

UNIVERSITY OF MUMBAI
No.UG/ 289 of 2005

CIRCULAR :

A reference is invited to the Ordinances, Regulations and syllabi relating to the M.S. and M.Ch. degree course vide pamphlet No.183 and the Deans of the affiliated Medical Colleges and Heads of the recognized institutions concerned are hereby informed that the recommendation made by the ad-hoc Board of Studies in Surgery and Allied subjects at its meeting held on 18th January, 2005 has been accepted by the Academic Council at its meeting held on 5th February, 2005 vide item No.4.11 and that in accordance therewith the syllabi in the branch of Surgery (1) M.Ch. degree in Paediatric Surgery, (2) M.Ch. degree in Cardio-Thoracic Surgery (3) M.Ch. degree in Urology of Genito-urinary Surgery and (4) M.S. and D.O. in Ophthalmology at the M.S. and M.Ch. degree course has been revised as per Appendices A, B, C & D and that the same will be brought into force with effect from the academic year 2005-2006.

Mumbai 400 032

14th July, 2005

To.

for REGISTRAR.

The Deans of the affiliated medical colleges and Heads of the recognized institutions concerned.

A.C. 4.11.05.02.05

No.UG/ 289-A of 2005

14th July, 2005

Copy forwarded with compliments to the Dean, Faculty of Medicine, for information.

Copy to :

for REGISTRAR.

The Director, Board of College and University Development, Deputy Registrar (Eligibility and Migration), the Director of students Welfare, the Personal Assistants to the Vice-Chancellor, the Pro-Vice-Chancellor, the Registrar and the Assistant Registrar Administrative sub-centre, Ratnagiri, for information.

The Controller of Examinations (10 copies), the F. & A.O. (Accounts Section), Fort (2 copies), Record Section (5 copies), Publication Section (5 copies), D.R., Enrolment (2 copies), D.R. (Statistical Unit), D.R., Accounts Section, Vidyanagari, (2 copies), D.R. (Affiliation Section) (2 copies), A.R., A.A. Unit (2 copies). He is requested to treat this as action taken report on the concerned resolution adopted by the Academic Council Management Council referred to in the above Circular and that no separate A.T.R. will be sent in this connection. A.R., CONCOL (1 copy), BUCTU (2 copies), In-charge, Central Computing Facility (1 copy), D.R., I.D.E. (10 copies), D.R., P.R.O., (2 copies), Supdt., Thesis Section (2 copies), Supdt., P.G. Section (2 copies), ELCTU (1 copy), Secretary, MHTSA, (1 copy).



APPENDIX - A

UNIVERSITY OF MUMBAI

REVISED SYLLABUS

FOR

M.Ch. DEGREE

IN PAEDIATRIC

SURGERY

(with effect from the academic year 2005-2006)

SYLLABUS FOR M Ch (PAEDIATRIC SURGERY)

1. **History** : birth and growth of Paediatric Surgery – overseas and in India; Percival Potts; Max Wilms; Harold Hirschsprungs; William Ladd; Oliver Swenson; Duhamel; Soave; Denis Brown; John Duckett; Hardy Hendren; Asopa; Malone; Birth and development of laparoscopic surgery in Paediatric Surgery; Robert Jeffs; Pena; Douglas Stephens.
2. **Genetics** : dysmorphology; principles of genetics; tests for assessment; genetic disorders with surgical malformations; chromosomal aberrations; antenatal counseling; fetal surgery; prenatal diagnosis and therapeutics; fetal sampling.
3. **Anatomy and embryology** : development of a fetus; differentiation of sex; anatomy of a newborn, infant, child; development of diaphragm; ano-uro-genital tract development and descent of testis; ventricular system and CSF circulation; development of tracheo-esophageal tubes and GE junction; development of small bowel, urinary bladder, kidney and ureters, vertebral column.
4. **Physiology** : deglutition; GE junction; gastric emptying and its problems; bilirubin metabolism; coagulation cascade; micturition, defecation; CSF circulation; deep tendon reflexes.
5. **Teratology** : Principles; teratogens.
6. **Fluid and electrolyte management of fetus, newborn, infant and a surgical child; acid base balance.**
7. **Management of a critically ill child** : invasive and non invasive monitoring, principles of shock.
8. **Anesthesia** : types of anesthesia; perianesthetic management; principles of pediatric anesthesia; regional anesthesia; control of post operative pain; newer drugs available.
9. **Respiratory support** : causes of ventilatory failure; respiratory support options and techniques; types of ventilators; principles of ventilatory support; complications of ventilatory support; acute and chronic respiratory failure; ECMO.
10. **Surgical Infections** : causes, components; immunodeficiency states; AIDS; neonatal sepsis; antibiotics; B-Cell; T-Cell; complement, phagocyte deficiency states.
11. **Nutrition** : assessment; requirements; metabolic responses to stress; enteral feeding; TPN; gastrostomies; enterostomies; short gut syndrome; home parenteral nutrition.
12. **Hematological diseases in surgery** : hemolytic and non-hemolytic anemias; thrombocytopenic purpura; ITP; hereditary spherocytosis; transfusion therapy; blood components; blood substitutes.
13. **Parasitology** : entamoeba histolytica, ascaris lumbricoides, echinococcus granulosus; ankylostoma duodenale; bilharziasis; elephantiasis.

14. **Imaging modalities** : plain x-rays, ultrasonography; IVP; MCU; barium studies; color Doppler; DTPA, DMSA; MAG 3 scan; PET scan; milk scan; manometry; MRI, CT scan.
15. **Trauma** : assessment and management of a child as an accident victim; triage and principles of stabilization; child abuse; blunt and penetrating thoracic trauma; blunt and penetrating abdominal trauma; genito urinary injuries; soft tissue injuries; principles of management of skeletal injuries; hand injuries; snake and insect bites; head and spinal cord injuries; vascular injuries; birth injuries; burns.
16. **Malignancies** : incidence; common tumors; principles of management of solid tumors; principles of chemotherapy; newer drugs available; radiotherapy for solid tumors; Hodgkin's and Non-Hodgkin's lymphoma; teratomas, rhabdomyosarcoma; neuroblastoma; Wilms tumor; liver tumors; ovarian tumors and cysts; testicular tumors; round cell sarcomas; PNET; bone tumors; brain and spinal cord tumors.
17. **Transplantation** : kidney; liver; pancreas; intestine; parathyroids; cadaver organ transplantation; multi organ transplant.
18. **Head and neck** : congenital cataract; obstructed lacrymal duct; surgery for eyelids; retinoblastoma; craniofacial anomalies; congenital anomalies of nose; nasal trauma; tumors of nose; cleft lip and cleft palate; surgery of tonsils and adenoids; choanal atresia; principles of treatment of hearing impairment; laryngeal cleft; salivary glands; congenital anomalies of lip; injuries of lip; vascular malformation of lip and jaw; infection of jaw; lesions of tongue and oral cavity; oro-cervico-pharyngeal teratomas; cervical lymphadenitis; congenital problems of thyroid gland; thyroiditis and malignancies of thyroid gland; goiter; diseases of parathyroids; cystic hygromas; cysts and sinuses in the neck; torticollis; cervical esophagostomy; carotid body tumor.
19. **Diseases of breast** : congenital anomalies; inflammatory diseases; diffuse and localized enlargement of the breast; breast mass.
20. **Chest wall** : congenital deformities; absence of ribs; depression-protrusion deformities; Poland's syndrome; tumors of chest wall.
21. **Congenital diaphragmatic hernia**
22. **Cysts and tumors in the mediastinum**
23. **Bronchoscopy**
24. **Lesions of larynx and trachea**: tracheostomy; tracheal reconstruction.
25. **Congenital malformation and neonatal problems of respiratory tract** : obstructions of upper and lower airways; lobar emphysema; pulmonary lesions; pulmonary agenesis; and aplasias.
26. **Lung cysts, sequestration, and bronchopulmonary dysplasia.**
27. **Chylothorax**
28. **Suppurative , mycobacterial, parasitic infections of lung, pleura and mediastinum** : empyema; esophageal perforation.
- 28a. **Thoracoscopy**
29. **Tumors of lung**

30. Esophagoscopy; esophageal atresia and associated malformations; congenital stenosis and corrosive strictures of esophagus, GER, neuromotor dysfunction; replacement of esophagus.
 31. Umbilical embryology, umbilical diseases; umbilicus as therapeutic portal, omphalocele, exomphalos major and minor; gastroschisis; cloacal exstrophy;.
 32. Inguinal hernia and hydrocele
 33. Undescended testis.
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34. Stomach and its related conditions : IHPS; peptic ulcer; volvulus; perforations; bezoars; microgastria; gastrostomy.
 35. Duodenum : atresias; stenosis; annular pancreas.
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36. Jejunoileal atresia and stenosis.
 37. Meconium ileus and cystic fibrosis.
 38. Meckel's diverticulum.
 39. Intussusception.
 40. Intestinal malrotation : bands and adhesions – congenital and post operative.
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41. Gastrointestinal endoscopy
 42. Laparoscopy
 43. G I bleeding.
 44. Foreign bodies and bezoars and alkaline disc batteries
 45. Duplications of GI tract
 46. Mesenteric and omental cysts
 47. Ascites : fetal; chylous; pancreatic, biliary, urinary, ovarian.
 48. Meconium peritonitis
 49. Polypoid disease of the GI tract
 50. Necrotizing enterocolitis
 51. Ulcerative colitis
 52. Primary peritonitis
 53. Ileostomy and colostomy.
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54. Atresia, stenosis and other obstructions of the colon
 55. Appendicitis

56. **Hirschsprungs disease and its management**
 57. **Neonatal intestinal dyskinesias, neuropathies and myopathies of the colon; total colonic aganglionosis.**
 58. **Colorectal tumors**
 59. **Anorectal malformations**
 60. **Constipation, incontinence, prolapse and anorectal trauma**
 61. **The jaundiced infant and biliary outflow obstruction**
 62. **Choledochal cyst; benign and malignant liver and gallbladder tumors.**
 63. **Cholecystitis and cholelithiasis**
 64. **Portal hypertension : Budd Chiari syndrome; hepatic venous outflow obstruction**
 65. **Pancreas : hypoglycemia; MEA; pseudocyst and tumors of pancreas; pancreatitis.**
 66. **Spleen : functions; post splenectomy sepsis; trauma; techniques of resection.**
 67. **Adrenal gland : physiology; pheochromocytoma; cortical lesions; adrenal insufficiency; hyperaldosteronism; secretory tumors.**
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68. **Cystic diseases of kidney; dysplasia and agenesis of kidney**
69. **Renal fusions and ectopia.**
70. **Congenital and acquired pelviureteral junction obstructions**
71. **Duplications and ureterocele.**
72. **Megaureter.**
73. **Vesico ureteral reflux; posterior urethral valves; anterior urethral valves; urethral duplication; megalourethra.**
74. **Prune belly syndrome.**
75. **Neuropathic bladder and enuresis.**
76. **Urodynamics.**
77. **Exstrophy of urinary bladder.**
78. **Diversions and undiversions.**
79. **Augmentation and bladder substitution.**
80. **Hypospadias and abnormalities of urethra.**
81. **Epispadias.**
82. **Abnormalities of penis and scrotum.**
83. **Abnormalities of female genital tract.**
84. **Ambiguous genitalia.**

85. Varicocele and other abnormalities of testis.
86. Testis : tumor; torsion and other abnormalities.
87. Cyanotic and acyanotic congenital heart diseases and its correction.
88. PDA; aortic coarctation; right sided aortic arch; vascular rings.
89. Spina bifida and hydrocephalus.
90. Tumors of brain.
91. Osteomyelitis and abscesses in the brain.
92. A V malformations in the brain.
93. Causes of raised intracranial pressure in the brain.
94. Bone and joint infections.
95. Amputations.
96. Hamartomatous lesions of skin; pigmented soft tissue lesions; tumors of muscle tissue origin.
97. Neurofibromatosis.
98. Lymphatic disorders : lymphangioma; cystic hygroma; mesenteric cyst; chylous ascites; intestinal lymphangiectasia; lymphedema.
99. Hemangiomas and AV malformations.
100. Congenital anomalies of veins.
101. Congenital malformations of arteries.
102. Reno vascular hypertension.
103. Peripheral vascular ischemia; compression syndromes.
104. Lasers in pediatric surgery.
105. Monoclonal antibodies and relevant immunology.
106. Relevant neonatology : acid base balance; jaundice; kernicterus; exchange transfusion; hypoglycemia; hypomagnesemia; hypocalcemia.

