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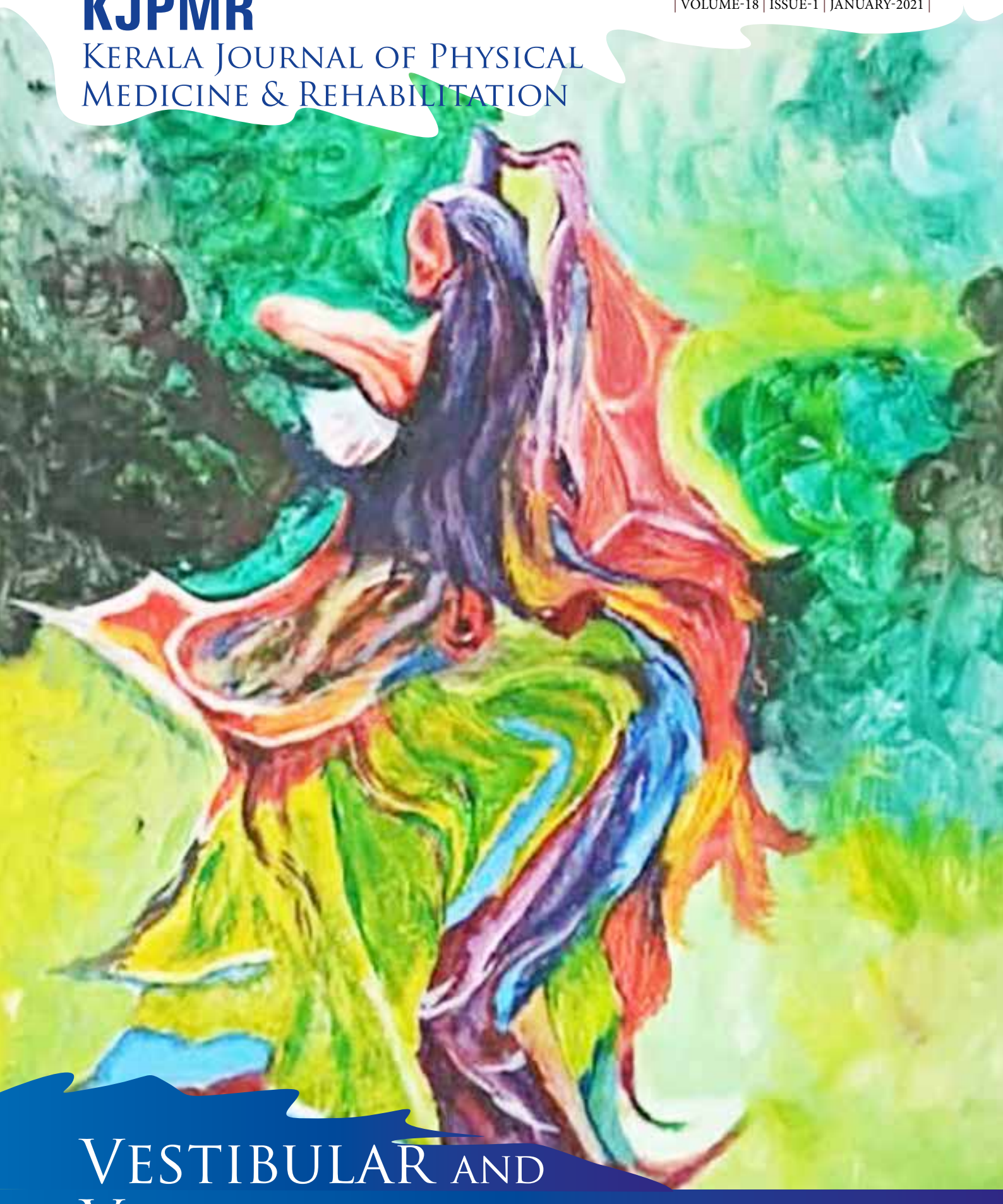

Vestibular and Visual Rehabilitation

The official journal of the Kerala chapter of the IAPMR

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FROM THE EDITOR'S DESK

This is the first year anniversary for KJPMR. Occasionally a challenging topic comes up in our publication cycle. Auditory, Vestibular, and Visual Rehabilitation, the theme for this release, is such. Our invited author is a specialist in Vestibular rehabilitation. Dr Swapna has given us a nice guideline paper on the same. Dr Soumya shows us the value of audiology exams. Dr. Bineesh is in full form with two quizzes. We have a case report from Dr Sudheera. Our second survey results are announced with a small write-up. Dr Henry from CMC Vellore joins us with an editorial on running and viruses. I've written the story of how PMR got started in AIMS. Our multi-talented Dr Sudheera has provided the cover and back artwork

Our next issue's topic is Employment of the Disabled. If you haven't, perhaps you should contribute to the journal. Happy New year and pleasant reading.

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CONTENT

The included articles are the responsibility of each author

Review of Guidelines in Vertigo

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INTRODUCTION

This paper makes an attempt to discuss the guidelines of three major conditions that present with vertigo in an ENT clinical setting. BPPV, Meniere's disease and Migranous vertigo form most cases of rotatory vertigo presenting to the clinician. A clear understanding of guidelines will help us to initiate appropriate treatment methods and also to arrive at a quick diagnosis

Vertigo and rehabilitation - concepts and theories

The finely tuned system of balance is unique for it's one very special nature. It is a system that never sleeps. Even when all your body functions are at the lowest ebb in NREM sleep, your balance system is constantly watching the environment- the real reason why you don't fall off your bed at night! Another ability of the system is the integration between the visual, labyrinthine, proprioceptive and cerebellar

functions, and the resilience in maintaining good function even if one, or sometimes two of these are lost. Many self-heal very well. Experimental animals with bilateral labyrinthine extirpation recovered balance in two to three weeks. Therein lies the importance of Rehabilitation in vertigo. All we need to do is to assist the compensatory mechanism.

Benign Paroxysmal Positional Vertigo

Some of the key recommendations of the guide line include:

- A strong recommendation for clinicians to diagnose posterior semicircular canal BPPV with an office-based diagnostic test (the Dix-Hallpike maneuver, detailed within the guideline).
- A recommendation for clinicians to also test patients for a second type of BPPV affecting the lateral semicircular canal when initial testing is not conclusive (using the supine roll test).
- Clinicians should differentiate BPPV from other causes of imbalance, dizziness, and vertigo.
- Clinicians should question patients with BPPV for factors that modify management including impaired mobility or balance, CNS disorders, a lack of home support, and increased risk for falling. These recommendations will help prevent some of the dangerous morbidities from BPPV.
- Clinicians should not obtain radiographic imaging or vestibular testing in a patient diagnosed with BPPV, unless the diagnosis is uncertain or there are additional symptoms or signs unrelated to BPPV that warrant testing.
- Clinicians should not routinely treat BPPV with vestibular suppressant medications such as antihistamines or benzodiazepines.
- For patients who are initial treatment failures, clinicians should evaluate them for persistent BPPV or underlying peripheral vestibular or CNS disorders.
- Clinicians should counsel patients regarding the impact of BPPV on their safety, the potential for disease recurrence, and the importance of follow-up.
- The guideline was created by a multidisciplinary panel of clinicians representing the fields of otolaryngology, audiology, emergency medicine, physical medicine and rehabilitation, geriatrics, physical therapy, family physicians, neurology, and chiropractics.
- In 2017, AAO-HNS revised the guidelines on basis of further peer review and suggested the following
- Addition of a patient advocate to the guideline development group
- New evidence from 2 clinical practice guidelines, 20 systematic reviews, and 27 randomized controlled trials (RCTs)
- Emphasis on patient education and shared decision making
- Expanded action statement profiles to explicitly state quality improvement opportunities, confidence in the evidence, intentional vagueness, and differences of opinion
- Enhanced external review process to include public comment and journal peer review
- New algorithm to clarify decision making and action statement relationships
- New recommendation regarding canalith repositioning postprocedural restrictions
- Expansion of the recommendations regarding radiographic and vestibular testing
- Removal of the “no recommendation” for audiometric testing
- Addition of a diagnostic and treatment visual algorithm

The most relevant things to consider are:

1. History and symptoms being the most important inputs for diagnosis
2. It is important to differentiate BPPV from other causes of positional vertigo
3. If horizontal canal BPPV is diagnosed by demonstrating rotatory torsional nystagmus with the head turned 45 degrees to the side and 30 degrees down, then Epley’s Maneuver is done
4. If not, then Lateral canal BPPV is diagnosed by the supine roll test and if positive the “barbecue” roll maneuver is performed.
5. Radiological imaging, medication and post procedural position restriction is ordinarily not advised or recommended.
6. Stress has been made on patient education and counselling

7. A pictorial representation of the treatment algorithm is given below

MENIERE'S DISEASE

Definite Meniere's Disease

- Two or more spontaneous attacks of vertigo, each lasting 20 minutes to 12 hours
- Audiometrically documented fluctuating low - to midfrequency sensorineural hearing loss (SNHL) in the affected ear on at least 1 occasion before, during, or after 1 of the episodes of vertigo
- Fluctuating aural symptoms (hearing loss, tinnitus, or fullness) in the affected ear
- Other causes excluded by other tests

Probable Meniere's Disease

- At least 2 episodes of vertigo or dizziness lasting 20 minutes to 24 hours
- Fluctuating aural symptoms (hearing loss, tinnitus, or fullness) in the affected ear
- Other causes excluded by other tests

DIAGNOSIS OF MENIERE'S DISEASE

Clinicians should diagnose definite or probable Meniere'sdisease in patients presenting with 2 or more episodes of vertigo lasting 20 minutes to 12 hours (definite) or up to 24 hours (probable) and fluctuating or nonfluctuating sensorineural hearing loss, tinnitus, or pressure in the affected ear, when these symptoms are not better accounted for by another disorder.

ASSESSING FOR VESTIBULAR MIGRAINE:

Clinicians should determine if patients meet diagnostic criteria for vestibular migraine when assessing for Meniere's disease.

AUDIOMETRIC TESTING:

Clinicians should obtain an audiogram when assessing a patient for the diagnosis of Meniere's disease

UTILITY OF IMAGING:

Clinicians may offer magnetic resonance imaging (MRI) of the internal auditory canal and posterior fossa in patients with possible Me ´nie`re's disease and audiometrically verified asymmetric sensorineural hearing los

VESTIBULAR OR ELECTROPHYSIOLOGIC TESTING:

Clinicians should not routinely order vestibular function testing or electrocochleography (ECochG) to establish the diagnosis of Meniere's disease

PATIENT EDUCATION:

Clinicians should educate patients with Meniere's disease about the natural history, measures for symptom control, treatment options, and outcome

SYMPTOMATIC MANAGEMENT OF VERTIGO:

Clinicians should offer a limited course of vesti bular suppressants to patients with Meniere's seformanagementofvertigoonlyduringMeniere's disease attacks.

SYMPTOM REDUCTION AND PREVENTION:

Clinicians should educate patients with Meniere's disease on dietary and lifestyle modifications that may reduce or prevent symptoms.

ORAL PHARMACOTHERAPY FOR MAINTENANCE:

Clinicians may offer diuretics and/or betahistine for maintenance therapy to reduce symptoms or prevent Meniere's disease attacks.

POSITIVE PRESSURE THERAPY:

Clinicians should not prescribe positive pressure therapy to patients with Meniere's disease

INTRATYMPANIC STEROID THERAPY:

Clinicians may offer, or refer to a clinician who can offer, intratympanic (IT) steroids to patients with active Meniere's disease not responsive to non invasive treatment.

INTRATYMPANIC GENTAMICIN THERAPY:

Clinicians should offer, or refer to a clinician who can offer, intratympanic (IT) gentamicin to patients with active Meniere's disease not responsive to non ablative therapy.

SURGICAL ABLATIVE THERAPY:

Clinicians may offer, or refer to a clinician who may offer, labyrinthectomy in patients with active Meniere's disease who have failed less definitive therapy and have non-usable hearing

ROLE OF VESTIBULAR THERAPY FOR CHRONIC IMBALANCE:

Interictal instability and following ablative therapy: Clinicians should offer vestibular rehabilitation/physical therapy for Meniere's disease patients with chronic imbalance

ROLE OF VESTIBULAR THERAPY FOR ACUTE VERTIGO:

Clinicians should not recommend vestibular rehabilitation/physical therapy for managing acute vertigo attacks in patients with Meniere's disease.

