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THE GREY MATTER

VOLUME
18

QUARTERLY NEWSLETTER FOR MEDICAL STUDENTS



Rx: Peak Performance

THE ATHLETE'S PILL



It is said that as soon as the second human learnt to run competition ensued. The first goal we ever scored, the first serve we aced, the first title we won are all key memories of our lives that we hold close. This urge to compete and conquer has led to the development of extravagant sports leagues which are considered to be the pinnacle of entertainment and sportsmanship.

But when you strive to compete against the entire world, you have to give your best. Everyday athletes push themselves beyond limits trying to clench that extra second to soar higher. No matter the sport, their performance is only second to best without a dedicated group of professionals standing guard.

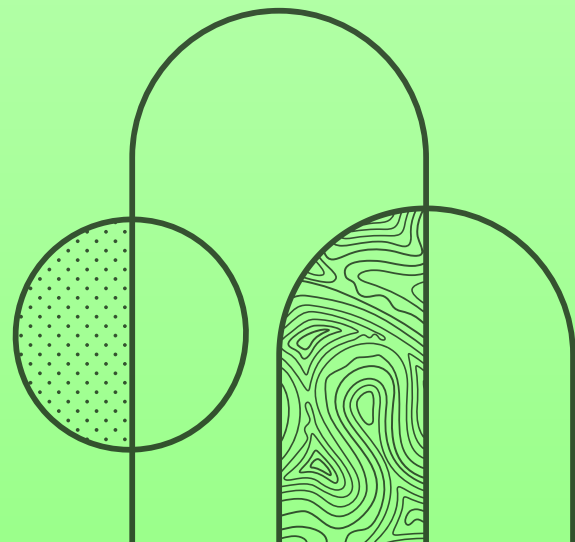
Encompassing a broad range of areas like biomechanical, psychological, nutritional, environmental, physiological and pathological this field has been progressing with immense scientific advances and diagnostic techniques.

With the notion of highlighting the potential of progress and development in the field of Sports Medicine, we present to you Volume 18 of The Grey Matter - Rx : Peak Performance.

Flip over to check out an interesting interview with the renowned Dr. Shirish Pathak, captivating movie suggestions, fun crosswords, beautiful artwork and much more.

- Gauri Hirekerur and Neel Waghu, Co-editors

Happy Reading!



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THE SPORTSMAN'S SPIRIT

-A brief look at performance enhancing drugs.

by Faizan Quraishi, III/ I M.B.B.S., IGGMC Nagpur

Barry Bonds was once considered the greatest baseball player in existence. In fact, even to this day he still holds all the major league records that actually matter, like the most career home runs, most home runs in a single season and the most career walks. He has won every major baseball award multiple times and is the only player to have more than 500 home runs and more than 500 stolen bases in the history of the game.

But despite his undeniable brilliance, Barry Bonds never made it to the National Baseball Hall of Fame. To put things into perspective, no player in the Hall of Fame has even half the number of MVP awards as Barry Bonds does. Yet as of today, if you were to stand in the middle of a group of baseball fans and say that Barry Bonds was your favourite player, you would be met with a lot of sarcastic looks. Such is the aftermath of one of the most infamous doping scandals that forever buried the legacy of some of the greatest athletes to ever live. A scandal that was born out of an unholy alliance between a small-time musician and an organic chemist who never missed the gym.

In 1970, Victor Conte had just joined a new band as their lead bassist. It was a pretty ordinary band that went on to perform in several clubs around Los Angeles for the next seven years before ultimately breaking up. The only notable feature of this band was its name: "Pure Food and Drug Act." Like most boy bands, the name had no real significance to it at the time. At least not until 1984 when Conte founded the Bay Area Laboratory Co-operative (BALCO). BALCO claimed to be a food supplement company and offered free urine and blood tests but in reality, it was a major doping scandal that distributed drugs under the guise of nutritional supplements. Yet it was only in 2001 that BALCO reached its full potential with the help of a man named Patrick Arnold.

Arnold had been lifting weights since he was 11 and found himself frustrated with his failure to build muscle. That is of course, until he discovered anabolic steroids. He dedicated the rest of his life to developing and processing steroids. Even before he met Conte, Arnold had already processed quite a few performance enhancing drugs. But Conte wanted Arnold to come up with a steroid that was completely untraceable by the existing testing methods. Arnold's attempt to achieve this gave birth to Tetrahydrogestrinone (THG) - the first designer steroid. THG was prepared completely in secret and was never used for any medical purpose at all, thus it would be cleared in every single test. This gave it its infamous nickname "The Clear" and Arnold would later come to be known as "The father of prohormones."

THG would never even be discovered if not for coach Trevor Graham who sent over a used syringe to the USADA. The investigation that ensued implicated a large number of high-profile athletes including NFL players, Olympic medalists, cyclists, and as you might have expected, Barry Bonds himself. Needless to say, the discovery of the BALCO scandal single-handedly stripped several athletes of their medals and instantly killed several legacies that had been fabricated over the last few decades.

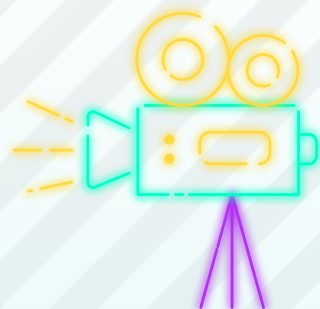
The history of doping in sports is as old as the concept of sports itself. Even in the very first Greek Olympic games, herbal concoctions and dried figs were used widely. In fact, doping was allowed in most major contests for a surprising portion of history. The obvious reason why doping came to be so widely condemned was how unfair it had made sports. There was a point in time when athletes claimed that the only reason they lost was because their drugs weren't good enough. An alarming concern was the safety of the athletes which was highlighted in the Tour De France of 1967, when the British cyclist Tom Simpson died of dehydration after taking amphetamines and alcohol, a diuretic drug combination. However, this was neither the last nor the most famous case of doping in the Tour De France. Decades later, a cyclist by the name of Lance Armstrong would go down in history as the most notorious case of doping in the entirety of sports history.

Armstrong's story was straight out of a movie. A guy who makes a comeback from testicular cancer and goes on to win seven consecutive Tour De France titles is no joke. Armstrong was among the few athletes who were well respected even outside their sport. This widespread influence later turned into an equally widespread infamy when he was accused of blood doping and stripped off his titles which would otherwise have made him a record-holder. Blood doping is a method wherein athletes increase the number of red blood cells in their body either by blood transfusions or more commonly by using Erythropoietin (EPO). This leads to increased endurance which is why cyclists often prefer it as a doping method.

