



Department of
Orthopaedic Surgery

Activity Report 2006 - 2007



Ganga Hospital
Coimbatore, India.

Founders



Mrs Kanakavalli Shanmuganathan & Dr. J.G.Shanmuganathan

*Their vision, commitment and hard work laid foundation for this institution ...
...By example, they continue to inspire us.*

Vision

To build a unit that would showcase to the world the best in patient care, surgical expertise, academics, medical ethics and state-of-the art technology.

To be a unit which will be a pride of our country.

Mission

To provide quality treatment at affordable cost so that the expertise will not be denied to any citizen of our country.

*C*ontents

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Highlights of 2006 - 2007

Clinical Work	2006	2007
New Out-patient registrations :	21,234	27,540
Admissions :	6127	6267
Surgeries:	5300	6194

Events

- Reference and Research Centre for Computer Navigated Surgery, March 2006.
- Shift to the New Premises, April 2007.
- Inauguration of the 'Shoulder & Elbow Unit', April 2007.
- Inauguration of 'Uyir' (A People's Movement Against Road Accidents), September 2007.

Salient Awards

- Eurospine Open Paper Award 2008.
- Harvard Medical International - Wockhardt Award for Medical Excellence, 2007.
- Asia Pacific Orthopaedic Association - Spine Award, 2007.
- ASSI Depuy Publication Award, 2006 & 2007.
- Clinical Excellence Award for Computer Assisted Surgery, 2006.
- ASSI Depuy Spine Research Award, 2005 & 2006.
- V T Ingahalikar Gold Medal ASSICON - 2006.

Prestigious Orations

- Prof. Vyageswaradu Oration, Guntur 2006.
- Presidential Oration, Indian Orthopaedic Association, Delhi 2006.
- Dr. Rajammal P. Devadas Annual Oration, 2007.
- Hari Om Ashram Prerit Dr.S.Rangachari Research Oration, 2007.

Courses Conducted

- Ganga Intelligent Knee Surgery Course, July 2006.
- Asia Pacific Orthopaedic Association Operative Spine Course, March 2007.
- Ganga Shoulder and Elbow Course, April 2007.
- Comprehensive Trauma Life Support Course, September 2007.
- 11th National Conference of International Trauma Anaesthesia & Critical Care Society, September 2007.

Community Service

- Project Helpline - Deformity Correction Surgery for Children.
- First Aid training programme for transport drivers.
- First Aid awareness programme for College Students.
- Free Ganga - St John's Ambulance Trauma Service, Tirupur.
- Accident Helpline Centers on National Highway, NH 47, Coimbatore

"The future depends on what we do in the present"

Looking back & moving forward



It has been a decade and five years since the inception of the Orthopedics unit. Reflecting on past performances and evaluating our strengths and limitations have allowed us to reinforce our commitments and move forward with confidence.

The most important happening of 2007 was the shift to the new premises. With a built-in area of 3,20,000 sq feet, 420 patient beds, 17 operating theatres, in-house state of art radiology, laboratory and blood bank services, the dream to create a specialty hospital has come true. This has been achieved by the commitment and hard work of the entire team fuelled by the 'Ganga Spirit' derived from the passion of working towards common aims and goals.

It will be our endeavor to continuously strive to create a unit that would showcase to the world the best in patient care, surgical expertise, academics, medical ethics and state-of-the-art technology.

Fuelling our efforts will be the words of our past President Shri APJ Abdul Kalam “ *As a citizen of India, armed with knowledge, technical expertise and above all a great sense of patriotism, we must realize that small aim is a crime*”.

It is my duty to thank our referring physicians for their support, our patients for their trust and above all God Almighty for his continued blessings.

Best wishes,

Dr. S. Rajasekaran
M.S. (Ortho)., DNB (Ortho)., F.R.C.S.(Ed)., M.Ch (Liverpool)., FACS., Ph.D.
Director and Head, Department of Orthopaedics & Spine Surgery

Ganga Hospital - The Journey

- 17 beds
- 2 Operating Rooms



1978 - 1991



1991-1996

- 42 beds
- 4 Operating Rooms



1996-2007

- 135 beds
- 6 Operating Rooms
- Intensive Trauma Care Unit



2007...

- 420 beds
- 17 Operating Rooms
- 10 bedded Intensive Trauma Care Unit
- Accident & Emergency room
- In-house MRI & CT
- Neurosurgery department

“The work goes on, the cause endures and the dreams shall never die”

Hospital Facilities

In 2007, Ganga hospital moved to a new building situated five minutes away from the old premises.

The hospital was designed by the renowned city architect Mr Ramani Shankar who has built many hospitals and medical centres across India. The hospital is now one of the largest in Asia dedicated to Orthopaedics, Plastic and Accident Surgery.



In-patient Reception



Outpatient Department

Outpatient and Emergency Services

The Outpatient and Emergency department of the hospital caters to around 300 patients every day. There are twenty outpatient examination stations for quick and efficient management of patients without delay.

The Emergency department is equipped with trained doctors and nurses along with facilities for receiving and resuscitating polytrauma victims.



Resuscitation room in Casualty



Out-patient waiting area

Hospital Facilities

Operation Theatres

The 17 operating theatres allow upto 300 operating hours every day. Amongst them, 8 are primarily orthopaedic theatres well equipped with modern instrumentation and imaging systems. An adequate inventory of the various orthopaedic implants is being maintained in the theatre to ensure continuous conduct of surgeries.



Operating theatre with Vectorvision open platform and Iso-C 3 D C-arm which enables computer navigation



Computerised Autoclave Machine

The spine theatre is equipped with two high-end Carl Zeiss microscopes. There are two advanced open platform navigations systems (BrainLab, Germany) and also two Siemens ISO-C 3D C-arms. This makes the unit probably one of the very few in the world which has two such systems operating in the same hospital. This allows for a high turnover of computer navigated surgeries in joint replacement, advanced spine and trauma surgeries.

