


## REPORT

Report on participation of the ICMR International Fellow (ICMR-IF) in Training / Research abroad.

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3. Front-line area of research in which training / research was carried out: Neuro-rehabilitation
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5. Duration of fellowship: 2 Weeks
6. Highlights of work conducted:
  - i) Teaching / expertise acquired: Please see Annexure-1
  - ii) Research results, including any papers, prepared/submitted for publication: n.a.
  - iii) Proposed utilization of the experience in India: Please see Annexure-2

  
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ICMR Sanction No. INDO/FRC/452/(S-12)/2013-IHD dated 26<sup>th</sup> July 2013

### Highlights of work conducted:

During my visit at NGH, Sheffield, UK, I got the unique opportunity to work with various consultants, registrars and paramedical professionals such as physiotherapist, occupational therapist, nurse, speech & language therapist, community nurse planner, prosthetist & orthotist, biomedical engineer among others at neurorehabilitation facility. I also visited and spent quality time in spinal cord injury OPD, operation theatre, uro-radiology clinic, bladder clinic, spasticity clinic, botulinum toxin clinic, adult and paediatric prosthetic clinic, P&O services, foot scanner lab, MDT clinic, FES clinic, Gait Lab and so on.

The Peripheral vascular disease (PVD) was found to be a major cause for the amputation. Throughout my stay at NGH, I had a chance to observe a couple of hip disarticulation, transfemoral, transtibial, symes, and partial foot amputees. I observed the numerous issues related to their systemic disease, stump related complications and their treatments, prosthetic issues and how to look at and their respective solutions by adding sinkers use, residual muscle strengthening, treatment of phantom pain and sensations, gait training with prosthesis, enhancement of their mobility by assisted walking with assistance of either stick, axillary crutches and/or elbow crutch use and few very old & debilitated patient were suggested ambulation with walker. The need of stump care and maintenance of hygiene of both skin and prosthesis was emphasized for each one.

The team of rehab physician, physiotherapist, nurse and prosthetist are used to work together while assessing the patients. I also have had a chance to observe few patients with complications; one was having unusual radicular pain on the amputated limb that was already on Pregabalin 600mg a day but no avail, and other one had undergone kidney transplant as a result of polycystic kidneys and also suffering from COPD having CCF. A bilateral transtibial amputee lady suffering from Burger's disease reported with non-healing ulcer was stressed upon the importance of dressing. It was attributed to poor blood supply and partly being hurt by suspension system.

During my attendance to prosthetic clinic, the need of cardiac fitness was emphasized before deciding on type of prosthesis requirement and its fitment. The importance to quit smoking among smokers was also discussed with each individual with a word of caution- "if you don't quit smoking now, be ready to lose another leg in a year's time". One patient very obese (180 Kg), who was a mini tractor operator, fractured his leg while attempting to stop a tractor which started to slide back at a slope, had a secondary infection that led to BK amputation.



I also spent one full day at the prosthetic clinic, where I observed a young very active male transtibial amputee with a very short stump that was being hurt by the upper edge of socket as it was pinching at tidal flare which was subsequently modified and he went back happy, walking with ease and without pain. Other patient was required to replace prosthetic foot and few others whose socket was loosened even after using four socks were considered for remould of socket. I was also shown the measurement technique which was very scientific and much improvised than the way we do it in India. The height assessment method was also different than we use in wooden block method. The gait assessment and training was routinely carried out for each lower extremity amputee.

In addition, I attended clinical grand round where I was exposed to the principles of foot care education:

1. Target level of information as per the risk of an individual; otherwise general advice about foot hygiene and foot care.
2. Make positive recommendations as stated below-
  - Do inspect foot daily.
  - Do report any problems, even if painless.
  - Do buy shoes with square toe box and laces.
  - Do inspect shoes for foreign objects every time before putting on.
  - Do attend trained podiatrist regularly.
  - Do cut nails across and not rounded.
  - Do keep feet away from heat.
  - Do always wear something and never walk barefoot.
3. Repeat the advice at regular intervals and check for compliance.
4. Disseminate advice to other family members or those involved in patient care.

During my observation in the orthotic clinic, I was shown various types of footwear modifications and their clinical relevance. The use of foam scan and foot scanner was demonstrated during my interactions with orthotist. I was highly impressed with the way they were handling a number of foot problems efficiently and effectively. In conversation with patients, they shared their happiness and joys and enhancement in their activity level after footwear modifications.