COUNSELING FOR AMPLIFICATION AND HEARING ASSISTIVE TECHNOLOGY:

Clinicians should counsel patients, or refer to a clinician who can counsel patients, with Meniere's disease and hearing loss on the use of amplification and hearing assistive technology

PATIENT OUTCOMES:

Clinicians should document resolution, impro vement, or worsening of vertigo, tinnitus, and hearing loss and any change in quality of life in patients with Meniere's disease after treatment.

Migrainous vertigo

1. Vestibular migraine

A. At least 5 episodes with vestibular symptomsof moderate or severe intensity , lasting5 min to 72 hours

B. Current or previous history of migraine with or with- out aura according to the International Classification of Headache Disorders (ICHD)

C. One or more migraine features with at least 50% of the vestibular episodes:

- headache with at least two of the following characteristics: one sided location, pulsating quality, moderate or severe pain intensity, aggravation by routine physical activity
- photophobia and phonophobia
- visual aura

D. Not better accounted for by another vestibular or ICHD diagnosis

2. Probable vestibular migraine

A. At least 5 episodes with vestibular symptomsof moderate or severe intensity , lasting 5 min to 72 hours

B. Only one of the criteria B and C for vestibular migraine is fulfilled (migraine history or migraine features during the episode)

C. Not better accounted for by another vestibular or ICHD diagnosis

Vestibular symptoms, as defined by the Barany Society's Classification of Vestibular Symptoms and qualifying for a diagnosis of vestibular migraine, include

- spontaneous vertigo including
  - o internal vertigo, a false sensation of self-motion, and
  - o external vertigo, a false sensation that the visual surround is spinning or flowing,
- positional vertigo, occurring after a change of head position,
- visually-induced vertigo, triggered by a complex or large moving visual stimulus
- head motion-induced vertigo, occurring during head motion
- head motion-induced dizziness with nausea. Dizziness is characterized by a sensation of disturbed spatial orientation. Other forms of dizziness are currently not included in the classification of vestibular migraine.

Vestibular symptoms are rated "moderate" when they interfere with but do not prohibit daily activities and "severe" if daily activities cannot be continued

Duration of episodes is highly variable: About 30% of patients have episodes lasting minutes, 30% have attacks for hours and another 30% have attacks over several days. The remaining 10% have attacks lasting seconds only, which tend to occur repeatedly during head motion, visual stimulation, or after changes of head position. In these patients, episode duration is defined as the total period during which short attacks recur. At the other end of the spectrum, there are patients who may take four weeks to fully recover from an episode. However, the core episode rarely exceeds 72 hours

Relation to benign paroxysmal vertigo of childhood

While vestibular migraine may start at all ages, the ICHD specifically recognizes an early manifestation called benign paroxysmal vertigo of childhood. The diagnosis requires five episodes of severe vertigo, occurring without warning and resolving spontaneously after minutes to hours. Benign paroxysmal vertigo of childhood is regarded as one of the precursor syndromes of migraine. Therefore, previous migraine headaches are not required for diagnosis

Chronic vestibular migraine

A chronic variant of vestibular migraine has been reported . A distinction between chronic vestibular migraine and comorbid psychiatric dizziness syndromes seems particularly challenging in these patients . In the future, following additional research, chronic vestibular migraine may become a formally recognized category of a revised classification.

Response to antimigraine medication

A favourable response to anti-migraine drugs may support the suspicion of an underlying migraine mechanism. However, the apparent efficacy of a drug may be influenced by confounding factors including spontaneous improvement, placebo response, and multiple drug effects So far, the evidence for treating vestibular migraine with anti-migraine drugs is insufficient as it is based on uncontrolled clinical case series rather than randomized controlled trials

The quality of the data on vestibular migraine management is still relatively poor, despite its enormous importance in daily practice. The first step should always be to give the patient a diagnosis and for the patient to accept this diagnosis. Although the condition can have a considerable psycho-social impact, it is medically benign and some patients are happy to receive an explanation for their symptoms and do not ask for treatment. However, treatment is often required and the choice of drugs is mainly guided by the frequency of the attacks and the side effect profile

It is important to consider comorbidities, such as arterial hypertension or hypotension, anxiety and depression, asthma and body weight, and to establish if vertigo and headaches are equally distressing or whether one is more pronounced than the other.

The mainstay of medical treatment for vestibular migraine appears to be betablockers, but must be avoided in asthma. If there is co existent depression, amitryptiline is a good choice. Flunarizine acts quickly, but side effect profiles like weight gain, depression and extrapyramidal effects limits its use.

Anxiety and Vertigo

Vestibular migraine and Meniere's disease seem to be the vestibular disorders with the highest risk of secondary psychiatric complications, mainly anxiety [Eckhardt-Henn et al. 2008]. Along this line, the term 'MARD' (migraine anxiety related dizziness) was proposed [Furman et al. 2005]

In patients with MARD in whom balance symptoms predominate, a combination of an antidepressant, such as imipramine, and a benzo-diazepine, such as clonazepam, is recommended. For patients with MARD in whom anxiety symptoms predominate, a selective serotonin reuptake inhibitor, such as paroxetine or sertraline, is preferred. Vestibular rehabilitation might be beneficial, particularly in patients with additional space and motion discomfort.

CONCLUSION

There are fewer conditions that can cause more distress and suffering to people than vertigo. Many are previously healthy and find that this limits whatever they do in everyday life. Since most conditions causing vertigo are thankfully benign and not life-threatening, it is important to give the maximum possible benefit with minimum possible medication and investigations. Herein lies the importance of proper guidelines in the management of vertigo. From perusal of standard guidelines across the world, it is clear that most of these conditions can be managed with a structured protocol and rehabilitation exercises and occasional medications.

BPPV guidelines specifically instruct the clinician to use no medications unless for nausea and to avoid investigations and rely on clinical assessment alone. The various rehabilitative exercises alone are enough to give quick and lasting relief to the patient. Meniere's disease guidelines recently released tell us to use an algorithm to decide the path taken to give optimum benefit to the suffering patient and to use interventional procedures only when necessary. The indication of intratympanic medication and surgery to destroy the offending labyrinth are clearly laid out. For nearly all people, return to active work is aided by vestibular exercises. The enigma of vestibular migraine is now unravelled by the Barany society guidelines for clear diagnosis and management for this often confused diagnosis.

This paper has attempted to review the most accepted guidelines for the most common diagnosis of vestibular vertigo. For sake of brevity, other conditions and the central causes of vertigo and instability have been omitted.

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The Unheard Melodies

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"Oh, you men who think or say that I am malevolent, stubborn or misanthropic, how greatly do you wrong me. You do not know the secret cause which makes me seem that way to you. Oh, how harshly was I flung back by the doubly sad experience of my bad hearing" - Ludwig Van Beethoven

The six year old fairy in the yellow frilled frock with white polka dots and a matching bow smiled brightly at me. She was N, my first patient in the cerebral palsy clinic that day. They had drove over 100 kilometres early in the morning to reach the outpatient clinic. But that didn't seem to tire her out or dampen her spirits. She walked towards me with an unsteady gait, hugged me grinning from ear to ear and gave a peck on my cheek pointing to the toys on my table. She was the only child of a young couple who belonged to a lower middle class family. She was diagnosed with spastic diplegia and had been undergoing various interventions& procedures including a stem cell transplantation, since young age.

When I asked for her name, she stared at my face still with that wide smile and mumbled something which I was unable to comprehend. Her mother informed me that her speech was limited to few words which were unclear,that she resorts to gestures for communication. She hadn't had any schooling till now because her parents wanted to achievewalking before schooling which had been attained now. She still couldn't goto a normal school because of the fact that she had no speech. Parents also complained that she had been throwing more tantrums, getting easily irritable, showing other behavioural issues for reasons they couldn't make out.As she was getting older, they were finding it more difficult to communicate with her or to understand her exact needs.

While going through the thick ledger of her previous medical records, I searched for the audiological evaluation details. At last I found a screening OAE result scribbled at one corner of the birth discharge card. It said refer in the right ear and pass in the left ear. Parents were unaware of any of these things or about the need of a follow up. They never suspected a hearing loss in their child as every problem she had was attributed to cerebral palsy. They had been to multiple doctors all through these years and she never had a complete audiological evaluation as she was a child with cerebral palsy and was bound to have a speech problem. She had undergone speech therapy sessions for years and was labelled to have ADHD as she was not attentive in the sessions.

A detailed audiological assessment showed that she had profound hearing loss in the right ear and moderate to severe in the left ear. After the hearing aid trial, aid was fitted in both the ears and the speech language pathologist started to work on from the initial pre linguistic skills. Within a few months her vocabulary improved. Her so

called inattention and hyperactivity reduced. She became more cooperative in other departments too which was manifested as improvement in gait, social skills, and starting of academics in our transition school for hearing impaired where teaching is done applying principles of auditory verbal therapy in the normal school curriculum .

She always had so much to speak and was exhilarated whenever she got a listener. Though the pace was slow, her comprehension, speech and language improved day by day. But her speech intelligibility is still low though better than earlier. Seeing how she has improved, if she had an early diagnosis and hearing intervention, her speech would have been normal by now and she could have had a more normal childhood.

ME was her contemporary. He had a very eventful postnatal period and was a fighter kid who was born with all the complications of congenital rubella syndrome- congenital heart disease, bilateral moderate – severe hearing loss, bilateral cataract and spastic diplegia. He started his journey with us when he was 4 months old. By the age of 6 months he had undergone multiple surgeries for heart disease and cataract. He was also fitted with bilateral hearing aid. It was a cumbersome task as he had recurrent ear infections. By 1.5 years of age he underwent unilateral cochlear implantation. Though he was young, he had gotten used to his aids as an extension of his body and would reach for it in the morning. It was a delight to watch this tiny human laugh and utter syllables in response to your voice, totally neglecting the bumpy road he had been through.

By the time he achieved head control and started tripod sitting, he also started his syllables. When he was nearing his third birthday he started to speak short sentences. He would point to the cupboard where I had kept the chocolate box and say ‘want chocolate’. Now he’s 4, comes to my op holding his mother’s hand, and tells me ‘Chechi, give me my chocolate’. He sings me the newly learned rhymes and movie songs in exchange of the chocolate. He had been enrolled in a kindergarten, but couldn’t go this year owing to the COVID pandemic which he says is making him sorrowful.

There was another girl named R, who was undergoing rehab therapies when I joined the institute. She was 6 years old, diagnosed with spastic diplegia, hydrocephalus with V-P shunt in-situ, bilateral profound hearing loss which was detected by the age of 1 year. As she didn’t benefit from the hearing aid, she was advised cochlear implantation. But the parents as well as her family physician were worried and reluctant as they didn’t want another surgery and was hesitant about the limited benefits as she already had cerebral palsy. She soon discontinued from our centre to join school for hearing impaired which offered classes in sign language. I see her occasionally for follow up and she tries to communicate shyly through the few hand signs she has picked up. Mother says that she has gone more silent and is grumpier these days. As the parents had difficulty in interacting with her, they are in the way of learning the sign language to understand and communicate with her.

ME could hear the world, the sounds, the music, and could express everything to everyone as he wished, just as his peers. Though N lost so many years, she’s busy picking up the lost world of sounds at her pace which may be incomplete, whereas R couldn’t, though she could have had. The world will be different for her, and will always be without sounds and music.

The interaction between a person and the environment is mediated through the sensory experiences. The sense of hearing, in particular, is the key to learning spoken language, facilitates communication and is important for the cognitive development of children. While the most obvious effect of childhood hearing loss is on language development, it also has an impact on literacy, self-esteem and social skills. Communication difficulties can have lasting emotional and psychological consequences that can lead to feelings of isolation, loneliness and depression, more so in a child with other disabilities. The impact on the family is equally profound.