Whether it be EPO, THG, testosterone, human growth hormone or Amphetamines, all drugs are accompanied by adverse effects that bear serious consequences in the long run. Steroids have been known to cause infertility, gynecomastia, and decreased libido. EPO can induce myocardial infarction. But apart from these well-defined adverse effects, doping can also have certain consequences that go far beyond any mild symptom.

When athletes are caught cheating, their entire career is invalidated. Both Barry Bonds and Armstrong were competing at a time when most of the competition was either accused of or implicated in doping scandals themselves. There is also some evidence to indicate that both of them were some of the best at their sport even before they started doping and would continue to dominate the sport even in a fair game. Yet these arguments mean nothing to the fans. Once a certain degree of trust has been breached, the athletes find it hard to even get a chance to justify their actions. And when it is legends like Bonds or Armstrong, fans might even end up losing their faith in sports as a whole. When Armstrong was caught cheating, seven years' worth of races were lost as well. In addition, the fans become critical of the Tour De France and its legitimacy. Many ardent fans gave up on the sport forever. Those who do continue to follow the sport do so with a pinch of salt. People who grew up looking up to these athletes as their role models lost a major part of their fundamental belief system. Perhaps it is this blow to the very spirit of sports that is the most severe adverse effect of performance enhancing agents.

*Lights, Camera,
Prescription*



**by Neel Wagh, III/I M.B.B.S., M.I.M.E.R.
Medical College, Pune**

• **Concussion:**

A dramatic thriller based on the incredible true David vs. Goliath story of American immigrant Dr. Bennet Omalu, the brilliant forensic neuropathologist who made the first discovery of CTE, a football-related brain trauma, in a pro player and fought for the truth to be known. Omalu's emotional quest puts him at dangerous odds with one of the most powerful institutions in the world.

• **Raging Bull:**

Raging Bull chronicles the life of Jake LaMotta, a middleweight boxer whose rage, jealousy & bouts of violent outbursts helps propel him to the top of the division but his inability to keep those vicious tendencies in check outside the arena leads him on a path of self-destruction.

• **Jerry Maguire:**

When a sports agent has a moral epiphany and is fired for expressing it, he decides to put his new philosophy to the test as an independent agent with the only athlete who stays with him and his former colleague.

• **Southpaw:**

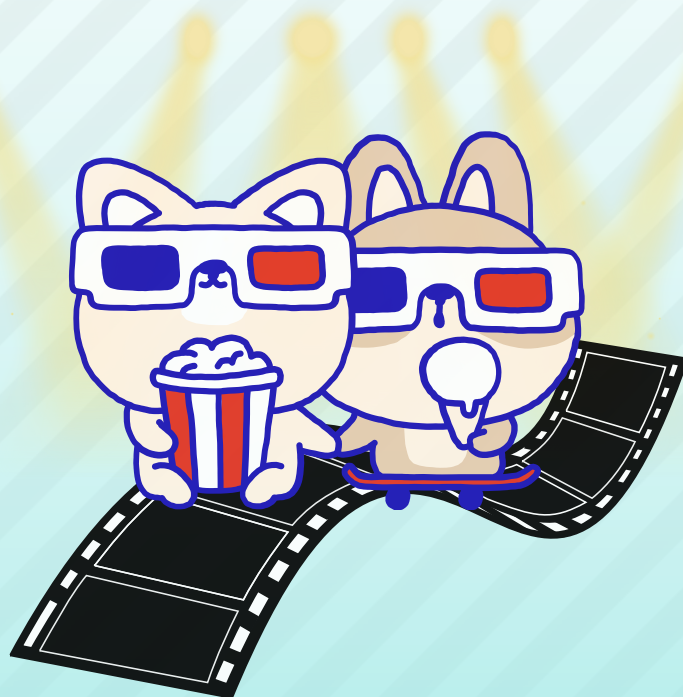
After a fatal incident sends him on a rampant path of destruction, a champion boxer fights to get custody of his daughter and revive his professional career. Southpaw's plot is based on the main character's fall and his irreproachable route to stand up again, reach the top once more. Only this time, the fight has completely changed and the goals are different, goals that make us question what we really fight for in our life.

• **Rush:**

This film is based on the true story of a great sporting rivalry between Formula 1 legends James Hunt and Niki Lauda. The story follows their distinctly-different personal styles on and off the track, their loves, and the astonishing 1976 season in which both drivers were willing to risk everything to become world champion in a sport with no margin for error: if you make a mistake, you die.

• **Journeyman:**

Boxer Matty Burton suffers a serious head injury during a fight. This is the story about the impact on his marriage, his life, and his family. Suffering from memory loss and with his personality altered, Matty must begin to piece his life back together as his world disintegrates.