Another whole day, I had a chance to work with FES and Gait laboratory where I interacted with the users of FES who came for the follow-up. In the case of an adult lady with the diagnosis of spastic cerebral palsy predominantly involving left upper extremity, it was primarily used for improvement of wrist extension, she was already on trial which was further extended as she did not use it properly because of unpleasant sensation. However, she was asked to use it for more time and regularly to observe beneficial effects, if any.



Another patient, a gentleman aged 60 years, being a case of operated cervical myelitis, was already using both upper and lower extremity FES successfully and improved both limb functions. Two others were stroke patients. In use of lower extremity FES, were happy while using it and improved all gait parameters.

I also attended Spasticity Clinic in forenoon where four patients suffering with stroke were examined. They were thoroughly evaluated and inquired about their present condition. All were injected with botulinum injection at biceps, FCR, FDS, pronators and pectoralis major as per the spastic muscle interfering either in performance of various activities of daily living or range of motion of a particular joint. Interestingly, all were injected previously but at a different time interval and the carry over effect was also observed. They were using all commercially available botulinum preparations such as Botox, Dysport and Xeomin. The Xeomin brand could be stored and remained stable at room temperature but unfortunately this brand is not available at the moment in India. EMG guided technique was used while injecting the patient to have better outcome. It is very precise technique. The need for OT and PT was also emphasized for each case to reduce or maintain tone and increase of ROM.

Further, I visited the Operation Theatre where I observed few surgeries among spinal cord injury patients, arthrodesis of IP joint of right big toe which was interfering in donning of shoe, deep seated ischial sore with heterotopic ossification who was debrided and partly HO resection was done, one case was done with tibialis anterior tendon transfer to reduce foot inversion and other one considered for FPL tenodesis to improve pinch grip in a quadriparesis patient.

I also attended ward rounds at spinal injury ward, neurorehabilitation ward and MDT clinic at both the places. The observations were very interesting to audit the outcome of interventions carried out by multidisciplinary team members and to set up further goals, discharge plans and community care plan. The community discharge plan was a unique experience which can be incorporated in the practices back home in India to make the treatment more effective and worthwhile as it enabled quick & optimal mainstreaming of the patient.

I present below an overview of the infrastructure, wide range of facilities, faculties and services obtaining in NGH that I was able to observe closely.

## **Introduction**

In Sheffield, there are group of hospitals which includes Charles Clifford Dental Hospital, Royal Hallamshire Hospital, Jessop Wing, Northern General Hospital, and Weston Park Hospital.



The Northern General Hospital (NGH), where I joined as a fellow, situated in the north of Sheffield, is home to the city's adult accident and emergency department. A separate accident and emergency department for children can be found at the Sheffield Children's Hospital.

NGH is the largest hospital within Sheffield Teaching Hospitals; NHS Foundation Trust spanning 100 acres. It is situated about 3 miles from the hospitals at the central.

The hospital has over 1100 beds and employs more than 6,000 staff. Together with the other hospitals managed by Sheffield Teaching Hospitals, a wide range of specialist services are provided including orthopaedics, renal, heart and lung services and a state-of-the-art, purpose-built Spinal Injuries Unit.

## **Neurorehabilitation**

Rehabilitation can be defined as the process of assisting an individual to maximise one's independence and function after an injury or illness. Neurorehabilitation is the area of rehabilitation medicine that treats conditions that affect the nervous system: for example, multiple sclerosis, spinal cord injury, stroke and certain infections or brain tumours. Far and away the most common condition, however, is traumatic brain injury.

Traumatic brain injury is one of the commonest causes of death and disability in young people and children. An estimated one million head injuries occur each year in the UK and over 100,000 people are admitted to hospital each year after head injury. Most are discharged within 24 hours and make a full recovery. However, a small number of individuals may suffer long term problems and hence sustained treatment. The aim of neurorehabilitation is therefore to minimise these residual problems, to promote recovery from brain injury and to compensate for any permanent alterations suffered.

Brain injury can have a marked effect on a number of functions:-

- Physical function, e.g. mobility, balance, weakness or decreased control of muscles
- Cognitive function – these are essentially thinking functions, such as memory, speech and use of language, concentration, attention, etc.
- Behavioural changes – e.g. mood, impulsivity, irritability, aggression

Such changes not only clearly affect an individual's lifestyle and aspirations but also have significant impact on family & friends which is sometimes quite dramatic. Input



from a rehabilitation team can help with recovery and has been shown to affect the long term outcome for family as well as for individuals suffering injury.

