

INJURY MANAGEMENT SERIES

Preventive approach to the knee injuries that happen on the field



If you are an athlete, an injury is probably the last thing that you want. But you also know that when you push your limits in training and sport, chances are high that you may end up with an injury, even a serious one that could cost you years of your athletic career. In fact, some even say that if you have not been injured once in your career, you may not have pushed your limits. Well, that makes sense because sports is about pushing your limits, being competitive and breaking all barriers of your own performance to reach your maximum potential. That does not mean, however, that you will not do everything to prevent it. So, let us understand:

- some of the most common injuries that can happen on the field - injuries that have cost athletes even their careers
- some of the possible reasons behind those injuries and some weak links in the kinetic chain that can easily be avoided while training
- A more preventive approach towards managing these and
- How to effectively leverage movement off the field for better & safer performance on the field

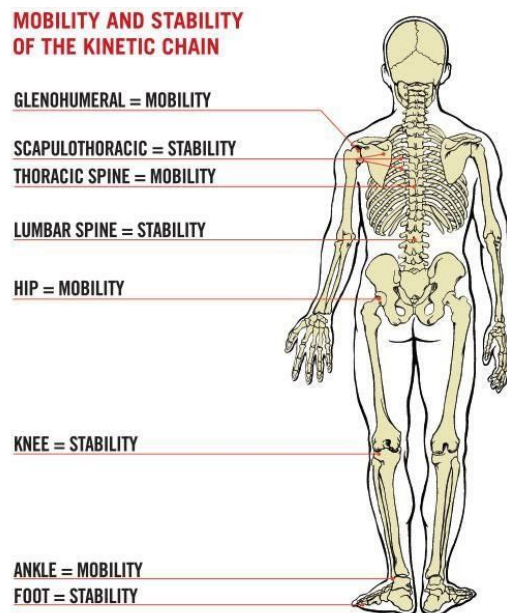
We know from experience that people who participate in sports are more likely to have ligament, tendon, muscle or bone injuries as compared to people that do not engage in field sports. Does that mean that one should not pick up sports as a lifestyle or a career choice? Naturally, the answer is an emphatic 'NO' because the benefits of being an athlete far outweigh the risks and

there is really no comparison with the negative health effects of leading a sedentary life. How then do injuries happen?

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| Poor Training methods | <ul style="list-style-type: none"> ❖ Lack of proper training plan and scheduling ❖ Pushing through pain and training ❖ Lack of recovery time & techniques ❖ Not adjusting the demands of the sport with strength training drills ❖ Improper ramp up of intensity ❖ Overtraining syndrome |
| Structural imbalances | <ul style="list-style-type: none"> ❖ Uneven limb length ❖ Difference in muscle insertion sites ❖ Asymmetrical muscular firing pattern ❖ Higher Q angle |
| Mobility restrictions | <ul style="list-style-type: none"> ❖ Mobility restriction in one joint leads to compensation at another ❖ Tendency of the body to choose the path of least resistance ❖ Training programs ignoring the effect of weak links throughout the kinetic chain |

Let's understand what kinetic chain is and how it forms the base of the entire preventive methodology that one can follow.

Anatomically, kinetic chain describes the interrelated groups of joints and muscles in the human body working together wherein performance (or the lack of it) in one part affects the performance in another. The diagram below is an example to illustrate what each joint needs to do in the chain.



Note :

- Mobility = the ability of the joint to move actively throughout the range of motion
- Stability = the ability of the body to limit unwanted motion

In this article, I will focus on the injuries that typically happen at the knee joint eg. torn Anterior Cruciate Ligament (ACL). Let us quickly revisit what each joint in the lower extremities is supposed to do.

- Foot: Needs stability
- Ankle: Needs mobility
- Knee: Needs stability
- Hip: Needs Mobility

Some of the most serious traumatic injuries that can happen at the knee joint are:

- Torn Anterior Cruciate Ligament <ACL tear>
- Torn Medial Cruciate Ligament <MCL tear>
- Meniscus tear, etc.

Visible reasons for these injuries could be

- Sudden shift in direction based on the need in a sport for cutting, pivoting, etc.
- Weak or improper landing on a single leg
- Sudden breaks in the run, which is a critical requirement in any field sport
- Repeated stress on the knee or overuse injury

Visible reasons apart, there are underlying aspects behind injuries that are known and understood only by those who understand human movement and its application in sports and with a great eye for detail. This is how it goes:

| Type of Injury | Visible reasons and underlying aspects |
|--|---|
| Weakness/instability in the joint itself | <p>The knee joint requires sufficient stability, without which an athlete is prone to injury triggered by sudden change of movements, jumping & landing, sudden stops, heavy load bearing, etc triggered in a sporting event.</p> <p>How does one gauge if there is sufficient stability in the knee joint? It's pretty simple; if the knees roll in while jumping/landing or while performing a movement as basic as a squat, then it's a pretty evident sign of unstable knees.</p> <p>By ignoring it and pushing the limits during a game or during practice, an athlete risks the high probability of an injury</p> |
| Joint by Joint Concept | <p>This concept has been explained well in Gray Cook's book 'Movement'. Cook is the creator of the Functional Movement Screen – considered the gold standard in identifying movement dysfunction.</p> |