The operating theatres are also specially designed with infection prevention as the primary aim with required air change facility and the latest computerised autoclave and sterilisation system.

There are also well equipped post-operative wards separately for various specialties and hi-tech intensive care units for trauma and neurosurgery patients with round the clock staff coverage.



Post-operative Ward

Hospital Facilities

In-patient Service

In line with the hospital's policy to cater to all sections of the society, there are,

- 151 Economy rooms
- 31 Comfort rooms
- 6 Executive rooms
- 6 General wards

Patient rooms have been designed keeping in mind the growing trends of medical tourism.

The 6 executive suites allow patients to not only have treatment in privacy but also in the comfort of relatives and friends.

The 6 executive suites allow patients to not only have treatment in privacy but also in the comfort of relatives and friends.

The 4 General wards can house up to 25 patients each and has a separate ward solely for female patients.



Executive Suite



General Ward



Blood donation in progress

Blood Bank

The Blood Bank is supervised by 4 medical officers, an administrative officer and 5 transfusion technicians to ensure safe blood transfusion and storage. In addition, the Blood Bank facilitates component separation and storage of blood products.

Apart from meeting the requirements of the hospital it also caters its services to other hospitals in the region. The Blood Bank donates thirty percent of its blood free of cost to the Government hospital for the benefit of the poor and needy.

Several blood donation camps have been organized in association with various voluntary service associations.

Hospital Facilities

Radiology Department

The radiology department received a facelift with the installation of two Fuji CR and one Kodak CR machine, four Siemens radiology units and three mobile X-ray units. This enables to cater to more than 250 patients per day.

The department has also acquired a Multi- Slice CT that has minimised whole body scanning to a few minutes, a 1.5 Tesla MRI and an ultrasound unit.



Dr Rajan performing a hip Ultrasound



Magnetom Symphony 1.5 Tesla Siemens MRI

The MRI machine is loaded with advanced softwares such as 'SPACE' and 'Tensor Diffusion Tracking' which allows research in the fields of physiology of discs, track monitoring in the spinal cord, three dimensional analysis of kypho-scoliosis etc.

The entire department's services are integrated with PACS for easy storage and retrieval of radiological data anywhere in the hospital. PACS also helps in accurate pre-operative planning and documentation of post-operative and follow-up radiographs.



Multi-Slice CT (Somatom Emotion, Siemens, Germany)

Hospital Facilities

Conference facility

One of the highlights of the hospital is the sprawling convention centre. It includes an auditorium with a seating capacity of 420 people and two meeting rooms that can seat 150 people each along with a pre-conference lobby that can hold trade exhibits and a food court. This makes the convention centre the largest conference facility available in the city at present.



Two views of the main auditorium

The convention centre allows audio visual transmission from all major operating theatres to the halls for live surgery workshops.

The centre has recently hosted the 13th Operative Spine Course of the Asia Pacific Orthopaedic Association that telecasted 24 live surgeries to delegates. This was the largest APOA Spine Course comprising of 26 faculty members and 333 participants from 19 countries.



CTLS workshop in progress in the annexe hall

Trade exhibits in the pre-conference lobby of the convention centre during the APOA Course



Team



*“Coming together is a beginning,
Keeping together is progress,
Working together is success”*

- Henry Ford

The hospital is apioneering specialty centre for Orthopaedic, Plastic and Accident surgery. With the inception of the Department of Neurosurgery in 2007 comprehensive in-house care is provided to patients with polytrauma.

The thrust of the clinical work is supervised and guided by Dr S Rajasekaran, Head of the Department of Orthopaedic and Spine Surgery and Dr S Raja Sabapathy, Head of the Department of Plastic, Hand & Micro Reconstructive surgery.



Dr. S. Rajasekaran
*M.S. (Ortho), DNB (Ortho),
F.R.C.S.(Ed), M.Ch (Liverpool),
FACS., Ph.D.*



Dr. S. Raja Sabapathy
*M.S. (Gen), M.Ch. (Plastic),
DNB (Plastic), F.R.C.S (Ed)*



Prof. Dr. M. V. Daniel
M.S. (Gen), M.S. (Ortho), FACS (Ortho)
Academic Director, Department of Orthopaedics

Prof Dr MV Daniel is the Academic Director for the Department of Orthopaedic surgery. Prof M V Daniel's experience as the former Head of the Department, Christian Medical College, Vellore has richly benefitted the unit. He also chairs the Ethics Committee of the department.

Orthopaedic Department

The department comprises of five consultants, seven registrars, seven (spine, trauma, arthroplasty) fellows, four tutors and ten residents. All consultants have special interests and are also closely involved in trauma care with high level input into the day to day functioning of the unit.

Chairman, Orthopaedics & Spine Surgery
Dr S Rajasekaran

Consultants

Dr. J Dheenadhayalan, Dr. T Ajoy Prasad Shetty, Dr. SR Sundararajan, Dr. P Dhanasekara Raja

Senior Registrars

Dr. N Rajkumar, Dr. S Pushpasekar, Dr K Venkatadass

Spine Fellows

Dr. Vijay Kamath, Dr. Ashish Jaiswal, Dr. V Vinod, Dr. R Kiran

Registrars

Dr. B Roy Wilson Armstrong, Dr. Mubarak, Dr. P Ramesh, Dr. K Ramalingam, Dr. K P Srikanth,
Dr. K Dhanasekar, Dr. Vineet Thomas, Dr. Ravikumar

DNB Trainees

Dr. Virupaksha, Dr. A. Devendra, Dr. S Suka, Dr. K V Nagakiran, Dr. Yadav Jayesh Rambhau, Dr. V Sarthy
Dr. M Bala Murugan, Dr. J Arun, Dr. Ravi Chandra Vattipalli, Dr. T Sudhakar



