MIOT International

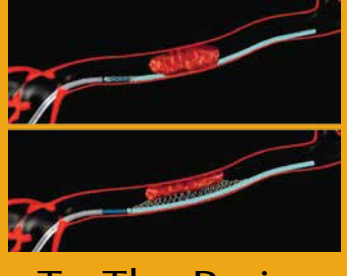
MARUTHUVA VIVEKAM

Making Intelligent Connections

@ The Department of Neurology & Neurosurgery, MIOT International

PLUS

Neurosurgery: Safer, More Accurate & Effective than ever before!



To The Brain, Through A Pinhole

Epilepsy 101

July 2016 Vol:19

From the Chairman's Desk

Dear friends,

While most of us are familiar with the maladies of the heart, we are, by and large, ignorant about the organ that makes each of us who we are - the brain. Together with the spinal cord, it forms an organ system, which is the reason we breathe, see, hear, feel, love, run from danger or walk into it. Needless to say, it has fascinated and baffled practitioners of medicine for centuries.

Today, Neurology has developed into one of the most sophisticated specialities, demanding a high degree of expertise and technology, both of which we offer at our Department of Neurology & Neurosurgery in MIOT International. Treatments & techniques have improved to the extent that there are hardly any 'untreatable' disorders, while morbidity in surgery has reduced to less than 5%.

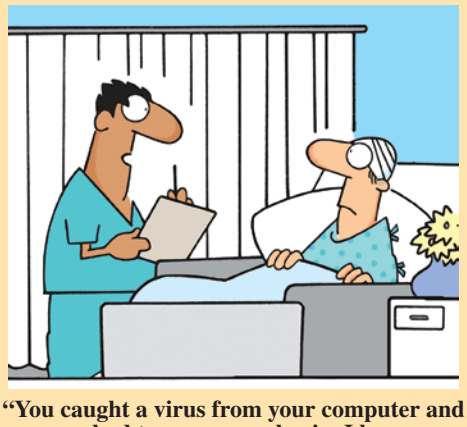
Unfortunately our awareness on the advancements in the speciality remains very low. We continue to stigmatise, ignore or isolate those affected with neuro disorders without realising that many of them can be cured completely with correct treatments.

Through this issue of Marthuva Vivekam, we hope to arm you with information that will open both eyes and minds!

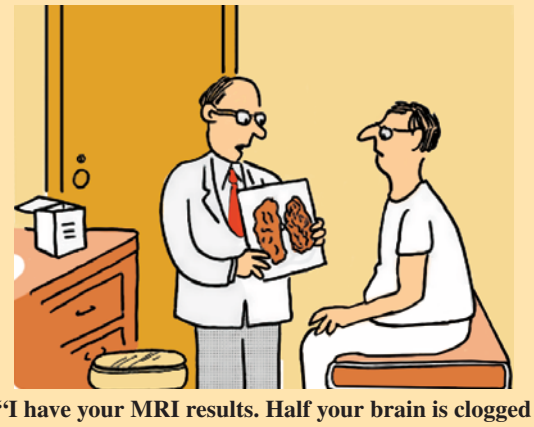
Warm regards,

Mrs. Mallika Mohandas
Chairman, MIOT International

Laughter is the Best Medicine



"You caught a virus from your computer and we had to erase your brain. I hope you've got a back-up copy!."



"I have your MRI results. Half your brain is clogged with passwords and the other half is clogged with user names. "

Heads Up!

The ancients believed that the brain was merely cranial stuffing and that the heart was the centre of intelligence, feeling and thought. So much so, that the early Egyptians took great pains to preserve all the organs, but threw away the brain during the mummification process. It took 5000 years to change this view!

Today, our knowledge about this most fascinating organ system is significantly better. However, many myths and fears persist. Such is the ignorance, that patients with certain disorders are branded 'mentally deficient' and do not get the care that is needed, as families try to cover up the problem. Sometimes, they choose to live with pain and suffering rather than go in for treatments which they fear may result in paralysis or death.

This need not be. Because today, advances in imaging systems has given specialists information that helps them make an accurate diagnosis. It has improved their understanding of the link that exists between the brain, spine and other organ systems. Advances in tools and techniques have given specialists safe and patient-friendly treatment options to cure patients completely or manage them better.

Most importantly, it has made us aware that a Medical institution can claim to offer effective Neurology treatment only when its team of Neuro specialists stay constantly updated, bring to the table their individual expertise and integrate the latest treatments to give patients the best outcomes.

MIOT's department of Neurology & Neurosurgery grew organically from the need to offer complete treatment to our accident affected patients. Today, our team of specialists with extensive training at leading centres, handle the entire gamut of neuro disorders, in both adults and children, with the latest medications and treatments. From accidents and injury to tumours, aneurysms and strokes and even conditions such as Parkinson's, Epilepsy, Depression and more.

We are one of the few centres in India that offer Mechanical Thrombectomy to reverse the effects of a stroke. We give patients with Parkinson's a fighting chance with DBS, and epileptics a cure with effective medications and surgery. The Department, supported by world class treatment facilities, is already a referral centre and I have every confidence that they will continue to excel.

I hope that this edition of Marthuva Vivekam gives the information that you need to seek the right care at the right time and place.

All the best!

Dr. Prithvi Mohandas
Managing Director, MIOT International

Treating the Seat of Intelligence

With Integrated Expertise & Cutting-edge Technology

Introducing

Care of the nervous system demands speed, precision and expertise, backed by technology. However the most effective Neuro care can be delivered only when continuous advancements in this multi-faceted speciality are integrated into current treatment plans.

At the MIOT **Department of Neurology & Neurosurgery** an expert team comprised of Neurologists, Neurosurgeons, Neuro Interventional specialists, Imaging specialists and Neuro Intensivists stay constantly updated and pool their knowledge and skills in complete co-ordination. This allows MIOT to offer end-to-end, cutting-edge care for the entire gamut of disorders that affect the brain, spinal cord, muscles and nerves, some of which were previously considered untreatable.