Apart from these other relevant topics from the following text books must be studied:

Text books: 1. Pediatric Surgery (Benson's) Vol 1 & 2: Eds:- James A. O'Neill

2. Rickham's Neonatal Surgery

Reference: 1. King and Kellali's Paediatric Urology

2. Text Book of Neonatal Surgery by Dr. D. K. Gupta

3. Prem Puri's Neonatal Surgery

Structured Training Programme

It should include active participation of the candidate in clinical ward rounds, attending out Patients and emergencies and involving in the pre and post operative care of the newborns and children.

During the 1st year- assisting major and minor operative procedures under guidance of senior colleagues/ faculty members.

During the 2nd year – independent minor work.

During the 3rd year- independent performance/participation in major work including neonatal surgery under the supervision of the faculty staff member.

Inter – departmental Participation

Neonatology and pediatrics: rotation for 1 month during the 1st year training program.

Radiology: participation on procedures like MCU, barium studies, percutaneous Nephrostomy, angiography, cine studies etc. through the period of training,

Neurosurgery and Plastic surgery: by rotation for 1 month each in case the subspecialties exist in a particular center.

Visit to a particular center for 2-3 months for observation and orientation course in neonatal surgical ICU if the facilities for this are not available in a particular center.

Academic Activities

To have regular academic activities like seminars, Journal Club discussions, Symposia and case discussions, adequate arrangements should include having a seminar room with adequate audio visual facilities for active participation and mutual discussions. A weekly teaching program should have minimum a seminars, journal club clinical case discussions and review of the morbidity and mortality (if any). Special attention must be given for recording the patient's information in detail.

A weekly faculty- resident meeting may be over a cup of coffee, is strongly recommended for exchange of views, discussing non academic matters (administrative) and other difficulties and also to understand each other well.

Assessment

The committee recommends that the candidates receiving training in pediatric surgery should be assessed at regular intervals preferably at the end of each year for the clinical interest, the acumen and the theoretical knowledge obtained during the period. Candidates should be suggested (allowed) to appear in the final examination only after the approval of the teaching faculty member.

Maintenance of the logbook

The committee recommends that the candidates must maintain a logbook for the various operative procedures he/she has assisted and performed, either independently or under the supervision during the training program. This log book should be countersigned from time to time by the supervisor/guide.

Research

Research is an integral part of the training program.

A. Clinical research

The committee members have found it difficult to recommend /establish a uniform pattern for conducting research during the MCh training program. On one hand, some of the centers have desired to completely abolish the thesis writing during the clinical training period, the others have strongly felt to continue not only the clinical research but provide an exposure to the experimental work also. The committee recommends that the candidate should be asked to conduct one of the followings during his 3 year training period:

- a. Publish 2 clinical research papers (not the case reports) in the indexed journals.
- b. Attend 2 conferences, workshops, symposiums; one of them should be National/International.
- c. Present two papers during the National / International conferences.
- d. The existing practice of thesis writing should continue as desired by the center.

B. Experimental animal facilities

As the facilities for conduction the experimental work are presently limited only to a few centers in India, the necessity to conduct an experimental work may remain optional with the center. However, an exposure to the experimental work widens the thinking horizon during the training program. The IAPS Committee recommends that the more and more centers should strive hard to create an animal lab and provide a unique opportunity to the candidates to handle the small animals and perform experiment work.

Final assessment and award of the MCh degree

The MCh degree in pediatric surgery should be awarded only after three year of training. This should follow after an extensive assessment by a competent and unbiased board consisting of at least 4 teaching staff members (2 internal and 2 external), assessing the clinical and the theoretical knowledge and competence of the candidate. All the committee members are in agreement of the opinion of all the centers, suggesting not to allow/continue the practice of conducting the operative exercise as a part of final MCh examination.

The current practice of conducting operative procedure during the final assessment of the MCh training program is practiced only in a few teaching centers, is likely to jeopardize the safety of

the patient under the trying condition of the candidate. The performance of the candidate is also unnecessarily put under undue stress.

The committee recommends that the assessment of the operative competence of the candidate should be based on the considered judgment of the concerned teaching faculty members, and suggests the centers to abolish the practice of operative procedure, if any, being currently followed.

CURRICULUM FOR THE MCh TRAINING PROGRAM

A. Operative surgery

The basic requirement for the minimal operative experience required during the 3 year training program are outlined here below. The operative experience would be acquired through progressively graded surgical responsibility starting from the investigative, history writing, preoperative and the postoperative management to the assisting surgery (initially in infants and children and then the newborns during the first and the second year of training. The logbook should have nearly the following number of operative procedures;

- 1. All indexed neonatal surgical cases; n=100**
 - a. Esophageal atresia and TEF
 - b. Anorectal malformations (low and high)
 - c. Exomphalos and gastroschisis.
 - d. Duodenal atresia/obstructions.
 - e. Hirschsprungs disease (colectomy, primary pullthrough)
 - f. Neonatal necrotizing enterocolitis.
 - g. Spina bifida and hydrocephalus.
 - h. Intestinal obstruction (atresia, malrotation and stenosis).
 - i. Congenital hypertrophic pyloric stenosis.
 - j. Meconium ileus and intestinal volvulus.
 - k. Neonatal tumors.
 - l. Neonatal surgical jaundice.
- 2. Gastrointestinal surgical problems; n=100**
 - a. Colostomy making and closure
 - b. Esophageal replacement.
 - c. Anti GERD surgery.
 - d. Gastrostomy.
 - e. Pull-through procedures for ano-rectal malformations.

- f. Pull-through procedures for Hirschsprung's disease.
- g. Intestinal obstruction, resections.
- h. Ileostomy making and closure.
- i. Intussusception.
- j. Splenectomy.
- k. Patent vitellointestinal duct anomalies.
- l. Umbilical hernia.
- m. Appendectomy.
- n. Laparoscopy (diagnostic and therapeutic)
- o. Biliary atresia.
- p. Choledochal cysts.
- q. Surgery on the pancreas, (pancreatitis, tumors, pseudocysts).

3. Pediatric urological cases; n=100

- a. Pyelolithotomy.
- b. Pyeloplasty.
- c. Ureteric reimplant.
- d. Ureterolithotomy.
- e. Ureterostomy.
- f. Cystolithotomy.
- g. Cystoscopy.
- h. Nephrectomy.
- i. Nephrostomy.
- j. Orchidectomy for tumors, exploration.
- k. Partial nephrectomy.
- l. Posterior valves, fulguration.
- m. Urinary diversion with colon conduit, ureterosigmoidostomy.
- n. Urinary undiversions.
- o. Operation for torsion of testis.
- p. Circumcision.
- q. Orchidopexy.
- r. Hypospadias repair.

4. Pediatric thoracic cases; n=100

- a. Esophageal dilatation.
- b. Foreign body removal.
- c. Esophagoscopy.
- d. Bronchoscopy and foreign body removal.
- e. Pleural drainage.
- f. Pulmonary resection.
- g. Thoracostomy for excision of duplication cyst, cam.
- h. Thoracotomy for tumor excision.
- i. Pneumonectomy.
- j. Decortication and pleural toilet.

5. Pediatric oncological cases; n=20

- a. Hepatoblastoma.
- b. Neuroblastoma.
- c. Rhabdomyosarcoma.
- d. Wilms nephrectomy.
- e. Adrenal tumors, sacrococcygeal teratomas.
- f. Ovarian tumors.
- g. Testicular tumors.
- h. Soft tissue sarcoma.
- i. Miscellaneous and other rare tumors.

6. Pediatric endoscopic procedures; n=50

- a. Cystoscopy, bronchoscopy, esophagoscopy

7. Pediatric laparoscopic procedures; n=20

- a. Diagnostic and therapeutic.

8. Pediatric plastic surgical cases; n=50

- a. Hypospadias, cleft lip and palate.

9. Pediatric neurosurgical cases; n=50
a. Spina bifida, hydrocephalus

10. General pediatric surgical cases; n=50

a. Undescended testis.	20
b. Inguinal hernia.	20
c. Circumcision.	10
d. Cut downs, abscess drainage, others.	20
e. Thyroglossal cysts.	05
f. Excision of lymphangiomas.	05

B. Non-operative areas of training

Not only the operative but the non-operative component of the structured MCh training program in pediatric surgery is also equally important and should include the following:

1. Technique of resuscitation of newborn and children.
2. Antenatal diagnosis and counseling (intervention if possible).
3. Orientation with internet and computer technology.
4. Management of day-care surgery.
5. Health economics, junior and senior staff management.
6. Pediatric transplants (liver, kidney, pancreas, intestine, lungs and heart).
7. Maintenance of case records and the library search.
8. Surgical embryology, genetics, and gene therapy.
9. Pediatric chemotherapy regimens for solid tumors.
10. Problems of babies with prematurity and small for date.
11. Physiology of the newborn and the drug schedules for the newborns, and blood exchange transfusions.
12. National health programs, progress and current strategies.
13. Organizational capabilities to host conferences, symposia, workshop etc.
14. Membership of national and international pediatric surgical associations and subscribing to the established journals in the specialty.
15. Knowledge about the progress made in pediatric surgery during the past few decades. (transplants, endoscopy, lasers, laparoscopy, tumor markers, antenatal diagnosis, gene therapy).

REQUIREMENTS FOR THE MCh TRAINING PROGRAMS IN PEDIATRIC SURGERY

The IAPS committee recommends the specialist centers to have the following so as to run a smooth and purposeful MCh training program in pediatric surgery in India. These include:

1. Teaching staff with adequate qualifications, experience, teaching and research interest. The IAPS recommends a team of 4 pediatric surgeons, a pediatric urologist, a radiologist, and at least 2 anesthesiologists to provide adequate cover in pediatric surgery to a population of 1 million in India. The British Association presently recommends a pediatric surgical specialist center for a population of 5 lakh people to provide effective health care.
2. A 1:2 teacher: trainee ratio is adequate is hereby recommended.
3. Availability of other teaching /postgraduate courses running concurrently in the center for interdepartmental interactions and discussions with pediatricians, neonatologists, intensivists, cardiologists, nephrologists, radiologists and the anesthesiologists.
4. Possibility of availability of stipends to all candidates, if they are not from the in-service training program, for the continuity of the residency program throughout the period of the course with dedication.
5. Provision for residential accommodation for the entire period of training near the place of working.
6. Opportunities for teaching the undergraduates and the postgraduates and training the people from other disciplines (nurses, technicians, and other paramedical staff).
7. Adequate space for indoor and OPD patients, operating room, day care surgery and minor procedures. Parents and the attendants should also get some place to stay so to have an unhindered access to their patients.
8. Adequate number of beds for pediatric surgical patients (newborns, children up to 12 years of age) with a minimum of 20 beds. A recommended bed ratio of 1:3 between pediatric surgery and pediatrics provides adequate work load to the pediatric surgical team.
9. Provision for intensive care unit (for post operative care, trauma care and resuscitation of the very sick child) and a neonatal surgical care unit (which may be in combination with that of the neonatal intensive medical care unit) for the indexed newborn surgical cases.
10. Supportive and trained staff (nurses, technicians and other paramedics) for the general pediatric and critical care.
11. The availability of the trained radiologist for the improvement in the diagnostic acuity and the trained anesthesiologist for decreasing the anesthesia related morbidity and mortality. These are critical in improvement of the outcome.
12. Availability of supportive services like the dietician, social worker, clinical psychologist. Chest physiotherapist and the play room managers.

13. Special instruments (established brands) and equipment like pediatric surgical diathermy (with neonatal size contact pads, and the electrical tips). Endoscopes and resectoscopes, laparoscopes, esophageal and urethral dilators and urodynamics machine and blood gas analyzer, ultrasonic aspirator) with argon beam spray /fulguration.
14. Sufficient number of textbooks (in pediatric surgery, urology, esophageal surgery, thoracic surgery, neurosurgery, endoscopy, laparoscopy and neonatal surgeries) and 4 Indian & international journals in pediatric surgery must be subscribed in the library, e.g.
 - a. Indian Journal of pediatric surgery-Calcutta.
 - b. PEDIATRIC SURGERY international-Switzerland.
 - c. Journal of pediatric surgery – USA.
 - d. Journal of European pediatric surgery-Netherlands
 - e. Pediatric Endosurgery and Innovative Techniques.

Apart from these the candidates should also get the exposure to the Indian journal of Urology, Indian pediatrics, Indian journal of pediatrics, and Indian journal of surgery to acquaint oneself with the spectrum of surgical and pediatric problems, ongoing research, drug trials, antibiotic sensitivity pattern and the other type of developments in the medical fields with in the country.