Dr. S. Rajasekaran

*M.S. (Ortho.), DNB (Ortho.), F.R.C.S.(Ed.), M.Ch (Liverpool), FACS., Ph.D.
Director and Head, Department of Orthopaedics & Spine Surgery*

Current Positions

President, World Orthopaedic Concern, UK
President, Association of British Scholars
Vice President, Association of Spine Surgeons Of India
Vice President, Chief National Delegate - APOA
Council Member of Spine & Trauma Section, APOA

Academic Posts

Hon. Member - Faculty of Medicine, Annamalai University
Member - Doctoral Committee, Anna University

Awards

EuroSpine Open Paper Award - 2008.
Harvard Wockhardt Medical Excellence Award, 2007.
ASSI DePuy Spine Research Award, 2005, 2006.
Sofamer Danek Award of ISSLS 1996, 2002, 2006.
ISSLS - McNab LaRocca Award, 2005.
ISSLS PRIZE, Clinical Sciences, 2004.
Hari Om Ashram Alembic Research Award, 2004.
Silver Jubilee Oration Award - IOA, 2003.
Silver Jubilee Research Award by MCI, 2002.
Tamilnadu Government Scientist Award, 2000 .

Reviewer

Journal of Bone and Joint Surgery (B).
INJURY Journal, UK.
Journal of Orthopaedic Surgery, Hong Kong.
Journal of Orthopaedic Science, Japan.
European Spine Journal.
Indian Journal of Orthopaedics.

Examiner

National Board of Examinations, New Delhi.

Dr S Rajasekaran had a brilliant academic career and was the best outgoing student of Coimbatore Medical College in 1983 and also stood *First in the University of Madras* in the Orthopaedic Post Graduate Examinations in 1987. He received higher training in Orthopaedics in UK from 1987 to 1991 and obtained his FRCS, Edinburgh in 1989.

He stood first in his MCh Orthopaedic Exam, Liverpool in 1990 and was awarded the *Khazenter Medal* for the best performance and *Norman Roberts Medal* for the Best Thesis of the year. He completed his PhD in 2000 and is one of the very few orthopaedic surgeons in India with the degree in clinical sciences.

His special interests are Spine surgery and the management of severely injured limbs with open injuries. His research on the natural history and progression of deformity in spinal tuberculosis has been highly appreciated in many international meetings and has been published in peer review journals. He has led basic science research on the biology of the lumbar discs which has focused on the diffusion patterns in those discs.

He has been instrumental in the evolution of the Ganga Open Injury Severity Score which helps making decisions regarding salvage and prognosticating outcome in severely injured limbs.

Orthopaedic Consultants



Dr. P Dhanasekara Raja
D.Orth., D. NB (Orth)

Dr. S.R.Sundararajan
M.S. (Ortho)

Dr. J.Dheenadhayalan
M.S. (Ortho)

Dr. Ajoy Prasad Shetty
M.S. (Ortho), D.NB (Ortho)

Dr. J.Dheenadhayalan joined the department in 1992 and became Consultant in 1998. Trained in basic Orthopaedics from Mysore, he underwent advanced training at Nuffield Orthopaedic Centre, U.K. and a fellowship in Joint Replacement Surgery, Germany. He was the Organising Secretary of the Indo German Orthopaedic Foundation Meeting, 1999 and the Ganga Shoulder-Elbow course in 2007. A founder member of the trauma section of Asia Pacific Orthopaedic Association, he is currently the Council Member of AO Foundation, India. He is the Secretary General elect for the World Orthopaedic Concern.

Associated with the department since 1994 Dr. Ajoy Prasad Shetty became a consultant in 2000. Initially trained from Bangalore he had advanced training in Spine Surgery at Adelaide, Australia. He was the Organising Secretary for the APOA Operative Spine Course in 2007. He is a regular faculty at AO Spine Courses and was awarded the ISSLS International Fellowship for the year 2007. He is also the co-author of the scientific papers which won the ISSLS Prize 2004 and EuroSpine Award 2008.

It has been a decade since Dr. S.R.Sundararajan has been a part of the unit. After receiving advanced training in Arthroscopy and Arthroplasty at Flinders Medical Centre, Australia he returned in 2004 to become Consultant at Ganga Hospital. He has presented papers on trauma at the Asia Pacific Orthopaedic Association meetings and is a regular faculty at National Conferences. He recently visited Arthroscopy centres in France to the current trends in arthroscopy.

Dr. P Dhanasekara Raja has been a Consultant since 2006. He had his basic Orthopaedic training at Stanley Medical College, Chennai and then at Ganga Hospital, Coimbatore. He had completed Fellowships in Arthroplasty and Arthroscopy at Flinders Medical Centre, Adelaide and Fairfield Hospital, Sydney, Australia. He won the "Mohandass Weller Gold Medal" for best paper at IGOF Meeting, Nov, 2005. He was also the Organising Secretary for the Intelligent Knee Course, 2006.

Orthopaedic Department



Senior Registrars - Dr Rajkumar, Dr Pushpasekar, Dr Venkatadass



Registrars : Dr Ramesh, Dr Dhanasekar, Dr Mubarak, Dr Armstrong, Dr Ramalingam, Dr Srikanth, Dr Vineet, Dr Ravikumar

Dr Pushpasekar M.S.Orth., is an alumni of Raja Muthaiah Medical College, Chidambaram who is a senior registrar since 2006. His areas of interest are trauma and shoulder surgery.

Dr Rajkumar joined as a registrar in 2005 after completing his M.S.Orthopaedics at Sri Ramachandra Medical College, Chennai. His special interests are trauma and arthroplasty and has presented papers at the Asia Pacific Arthroplasty Meeting, Shanghai. He was also the Organising Secretary of the "Ganga Intelligent Knee Course 2006".