Early identification of hearing impairment needs to be followed by timely and appropriate interventions in order to minimize developmental delays and promote communication, education and social development even if the child is having other impairments. As Physiatrists, we always aim for comprehensive rehabilitation, and timely audiological evaluation and management is something that shouldn’t be missed out in a high risk infant or a child with developmental delay.

What greater joy could you have than gifting a child the world of sounds just by your timely assessment and interventions!

A Rare Complication of Steroid Injection Given For Plantar Fasciitis - A Case Report

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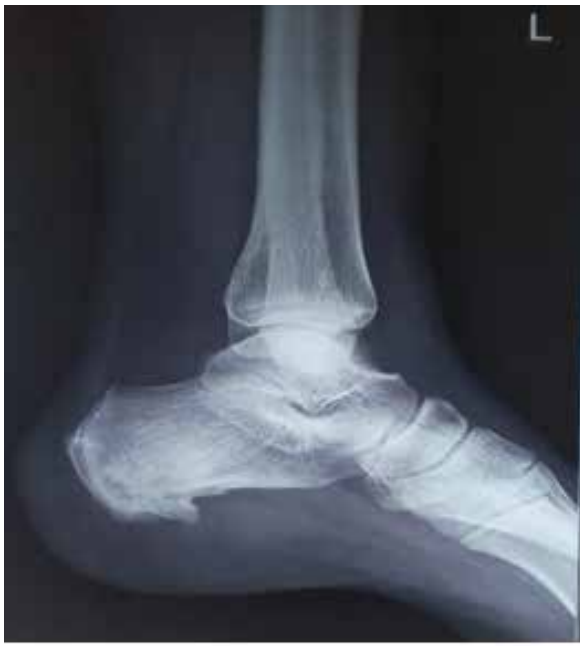
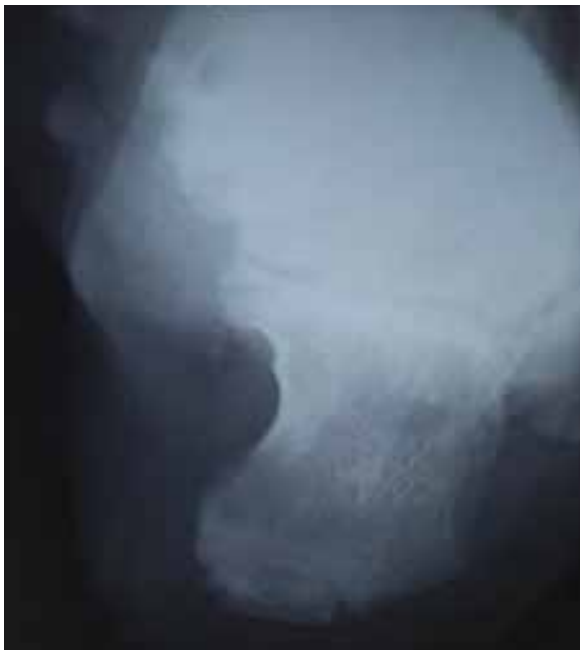
INTRODUCTION

Plantar fasciitis is a common condition causing heel pain. It often responds well to conservative treatment such as nonsteroidal anti-inflammatory medications, podiatry, and physiotherapy. In some cases, when symptoms persist despite the above treatment, injection of steroid is an accepted and commonly used treatment. Rupture of the plantar fascia has been reported as a possible complication following corticosteroid injection but we present a rare complication presented as osteomyelitis of calcaneum following corticosteroid injection.

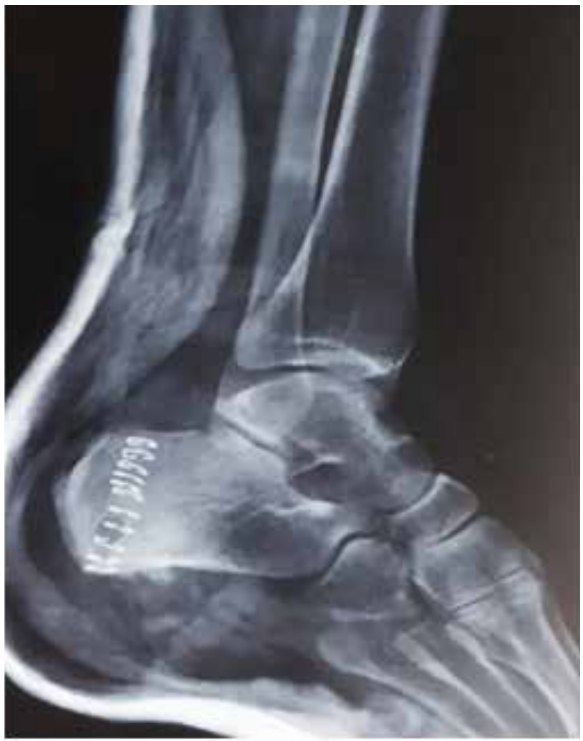
Case Report : A 41-year-old woman patient presented to outpatient department with complaints of low backache and difficulty in walking and was not able to do her daily activities because of pain. On examination she was limping, walking on fore foot of the left leg. Straight leg raising test was bilaterally negative, range of movements of hip and knee were normal. Range of movements of left ankle joint was limited with pain. There were no positive clinical findings in the lumbar spine for low back pain .So more emphasis was given to the left foot and revealed a swelling just below the medial malleolus and around the heel which was soft and fluctuating associated with Local rise of temperature and severe tenderness over the heel.(Figure 1)

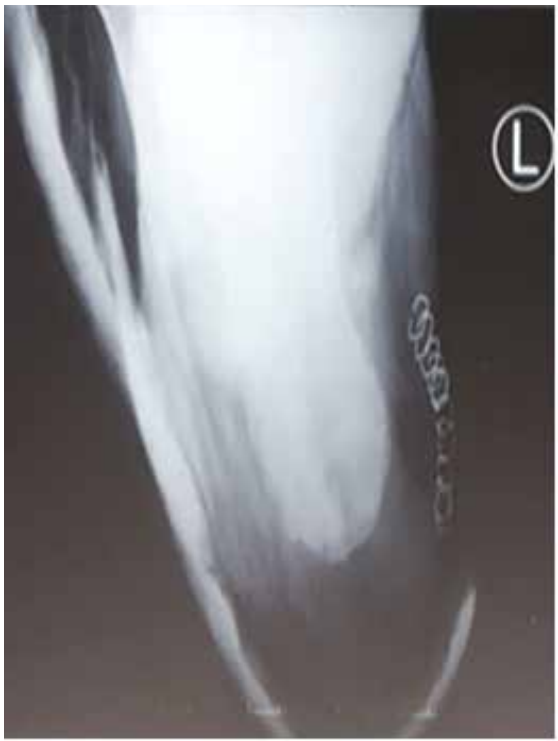
Because of these findings in left ankle joint a detailed history was taken and revealed that the patient had pain in the left heel and difficulty in walking one year back which was gradual in onset and pain was more in the morning. She was initially given some NSAIDs with no relief and later given corticosteroid injection. On the next day the patient developed swelling with severe pain around the heel and around the medial malleolus. Swelling gradually increased within 3-4 days. She also found difficulty to bear weight on that foot (Figure 2) and an X-ray of left ankle joint was taken.(Figure 3)





Conservative treatment with antibiotics and NSAIDs were continued for 1 month. There was some relief for few days with recurrence of symptoms on most of the days. Later MRI was done and reported as osteomyelitis of calcaneum posterior third with abscess inferior to calcaneum involving plantar muscles, for which patient underwent surgery – debridement and soft tissue excision was done. (Figure 4)





And was on plaster immobilization for 3 months and later when plaster was removed She was advised not to bear weight on the heel, so she started walking on forefoot and this resulted in low back ache because of the abnormal walking posture and weight transmission.

Patient when seen in OP had clinical features of infection at the same site. A further surgical debridement was needed. They were not willing for it. The complications were explained Conservative treatment was given and asked partial weight bearing, and review in OP SOS.

DISCUSSION

Steroid injection is an accepted and effective treatment in plantar fasciitis. Yucel et al advocate giving injection using palpation or ultrasound as referencing as this is more effective and efficient than physical therapy alone. Lee and Ahmad compared autologous blood injection against corticosteroid injection and concluded that steroid is superior in terms of speed and extent of improvement. Tatli and Kapasi reported that steroid therapy, when coupled with physiotherapy, can provide efficacious pain relief, but they recommended that steroid injections should be combined with ultrasound monitoring to reduce complications. Very few complications of ster oid injection were reported in the literature. Other complications of plantar fascia injection described in the literature involve sterile abscess formation, lateral plantar nerve injury, and plantar fascia rupture. Calcaneal osteomylitis is uncommon and challenging. Frequent relapse, delayed wound healing can occur. Sometimes it is limb threatening and even life threatening.

CONCLUSION

Complications of steroid injection in the treatment of plantar fasciitis are rare but potentially very serious. As presented in this case report, the injection may cause calcaneal osteomyelitis. I would like to highlight this serious risk and to make orthopaedic surgeons and physiatrist aware of the above complication and urge them to consider this when obtaining consent for injection in plantar fasciitis.

Steroid therapy is a valuable adjunct to other therapy measures, including plantar fascial stretching. However, one should be cognizant that overuse of steroid injection can lead to complications. Ultrasound guidance should be utilized to improve injection target and monitor soft tissue changes, thus preventing complications.

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Members in Action

Dr. Roshin Mary Varkey
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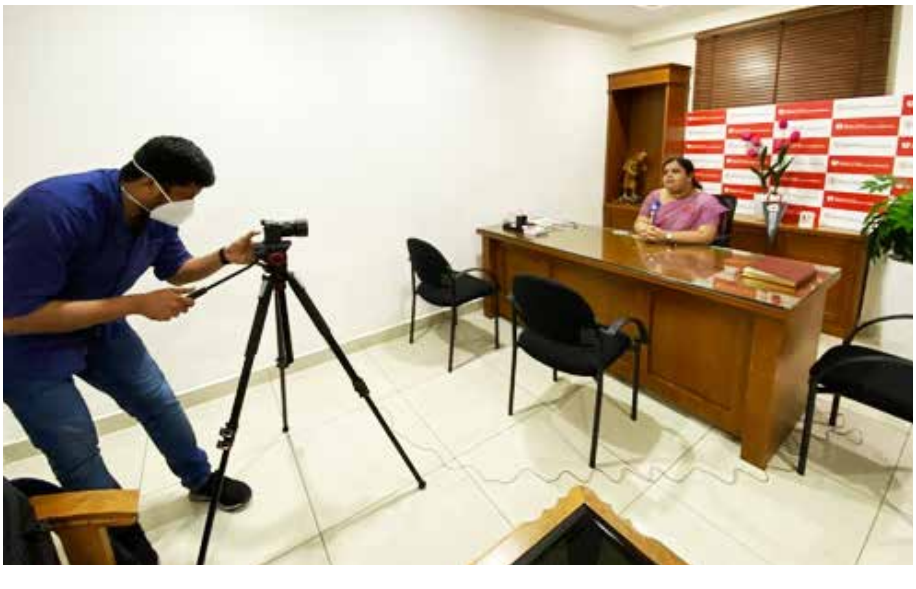
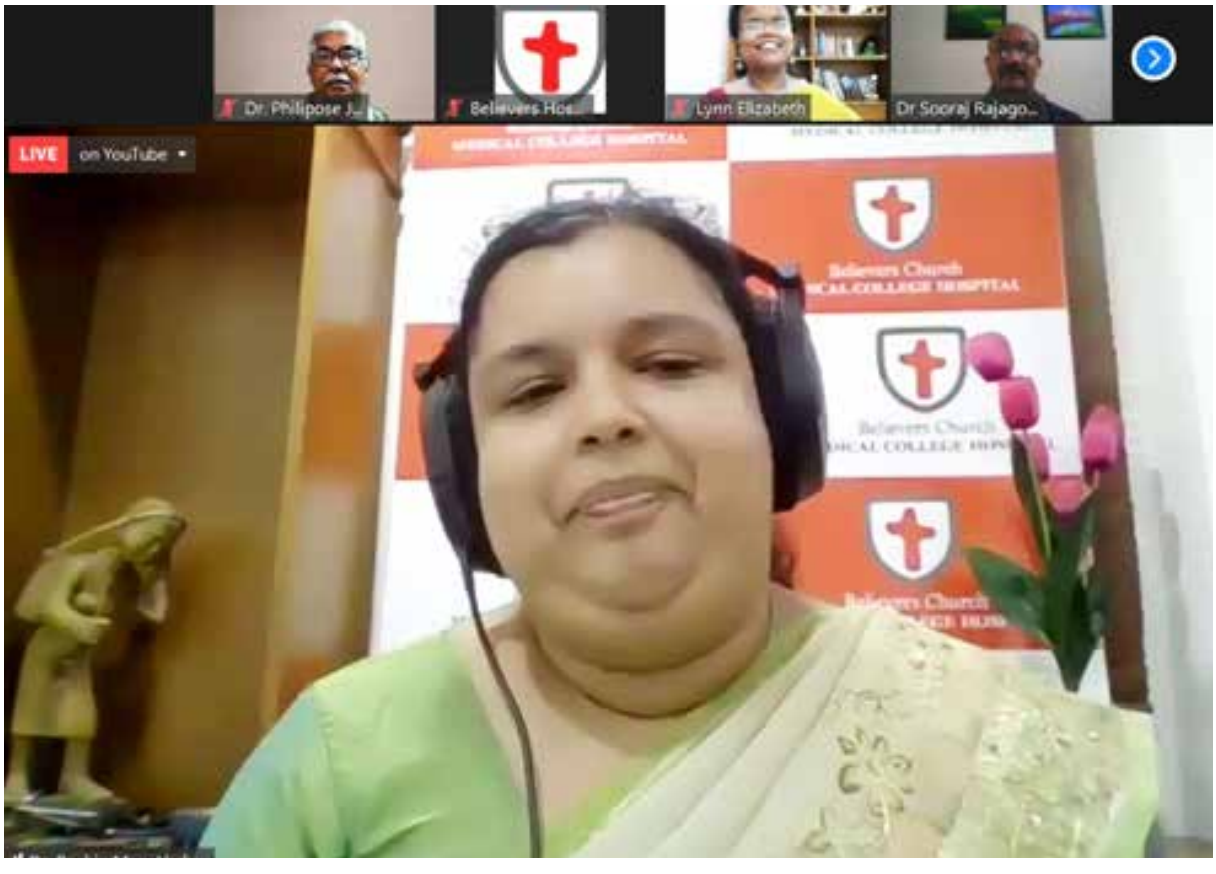
Virtual Medical Camp organized by Believers Church Medical College and Hospital, Thiruvalla in association with Deepthi Special School for differently abled children on the occasion of Children's Day, November 14th