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APPENDIX - B

UNIVERSITY OF MUMBAI

REVISED SYLLABUS
FOR
M.Ch. DEGREE
IN CARDIO-THORACIC
SURGERY

(with effect from the academic year 2005-2006)

University of Mumbai

SYLLABUS FOR M. Ch. DEGREE IN CARDIO - THORACIC SURGERY

Goal: The M.Ch. course in Cardiovascular and Thoracic surgery is aimed at inculcating in the student a rational approach in management of patients with cardiovascular or thoracic ailments, by imparting sound knowledge of the subject and by teaching surgical skills to the post-graduate student.

Objectives: The following should be fulfilled to achieve the goal of the training program.

- 1) Diagnose cardiac, vascular and thoracic surgical problems based on clinical methods.
- 2) To interpret relevant investigations for the purpose of diagnosis
- 3) Be able to carry out routine & emergent surgical management for cardiac/vascular and thoracic surgical conditions
- 4) To keep abreast of the current knowledge and recent advances in the field.
- 5) To carry out research and publications in the field
- 6) To teach the undergraduate medical students and nursing, physiotherapy, occupational therapy and perfusion students.

COURSE OF STUDY

The course of study shall include the theory and applied aspect of:

legend *** : Must Know topic

** : Better Know topic

*: Nice to Know topic

Importance of a topic is decided depending up how frequently a student is likely to encounter it in day today practice.

- * : very uncommon = nice to know
- *** : very common = must know

1] Anatomy and Embryology: Applied anatomy of

- *** heart including cardiac valves , skeleton of heart, muscle arrangement, blood supply, venous drainage, nerve supply, morphology of cardiac chambers and septae ,structure of cardiac muscle
- *** aorta, major branches , arteries involved in collateral supply in chest , arteries used as conduits
- *** vena cave and their tributaries.
- *** trachea ,bronchi and lungs ; pulmonary arteries
- *** mediastinum and mediastinal structures
- *** thoracic esophagus
- *** diaphragm
- *** structure and function of a gene
- ** rest all the anatomy related to heart, lungs and systemic blood vessels

2] Physiology:

The Heart

- * basic physics of membrane potential ,action potential
- *** myocardial action potential,
- *** energy for contraction of cardiac muscle,
- *** cardiac cycle
- *** regulation of cardiac function
- *** rhythmic excitation of heart,
- *** Myocardial metabolism , -- under various conditions(full /empty beating, fibrillating, cold, arrested state
- * skeletal & smooth muscle contraction , difference from the myocardium

Circulation

- *** Physics of blood , blood flow and pressure
- *** Physical characteristics of the systemic circulation and function of large and small arteries ,arterioles, capillaries and veins.
- *** control of blood flow to individual organs (brain, heart, kidneys)
- *** arterial pressure control : rapid and long term control
- *** cardiac out put , venous return & their regulation
- *** Pulmonary circulation
- *** coronary circulation
- *** cardiac failure and circulatory shock

Respiration`

- ***Mechanism of pulmonary ventilation, pulmonary volumes and capacity functions of respiratory passageways
- *** physical principle of gas exchange & diffusion of O₂ & CO₂.
- ***transport of O₂ & CO₂ in blood.
- ** regulation of respiration

****Body fluids , Kidneys and Acid base balance**

**** Metabolism**

CNS

***brain waves,**

*****thoracic autonomic system**

**** Basic characteristics of sympathetic and parasympathetic function**

Hypothermia

***** Core temperature and surface temperature, Insulator system of body, heat transfer from body core , heat production and loss, regulation of body temperature , isotherms and poikilotherms
Effect on metabolic rate, heart, circulation, blood viscosity, ions, hormone release, solubility of blood gases, pH changes, SVR/PVR**

3] Bacteriology, Virology, Parasitology & immunology :

***** Streptococci , Staphylococci, Common gram negative bacteria**

***** Mycobacteria**

***** Aspergillosis and fungi affecting heart and cardiac valves.**

***** immunology relevant to heart and lung transplantation**

***** life cycle of Echinococcus**

***** HIV virus**

4] Pathology:

***** General pathology required to understand specific pathology:
degeneration, infarction, necrosis, stunning, hibernation**

***** gross and microscopic pathology of**

1) rheumatic heart disease

2) syphilitic heart disease

3) tuberculous heart disease

4) atherosclerotic cardio vascular disease

5) cardiac myxoma

6) suppurative lung diseases

7) hydatid disease of lung

8) pulmonary tuberculosis

9) benign tumors of lung

10) carcinoma of lung

11) Medistinal tumors and Thymic hyperplasia and Thymomas.

12) CHD: (including the anomalies and variants associated with)

ASD, VSD, AV canal, PDA, AP window, RASOV, TOF,

Pulmonary atresia , TAPVC, Tric.atresia, Single Ventricle

physiologies, Transposition complexes, Truncus arteriosus

Ebsteins anomaly, Pulmonary stenosis , aortic stenosis,

coarctation of aorta,

13) HIV related infections

- 14) Burger's disease
- 15) specific and non specific aorto arteritis
- ** gross and microscopic features of
 - 1) valvular heart diseases not covered above
 - 2) cardiomyopathies
 - 3) benign and malignant diseases of pleura
 - 4) benign and malignant tracheal tumors
 - 5) benign and malignant tumors of esophagus
 - 6) cardiac tumors other than myxoma
 - 7) CHD : not covered in the above list

5] Pharmacology:

*** antibiotics , antitubercular , antifungal and antiviral drugs

*** Pharmacology of drugs used in the treatment of

- 1) congestive cardiac failure
- 2) hypertension
- 3) angina pectoris
- 4) peripheral vascular disease
- 5) acidbase imbalance
- 6) supra ventricular and ventricular arrhythmia
- 7) chemotherapy of CA lung

*** Pharmacology of drugs used as

- 1) oral and parenteral anti coagulants, antiplatelet agents, fibrinolytic agents, antidotes for –
- 2) bronchodilators , mucolytics
- 3) systemic and pulmonary vasodilators ,
for conduit dilators
vasoconstrictors
- 4) diuretics

*** adenosine , antifibrinolytics, serine protease inhibitors,
constituents of cardioplegia , Free radical Oxygen Scavengers

** immunosuppressants used in heart lung trans plant

** drugs used in pre-anesthetic medication and anesthesia

Cardio – Thoracic Surgery

- 1 * Function of the gas Exchange System and its Evaluation
- 2 * Anesthesia for CardioThoracic surgery.
- 3 *** Postoperative Care and complications in CardioThoracic surgery .
- 4 ** Ventilatory assistance and support. Respiratory support in infants

- 5 *** shock : types, diagnosis ,management. Cardio pulmonary resuscitation.
- 6 *** Use of Antibiotics in Cardiac and Thoracic Surgery
- 7 ** Computer Application in Cardio thoracic Surgery.
- 8 *** Thoracic Incisions, complications of incision including sternal dehiscence
- 9 *** Thoracic trauma.
- 10 ** Pulmonary resection Anatomy and Techniques.
- 11 ***Thoracic Imaging.
- 12 ** Esophagoscopy
- 13 ** Bronchoscopy: trans bronchial biopsy and bronchoalveolar lavage.
- 14 ** Thoracoscopy : general principles, diagnostic & therapeutic procedures
- 15 * Developmental Abnormalities of the airways and lungs
- 16 ***sequestration of lung,
- 17 * Surgical treatment of the Bullous Emphysema.
- 18 ***Diagnosis of Benign, diffuse Pulmonary Disease.
- 19 ***Pneumonia, Bronchiectasis, and lung abscess.
- 20 ** Thoracic infections caused by Actinomyces, Fungi, Opportunistic organisms, and Echinococcus.
- 21 ***Surgical treatment of tuberculosis
- 22 * Molecular biology and immunology of lung and esophageal cancer.
- 23 ** Benign tumors of the lower respiratory tract.
- 24 *** Lung carcinoma :diagnosis, staging, surgery for- ,limited pulmonary resection, bronchoplastic techniques for
- 25 ** Multimodality Therapy of Carcinoma of the Lung: Irradiation, Chemotherapy, and Immunotherapy.
- 26 * Indications for Resection of Pulmonary Metastases.
- 27 ** Thoracic disorders in an immunocompromised host
- 28 ** Pulmonary embolism acute & chronic
- 29 ** Pulmonary AV fistule
- 30 * Lung Transplantation.
- 31 ** Benign & Malignant Disorders of Pleura
- 32 *** Pleural Space Problems & Thoracoplasty
- 33 ***Thoracic Outlet Syndrome
- 34 ** Chest wall & sternal abnormalities & management of chest wall tumours
- 35 * Diaphragm : developmental, traumatic, neoplastic disorders, dysfunction & pacing
- 36 *** Mediastinal tumours, Thymic tumors and managemnt of myesthenia gravis

- 37 ** Trachea : tumors , strictures , tracheomalacia ,tracheal resections & reconstructions .
- 38 ** The Esophagus : Anatomy & Functional Evaluation .
- 39 ** Esophageal injuries
- 40 * Medical & Surgical Treatment of Hiatal Hernia .
- 41 * Barrette's Esophagus.
- 42 * Nissen Fundoplication .
- 43 * Hill Procedure .
- 44 * Belsey Mark IV Procedure.
- 45 * Benign Strictures of Esophagus .
- 46 * Paraesophageal Hiatal Hernia.
- 47 * Esophageal Dysmotility.
- 48 * Treatment of Achalasia & Gastroesophageal Reflux.
- 49 ** Thoracoscopic Esophageal Surgery .
- 50 * Carcinoma of Esophagus, surgical options Resection, Reconstruction, Palliative treatment of Carcinoma of the Esophagus .
- 51 ***special diagnostic and therapeutic procedures in cardiac surgery:
Echocardiography, Cardiac catheterization, angiography and interventional techniques , PTCA & stenting , Fibrinolytic therapy in the management of acute myocardial infarction, Role of CT scan, MRI , radionucleotide imaging in Cardiovascular Diagnosis.
- 52 ** Normal & Abnormal Development of the Heart.
- 53 *** Peri operative care of the pediatric cardiac patient.
- 54 * Anesthesia for Pediatric Cardiac Surgery.
- 55*** Management of Cardiopulmonary Bypass in adults,infants & children .Pump, oxygenators, filters, tubings, cannule, ultrafiltration for CPB
- 56 *** Deep Hypothermia & Total Circulatory Arrest.
- 57 *** Myocardial Protection & cardioplegia: rational of various constituents, common cardioplegic solutions. Constitution of cardioplegia used at the candidates institute.
- 58 *** Palliative Procedures in Congenital Heart Disease
- 59 ** Tracheoesophageal Compressive Syndromes of Vascular Origin: Rings & Slings.
- 60 *** Anomalous Pulmonary and Systemic Venous Connections.
- 61 *** Atrial Septal Defects and Cor Triatriatum.
- 62 *** Ventricular Septal Defect.
- 63 *** Patent Ductus Arteriosus and Aortopulmonary Window.
- 64 *** Atrioventricular Septal Defects.
- 65 *** Tetralogy of Fallot and related physiological complexes
- 66 *** Complex of Functional Single Ventricle.
- 67 ** Truncus Arteriosus.

- 68 ** Congenital Malformations of the Aortic Valve and LV outflow tract.
- 69 *** Coarctation of Aorta and Interrupted Aortic Arch.
- 70 ** Hypoplastic Left Heart Syndrome.
- 71 *** Pulmonary Stenosis with intact IVS
- 72 *** Pulmonary Atresia with intact IVS
- 73 *** Transposition of Great Arteries
- 74 *** Congenitally Corrected Transposition of the Great Arteries.
- 75 *** Double Outlet Right Ventricle and Double Outlet Left Ventricle.
- 76 *** Tricuspid Atresia.
- 77 *** Ebstein's Anomaly
- 78 ** Congenital Abnormalities of the Mitral Valve.
- 79 * Heart & heart – lung transplantation in children
- 80 * Circulatory Support in Infants and Children
- 81 ** Anomalies of the Coronary Vessels
- 82 *** Hemorrhagic and Thrombotic Complications of Cardiac Surgery.
- 83 *** Intra-aortic Balloon Counter pulsation, Ventricular Assist Pumping,
- 84 * Artificial Heart.
- 85 ** Preservation of Intrathoracic Organs for Transplantation.
- 86 ** Heart & heart-lung Transplantation.
- 87 ** Cardiomyoplasty, surgical treatment for congestive cardiomyopathies.
- 88 *** Surgery for Bacterial Endocarditis.
- 89 *** Acquired Disease of the Tricuspid Valve.
- 90 *** Acquired Disease of the Mitral Valve.
- 91 *** Acquired Aortic Valve Disease
- 92 ** Surgical management of Hypertrophic Cardiomyopathies
- 93 *** Homografts and Auto grafts
- 94 *** Cardiac Valvular Prostheses: design, selection, complications of
- 95 *** Coronary Revascularization: non surgical techniques, surgical indications, direct and indirect surgical interventions, conduit selection & harvesting , surgical management of complications of MI, combined Coronary and carotid artery disease.
- 96 ** Surgery for supraventricular & ventricular Arrhythmias.pacemaker therapy.
- 97 *** Aneurysms of the ascending , arch and descending thoracic aorta
- 98 *** Dissections of the Aorta.
- 99 *** Constrictive pericarditis, cardiac tamponade
- 100 * Other diseases of pericardium.
- 101 *** Cardiac myxoma
- 102 * Cardiac Tumors.
- 103 *** History of
 - a) heart , lung and vascular surgery (out line)

- b) prosthetic valves
 - c) CPB & cardioplegia
 - d) ASD closure
 - e) coronary surgery
 - f) CVT surgery in India , Mumbai and at the candidate's institution
- 104 ** legends in CVT surgery
- 105 *** Prosthetic material (biological / artificial) in Cardio, vascular and thoracic surgery
- 106 *** Sutures in CVT Surgery: physical properties of sutures, needle types, recent advances in suture materials.