Dr Venkatadass M.S.Orth., DNB Orth., joined as a registrar in 2006. Trained at Manipal University and then at the Balaji Insitute, Tirupati with special focus in paediatric orthopaedics he is actively involved in the research activities of the department and his areas of interest are trauma and paediatric orthopaedics.

Radiology

Dr.K.Rajan joined Ganga Hospital in April 2007 as the Head of the Department of Radiology. He has had his basic training in radiology at Madras Medical College, Chennai in 1987. He was formerly working as Consultant Radiologist at Malar Hospital, Chennai and then the Director, Precision Diagnostics Pvt Ltd., Chennai from 1995 to 2007. His area of special interest is Musculo Skeletal Radiology.



Dr K Rajan



Dr G Venkatesh

Neurosurgery

Dr G Venkatesh joined Ganga Hospital as a Consultant in the Department of Neurosurgery in 2007. He had his neurosurgical training from Madurai Medical College, followed by fellowship in Neurosurgical Oncology at National Neuroscience Institute, Singapore in 2006. He has published many papers in National and International journals. His special interests are neuro-oncology and severe head injuries.

Anaesthetic Consultants



Dr.J.Balavenkatasubramanian, Dr Prabhu, Dr.V.Ravindra Bhat, Dr.C.Sekar,

Dr. V. Ravindra Bhat joined the Department of Anaesthesia in 1993. Graduated from Coimbatore Medical College he did his post graduation in Anaesthesia from Madras Medical College. His special interests are in resuscitation of polytrauma patients and anaesthesia for upper limb injuries and reconstructive microsurgery.

Dr. C. Sekar joined as a consultant in 1995. After medical graduation he worked as medical officer in a polyclinic for 10 years and later completed his Post graduation in anaesthesia from KMC, Manipal. His special interest is in anaesthesia for spine surgeries and ultrasound guided nerve blocks.

Dr. J. Balavenkatasubramanian has been associated with GangaHospital from 12 years. He graduated from Coimbatore Medical College and did his Post graduation from PGI, Chandigarh and Diploma in Anaesthesia from BJ Medical college, Pune. He is currently the Assistant Editor of Journal of ITACCS, Indian chapter and peer reviewer for Indian Journal of Anaesthesia. He serves as a CTLS course instructor and has special interest in regional anaesthesia, geriatric anaesthesia and trauma anaesthesia.

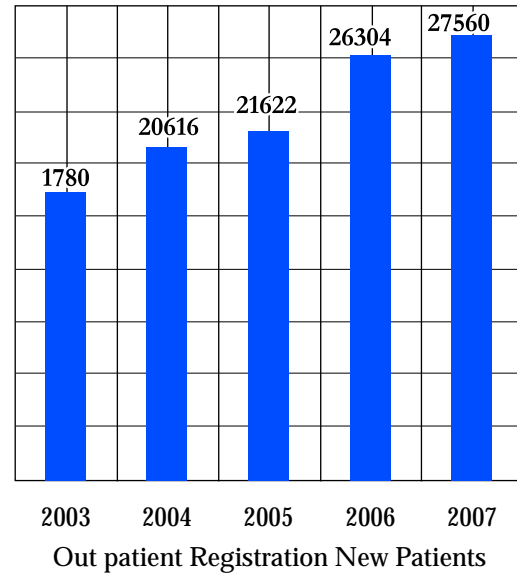
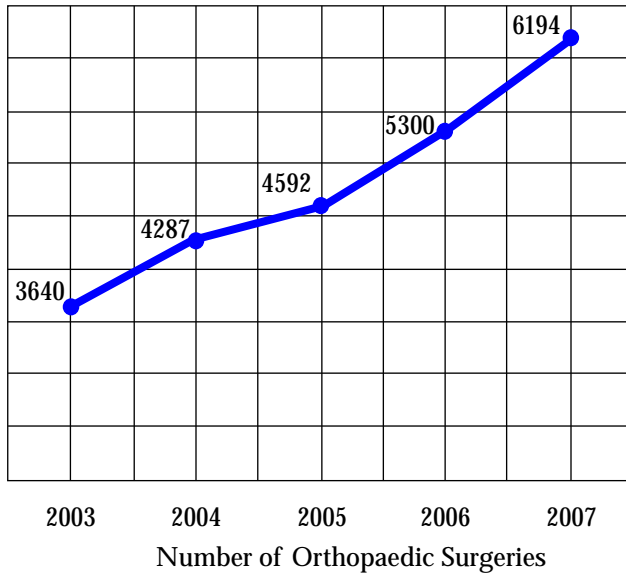
Dr. Prabu Chinnaswamy joined the Department as a Consultant in 2007. He has completed his basic anaesthesia training in 1999 from Stanley Medical College. He had further training at United Kingdom from 2001-2004 and obtained a Fellowship from Royal College of Anaesthetists, Ireland and Membership of Royal College of Anaesthetists, UK. His special interests are Neuro Anaesthesia & Critical Care Management of Trauma patients.

Anaesthesia Registrars



Dr. Boopathy, Dr.Maheshwari , Dr. Sathish, Dr. Rajkumar, Dr. Vivekanandan, Dr. Meenakshi, Dr. G. Venkateswaran, Dr. Snehalatha.

Clinical Work



“In nothing do men more nearly approach the Gods than in giving health to men”

- Cicero



The unit stands as one of the premier institutes in the field of Orthopaedic surgery in this part of the world. In 2007, the Orthopaedic Department catered to 27560 new outpatients, 98000 total outpatients, 6487 orthopaedic admissions and 6194 major surgeries.

This clinical load is managed by a team of surgeons who are committed to the common aim of better clinical and patient care. The medical staff is amply supported by a dedicated team of nurses and excellent infrastructure. The clinical work is also periodically audited to make sure that high standards are maintained at every stage of treatment.

