Endeavor Health
Orthopaedic & Spine Institute

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ACL Reconstruction: Post-surgical Recovery Process, Expectations, and Timelines

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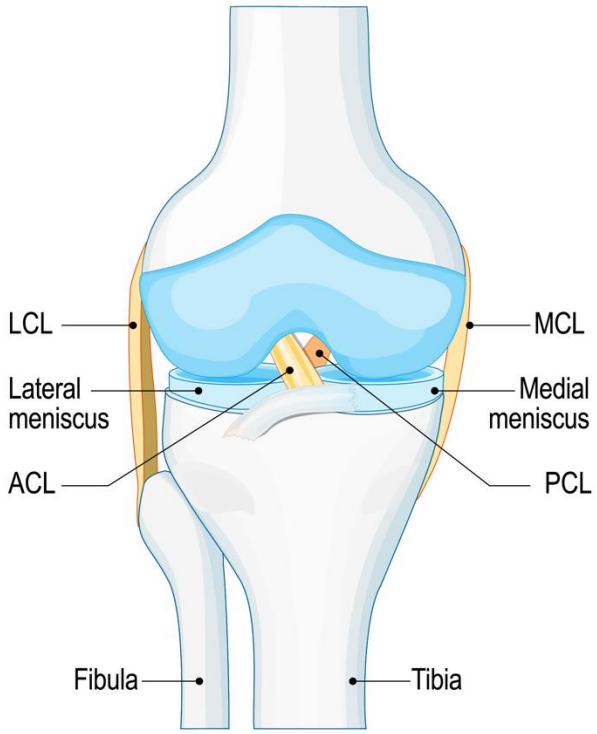
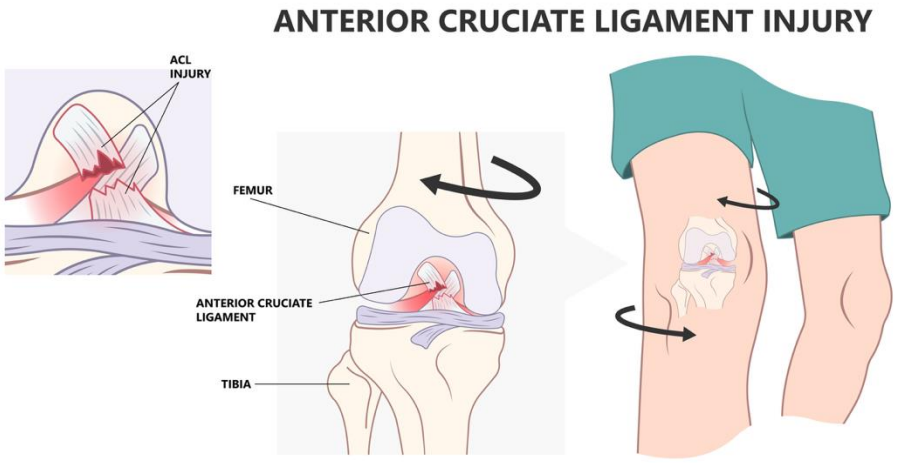
What is the Anterior Cruciate Ligament (ACL)?

- **Ligaments connect bones to one another**
  - ACL connects femur (thigh bone) to tibia (shin bone)
  - Resides in center of knee joint
- **What does the ACL do?**
  - Stabilizes knee joint during athletic movements
    - Jumping/landing
    - Cutting/pivoting



