

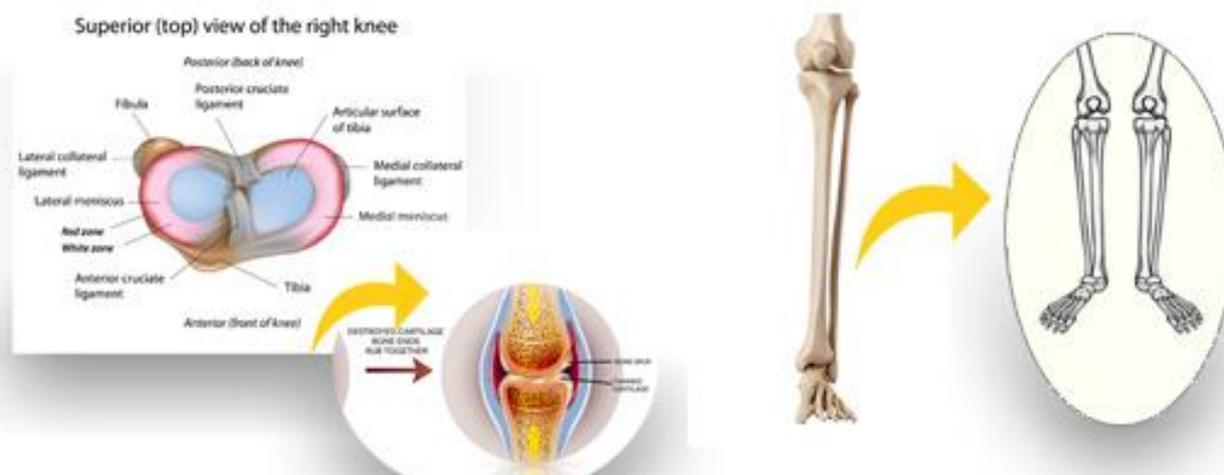
Understanding Tibial Torsion and the Common Compensations

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Changes through **TIBIAL Torsion**

TWISTING OR WRENCHING of your knee is never a great idea! Tibial Torsion is a natural compensation in adults when performing functional daily movements. Constant Tibial Torsion can have negative effects of the knee joint resulting in constant knee pain as well as a decline in the stability of the knee joint.

Tibial torsion can be seen in bowlegs, knock-knees and 'normal' knees. When we are adults, the torsion is created through our general movement pattern of Hip-Knee-Foot action. When the torsion is weight bearing, the effects are more damaging. Therefore, we need to take note of what is happening at the knee joint. It is usually quite easy for the naked eye to see a misalignment in the hip, knee and ankle joint. This is why we need to train our eye to see alignment.

Not only will the foot be an indication of what is happening at the Superior portion of the Tibia, but the Femur could be doing the complete opposite i.e., medial hip rotation with 'lateral' foot positioning. This would mean that there is a severe TWISTING or WRENCHING action at the knee joint. When you are young, it seems like something small, but when you are older, the Tibial Torsion becomes more vocal and starts affecting your functional movement. **Just ANOTHER reason to make Alignment a cornerstone for all of your work.**

Let's put this into everyday life

Think of all of your clients who bend their knees with their knees caving inwards and their feet facing outwards. Think of your dance students who turnout at the *FEET* once their body reaches its maximum range at the hip joint (which is normally not more than 60degrees). Think of the clients who are jumping in your classes and hit the ground with the knees caving in and the feet facing outwards. It might seem minor, but the more you do it, the worse the consequences will be. Let's not even forget that the Meniscus of the Knee does not like sudden rotation without stability.

Knee Osteoarthritis creates a physical change in the knee joint and when severe, you can see a distinct change in the alignment of the femur-foot angle.

So, what is actually happening and why?

Let us analyse it from a Biomechanical perspective.

Step 1: What is the Status of the Pelvic Tilt position?

Can the pelvic tilt affect the knee joint in any way? Well, we know that the hip rotation will definitely affect the knee joint but the pelvic tilt will also have a big impact on the femur. This is one of those scenarios where you can never put a tilt in a box and say that you will 100% have a specific rotation with a specific tilt. You can however, look at the individual and then based on their natural hip flexibility or inflexibility combined with any lateral pelvic tilt, deduce a few common changes e.g. a posterior pelvic tilt for a person with tighter hip flexors will force them to laterally rotate their hips. This is to ease the stretch over the hip flexors. A true posterior tilter can medially or laterally rotate their hips. Take a postural bowleg for example, they tend to medially rotate their hips and if they then laterally rotate the feet, you are looking at clear Tibial Torsion of the knee joint.