The increase in workload is supported by the upgradation of facilities in the new premises. An entire floor of the Out patients department allows the servicing of more than 300 outpatients per day.

All investigations have been made available in-house so that the process of consultation, investigations and review are made on the same day without any waiting period. This is a boon to many patients who are travelling from all over the country.

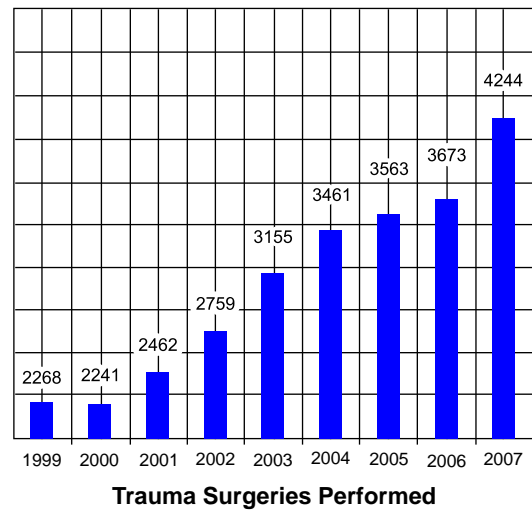
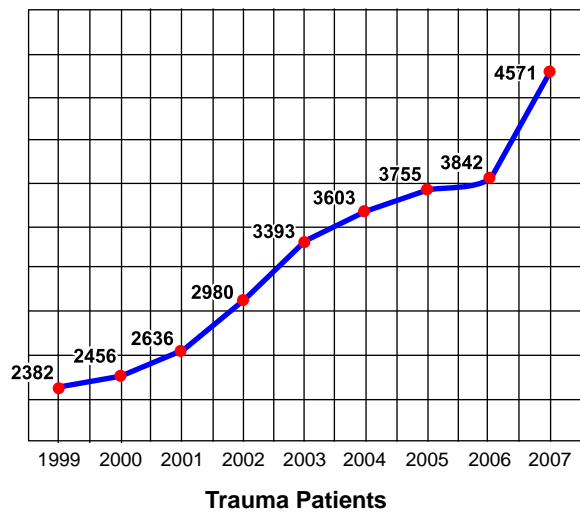


Severe III B injury of leg- salvaged to good function by orthopaedic & plastic surgery reconstructive procedures

The staff pattern is well-structured to provide specialized care to patients. All consultants provide trauma cover and lend their expertise on trauma admissions. They have built a team that is capable of delivering efficient treatment in their chosen field of interest. Every effort is aimed at maintaining a high standard of care at all stages of the treatment including physiotherapy and rehabilitation.



Trauma



*“The next best thing to creating life
is to save one”*

The trauma work has increased considerably following the expansion of the unit. A full-fledged Intensive Trauma Care Unit, a neurosurgery unit and on-call cardiothoracic and general surgery facilities cater to poly trauma patients. The outpatient fracture clinic caters to more than 100 patients per day. The number of trauma surgeries saw an increase from 3563 procedures in 2005 to 4244 procedures in 2007.

The increase in work load is a direct reflection of the good results achieved and the patients' confidence in the team which provides consultant level input to trauma patients. The anaesthetic, orthopaedic and the plastic surgery teams work hand in hand from resuscitation to the post operative care and rehabilitation.

New trends in the treatment of severely injured limbs, especially in the management of open injuries has been evolved by the Ganga team. New principles such as 'On-arrival blocks', the evolution of 'Ganga Hospital Score for Open Injuries of Limbs', 'Safe Indication for Primary Closure in Open injuries', 'Primary bone grafting in suitable open injuries' and 'Global reconstruction of soft tissue and bone defects in suitable open injuries' have been presented and published in international journals.



A polytrauma patient being resuscitated



CT Angiogram with 3 D Reconstruction showing fracture humerus and brachial artery rupture

Upper limb Fractures

Year	2006	2007
Fractures around Shoulder	104	112
Humerus Fractures	133	132
Fractures around Elbow	164	136
Forearm Fractures	299	358
Distal Radius Fractures	358	354
Dislocations & Miscellaneous	95	112
Total	1153	1204

Lower limb Fractures

Year	2006	2007
Fractures around Hip & Pelvis	445	585
Femur Fractures	202	262
Fractures around Knee	396	445
Tibia Fractures	386	454
Ankle Fractures	198	241
Dislocations & Miscellaneous	112	107
Total	1739	2094

Year	2006	2007
Total	2892	3298

Trauma

The trauma workload is managed by five consultants, three senior registrars, four registrars and ten residents of the hospital. Special emphasis is made to ensure consultant level input irrespective of the severity of trauma.

The availability of five theatres dedicated to trauma surgery and an in-house trauma anaesthetic team available 24 hours of the day allows life-saving damage control surgeries to be started without any delay.

Advanced diagnostic facilities like CT angiogram and MRI are also available at any time of the day. This ensures the least possible time without any delay for a severely injured patient to be processed and have surgery. All the trauma theatres are fully equipped with advanced fracture fixation equipments and image intensifiers.

There is also adequate inventory of all implants and instrumentation which allows simultaneous and continuous trauma surgeries to be performed in all the theatres. The eight bedded Intensive Trauma Care Unit also helps in the pre and post-operative management of very sick and polytraumatised patients.



A comminuted Type IIIB supracondylar fracture of the femur with a large irregular wound over the anterior aspect of the knee joint. The wound was managed with immediate debridement and day-one global reconstruction & primary closure of skin.

Trauma Procedure

Trauma Surgery	2006	2007
Interlocking Nailing	532	696
Plate Osteosynthesis	874	1023
Hemiarthroplasty	97	137
Dynamic Hip Screw Fixation	201	245
Dynamic Condylar Screw Fixation	78	86
Cancellous Screw Fixation	381	434
Percutaneous pinning	448	435
Tension Band Wiring	115	122
Limb reconstruction for bone loss	65	32
Miscellaneous	882	1034
Total	3673	4244

Limb reconstruction procedures along with the availability of micro vascular reconstructive capacity has led to the salvage of many severely injured limbs which would have otherwise been amputated.