Making Every Second Count

Time is brain in Neuro care, more so with Neuro emergencies. MIOT is one of the few centres with a **dedicated Emergency unit** for accident cases, where victims come in with serious brain and spine injuries, as well as neuro emergencies such as Stroke, Myasthenia Gravis (an autoimmune neuromuscular disease), Guillain Barre Syndrome (a disorder that attacks the peripheral nervous system), Epilepsy, Cerebral Venous Thrombosis (CVT) and more.

They require quick and expert diagnosis, treatment plans & decisions, and immediate action.

Any delays or missteps could result in death or disability for life. Our **Neuro Trauma Team**, which is on call 24 x7, is supported by expert Imaging teams and dedicated Neuro & Stroke ICUs to handle all emergencies.

Diagnosis, the Key to Success

Misdiagnosis or late diagnosis was one of the key reasons for the high morbidity rate in Neurology.

At MIOT, the **Integrated Diagnosis Support system** provides specialists with accurate and in-depth information **24x7**. State-of-the-art, on-campus facilities for Imaging and Radiology at MIOT include the 1.5T HDxT MRI, PET CT and nuclear scans for detailed views of the brain. While our world-class Laboratory offers comprehensive blood studies and biopsies, sophisticated genetic testing is done through expert associates.

This allows our specialists to make accurate diagnoses and chart effective treatment plans, even at early stages, for a wide array of neuro disorders. It also helps in managing neurological problems in children, such as cerebral palsy, developmental delays and behavioural disturbances.

Cutting Out Disease

There is no room for error in Neuro care. Nowhere is this truer than in the Dept of Neurosurgery at MIOT, which offers **cutting-edge microsurgery** through experienced and skilled Neurosurgeons. They perform complex and intricate surgeries for brain and spine tumours, injuries, epilepsy, congenital defects, strokes and more, with excellent outcomes.

Introducing

They are supported by state of the art modalities for both surgery and recovery:

- Dedicated surgical suite with the high powered Moller Wedel operating microscope & microsurgical instruments

Moller Wedel operating microscope

- Aesculap high speed micro drill & system
- Karl Storz Neuro endoscope
- Cavitron Ultrasonic Aspirator (to control bleeding)

- Neuro ICUs with Intra Cranial Pressure monitors and other brain monitoring equipment
- Sophisticated Neuro Cath Lab

Our surgeons also work in close conjunction with Orthopaedic surgeons, Oncologists, Opthalmologists, Head & Neck surgeons, Oral and Maxillofacial surgeons.

Dedicated Stroke Care

The **MIOT Stroke Restore Centre** handles all types of strokes, **24x7**, using the latest treatments and techniques. Led by experienced Neuro Endovascular specialists, MIOT is among the few centres in the country, to offer **Mechanical Thrombectomy**, the globally preferred stroke treatment which can **reverse** stroke damage completely.

Restoring Function

MIOT is also one of the few centres to offer **Functional Neurosurgery,** a relatively new branch of Neurosurgery which today treats a number of conditions that were previously considered untreatable, such as Parkinson's disease, dystonia, tremors, chronic intractable pain and spasticity. It involves using electric impulses or direct medication to stimulate damaged parts of the nervous system or block damaged parts through lesioning.

Spine Matters

A major advantage that MIOT International offers its patients is the benefit of **integrated care** across specialities, visibly demonstrated in **spine disorders** and **injuries**. Our Neuro specialists, in conjunction with our renowned orthopaedic spine specialists, treat the myriad disorders of the spinal cord, which include tumours, malformations, disc damage and more.

Mapping the Brain & Spine

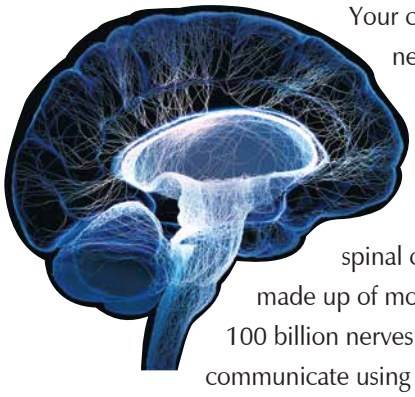
MIOT is one of the few centres equipped with a **Neurophysiological Lab** that uses sophisticated electrophysiological equipment to assess the patient's spinal cord, peripheral nerves and muscles. Extremely helpful in the evaluation of patients with disc disease involving the neck and lower back, it can pinpoint the exact location of the disease. Our modalities include the 16 channel EEG, nerve conduction studies, reflex studies, nerve stimulation, electromyography, sleep study and needle EMG study.

Neurology for Children

The department's **Paediatric Neurologists** deal with all types of neuro disorders in children and babies, even as young as a day old. They routinely treat children with brain tumours, epilepsy, cerebral palsy, movement disorders, neural tube defects and meningitis.
They are supported with specialised microscopes and instruments including those for neonatal interventions, radiotherapy and chemotherapy, advanced ICU care, and facilities for rehabilitation (physiotherapy, speech therapy, diet).

What Makes You Tick?
A Brief Tour of the Human Brain

If your heart is your body's engine, your brain is its command centre and CPU. It is the reason why you are can stand up straight, think and reason, have emotions, see, speak, hear, touch & taste, retain & recall information, respond to the world around you and so much more! Simply put, it is what makes you, you!



Your central nervous system, comprised of your brain and spinal cord, is made up of more than a 100 billion nerves that communicate using trillions of connections called synapses. They simultaneously process information from your body and surroundings, regulate body processes such as breathing and digestion, generate thoughts and feelings, make memories and control movement.