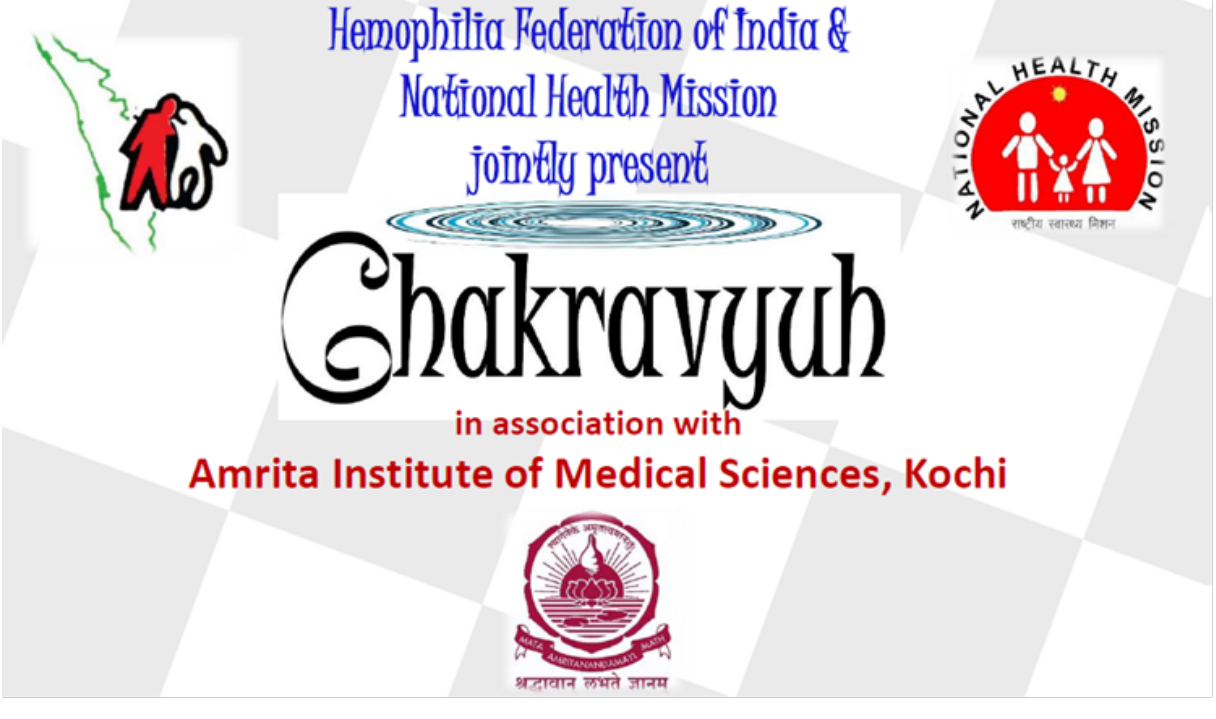


Awareness talk (short video presentation) on the occasion of International Day of Persons with Disabilities, December 3rd 2020

Organized and moderated a webinar on Rights and Opport unities for Differently abled on the occasion of International Day of persons with disabilities, December 3rd



Dr. Nittu Panjikaran



Inspired by Dronacharya of the Mahabharatha, this meeting was named Charkravyuh, a military strategy to overcome the multiple problems the disease manifested. It was the first hemophilia virtual meet which was conducted in Amrita Medical College along with Hemophilia Federation India and National

health Mission by the Government of Kerala. Over a period of 3 days, they brought together patients, doctors and health care policy makers both national and international to improve the quality of life of hemophilic patients.

The physiatrists handled the musculoskeletal aspects of hemophilia like hemarthrosis, muscle bleeds and treatment options for deformity correction and compensatory strategies. The session was moderated by Dr. Javed Anees, (Consultant Physiatrist in District Hospital Tirur HTC) and the speakers were Dr. Shigy Francis, (Consultant Physiatrist in HTC Aluva and Lisy Hospital) emphasized the importance of Hemophilia Rehabilitation and Dr. Nittu Panjikaran, (Assistant Professor in Amrita Medical College) highlighted the deformity correction techniques like skin traction, serial casting with wedging and casting under anesthesia. In addition, the role of Yttrium synovectomy in patients with recurrent hemarthrosis. This treatment is currently being done in CMC Vellore by the PMR department since the last 15 years and currently started in PMR department of Amrita Medical College, Kochi.

My Rehab Diary

Dr. Anne Mary John
Assistant Professor, Kasturba Medical College, Mangalore.

Stories have always intrigued me. Though not so befitting for an adult, I have retained a childlike fascination towards stories. And when I joined for postgraduation in PMR, I felt like being thrust into a storybook filled with dismal stories which played out right in front of my own eyes.

They came from different walks of life, but their eyes reflected the same pain and helplessness; be it haemorrhagic stroke one month back or a Diffuse Axonal Injury 10 days ago or a spinal cord injury 2 months back. I witnessed the various Kubler-Ross stages of grief; denial, anger, bargaining, depression and acceptance, strewn across the ward.

It was during this time, a 40year old man named Mr.Vwas brought to our ward. He was diagnosed with pontine haemorrhage which resulted in 'locked in syndrome'. It was in 2012 and I was an infant in PMR. This was the first case of 'Locked-in syndrome' I encountered and it made me feel immensely incompetent. I could not imagine myself in his shoes - unable to move, unable to speak or vent out frustration; all the while fully aware about what is happening to himself. His young wife would silently stand next to him, as he sobbed himself to sleep. This man's situation shook me and made me wonder what a Rehab physician can do for him. He got discharged before we could do something and was lost for follow up.

In a few months' time, the next patient with 'Locked in syndrome' came. This time, it was a brilliant young man (a scientist, to be precise) in his early thirties who developed stroke after taking his first chemotherapy for Non Hodgkin's Lymphoma. My professor insisted that I make a communication board. I had never heard of such a thing before and ventured out to make a communication board using English alphabets, words and numbers. The patient was asked to blink twice for yes and each word was spelt out meticulously by going through the rows and columns. It was a tedious process as it took three or four minutes to elucidate a simple four lettered word. But that did not deter his newly wedded wife. As I watched this young couple trying to communicate with each other, I learned something, which I would not have learnt from a textbook; Rehab is not always about correction and cure. Success of rehab cannot always be accounted to the number of footsteps the patient takes. Achieving a small thing is also rehab. Doing something to ease the suffering is also rehab. When you see the mess a person with tetraplegia would make while trying to eat food with his universal cuff, you may perceive it as a failure. But you will see the success, if you contemplate the independence the man has achieved.

As time passed by, my attitude towards many things have changed, especially about Rehab and human suffering. I began to see colours of hope, adventure and love, in these sombre portraits. The story of a pregnant woman who became a paraplegic and lost her two children (3 year old child as well as the unborn child) in the same accident, was one among them. The only 'felt need' that she expressed was, her desire to be a mother again. And finally, when she became pregnant and gave birth to a child, it brought her great joy and fulfilment.

I still vividly remember, the day I saw a young girl walking into our amputee clinic with a peculiar gait. Though not very evident at first, we could see that she had lost all the four limbs (at different levels) once she removed all her prostheses. Her face was radiant as she explained her daily struggles and how she was overcoming it.

Resilience of the human spirit is something beautiful to behold. And a rehab physician's role is to foster that trait along with all the other rehab measures.

PMR in Kerala survey

Dr Ravi Sankaran
Associate Professor, Amrita Institute of Medical Sciences

This survey was completed by 76% of our group members. I thank all who participated. To those of you who didn't attempt, your critical opinions are needed for us to grow. The idea here is to unify our professional body by spreading awareness. Considering the success rate more will follow. Of the participants 97% felt contributing was worthwhile.

With respect to Quality of Life issues we considered usual versus optimal care providers for those with rehabilitation needs. The usual providers selected are as listed: Local MBBS 16%, Physiatry 23 %, Non-PMR Specialist 43%, Pain and Palliative 7%, Home nurse 1%, PT 4%, Other 6%. If this is representative of reality, it's no wonder people are angry at the medical profession. No other doctor is trained to look at quality of life the way we are. Among those (non-PMR) who utilize ICF, the ability to address identified issues is limited. Thankfully 99% of our group felt that we are the best to treat chronic neurological/ musculoskeletal/ lifestyle disease(s). The other cent went to Local MBBS doctors, who certainly pale versus our skill set. It seems that we have to reach out to those we want to serve.

The majority (89%) feel our allied colleagues awareness of Physiatry is inadequate. Of the balance an equal number feel it is Adequate or Absent, but no one feels it is Perfect. We have to start by improving ourselves, then sharing that progress. Along those lines 91% make efforts to promote awareness. It makes we wonder what the others are doing if they won't. Part of the reason for low awareness can be found when we look at daily case loads. Forty two percent do a mix of general practice, Neuro and MSK-rehabilitation. Four percent do general practice. Just under a third exclusively do rehabilitation. Of those mixing general practice with PMR more do MSK-rehabilitation than Neuro. Six percent do something entirely different. The majority (85.2%) are non-operative, and are part of a rehabilitation referral network (75.2%). Summarizing all this exposes why people don't know what rehab is. Only a third of our graduates actually practice exclusively what their degree demands. Based on the previous survey, more than 80% of us only do OPD work. Health sector growth and development has mostly been hospital centric. If we aren't around the action it's no surprise our colleagues are clueless of what we do. Acute care is challenging, but it cements ones place in the care pathway. The result of the vacuum we've created is as follows. Regarding PMR in Kerala the majority feel it is not adequately developed to the needs of patients (59.0%), highly variable in services and options (34.4%), in an abysmal state of affairs (4.1%), or well established and able to cater to all rehabilitation needs (2.5%). We needn't look further than a mirror if we want to know where improvements should originate from.