Vascular

1. *** Physiologic assessment of peripheral arterial occlusive disease
2. *** vascular imaging techniques
3. *** Burger's disease
4. *** Takayasu's disease , Nonspecific aortoarteritis
5. *** management of arterial aneurysms
6. ** fibrodysplasia
7. * uncommon arteriopathy
8. *** antithrombotic therapy
9. ** angioplasties and endovascular techniques
10. *** basic vascular surgical technique, Fogarty thrombectomy,endarterectomy
11. *** Vascular grafts
12. *** Complications of vascular surgery and interventions
13. *** management of acute ischemia of limbs
14. *** management of chronic ischemia of limbs and viscera
15. *** management of thoracic outlet syndrome
16. ** other neurovascular conditions involving the upper extremity
17. * congenital vascular malformations
18. *** management of renovascular hypertension
19. *** management of extracranial cerebrovascular disease
20. * * management of deep venous thrombosis

Recommended Journals

Indian Heart Journal

Indian Journal of Cardio Vascular Thoracic Surgery

Journal of Thoracic & Cardiovascular Surgery

Annals of Thoracic Surgery

Circulation

Chest

Thorax

Asian Journal of Cardio Vascular & Thoracic Surgery

Year book of Cardiology

—x—x—x—x—



APPENDIX - C

UNIVERSITY OF MUMBAI

REVISED SYLLABUS
FOR
M.Ch. DEGREE
IN UROLOGY OR GENITO-
URINARY
SURGERY

(with effect from the academic year 2005-2006)

SYLLABUS and TRAINING ACTIVITIES PLANNED FOR STUDENT :
M.Ch. (Urology) or Genito-urinary Surgery Course

The course of study

A. THEORY :

It will cover wide spectrum of the diseases of urogenital system and retroperitoneum. Apart from the clinical aspect of these subjects, candidate has to acquire indepth knowledge of the related basic subjects like applied anatomy, embryology, physiology, Biochemistry, Pharmacology, Pathology, Genetics and Immunology.

1. Anatomy and Embryology of GU tracts, adrenals and retroperitoneum.
2. Applied physiology and biochemistry, Immunology, Microbiology and Genetics pertaining to Urology.
3. Investigative Urology and Genito-urinary radiology and imaging / including nuclear medicine.
4. Male Infertility, Andrology, Microsurgery and Urological Endocrinology.
5. Sexual dysfunction - investigations and management.
6. Preoperative care, management of urological complications and care of the critically ill patients.
7. Urodynamics and Neurogenics vesico-urethral dysfunction.
8. Genito-urinary trauma.
9. Urolithiasis - Medical, Biochemical and Surgical aspects - Open surgical and Endourological procedures.
10. Uro-oncology - Adult and Pediatric.
11. Reconstructive Urology.
12. Pediatric Urology - congenital malformations and acquired diseases.
13. Urinary tract infections and sexually transmitted diseases.
14. Obstructive Uropathy.
15. Renal transplantation (including transplant immunology, medical and surgical aspects).
16. Renovascular hypertension.
17. Gynaecological Urology.
18. Operative Urology - Open and endoscopic.
19. Endourology - Establishment of PCN, stents - Antegrade Ureterorenoscopy, PCNL - retrograde.
20. Diathermy, lasers, fibre optics, instruments, catheters, endoscopy etc.
21. Retroperitoneal diseases and management.
22. Medical aspects of the kidney disease - Nephrology as applied to Urology.
23. Newer modalities in management of Urological disease.
24. STD / AIDS.
25. Laproscopic urological surgeries
26. Robotics
27. Genetic and molecular biology in Urological diseases
28. Recent Pharmacological drugs
29. Documentation and record-keeping : Details endovision camera and recording camera – Image capture, transfer & recording, presentation of recording inter compatibility of different image capturing, processing and presentation equipments.

B. INVESTIGATIVE UROLOGY :

To be done and learn the interpretation of -

1. Radiological :
 - Ascending Urethrograms /
 - Micturiting cystourethrograms /
 - Nephrostogram, Interpretation of Intravenous Urogram (IVU)
 - Retrograde Pyelogram (RGP)
 - Angiography / CT / MRI / Radioisotopes in urology
2. Ultrasonography
3. Uroflowmetry
4. Doppler
5. Testicular biopsy and Prostatic biopsy
6. Uro-endoscopy
7. Phalldynamic evalution

C. LABORATORY INVESTIGATIONS :

1. Various biochemical, serological blood investigations - interpretations.
2. Testicular Biopsy

D. OPERATIVE UROLOGY : OPEN & ENDOSCOPIC SURGERY

To assist -

Open urological major procedures and observe endoscopic surgery
To independently perform minor urological procedures

1. Orchidectomy
2. Circumcision
3. Meatoplasty
4. Biopsy of Prostate
5. Trocar cystostomy
6. SPC
7. Urethral dilatation
8. Testicular Biopsy
9. Surgery for Varicocele
10. Hydrocelectomy
11. To observe the cystoscopy findings
12. Learn about endoscopic instruments and Principles of diathermy.

Interpretation of Ultrasound of findings, Renography and other radio nuclide studies renal angiography, venography.

Vasoseminovesiculography.

E. To assist and/or independently perform under supervision -

1. Endoscopy of lower urinary tract under supervision and interpretation of findings. RGC and Bladder biopsy.
2. Open surgeries like
 - a. Angio Access (AV shunts, fistulae)
 - b. Total and partial amputation
 - c. Penis,
 - d. Open prostatectomy
 - e. Nephrostomy
 - f. Ureterolithotomy
 - g. Pyelolithotomy
 - h. Urethroplasty for stricture
 - i. Excision of filarial scrotum and Penis

URODYNAMICS:

- a. Uroflowmetry
- b. Cystometry
- c. UPP
- d. EMG
- e. Sexual dysfunction studies

ENDOSCOPIC PROCEDURES :

To be performed under supervision

1. Internal Urethrotomy for structures
2. Bladder neck incision
3. Cysto lithotripsy
4. Insertion and retrieval of ureteral stents.

OPEN SURGICAL PROCEDURES :

1. Simple nephrectomy
2. Extended Pyelolithotomy
3. Pyeloplasty
4. Urethroplasty
5. Hypospadias Surgery
6. VVF repair
7. Donor nephrectomy
8. Orchiopexy

ENDOSCOPY :

1. Cystolithotripsy
2. TUR Prostate
3. TUR - Bladder tumor
4. Percutaneous Nephrolithotomy
5. Ureteric stone manipulation and disintegration by ureterorenoscopy.
6. Endoscopic bladder neck suspension for stress incontinence.

OPEN SURGERY :

1. Radical Nephrectomy and Nephro Ureterectomy
2. Anatomic nephrolithotomy
3. Ureteroneocystostomy
4. Boari flap
5. Urinary diversion
6. Augmentation cystoplasty and Neobladders
7. Severe forms of Hypospadias repair
8. Microsurgical Vaso Vasal (VVA) and Vaso Epididymal Anastomosis (VEA)
9. Renal transplant recipient surgery
10. Transpubic urethroplasty
11. Cystectomy (Radical)

LAPAROSCOPY SURGERY :EXTRA CORPOREAL SHOCK WAVE LITHOTRIPSY (ESWL):**F. RESEARCH :**

1. Clinical - Prospective
Retrospective
2. Laboratory
3. Experimental surgery
4. Biochemical aspects of Urology, Statistics, use of Computers.

G. QUANTUM OF TRAINING :

1. It is necessary to have formal academic programme in the department.
2. One faculty member should be a participant in all the programmes
3. The department should maintain records of its academic activities
4. The candidate should maintain log book of all academic activities attended
5. The candidate should be a resident trainee with increasing ward responsibility each year
6. He should have an exposure to emergencies in urology and their management
7. Candidate should maintain record of his practical training.
8. Where upper tract endoscopy is not being done, the candidate should be sent to another teaching department where this work is being done for a period of 4 weeks.

The following number of credit hours were recommended against each programme.

ACADEMIC CONTENT OF TRAINING :

A	Intradepartmental Programme	250
B	Interdepartmental Programme	50
C	Peripheral Programme	
	1. Paper presentation in conference	2
	2. Credit hours	50

PRACTICAL CONTENT OF TRAINING :

		Performed by candidate	Assisted by candidate
1	Open renal and ureteric surgery	15	50
2	Open bladder and prostate surgery	15	40
3	Open External Genitalia and Vascular Access Surgery	20	50
4	Adult cystoscopy	100	100
5	Pediatric cystoscopy	10	20
6	Internal Urethrotomy	20	20
7	T.U.R.P.	15	30
8	T.U.I.P.	5	10
9	T.U.R.B. / Tumor	5	10
10	U.R.S.	15	50
11	P.C.N.L.	10	20

H. Training in related disciplines :

1. Candidate shall be required to spend at least 4 weeks in the recognized department of Nephrology.
 2. Four to six weeks of training in each of following branches in the same institution or other recognized institution depending on the facility in given department : Urodynamics, Renal Transplant, Uro-oncology, Pediatric Urology.
- I. A Candidate shall maintain a Log Book of the surgery and procedures done, academic activities – Annexure – E .
 - J. A Candidate shall be required to work and prepare a Dissertation on subject allotted to him by his / her teacher – as per the present format

Suggested changes as per Annexure - D

Annexure-B

EVALUATION PATTERN (INTERNAL & EXTERNAL) :M.Ch. -BRANCH IV - GENITO-URINARY SURGERY :

Final Examinations		Marks
Paper I	Basic Sciences applied to Genito-urinary Surgery	100
Paper II	Urology	100
Paper III	Urology	100
Paper IV	Recent Advances in Urology	100
	Clinical	200
	Oral	100
	Dissertation	100
Total		800

Present format - 2 Long questions and 6 short notes
 Suggested changes - as per Annexure-D

Minimum marks required for pass in the Examination :

	Total marks	Separate minimum marks required
Paper I) Paper II) Paper III) Paper IV)	400	200
* Clinical	200	100
Oral	100	
Dissertation Oral on 75) Dissertation 25)	100	100
Total	800	400

* Clinical Examination -

Long Case 1
 Short Case 2
 Ward Round

Note : Not more than 3 candidates shall be examined per day.

Annexure - C

UNIVERSITY OF MUMBAIM.Ch. - Genito-Urinary Surgery - 2005TIME-TABLE OF POST-GRADUATE LECTURES FOR THE M.CH. STUDENTS IN
GENITO-URINARY SURGERY FOR THE YEAR 2005.Lecturers will commence from : Friday, 1st March, 2005.