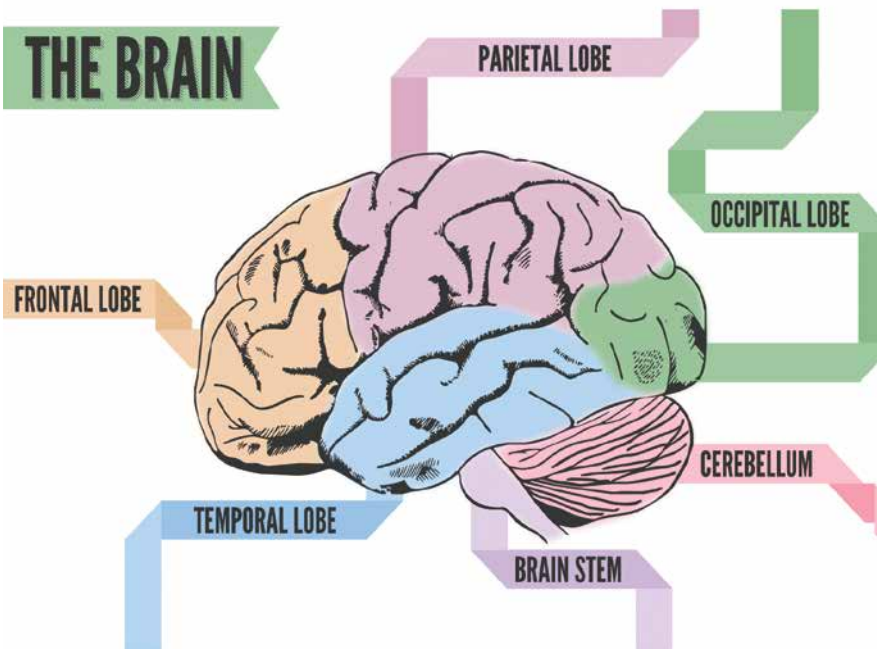
Decoding Your CPU

Your brain has specialised areas that are responsible for specific functions. Anatomically, your brain can be divided into four distinct sections – the cerebrum, the cerebellum, the brain stem and the diencephalon at its core.

The **Cerebrum** is the largest part of the brain, distinguished by its deeply wrinkled outer surface. It has two halves or hemispheres, which are further divided into four lobes.

The left brain contains regions which are involved in speech and language, mathematical calculation and fact retrieval. The right brain plays a role in visual and auditory processing, spatial skills and artistic ability.

- The **Frontal lobes**, which are located just behind the forehead, are involved in what are termed as 'higher functions' – speech, thought, learning, emotion and movement.



- The **Parietal lobes**, found behind the frontal lobes process sensory information such as touch, temperature and pain.
- Bringing up the rear, are the **Occipital lobes**, which deal with vision.
- Finally, the **Temporal lobes**, which are near the temples, are involved with hearing and memory

Fun Fact: Human brains have the largest frontal lobes in the animal kingdom.

The **Cerebellum** lies beneath the cerebrum, and is in charge of co-ordinating muscle movement and controlling balance.

The **Brain Stem** makes up the base. It controls reflexes as well as crucial life sustaining functions such as breathing, heart rate and blood pressure. It is also connected to your spinal cord.

Fun fact: The left side controls all the muscles on the right side of your body and vice versa.

Core Processor for Core Functions

The core of your brain, the **Diencephalon** (also called the interbrain), is located below the cerebrum. It is made up of the thalamus, the hypothalamus, the epithalamus and the pituitary gland. Together, they are in charge of relaying **incoming nerve impulses** from different parts of the body to the correct brain region for processing, consciousness, sleep & alertness, and the secretion of hormones necessary for growth and instinctual behaviour.

Protection force

Your brain and spine are extremely sensitive and delicate, and need to be protected. Three layers of tissue - called the meninges surround the brain and spinal cord, which are housed inside the skull and the vertebral column. The spaces between these membranes are filled with fluid that cushions them.

Did You Know?

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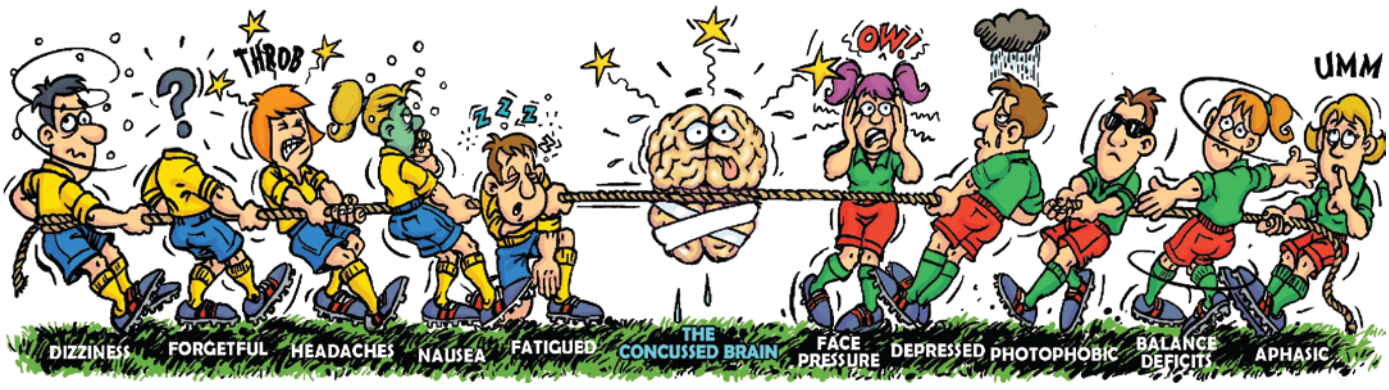


As with any other organ system, genetics, lifestyle & injury can disrupt the working of the nervous system. However, depending on the size and location of the disruption, it can affect memory, the sensory system, and even personality.

The most common disorders of the brain and spine include

- Tumours of the brain and spine
- Head injuries
- Stroke
- Neurodegenerative disorders such as Parkinson's disease
- Chronic disorders such as Essential Tremor, Dystonia
- Aneurysms

Anyone can be affected by a brain or spine disorder, but the risk factors vary for the different types of conditions.

For instance, a traumatic injury is most common in children and adults under the age of 25, or 65 years & older. Older people and those with family history are more at risk for neurodegenerative diseases. And today, lifestyle choices are certainly taking a toll as well!

Unfun fact: Chronic stress can lead to memory loss.

Sit Up and Take Notice

Some of the signs that could indicate a disorder of the nervous system include:

- Headaches
- Seizures
- Dizziness, nausea, vomiting
- Impaired movement or balance
- Changes in speech, hearing, vision
- Memory loss
- Mood changes

Harmless Headache or Something More Sinister?