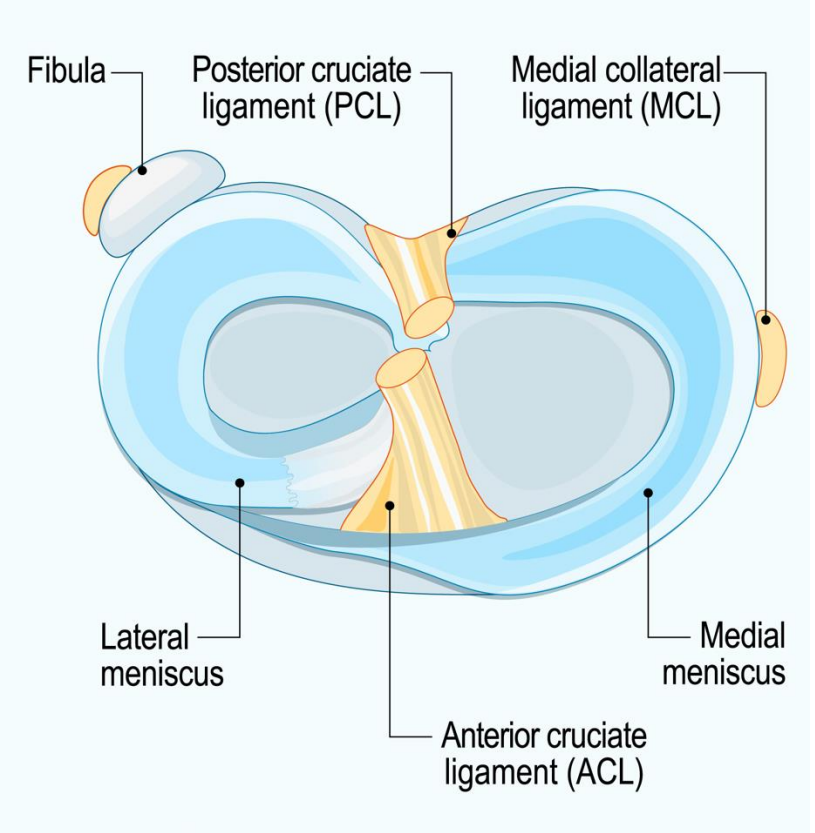
How do ACL tears happen?

- **Non-contact injury (most common)**
  - Sudden change in direction
  - Stopping/decelerating
  - Awkward landing after jump
- **Contact injury**
  - Collision with another athlete
  - Fall/slip
  - High-energy mechanism
    - Motor vehicle accident



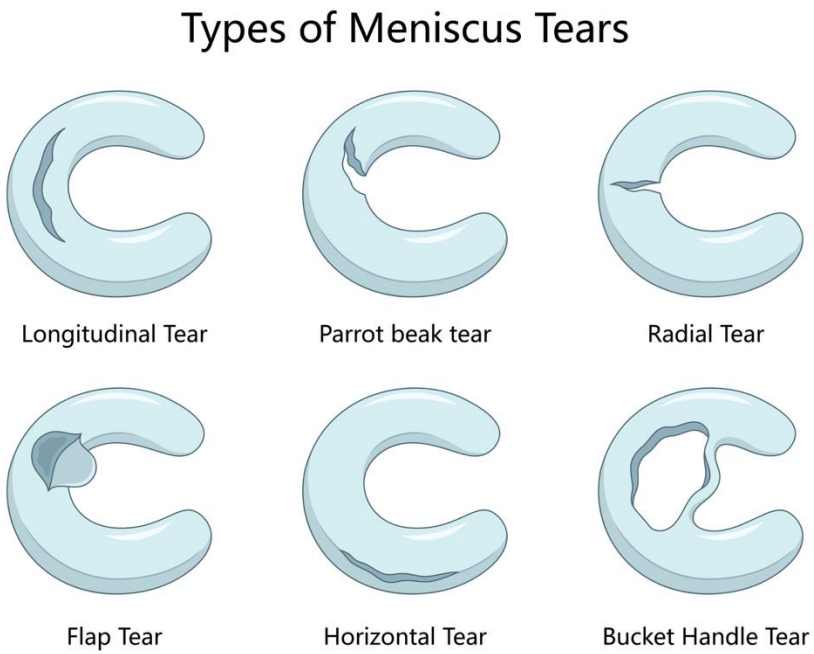
What is the meniscus?

- **C-shaped rubbery cartilage disks that cushion knee joint**
  - Medial (inside part of knee) is more commonly torn
  - Lateral (outside part of knee) is less commonly torn
- **What does it do?**
  - Acts as a shock absorber to transmit weight across knee joint
  - *If torn, the torn portion is no longer functional unless repaired*



What if my meniscus is torn?

- **Repairable**
  - **Will stitch together**
  - *May delay ability to put full weight on leg after surgery*
- **Non-repairable**
  - Will trim or remove torn portion
  - *No restrictions on weight bearing*



Indications for ACL Surgery

- Cutting/pivoting athletes desiring return to sport
  - Basketball
  - Football
  - Soccer
  - Tennis
  - Others
- Manual labor job

- Failure of non-surgical treatment
  - Instability with activities of daily living
  - Despite adequate course of Physical Therapy (4-6 weeks)

How is Surgery Performed?