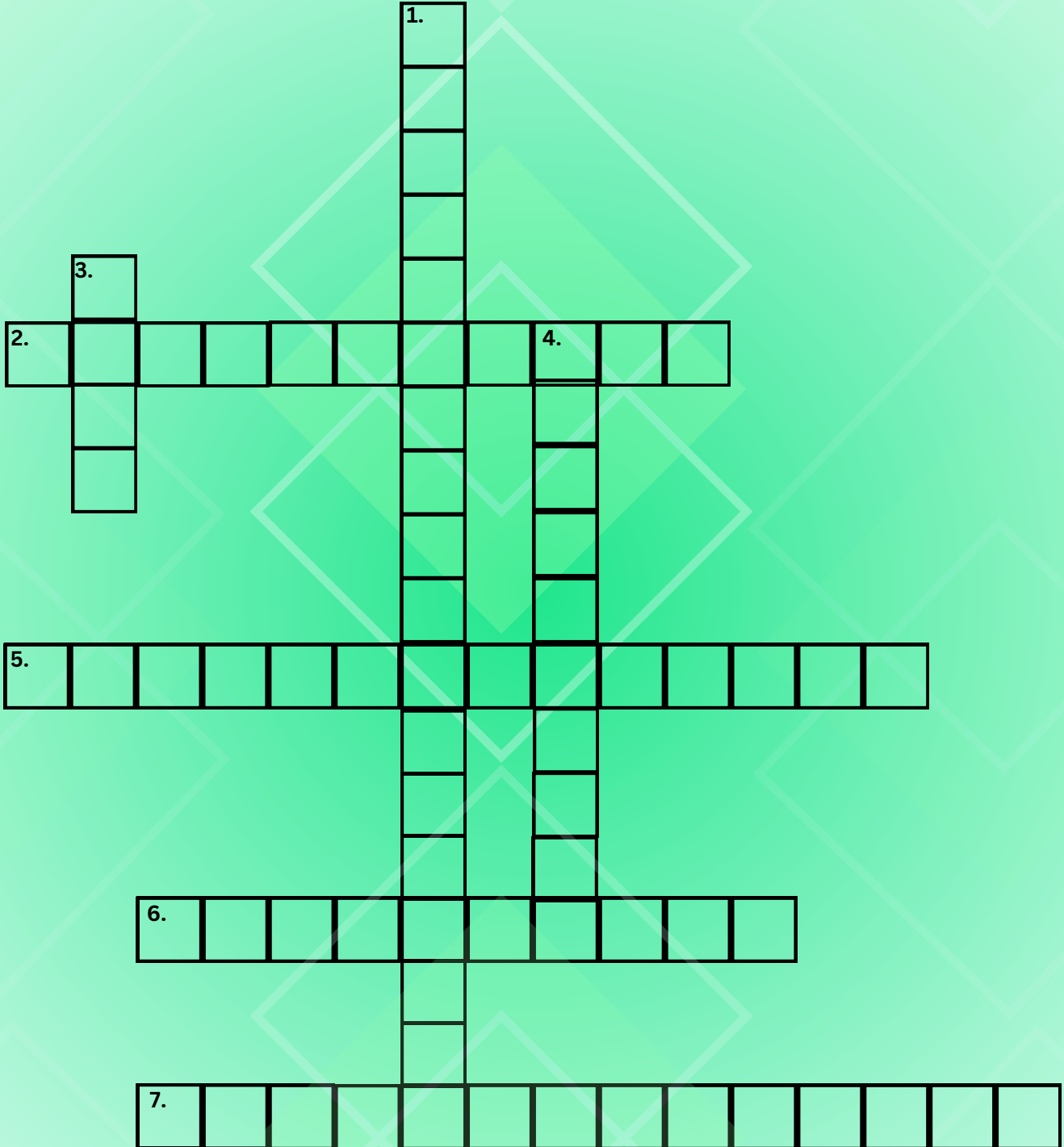


CORTEX

Crossword

by Gauri Hirekerur, III/I M.B.B.S., M.I.M.E.R. Medical College, Pune

Answers:
 1. Female athlete triad
 2. Tennis elbow
 3. DEXA
 4. Basketball
 5. Achilles tendon
 6. Nandrolone
 7. Rhabdomyolysis



Across

- 2. Lateral epicondylitis
- 5. A Greek mythology hero was held in this anatomical region in river Styx
- 6. Doping drug
- 7. Exertional collapse + tenderness + swelling + proportional pain

Down

- 1. Menstrual dysfunction + low energy availability + decreased bone mineral density
- 3. Mandatory fitness test for selection criteria for cricketers
- 4. Sport with highest injury rate

The Finish Line

GUEST
INTERVIEW

Dr. Ajinkya Achalare, M.B.B.S., M.S., D.N.B., Orthopaedics, FIAS- Gopalkrishna Fellowship, FIFA Diploma in Football Medicine.

In conversation with Neel Waghu, III/I M.B.B.S. and Gauri Hirekerur, III/I M.B.B.S., M.I.M.E.R. Medical College, Pune



Dr. Ajinkya Achalare

Dr. Ajinkya specialises as a Trauma and Arthroscopy surgeon and sports injury consultant. He is currently affiliated with prestigious hospitals such as Dhanwantari hospital, Mumbai. He is also a professor at Dr. D Y Patil Medical College, Navi Mumbai.

Q) As technological advancements continue, sophisticated procedures are being pushed into the limelight. What are your views on the use of traditional medicine as opposed to modern care in the field of orthopaedics?

Traditional medicine has always been the gold standard. But as we progress further newer technologies and methods have become the need of the hour. But traditional methods should never be replaced. No investigations or methods should be a replacement for history taking and examination. Patients benefit the most when there is a good mixture of both. Nowadays robotics are becoming popular in the field of arthroplasty.

Q) Throughout your years of practice, which are the most common causes of joint and bone pain that you have encountered?

Most common in all age groups would be back pain followed by knee pain. Knee pain is generally an issue faced by people who are more than 40 years old. They typically start experiencing early osteoarthritic changes. Back pain on the other hand affects all age groups. Poor ergonomics and long desk jobs are the main culprits. As for the older age group, spondylosis and degenerative changes in the spine are to blame.

Q) The use of performance enhancers and steroids are on the rise. What are your views regarding the rampant use of such medication amongst athletes and sportspersons?

These kind of drugs are short acting with long standing side effects. They should never be encouraged. Athletes must be properly educated about the major side effects these apparent enhancers lead to. We actually use some of these drugs in our day to day practice so it's important to draw a line. Nutritional supplements such as whey protein are being used rampantly. Ideally, they should be taken after a right amount has been prescribed by a nutritionist to prevent over usage. People using them are just aware of its benefits- only one side of the coin. It becomes even worse because of the stigma related to their use. Sportspersons who have used them do not disclose and often give a false history. It is only after the occurrence of complications that they start being honest about it. With misinformation on the rise by the so called Gym Gurus on social media, awareness plays a vital role in ensuring judicious use of such substances.

Q) With the advent of alternative medicine in various branches of the medical field, what is your opinion about acupuncture and chiropractic therapy being available as alternative treatment options for orthopaedic problems?

They are not really alternatives for each other. They play a vital role in the management of acute sprains and other injuries where a swift and efficient recovery is possible. Delays in providing appropriate care and treatment must be prevented. Athletes tend to approach non invasive methods.



Chiropractors should be aware of all the conditions that can be treated by their routine methods and when required they should refer to an orthopaedic surgeon. This is imperative to maintain a balance. All fields must arrive to a consensus about the various conditions that can be treated at the elementary level itself.

Q) Surgeries and post-op rehabilitation alike require quite the physical, repetitive strength and stamina. What are some of the work-related injuries that you have suffered or have observed among health care workers throughout the years?

When you have back to back procedures lined up your own physical health and stamina plays a major role. Surgeons tend to overburden their backs while operating for longer periods. Varicose veins is another major risk factor that affects specialists and surgeons alike. Managing patients of trauma is a major factor that can lead to injuries.

Q) As a specialist in Sports Medicine, what is your spectrum of responsibilities?

Sports Medicine as a field includes specialists in exercise science, nutrition, physiotherapist and the actual orthopaedic usually comprise a very small part of it. Our responsibilities would include evaluation of the athletes. Questions like- What are his weaknesses? What is the group that he is focusing on? What are their specific requirements to achieve their maximum potential in competitive matches? It is based on a collaboration of all aspects of physical medicine. When we're dealing with major procedures post-operative care is equally important. Our main focus is always to make sure that the athlete is back at the ground as soon as possible and is physically and mentally fit while he's at it. Any delay in early care can spiral out of control and lead to a chain of complications. Keeping the competitive spirit of the athlete in mind, we have to make appropriate decisions. Giving them expert guidance at every stage of their treatment is a vital part of the recovery process.