Name of the teacher	Date	Place	Topic
Dr. H.M. Punjani	04.03.2005	B.H.I.M.S.	Posterior Urethral Valves
Dr. P.J. Chibber	11.03.2005	J.J. Hospital	Endourology of Upper Urinary Tract - Non Calculus application
Dr. A.G. Phadke	18.03.2005	B.H.I.M.S.	Male Infertility
Dr. A.V. Rao	01.04.2005	St. George	Ca prostate - Non Surgical Management
Dr. H.R. Pathak	08.04.2005	Nair Hospital	Intersexuality
Dr. J.V. Dhabalia	15.04.2005	KEM Hospital	Urinary fistulas
Dr. S.R. Rao	29.04.2005	Nair Hospital	Urolithiasis - I : Pathophysiology & Evaluation
Dr. S.K. Patwardhan	06.05.2005	LTMG Hosp	Renal & Ureteric Injuries
Dr. H.M. Punjani	13.05.2005	B.H.I.M.S.	Paediatric Uro-oncology
Dr. P.J. Chibber	20.05.2005	J.J. Hospital	Neurogenic Bladder & UDS
Dr. A.G. Phadke	27.05.2005	B.H.I.M.S.	Superficial Bladder Cancer
Dr. A.V. Rao	03.06.2005	St. George	Lower Urinary Tract Injuries
Dr. H.R. Pathak	10.06.2005	Nair Hospital	Urolithiasis - II : ESWL & Medical Management
Dr. J.V. Dhabalia	17.06.2005	KEM Hospital	Stress Urinary Incontinence
Dr. S.R. Rao	24.06.2005	Nair Hospital	CT Scan & MRI in Urology
Dr. S.K. Patwardhan	01.07.2005	LTMG Hosp	Structure Urethra
Dr. H.M. Punjani	08.07.2005	B.H.I.M.S.	Undescended Testis
Dr. P.J. Chibber	15.07.2005	J.J. Hospital	Urolithiasis - III : Endourological & Surgical Manageme

Dr. A.G. Phadke	22.07.2005	B.H.I.M.S.	Interstitial Cystitis
Dr. A.V. Rao	29.07.2005	St. George	BPH-I : Evaluation & Medical Management
Dr. H.R. Pathak	05.08.2005	Nair Hospital	Invasive Bladder Cancer
Dr. J.V. Dhabalia	12.08.2005	KEM Hospital	Radionuclides In Urology
Dr. S.R. Rao	26.08.2005	Nair Hospital	Prostatitis
Dr. S.K. Patwardhan	02.09.2005	LTMG Hosp	Lasers in Urology
Dr. H.M. Punjani	09.09.2005	B.H.I.M.S.	Vesino-Ureteral Rethux
Dr. P.J. Chibber	16.09.2005	J.J. Hospital	Carcinoma Prostate - I : Evaluation & Surgical Management
Dr. A.G. Phadke	23.09.2005	B.H.I.M.S.	Augmentation Cystoplasty
Dr. A.V. Rao	30.09.2005	St. George	Carcinoma
Dr. H.R. Pathak	07.10.2005	Nair Hospital	Renovascular Hypertension
Dr. J.V. Dhabalia	14.10.2005	KEM Hospital	Urinary diversion
Dr. S.R. Rao	21.10.2005	Nair Hospital	BPH-II : Minimally Invasive and Surgical Management
Dr. S.K. Patwardhan	28.10.2005	LTMG Hosp	Renal Transplantation
Dr. H.M. Punjani	11.11.2005	B.H.I.M.S.	Hypspadias
Dr. P.J. Chibber	18.11.2005	J.J. Hospital	Laprosocopy in Urology
Dr. A.G. Phadke	25.11.2005	B.H.I.M.S.	Phaechromocytoma
Dr. A.V. Rao	02.12.2005	St. George	Genito-urinary tuberculosis
Dr. H.R. Pathak	09.12.2005	Nair Hospital	PUJ Obstruction
Dr. J.V. Dhabalia	16.12.2005	KEM Hospital	Continent Urinary diversion
Dr. S.R. Rao	23.12.2005	Nair Hospital	Renal Tumours
Dr. S.K. Patwardhan	30.12.2005	LTMG Hosp	Testicular tumours
Dr. P.J. Chibber	06.01.2006	J.J. Hospital	Erectile dysfunction

Annexure - D

Following changes have been suggested in the meeting held on Saturday 11th December, 2004 at 1.00pm in the Department of Urology, 8th floor, M.S. Building, KEM Hospital, Parel, Mumbai-400 012.

1. Theory Paper :

Present format	-	2 Long questions	-	6 short notes
Suggested changes	-	no long question	-	all short notes (12)

This gives chance for wider coverage of the subject and better evaluation of the candidate.

2. Dissertation :

Present format - Usually it is repetition of work as, due to various prevailing Circumstances, genuine and new research work is not feasible to carry out practically.

Suggested Changes - A candidate should complete a fixed number (15 to 20) of cases in full details during his residency tenure right from the time of presentation to the hospital up till follow-up and completion of the treatment. This will give a wide practical and theoretical coverage and a practice to the candidate of the ways of documenting clinical material. It can avoid mere repetition of clinical material with cosmetic changes over and over again as done in the dissertation.

3. The candidate should bring with him the log book in the format suggested hereby and some weightage of marks should be given to the evaluation of the candidate based on his experience as per the log book- Annexure E .

Annexure E

LOG BOOK :Personal details :

Forenames :

Surname:

Date of Birth :

MCI registered no :

Date of joining:

Date of completion:

Permanent address:

Address for correspondence:

Please paste a
recent passport size
photograph attested
across the front by
the Head of
Department

I certify that this is a true likeness of

Signed :

(Professor and Head)

Date :

Explanatory Notes :

This is an important document. The log book is an integral part of your urological training and it will provide a record of your operative experience and your academic and educational activities. It will be part of your internal assessment as you move through Urological training towards the final examination.

The log book will be issued to you the day you join this department. A passport size photograph must be placed inside the front cover and it must be attested by the Head of Department. All personal details must be filled out in the space provided inside the front cover. The explanatory notes must be read carefully and the standard departmental abbreviations listed must be adhered to.

Organizational Structure: This section contains No. of beds, faculty, OPD timings, operation days, operation tables and training facilities in department, existing during the period of your training.

Workload of the department : This section contains patient workload, diagnostic workload, operative workload of department. (This will be filled in after department record is available.)

Academic activities : This section contains inter-departmental meetings, superspeciality training by rotation, journal review, Bombay Urological Society meetings, lecture series by Mumbai university, workshops/CME/updates/conferences, paper presentation, publications, prizes. The requisite details are to be filled by you and final signature obtained from the Head of Department at the completion of your tenure.

Summary of diagnostic work : This section contains USG, Doppler study, Cystoscopy & related procedure in comparison to total workload of the period of training in the department are included in log book.

Record of Procedures : This section of the log book is divided into numbered segments. These segments correspond to the different types of procedures that you are supposed to be involved

with during your period of training. At the beginning of segment there is a consolidation sheet to summarize the record of procedures for that segment. For all procedures, the degree of your involvement should be indicated using the following system :

AS : Assisted Senior

P : Personally performed under supervision of faculty member

AJ : Assisted Junior

Operations that were performed as an emergency should be recorded as an 'E' and others should be recorded as an 'R' in the appropriate box. Duration of hospital stay, complications, and surgical outcome should also be recorded. Below is a list of possible complications that are expected to be recorded. Any other complications not mentioned in this list if they occur, should also be recorded.

Wound infection and/or dehiscence	Intra-abdominal sepsis
Bacteremia	Septicemia
Hemorrhage	Major hematoma
DVT and/or pulmonary embolism	Other chest complications
Perforation (bladder/prostatic capsule)	Extravasation
Stricture formation	Incontinence
Anastomotic leak	Steinstrasse
Renal failure	Coronary complications
Prolonged ileus	Intestinal obstruction

In the event of the death of a patients it must be recorded in the column for surgical outcome, with a mention of the cause of death. Any other factor or factors that significantly delay the patient's expected discharge should also be mentioned. At the completion of each page it should be signed by the Head of Department. It is advisable to keep your log book up to date and in a safe place, within the hospital premises. It may be inspected at any time by a consultant or by the Head of Department.

Contents :

Personal Details

Explanatory Notes

Abbreviations

Organizational Structure

Workload of the Department

- Patient workload
- Diagnostic workload
- Operative workload

Academic Activities in the Department

- Workshops / CME / Updates / Conferences :
- Paper Presentation :
- Publications :
- Prizes :

Summary of Diagnostic Work :

- USG
- Doppler study
- Cystoscopy & related procedures

Record of Procedures :

- Experience at glance (Summary)
- Open surgical procedure
- Endourological procedures

(on letter head)

CERTIFICATE

This is to certify that this log book contains the comprehensive report of the various academic activities and operations performed by Dr. _____ in the department of urology at Seth G.S. Medical College and K.E.M. Hospital, Mumbai. He joined the department of Urology as M.Ch.(Urology) student and worked as resident from _____ till _____. I have no objection for his appearing DNB / M.Ch. examination to be held in _____.

Signature of Head of Department



(on letter head)

ACKNOWLEDGMENTS

I take the opportunity to express my gratitude to Dr. _____, Professor and Head of the Department of Urology for his constant guidance and encouragement throughout my training period. His easy approachability and readiness to help created an open atmosphere for discussion which added to the pleasure of learning from him the intricate aspects of urology.

I also thank the Director, Dean and Medical Superintendent of _____ for the facilities which were made available to me.

I thank my colleagues Dr. _____ and various junior resident who have worked with me.

I thank the Nursing staff of the Urology Operation Theater, Urology Ward , Urology Lab and Urology Office for their constant co-operation and help which made the ward work quite a pleasant experience.

This log book would not have existed but for the patients who are mentioned in it. For them just thanks will not suffice.

(Signature)

Thesis / Dissertations :

Title:

Aims / Objectives :

Material & Method :

Results :

Conclusion :

Institution of Training : Seth G.S. Medical College and
K.E.M. Hospital, Mumbai.

University : Mumbai

Date of Registration :
for M.Ch.(Urology)

Duration of M.Ch. : 3 years
course

Name of the Teacher :

Organizational Structure

Department of _____, Mumbai.

No. of indoor beds : _____

Faculty : 1.
2.

O.P.D. : 1. Stone Clinic
2. General Urology
3. Male Infertility

Operation days : _____ tables / day / _____ hrs. daily / _____ days week

Operation Tables : _____ Nos.

- OR-I. Open
- OR-II. Endoscopic
- OR-III. Uroradiology
- OR-IV. Diagnostic Endoscopic

Training facilities in urology department :

1. Ultrasonography - done by M.Ch. students under seniors guidance for all urology cases.
2. Doppler - done by M.Ch. students under seniors guidance
3. Operative microscopic basic training in Animal Lab
4. Testicular Biopsies for infertility patients
5. Kidney transplant programme
6. Extra-corporeal Shock Wave Lithotripsy (ESWL)
7. Laparoscopy training

Treatment modalities offered by the department:

1. Stone disease
 - Endoscopic
 - Suprapubic & perurethral Cystolithotripsy
 - URS
 - PCNL
 - Open surgeries
 - Extra Corporeal Shockwave Lithotripsy (ESWL)
2. Uro-oncology
 - advanced uro-oncologic surgeries like radical retropubic prostatectomies, radical cystectomy with orthotopic neobladder etc.
3. Female Urology
 - Surgeries for SUI, genitourinary fistulas
4. Paediatric Urology
 - Hypospadias surgeries.
 - Bladder neck reconstruction.
 - PCNL
5. Renal Transplant Surgery
6. Andrological Surgery
 - for infertility
 - VEA, VVA, TUED (Transurethral incision of ejaculatory ducts)
 - for impotence
 - Penile prosthesis
 - Venous ligation

Workload of the Department

Patient Workload:

	O.P.D Attendance			Indoor Admission	Referrals	
	Urology	Infertility	Stone Clinic		Emergency Calls	
					Indoor	Intra op.
1 st						
2 nd						
3 rd						

Diagnostic Workload:

Year	USG	Doppler	Cystoscopy & Related procedures
1 st			
2 nd			
3 rd			

Operative Workload :

	1 st Year	2 nd Year	3 rd Year
Open surgery			
<u>Endo-urology</u>			
VIU			
TURP			
TUIP			
TURBT			
Endomeatotomy			
Endopyelotomy			
Balloon dilation			
Litholapaxy			
URS			
PCN			
PCNL			
Renal Transplantation – LRDT Cadaver			
ESWL (Lithotripsy)			
Laparoscopy			
Emergency (Assist)			
Miscellaneous			
Inj. Papaverine I.C.			

Academic Activities in the Department

A. Inter-departmental meetings :

1. Urology-Nephrology meeting :
to (a) Discuss prospective and operated renal transplantation cases
(b) Discuss the management of urology cases with compromised renal function
(c) Plan strategy for complex uro-nephrology cases
2. Clinical case discussion in OPD by residents
3. Ward rounds and bed side clinical discussions and demonstrations.
4. Uro-Radiology meeting :
to (a) Basic instructions and teaching on various uro-radiological procedures
(b) Discuss entire week's uro-radiological cases performed

B. Teaching Program : The teaching program included regular integrated undergraduate lecture for all the 3 terms and post-graduate teaching schedule for M.Ch. (Urology) students in the form of clinical, case presentation, bed side clinics, ward rounds, uro-nephrology meetings, Journal reviews and operative video session.