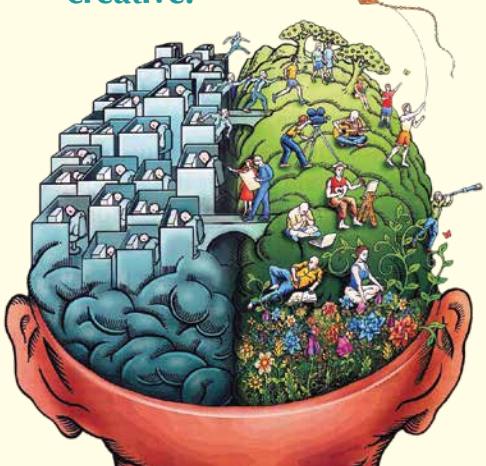
Not all headaches are harmless – there are those that could signal a more serious issue, or even a life threatening emergency. But how can you tell the difference? Here are some of the red flags that you definitely should not ignore.

- Headache for the first time after 50 yrs
- Headache with blurred vision, dizziness, vomiting
- Headache when bending forward, sneezing, coughing
- Headache so severe it wakes you up from sleep
- Recurrent headaches that affect activity

MYTHS BUSTED!

There are so many myths and so much misinformation about the brain that it's hard to keep up! Here are a few major ones, busted!

You have one dominant side of your brain – which determines if you are technically inclined or creative.



Brain scans have shot down this myth by showing that both hemispheres of the brain most often work together. For instance, in processing language, while the left side of your brain processes the grammar and pronunciation, the right side processes intonation.

You only use 10% of your brain

Truth: different parts of your brain have distinct functions, some of which rely on information from your five senses. So almost everything you do involves several of its areas.

Women are from Venus and men are from Mars

The idea that women's brains are wired

differently from men's, and therefore men are better suited for math and science, while women are more emotion-led is a falsehood perpetuated by society, not biology. In fact, studies tell us that women usually have a larger hippocampus, which is involved with memory, while men have a larger amygdale which is involved in emotion. Go figure!

The Changing Landscape of Neurology & Neurosurgery

Safer, More Accurate & Effective than Ever Before!

Hippocrates once observed, "From the brain and the brain only arise our pleasure, joys, laughter and jests, as well as our sorrows, pains, grief and fears." The study and treatment of the nervous system has fascinated mankind since prehistoric times, with equal measure of success and failure. The last couple of decades have seen much progress in how conditions that affect the central nervous system are diagnosed and treated. Yet, for the public at large, the speciality still remains steeped in myth, stigma and fear. MIOT's top neuro specialists explain why this doesn't have to be and what the future holds for this multi-faceted speciality.

Lead Article

Q: What makes this speciality so complex?

A: The brain IS the command centre of your body. Along with the spine, it forms a complex system comprised of 100 billion neurons that are connected to about 100,000 others, which store information and control everything. So, when we try to treat anything that goes wrong in this maze: **1.** It is crucial to get to the Source of the problem, which can be challenging. **2.** It is critical to remember that Time is brain and that Accuracy is everything in treatment, whether it is medication or surgery.

Q: Why is it feared?

A: There's a lot of fallacy associated with brain & spine disorders among the general public. Epilepsy, for instance, was associated with demonic possession. Or the idea that patients with conditions like spasticity must also be mentally deficient. Or that any neurosurgery is going to leave the patient with deficits.

From a specialist's standpoint, earlier, while we could identify the disease, the treatments and their effectiveness were very limited. This was mainly because we were unable to access the deeper regions of the brain and had poor information about what was happening within. Surgery often resulted in further damage or death.

Q: What has changed to make it more treatable and safer?

A: Advances in imaging technology, microsurgery and medication have made all the difference.

Today, Neurology has shifted from being a **diagnosis-based** to a **treatment-based** speciality. Better understanding of the nervous system along with advances in medical technology enable us to manage or cure conditions that were thought to be incurable just 20 years ago.

In surgery, we've figured out how to **control bleeding**, one of the biggest risks. Microsurgery and neuro interventional (pinhole) procedures have made it more targeted and less invasive. We can now get in and out of an affected area without the surrounding healthy parts ever knowing we were there! And there has been a sea change in how we manage several chronic diseases.

Q: Has technology been the gamechanger then?

A: It has played a huge role! Neuro-specialists have always been the gatekeepers for new advances in medical technology as **information is priceless for diagnosis** - in our speciality. Today, we are able to get it - with advanced MRIs, PET, SPECT & CT scans, angiography and more.

They give us every last detail to plan treatments - like army generals preparing to go to war.

Q: How has technology helped neurosurgery?

A: In many ways! Today, the risk of morbidity in surgery is **less than 5%**. We have tools like stereotactic and neuro navigation to aid accuracy, so we know exactly where to go, **safely**. Advanced operating microscopes and microsurgical instruments have made surgery less invasive and more accurate. So we can even remove large tumours through openings that are about the size of a coin! For the patient, this means better results with little trauma, and minimal risk of infection and neuro deficits.

No more depressed

Let me give you a quick example: we recently met a young woman with severe depression, who had not responded to medication, despite treatment for a few years. It got us wondering if there was something else behind it - and so we decided to investigate deeper. Detailed blood studies and scans led us to the culprit - a **tiny tumour** in her pituitary gland, missed because of her misleading symptoms and its tiny size. We removed the tumour **endoscopically** (through her nose), without hurting the delicate gland that it sat on.

In a week, she was cured of depression - for life!

Two other exciting areas are Functional Neurosurgery for a number of chronic and neuro degenerative disorders, and Neuro Interventional Radiology. They have enabled us to treat conditions that were previously considered untreatable, with excellent outcomes.

Q: Let's talk for a minute about Endovascular Neuro Interventional procedures – what are they?

A: They are procedures that are done via the patient's blood vessels (arteries), by a 'Neuro Interventional Radiologist', in about **90%** of surgical cases. They are similar to cardiac interventions, but with more miniscule pathways and vessels.

