	L2	L2/3	L2/3	L2/3	
Section XXIX Thoracic aortic aneurysms and dissection	Trainee may require further exposure to high volume center or pursue further training						

General consideration, evaluation and decision making	L0/1	L1	L2	L2/3	L2/3	L2/3	
Open surgical treatment	L0/1	L1	L2	L2/3	L2/3	L2/3	
Endovascular, hybrid procedures	L0/1	L1	L2	L2/3	L2/3	L2/3	
Emergency repair	L0/1	L1	L2	L2/3	L2/3	L2/3	
Section XXX Peripheral and visceral aneurysm							
Extermity aneurysms	L0/1	L1	L2	L3	L4	L5	
Visceral aneurysms	L0/1	L1	L2	L3	L4	L5	
Infected/mycotic aneurysms	L0/1	L1	L2	L3	L4	L5	
Other aneurysms- connective tissue related, anastomotic, pseudoaneurysms, mural ulcers	L0/1	L1	L2	L3	L4	L5	
Section XXXI Cerebrovascular diseases							
General considerations, evaluation	L0/1	L1	L2	L2	L2	L2	L2 in this category means full knowledge
Decision making and medical therapy	L0/1	L1	L2	L2	L2	L2	L2 in this category means full knowledge
Carotid endarterectomy	L0/1	L1	L2	L3	L4	L4	Trainee may require further exposure to high volume center or pursue further

							training
Carotid stenting	L0/1	L1	L2	L2	L3	L4	
Other supra aortic arch diseases	L0/1	L1	L2	L2	L3	L4	
Carotid body tumors	L1	L2	L3	L4	L5	L5	
Section XXXII Mesenteric vascular diseases							
General considerations – etiology, pathophysiology, evaluation- clinical diagnostic	L1	L2	L3	L3	L3/4	L4/5	
Acute mesenteric ischemia diagnostic approaches and intervention (surgical, endovascular)	L1	L2	L3	L3	L3/4	L4/5	
Chronic mesenteric ischemia – general considerations, diagnostic approaches and interventions (surgical, endovascular)	L1	L2	L3	L3	L3/4	L3/4	
Section XXXIII Renovascular disease- diagnosis, interventions	L1/0	L1	L2	L2	L3	L3	
Section XXXIV Lymphedema – Diagnosis and management	L1	L2	L3	L3	L3	L3	
Section XXXV Miscellaneous	L2 in this category means full knowledge						

Biostatistics, Research Methodology and Clinical Epidemiology	L1	L2	L2	L2	L2	L2	
Ethics and medico legal aspects relevant to vascular diseases and treatment	L1	L2	L2	L2	L2	L2	
Health policy issues relevant to vascular diseases	L1	L2	L2	L2	L2	L2	

VII. LOG BOOK

The logbook maintained by the candidate in DNB-VES should comprehensively reflect the various aspects of training throughout the 3-year course, with documented evidence in the following:

- i. Complete profile of the candidate
- ii. Complete documentation of candidates work-performance in the Operating Theaters (OTs)/Cath Lab (Endovascular procedures)
- iii. Document the “in-house teaching” programs attended by the trainee
- iv. A separate section in the log book documenting Non Invasive and Duplex Scan performed should be added.
- v. The procedure performed in OT/Cath lab should be in the below mentioned format and written chronologically

S. No.	Procedure	Observed	Assisted	PA (Performed under Assistance)	PI (Performed Independently)

The serial numbers will be continuous and a summary of procedures participated will be mentioned at the end of each month and year during the period of training. The summary of cases will be as follows at the end of the month/year:

- i. Aortic

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- ii. Arteries
 - iii. Venous
 - iv. AV Access
 - v. Amputations/Debridement
 - vi. MISC

- Document the studies/articles submitted and accepted in peer reviewed journals
- List the presentations (papers and/or posters) presented and/or accepted in national international vascular/surgical or other conferences
- List other academic activities – e.g., Workshops attended/conducted
- The logbook should be certified by the concerned postgraduate teacher
- / Head of the department / senior consultant.
- This logbook shall be made available to the board of examiners for their perusal at the time of the final examination.
- Every candidate, at the time of practical examination, will be required to produce performance record (logbook) containing all details outlined above
- In the absence of production of logbook, the result will not be declare

VIII. RECOMMENDED TEXT BOOKS AND JOURNALS

- a. Vascular Surgery: 8th Edition. Rutherford R.B.(Ed.)/ latest edition
- b. Vascular and Endovascular Surgery Wesley Moore – 8th edition
- c. Vascular and Endovascular Surgery: 4th Edition. Beard J.D., Gaines P.A. (Eds) Saunders Elsevier2009
- d. Comprehensive Vascular and Endovascular Surgery: 2nd Edition. HalletJ.W., Mills J.L., Earnshaw., ReekersJ.A.,
- e. Rooke TM (Eds), Mosby Elsevier, 2009
- f. Venous diseases by American Venous Forum Edited by edited by PeterGloviczky
- g. The Vein Book. Bergan J. J. (Ed.) Elsevier, 2007
- h. Diabetic Foot – Levine &O'Neil
- i. Yearbook of Vascular & Endovascular Surgery 2016– R. Sekhar, Jaypee brothers
- j. “A Practical Approach to Vascular & Endovascular Surgery”– Jaisom Chopra, V.S.Bedi; Jaypee brothers,2016
- k. Approaches to Vascular Surgery- Rutherford 9th Edition
- l. Haimovici's Vascular Surgery, 6th Edition

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- m. Endovascular Skills: Guidewire and Catheter Skills for Endovascular Surgery, Fourth Edition - Peter A. Schneider

JOURNALS

- a. Indian Journal of Vascular and Endovascular Surgery
- b. Journal of Vascular Surgery
- c. European Journal of Vascular and Endovascular Surgery
- d. Annals of Vascular Surgery
- e. Circulation
- f. Journal of Vascular & Endovascular Therapy
- g. Seminars in Vascular Surgery



आयुर्विज्ञान में राष्ट्रीय परीक्षा बोर्ड
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