- Arthroscopic-assisted (minimally invasive)
  - Will “reconstruct” or create new ACL using a graft
  - Torn ACL cannot be stitched together due to unacceptably high failure rate
- 2 half-inch incisions below the kneecap on front of knee
- One incision (1-2”) on front of knee
  - Used to harvest graft which will become new ACL
  - Incision length generally smaller in shorter patients, females, and patients with “stretchy” skin
- 1–2-hour outpatient procedure
  - General anesthesia (asleep)
  - ACL reconstructed
  - Incisions closed with dissolvable stitches

Anterior Cruciate Ligament (ACL) Reconstruction Graft Options

Which knee structures are injured?

- ❑ ACL (Anterior Cruciate Ligament)
- ❑ MCL (Medial Collateral Ligament)
- ❑ Medial meniscus
- ❑ Lateral meniscus
- ❑ Other

How lax (flexible) are my tissues?

Hyperlax

Beighton Score for Laxity (0-9)

Normal

Autograft (Your own tissue)

Bone-Patellar Tendon-Bone (BTB)

Pros:

- ❑ **The Gold Standard**
- ❑ Lowest published failure rates
- ❑ Bone-to-bone healing (preferable)
- ❑ Potentially earlier graft healing and earlier safe return to sport
- ❑ ***Used by nearly all pro athletes in the U.S.***

Cons:

- ❑ Kneeling pain
- ❑ Minor skin numbness

Hamstring Tendon

Pros:

- ❑ Does not affect extensor mechanism
- ❑ Generally easiest autograft to rehab

Cons:

- ❑ Hamstring weakness
- ❑ **2x failure rate compared to BTB in athletes aged 14-22** (*MOON Group, American Journal of Sports Medicine 2020*)

Quadriceps Tendon

Pros:

- ❑ Less early postoperative pain than BTB
- ❑ Slightly smaller incisions than BTB

Cons:

- ❑ *Potentially higher rate of stiffness requiring reoperation*
- ❑ No bone-to-bone healing (soft tissue only)
- ❑ Few outcomes studies in athletic populations

Allograft (Cadaver tissue)

Pros:

- ❑ No donor site morbidity
- ❑ Generally least painful and easiest to rehab

Cons:

- ❑ ***3-4x failure rate*** *compared to autograft choices in all patients (MOON Group, multiple studies)*
- ❑ **Unacceptably high failure rate in athletes (25-40%)**

JOSEPH D. LAMPLOT, M.D.

ORTHOPAEDIC SURGERY

SPORTS MEDICINE

Do I need an LET?

- What is an LET?
  - Lateral Extra-articular Tenodesis
  - 1 cm wide x 8 cm strip of iliotibial (IT) band is fixed to femur bone

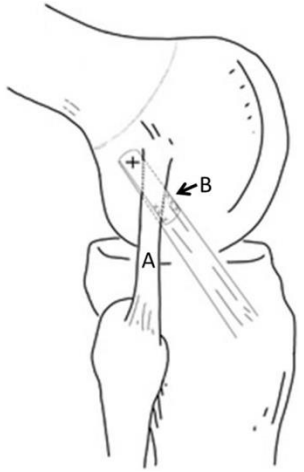
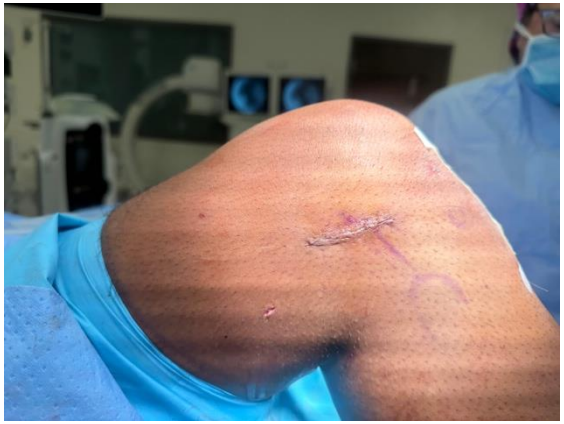


Fig. 6: Schlichte LM, Aitchison AH, Green DW, Cordasco FA. Modified Lemaire Lateral Extra-articular Tenodesis in the Pediatric Patient: An Adjunct to Anterior Cruciate Ligament Reconstruction. Arthrosc Tech. 2019 Dec 18;9(1):e111-e116. doi: 10.1016/j.eats.2019.09.010. PMID: 32021783; PMCID: PMC6993266.