C. P.G. Teaching :

- a. Didactic lecture as per University programe
- b. Discussion of thesis work
- c. Research projects discussion regular interval

D. Journal Review

Once in a month

E. Bombay Urological Society meetings

Quarterly

F. Lecture series by Bombay University :

12 per term x 3 years'

Workshops/CME/Updates/Conferences :

	Name	Place	Year
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

Paper Presentation :

- 1.
- 2.
- 3.
- 4.

Publications (Awaiting) :

- 1.
- 2.

Prizes:

- 1.
- 2.

Summary of Diagnostic Work :

USG:

Year	Total Nos.	Self	Assisted Senior	Assisted Junior
1 st				
2 nd				
3 rd				

Doppler Study :

Year	Total Nos.	Self	Assisted Senior	Assisted Junior
1 st				
2 nd				
3 rd				

Cystoscopy & Related procedures :

Year	Total Nos.	Self	Assisted Senior	Assisted Junior
1 st				
2 nd				
3 rd				

Log Book – month wise

Month :

Sr. No.	Date	Reg. No.	Name of the patients	Surgery	P / AS / AJ
1			<u>Open Surgeries :</u>		
2					
3					
4					
5					
1			<u>Endoscopic Surgeries :</u>		
2					
3					
4					
5					

Key to short forms :

AS : Assisted Senior

P : Personally performed under supervision of faculty member

AJ : Assisted Junior

SUMMARY :

DEPARTMENT OF UROLOGY

Name of the candidate :

(Period from to)

Key to Short forms :

AS : Assisted Senior

P : Personally performed under supervision of faculty member

AJ : Assisted Junior

Total Work :

Performed

Assisted
Senior

Assisted
Junior

Open Surgeries :

Microscopic			
Uro-oncology			
Female urology			
Renal Transplant			
Donor nephrectomy			
Receipient Transplant surgery			
Miscellenous Surgeries:			

<u>Total Work :</u>	Performed	Assisted Senior	Assisted Junior
<u>Endoscopic Surgeries</u>			
ESWL			
Laparoscopy			

— x — x — x — x —



APPENDIX - D

UNIVERSITY OF MUMBAI

REVISED SYLLABUS

FOR

M.S. AND D.O. DEGREE

IN OPHTHALMOLOGY

(with effect from the academic year 2005-2006)

The syllabus for MS and DO in ophthalmology is designed for basic training of residents so as to enable them in diagnosing and treating common ocular disorders with surgical techniques where ever required as a general ophthalmologist. However, the student is expected to be well informed about the diseases which affect the eye secondarily either by direct continuity or contiguity with neighboring structures. He is also expected to be updated with the recent advances in investigation, diagnosis and treatment. Systemic diseases involving the eye gain considerable importance in the present day practice of ophthalmology, diagnosis and therapy. Thus the topics provide a generalized guide to update clinical ophthalmology without going into specialized training and yet train the student to deal with various ocular disorders both medically and surgically.

ANATOMY AND PHYSIOLOGY

ANATOMY :-

- EMBRYOLOGY
- STRUCTURES OF THE EYE
- BLOOD SUPPLY OF EYE
- STEM CELLS IN OPHTHALMOLOGY
- DEFICIENCY, TREATMENT, TECHNIQUES
- AMNIOTIC MEMBRANE TRANSPLANTATION

PHYSIOLOGY :- OF EYE

- NATURE & FORMATION OF INTRAOCULAR FLUID
- CIRCULATION OF AQUEOUS HUMOUR
- INTRA OCULAR PRESSURE
- METABOLISM OF OCULAR TISSUE

PHYSIOLOGY :- OF VISION

- RHODOPSIN CYCLE
- MAGNOCELLULAR & PARVOCELLULAR PATHWAY
- VISUAL PERCEPTIONS
- BINOCULAR VISION & STEREOPSIS

NEUROLOGY :- OF VISION

- VISUAL PATHWAY
- NEUROLOGY OF BRAIN IN RELATION TO VISION
- PUPILLARY PATHWAYS AND REACTIONS
- COLOUR VISION
- ELECTROPHYSIOLOGY OF VISION

**ASSESSMENT OF
VISUAL FUNCTION:**

- VISUAL ACUITY
- FIELD OF VISION - PERIMETRY
- DARK ADAPTATION
- CONTRAST SENSITIVITY
- COLOUR VISION
- PUPILS AND ACCOMODATION, RAPD
- ANISOCORIA, TONIC PUPIL

**OPHTHALMIC ELECTRO
DIAGNOSTIC TECHNIQUES:**

- ELECTRO PHYSIOLOGICAL TEST
- ERG, EOG, VEP
- BINOCULAR VISION & STEREOACUITY
- ELECTRO NYSTAGMOGRAM
- ELECTRO MYOGRAPHY

ULTRA SONOGRAPHY

- PHYSICS
- INSTRUMENTS
- (ASCAN AND B SCAN)
- C SCAN
- COMPUTERIZED AXIAL TOMOGRAPHY
- MAGNETIC RESONANCE IMAGING

OPHTHALMO DYNAMOMETRY

OCULAR THERAPEUTICS :

- ROUTE OF THERAPY
- CHEMOTHERAPY OF INFECTIVE CONDITONS
- ANTIINFLAMMATORY THERAPY
 - STEROIDAL
 - NON STEROIDAL
- THERAPY FOR OCULAR ALLERGIES
 - ANTI HISTAMINICS
 - MAST CELL STABILIZERS

DRUGS IN OCULAR SURGERIES: VISCO ELASTICS

ANTI-MITOTIC AGENTS

DRUGS AFFECTING PUPIL AND ACCOMODATION

MEDICAL THERAPY FOR GLAUCOMA

MEDICAL THERAPY OF DRY EYES

DISEASES OF EYE

- CONJUNCTIVA:**
- ANATOMY AND PHYSIOLOGY
 - CLINICAL FEATURES OF CONJUNCTIVAL DISORDERS
 - CLASSIFICATION OF CONJUNCTIVITIS
 - OPHTHALMIA NEONATORUM
 - TRACHOMA
 - IMMUNE SYSTEM MEDIATED CONJUNCTIVITIS
 - DEGENERATIVE CHANGES IN CONJUNCTIVA
 - CYST AND TUMORS
 - DRY EYES SYNDROME AND DISORDER OF OCULAR SURFACE

- MALIGNANCY RELATED DISORDERS

- SCLERA :**
- INFLAMMATORY -
 - SCLERITIS, EPISCLERITIS, POSTERIOR SCLERITIS
 - INFECTIONS - T B, BACTERIAL
 - STAPHYLOMA
 - TUMORS : CHORISTOMAS, MALIGNANT
 - CONGENITAL: BLUE SCLERA
 - ABNORMALITIES
 - OCULAR IMMUNOLOGY & IMMUNE RELATED DISORDERS OF EXTERNAL EYE DISEASE

CORNEA

- ANATOMY AND PHYSIOLOGY, CONGENITAL ABNORMALITIES
- PATHOLOGY- KERATITIS
- CORNEAL TRANSPARENCY, TRAUMA, TEARS, CHEMICAL BURNS
- CORNEAL TOPOGRAPHY
- PACHYMETRY
- SPECULAR MICROSCOPY

- INFECTIONS AFFECTING : CORNEA
 - BACTERIAL
 - FUNGAL
 - HERPES SIMPLEX KERATITIS
 - ACANTHAMOEBA KERATITIS

- DEGENERATIVE CHANGES-
 - RECURRENT CORNEAL EROSIONS
 - DYSTROPHY, METABOLIC DISORDERS

- ECTATIC CHANGES
 - KERATOCONUS
 - KERATOGLOBUS
 - PELLUCID
 - MARGINAL DEGENERATION

- KERATOMALACIA, KERATOPLASTY

- TUMOURS OF CORNEA

- CORNEAL PRESERVATION AND EYE BANKING

- SURGERY FOR CORNEAL DISEASE : -
 - KERATOPLASTY
 - KERATOPROSTHESIS
 - TATOOING, BIOPSY
 - MUCUS MEMBRANE GRAFTING
 - LIMBAL STEM CELL TRANSPLANTATION

- PHOTOTHERAPEUTIC KERATECTOMY

- REFRACTIVE CORNEAL SURGERY

LENS

- ANATOMY AND PHYSIOLOGY
- TRANSPARENCY OF THE LENS
- AETIO PATHOGENESIS OF CATARACT
- MORPHOLOGY, ROLE IN ACCOMODATION
- SYMPTOMATOLOGY
- SENILE CATARACT
- CATARACT ASSOCIATED WITH SYSTEMIC DISEASE
 - OTHER CAUSES- HEAT, IRRADIATION, ELECTRIC
- DEVELOPMENTAL CATARACT
- DEVELOPMENTAL ABNORMALITIES OF LENS,
 - MICROSPHEROPHAKIA, ECTOPIA LENTIS
- MANAGEMENT : SICS, ICCE , ECCE , PAEDIATRIC CATARACT SURGERY, ZONULAR DEHISCENCE, CATARACT WITH UVEITIS, GLAUCOMA, PHACOEMULSIFICATION, PHACONIT
- BIOMETRY, IOL POWER CALCULATIONS
- PHACOMACHINE
- AIR PUMP
- ANESTHESIA FOR CATARACT
- CORRECTION OF APHAKIA
- INTRAOCULAR LENSES MATERIALS
- MANAGEMENT OF POSTERIOR DISLOCATED LENS & SUBLUXATED LENS
- POSTERIOR CAPSULAR OPACITY
- LASER PHACO CATARACT SURGERY
- ENDOCAPSULAR LENSECTOMY
- REFRACTIVE CATARACT SURGERY
- PHACO TRABECULECTOMY, COMPLICATIONS OF CATARACT SURGERY

GLAUCOMA

- ANATOMY OF ANTERIOR CHAMBER AND ANGLE
- AQUEOUS HUMOR DYNAMICS
- GONIOSCOPY
- TONOMETRY
- VISUAL FIELDS

- PRIMARY GLAUCOMA
 - EPIDEMIOLOGY, MECHANISM
 - GENETICS OF GLAUCOMA
 - OPTIC DISC CHANGES
 - DIGITAL QUALITATIVE ANALYSIS
 - STREOSCOPIC OPTIC NERVE HEAD PHOTOGRAPHY
 - RETINAL NERVE FIBER ANALYSIS
 - ANGIOGRAPHY, COLOR DOPPLER, LASER DOPPLER FLOWMETRY
 - OCULAR PULSE AMPLITUDE
- THERAPY OF GLAUCOMA
 - MEDICAL
 - ARGON LASER TRABECULOPLASTY & PBI
 - LASER INFILTRATION PROCEDURE
 - CYCLODESTRUCTIVE PROCEDURE
 - GONIOTOMY & TRABECULOTOMY
 - ROLE OF ANTIFIBROTIC AGENTS
 - DRAINAGE IMPLANTS
 - COMPLICATIONS OF GLAUCOMA SURGERIES AND MANAGEMENT
- SECONDARY GLAUCOMA
- AQUEOUS MIS DIRECTION SYNDROME
- POST TRAUMATIC GLAUCOMA
- NEOVASCULAR GLAUCOMA
- PEADIATRIC GLAUCOMA
- GLAUCOMA WITH ABNORMALITIES OF CORNEA, IRIS, RETINAL DISEASE
- CONGENITAL- POAG, ANGLE CLOSURE GLAUCOMA
- NORMOTENSION GLAUCOMA
- JUVENILE PRIMARY OPEN ANGLE GLAUCOMA
 - MANAGEMENT: MEDICAL
 - SURGICAL
- PHACO TRABECULECTOMY
- COMPLICATIONS OF GLAUCOMA SURGERY
- VISCOCANALOSTOMY
- NANOPHTHALMOS

- CATARACT EXTRACTION AND FILTERING SURGERY, LASER PROCEDURES

UVEAL TRACT

-ANATOMY AND PHYSIOLOGY

-INFLAMMATION (UVEITIS) CLASSIFICATION ON ANATOMICAL SITE

-CLINICAL FEATURE: ANTERIOR UVEITIS- IRITIS, CYCLITIS
INTERMEDIATE UVEITIS
POSTERIOR UVEITIS

-TYPES NONGRANULOMATOUS
GRANULOMATOUS

-INVESTIGATION

-TREATMENT OF SEQUELAE AND COMPLICATION

-PURULENT UVEITIS

-EXOGENOUS

-ENDOGENOUS

-SPECIAL TYPES OF UVEITIS

BACTERIAL, T.B, LEPROSY, BRUCELLOSIS

SYPHILIS, LEPTOSPIROSIS, WHIPPLE'S

VIRAL, ACUTE RETINAL NECROSIS, CYTOMEGALOVIRUS,
MEASLES.