### Services available at NGH

The table below showing the Services Provided at Sheffield Teaching Hospitals NHS Foundation Trust.

Accident and Emergency	Obstetrics/Gynaecology/ Neonatology
Acute General and Elderly Medicine	Occupational Health Service
Assisted Conception	Operating Services
Anaesthetics	Ophthalmology
Cardiothoracic surgery & Cardiology	Oral-maxillofacial Surgery
Chemotherapy	Orthopaedics
Clinical Research and Development	Palliative medicine
Communicable Diseases	Pharmacy
Critical Care	Professions Allied to medicine
Day Surgery	Radiology
Dental Services	Radisurgery
Dermatology	Radiotherapy
ENT, Hearing Services and Medical Audiology	Reconstructive Plastic Surgery and Burns
General Surgery	Reproductive Medicine
Haematology	Renal Services
Laboratory Medicine	Rheumatology
Medical Physics	Under and Post graduate Education
Mobility and Specialised Rehabilitation Services	Urology
Metabolic Bone Disease	Vascular Surgery
Neurosciences	



## Referrals

*Osborn* 4 is a 14-bedded neurorehabilitation ward at NGH.

Referral to the Unit is made from a number of sources and has particularly strong links to Neurosciences. All potential referrals are discussed and a short period of inpatient rehabilitation offered when the Unit feels that an individual would benefit from such treatment. A short period of assessment is followed by appropriate treatment during which any remaining medical issues, tests or treatment can also be finalised. The aim is to increase an individual's independence; this is done by using goals set by the individual and staff working in unison.

Regular review meetings are held for feedback to family and relatives, to set any further goals and to plan for discharge. Each patient is given a timetable for her/his therapy sessions. The most important phase of rehabilitation is in the community and at home and therefore, a period of inpatient stay should be as short as possible.

Planning for discharge begins on admission and by the time first review is due or undertaken, a decision on discharge destination would be made. Most individuals will return home with support from family or a small amount of carer support. In a few cases, a decision to seek appropriate nursing or residential home will be made by family and this process is initiated soon on admission to ensure timely discharge. At the time of discharge, appropriate follow up by the relevant community rehabilitation service is arranged. Medical staff will continue to follow up patients in Outpatient Clinic

## Spasticity

Spasticity is a disorder of muscles that can be caused by a number of different diseases affecting the brain or spinal cord. It is perhaps best thought of as a 'tightening up' of muscles. It causes weakness, pain, decreased voluntary control of muscle and spasms and can interfere with daily functions, e.g. washing, dressing and walking.

The treatment of spasticity is complex and requires many different skills. A number of different specialists are involved at the **Complex Spasticity Management Clinic**, run in the *Osborn* Unit. It combines the skills of specialist doctors, specialist physiotherapists, gait analysis laboratory, functional electrical stimulation, orthotics, specialised seating, splinting and specialist surgery. It is the combination of these treatments that gets the best results in improving the lives of patients and their carers. The clinic offers a complete and specialised service with all these different aspects being involved as no one treatment on its own is effective.



The Multi-Disciplinary Team (MDT) is a group of staff that includes many different professions, for example, nurses, doctors, physiotherapists etc. They work closely together, sharing information to help provide the best possible care to each individual during one's stay in the hospital.

All the staff at Osborn aims to support the patient and her/his family and friends throughout the rehabilitation process, giving advice and information. Some people may need to see most or all of the team, while others only a few. Wherever appropriate, families have regular meetings with the team at scheduled review meetings. However, families can ask specific questions to individual staff members at any time.

***The multi-disciplinary team includes:***

**Doctors**

All patients are admitted under the care of a Rehabilitation Medicine Consultant. They have overall responsibility for patients and they coordinate and guide treatment by all staff. Medical staff conducts rounds twice per week with nurses and therapists and will arrange investigations and treatments. They will also carry out procedures such as localised injections to joints and spasticity management which includes full assessments, injection techniques and linking to other treatment modalities using specialised rehabilitation staff within the department.