- Why add LET to an ACL reconstruction?
  - **Reduces risk of ACL re-tear by 2-3-fold (8% to 3%)**
  - Better controls stability of knee than ACL graft alone
  - Appropriate for high-risk athletes
    - Knee hyperextension
    - High-risk sport (soccer, basketball, football)



- Additional small incision on outside part of knee
  - 1” incision and tiny poke hole to perform procedure
- Adds 20 minutes to surgery
- DOES NOT AFFECT POSTOPERATIVE REHABILITATION
  - Same time to return to sport/activity
  - May have slightly more pain early after surgery (approximately 1 week)
  - May be slightly more difficult to regain extension (straight knee) after surgery

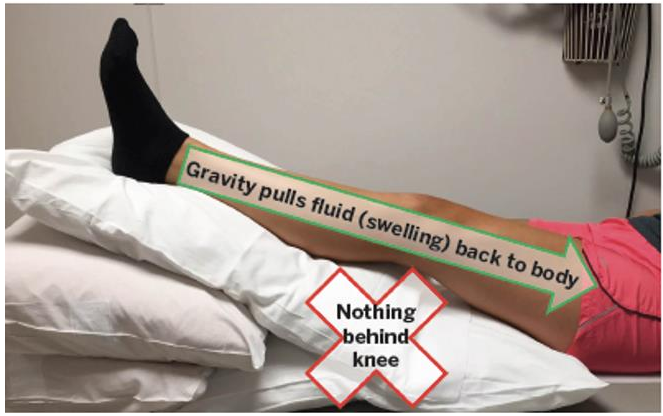
Expectations for Day of Surgery

Day of Surgery: At Surgery Center

- Will arrive to surgery center approximately 2 hours prior to surgery
  - Surgery center will call with specific time day before surgery
- Nothing to eat or drink after midnight
- Shower with Hibiclens night before and morning of surgery
- Time at surgery center:
  - Before surgery: Check in, paperwork, IV placement, meet anesthesia team, nerve block (1-2 hours)
  - Surgery: Roll back to operating room, go to sleep, surgery performed, wake up (2 hours)
  - After surgery: Roll to recovery room. Pain will be controlled. Water and crackers administered. Roll to car for family member/friend to take you home.

Instructions After Surgery

Day of Surgery: Home



- Ice and elevate knee above level of heart
  - 15 mins on and 15 mins off
  - Recommend ice machine (purchase on Amazon) or compressive device (rent/purchase GameReady)
- Resist temptation to place pillow under knee – **KEEP KNEE STRAIGHT WHEN RESTING!**
- Take medications as directed on discharge instructions for pain and inflammation
- Light diet on day of surgery - avoid heavy/greasy foods
- Limit time on feet to minimize swelling
- Limit narcotic use – do not "stay ahead" of the pain

Day after Surgery: Home

- Continue to ice and elevate knee above level of heart to control swelling
  - Consider ice machine for ease of use
- Resume your regular diet
- You may shower the day after surgery
  - Remove Ace bandage
  - Leave waterproof bandages in place until 2-week follow-up visit
  - Wrap knee in Saran wrap/food cling and discard after shower
  - It is OK if the waterproof dressing peels of prior to 2-week follow-up visit

Wound Care

Leave the waterproof bandages in place until 2-week follow-up visit, if possible

- Be very careful in shower
  - *Most dangerous place after surgery*
  - Brace will be off, and it is slippery
  - **Consider shower chair**
- You may wrap knee with Ace bandage for comfort
  - Some patients prefer using Ace bandage when brace is on to minimize rubbing on incisions
- Glued on tan bandages (Episeal) will fall off
  - No need to keep wounds covered while showering after 2-week visit
  - Allow Episeal to fall off on its own
  - All stitches are dissolvable

Tan bandages (Episeal) will fall off within 3-4 weeks of surgery

Weightbearing and Brace

- Brace only to be used when on feet/weightbearing and during sleep
  - Locked in full extension (straight) unless directed by Dr. Lamplot or your Physical Therapist

- If no meniscus repair
  - You may put full weight on surgical leg with brace on
  - Use brace and crutches until instructed to stop by Dr. Lamplot or your Physical Therapist