From here the questions moved to forming a good practice foundation. Dr Ed Atty one of my teachers back at MSU told me to succeed in PMR

you have to know more OT than PT, and more PT than OT etc. One of the biggest problems we face is the breadth of subjects to master in order to get into deeper levels of practice. The average surgeon only has to learn how and when to cut. A Physiatrist can't do high end rehab until they're good at General Medicine, and all the associated paramedical disciplines. About half felt their PG degree was a stepping stone into a domain they're still unsure of (55%), followed by others feeling PG wasn't enough so they read in select areas of interest (44%), and less than a cent felt PG was sufficient for daily work with no need to grow further.

Knowing we have to grow is one thing. The direction and trajectory are a different issue. Most of healthcare has been reduced to protocols. Pick up any two guidelines and the differences will be minimal. In PMR though, we don't have any. This is a real issue. Regarding this 85% feel Physiatry in Kerala would benefit from established protocols. Plumbing this further if the pastmasters of Kerala PMR standardized care plans 87% would use it as a guide and fine tune it to patient's needs, while 13% would follow it to the letter. None would ignore or do the opposite. Opinions change when foreign Physiatrists (ignorant of India) set the standard. Ninety-seven percent would use such protocols as a guide and fine tune it to patient's needs. The balance would ignore it, and less than a cent would follow it to the letter, with no one would doing the opposite. When local physiatrists (who read and summarize all the published literature while mentioning levels of evidence) become the guides 82% would use it and fine tune it to the patient's needs, 18% would follow it to the letter, while no one would ignore it or do the opposite. Its amusing to see the number willing to blindly follow stalwarts(11%) or young local Physatrists(17.9%). Another interesting point is 15% less people (97% vs 82%) were willing to use the same protocol made by a local group summarizing literature (mostly western) versus if a foreigner with no concept of Indian diversity did the same. Sixty percent of participants are interested in being part of a protocol making committee for rehabilitation disciplines. Seventy-seven percent of us are interested in being part of a group of like-minded Physiatrists who do clinical research on similar patient populations. This is potential we must tap and develop. There are four PMR residencies in Kerala, and a comparative abundance of us versus other states in India.

So how do we get there? The first step is to make protocols from the existing literature. Those who like the same topics will be drawn together. With web meetings being en-vogue, special interest groups can easily meet. The majority (91%) feel a state-wide registry of all patients with various rehabilitation related diagnoses is important. With a special interest groups/ task force in place this becomes easy. Many (85%) expressed interest in addressing public health issues for rehabilitation patients. The opinions varied on who should advocate for accessibility in public places. Government officials (33%), patients with accessibility issues (32%), and Physiatrists (35%) all relatively rank equal. The politicians will always pander to those who give votes, and the patients have a real need. As doctors if we get involved we gain value.

CONCLUSION

There are so many opportunities for Kerala PMR to grow and set the example with. Perhaps it's time we start taking advantage of the abundant opportunities.

■

QUIZ

1. **Our auditory system receives air vibration & converts it to different energy forms so that we perceive it as sound. What are these energy forms?** (a) Mechanical (b) Hydrodynamic (c) Electrochemical (d) All the above (e) a & b

2. **The divisions of the cochlea include all except..?** (a) Scalavestibuli (b) Scala tympani (c) Scala media (d) Scalatarsalis

3. **The sensory cells of hearing, called _____ cells,lie on the basilar membrane that separates the scala media and scala tympani.** (a) Oat (b) Clear (c) Basilar (d) Hair

4. **What do otoacoustic emissions assess?** (a) Function of brainstem in response to sound (b) Air conduction (c) Bone conduction (d) Function of outer hair cells of the cochlea

5. **The SNHL is characterized by elevated air-conduction thresholds with an air-bone gap of _____?** (a) 25dB or less (b) 15dB or less (c) 35dB or less (d) 10dB or less

6. **_____ evaluates the function of the tympanic membrane, the status of the middle ear, and the acoustic reflex pathway?** (a) Speech audiometry (b) Immittance audiometry (c) Auditory brainstem response (d) Otoacoustic emissions

7. **The 'occlusion effect', where hearing aids block the ear canal, &patients may feel that their ears are plugged, is seen with the following hearing aids except?** (a) ITE (b) ITC (c) Open BTE (d) CIC

8. **The two otolith organs (the utricle &saccule) detect all except?** (a) Angular velocity (b) Head tilt (c) Gravity (d) Linear acceleration

9. **During _____testing, the patient tracts a visual target moving in a sinusoidal pattern that varies in frequency over time?** (a) Random saccade (b) Smooth pursuit (c) Positional (d) Caloric

10. **The cervical vestibular evoked myogenic potential (cVEMP) can be recorded with electrodes placed over the _____ muscle?** (a) Orbicularis oculi (b) Stapedius (c) Trapezius (d) Sterno Cleido Mastoid

KEY

1. (d)

Sound is generated when air particles vibrate and propagate as sound waves. Our auditory system receives this air vibration and converts it to different energy forms (mechanical, hydrodynamic, and electrochemical) so that we perceive it as sound.The sound travels to the middle ear, which houses two major ear structures: the tympanic membrane (eardrum) and the ossicular chain that consists of the malleus, incus, and stapes.

The middle ear is an air-filled space that is connected to the posterior of the nasopharynx via the Eustachian tube that works to equalize air pressure between the middle ear and the outside environment. The sound vibrates the tympanic membrane and then sets the ossicular chain into motion to further amplify sound by making the ossicular chain act as an impedance-matching transformer that is an important step to prevent energy loss when sound travels from air (middle ear) to a fluid medium (inner ear).

The inner ear is a fluid-filled space within the temporal bone and is connected to the stapes of the ossicular chain via the oval window and to the eighth cranial nerve (vestibulocochlear nerve) through hair cells. The inner ear consists of two different parts: cochlea for hearing and vestibular section for balance.

2. (d)

3. (d)

The cochlea is divided into three divisions: scala tympani, scala media, and scalavestibuli. Hair cells, the sensory cells of hearing, lie on the basilar membrane that separates the scala media and scala tympani.

The hair cells are mechanoreceptor cells that have important ion channels in their cilia (stereocilia) for electrochemical sound transduction.

4. (d)

Otoacoustic emissions objectively assess the function of the outer hair cells of the cochlea.

Acoustic reflexes objectively assess the function of acoustic reflex pathway including stapedius muscles, auditory nerve, cochlea nucleus, superior olivary complex, facial nerve; the testing site is retrocochlea.

Auditory brainstem response objectively assesses the function of the brainstem in response to sound; the testing site is retrocochlea.

Tympanometry objectively assesses mobility of tympanic membrane, function of the middle ear, ear canal volume, and obstruction of the ear canal; the testing site is outer & middle ears.

5. (d)

The sensorineural hearing loss (SNHL) is characterized by elevated air-conduction thresholds with an air-bone gap of 10 dB or less.

The hearing loss caused by damage to the outer ear and/or middle ear is called conductive hearing loss. It is characterized by normal bone-conduction thresholds and elevated air-conduction thresholds with an air-bone gap (difference between airconduction and bone-conduction thresholds) of 15 dB or greater.

The mixed hearing loss is characterized by elevated airconduction and bone-conduction thresholds with an air-bone gap of 15 dB or greater. It is a mixture of conductive and SNHL.

6. (b)

Immittance audiometry evaluates the function of the tympanic membrane, the status of the middle ear, and the acoustic reflex pathway.Tympanometry and acoustic reflexes are two major tests included in immittance audiometry.

Speech audiometry assesses a patient's ability to perceive and recognize spoken words either under earphones or in sound-field.

Otoacoustic emissions (OAEs) are retrograde transmissions of energy from the cochlea to the ear canal. OAEs provide information about function of the cochlear outer hair cells. Proper measurements of OAEs require an intact middle ear system. Clinically, OAEs are used for differential diagnosis, infant and pediatric hearing screening, and ototoxicity monitoring. There are two major types of OAEs that have been used clinically; transient-evoked OAEs (TEOAEs) and distortion product OAEs (DPOAEs).

The auditory brainstem response (ABR) measures neural activities along the auditory pathway from the eighth cranial nerve up to possibly the inferior colliculus in response to auditory stimuli delivered via insert earphones.In normal-hearing adults, the ABR has seven distinct peaks, labeled sequentially from I to VII. These peaks and troughs are thought to have different neural generators. Typically, only waves I, III, and V are used clinically.

7. (c)

The main components in digital hearing aids are (1) microphone, (2) analog-to-digital converter, (3) digital signal processing circuit, (4) digital-to-analog converter, (5) receiver (speaker), (6) battery, and (7) a means of coupling the amplified sound into the ear canal.

Various styles of hearing aids are available, including BTE, open-fit BTE, in-the-ear (ITE), in-the-canal (ITC), CIC, and receiver-in-canal (RIC).

The BTE and RIC hearing aids have microphones behind the pinna, but the ITE, ITC, and CIC have a microphone either at the entrance of or deeper in the ear canal so the aid can take full advantage of pinna effects (e.g., sound collection and amplification). However, because the ITE, ITC, and CIC hearing aids block the ear canal, patients may feel that their ears are plugged (occlusion effect) compared with a BTE with a nonocclusive ear tip (open-fit BTE).

ITE - In The Ear

ITC - In The Canal

CIC - Completely In the Canal

BTE - Behind The Ear

RIC- Receiver In the Canal

8. (a)

The vestibular end organs consist of the semicircular canal (SSC) system and otolith organ system.

The three nearly orthogonally positioned SSCs (posterior, horizontal/lateral, and anterior/superior) sense rotational/ angular acceleration.

The two otolith organs organs (utricle and saccule) detect linear acceleration, head tilt, and gravity.

The stereocilia of the sensory hair cells within the utricle and saccule are embedded in a gelatinous structure (otolithic membrane) with associated microscopic calcium carbonate crystals (otoconia). The abnormal migration of otoconia into the SSC system results in a type of dizziness termed benign paroxysmal positional vertigo.

9. (b)

Saccades are rapid movements of the eyes. During the saccadic testing, the patient's eye movements are compared with the fast, random movement of the target stimuli. Analysis includes the measurement of saccadic accuracy, latency, and velocity.

During smooth pursuit testing, the patient tracts a visual target moving in a sinusoidal pattern that varies in frequency over time. Symmetrically impaired pursuit is suggestive of a nonspecific central finding after accounting for patient variables. Asymmetrically impaired pursuit is consistent with a unilateral hemispheric or asymmetrical posterior fossa lesion.

Positional testing is used to identify nystagmus present during the maintenance of a provocative head or body position.When nystagmus is present, the comparison of the nystagmus with and without fixation is essential to determine site of lesion. Visual fixation is expected to decrease the slow-phase eye velocity of a nystagmus of peripheral origin, whereas the nystagmus velocity is likely to increase with fixation nystagmus of central vestibular origin. A change in nystagmus direction within a set position is also suggestive of a disorder of central vestibular origin.

The caloric test is performed by applying cool and warm temperature irrigations of water or air in the external auditory canal. The patient is positioned such that the horizontal/lateral semicircular canal is perpendicular to horizontal. The temperature gradient induces endolymph flow in the horizontal/lateral semicircular canal, which then activates the VOR.The irrigations are applied into each ear individually, and the resultant slow-phase velocity of the nystagmus is analyzed. The ensuing nystagmus should follow the "COWS" (Cold Opposite, Warm Same) mnemonic.

10. (d)

Intense sound stimuli such as clicks or tone pips can stimulate sensory tissue within the otolithic organs. The cervical vestibular evoked myogenic potential (cVEMP) can be recorded with electrodes placed over the sternocleidomastoid muscle (SCM).