We do Neuro interventions to open blocked blood vessels in the brain that cause Stroke, to block dangerous aneurysms (bulges in the arteries) and to remove Arteriovenous Malformations (AVMs) (abnormal blood vessel clusters) in the brain's circulatory system.

In Stroke care, we can now completely reverse the damage with **Mechanical Thrombectomy**, by removing the block using a special cage, and restoring blood flow - IF the patient reaches us in time.

For Aneurysms, **Coiling** is the preferred treatment, today.

During the procedure, the specialist places a 'coil' in the bulge of the aneurysm to prevent blood from flowing into it.

Endovascular Embolization is done to block malformed vessels (AVMs), and is the global standard.

Q: Where does Functional Neurosurgery fit in?

A: Functional Neurosurgery is an evolving speciality, where we stimulate or block specific circuits in the brain or spine, to treat neuro-degenerative and chronic conditions like Parkinson's disease, chronic pain, spasticity, epilepsy, dystonia and essential tremor. These treatments have enabled us to give patients a much better quality of life.

Q: What does the future hold for Neurology and Neurosurgery?

A: They are continuously evolving specialities. Researchers are looking at how we can shift from managing progressive neurodegenerative conditions to **delaying or even preventing** them. Intraoperative image guidance is another sphere. Neurogenomics, as well as therapies using human stem cells and gene therapies, is another exciting field that holds so much potential, particularly for the Neurosciences.

Q: What does the future hold for the departments of Neurology & Neurosurgery at MIOT?

A: MIOT is today a referral centre for several of these new treatments. Our goal is to stay on top by keeping abreast of the latest advances and integrating them into treatment plans for our patients. This will not only improve outcomes but also allow us to offer solutions where there were none.

Back where he Belonged!

Life changing Micro Surgery

Case Study

Mustaffa, who was forced to retire from the battlefront was deeply upset at the way illness had changed his life, overnight. The 'difficulty in hearing ' and 'slight imbalance in walking' that he had developed were ignored as 'minor issues' for a soldier. A check-up was done only when his daily routine got affected. Results revealed a tumour in his brain which could leave him paralysed, if not treated immediately. Within a week he was at MIOT, Chennai, meeting our expert Neurosurgeon.

Advanced scans at MIOT confirmed it to be a rare type of tumour which lay in an extremely **sensitive location** - in the bend between the all-important cerebellum and the brain stem. The tumour, besides pressing on his brain stem, had also extended beyond the Choroid Plexus, which produces cerebrospinal fluid and also maintains the delicate environment within the brain. The tumour, if unremoved, would lead to build up of poisonous fluid within the brain, while its constant pressure on the brain stem would result in complete paralysis. Immediate surgery was his only option.

Neurosurgery - the youngest Surgical Speciality

In the past, surgery on the brain or spine was often avoided because the risks of bleeding or even greater damage during the procedure were too high. That isn't true anymore as neurosurgeons today use highly advanced technology to track disease and perform surgery - all with the least amount of trauma to the patient.

Step by Step by Step

During the intricate microsurgery that lasted over 6 hours, MIOT's neuro surgeons used high powered operating microscopes to carefully navigate the treacherous collection of delicate cranial and facial nerves around the tumour, before removing it completely with specialised microsurgical instruments. The slightest error could leave Mustafa with one side of his face paralysed, a drooping mouth or eye, lifelong difficulty in swallowing - indignities the proud soldier would not have wanted to live with. In this case, all went well. The MRI done post surgery confirmed zero remnants of the tumour with all his cranial & facial nerves intact and nil neuro deficits.

Mustafa was delighted to recover **90%** hearing in his left ear within a few days. Our Head & Neck surgeon also assured of him of recovering hearing in the right ear through a minor surgery, six months later. He could now hope to return to the battle front!

Not the Norm

Not everybody is as fortunate as Mustafa. Refusal to take warning signals seriously could turn into life threatening situations, overnight - despite there being centres and treatments which offer a complete cure.

Eliminating Risk

Neurosurgery is performed for injuries, tumours and congenital defects. There are **four** broad categories - craniotomy, biopsy, minimally invasive endoscopy and nasal endoscopy. They are done with **minimal exposure** of delicate brain or spine tissue (if at all), aided by powerful microscopes that provide a high degree of magnification and special microsurgical instruments.

Other technologies such as Neuronavigation and Cavitron Ultrasonic Surgical Aspirator (**CUSA**) eliminate chances of damage to surrounding tissue and bleeding. Dexterity, tactile memory, hand-eye co-ordination and spatial perception are the hallmarks of an ace neurosurgeon, whose blink-and-you-miss-them movements are very precise and miniscule! Supported with highly sophisticated imaging, laboratory facilities & pristine care environments, the morbidity in a neurosurgery has today **dropped to around 5%**.

Unfortunately, this is not common knowledge. And yet, modern neurosurgery saves precious lives everyday.

Cutting Edge

Breakthroughs in Managing the 'Incurable' with Functional Neurosurgery

Life for Raman, 45, had become unbearable due to damaged discs in his spinal column. A surgery to repair them and relieve the pressure on his spine had eliminated his pain, but it also left his muscles contracted and bent over. He needed constant assistance and couldn't even leave his home.

Parkinson's had turned the once fiery Lalitha, 54, into a helpless woman, who couldn't even hold a cup of tea steady and was scared to leave home. The medication affected her hormones as well, making her moody and depressed, while her disease continued to progress.

Even as little as a decade ago, Raman and Lalitha would have been considered hopeless cases, with no other treatment options. Today, **Functional Neurosurgery** offers them the chance of a near normal life.

A Brief Definition

Functional Neurosurgery treats conditions where the normal function of the brain or spinal cord is **altered** due to disease or injury - such as chronic pain, spasticity, movement disorders such as Parkinson's disease, dystonia and tremors and epilepsy.