FUNGAL

OCULAR HISTOPLASMOSIS SYNDROME

PARASITIC, TOXOPLASMOSIS, ONCHOCERCHIASIS,
CYSTICERCOSIS

IMMUNOLOGICAL

SYMPATHETIC OPHTHALMITIS

FUCH'S HETEROCHROMIA

GEOGRAPHIC CHOROIDOPATHY

ACUTE MULTIFOCAL PLACOID PIGMENT EPITHELIOPATHY

MASQUARADE SYNDROME

-VASCULAR & CIRCULATORY DISTURBANCES:

NEOVASCULARIZATION OF IRIS

UVEAL EFFUSION SYNDROME

DEGENERATIVE CHANGES OF IRIS, CHOROID

ESSENTIAL (GYRATE ATROPHY OF CHOROID

CHOROIDEREMIA

ARMD, SRNVM

JUNIUS KUHNT DISEASE

SENILE CENTRAL CHOROIDAL ATROPHY

CENTRAL AREOLAR CHOROIDAL ATROPHY

ALBINISM

- AIDS- OCULAR INVOLVEMENT
- ENDOPHTHALMITIS

- CYSTS OF IRIS: CYST OF POST EPITHELIUM, IMPLANTATION CYSTS.

- NEOPLASMS AND RELATED CONDITIONS

- CONGENITAL : PERSISTENT PUPILLARY MEMBRANE
ABNORMALITIES COLOBOMATA

ALBINISM

RETINA

-ANATOMY, PHYSIOLOGY
-ELECTROPHYSIOLOGICAL TESTS- ERG, EOG, VER, VEP
-INVESTIGATIONS- FFA, ICG, OCT

-FUNDUS EXAMINATION

MACULA LUTEA
RETINAL VESSELS
VENOUS PULSATION
+78.0D, +90.0 D, RED FREE LIGHT

-VASCULAR RETINOPATHIES:-

HYPERTENSIVE
DIABETIC RETINOPATHY
NONPROLIFERATIVE
PREPROLIFERATIVE
PROLIFERATIVE
TREATMENT
LIPAEMLIA

-RETINOPATHY OF :-
PREMATURITY

PATHOGENESIS
AND MANAGEMENT.

-ACQUIRED IMMUNE DEFICIENCY SYNDROME: AIDS

-RETINOPATHY OF TOXEMIA OF PREGNANCY

-SICKLE CELL RETINOPATHY

-LUPUS ERYTHEMATOSIS RETINOPATHY

-VASCULAR DISORDERS OF RETINA

OBSTRUCTION OF ARTERIAL CIRCULATION.
OBSTRUCTION OF VENOUS CIRCULATION
VENOUS THROMBOSIS (CRVO)
BRANCH VEIN OCCLUSION.
CENTRAL SEROUS CHOROIDORETINOPATHY
COATS DISEASE

-RETINITIS :

INFLAMMATION
PURULENT RETINITIS
SUBACUTE INFECTIVE RETINITIS
(SEPTIC RETINITIS OF ROJH)
ENDOPHTHALMITIS : ETIOLOGY, MANAGEMENT
ACUTE RETINAL NECROSIS SYNDROME
(ARE~~N~~ SYNDROME)
N

INFECTIONS

**CYTOMEGALO VIRUS INFECTION
SYPHILIS
SARCOIDOSIS
TOXOPLASMOSIS
TOXOCARIASIS
PERIPHEBITIS RETINAE
PHOTORETINITIS**

DEGENERATIVE DISEASES:

**ARMD- PATHOGENESIS, MANAGEMENT
MACULAR HOLES.
(RP): PIGMENTARY RETINAL DYSTROPHY
ANGIOID STREAKS
BENIGN PERIPHERAL RETINAL DEGENERATIONS
WITH BREAKS - LATTICE, WWP
FOCAL PIGMENT CLUMPING.**

DIFFUSE CHOROIDAL DEGENERATION

CYSTOID RETINAL DEGENERATION OF PERIPHERAL RETINA

RETINOSCHISIS

JUVENILE RETINOSCHISIS

DETACHMENT OF RETINA

**:PATHOPHYSIOLOGY
TYPES
PREDISPOSING FACTORS
DIAGNOSIS & MANAGEMENT
SURGICAL MANAGEMENT
CRYOTHERAPY
PNEUMATIC RETINOPEXY
SCLERAL BUCKLING& EXTERNAL PLOMBAGE
DRAINAGE OF SUB RETINAL FLUID**

VITREORETINAL SURGERY

**: PARS PLANA, 3PORT VITRECTOMY
GAS TAMPONADE
COMPLICATIONS OF SURGERY
PROGNOSIS**

CONGENITAL ABNORMALITIES OF RETINA:

**MEDULLATED NERVE FIBRES
COLOBOMA
ALBINISM
PHAKOMATOSIS**

HEREDITARY DYSTROPHIES OF CENTRAL RETINAL & CHOROID:

SEX LINKED JUVENILE RETINOSCHISIS
STARGARDT'S DISEASE
DOMINANT FOVEAL DYSTROPHY
INVERSE RETINITIS PIGMENTOSA
PROGRESSIVE CONE DYSTROPHY
VITELLIFORM DYSTROPHY OF FOVEA
RETICULAR DYSTROPHY OF RPE
BUTTERFLY SHAPED PIGMENT DYSTROHY
OF FOVEA
FUNDUS FLAVIMACULATUS
GROUPED PIGMENTATION OF FOVEAL
AREA

HYALINE DYSTROPHIES
PSEUDO-INFLAMMATORY FOVEAL
DYSTROPHY (SORSBY)
CENTRAL AREOLAR CHOROIDAL ATROPHY
LEBER CONGENITAL AMAUROSIS

LYSOSOMAL STORAGE DISORDERS
TAY SACHS, BATTEN MAYO
LIPID STORAGE DISEASE (NIEMANN-PICK
DISEASE ETC)

LIDS

ANATOMY

-OEDEMA OF LIDS-

-INFLAMMATION OF LID: INFLAMMATORY, PASSIVE
BLEPHARITIS, MOLLUSCUM
CONTAGIOSUM
PRESEPTAL CELLULITIS

INFLAMMATION OF GLANDS: HORDEOLUM EXTERNUM
HORDEOLUM INTERNUM
CHALAZION

ANAMOLIES OF LID POSITON : BLEPHAROSPASM, TRICHIASIS
& LASHES
ENTROPION
ECTROPION
ANKYLOBLEPHARON,
BLEPHAROPHIMOSIS, LID RETRACTION
LAGOPHTHALMOS
PTOSIS- CONGENITAL
TREATMENT SURGERY OF CHOICE
ACQUIRED PTOSIS
FLOPPY EYELID SYNDROME

TUMOURS OF LIDS
& ALLIED CONDITONS

BENIGN GROWTHS, STYE, CHALAZION,
MALIGNANT TUMORS
BASAL CELL CA, SQUAMOUS CELL CA
SEBACEOUS CELL CA, KAPOSI SARCOMA
RETICULAR TUMOURS- LYMPHOMA
LYMPHOSARCOMA
PSEUDOLEUKEMIA, MALIGNANT
MELANOCYTOMA

INJURIES OF LIDS
CONGENITAL ANAMOLIES

: DISTICHIASIS, COLOBOMA
CRYPTOPHTHALMOS
MICROBLEPHARON
EPICANTHUS
BLEPHAROPLASTY-SURGICAL
LASER CO2, YAG

BOTULINUM TOXIN

INFECTIONS

: HERPES ZOSTER OPHTHALMICUS
HERPES SIMPLEX
IMPETIGO
ERYSIPELAS
NECROTISING FASCICULITIS.

LACRIMAL APPARATUS

ANATOMY & PHYSIOLOGY	: LACRIMAL GLAND APPARATUS NASOLACRIMAL DUCT LACRIMAL SAC, SECRETION, LACRIMAL PUMP
DISEASES OF LACRIMAL GLAND	: DACRYOADENITIS DACRYOPS MIKULICZ SYNDROME TUMOURS OF LACRIMAL GLAND
DRY EYE TESTS	: DYES - ALCIAN BLUE - FLUORESCEIN TEAR FILM BREAK UP TIME SCHIRMER'S TEST
TREATMENT	
DISEASES OF LACRIMAL PASSAGES	: CHRONIC DACRYOCYSTITIS BACTERIA CONGENITAL DACRYOCYSTITIS
TREATMENT	
INVESTIGATION	: CONTRAST DACRYOCYSTOGRAPHY : LACRIMAL SCINTILLOGRAPHY : RADIO OPAQUE DYE TRACERS
EPIPHORA TREATMENT	: CAUSES. : PROBING, CONVENTIONAL DCR ENDOSCOPIC TRANS-NASAL DCR CANALICULAR DCR INTUBATION OF CANALICULUS

STRABISMUS

-ANATOMY OF EXTRAOCULAR MUSCLES
-SQUINTS: COMITANT, INCOMITANT

-ETIOLOGY OF COMITANT SQUINT
-SYMPTOMS OF COMITANT SQUINT
-SENSORY AND MOTOR ADAPTATIONS
-LATENT SQUINT, SYMPTOMS, TESTS, TREATMENT
-AMBLYOPIA
-TREATMENT OF AMBLYOPIA

-CLINICAL: INVESTIGATIVE EVALUATION OF PATIENT WITH STRABISMUS
-OBLIQUE MUSCLE DYSFUNCTION

-CLINICAL PARAMETERS OF OCULAR DEVIATION
-COVER TESTS
-FORCED GENERATION TEST
-FORCED DUCION TEST
-ASSESSMENT OF BINOCULAR VISION
-MEASUREMENT OF ANGLE OF DEVIATION
-ESODEVIATION – TYPES, TREATMENT
-EXODEVIATION – AETIOLOGY, CLASSIFICATION
TREATMENT

A-V PHENOMENON
MICROTROPIA

OPERATIONS – FADEN, HANG BACK SUTURES
(CONJUNCTIVAL RECESSIOIN)
OF EXTERNAL MUSCLE

SPECIAL SYNDROMES :- DUANES, BROWN, MOBIUS,
FIBROSIS SYNDROME

TREATMENT

: NON SURGICAL
OPHTHALMIC PRISM & ORTHOPHORIA
SURGICAL MANAGEMENT
CORRECTION OF SQUINT WITH
BOTULLINUM TOXIN

INCOMITANT STRABISMUS: (PARALYTIC, RESTRICTIVE, KINETIC)

AETIOLOGY: LESIONS OF NUCLEUS

LESIONS OF NERVES

LESIONS OF MUSCLES

ORBITAL DISEASE

MYOSITIS

HEREDITARY MYOPATHIES.

SIGNS & SYMPTOMS

INVESTIGATIONS

SYNKINESIS.

I

A

OPTIC NERVE

ANATOMY : INTRACRANIAL, INTRAORBITAL, INTRACANALICULAR,
INTRAOCULAR
MICROSCOPIC ANATOMY

PHYSIOLOGY: AXOPLASMIC FLOW & TRANSPORT
ORTHOGRADE AXOPLASMIC TRANSPORT
RETROGRADE AXOPLASMIC TRANSPORT

BLOOD CIRCULATION OF OPTIC NERVE
AETIOPATHOGENESIS OF OPTIC NERVE DISORDERS

D/D OF OPTIC NERVE DISORDERS BASED ON OPHTHALMOSCOPIC APPEARANCES

PAPILLOEDEMA : PATHOGENESIS
PSEUDOTUMOR CEREBRI
UNILATERAL OR BILATERAL

D/D : ISCHAEMIC OPTIC NEUROPATHY
DRUSEN OF OPTIC DISC
PSEUDONEURITIS, PAPILLITIS, ORBITAL LESIONS
TREATMENT

AION : AETIOPATHOGENESIS
CLINICAL FEATURES: ARTERITIC
NON- ARTERITIC
INVESTIGATIONS:- BLOOD :- ESR
FA
IMMUNOLOGICAL
HAEMATOLOGICAL TESTS

PION :- AETIOPATHOGENESIS
VASCULITIS, GIANT CELL ARTERITIS, SLE
" SHOCK" OPTIC NEUROPATHY.

OPTIC NEURITIS : AETIOLOGY
NEUROMYELITIS OPTICA OF DEVIC
ACUTE DISSEMINATED ENCEPHALITIS
POLIOMYELITIS, ZOSTER

LOCAL CAUSE
ENDOGENOUS INFECTION
AUTOIMMUNE VASCULITIS
METABOLIC DISORDERS

TOXIC OPTIC NEUROPATHY

**HEREDITARY OPTIC NEUROPATHY :- DOMINANT
RECESSIVE**

LEBER'S HEREDITARY OPTIC NEUROPATHY

- AETIOPATHOGENESIS, CLINICAL FEATURES.