Q) Is there any particular instance that you would like to share where early diagnostic care has played a vital role?

Actually I encounter such situations on a regular basis. This is seen mostly in football players. Ankle injuries, ACL tears, PCL tears are very common injuries amongst them. We grade them to assess the modality of treatment to be provided. Recently we evaluated an athlete in the emergency department and immediately started with rehabilitation. The main goal is always to ensure that the athlete is back in his game within a year with full recovery.

I did my fellowship with Dr. Dinshaw Pardiwala. He has operated upon many elite athletes including Neeraj Chopra. When you see these players getting back to the game and winning laurels for the country after the injuries that they have sustained, is a huge motivation. I would definitely recommend MBBS students to think about arthroplasty as a viable option for their speciality as there are so many sports tournaments that are coming up in a big way and the need for specialists in sports medicine is at an all time high.

Q) The current and upcoming generations have a higher risk of developing lifestyle disorders which in turn can lead to orthopaedic complications. What is your advice to all our readers regarding the same?

An active lifestyle plays a vital role in our overall health. Excessive use of gadgets has played a major role in the recent surge of cervical spine injuries. Overuse and disuse are both major risk factors for any injury. With longer desk hours and busy schedules it has become impossible to take out some time for daily physical activities. But our health is our own responsibility. Keeping an active mind and body by devoting some time during the day is crucial.



An Ode to Geriatrics

by **Nidhi Parikh, II M.B.B.S., M.I.M.E.R. Medical College, Pune**

As we pass each milestone of life, we often wonder what happens next. No one knows what the future holds, but preparing for our geriatric years can be the biggest gift we give ourselves.

In the modern era with the constant evolving technology, medical advancements have also been made in various fields. One of which is Geriatric Physical Therapy, a profound gateway into embracing the unknown!

Geriatric Physical Therapy is a discipline tailored to cater the uncanny needs of the elderly. It is an art that breathes life into the golden decades of aging. As time progresses and demographics shift, understanding and valuing the significance of this therapy has become paramount.

We all know that as we grow older, there are a lot of transitions going on inside the cells of our body. Our physical and mental dimensions are changing and shifting within. Muscles once robust begin to show signs of wear and tear. Bones once steadfast may grow brittle. This kind of therapy helps to maintain mobility and strength.

At its core, geriatric physical therapy is a dance between science and empathy. The process of aging can be overwhelming and bewildering. At that point, compassion does a wonderful job of providing calmness and strength. Geriatric physical therapy comprises three main categories manual therapy, exercise and education.

Manual therapy, also known as "hands-on-treatment" is performed in order to decrease patient's pain, restore their mobility and increase their circulation. This includes soft tissue and joint mobilization.

Exercise, one of the crucial parts of the treatment plan. A highly trained physical therapist will prescribe targeted exercises to improve mobility. This training helps to improve muscle strength, coordination, flexibility, balance and physical endurance. Common exercises are walking, stretching, resistance training and aquatic therapy.

Education, to maintain the progress made during treatments, the physical therapist will provide patients with helpful tips and techniques for safely performing daily tasks. Using assistive devices will prevent further injuries from occurring.

Geriatric conditions are susceptible to various musculoskeletal, neurological and cardiopulmonary problems. A physiotherapist helps to alleviate pain and return mobility, some common causes are depression, lack of sleep, diabetes, congestive heart failure, and medication side effects. Balance impairment in older people is due to the loss of normal functioning of muscles and bones. Physiotherapy treatment includes balance exercises to help individuals with neurological conditions such as Alzheimer's disease, ALS, Parkinson's disease, or who suffered a brain injury. It includes exercises, workouts, and using electric modalities such as Ultrasound, TEN, and Shock wave

therapy.

Moderate intensity activity like brisk walking is recommended. In addition, strengthening exercises for muscles can be done against resistance using resistance bands.

Let us now dive into Mrs. Radha Ramaswamy's story. She is 77 years old and had been diagnosed with an ischemic stroke affecting her left middle cerebral artery. Initially she was completely bedridden and had difficulty in moving her right upper hand and right lower leg. Her treatment procedures began with standing balance, dynamic balance, stair climbing, etc. Slowly and gradually she is picking herself up, getting her strength back, doing things that she loves. It has been seven months of her treatment with the Nightingales Home Physiotherapy and rehabilitation centre. Her experience gives hope to the 138 million elderly population and many more.

In the canvas of life, geriatric physical therapy creates vibrant strokes that blend the hues of past experiences with the promise of the present. It honours the spirit of the elderly, reminding us that age is not a limitation but an opportunity for growth. As we contemplate the artistry of geriatric physical therapy, we come to realize that it is more than just a medical practice. It is a celebration of resilience.

"Choosing happiness In the darkest times, Its a choice
It'll forever be...

A touch,

A smile,

A soothing balm, In therapy's arm They'll find calm...

To bring back their laughter, To rise up their spirits,
And retrieve the twinkle

Of their aging eyes,

Will always be a blessing In disguise..."



Medicine on the run!

Mr. Ashok Sonawane, Ward Boy at Dr. BSTRH, Talegaon

In conversation with Soba Inamdar, III/I M.B.B.S., M.I.M.E.R. Medical College, Pune



Mr. Ashok Sonawane

Mr Ashok Sonawane started working as a ward boy in the Ophthalmology department from 1986 in Talegaon General Rural Hospital before transferring to the Orthopaedics department of MIMER Medical College, Pune in 1995. A beloved staff member adored by students and teachers alike, Mr Ashok strongly believes in discipline and always being on time.

Q) The use of heavy instruments is vital to this branch in medicine. How do you manage to maintain them?

Working with the Orthopedics department it goes without saying there is plenty of labour involved. When it comes to transfer of patients from the OPD to the wards, sometimes the relatives of patients assist us. Other than that there are trolleys that we use for the instruments and materials used back and forth in the operation theatre, wards and OPD.

Q) COVID-19 was a busy time for the whole hospital. What did the Orthopaedics OPD look like during the pandemic?

The work was the same, except for certain restrictions caused by the pandemic. Additional preventive measures were implemented and it got comparatively difficult to assist patients with the on going fear of how fast the virus was spreading. As masks and sanitizers became a mandate, the whole hospital was more cautious than before and we were showing up to our jobs regularly despite the fear of acquiring the virus ourselves. When one is a healthcare worker one can't really let fear overrun them while doing their job so we kept focusing to keep our focus.

Q) During your years of service at this hospital, which are the most common injuries that you have seen?

Most common and frequently seen cases are always fractures or road traffic accidents. Broken bones, minute hairline fractures, osteoporosis, arthritis, and other age related abnormalities are seen around more. As expected, the OPD sees more aged people than children. The below 40 cases are more often than not simply fractures.