Surgeries for open injury are performed as an emergency procedure at any time of the day which leads to excellent results without infection and also good functional outcome.

In 2007, 4244 trauma surgical procedures were performed accounting for nearly 12 to 15 procedures every day. 696 interlocked nailing procedures and 1023 plate osteosynthesis were done for long-bone fractures. Apart from primary injuries, the unit also operates on neglected and failed osteosynthesis referred from other units. 174 non-unions were treated in 2006 and 199 in 2007.



Grade IIIC open injury with near total amputation of leg which was successfully reimplemented with good functional outcome.



Grade IIIB open fracture of both bones leg with bone loss. Debridement, flap cover and bone transport with limb reconstruction system was done. Good union and functional outcome was achieved.

Trauma - Research

A score for predicting salvage and outcome in Gustilo type III A and type III B open tibial fractures.

Limb injury severity scores are designed to assess severely injured limbs and help the surgeon in deciding salvage. The existing scoring systems have the disadvantage of being designed to assess limb injuries with vascular injuries and are not very sensitive when used for III B injuries.

Ganga Hospital Open Injury Severity Score was evolved to overcome the above disadvantages. The severity of injury to the covering structures, skeletal structures and musculotendinous & nerve units were assessed individually on an incremental score of one to five. Seven Co-morbid conditions known to influence the management and prognosis were each given a score of two.

The total score was used to predict salvage and a score of 14 had the highest specificity and sensitivity for indicating amputation. The individual scores for covering and functional tissues were also found to offer specific guidelines in the reconstruction protocols of these complex injuries.

The Ganga Hospital Injury severity score	
	Score
Covering structures: skin and fascia	
Wounds without skin loss	
Not over the fracture	1
Over the fracture	2
Wounds with skin loss	
Not over the fracture	3
Over the fracture	4
Circumferential wound with skin loss	5
Skeletal structures: bone and joints	
Transverse (oblique fracture) (unifocal) (segmental) (bifocal) (circumferential)	1
Longitudinally (segmental) (bifocal) (circumferential)	2
Comminuted (segmental) (fracture) (without bone loss)	3
Bone loss < 4 cm	4
Bone loss > 4 cm	5
Functional tissues: musculotendinous (MT) and nerve units	
Partial injury to MT unit	1
Complete but repairable injury to MT unit	2
Irreparable injury to MT unit (partial loss of compartment) (complete injury to posterior tibial nerve)	3
Loss of one compartment of MT unit	4
Loss of two or more compartments (below amputation)	5
Co-morbid conditions: add 2 points for each condition present	
Injury - debridement interval > 12 hours	
Salvage or organic contamination/forward injuries	
Age > 55 years	
Drug alcohol or tobacco with any of the following disease leading to increased anaesthetic risk	
Polytrauma involving chest or abdomen with injury severity score > 25 (not applicable)	
Hypotension with systolic blood pressure < 90 mmHg at presentation	
Another major injury to the same limb (compartment syndrome)	



A Polytrauma patient

The purpose of this study is to study the pattern of serum lactate levels in polytrauma patients before and after resuscitation and to evaluate the role of serum lactate levels in predicting the outcome with regard to mortality and morbidity.

Delayed serum lactate clearance after 24 hours is associated with increased risk of wound infection and development of multi organ failure and elevated levels of lactate after 48 hours has increased mortality.

Safe Indications for Immediate Primary Skin Closure in Type III Open Injuries - Long term Results of a prospective study.

Immediate direct skin closure in open injuries is controversial, the safety and indications of which are not yet clear. We analysed the results of a prospective study of immediate direct skin closure in Gustilo Type III injuries performed with specific indications. The indications were that wounds without skin loss either primarily or secondarily after debridement, a Ganga Hospital Score Skin Score of 1 or 2 and a total Score of 10 or less; injury-debridement interval less than 12 hours; presence of bleeding wound margins; wound edges approximated without tension; no sewage or organic contamination, and no peripheral vascular diseases. Our results showed that 95% of our patients went on for good wound healing without any complications. Primary closure of open injuries, although controversial, is a safe procedure when performed with the above mentioned specific indications.



A Type IIIB supracondylar fracture of femur with a large wound over anterior aspect of the knee. After debridement and skeletal stabilization, the skin edges could be closed without tension resulting in excellent outcome.

Clinical Randomisation of an Antifibrinolytic in Significant Haemorrhage



CRASH 2 is a large randomized placebo controlled trial to study the effects of an antifibrinolytic agent among trauma patients with or at risk of significant haemorrhage. It aims to determine the effect of the early administration of the antifibrinolytic agent tranexemic acid (TXA) on death and transfusion requirement in adult trauma patients with ongoing significant haemorrhage or those at risk of significant haemorrhage.

This global trial is being conducted all around the world in many centers and Ganga Hospital is selected as one of the centers for the conduct of this trial. If a widely practicable treatment such as TXA could reduce blood loss following trauma then this might prevent thousands of premature trauma deaths each year and could also reduce exposure to the risks of blood transfusion.

Trauma - Publications

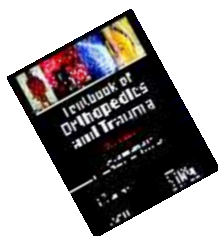


A philosophy of care of open injuries based on the Ganga hospital score

Dr S. Rajasekaran , Dr S Raja Sabapathy
INJURY , Int. J. Care Injured 2007

A Score for predicting salvage and outcome in Gustilo type III-A & type III-B open tibial fractures.