It has three categories of therapies, which are:

- Intrathecal drug delivery
- Neurostimulation
- Neuroablative therapies

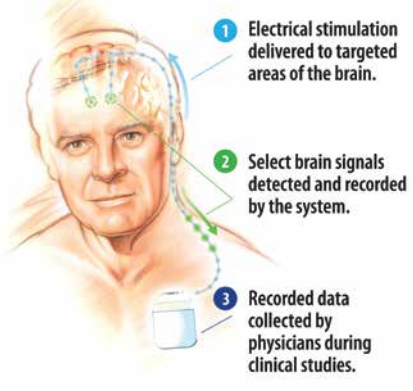
Delivering to the Source - Intrathecal Drug Delivery

Intrathecal drug delivery is a method by which medication to control pain or spasticity is given directly into the intrathecal space with contains the spinal fluid - so that they act directly on the spinal cord's receptors. It takes effect faster and requires smaller doses of medication, which also reduces any side effects.

Here lay the solution for Mr. Raman. An evaluation at MIOT revealed that he was a good candidate for an **Intrathecal Baclofen Pump** to deliver the medication that would dramatically reduce his spasticity. A mere weeks after the 2-hour procedure, he was upright and walking unassisted!

Disrupting Wrong Signals - Neurostimulation

Neurostimulation uses low grade electrical impulses to activate a part of the nervous system.



Deep Brain Stimulation (DBS) is effective for pain and movement disorders such essential tremor, dystonias and Parkinson's disease. It uses a **'brain pacemaker'** to stimulate specific parts of the brain (depending on the condition being treated) through implanted electrodes. The procedure is performed while the patient is awake, using a local anaesthetic and mild sedation, as specialist monitors the patient's motor function to ascertain that the target site for stimulation has been reached.

Their search for a specialist in DBS brought Lalitha and her husband to MIOT, where tests revealed that she was a candidate for the procedure. During the surgery, she followed the doctor's instructions to the letter, while her infectious optimism spurred the team on. Today she is independent, happy and mobile.

Spinal Cord Stimulation is used to treat chronic pain, certain kinds of nerve dysfunction and injuries. It involves implanting stimulating electrodes in the epidural space near the spinal cord, which disrupt the pain signals travelling between the brain and the spine.

Disabling Dysfunction – Neuroablative Therapies

Neuroablation is the destruction or deactivation of nerve tissue to treat pain and other disorders. The destruction is permanent. These days, if ablation is considered, the goal is to incapacitate the nerves for an extended period of time rather than destroy them.

Functional Neurology is, today, predominantly used for pain and movement disorders, but we now know that its applications can be further extended to Epilepsy, Cluster headaches, and more recently, to psychiatric conditions such as Tourette's, Depression, Obsessive Compulsive Disorder and even addiction.

To The Brain, Through A Pinhole

Game-changing Neuro Interventions for Strokes, Aneurysms & AVMs.

Two decades ago, a stroke most often meant paralysis, loss of speech, memory, a permanent vegetative state, or worse, death. Patients with aneurysms would have been considered inoperable. **Not anymore**!

Through Natural Highways

Neuro Interventional Radiology uses non-invasive, image-based techniques to treat Stroke, Aneurysm and Arteriovenous Malformations (AVMs) through the patient's blood vessels (arteries and veins). The procedures are performed by a Neuro Interventional Radiologist in a Cath Lab, and have completely revolutionised care in these conditions.

Breakthrough Stroke Care

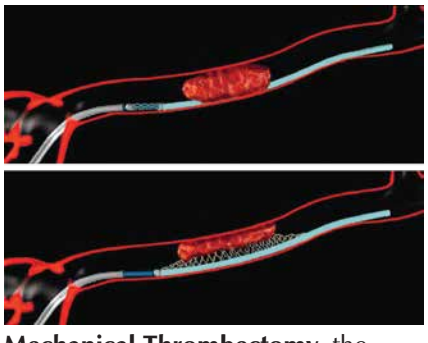
During a **stroke**, the blood flow in the brain is blocked by a blood clot. Deprived of life-giving oxygen, the cells in the area die. The longer it is starved of oxygen, the greater the damage.

Most centres treat a stroke with clot dissolving drugs to restore blood flow. However, they take time to work and are most effective with smaller blocks. But if the stroke is in a larger vessel, what then?

60-yr old Ganga was getting breakfast on the table when her husband noticed that something was off. She was showing signs of weakness on one side and didn't seem to know him.

Less than an hour later, the doctors at MIOT confirmed a stroke in one of the major blood vessels of Ganga's brain.

The specialists elected to remove the block through a procedure called



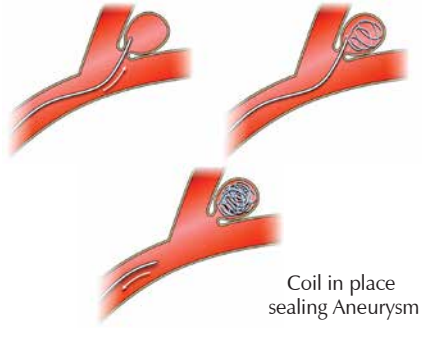
Mechanical Thrombectomy, the *preferred treatment* at leading global centres. During the procedure, MIOT's Neuro Interventional Radiologist used a stent retriever (a tiny metal cage) to extract the clot. With the blood flow fully & quickly restored, Ganga went home in a week, with zero brain damage.

Diffusing Aneurysms

An **aneurysm** is a bulge in a blood vessel, caused by the weakening of its walls. It could rupture, causing blood to leak into the brain, and is often life-threatening.

64-year old Mahima didn't even know that she had an aneurysm until she collapsed after the worst 2-day headache of her life. It had ruptured, putting her life in danger!

In the past, aneurysms were treated with 'watchful waiting'. Today Aneurysm Clipping is done at many centres to drain & repair the damaged vessel.



Coil in place sealing Aneurysm

However, **Aneurysm Coiling,** the go-to treatment at leading centres, was recommended for Mahima. During the procedure, the interventional specialist accessed her aneurysm through her femoral artery (groin) and passed platinum coils into its balloon. The coils sealed the opening of the aneurysm and also induced clotting within. Mahima made a full recovery in no time at all!