Goals of rehabilitation are set by the Consultant led MDT and discharge planning is started immediately on admission to facilitate smooth transition into community rehabilitation. Medical staff lead the family review meetings held regularly for relatives and patients to discuss progress, treatment and discharge.

**Nursing**

The nursing staff provides expert care 24 hours a day and therefore has the most important role in rehabilitating individuals. The input provided is based on the person's needs and independence and self-help as much as possible, is encouraged. Nurses are central to the individual's time on the ward and provide advice and support to her/him and the family. They act like magnet that attracts/pulls together all the elements of rehabilitation from the rest of the team. Nursing staff are responsible for seeing referrals from other units and feeding back to the team.

**Occupational Therapy (OT)**

Occupational Therapists aim to help individuals maintain or improve their ability and independence in daily activities and OT sessions may include:



- Practice and assist with daily activities such as washing and dressing and kitchen tasks. This may involve exploring alternative ways of doing activities, for instance through providing aids for dressing or memory.

- Look at cognition (ways of thinking) by assessing memory, problem solving, planning and organising.

- Arrange a home visit to assess what kind & level of support, equipment and/or home adaptations may be required.

### **Physiotherapy**

Physiotherapists aim to help patients to achieve individual goals for movement and mobility and physiotherapy sessions may include:

- Assessment and advise on positioning and wheelchairs.
- Treat to improve movement, strength, balance, co-ordination and mobility.
- Advise family, individuals and the team on how to assist people to move.

### **Speech and Language Therapy (SLT)**

Speech and Language Therapists work with individuals who have difficulties with communicating (speaking clearly; understanding or using language; interacting with other people) or in eating and drinking safely.

The Speech & Language therapist may offer one or more of the following approaches:

- Direct therapy, or a programme of exercises (for example, language exercises)
- Advice to the individuals and their family
- Developing new ways of communication (for example, using a picture chart).

### **Art and Music Therapy**

Art Therapy and Music Therapy sessions offer a place where individuals can explore some of the emotional effects of the illness that they have suffered. Everyone is offered either art or music therapy. They do not need to be good at either to get benefit.

Music Therapy uses improvised music as a means of sharing the person's feelings and experiences. Art Therapy uses art materials to create artwork such as an image, a model, colours or textures as a way to express thoughts and feelings. In these sessions individuals may choose to use Art or Music materials or instead choose to talk about current difficulties, worries or anxieties.



## **Clinical Neuropsychology**

Clinical Neuropsychologists specialise in detailed assessment of brain function and behaviour after injury. They utilize a large number of detailed tests which measure different areas of brain function in order to form a picture of the deficits caused after injury. From this detailed picture, appropriate treatment strategies can be devised.

## **Social Work**

Social workers work with patients directly. Out-of-city patients will be referred to their local social services department.

- Work as part of the team to support individuals and families through the rehabilitation process.
- Can give some benefits advice, support clients with forms and find out information but are not welfare rights experts.
- Are involved with discharge planning – organising funding for care packages or nursing homes and setting up care as necessary.

## **Spinal Cord Electrophysiology Clinical Services**

It includes examination and care for patient with scoliosis, kyphosis and other degenerative disorders of the spine and also contributes to clinical sessions held in the spinal injuries unit to see patients who have suffered a major spinal cord injury and who have opted to take advantage of the SARs assistive technology to maintain quality of life.

These services are split into two areas:

### *a) Intraoperative Spinal Cord Monitoring (ISCM)*

Single mode spinal cord monitoring has been performed by the group since 1989. Specifically, the ISCM technique is used for monitoring the health of the spinal cord during surgical corrections for scoliosis, kyphosis and other degenerative disorders of the spine performed by orthopaedic surgeons.

### *b) Sacral Anterior Root Stimulators (SARs)*

Specifically the SARs medical devices use electrical stimulation applied to spinal roots to provide bladder, bowel and erection control.



Other Areas of Expertise within the Group are Transcranial & Peripheral magnetic nerve stimulation and Nerve conduction velocity measurements.

### **Prosthetics**

The prosthetic Clinical Services recognises that patients have varying needs influenced at any time by specific treatment requirements or issues relating to lifestyle changes and developments. Individuals can access a Prosthetist for major limb reviews, treatment discussions or complications, choose to see a Clinical Assistant for minor supplies or consumable accessory replacements, attend a Technician Clinic for instant repairs.