Rajasekaran S, Dheenadhayalan J, Shetty A.P, Sundararajan SR, Kumar M, Raja Sabapathy S.
JBJS 2006: Volume 88-B, No.10, October 2006.



Open Fractures: Ch 158, Text book of Orthopaedics and Trauma, GS Kulkarni, 2nd Edition, JAYPEE publications:1279-1305

Rajasekaran S

Early versus delayed closure of open fractures

Dr S. Rajasekaran
INJURY , Int. J. Care Injured 2007

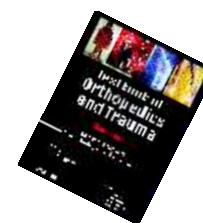


Spontaneous rapid osteolysis in Paget's disease after internal fixation of subtrochanteric femoral fracture.

Khurjekar KS, Vidyadhara S, Dheenadhayalan J, Rajasekaran S.
Singapore Med J. 2006 Oct;47(10):897-900.

Diaphyseal Fractures of Tibia and Fibula in Adults: Ch 221, Text book of Orthopaedics and Trauma, GS Kulkarni, 2nd Edition, JAYPEE publications:2138-2161

Rajasekaran S, Dhanasekara Raja, SR Sundararajan



Technical considerations and functional outcome of 22 major replantations.

Raja Sabapathy S, Venkatramani H, Ravindra Bharathi R, Dheenadhayalan J, Ravindra Bhat V, Rajasekaran S.
Journal of Hand Surgery(European) 2007;32E:488-501.

Trauma - International Presentations

“Long term results of Primary bone grafting in Type IIIA and Type IIIB open injuries”

Dr S Rajasekaran

15th Triennial Congress of Asia Pacific Orthopaedic Association, Seoul, Korea - September 9-13, 2007.

“A score for predicting salvage and outcome in Gustilo Type-III A & Type-III B open tibial fractures”

Dr S Rajasekaran

15th Triennial Congress of Asia Pacific Orthopaedic Association, Seoul, Korea - September 9-13, 2007.

“Can Management outcomes be predicted in Type-III A & B open injuries? A Prospective evaluation of 293 open injuries”

Dr S Rajasekaran

15th Triennial Congress of APOA, Seoul, Korea - September 9-13, 2007.

“Primary closure in open injuries - Is it advantageous or adventurous?”

Dr S Rajasekaran

15th Triennial Congress of APOA, Seoul, Korea - September 9-13, 2007.

“Post Traumatic one bone forearm reconstruction”

Dr S Rajasekaran

15th Triennial Congress of APOA, Seoul, Korea - September 9-13, 2007.

“Management of Post Traumatic Bone Loss in Femoral fractures”

Dr S Rajasekaran

36th Malaysian Orthopaedic Association - 2nd APOA Trauma Society Meeting, Kuala Lumpur; Malaysia - 14 June 2006.

“Ganga Hospital Score in Assessment of Complex Open Tibial fractures”

Dr S Rajasekaran

36th Malaysian Orthopaedic Association - 2nd APOA Trauma Society Meeting, Kuala Lumpur; Malaysia - 14 June 2006.

“The Mangled Foot”

Dr J Dheenadhayalan

36th Malaysian Orthopaedic Association - 2nd APOA Trauma Society Meeting, Kuala Lumpur; Malaysia - 14 June 2006.

“Beyond the golden hour - the silver day”

Dr J Dheenadhayalan

36th Malaysian Orthopaedic Association - 2nd APOA Trauma Society Meeting, Kuala Lumpur; Malaysia - 14 June 2006.

“Acute pain management in polytrauma”

“Anaesthetic considerations in geriatric trauma”

Dr J Balavenkat

Srilankan National Anesthesia Conference, Colombo - January 2006.



Dr. S Rajasekaran at Singapore Orthopaedic Society Annual Meeting



Dr. J Dheenadhayalan at APOA Trauma Section Meeting, Kuala Lumpur



Dr. Balavenkat delivering a lecture at National Srilankan Anaesthesia Conference

Trauma - National Presentations



Dr. S Rajasekaran at ASICON 2007, Bhuvaneswar.



Dr. N Rajkumar at TNOACON 2007.



Dr. S Rajasekaran delivering a lecture at TNOACON.

“Multiple Fractures: Priority of Management”

Dr S Rajasekaran

Continuing Orthopaedic Education 2007, Kolkata - September 20-23, 2007

“ Spinal fractures - Controversies in Operation ”

Dr S Rajasekaran

Continuing Orthopaedic Education 2007, Kolkata - September 20-23, 2007

“Deciding Salvage and Reconstruction Options in severely injured limbs ”

Dr S Rajasekaran

11th National Conference of International Trauma Anaesthesia & Critical Care Society (Indian Chapter), Coimbatore - September 7-9, 2007

“Available Scoring Systems and their relevance in Open Injuries of Lower Limbs”

Dr S Rajasekaran

First Instructional Course in Plastic Surgery, Tamilnadu & Pondicherry Association of Plastic Surgeons - CME Lower Limb Reconstruction, Coimbatore - July 7 - 8, 2007.

“Posterior lip acetabular fracture” - How I do it?: Video demonstration.

Dr S Rajasekaran

Tamilnadu Orthopaedic Association Conference, Erode - February 9-11, 2007,

“ Management of Grade IIIB Compound fracture tibia - What is new?”

Dr. S. Rajasekaran

Tamilnadu Orthopaedic Association Conference 2006, Chennai - March 3-5, 2006

“Non-Union following Interlocking Surgery”

Dr S Rajasekaran

International Nailscon-2006, Coimbatore - April 2006.