- If meniscus repair performed
  - Minimal weightbearing for 2 weeks (stable tear patterns)
  - Minimal weightbearing for 4 weeks (complex/unstable tear patterns)
  - No weightbearing for 6 weeks (meniscus root tear or multiple ligaments reconstructed i.e. ACL and MCL or LCL)
  - ***Dr. Lamplot will clarify these instructions for you and your Physical Therapist after surgery***

Crutch Fitting

Crutch Height:
adjust so the pad is 2 finger widths below the armpit

Hand support:
aligns with the crease of the wrist when the arm is hanging relaxed

Final Fit:
Elbows are slightly bent when the hands are grasping the supports

Crutch Use

- Once you are allowed to put full weight on surgical leg, you will wean from 2 crutches to one, and then none.
  - This process usually takes 1-2 weeks but depends on the individual
  - If no meniscus repair is performed, this process begins immediately after surgery
- You will use at least one crutch until your limp resolves
- Your Physical Therapist and Dr. Lamplot will coach you through this process

Home Exercises:
Start prior to outpatient Physical Therapy the day after surgery

*Please note in all pictures, the involved leg is the right leg which is identified with a yellow band around the right ankle. If it is your left knee that is injured (involved), follow these directions using your left leg.

Knee Extension

It is very important to get your knee fully straight prior to surgery

- **Lie on your back with both legs straight.**
- **Place a rolled up towel under the heel of your injured leg.**
- **Relax and let your involved knee straighten as much as possible.**
- **Try to maintain this position for 2-3 minutes.**
- **Then place the towel under your knee for a 30 sec rest period.**
- **Repeat this sequence 4-5 times.**
- **Perform 3-5 times per day until your knee is fully straight.**
- **A cold pack can also be applied during this exercise.**

Quadriceps Set

- Lie on your back with a towel roll under your involved knee and your noninvolved knee bent.
- Tighten your quadriceps (the muscles on the top of your thigh) and gently press the back of your knee into the towel roll. NOT as hard as you can. Do NOT lift your heel off the bed
- Should you experience any pain or discomfort, make the towel roll thicker/bigger.
- Hold 10 seconds. Rest 10 seconds. 15 repetitions. 5-7x /day.
- Goal is 100 repetitions per day.

**Note: This is the only time you are allowed to place anything under your involved knee*

Knee Bending (Flexion) and Straightening (Extension): Active / Active-Assisted Range of Motion

(1) Sit at the edge of the bed or a firm surface. Support your involved leg (band) with your non-involved leg.

(2, 3) Gently allow your involved leg to bend by supporting it with the assistance of your non-involved leg.
When your knee bends to an angle of approximately 70 degrees (or at an angle that you deem comfortable) slowly remove your non-involved leg from behind your involved leg and dangle as tolerated

(4) Attempt to bend your involved knee under the bed or firm surface. Hold a gentle stretch for 5 seconds

(6) Place your non-involved leg back behind your injured leg for support. Straighten your involved knee with the assistance of your non-involved leg

Repeat 20 times. 3-5 times per day.

When range of motion improves, advance this exercise by:

(5) Placing your non-involved leg in front of your involved leg and together with your involved leg gently bend your involved knee back until you feel a gentle stretch. Again hold 5 seconds.

SUPPORT

RELAX TO BEND

RELAX TO BEND

DANGLE

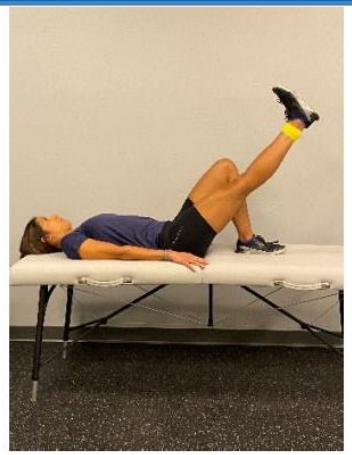
BEND

STRAIGHTEN WITH SUPPORT

Note: Do not force the knee into flexion (bend). Take what the knee allows naturally without pain.

Straight Leg Raise (Lying on your back)

- Lie on your back with your involved knee straight and your other knee bent as shown.
- Tighten your stomach, tighten the muscles on top of your thigh (quadriceps), keep the leg completely straight, and then raise it to the height of your other knee.
- Hold for 1 second and slowly lower.
- Perform 1 set of 10 repetitions, 3 times per week
- Advance to 2 sets of 10, then 3 sets of 10 as tolerated.
- Use a brace if recommended by your physician or if you can't keep your knee straight when lifting.