Sealing off the Abnormal

An **Arteriovenous Malformation** (AVM) is a tangle of abnormal blood vessels connecting the arteries and veins in the brain, which disrupts the flow of oxygen-rich & deoxygenated blood. Though rare, AVMs can be dangerous - and even lead to stroke.

Endovascular Embolization has eliminated the need for open surgery in most cases of AVM today. Instead, the specialist accesses the AVM through the network of arteries, and seals it off using special glue, stopping blood flow to the abnormal vessels.

Eliminating Risk

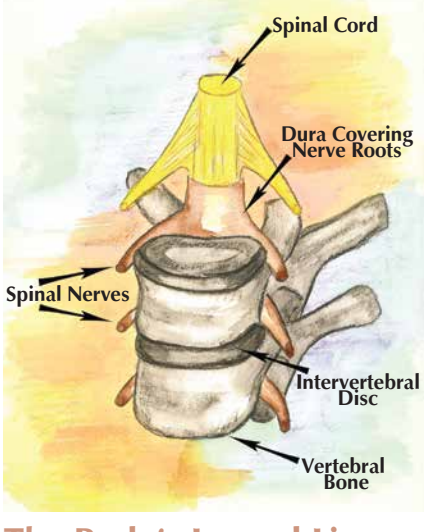
Together, these procedures have removed the risks arising from life threatening open surgeries and made treatments safer. Patients recover faster and treatment results are better, immediately and in the long term. In other words, they have changed the brain game!

Cutting Edge

Cutting Edge

Standing Up For The Spine!

Most of us associate the spine with standing upright and structure - because that is something visible. We forget that it performs another important function: it houses the **fragile spinal cord**, which connects our brain with the rest of our body and performs numerous critical functions.



The Body's Leased Line

The spinal cord conducts a range of electrical signals from the brain to the rest of the body-messages of pain, temperature, touch, vibration and movement. These signals pertaining to the skin, joints, muscles and internal organs, go back and forth between the brain and the muscles, glands and various non neural cells.

However, they can get **disrupted** due to disease or injury. Depending on the severity and location of the damage, you could experience varying loss of movement and sensation. It becomes difficult to decode the exact cause for the loss as the most common symptom for disorders of both the spinal cord and the spine is **simple back pain**!

A Lost Cause?

Mr. Vinod, 72, an active gentleman was suddenly in constant pain and couldn't walk without help. The doctors at his hometown had diagnosed spinal cord compression due to wear & tear, but declared him inoperable due to his age. A week later, he lost his remaining mobility and was confined to a wheelchair. Was there **another reason** for his rapidly deteriorating condition?

Mr. Vinod's son initially brought him to MIOT's Centre for Orthopaedics on a friend's recommendation. The Ortho specialist examined him thoroughly and then ordered advanced scans to confirm a hunch. The detailed images, done at MIOT's Imaging & Radiology department, revealed a tumour in his spinal cord. He needed the **Neurosurgeon**!

Blurred Lines

Given the ambiguity of symptoms in Spinal ailments, it sometimes becomes difficult to decide which specialist to consult: an orthopaedic spine specialist or a neuro specialist. **Often, it calls for the skills of both,** which is why it is important to choose a centre that offers **care across specialities**.

For instance, the orthopaedic surgeon corrects deformities and injuries, like scoliosis. But this could be followed up by a procedure to deliver medication to the spinal cord directly for spasticity /pain, performed by the neurosurgeon.

Similarly, while you would see the orthopaedic spine surgeon for a damaged disk in your spine, it is the neurosurgeon who would remove a tumour or fistula (abnormal connection) on the spinal cord using microsurgery or interventional radiology. Of course, to be effective, they also need the support of advanced Imaging & Radiology and Laboratory services to diagnose & track illness, as well as Rehabilitation facilities to aid recovery.

In Mr. Vinod's case, MIOT's experienced Neurosurgeons, got to work at once, planning the surgery to remove the tumour. The procedure, performed using microsurgical techniques, went perfectly. And there was more good news - the tumour was benign. Two weeks after his surgery, Vinod returned to MIOT for his review - walking unassisted!

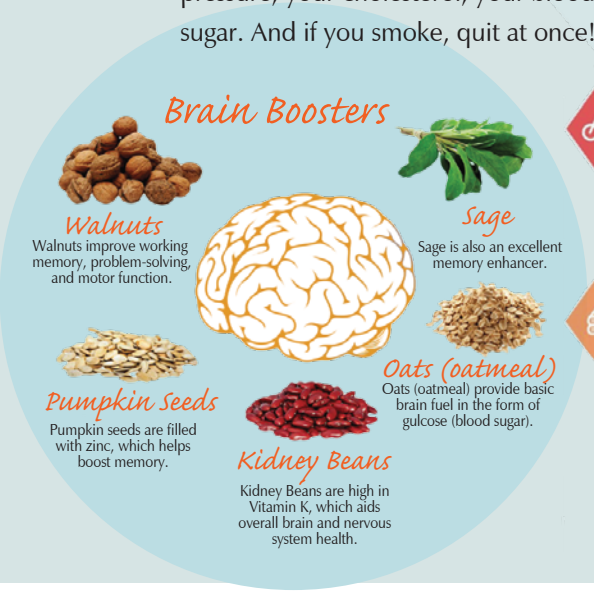
Care Sans Borders

MIOT International has dedicated Spine specialists in both the Neurology and Orthopaedics departments. And while the anatomical areas addressed often overlap, the distinction lies in the **specific tools and expertise** that are necessary to treat each condition. This makes it critical for specialists to work together to get to the root of the problem and treat it completely. It is this seamless integration between specialities that has enabled MIOT to take on cases like Vinod's, and treat them successfully.

Stay Brain Sharp

We now know that what's good for your heart is good for your brain.

Ergo, keep track of all those crucial numbers - your weight, your blood pressure, your cholesterol, your blood sugar. And if you smoke, quit at once!



GET MOVING
Exercise sends blood to your brain, which helps it refresh itself. Even a half hour of exercise everyday helps to build new neurons &connections.

USE IT OR LOSE IT
Your brain can learn & retail information & skills throughout your life. And even simple stuff like reading a new book or learning a new skill are great for brain building!