“ Interlocking Nailing in Proximal Tibial Fractures “

Dr S Rajasekaran

International Nailscon-2006. Coimbatore, 21 April 2006

“Open fracture and soft tissue injury ”

Dr S Rajasekaran

24th Mangalore Orthopaedic Course 2006, Mangalore, 29 April 2006

“Skeletal fixation in open injuries”

Dr Ajoy Prasad Shetty

First Instructional Course in Plastic Surgery, Tamilnadu & Pondicherry Association of Plastic Surgeons - CME Lower Limb Reconstruction, Coimbatore - July 7-8, 2007.

Trauma - National Presentations

“ Traumatic Diaphragmatic Rupture - A Phenomenon not to be missed”

Dr N Rajkumar

Tamilnadu Orthopaedic Association Conference, Erode Feb 9th, 2007.

Fixation of proximal humerus fracture - Video demonstration

Dr J Dheenadhayalan

Tamil Nadu Orthopaedic Association Conference, February 2007; Erode

Beyond the golden hour - the silver day

Dr J Dheenadhayalan

Karnataka Orthopaedic Association Conference, February 2007

Cortico Cancellous bone graft for AVN femoral head - An innovative Method

Dr J Dheenadhayalan

TNOACON 2006, Chennai

Proximal Humerus fracture fixation

Dr J Dheenadhayalan

Continuous Medical Education Update at Kakinada, February 2007

Proximal Humerus fractures in elderly

Dr J Dheenadhayalan

Shoulder Elbow Course; April 27th - 29th 2007; Coimbatore

Management of Post traumatic Bone gaps

Dr J Dheenadhayalan

Instructional Course Lecture 2007, Tamilnadu and Pondicherry Association of Plastic Surgeons, Ganga Hospital; Coimbatore

Estimation of Serial levels of Serum Lactate as predictor in outcome of Trauma

Dr Maheshwari S Kumar

ITACCS 2007; Ganga Hospital; Coimbatore.



Dr. S Rajasekaran at APOA Trauma Section Meeting, Kuala Lumpur.



Dr. S Rajasekaran with Prof. Sailendra Bhattacharya at the Silver Jubilee COE, Kolkata - Sep 2007.



APOA Trauma Section Meeting, Kuala Lumpur.

Trauma - National Presentations



Dr. Dheenadhayalan giving a lecture in AO Trauma Course

“Orthopedic management of pelvic fractures”

Dr J Dheenadhayalan

ITACCS September 2007; Ganga Hospital; Coimbatore

“AO Classification”

Dr J Dheenadhayalan

AO educational Update: Pre Basic Course; December 2007; Coimbatore.

“Management of Open Fractures”

Dr J Dheenadhayalan

AO educational Update: Pre Basic Course; December 2007 ; Coimbatore.



Dr. Balavenkat delivering a lecture at ITACCS 2007

“Management of Infections Open Fractures”

Dr J Dheenadhayalan

AO educational Update: Pre Basic Course; December 2007 ; Coimbatore.

“Relative stability fixations”

Dr J Dheenadhayalan

AO educational Update: Pre Basic Course; December 2007 ; Coimbatore.

“Fluid resuscitation in trauma - Correct status”

Dr J Balavenkat

First National Convention on Resuscitation of Indian Society of Anesthesiologists, 2nd December 2007, Mangalore

“Invited lecture - Management of acute pain in polytrauma”

Dr J Balavenkat

The National Conference of Emergency Medicine; 17th & 18th November 2007, Chennai

“Renal Preservation in a polytrauma victim”

Dr J Balavenkat

Kerala State Annual Conference of ISA 27th 28th October, 2007, Calicut.

“Faculty in the workshop of 'Comprehensive trauma Life support CTLS”

“End points of Resuscitation - Panel Discussion”

Dr J Balavenkat

11th National Conference of International Trauma Anesthesia and Critical Care Society,

On 5th -6th September 2007, Ganga Hospital, Coimbatore.

“End points of Resuscitation in Trauma”

Dr J Balavenkat

Indian Society of Critical Care Medicine, Coimbatore Chapter on 5th August 2007

“Anesthesia for major polytrauma”

Dr J Balavenkat

Annual state conference of Anaesthesiologists on 17th June 2007, Andhra Pradesh.

Trauma - National Presentations

“End points of Resuscitation in Trauma”

Dr J Balavenkat

CME, National conference of Indian Society of Critical Care Medicine, 8th February 2007, Cochin.

“Anaesthetic considerations in patient with severe left ventricular dysfunction for emergency limb amputation”

Dr J Balavenkat

HYCOME CME, Hyderabad, August 2006

“Prognosticating outcome in major trauma with biochemical markers”

Dr J Balavenkat

Annual state ISA conference, June 2006, Tanjore.

“Post traumatic pulmonary dysfunction”

Dr J Balavenkat

Annual state conference of ISA, Assam branch, February 2006, Tezpur.

“Anaesthetic considerations in Geriatric patient with Hip fracture”

Dr J Balavenkat

Annual state conference of ISA, Assam branch, February 2006, Tezpur.

“Occult hypotension syndrome in trauma”

Dr J Balavenkat

National conference of International trauma anesthesia and critical care society conference, Sep. 2006, Agra.

“Management strategies of pain relief in trauma”

Dr J Balavenkat

Global update in Pain, Bombay Hospital,
9th & 10th December 2006, Mumbai.

“Anaesthesia for orthopaedic trauma procedures”

Dr J Balavenkat

CME of Indian Society of anesthesiologist, Mallapuram Branch,
11th November 2006.

“Role of regional analgesia in polytrauma”

Dr J Balavenkat

National conference of International trauma anesthesia and critical
care society conference, September 2006, Agra.

“Management strategies of pain relief in trauma”

Global update in Pain, Bombay Hospital, on 9th 10th December
2006, Mumbai.



*Post Traumatic One Bone Forearm
Reconstruction paper won the Gold medal in
TNOACON 2006 Held in Chennai, Feb 9-11*



*Dr. Balavenkat delivering a invited lecture at
NELCON 2007*