Calf Stretch

- Sit Up with your knee straight with a STRAP or Towel around the ball of your foot.
- With your hands, gently pull the strap/towel (foot) towards you to feel a stretch in your calf and behind your knee.
- Hold 30 seconds. Repeat 3 sets. Perform 2 times per day.

IMPORTANT!!!!

- DO NOT PUT PILLOW OR BLANKET UNDER KNEE WHEN RESTING OR SLEEPING!

- **CRITICALLY IMPORTANT** TO REGAIN KNEE EXTENSION (STRAIGHT KNEE) AFTER SURGERY
  - **YOU WILL HAVE A POOR OUTCOME IF YOU CANNOT GET YOUR KNEE COMPLETELY STRAIGHT AFTER SURGERY**

Outpatient Physical Therapy

Start 2-3 days after Surgery

Outpatient Physical Therapy

Make sure to call ahead, as they often book out weeks in advance

Goals of Physical Therapy

1. Control pain
2. Regain full range of motion
3. Activate (early) and strengthen (later) quadriceps muscles
4. Wean off crutches
5. Return to desired sport/activity level

Please discuss goals with Physical Therapist

1. Desired return to sport (competitive/recreational)
2. Fitness goals
3. Specific job demands (i.e. manual labor job), if applicable

Expectations: Symptoms

Time after Surgery	0-2 weeks	2-6 weeks	6 weeks-3 months	3-6 months	6 months - 1 year
Noticeable knee swelling			Tapers off		
Bruising					
Knee stiffness			Tapers off		
Knee soreness with daily activities (walking, standing)			Tapers off		
Knee soreness (frontal) with running/athletic activities				Tapers off	Rare
Weakness of surgical limb (quadriceps)					Restored around 9-12 months (will be tested)
Pain medication needed		Tapers off	NSAIDs/Tylenol only	Minimal, if at all	None
Skin numbness around incision			Area becomes smaller (approximately quarter-sized)		

Note: *Recovery timelines are general expectations and vary from person to person based on a variety of factors including age, presence/severity of meniscus tear, baseline strength and activity level, body habitus, compliance with postoperative instructions including home exercises and physical therapy, and other health factors.*

Expectations: Function

Activity	0-2 weeks	2-6 weeks	6-12 weeks	3-4 months	4-6 months	6-9 months	9 months +
Driving (surgery on left knee) *must be off narcotic pain meds							
Driving (surgery on right knee) *must be off narcotic pain meds		Once able to bear weight and push pedals confidently. Start on side streets or parking lots and once comfortable, OK for busy streets/highways					
Desk work	Plan to take anywhere between 2 days and 2 weeks off						
Walking without crutches		Depends on whether meniscus repair performed. If no meniscus repair performed, expect to be off crutches within 2-3 weeks of surgery.					
Long distance walking			Ramp up				
Basic housework (cleaning)							
Light manual labor				Wait for clearance from Dr. Lamplot			
Heavy manual labor					Wait for clearance from Dr. Lamplot		
Jogging				Jogging to start only if passing PT tests @ 3 mos			
Plyometrics/controlled sports-specific movements				Ramp up with PT	Perform all movements under direction of PT before doing on your own		
Advanced agility work for sport							
Full return to sport	No return prior to 9 months. Must pass all testing to return @ 9 months.						

Additional Considerations/FAQs

- **Return-to sport brace:** Will discuss at your 6-month follow-up visit
  - If interested, will be fitted for brace at 6 months to wear for return-to-sport

- **Why does it take so long to get back to sports?**
  - 6-fold increased risk of re-tear among athletes returning to sport prior to 9 months, even if passing all return-to-sport testing criteria

- **How will I know if I am ready to go back to sports at 9 months?**
  - Strength testing will be performed at 3, 6, and 9 months
  - Return to sport movement assessment will be performed by PT at 9 months
  - Mental preparedness for return to sport will be assessed at 9 months

- **How long do I have to go to Physical Therapy?**
  - Athletes ideally attend until cleared for return to sport
  - Frequency decreases over time (i.e. once weekly at 12-24 weeks, once every other week after 24 weeks until return to sport).
  - Consider # of visits permitted by your insurance plan, and we can plan accordingly

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Questions?

Contact Brittany Lukaszewski, RN

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