Q) Since you have been dealing with all types of orthopaedic patients what part of your job do you love the most?

It has to be the most common of cases, dealing with plasters and casts, the process of putting the casts on and removing them from time to time as it is an all time job for us. Alongside this another job I enjoy is joint movement assessment for which our assistance to the doctor in charge is necessary. Earlier we used powdering for plasters but in today's date it has been replaced by POP.

Q) What message would you like to give our readers as they proceed towards becoming budding doctors?

I would like to say that when it comes to doing one's job correctly, it has to be taken seriously and done with utmost sincerity. Carelessness of any sort always leads to poor outcomes and unsatisfactory results. Keeping that in mind all I would really want the students to know a job done carefully is a job done right!



the *Mind-y* project

by **Anushka Gupta** , II M.B.B.S., M.I.M.E.R.
Medical College, Pune

How often have you heard the words “I just choked” or “My mind just went blank” spill out of someone’s mouth when retelling a story or narrating their experience? I’m assuming quite often.

Honestly speaking, if you know me, then you’ve probably heard me utter them.

Stage fright to the masses, performance anxiety to the learned— this affliction has tormented me for as long as I can remember. As a medical student, there’s no shortage of stressful situations to induce it either. Vivas, exams, presentations, speeches—heck, something as simple as giving an answer in class can cause me to break out in a sweat. It is an uninvited guest that resides inside of me, making an appearance every time I step into the perceived limelight.

Clinically, performance anxiety is the body’s response to the pressure of being observed, evaluated, and judged. Whenever I stand before an audience, a cascade of physiological reactions flood my body—rapid heartbeat, shallow breaths, trembling limbs—symptoms of a fight-or-flight response. My mind races, overwhelmed by thoughts of failure, rejection and convoluted “what ifs.”

Despite being a deeply personal feeling, there’s some solace in knowing I’m not alone. Performance anxiety doesn’t discriminate. It’s a shared human thread that ties together artists, athletes, public speakers and even those facing everyday situations like social interactions or exams.

The psychology of performance anxiety intertwines with the concept of self-worth. Success validates our self-worth, while failure threatens it. This inner meter drives up the stakes and intensifies the fear of falling short, leading to a self-imposed cycle of anxiety and self-doubt. It’s ironic that the fear of judgement drives us to seek approval even as it hinders our ability to perform to our maximum potential.

In an increasingly interconnected world, it’s crucial to cultivate empathy and understanding. By acknowledging that this affliction extends far beyond the realm of mere stage fright, we pave the way for a more compassionate and supportive society.

When the plot remains the same but the characters keep changing, how does one combat it?

I’m no expert; hell, I’m not even close to having a degree, but, as someone who’s spent a long time trying to know it closely to overcome it, acknowledge that it’s okay to be scared. Accepting that you feel anxious means you care



and that’s a good thing. What also helps is finding ways to anchor yourself by engaging in deep breathing, an uplifting mental pep talk, a friend’s comforting embrace.

I’ve learned that seeking help is not a sign of weakness but an act of courage. Talking about my anxiety and seeking support from mentors, peers and mental health professionals has been a lifeline in this storm.

Performance anxiety, with all its complexities and nuances is a facet of our shared human experience. It’s a reminder that beneath the facade of confidence and success lies a vulnerability that unites us—a vulnerability that, when embraced, can ultimately lead to a more authentic, compassionate and resilient existence.



Comic by **Anuja Argade III/I** M.B.B.S.,
M.I.M.E.R. Medical College, Pune

Inside the muscle mind



by Shreya Kelkar, III/I M.B.B.S., M.I.M.E.R. Medical College, Pune

The roaring cheers echoing in every stadium and field have always boosted athletes to win one for the crowd. As athletes soar high on this motivation, the resentment they face for every lost medal equally puts a dent on the confidence they have. Such collective expectations want these athletes to cross every finish line, score every goal, win every match and earn every medal. According to the Indian rifle shooter Joydeep Karmarkar, "athletes have become the racehorses of the sports industry". When players get injured, some of us sympathise, some worry, and some put up headlines when they play through their injuries; but the scars on the inside often go unnoticed.

Competent players have their abilities and skills questioned the minute they perform poorly for a couple of games. The tough mindsets of such players and the almost unrealistic pressure they are put through are never accounted for. If I were to say, it is this loss of faith in their capabilities that further deteriorates their performances. And this is where sports psychology comes into play.

Technically defined, sports psychology is the study of psychological factors that influence athletic performances. A sports fraternity that considers and supports an athlete's psychological health is a mirage in today's situation. The mental and emotional status of an athlete before or during a performance plays a vital factor in the outcome. When even the common man fails to focus when emotions conquer minds, athletes are no different. Sports psychology uses techniques such as muscle relaxation, deep breathing, meditation, listening to music, etc to regulate emotional imbalance and pivot the mind towards a positive outlook.

While the antics demonstrated by Usain Bolt before every run is his way of regulating his emotions and establishing self-confidence, Michael Phelps prefers music to calm his nerves before his exemplary swim. There is no denying that a psychologically sound mind plays a major role in reaping flawless performances.

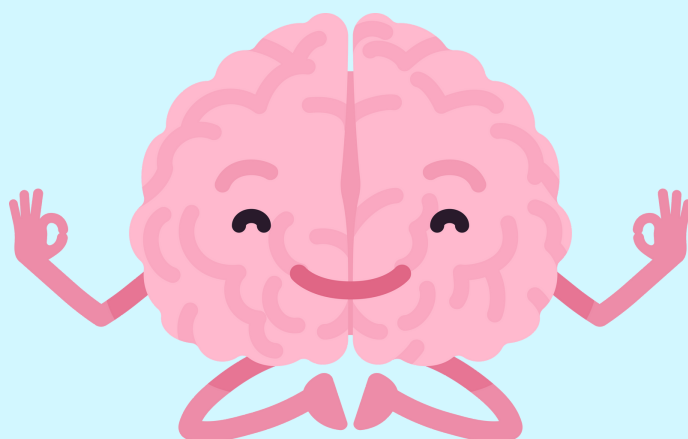
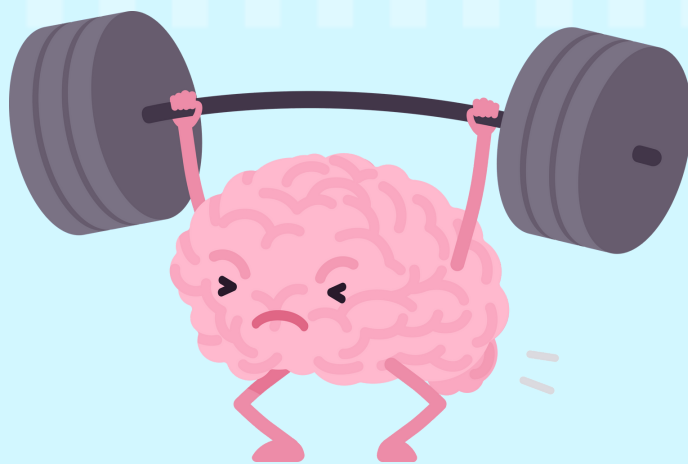
Another widely promoted strategy by sports psychologists is a popular practice called 'imagery'. It is often said that what you see is what you remember better and longer. That is exactly how this technique helps athletes; by helping them create mental images of experiences in their minds. This upcoming action plan helps them visualize their mistakes and correct them in a much more efficient manner.