The cVEMP is based on the vestibulo-collic reflex and is thought to originate in the saccule. The neural structures involved in the stimulation of the SCM include the inferior division of the vestibular nerve, the lateral vestibular nucleus, the lateral vestibulospinal tract, and the accessory nerve (XI).

The ocular vestibularevoked myogenic potential (oVEMP) is believed to originate in the utricle, and it involves the superior division of the vestibular nerve. It can be recorded using electrodes placed over the inferior oblique muscle in the contralateral infraorbital region.

The cVEMP abnormalities encountered in various otologic and neurologic disorders, are helpful in differentiating these conditions.

Creating a space for yourself

When I joined AIMS in 2009 the PMR department was a therapy clinic with a Physiatrist at the head, with PMR starting a decade after Physiotherapy. Without supervision therapy was unstructured. Naturally this resulted in problems. As the sole physician, it was hard for my predecessor to make improvements. We've grown since then, but contrary to popular belief it wasn't easy. What follows are challenges a budding physiatrist in a corporate hospital may face, and ways we addressed them.

Where are you in the referral network?

Modern Medicine is a conglomerate of widely varying services. After exhausting all their treatment modalities refractory patients are referred to PMR, making us a quaternary specialty. Being the last home for these patients is difficult but producing results with this group of patients helps develop your skill and reputation. In the least people will know you exist. Such patients often have bedsores, nutrition issues, contractures, and complications related to consciousness, or peripheral lines. This is our bread and butter, albeit with sporadic emergencies and patient-party angst.

Why/ How should I help you?

We add quality to the heroic measures our colleagues undertake. That is the bottom line. You'll always have helpers when you start working. They come in two forms. One builds you up from within, while the other makes you tougher and sharper on the outside. We all know a bad workman quarrels with his tools. It remains in your hands to utilize what's given. Let's start with antagonists . A few months after I joined, the hospital hired a UK returned GP with a specialty diploma. Initially he was supportive and we planned a combined unit. Once he got the flavor of corporate healthcare the tune changed. First, he got the concerned department banned from seeing his patients, then he became a self-styled physiatrist, and sold administration a money-making, market-share-grabbing plan. Despite lacking knowledge of rehabilitation, he cut us out next. He felt a dedicated therapist could replace us. What does that have to do with PMR and growth? To get back into this side of rehabilitation we made our first big technology purchase. As the he was not trained for this, the plan was to use it to gain access to his patients. The purchase team gave us a few threats as motivation to get it paid off quick. We responded by canvassing the hospital lift lobbies with posters promoting the device. Seeing our efforts his dedicated PT started a libel campaign. Interestingly though this highlighted to our colleagues that we were trying to provide better care.

Next Orthopedics demanded a dedicated Physi otherapist for arthroplasty. They decided to have this PT serve their OPD patients, cutting us out of pain management. Administration called us and sought our approval. Naturally we didn't agree, and this was disregarded. Our OPD numbers plummeted from a daily forty to sixty down to five to ten. It got me really wondering what we had to actually contribute. In those days after a history and exam the majority of patients went to the therapist next. Naturally the referring doctors saw us as an obstacle. Having done an exam and made their diagnosis, for them all that remained was some exercise. As they lacked understanding of how complex pain rehabilitation was, they felt writing 'Physio' or 'SWD' was enough. When our numbers dropped I had to validate my existence in the hospital. I began to look into other options

to treat pain patients. Reading more changed my entire approach to MSK pain management. Growth is initially painful, but stagnation yields perpetual discomfort.

The drop in OPD numbers raised a red flag though. It resulted in us being summoned to a meeting with superintendant and all the Physiotherapists. All our actions were questioned and care planning devalued. The multi-specialist's PT contradicted everything Surendran Sir said by quoting the latest (skewed) evidence, and made him look inept. Administration conveniently forgot that they allowed all this to happen. The meeting concluded with allowing the therapists individual consulting privileges, rendering Physiatry inert. I left America to serve God in his human form in my Guru's hospital. I never expected to be made obsolete, so I prayed for a solution. What began that day was the process to redeem our department.

It wasn't always doom and gloom though. We had strong support from Neuroscience specialists who had lots of traumatic encephalopathy/ myelopathy and peripheral neuropathy for us. This became the foundation for our inpatient service. I'd known one of the neurosurgeons from childhood, so he would give me support and feedback about patients. Both departments provided the support needed to get our first big device paid off. The real value we added was both as an asset and being no relevant threat. As prayers got answered we began more services. An ashramite from the California branch had been given a new Nintendo Wii with balance board. She asked me if I had a use for it. Opportunity knocks but once, and I pounced on it. A defining moment in care came when I casually picked up a stroke patient from Neurosurgery and made a video of his performance in the virtual reality balance games. What I didn't know was that morning he had been abusive tothe Neurologist when she asked him to walk. His cerebellar stroke left him with vertigo and vomiting resulting in phobia. After playing those games he walked and went home. On seeing the video our Neurologist realized the value of our service and doubled effort to support us. Neurology kept giving us a steady flow of pain patients. From there we started doing trigger point injections, ergonomics and postural analysis.

From the Neurosurgery side I got guidance on how to shape myself into something useful for the hospital. While Neurology was addressing spasticity with oral agents and botulinum, they didn't have time for rehabilitation. My neurosurgeon guide joined me for a spasticity conference in AIIMS Delhi, and prompted me to approach the faculty for training. Eight months later I was in Japan learning surgical interventions for spasticity. On my return we started a spasticity clinic. When adversity strikes people often forget 'Diamonds are a chunk of coal that did well under pressure'.

What am I missing?

The past HoD of neurosurgery called me one day to tell me about a patient he had. He basically told the family to see Ravi who would do magic and send the patient home walking. He called me and said, 'do whatever you like'. The patient was a respected maths teacher whose recent surgery left him with hemiplegia and neglect. Like it or not every doctor has to hear patient complaints they can't address. Somewhere in that we get a history and exam then make a diagnosis. The remaining problems are written off as psychosomatic and the patient is eventually given a placebo (drug or therapy referral) and discharged from follow-up care. Sadly many of these complaints can be sorted by PMR, if we get access to the patient. Often sincerity, good bedside manners, a detailed clinical exam, and honesty can get a patient/ family to a better place mentally if not physically.

What more do you have to offer?

After three years I was tired of being asked why I left medicine to become a therapist. It wasn't the fault of those doctors though.They only connected to us for physiotherapy or braces. While we were doing chemo-neurolysis and trigger point injections more important departments were too, so we were not unique. Hyperbaric Oxygen was one of the first steps to shed that misconception. Being new, many in the department were wary of it. One member scorned the attempt to develop, while the remainder tried to have nothing to do with it. This was perfect! We got a technician to operate it, and began training courses. Underprivileged individuals were trained as attenders. The Bangladesh Airforce sent two doctors to me for certification. For the first time Physiatry was associated with something other than therapy. We've since started a robotic rehab service (without therapist involvement), and more. Find something no one else is doing(with strong scientific value) and grow yourself along this line. The harder it is to learn the less people will imitate you. Getting certified abroad gives you market value.Some will support or rejectyou, but persevere for your patients sake.

I already do that, so what are you going to add?

Botulinum for spasticity was the domain of a particular department. They would inject blind,

and then sent patients outside for therapy. Perchance such a patient came to me. He was a five year old with GMFCS 3 spastic diplegia in apparent equinus. As you know in such cases the gastroc is normal, but the hamstring is not. The injecting doctor sadly didn't, and put 200 units of medicine into the wrong muscle groups without sedation. Along with the patient their savings were traumatized.One of my mentors was hosting a botulinum preceptorship in Bangalore at the time. After he taught me how to do USG guided injections we could scale up the quality our services. Now that department refers botulinum cases to PMR. Children get General Anesthesia so they don't suffer as badly, and PMR gets time in the operating theater. If we improve ourselves for the patient's sake, at least we improve.

No one really wants to see a doctor, so many act as touch-and-go care providers. They are only active when needed. Pain and Neurorehab patients often need maintenance and routine checkups. Being time consuming with little reward, many consultants don't like these cases. Being a non-specialty department we had limited direct access to patients, so this was a start. Results, good or bad echo back to the referring doctor so tread carefully. Neurology knew about CIC and wanted someone else to do it. We took it up. Need solutions for the non-motor symptoms of PD? Enter Physiatry. Pediatric Neurology wants a life care plan for kids with CP. No problem. Seize the moment and don't let go.

Do you actually have a treatment plan?

Healthcare has become so streamlined and efficientthat apparently even an advance practice paramedical can manage diabetes.[1] With neuroregeneration it is hard to predict when and how a patient will improve. Often we are left to juggle nutritional needs, bowel, and complications of prolonged in-house stay for a person not fit for home or subacute care. My neurosurgery friend caught me off guard early on by asking me why I had no plan regarding the patient he gave me a month ago. Actually we had done so many things to reach goals set with the family. As he reached them the family would raise the bar and refuse to go home until those too were met. When he met them in the ward and asked why they hadn't gone home yet, they passed the blame to me. In corporate care reputation is important, and one disgruntled patient-party can create a lot of problems. It takes experience to make a comprehensive plan, but a simple approach is to see what the patient needs then set baby steps for them to achieve it. Often allied doctors want details of what will happen in rehab before they transfer a patient. Patients-party often ask and look for local options. The more details your referral base has the more confident they can be in what you have to offer, hence convince your prospective clients.

How hard will I have to work?

The amount of effort you'll have to exert is directly proportional to the existing inertia to change. The tricky thing is this is both internal and external. Unlike those in organ/disease specific specialties we have to evolve as people, in order to help others. This is especially true because of field is so vast and poorly represented. Aside from resistance within the department and allied specialties, I found my own attitude was an obstacle at some point. I needed a lot more skills to survive than I learned in residencies. Some days after work, I just didn't feel like reading more. I had to put my needs aside for the patients though. On gaining the knowledge, having the confidence to translate that into good patient outcomes was the next struggle. Fear of the unknown, and insecurity were the burdens to shed. There simply was no value in over thinking past mistakes. The more I did, I'd end up vacillating on negative thoughts that left me dull for the next situation. One asks what they can gain by undergoing such ordeals. You become living proof that no obstacle is insurmountable. The willpower gained can be channeled to help others with activity and participation restrictions improve. That in a nutshell is rehabilitation. 'If you can't walk the walk, don't talk the talk'.

"On the heights, all paths are paved with daggers."[2] Physiatry in the corporate world is really tricky, but rewarding. What happened to the other characters in our story? The multi-specialist became so power crazy he could no longer be accommodated in our hospital. Ortho tried to have their way with the therapists and got a strong backlash. Their dreams remain and empty shell. The same administrator who had earlier facilitated our downfall later came back to help when support was needed. Being our administrative overseer he saw how much we had done since that meeting a decade ago. Together (using me as the battering ram with him the steering system) we overcame all sorts of obstacles. There were more and still are many attempts to subvert PMR development. What helped was to have a focus and drive at it regardless of what happened. Ensuring patients get the best possible outcome is mine.

The Viral Run

Runnir has spiked, morning, evening and in the night I see more and more people running in my campus, most of them isolate runners. Our own running pack has ceased to run together, "Run your own run" has gone viral!

It's very rare that something can keep us isolated form our own species when we are well, sick, very sick and more so when we are dead. We are going through it now with this viral pandemic. Running might not be a common thread running between us! but one thing is, the void in reality that will one-day swallow us "Death".

Who does not want to avoid the thought or dream of death? Given the awareness of mortality and fear of death, we are willing to believe in more imagined realities /stories/treatments. During these times many who were not looking up, are willing to look up to their own Gods for respite. Life is but a hard bound text book  with a firm beginning and end. The initial chapter being written, or I should say drilled with and formed by the teachings, influences and environments of a particular culture or society. The middle chapter are full of ambitions dreams, achievements, adventures and all that's considered Maya! After those busy rough chapter are over, it's time for the last few chapters. Wisdom and experience takes over and we look back at the other chapters to make sense of it, and we do see a lot of it and more, as we move closer to the void that awaits us. So does one become bias in any kind of belief that promises at least some degree of immortality. Yes of course most of us do. These biases have shaped our past and will, the generation next.