An anterior tilter is normally able to hyperextend their knees which leads to a posterior vulnerability of the knee joint. This combined with any lateral rotation in the foot will create chaos within the knee joint. However, a set posterior tilter with natural flexibility can also hyperextend their knees and this is why we cannot box a client into a specific chain reaction. You also have to look at their daily activities, sports or habitual movement patterns as these will impact the control that they have over their pelvis.

Step 2: What is their Favoured Hip Rotation?

Tibial Torsion is exacerbated by a hip rotation that is opposite to the lower leg rotation. This is where the wrenching of the joint comes in. If the client is a natural lateral hip rotator with an excessive lateral rotation of the foot beyond the hips rotation it will also cause Tibial Torsion. If the client is naturally in medial hip rotation and the lower leg is laterally rotated, this will cause an obvious Torsion at the knee joint, especially medially.

Step 3: What is the Natural Knee Alignment?

This is where it gets tricky. Bowlegs, knock-knees, postural or structural and then hyperextension will all have their own alignment knock-on effects. Structural knee differences means that there is a possibility that the femur can be in a neutral degree of zero rotation but the lower leg can do whatever it wants to do. Postural changes in the knees means that there is an amount of hip rotation that played a role in the change and therefore, the chain reaction is dependant on what the lower limb does in functional movement. E.g., A postural knock-knee who laterally rotates their hips but keeps their feet fairly parallel will tend to supinate their feet. Tibial Torsion will come in when the feet exceed the amount of lateral rotation that the hip is doing or if the feet turn medially (which is more unlikely to happen).

Step 4: What are your Client's Functional Movements?

This is very important as it will give you an indication of how much twisting and wrenching is happening in the knee joints. Is it in both knees or only one knee? Does this client have a lateral pelvic tilt and now they are trying to get the same amount of external rotation in the higher hip than what they have in the lower hip. How would they do this? They would turnout from the feet and create Tibial Torsion. Do they do any sports? Do they jump and what impact would it have on their landing? The list goes on and on and on.

Step 5: How would you approach Tibial Torsion?

Looking at the steps above, it is evident that we need certain information before we just delve into a program. We need to understand the anatomy involved, the client, their compensations and most certainly their restrictions too. Awareness forms the greatest part of this process and then a program needs to be designed to address the hip and the lower leg. Education on the perfect weight placement, seeing a podiatrist to improve foot function can all contribute to a better result. Doing leg work in a mindful manner and therefore, ***Time Under Tension*** is great to re-educate the limbs of where you want them and how you want them to get there. Slow repetitions to start this process is best, as you are then able to work through the muscle recruitment pattern and repeat that new habit efficiently. Gaining control of the hip rotation through muscle activation and awareness is key to this process. Placing focus on the 2nd and 3rd toe positioning in line with the centre of the patella is a great way to encourage awareness of **WHERE YOUR KNEE IS IN RELATION TO YOUR FOOT!**

Step 6: Do You need Load to Address Tibial Torsion?

This is dependant on what joint you are focusing on. If you are working on the hip alignment and strengthening, then you would absolutely need to bring in loaded work to assist in obtaining improved strong alignment change. If you are working on the rotation that is happening at the knee joint, you will use less load due to the size of the muscles involved i.e. Popliteus and hamstrings. How much load can the knee handle in rotation? We want to be cautious in the load that we give it as rotation is not it's primary movement and therefore it is its vulnerable movement when put under pressure. Remember that the internal structures can take strain i.e. the Meniscus and all the other ligaments. But particularly the Meniscus as it tends to tweak when performing sudden knee rotation. But controlled, stable rotation within range is absolutely fine. The knee is able to rotate at a greater degree when between 30° - 90° flexed and this rotation ROM decreases as you extend the knee.

Step 7: What Tools do You need in Your Toolbox?

Before anything, you need to understand the ***anatomy*** involved. You need to know the muscles, the joints, the knee structure and the various knee alignment issues that you can get. If your client has osteoarthritis then you must know that this can change the shape of the knee and affect the lower leg. You do not need elaborate, expensive equipment but rather creativity and innovation with your knowledge to help your client improve their knee stability. Understand effective hip stability, hip rotation deviations and how to improve these. Know what irritates knees when they move and what movements cause pain or irritation laterally, anteriorly, medially and posteriorly on the knee.

Just by reading the above, it is so easy to see how we can become so enthralled in the anatomy and biomechanics of the knee and how each person is different and unique.

I have delved into knees extensively over the years and put a course together that ties in perfectly with Training a Knee Effectively for Stability and Strength. If you want to learn more then [CLICK HERE](#).

To delve into Anatomy and Learn Functional Anatomy & Biomechanics on a Grand Scale [CLICK HERE](#)

KEEP LEARNING AND KEEP INSPIRING OTHER TO LOVE MOVEMENT AND EXERCISE.