What we commonly declare as superstitions, like having a lucky t-shirt, a must listen song before an important task, a definite exercise routine have all been identified as necessary aspects of pre-performance regimes by sports psychologists.

They claim this sort of practice enhances stability and predictability while also being a crucial trigger for inducing concentration and reducing anxiety before the game.

Amidst various performance effective tricks being utilized for a stable mind determined to win, an old-school motivational talk is still the biggest weapon of sports psychology. Words of optimism are believed to induce the release of the 'feel-good' hormone-dopamine, which brings pleasure and thereby builds on enthusiasm right before the game. What we witnessed in the movie Chak De India where a positive speech was all the push that the team needed, is not just a cinematic monologue but evidence enough that such encouraging words instil optimism, improve focus, and inspire confidence.

While the talent flows beyond bounds, the only barrier in sports business is the fact that the mental health of these athletes is often overlooked. It is time to break these shackles and walk towards excellence. The only invincible key to this is sports psychology!



Shutterbug



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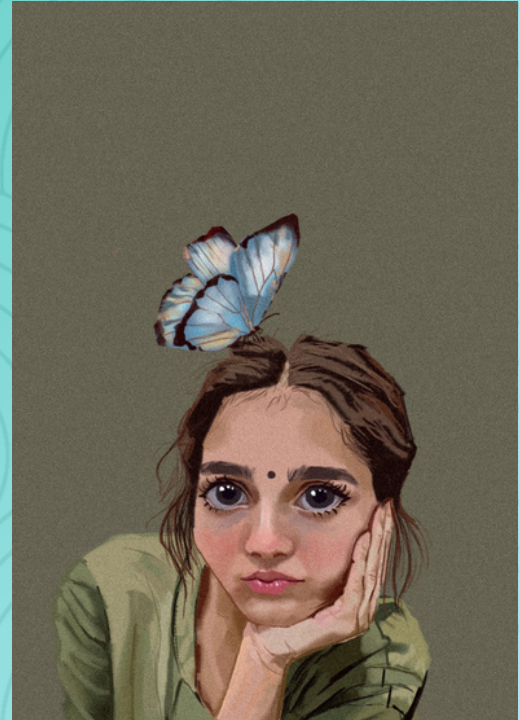


Pigment



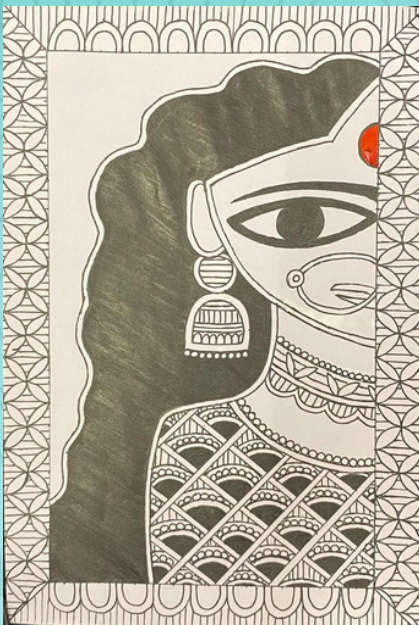
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DIALOGUE

Dr. (Prof.) Snehal Ghodey, Principal, MAEER MIT Pune's Physiotherapy College, Talegaon

In conversation with Aaditya Kiratkar, II M.B.B.S., M.I.M.E.R. Medical College, Pune

Dr. (Prof.) Snehal Ghodey has been the Principal at MAEER's MIT Physiotherapy College of Pune, Talegaon Dabhade since 2007. She has a total of 30 years of experience in academics. She obtained her undergraduate degree (B.P.T) in the year 1986 from Government Medical College, Nagpur (Nagpur University) and completed her post-graduation (M.Ph.T) in Musculoskeletal Physiotherapy in the year 2005 from CMF College of Physiotherapy Pune (Pune University).

She has worked extensively in the field of Haemophilia at Haemophilia Society, Pune as an honorary physiotherapist. She has also been bestowed upon a scholarship by the World Federation of Hemophilia.

She has several research publications to her name and a significant contribution to the book 'Comprehensive Hemophilia Care in Developing Countries'.

Q) Can you shed light on musculoskeletal physiotherapy and elucidate the role of a musculoskeletal physiotherapist in sports medicine?

Musculoskeletal Physiotherapy is a self-explanatory term i.e. related to the muscles and skeleton.

The musculoskeletal system consists of ligaments, tendons, cartilages and muscles which are all attached to bones. All these components give our body structure, posture and the ability to move.

Physiotherapy helps in restoring the normal movement and function in an instance of injury, illness or disability. A physiotherapist has a major role to play in sports medicine with respect to muscle conditioning, flexibility, proprioception, sport-specific skills, posture and even cardiovascular fitness.

Muscles atrophy rapidly due to cellular response to pain, inflammation and immobility after an injury. Hence, a proper assessment of pain, residual muscle strength, flexibility, functional abilities and disabilities is very important.

In overuse injuries, muscle weakness and wasting follow a specific pattern. Generally, joint pain follows weakness and wasting. In conjunction with strengthening and flexibility training, endurance training is started as well.

Once a reasonable level of strength, power, flexibility and proprioception have been achieved, sport-specific functional activities with mobility (running, agility drills) are introduced. Maintenance of cardiovascular fitness is equally important.

In rehabilitation of sports of any kind, the sportsperson undergoes initial, intermediate and advanced stages of rehabilitation and only then returns to the field.



Dr. Snehal Ghodey

Q) What are the different therapy techniques under the umbrella of Musculoskeletal Physiotherapy?

A musculoskeletal physiotherapist treats patients with electrotherapy, kinesiotherapy and manual therapy. In electrotherapy, various electrical modalities are used for pain relief as well as healing of injured tissues.

Short wave diathermy and ultrasound are high frequency currents which produce thermal effect on deeply situated structures thereby enhancing tissue healing and reducing pain.

Interferential Current Therapy (IFT) consists of two medium frequency currents which interfere with each other to produce a low frequency effect. This low frequency effect is used to relieve pain. IFT is also used in 'muscle re-education'.