Within a century or so we have learnt so much and have gathered immense knowledge. Somethings as simple as, washing hands with soap (one of the best options these days) can help prevent or reduce infections, to a fact that we have technology to freeze (umbilcal) cord blood even before we even take our first gasp and the first photon reaches our retinas, with a hope of technically reaching near the fringes of immortality.

Yet an  invisible crown (corona : Latin - Crown,), as small as few nanometre's ($1/1000000^{th}$ of a mm, most of us cannot even comprehend that size), has been placed on us. A very small piece of chemistry,  a virus (Latin: Virus – Poison) seemingly occupying large part of our mind, body and spirit, that has threatened to put the breaks to this roller coaster ride of life.

Forwards and Backwards:

Imagine if we were in 1970's and if we were in this situation (thanks to globalisations and capitalism our portals to good life and problems) without the internet, connectivity, and the rapid pace of dissemination of information, would our anxieties, expectations and fears been more manageable? Are we reading forwards and moving backwards into the realms of uncertainty?

How much is too much information? What is appropriate information? How much should you panic? Definitely it makes sense to look at the past number, spread patterns and all necessary data. Medicine is a science of statistics, so most forwards on your mobile are backward issues/

data, we literally live-in in the past.

Cases, Clusters, R-0, series intervals, fattening the curve, these are the terminologies that we use to understand from the past the happenings in one place to predict the future in another. We are learning form the Chinese, Korean and Italian models, to see how we can douse this raging fire in other areas. Getting an epidemic or a pandemic after a few regions have experienced it is definitely a luxury, as one can be better prepared and not make mistakes that the previous regions did. Question is, did we learn? Did we underestimate this invisible tsunami? Were we complacent, procrastinating?

Change in behaviour and care for environment probably is the key. In the past 5 decades or so, 60 % of major communicable diseases we have seen are zoonotic meaning, came from animals. This is probably a massive hidden cost of our rapid economic development and globalisation.

We got drunk with the capitalistic free markets and see what has happened. Easy to connect with and understand the severity of the problems form China, Italy and Europe! Post pandemic we might build more walls with tighter restrictions, and give ethnic identity to the virus, but does the bat or the virus know borders or race?

Talking of bats, why are they able to cohabitate with viruses so well, they too are mammals they too live 40-50 yrs. What is their secret? Recent research tells us that one of the reasons could be the fact that they work out heavily (Regular running in our terms) by flying at night foraging for food. This physical activity akin to running has evolved a metabolism and immune system which helps the bats to coexists with the virus without getting into trouble. Its when the virus jumps species trouble starts.

Is there an end? Of course there is one, has to be one. But when…. is anybody's guess! Today's is primarily but not merely a health issue, it does come with a big baggage, one that might be challenging to carry. What is visible at present is lock downs, panic buying of goods, medicines and Panic selling of stocks and shares. What stealthily follows is looming, contracted quarter's, growth figures, stimulus package, poor head room for fiscal deficit, and inflation. These are a sure recipe of some challenging times for a most of us, irrespective of our socio-economic strata. At least, can we get aware and ready to face that?

A lot is not lost yet! what we need to do is stay calm, positive, control the panic, contain our greed and abide by the reasonable social distancing measures, to keep Running.

Tele-rehabilitation experiences

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Our Whatsapp group is an interesting place to watch flight of ideas get shot down. Recently a member started a thread on about how there is no scope for doctors in the digital future. Some members took the bait responding with emotions devoid of facts, and the flames petered down in a day. Both sides missed the reality that this is a tool for future doctors. In every age a new technology emerges, and the imaginative wonder if humans will be rendered into artifacts by it. Somehow Armageddon doesn't happen and life goes on, albeit in a modified fashion. I tried out tele-health over the past year, and wanted to share my experiences. Everything I say here has been said by US physicians currently working regularly with tele-health, and also in the KJPMR January 2020 article 'AI and PMR'. The purpose of this article is simple. I want to show you the good and bad of tele-health.

Case of the Noisy Neck (repetitive strain injury)

Modality : Email

History- 44 y/o male programmer, sits 8-12 hours a day crunching out code, has neck pain for 3 months, now worse for 1 week to the extent he can't sleep.

What I normally do: Get a detailed history, examine PNS and MSK, then posture, get a VAS pain rating (8), palpate trigger points, document their site and number per quadrant, check BMI and make a treatment plan accordingly

What I did differently: After I got the history, he sent coronal and saggital standing photos. He provided a detailed history of ergonomics, picture of his back he marked with the most painful areas, and a VAS score for pain. As I couldn't do more I asked him to get Voveran 75mg BD for a week, and start with simple stretches to improve his flexibility.

Follow up 1: VAS 4. He found a PhD therapist in youtube who taught exercises. He asked permission from me to do them. Why? The therapist cleverly has a liability disclaimer before showing the same, and a shirt saying 'Trust me, I'm a doctor'. It leaves the patient in a quandary. While the advice should be solid, it's not been optimized for him. He is now forced to

experiment or approach a healthcare professional with doubts. Most look and it's not PMR they seek.

Follow up 2: VAS 1, had done exercises for a week and felt better

Outcome: Pain resolved in 8 days, and he went back to doing the things that created his pain in the first place. The only difference is he now has a program to correct the postural deficits I could target.

What was good/ bad: Part of educating a pain patient is to inform them of the 5kg weight deforming their spine (the head). Showing them the effect of head posture communicates this. This is a problem when online. It's hard to determine which non-routine labs and imaging is worth asking for. Though an affording patient may oblige, it isn't right. If he needed a trigger point infiltration to improve, there is no way I could do this.

Case of the Gnarly Knee (recent weight gain with posture issues)

Modality: Whatsapp chat

History- 37 y/o male who recently started a distance education program. He sits 15 hours a day in computer chair with his legs wrapped around the chair pylon. He stopped running and has gained 10kg. Has a pain (VAS 9) in the lateral side of R Knee with stairs. He says the whole problem is his Lateral collateral ligament damage, but has no clear history to support how this happened.

What I normally do: aside from what I mentioned previously, look at how weight gain distribution pattern affects stance and swing phases of gait, and of course local exam with varus/ valgus instability testing

What I did differently: I really couldn't do the extra things above. This was very unsatisfying. He did have a popliteal angle of 90° though, so I based treatment around that. He had a flatback posture which corroborated with the previous finding. This indicated the problem was also rostral.

Follow-up 1: compliant with exercise, VAS 4, no more pain with stairs, added a tabata program to reduce his weight

Follow-up 2: VAS 1, lateral knee pain gone and he can do 30 burpees without pain and can run. Still has lateral knee pain VAS 1 at times.

Follow-up 3: VAS 0, start gluteal bridges to stretch out a tight rectus femoris. As I couldn't palpate this I'm still unsure if this is the right direction. I signed off on the case at this point.

Follow-up 4: Patient went back to running, lost weight and started all sorts of Plyometrics. His knee pain came flares up rarely but is intense when it does. At this point I told him I need to get hands on and have an MRI. He plans to come up soon.

What was good/ bad: He was convinced he had ligament damage. Counseling him would have been easier if I could put my hands on him. Regardless the pain significantly reduced at the first follow-up so he became convinced anyway. I don't like to practice like this though. I need objective evidence with my own subjective inputs to formulate a plan. Luckily things worked out. Again labs and imaging are an issue. Without examining I can't fully understand the lateral knee pain. Now he knows it too, but is able to do his ADLs and stay fit.

Case of the Stagnant Stroke (post stroke palliation)

Modality: Zoom conference call

History: (provided by son sitting with me, and PT on the patient's side) 65 y/o male with CKD, HTN, and dense L MCA stroke 9 months ago. Has R hemiplegia, aphasia, and is max assistance for all ADLs. He had a recent breakthrough seizure related to constipation and UTI. With a higher dose of anti-epileptics he is less responsive than usual. He still has a RT for feeds and communicates yes/ no with hand gestures. The son mentions he couldn't get a senior therapist, so he got a young one with a gold medal instead.

What I normally do: After FIM and ICF I sat with the family and plan out goals. The son wanted

him to walk to the bathroom with assistance and go to the verandah. To plan that we need the Brunnstrom stage and the Modified Ashworth Scale.

What I did differently: Sadly our gold medal therapist didn't know what these measures were and kept telling me there was no contracture. She was correct, but was unable to detail the hypertonia preventing her from moving his limb freely. Finally I had the son explain the definitions of each stage in Gujurati, let her pick which it was, and confirmed via video. We set goals of shifting to a bedside commode and progressively increasing his step count weekly with a pedometer. He had MAS 2 hypertonia from what I could tell, but we avoided antispastic oral agents as he was already constipated.

Follow-up 1: The son contacted me after 5 months. His Dad was persisting as he was before albeit without constipation, UTI's or seizures. In a relaxed state he could more his knee into extension while seated, but when he was alert and active the spasticity kicked in fully. I couldn't advise more without getting hands on, so I tried teaching active assisted range of movement.

Outcome: No idea. This still bothers me when I remember it.

What was good / bad: Having a therapist who doesn't know the basic measures isn't a problem, until this situation comes up. Here it was like being blindfolded and wondering if you are being misled. Patients don't benefit here. Not being able to do the MAS was a problem also. If he needed botox, planning is a problem.

Case of the Wobbly Walker (Cerebral Palsy)

Modality: Skype telecast

History: 13 y/o male with spastic diplegia. He wants to play football with his friends. Has been doing PT for 5 years and wants to know if more can be done (from pediatrician and physiotherapist)

What I normally do: Determine GMFCS, GMFM-88, MAS, all the special tests to localize muscle problems, do an observed gait analysis, categorize per Rodda's classification then chart expected gains using GMFM-88

What I did differently: video based gait and spasticity assessment

Outcome: lost to follow-up

What was good/ bad: Being 13 and GMFCS 3, he wasn't going to start playing football. The goal of care at this stage is to prevent decline. Neither the doctor nor therapist could explain the MAS, or do the special tests. On asking them to show what therapy was going on, the response was a lot of ambiguity. When I asked specific things the answer was always a yes, even when the answer was clearly no.They repeatedly asked if he was going to start walking normally. The problem is every therapy has a limit. Done well it should yield a result. None of those signs were present in the tele-exam that day. This means either the spasticity was not being controlled well, or exercise was not all they agreed it to be. I guided them on an exercise program, and clarified the expected minimum gains in a one month window. If he wasn't better, then we would try a trial of Baclofen at follow-up.

Case of the Floppy Face

Modality: Whatsapp video chat

History: 53 y/o male reports the L side of his face droops for the past 14 years. Someone else pointed it out and told him to see Neuro. They promptly referred him to me 'for the needful', after ruling out Bell's palsy etc.

What I normally do: have them activate individual and en-mass facial muscles then plan exercises

What I did differently: video based version of the same

Outcome: He has received three reminders so far and is noncompliant.

What was good/ bad: Luckily I know him personally so when quarantine ends I will meet him in person and reassess. So far I doubt his compliance. Lack of exam left me dubious if I missed anything.

CONCLUSION

In my opinion telemed for PMR has been weighed and found wanting. If I can't get hands

on with a patient, it is not Physiatry. There are so many confounding factors that a physical exam remedies, there is no substitute for it. Many US physicians are turning to tele-health regardless. Most of their work though is follow-up on lab work and tracking non- MSK/ non-Neurological recovery. Its natural they lean to this service. This of course is a problem for us and surgeons. As it is some see PMR as an obstacle to direct therapist access. If physician work goes online while we insist the patient still to come to us, we will be perceived as redundant. Virtual Physiotherapy has been recently validated as equal to real-time care[1]. If the whole industry moves towards online we should find a way to keep up.

Having analyzed posture repeatedly for 13 years it's easy to pick up on subtle clinical findings and make a custom plan. Regardless nothing compares to face-to-face for counseling. Looking for the stigmata of gout or psoriasis can't be done no matter how many megapixels your camera is, simply because you need the intuition to look in the scalp. Neuro-rehab is just too complex to try over a video chat, unless you want to selectively target small issues at the expense of the bigger picture. At the 2019 Congress of the International Society of VascuIarized Composite Allotransplantation, Dr Vijay Gorantla discussed implanted sensors for oxygen content after hand transplant surgery. With these he could identify the exact area of ischemia down to the branch blocked, from the convenience of his phone and the patient at their home. He also mentioned implanted microchips as drug trackers which pick up selenium in tablets to track drug compliance. This is how far remote healthcare has come.