DITCH STRESS
Chronic Stress halts the production of new brain cells. So it is important to deal with stress through meditation, exercise etc.

FUEL UP RIGHT
A balanced diet, which is low on saturated fats is good for both your heart and brain. So swap the processed & fast foods for fresh options, and limit sugar and salt.

GET SOCIAL
Social interactions help your brain make new connections and strengthen old ones. Go ahead, unleash your social butterfly!

Epilepsy 101: The Facts Behind the Fallacies

Article

The falling disease. Possessed by demons. Congenital and contagious. Disabling. Mentally deficient.

One of the oldest and most common neurological disorders known to humankind, Epilepsy remains shrouded in superstition, untruth, fear and shame even today.

A brief definition

Epilepsy is a chronic neurological disorder characterized by recurrent seizures, generally as a result of excessive electrical charges in a group of brain cells. The seizures can vary from the briefest lapses of attention or involuntary muscle jerks, to full blown convulsions and loss of consciousness - and always start in the brain.

So what are the other red flags that could signal a seizure?

- Temporary confusion
- Staring spells
- Loss of consciousness / awareness
- Changes in smell
- Repetitive abnormal movements
- Up-rolling of the eyes
- Drooling
- Dropping things (loss of muscle control)

It affects anyone, anytime

Epilepsy can affect any one and at any age. However, it is most common in young adults and children (20 years and less) and seniors (65 and above). Some of the factors that increase one's risk are genetics, head trauma, prior history stroke or brain tumour, and infections.

Live Seizure-free

Contrary to popular belief, **anti epileptic medications** are very effective in controlling the seizures - and need not be taken for life. In fact, most patients can also be weaned off the meds and live seizure-free without them in about five years.

However, if the anti-epileptic drugs don't provide satisfactory results – which happens in less than 20% of epileptic patients, there are other therapies that offer long lasting results. In such cases, **ablation or surgery**, to deactivate the circuits causing the seizures is an option, and is, today, restoring patients to a normal life.

The bottom line!

The important thing to remember: epileptics can live completely normal lives with the right care. So if you recognise an undiagnosed epileptic, before you call in the shaman or exorcist, see a Neurologist.

In my Own Words

Untethering Sunita

Denying my 5-year old, Sunita's pleas to play with the kids next door broke my heart. But I couldn't give in to them - because Sunita needed a catheter for her untreatable **incontinence**, and I needed to protect her from infection as well as the stigma that she would face from other kids and adults.

Of Cure & Complications

Sunita was born with a neural tube defect and had undergone complex neurosurgery as an infant. The surgery had successfully treated the defect, but left her unable to control her urinary bladder. We had taken her to several Urologists, with no success. I was grateful that she wasn't paralysed or worse, but I didn't want her to live attached to a urine bag for the rest of her life! Then our family doctor referred us to the specialists at MIOT International, and I had the feeling that my prayers were answered.

Answers & A Ray of Hope

At MIOT, the neuro team went over her medical history in detail and did a thorough neuro examination, which included an MRI scan. Soon, we had answers. The nerves in Sunita's lower spinal cord had become stuck due to scar tissue from her earlier surgery, and were affecting her bladder control. She could be cured completely, but only with surgery. We agreed - anything to give her a normal life!

Surgeons to the Rescue

A week later, Sunita was taken into surgery in the early hours of the morning. The doctors had explained that the intricate surgery would be performed under the powerful microscope, using special surgical instruments designed to handle the delicate tissues of the brain & spine. Sophisticated computer systems, specially programmed for the tiny structures of a child, would help the surgeons stay on track.

I spent the time praying. It was midday when the doctors finally told us that all was well.

On the other side

A month after her life-changing procedure, I can't help but marvel at how far we've come. She's still has rehab to strengthen her muscles, but no more urine bag! Soon she'll be playing with kids her own age and going to school. I cannot wait to see her smile as she faces all these 'firsts' that are coming her way!

- Mrs. Rajeshwari, on her daughter's surgery for her tethered spine

MIOT for Paediatric Neurology

Paediatric Neurology is perhaps one of the most challenging specialities for many reasons. The child's inability to express discomfort, poor awareness among parents, stigma in society are challenges that often come in the way of children receiving the right care. The lack of access to advanced medical facilities and specialists is another factor, as Paediatric Neurology demands the skills of paediatricians, paediatric neurologists, neurosurgeons, electrophysiologists, specially trained nurses, dieticians & rehab specialists.

MIOT International is today a **referral centre** for Paediatric Neurology as it can offer the experience and the expertise of a highly qualified team of specialists, who work together to find solutions to even the most complex cases. The department, which offers life-changing neuro care for children such as Sunita and even day old babies, is equipped to handle all types of neuro disorders in children, both surgical and non-surgical. These include neural tube defects, epilepsy, cerebral palsy, brain tumours, movement disorders, meningitis and more.

MIOT International

MIOT Centre for Interventional Cardiology

The Complete Suite for Advanced Cardiac Care

Your heart beats a mind-boggling 35 million times, non stop every year. It is an amazing amalgam of many moving parts: muscles, valves, electrical circuits and interconnecting blood vessels. A system so sophisticated that each part when damaged needs its own specialist, much like the famed Swiss Knife that holds within it multifunctional expertise of every kind.

Comprehensive Care

That's why at the MIOT Centre for Interventional Cardiology, we have renowned specialists for **every condition of the heart**, be it Coronary disease, Valve problems, Arrhythmia (irregular heartbeats) & Heart Failure. They work as a seamless team, pooling rich experience and expertise garnered from leading international centres. Armed with cutting edge tools & techniques, the latest devices and drugs and advanced procedures like OCT & FFR,they **diagnose**, **intervene**, **prevent** or **correct** all types of cardiac conditions through minimally invasive procedures.

So that our patients go home safely and quickly with minimal discomfort and excellent outcomes. Because to us, restoring the status of your heart with utmost care to 'Healthy' is priority. ***Nothing else matters.***

MIOT Centre for
Interventional Cardiology
Complete, Advanced Cardiac Care

MIOT International

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