Neuromuscular Electrical Stimulation (NMES) and Transcutaneous Electrical Nerve Stimulation (TENS) are some low frequency modalities. TENS is used for pain relief. TENS and IFT block pain pathways involved in the Gate Control Theory of Pain.

Kinesiotherapy deals with exercise therapy. After careful evaluation, exercises are prescribed. Passive, active assisted, free and resisted exercises are introduced. These exercises improve flexibility, strength, power, endurance, speed and proprioception. These exercises are modified in terms of intensity, duration, repetitions and degree of resistance in order to get the desired effect.

Manual therapy is major part of musculoskeletal physiotherapy. Maitland therapy, Mulligan mobilisation, McKenzie and Kaltonborne are various types of manual mobilisation therapies. These are used to treat mobility and pain in the joints.

Neural tissue mobilization is widely used for pain relief as well. Kinesiotaping is widely used in treatment of sports injuries.

Q) A proposed method of assessing painful musculoskeletal disorders is subcutaneous pressure pain threshold movements. How reliable is this method?

Yes, subcutaneous pressure pain threshold is used to assess the intensity of the pain. The instrument used is a pressure Algometer. Pressure is applied over the area with this Algometer as a painless pressure stimulus which turns into a painful pressure sensation in these disorders.

Pain is subjective. This pressure pain threshold gives an objective method to grade pain from no pain to intolerable pain. Visual analogous scale and numeric pain rating scales are other methods to determine the intensity of pain which are widely used in physiotherapy for research purposes as well.

Q) How effective is electro stimulation in Bell's and other palsies?

As discussed earlier, we have Neuromuscular Electrical Stimulation which can be further classified as Faradic type current and interrupted Galvanic current. Faradic type current is a low frequency current that stimulates innervated muscle and can be used to re-educate disused intrinsic foot muscles in cases of flat foot or hallux valgus (bunions).

Regarding the effectiveness of electrical stimulation in nerve palsies, let me tell you that the muscles supplied by the involved nerve in case of nerve injuries like axonotmesis or neurotmesis usually remain denervated. These muscles respond to interrupted Galvanic current rather than Faradic current. It's role however, is controversial and still under research.

In neurotmesis or axonotmesis, there is a complete loss of strength of the muscle supplied by the damaged nerve. Over a period of time, the muscle fibres may get fibrosed. Stimulation of these muscles with interrupted Galvanic current maintains their elasticity, contractility, extensibility and irritability. This halts fibrosis till the nerve regenerates or the muscles reinnervate.

Electrical stimulation has a diagnostic role as well. We can plot a strength-duration curve with its help to diagnose whether a muscle is innervated wholly or partially.

Q) How can sportspersons save themselves from an impending injury?

Preventive physiotherapy enhances the functions and fitness of a sportsperson's body and thus reduces the risk of injury.

Training errors are amongst the most common predisposing factors in developing a sports injury. Proper training leads to an increase in performance in any sport and reduces the risk of getting injured.

A physiotherapist follows the principles of training which include periodisation, specificity, overload and individuality.

In periodisation, it is important to divide training into pre-competition and competition.

Pre-competition phase of training is a transitional phase during which the emphasis switches from conditioning to technique work. In the competition phase, emphasis is on competitive performance while maintaining basic conditioning. It is followed by active rest.

While training, the overload principle is adopted to improve different parameters of fitness. More stress is applied to make it more challenging over the course of training, provided the increased stress is not excessive. An adequate recovery time is also given to produce the desired effect.

All programs should follow the principle of specificity, meaning training should be sport specific.

Strength and power training can be given through isometric, isotonic and isokinetic exercises for which a variety of instruments are available.

Plyometric exercises are also a form of resistance training that entail rapid eccentric contractions followed by rapid concentric contractions to produce fast and forceful movement.

Q) How do you assess neuromuscular regulation problems in ADHD?

Attention Deficit Hyperactivity Disorder is generally treated by a neurophysiotherapist. Physical exercise improves skills and behaviour in a person with ADHD. The ability to maintain attention is improved with physical exercises. Yoga is beneficial as it increases the attention span. It can reduce impulsivity, anxiety and social difficulties. Techniques like breathing exercises, aquatic therapy have shown to reduce anxiety, stress and muscle tension. It induces relaxation and improves quality of life.

Q) Which orthopaedic ailments and fractures predominantly afflict sportspersons?

It would be impossible to enumerate all sports injuries!

Some commonly seen ones are-

Rotator Cuff Tendinopathy, seen in sportspersons because of overuse and faulty biomechanics or secondary to excessive load.

Freestyle and butterfly swimmers are inclined to get Rotator Cuff Tendinopathy.

We are all aware about tennis elbow and golfer's elbow but at the same time, supra condylar fracture, olecranon fracture, fracture of radius and ulna, etc are other sports injuries commonly seen around the elbow joint.

The most commonly involved joint in the lower limb is the knee joint. Meniscal tears, medial and lateral collateral ligament injuries, ACL and PCL tears, patellar fractures are all frequently seen.

Q) Can you list the various rehabilitation therapies in cases of severe disorders and their subsequent treatment?

Apart from musculoskeletal physiotherapy, neuro-physiotherapy has their rehabilitation programs like motor relearning program, proprioceptive neuromuscular facilitation, vestibular rehabilitation and many more. Cardiovascular respiratory physiotherapy has got various rehabilitation protocols as well. Best known among these is the cardiac rehabilitation programme. A community based Rehabilitation Department works in the local community. Their role in antenatal care, postnatal care and oncology has gained much importance recently.

Q) Is there a specific case that stands out in your career?

Instead of a specific case, I would like to elaborate on the various haemophilic patients that I treated during my service.

Hemophilia is an X chromosome linked coagulation disorder with factor VIII and factor IX deficiency. Severe haemophiliacs may bleed spontaneously at rest also. Shoulder, elbow, knee and ankle are commonly involved joints whereas the knee and ankle are considered target joints. When haemarthrosis occurs, it leads to swelling, pain, reduction in strength, muscle atrophy and restricted range of motion. Subsequent bleeding paves the way for chronic synovitis and over a period of time the patient lands up in severe hemophilic arthropathy with major restriction in range of motion, fixed deformities, severe weakness, atrophied muscles and severe disability.

Regular physiotherapy in haemophilic patients plays a miraculous role. It improves range of motion, strength of muscles, corrects deformities, reduces frequency of bleeding episodes, increases functional abilities and improves their quality of life.

I feel blessed to have gained the opportunity to serve these patients for 15-16 years.

I am also thankful to the management and the editorial team of The Grey Matter Newsletter for inviting me on this platform to share my thoughts.