Last year a Swami who looked really unhealthy immediately after discharge met me in OPD one day. I knew something was wrong, but wasn't sure what. He was dead the next morning, Myocardial Infarction. You can't grow professionally without that kind of contact. How do you do Waddell signs for malingering in pain patients? The issue is lost bedside exam skills. A PG degree or fellowship doesn't make one a great doctor. Repeated exam, making mistakes, owning them, and learning from them, does. This is how we wrap our mind around the issue. We risk losing this opportunity in tele-health. For complex diseases we need to find out clues to other diagnoses. This means we need to see them in person frequently. As symptoms progress, our differential diagnoses wax and wane. No physical exam test is 100% perfect, regardless it is a way to form and rule out likely etiologies.

Aside from miscreant neighbors healthcare is another big headache for every government. Being the dominant form of healthcare the burden of the masses falls on us first. Naturally India doesn't meet the golden ratio of Doctor: Patient that Western countries set up. As a result we have other healthcare providers slowly being legalized to prescribe our drugs. With tele-health rural areas can be covered and e-prescriptions issued directly to the pharmacist. The next decades may have current young adults not coming to brick and mortar offices. The media will play this up to a good degree, and following decade will have horror stories of wrong/ missed diagnoses. The pendulum momentum towards e-health will diminish and a balance between online care and face-to face meetings will be set. This is a good thing, but only if you are part of it.

So how about that Healthcare Apocalypse everyone is worried about? As long as something has a value, it will persist. Accessibility facilitates that persistence. Our value can be lost as follows: when patients don't want to directly see a physician. or the day a patient is sent to the lab or scanner before a history and exam. Sensible humans will have to prevent this from happening.

1. https://www.healtheuropa.eu/virtual-physiotherapy-is-just-as-effective-as-in-person-treatment/101579/

1. Intermediate Diabetes Outcomes in Patients Managed by Physicians, Nurse Practitioners, or Physician Assistants George L. Jackson GL, Valerie A. Smith VA, Edelman D

2. Jordan R, The path of daggers, Wheel of Time book eight

QUIZ 2

1. **Scientific evidence for the efficacy of vestibular rehabilitation is abundant in which of the following conditions?** (a) Unilateral peripheral vestibular disorders (b) Central vestibular disorders (c) Bilateral peripheral vestibular disorders (d) All of the above (e) None of the above

2. **In vestibular rehabilitation, _____ is the process by which symptoms are decreased through repeated exposure to provocative stimuli?** (a) VOR adaptation (b) Habituation (c) Sensory substitution (d) CRT

3. **_____ is characterized by the prolonged sensation of swaying, rocking, and/or bobbing often triggered by sea travel.** (a) BPPV (b) Meniere's disease (c) MdDS (c) Vestibular neuronitis

4. **It is well documented that BPPV can be treated successfully with the correct application of ____?** (a) Habituation (b) CRT (c) VOR adaptation (d) Sensory substitution

5. **The VOR is an important ____ vestibular reflex affected by stimulation of the semicircular canals that creates con¬jugate eye movement of equal and opposite direction to the movement of the head.** (a) 3- neuron (b) 2- neuron (c) 4 - neuron (d) 5 - neuron

6. **The retina of the eye has ____ basic components?** (a) 4 (b) 8 (c) 2 (d) 5

7. **Because vision provides some ____ of human sensory input used in interacting with the environment, vision rehabilitation may address a wide variety of activities from watching television to colour-coordinating clothing, using smartphones and tablets, preparing meals, and interacting socially.** (a) 50% (b) 70% (c) 60% (d) 80%

8. **Age related macular degeneration affects the ____ field of retina, while early-stage glaucoma affects the ____ field of retina.** (a) Peripheral, central (b) Upper, lower (c) Medial, lateral (d) Central, peripheral

9. **The earliest symptom of Diabetic retinopathy is?** (a) Headache (b) Increased lacrimation (c) Scotopsia (d) Blurred vision

10. **_____ is the term used in rehabilitation of visually impaired individuals to restore independent travel in their environment, and the white cane has become synonymous with such travel?** (a) Near vision activities (b) Habituation (c) Orientation & mobility (d) Sensory stimulation

KEY

1. (a)

There is sparse evidence supporting the benefits of vestibu¬lar rehabilitation in patients with most forms of central vestibular disorders.

Furthermore, patients with central vestibular disorders are noted to progress at a slower rate than those with peripheral disorders and thus require more time for optimal rehabilitation results.

Conversely, there is abundant evidence of the efficacy of vestibular rehabili¬tation for patients with unilateral peripheral vestibular disorders.

2. (b)

Habituation is the process by which symptoms are decreased through repeated exposure to provocative stimuli.

A peripheral vestibular lesion can create a sensory discrepancy caused by unequal vestibular inputs from the vestibular labyrinths.

Repetitive movement may reduce this asymmetry of vestibular input.

3. (c)

The central ves¬tibular disorder of mal de debarquement (MdDS) is characterized by the prolonged sensation of swaying, rocking, and/or bobbing often triggered by sea travel.

4. (b)

Of the various vestibular rehabilitation interventions, the most notable in effectiveness is canalith repositioning treatment (CRT) for BPPV.

The maneuver involves sequential head/body positions, with each posi¬tion maintained for at least 30 seconds or until no nystag¬mus is observed.

5. (a)

The VOR is an important 3-neuron vestibular reflex affected by stimulation of the semicircular canals that creates con¬jugate eye movement of equal and opposite direction to the movement of the head.

The VOR allows for stabiliza¬tion of the image on the retina, leading to clear vision when the head is moved.

The gain of the VOR is the ratio of eye velocity to head velocity. The ideal gain in a normal patient is 1 : 1.

A vestibular disorder can result in decreased gain in the VOR, which in turn would result in a blurred image when the head is moved rapidly.

6. (c)

The retina or receptive surface of the eye can be considered, in a simplistic sense, to have two general components: the fovea, which provides greatest acuity, and the periphery, which provides orienta¬tion information. The fovea, although small in area (com¬prising only about 1% of the retina) is disproportionately represented in the visual cortex (cortical magnification) allowing for resolution of fine detail; hence its importance in near tasks such as reading).

7. (b)

The approach taken in vision rehabilitation is func¬tional restoration of the capacity to perform activities of daily living.

Restoration of reading ability and indepen¬dent mobility are the two most frequently addressed func¬tions.

However, because vision provides some 70% of human sensory input used in interacting with the environ¬ment, vision rehabilitation may address a wide variety of activities from watching television to colour-coordinating clothing, using smartphones and tablets, preparing meals, and interacting socially.

It is therefore not surprising that visual impairments negatively affect quality of life84 and that rehabilitation improves quality of life.

8. (d)

9. (d)

Diabetic retinopathy (DR) is a complication of diabetes that occurs when diabetes damages the blood vessels or results in new vessels forming in the retina.

As DR progresses retinal bleeding may cloud vision and lead to damage of retinal cells, causing scotoma to form. DR may cause total blind¬ness; however, early detection and treatment lessen this risk.

Age-related macular degeneration (AMD) creates a loss of central vision, which primarily affects near visual tasks such a reading. There are two forms of this disease:- Dry AMD & Wet AMD

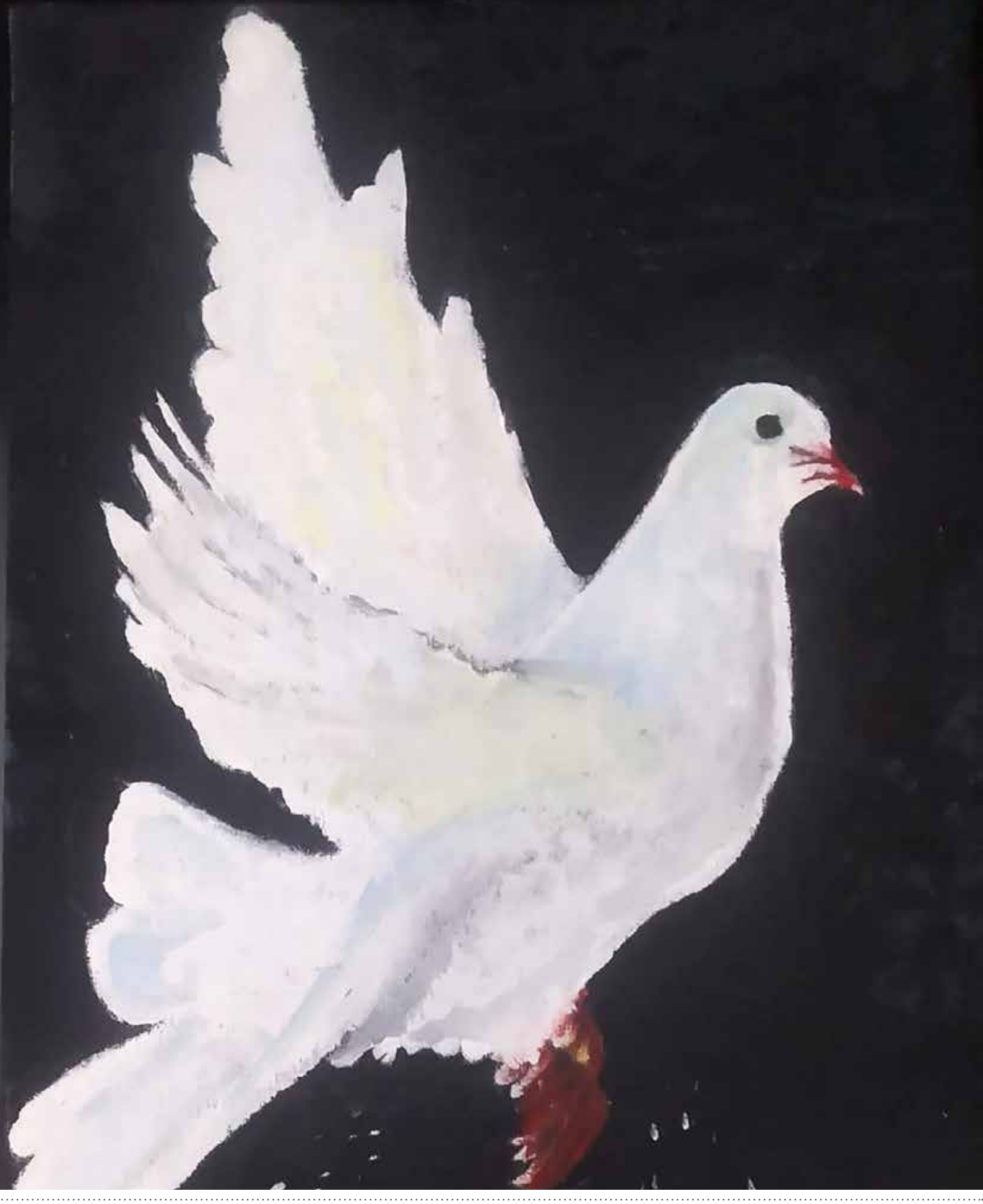
Dry AMD, like the wet form, causes loss of retinal receptors in the macula; however, effective treatments are not available and vision is progressively lost, although total blindness does not commonly occur.

Glaucoma is a complex of diseases and the risk to vision varies by type; every type damages the optic nerve, interfer¬ing with visual signals from the retina to the brain. Treatment depends on type, and untreated or unresponsive glaucoma may result in total blindness.

10. (c)

In low-vision settings, reading rehabilitation is one of the most common patient requests and it has been shown to improve reading ability.Reading rehabilitation usually includes one or more devices as well as training in their use. Optical magnifiers have historically been important because they are low cost and portable. More recently, electronic devices including both portable and desktop closed-circuit television systems have become widely used.

Orientation and mobility (O&M) is the term used in reha¬bilitation of visually impaired individuals to restore inde¬pendent travel in their environment, and the white cane has become synonymous with such travel.



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