Primary amputees, those people who have recently undergone surgery, will have additional clinical time to discuss their prosthesis in the light of their amputation level and lifestyle needs. Various component options will be evaluated to find those that complement day-to-day activities. In the early days of treatment, this choice will often develop over time as healing and gait rehabilitation progress. Established amputees, who are confident and comfortable with their chosen limb system, may carry on with that prescription or may wish to consider additional options to engage in a sport or leisure pursuit that requires specific limb components for optimum performance. The Prosthetist is happy to discuss these requirements with the individual and in conjunction with the clinical team so that a good solution can be developed to support this enhancement in lifestyle choice.

### **Orthotics**

The range of Orthotic devices include orthotics for diabetes, neurological disorders, orthopaedics, spinal pathologies, orthopaedic footwear and treatment ranges from paediatric provision through to disorders related to old age.

These Orthotists work with both NHS Hospitals and GP referrals to supply devices that support the body, encourage active lifestyles and reduce pain or pathological developments and uses a combination of made to measure and off-the-shelf devices to ensure optimum treatment effect and comfort. Digital scanning and computer aided manufacture of insoles and braces ensure that Orthoses are manufactured to a high degree of accuracy.

The team of Orthotists maintains a training regime that ensures that they are up-to-date with the latest technologies and rehabilitation thinking. This means that each patient can be provided with appropriate treatments, optimised designs and lightweight materials.



## **seating**

Clinical Services is at the forefront in the area of Special Seating includes comprehensive assessments involving all members of the patient's team including her/his family, carers, therapists, rehabilitation engineers and seating clinician. This approach is focused on getting it *"right first time"* to enable the patient to get their seat as quickly as possible and to minimise wheelchair service waiting lists and introducing the concept of *"See the person, not the chair."*

These varied seating solutions include moulded seating (MSI); carve foams, modular seats (KATO) and hybrid seats. A hybrid is designed to encapsulate different types of seating to best meet the user's needs. It can include combinations of lynx/matrix, carve foam or moulded seats.

## **Design innovation**

In NGH focus is on working on a number of design projects to develop new seating solutions that enhance seating comfort and positioning for specialist chair users. These designs take into account ease of car access and mobility within confined spaces so as to improve the lifestyle choices for patients and carers.

## **Wheelchairs**

These combined with custom seating services offer a variety of trusted and innovative solutions for wheelchairs in the home, to provide comprehensive and innovative solutions for a wide range of needs, and also transport and general mobility situations to reach a high level of comfort and independence, which are flexible to the needs of the users and the changing nature of their requirements over time. In addition, the following services are also provided:

### **Manual and powered wheelchairs**

These services assess, review and handover manual and powered wheelchairs and accessories for long term conditions and available range of wheelchairs to meet both the postural needs of the patient and the lifestyle needs of the patients and carers. At the point of delivery we provide comprehensive training and advice.

### **Specialist buggies**

To provide specialist buggies for children with postural needs or children over 3 years of age who have mobility needs; a specialist children's team and centre include specially



designed children's waiting rooms which have been designed to make their experience as positive and enjoyable as possible.

#### **Pressure relief cushions for mobility equipment**

To provide a speedy response to ensure that patients have the right cushion to ensure that pressure sores do not develop. Advice regarding pressure relief management is given to patients, families and healthcare professionals.

#### **Mobility and Specialised Rehabilitation Centre**

Referral by a GP or health professional is required for access to the prosthetic, orthotic, Functional Electrical Stimulation (FES) and gait analysis services held at the centre.

#### **Princess Royal Spinal Injuries Centre**

With 64 inpatient beds, including 4 Ventilator Support beds, this centre of excellence is second only to the unit at Stoke Mandeville in terms of size and numbers of patients treated. It provides comprehensive Spinal Cord Injury (SCI) services incorporating acute, rehabilitation and continuing care facilities- including specialist plastic and urological surgery. The Centre provides services for patients within North and North-West England, Yorkshire, East and West Midlands and East Anglia.

The Centre supports a dedicated multi-disciplinary team that incorporates Medical Consultants, Nursing staff, Physiotherapists, Occupational Therapists, Dietician, Clinical Pharmacist, Radiographer, Social Worker and Psychologist. The Centre has its own integral Radiography Suite and Operating Theatre. In addition, the Unit provides Day Care surgery and investigation facilities, Outpatient and Community Liaison services.