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|---|--|
| | <p>The Joint by Joint concept states that a lack of mobility/function in one joint can lead to dysfunction at another joint in the kinetic chain.</p> <p>Hence, if the ankles lack sufficient mobility, it's going to affect the stability of the knees, thereby making them more susceptible to injuries.</p> |
| <p>Inefficiency in one joint leading to weakness in the other</p> | <p>This is related to the joint by joint concept but slightly different.</p> <p><i>The body always chooses the path of least resistance</i></p> <p>Speaking of ankle mobility again- a sufficiently mobile ankle joint will enable the knees to pass over the toes without any difficulty or hindrance. However, when the ankles are stiff, the knees might find it hard to pass over the toes and often end up rolling in while landing on the ground.</p> <p>It leads to 'dysfunction' and unnecessary load on the ligaments & tendons present at the knee joint. If not addressed promptly, this ends up injuring the knee, many times resulting in an ACL tear.</p> |

Now that we are beginning to understand some of the things that can go wrong in fitness, let us now look at some of the elements and methods that can be incorporated into the fitness training regime of an athlete.

Focusing on building sufficient mobility:

Mobility is the ability of the joint to move throughout the active range of motion. This is an important construct of fitness and a key building block for any well-planned fitness program. When it comes to building stronger knees, it is important to look at all the joints of the leg and train them for readiness.

- **Ankle Joint mobility** - The function of this joint is to enable the foot to point up and down. Further, it allows the knees to cross the toes without having to lift the heels off the ground. Hence, athletes must incorporate joint mobilization techniques to ensure sufficient mobility and fluidity in movement around this joint. Athletes and coaches must incorporate enough ankle mobility drills into the fitness training program, especially for high-impact sports (such as sprinting, football, basketball etc.) that place heavy amounts of stress on the knees.
- **Hip Joint mobility** – The hip joint requires more mobility than stability. Just like stiff ankles can impact knee stability, so can tight hips. In case of inadequate mobility in the hip joint, the knees start to overcompensate by applying unwanted forces, leading to dysfunction or poor-quality movement. Athletes and coaches should design training programs to focus on building multidirectional hip mobility to ensure that this ball and socket joint gets the fluidity of movement in multiple directions that it requires.

- **Stability training** - For efficient functioning of joints, stability is as important as mobility so that athletes can ensure that their muscles fire at the right time for best movement at different ranges of motion. This happens best with better mind muscle connection to ensure that the requirements of the sport are incorporated into the fitness training, ensuring stability in the joints just when and where it is required the most
- **Unilateral training principles** - Unilateral training ensures symmetry in how each joint moves and that can really go a long way when it comes to safety & performance in sports. Since performance in sports requires athletes to remain on a single leg while changing directions, sprinting, etc., unilateral training provides the stability and strength to support this requirement. It is important for fitness coaches to analyze the demands of the sport and incorporate the right exercises into the training design so that the joints build more familiarity with the desired movement pattern.
- **Reactive Neuromuscular Training** - Using resistance bands in fitness training to force muscle engagements. There can be various creative ways to train with bands and coaches should mimic the demand of sports in the usage of bands during fitness training. This type of training methodology ensures that muscles fire at the right time depending upon the requirement of the sport
- **Pliability training** - Written quite precisely by **Tom Brady in his book The TB12** method: *“You can’t sustain peak performance solely through strength & conditioning. You can perform well, often great, for a short period of time, but you will not be able to sustain it. Ask yourself what it might mean to not get hurt, or not be in pain or at least to begin creating a stronger, more effective “Body immune system” to counteract pain and injury. Nobody plans for a two-year career, after all! That’s where pliability plays a major role”*. Pliability is the way of training the brain and muscles to remain lengthened, softened and primed and which can potentially help in absorbing great deal of forces on the field. It involves targeted deep force muscle work to rhythmically contract and relax the muscle.

While these were some of the methods that can be used in training off the field to ensure much safer and effective navigation of joints on the field, a lot really depends on the type of sport, the specific requirements and how they can be effectively incorporated into training. In the next set of articles, we will cover more preventive techniques to avoid unnecessary and serious injury as well as drill down into some of the prominent training methods to enable athletes enjoy a much longer career with a sustained level of peak performance.

This article is written by Rishabh Telang. Rishabh is the founder of the fitness revolution – Cult. He is also a national level basketball player and a CrossFit L2 trainer and Functional movement screen certified.

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