TAAZA

KHABAR



by **Abhishek Bodne, II M.B.B.S., M.I.M.E.R.**
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Whispers from the cellular underworld, Exosomes. Picture this, a world where ageing is no longer synonymous with achy joints and creaky backs. Sounds far-off and unrealistic? Let me expose the secrets of exosomes, cellular messengers that hold the key to turning back the clock on degenerative diseases. With the silver haired population on the rise, the hunt for solutions to orthopaedic degeneration is more pressing than ever. Osteoarthritis (OA), Rheumatoid Arthritis (RA), Intervertebral disc degeneration (IVDD) are a few of the major degenerative diseases causing debilitating pain and disability.

You must be wondering, what are exosomes? They are disc shaped vesicles formed from the plasma membrane of our cells that shuttle parcels of information in the form of miRNAs, proteins, lipids, etc. They are the postal services of the microscopic world.

Imagine being able to reprogram cells into repair, as simply as waving a magic wand and poof! Suddenly your joint cartilages and spinal discs rival those of a teenage boy. Thanks to exosomes, this is not just a pipe dream anymore. These cellular cheerleaders rally troops of chondrocytes to ramp up production and boost repair. They promote chondrocyte migration through endocytosis, which means they can guide cells to the places that require healing. All hail the GPS of the cellular maze!

But wait, there is more! Their role is not just limited to migration. They are also incredible at chondrogenic induction. Fancy word, right? It means they excel at ensuring chondrocytes stay true to their identity and continue producing cartilage without getting distracted by the chaos of degeneration. Exosomes secreted by stem cells have excellent anti-senescence and anti-inflammatory effects. They reduce local inflammation by increasing M2 macrophage infiltration with a concomitant reduction in M1 macrophages. Additionally, they up-regulate the expression of anti-inflammatory interleukin IL-10 and growth factor β 1 while reducing the expression of pro-inflammatory IL- 1β , IL-6, tumour necrosis factor (TNF- α). The decreased risk of tumorigenicity and immune rejection allows exosome-based therapy to be an alternative to stem cell transplantation in degenerative diseases.

These therapeutic nanocarriers possess the potential to revolutionize the realm of treatment for degenerative orthopaedic disorders and bring a spring in the step and smile to the face of our beloved elderly.

A Joint Dilemma!

by Divya Iyer, Final yr BpTh, Charusat University, Nadiad

POP! A sound like this, while cracking the knuckles, feels so relaxing. But imagine the same in the knee; probably the worst nightmare of an athlete. This usually happens when you twist your knee like a pretzel during activities like basketball, kabaddi, or even an overenthusiastic game of Twister, which puts a lot of strain on the two main stabilizers of the knee joint: the "Anterior Cruciate Ligament" and the "Posterior Cruciate Ligament." You can imagine them as two main strings that keep the tibia aligned with the femur.

The anterior cruciate ligament (ACL) is one of 2 ligaments that aid in stabilizing the knee joint. It originates from the anteromedial aspect of the intercondylar region of the tibial plateau and extends posteromedially to attach to the lateral femoral condyle. The ACL and the posterior cruciate ligament (PCL) together form a cross (or an "x") within the knee that prevents excessive forward or backward motion of the tibia in relation to the femur during flexion and extension. The ACL additionally provides rotational stability to the knee with varus or valgus stress. ACL is taut during the extension of the knee; thus, forceful hyperextension of the leg causes its tear. ACL sprains and tears are common knee injuries, with a reported incidence of 68.6 per 100,000 people every year in India.

If we look at it from a medical perspective, most patients typically complain of hearing and feeling a sudden "pop" and feel that their knee "gives out" from under them at the time of injury. Without the ACL's stabilizing function, the tibia can move excessively forward in relation to the femur, leading to a sensation of the knee "giving way." Other clinical features include tenderness along the joint line, pain, and swelling, decreased or loss of range of motion, and difficulty and changes in gait parameters.

The mechanism of the injury that follows is when a knee undergoes excessive rotation or tibial torsion with the foot firmly planted, it takes a hit. There is a cut-and-plant movement that is the typical mechanism that causes the ACL to tear. This, in turn, results in the increase in varus-valgus and internal rotation movements. The typical ACL injury occurs with the knee externally rotated and in 10-30° of flexion when the knee is placed in a valgus position as the athlete takes off from the planted foot and internally rotates with the aim of suddenly changing direction. The simple biomechanics that work here is the ground reaction force falls medial to the knee joint during this action, and this added force may contribute to an already tensioned ACL and lead to failure. Similarly, in landing injuries, the knee is close to full extension. Athletes who land with their knees caving inward (valgus collapse) are at a higher risk.

Certain anatomical factors can contribute to ACL injury susceptibility, including the "Q-angle," short for the quadriceps angle. A larger Q-angle indicates a wider gap between the quadriceps muscles and the patellar tendon, potentially creating unfavourable forces within the knee joint, contributing to valgus collapse.

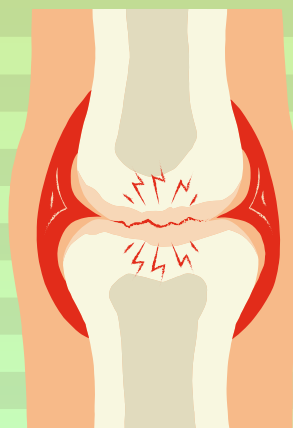
The injury is usually accompanied by Meniscal injuries around 50 percent of the time. It is termed as O' Donohue's Triad when this combination exists. The triad has three major components:

1. Meniscal Tear
2. Anterior Cruciate Ligament Tear
3. Medial Collateral Ligament Tear

When we talk about the management, the primary goal of the treatment is to return back to performance. Whether it is the athletic or the non-athletic population, the protocol aims at pain reduction and gaining the full knee range of motion. The mean duration of time lost in the athletic population to return to their sport is 8.84 months. It is commonly found that the highest incidence of knee stiffness occurs in an ACL injury is when the knee is swollen, painful, and has limited range of motion. The treatment plan sits in action which focuses on obtaining and maintaining full range of motion in extension and keep improving range of motion in flexion with minimal swelling. It also includes developing muscle strength along with improving proprioception.

The RICE plan (Rest, Ice, Compression, Elevation) is followed at the beginning of post-surgery days with a knee brace. Some of the treatment plans range from mobilizations of patella, calf and hamstring stretch, non-weight bearing to partial weight bearing, isometric exercises for the quadriceps and closed chain kinetic exercises.

In the end, the knee joint is a complex joint with the ligaments acting as their bearers. The injury is a common one among athletes. There have been many famous players like Virat Kohli, Klay Thompson, Rohit Sharma, and Kane Williamson who have returned to their sport after successfully completing the rehabilitation. As they say, with a problem comes the solution.



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