#### **Functional Electrical Stimulation (FES) services**

In addition to the physical effects of exercise, FES for standing, transfer, and ambulation provides functional and psychological benefits. Potential benefits include improved digestion, bowel-and-bladder function, retardation of bone-density loss, decreased spasticity, reduced pressure-sore risk, improved cardiovascular health, and improved skin and muscle tone. FES-assisted ambulation allows greater access to inaccessible locations and facilitates face-to-face interactions.

Systems for standing and ambulation can be strictly FES, or combine FES with various braces, including foot-and-ankle, knee, and long-leg braces. FES standing or



ambulation systems use walkers, parallel bars, or elbow canes for balance and support. Depending on the system being used and its application, physical requirements and contraindications can vary as given below:

- ⊖ Upper extremities needed for balance and support.
- ⊖ Intact lumbar and sacral spinal cord so stimulation can reach target muscles.
- ⊖ Trunk stability for support and control.
- ⊖ Arm strength to use walker.
- ⊖ Commitment to intensive training and consistent use.
- ⊖ Sufficient finger or voice control to select menus.
- ⊖ No cardiac or respiratory problems.
- ⊖ No history of long-bone stress fractures, osteoporosis, or severe hip or joint disease.
- ⊖ Due to effort involved in FES, not pregnant.
- ⊖ No severe scoliosis.
- ⊖ No morbid obesity.
- ⊖ No irreversible contractures.
- ⊖ No stimulation-preventing skin problems at stimulated sites.

Over the years, various FES devices have been developed to enhance grasping in individuals with upper extremity impairment. These devices also can be used as a rehabilitation tool to improve voluntary manual control when used soon after injury.

Individuals with quadriplegia who use FES to facilitate grasping report greater independence from adaptive equipment, a reduced need for personal assistance, and improved self-image. FES-grasping assistance can increase the number of activities that an individual can perform or improve existing abilities.

FES can facilitate both the lateral or key-pinch grasp, effective for handling small objects, such as a spoon or a pen; and the palmar grasp, used to hold a glass or a book.

Physical requirements for upper-extremity FES include:

- ⊖ Hand and forearm muscles must be sufficiently innervated. Too much denervation results in FES-initiated muscle contractions that are too weak or fatigue too quickly for functional use.
- ⊖ Bicep, deltoid, and rotator cuff muscles must have enough voluntary strength to control hand placement.
- ⊖ Subjects must be able to see well enough to direct movements, especially if the hand lacks sensation.
- ⊖ Trunk support must provide a sufficient base for controlled arm movements and object lifting.



## The Gait Lab

The Gait Analysis Laboratory at NGH is a leader in the analysis of walking disorders in both children and adults. The lab itself is simply a room large enough for patient to walk up and down in easily. It is about 12 metres long and 10 metres wide to allow room for walking and the equipment. The laboratory is equipped with the very latest measuring equipment to perform a range of tests.

Using state-of-the-art equipment, highly specialised staff are able to determine why they walk the way they do. Knowing this, it is then possible to plan treatment individually for each patient.

The Gait Lab aims to:

- Provide measures of body structures & function, levels of activity and participation that are relevant to an individual's walking.
- Provide analysis and interpretation of such measures to assist in diagnosis, assessment, monitoring and treatment planning.
- Develop innovative methods for data collection, analysis and interpretation to advance our understanding of gait.
- Provide education and training in the area of Gait Analysis.





**Proposed utilization of the experience in India**

The two weeks long intensive as well as extensive exposure to tools & techniques at NGH, Sheffield that I got and the unique opportunity which enabled me to work with various consultants, registrars and paramedical professionals such as physiotherapist, occupational therapist, nurse, speech & language therapist, community nurse planner, prosthetist & orthotist, biomedical engineer among others at neurorehabilitation facility will go a long way in improving patient care in India.

The visit, facilitated by ICMR, enabled me to visit and spend quality time in spinal cord injury OPD, operation theatre, uro-radiology clinic, bladder clinic, spasticity clinic, botulinum toxin clinic, adult and paediatric prosthetic clinic, P&O services, foot scanner lab, MDT clinic, FES clinic, Gait Lab and so on. In the following paras, I revisit some of the major observations and how these will enable me to utilize some of these to improve patient care in India.