MISCELLANEOUS : DIABETIC PAPILLOPATHY

THYROID RELATED O.N.

RADIATION O.N.

TRAUMATIC O.N.

TREATMENT.

CONGENITAL ANOMOLIES OF DISC

HYPOPLASIA OF OPTIC DISC

OPTIC DISC PIT

HEREDITARY DISEASES

PAKINSON'S DISEASE

PROGRESSIVE SUPRANUCLEAR PALSY

OPHTHALMOPLÉGIA - DEFICIENCY

TOXINS

CONGENITAL & DEVELOPMENTAL CONDITIONS

ENCEPHALOCÉLES

CRANIOSTENOSIS

CRANIOSYNOSTOSIS

CONGENITAL OCULAR APRAXIA

CONGENITAL SPASTIC DIPLEGIA (LITTLE DISEASE)

INTRAOCULAR TUMOURS

TUMOURS OF UVEAL TRACT:

TUMOURS OF IRIS
HAMARTOMATOUS LESIONS
MALIGNANT MELANOMA
AMELANOTIC MELANOMA
TREATMENT

**MALIGNANT MELANOMA
OF CHOROID**

: PATHOLOGY
CLINICAL FEATURES

DIAGNOSIS
TREATMENT

**MALIGNANT MELANOMA
OF CILIARY BODY**

**: EPITHELIAL HYPERPLASIA
OF CILIARY PROCESSES**

DIKTYOMA

**SECONDARY CARCINOMA OF :
CHOROID**

RETICULUM CELL SARCOMA

TUMOURS OF RETINA :

RETINOBLASTOMA
ETIOLOGY, PATHOLOGY
CLASSIFICATION, DIFF DIAGNOSIS
INVESTIGATIONS
TREATMENT

ORBIT

ANATOMY
SURGICAL SPACES
COMMON SIGNS :

EXOPHTHALMOS
ENOPHTHALMOS

INVESTIGATION OF ORBITAL DISEASE

: X-RAY, CT & USG

ORBITAL VENOGRAPHY

CAROTID ANGIOGRAPHY

DIGITAL SUBTRACTION ANGIOGRAPHY

MR ANGIOGRAPHY

ORBITAL INFLAMMATORY DISEASE

: PERIOSTITIS

ORBITAL CELLULITIS

TREATMENT

DYSTHYROID OPHTHALMOPATHY

THROMBOSIS OF CAVERNOUS SINUS

ORBITAL INFLAMMATORY DISORDERS

-DACRYOADENITIS

-ORBITAL MYOSITIS

IDIOPATHIC ORBITAL INFLAMMATORY DISEASE
TOLOSA- HUNT SYNDROME

PARASATIC INFECTIONS:
OF THE ORBIT

TRICHINOSIS
CYSTICERCOSIS
HYDATID DISEASE

DISTENSION OF PARANASAL SINUSES
VASCULAR LESIONS-

ORBITAL VENOUS ANAMOLIES

CAROTID CAVERNOUS FISTULA

WEGENER'S GRANULOMATOUS

TUMOURS OF ORBIT
ANGIOMA

: DERMOLIPOMA,DERMOID CYSTS
OSTEOMA, PLEXIFORM NEUROMA
MENINGIOMA
CAPILLARY HAEMANGIOMA,
LYMPHANGIOMA
MENINGOENCEPHALOCOELE
RETICULOSARCOMA,
RHABDOMYOSARCOMA

RHABDOMYOSARCOMA
HODGKIN'S DISEASE, NEUROFIBROMA
LACRIMAL GLAND TUMORS
SINUS TUMORS INVADING THE ORBIT

TUMOURS OF OPTIC
NERVE SHEATH :

ECTODERMAL
MESODERMAL

OSTEOMATA

: NASAL SINUSES

MALIGNANT TUMOURS :

RHABDOMYOSARCOMA
CARCINOMA

SECONDARY ORBITAL:
TUMOURS

INVADE ORBIT FROM
ADJACENT STRUCTURES OR
METASTASIS

MALIGNANT NASOPHARYNGEAL TUMOURS

LIPODYSTROPHIES

: DIABETIC EXOPHTHALMIC DYSOSTOSIS
XANTHOMATOSIS

THERAPY OF ORBITAL DISEASES.

- ENAD

-SURGERY

EXENTERATION

ORBITOTOMIES

ENUCLEATION

EVISCEATION

ORBITAL DECOMPRESSION

EMPTY SOCKET RECONSTRUCTION

ENDOCRINE EXOPHTHALMOS. THYROID OPHTHALMOPATHY

INJURIES OF ORBIT

: PROPTOSIS

PENETRATING

NON-PENETRATING INJURIES

BLOW OUT FRACTURES.

TRAUMATIC ENOPHTHALMOS

FRACTURES OF BASE OF SKULL

FOREIGN BODIES

:

INTRAOCULAR

INTRAORBITAL

INVESTIGATIONS

MANAGEMENT

OCULAR MANIFESTATIONS OF SYSTEMIC DISORDERS

IMMUNOPATHOLOGICAL PROCESSES OF EYE

AUTOIMMUNE DISORDERS

HAEMATOLOGICAL

INFECTIOUS DISEASES

AQUIRED IMMUNE DEFICIENCY SYNDROME : AIDS, HIV

ENDOCRINE DISORDERS

DISORDERS OF METABOLISM

OCULAR & SYSTEMIC FEATURES OF MUSCULAR DISORDERS

INHERITED DISORDERS :

DOWNS

STURGEWEBER

NEUROFIBROMATOSIS

MARFAN'S

VON-HIPPAL LINDAU

MACULA

INVESTIGATIONS :

FUNDUS FLUORESCIN ANGIOGRAPHY
INDOCYANINE ANGIOGRAPHY
OPTICAL COHERENCE TOMOGRAPHY

DISEASES

: ARMD, CSR, CMO
MYOPIA & MANAGEMENT
CHOROIDAL FOLDS
ANGIOD STREAKS
TOXIC MACULOPATHIES
MACULAR SURFACE DISORDERS
: EPIRETINAL MEMBRANE
IDIOPATHIC MACULAR HOLE
VITREORETINAL TRACTION
SYNDROME

TRANS PUPILLARY THERMOTHERAPY (TTT)
PHOTODYNAMIC THERAPY(PDT)

HEREDITARY FUNDUS DYSTROPHIES

ELECTROPHYSIOLOGICAL TESTS : ERG, EOG

PHOTORECEPTOR DYSTROPHIES : RETINITIS PIGMENTOSA
STATIONARY NIGHT
BLINDNESS
CONE DYSTROPHY
LEBER CONGENITAL AMAUROSIS

DYSTROPHY OF RPE : BEST VITELLIFORM MACULAR DYSTROPHY
STARGARDT'S MACULAR DYSTROPHY
FUNDUS FLAVIMACULATUS
FAMILIAL DOMINANT DRUSEN
SORSBY PSEUDO-INFLAMMATORY
MACULAR DYSTROPHY
NORTH CAROLINA MACULAR DYSTROPHY

CHOROIDAL DYSTROPHIES: CHOROIDEREMIA
GYRATE ATROPHY
CENTRAL AREOLAR CHOROIDAL
DYSTROPHY
DIFFUSE CHOROIDAL ATROPHY

VITREORETINAL : STICKLER SYNDROMES
DEGENERATIONS CONGENITAL RETINOSCHISIS
FAVRE GOLDMANN SYNDROME
FAMILIAL EXUDATIVE VITREORETINOPATHY

ALBINISM

CHERRY RED SPOT

VITREOUS

VITREOUS

: DEVELOPMENT
ABNORMALITIES
ASTEROID HYALOSIS
SYNCHYSIS SCINTILLANS
AMYLOIDOSIS
SPONTANEOUS VITREOUS
HAEMORRHAGE

INFLAMMATION: VITRITIS
PVR
VITREAL COMPLICATIONS
OF CATARACT SURGERY

VITRECTOMY : PARS PLANA VITRECTOMY
FOR SELECTED MACULAR DISEASE
COMPLICATIONS OF PPV
SUTURELESS VITRECTOMY
WIDE ANGLE SYSTEM.

GENETICS IN OPHTHALMOLOGY

FUNDAMENTALS OF HUMAN MACULAR GENETICS

GENETIC DISORDERS : MUTATIONS
 DNA BASED DIAGNOSIS
 TRANSMISSION OF GENETIC DISORDERS.

MONOGENIC
POLYGENIC : MULTIFACTORIAL

TREATMENTT & PREVENTION OF GENETIC DISEASES

CONCEPT OF GENE THERAPY
GENETIC SCREENING
COUNSELLING

INDICATIONS & METHODS OF PRENATAL DIAGNOSIS

DISEASE OF CNS WITH OCULAR MANIFESTATIONS

SYMPTOMS- HEADACHES AND FACIAL PAIN
-TRANSIENT VISUAL LOSS

PATHOLOGY- TUMOURS, INFECTIONS,
NEURO-DEGENERATIVE DISEASES
TRAUMA, DRUGS, TOXINS

VASCULAR DISORDERS- ANEURYSMS
-CAROTID CAVERNOUS FISTULA &
DURAL SHUNTS
-AV MALFORMATIONS

VISUAL PATHWAY &
NEUROLOGICAL DISORDERS

: HISTORY
NEURO OPHTHALMIC
EVALUATION
VA, VISUAL FIELDS
COLOUR PERCEPTION
EXTRAOCULAR MOVEMENTS
NYSTAGMUS
FUNDOSCOPY – PAPILLOEDEMA
↑ OPTIC ATROPHY

MODERN IMAGING
TECHNIQUES

ULTRASOUND
MRI
MR ANGIOGRAPHY
DIGITAL SUBTRACTION
ANGIOGRAPHY
CONVENTIONAL ANGIOGRAPHY
PLAIN X RAYS
CONTRAST CT
GADOLINIUM DIETHYLENE TRIAMINE
CHELATAL COMPOUND FOR MRI

FUNCTIONAL MRI

POSITRON EMISSION TOMOGRAPHY (PET)

SINGLE PHOTON EMISSION COMPUTED TOMOGRAPHY (SPECT)

DOPPLER ULTRASONOGRAPHY (ORBITAL & CEREBRAL VASCULAR
STUDY)

OCULAR MOTOR SYSTEM & NEUROMUSCULAR DISORDERS

EXTRAOCULAR MUSCLE PARESIS
SKEW DEVIATION

NYSTAGMUS

:AETIOPATHOGENESIS &
CLASSIFICATION
ETIOLOGY, DIRECTION
PATTERN OF MOVEMENT

PATHOLOGICAL-

CONGENITAL
ACQUIRED.

D/D
EVALUATION & TREATMENT
INDICATIONS OF SURGERY

VASCULAR MALFORMATION OF CNS
CEREBRAL HAEMORRHAGE & THROMBOSIS
CORTICAL BLINDNESS
GIANT CELL ARTERITIS
MIGRAINE
D/D OF HEADACHE
INFECTIONS
ENCEPHALITIS
DEMYELINATING DISEASES
INTRACRANIAL TUMOURS
HYDROCEPHALUS.
HEAD INJURY
HEREDITARY & DEGENERATIVE DISEASES.

THE EFFERENT VISUAL SYSTEM- SUPRANUCLEAR, NUCLEAR,
FASCICULAR DISORDERS
PARESIS OF CRANIAL NERVES, OPHTHALMOPLEGIAS, ISOLATED
NERVE PALSIES
OCULAR MYOPATHIES

MISCELLANEOUS

- OCULAR TRAUMA- VARIOUS TYPES (PHYSICAL, CHEMICAL,
RADIATIONAL, THERMAL)
- INTERNATIONAL TRAUMA SOCIETY CLASSIFICATION
- OCULAR MANIFESTATIONS IN HEAD INJURY
- OCULAR MANIFESTATIONS OF SKIN DISORDERS
- PREVENTIVE AND SOCIAL MEDICINE IN OPHTHALMOLOGY
 - BLINDNESS: DEFN, STATISTICS, CLASSIFICATION, CAUSES
PREVENTION, MANAGEMENT
- NATIONAL PROGRAMME OF PREVENTABLE BLINDNESS (NPCB)
- VISUAL DISABILITY -DEFINITION
- VISUAL ACUITY PREREQUISITES FOR DRIVING LICENSE
- RECENT ADVANCES IN THE FIELD OF OPHTHALMIC MEDICINE AND
SURGERY APPROVED BY FDA

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