In NGH, as it should be in a large & modern hospital, the team of rehab physician, physiotherapist, nurse and prosthetist work in unison while assessing the patients. There was a marked emphasis on communication in intra as well as inter departmental facilitators and also carers & community. Some very interesting cases were also examined in my presence to give me first-hand exposure to complications: one was having unusual radicular pain on the amputated limb that was already on Pregabalin 600mg a day but without significant benefit, and other one had undergone kidney transplant and also suffered from COPD having CCF; a bilateral transtibial amputee suffering from Burger's disease also reporting non-healing ulcer was shown importance of dressing.

In the prosthetic clinic, the need of cardiac fitness was emphasized before deciding on type of prosthesis requirement and its fitment. I also observed an active male transtibial amputee with a very short stump that was getting hurt by upper edge of socket as it was pinching at tidial flare which was subsequently modified; other patient needed replacement of prosthetic foot. I also witnessed measurement technique which was very scientific and much improvised than the way we do it in India. The height assessment method was also different than we use in wooden block method. The gait assessment and training was routinely carried out for each lower extremity amputee.

During my visits to the orthotic clinic, I saw various types of footwear modifications and their clinical relevance. The use of foam scan and foot scanner was demonstrated during my interactions with orthotist. I was highly impressed with the way they were handling a number of foot problems efficiently & effectively. The patients shared their happiness and joys and enhancement in their activity level after footwear modifications.



I plan to introduce these improved techniques at AIIMS to facilitate better patient care. I also intend to include this in my lectures, interactions and training programmes elsewhere in India.

The exposure gained during visit to FES and Gait laboratory, where I interacted with the users of FES who came for the follow-up and had improved all gait parameters. These tools could be initiated in most large, modern hospitals in India.

In the Spasticity Clinic patients suffering with stroke were examined, thoroughly evaluated and inquired about their present condition. All were injected with botulinium injection at biceps, FCR, FDS, pronators and pectoralis major as per the spastic muscle interfering either in performance of various activities of daily living or range of motion of a particular joint. Interestingly, all were injected previously but at a different time interval and the carry over effect was also observed. They used commercially available botulinium preparations such as Botox, Dysport and Xeomin. Xeomin could be stored and remained stable at room temperature but this brand is not available in India. I plan to recommend its use. A precise EMG guided technique was used while injecting the patient to have better outcome, which too can be explored here.

During the rounds of spinal injury ward, neurorehabilitation ward and MDT clinic the observations were very interesting to audit the outcome of interventions carried out by multidisciplinary team members and to set up further goals, discharge plans and community care plan. The community discharge plan was a unique experience which can be incorporated in the practices back home in India to make the treatment more effective and worthwhile as it enabled quick & optimal mainstreaming of the patient.

The Multi-Disciplinary Team (MDT) is a group of staff that includes many different professions, for example, nurses, doctors, physiotherapists etc. They work closely together, sharing information to help provide the best possible care to each individual during one's stay in the hospital. Though the importance of such collaborative efforts, which should be inherent in major hospitals, their near absence or casual introduction, leads to unnecessary hurdles in patient care. It is imperative that these basic practices are given their due importance in India and I shall recommend the same at my work place, to start with.

All the staff at Osborn aims to support the patient and her/his family and friends throughout the rehabilitation process, giving advice and information. Some people see most or all of the team, while others interact with only a few. Wherever appropriate, families have regular meetings with the team at scheduled review meetings. However, families can ask specific questions to individual staff members at any time. I found this as a critical function in ensuring efficient & effective after-care and plan to introduce this more vigour back home.



This fellowship program has given me a deep insight into the importance of analysis of information shared by patient and carer, how to improve or develop effective interpersonal skills to promote understanding of the professionals involved in treatment with patient, on one hand and family, carers and community, on the other (please see pic).



The visit also gave me an opportunity to observe various new tools & techniques; methods of evaluation and subsequent treatment apart from operation & interaction with professional staff on a daily basis (please see pic). We are still way behind the developed countries in providing such state-of-the-art tools & techniques and I would continue to recommend that these are available at least in select hospitals in India.







Further, it enabled me to learn the principles of educational administration and collaborative culture which I intend to promote in India.

In the long run, this fellowship program will help me to eliminate academic silos, and provide a framework for additional research and testing of its effectiveness while providing rational medical care that could lead to positive changes in practice.

The sustained exposure that I got to soft skills too will help in improving leadership skills, enhance communication within the team at AIIMS and with carers, family and community and in short facilitate more optimum patient care.