

Medial Meniscus Root Repair: Post-surgical Recovery Process, Expectations, and Timelines

Twin Cities Orthopedics – Complex Knee Injury Clinic

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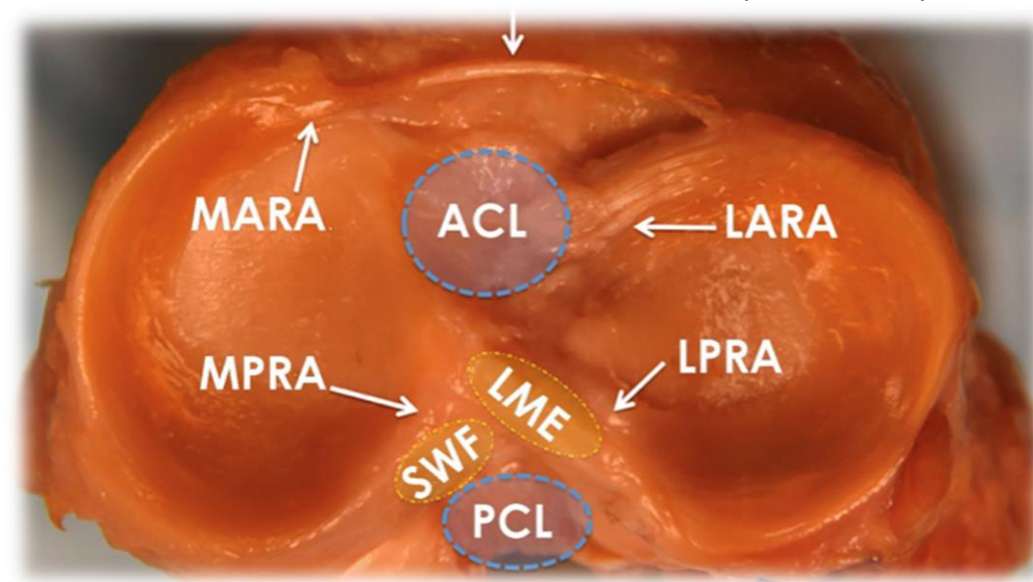
Lead Physical Therapist for TCO Complex Knee Injury Clinic & the practice of Dr. Robert LaPrade

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The Meniscus Roots

- What are they?
 - The meniscus roots are the anchor system for the menisci, attaching the menisci onto the tibia within the knee joint.
- Where are they?
 - There is an anterior and posterior root for both the medial and lateral meniscus.
 - These are located at the very front and very back portions of each meniscus on the tibial side of the knee joint.
- What do they do?
 - They stabilize the meniscus through attachments onto the tibia (shin bone) to keep it in place within the knee joint.
 - This allows the menisci to serve as cushions within the knee during loading activities (standing, walking, running, jumping) and to help stabilize the knee during movement.

View: looking down at the top of the tibia (shin bone)



MARA: medial (meniscus) anterior root attachment

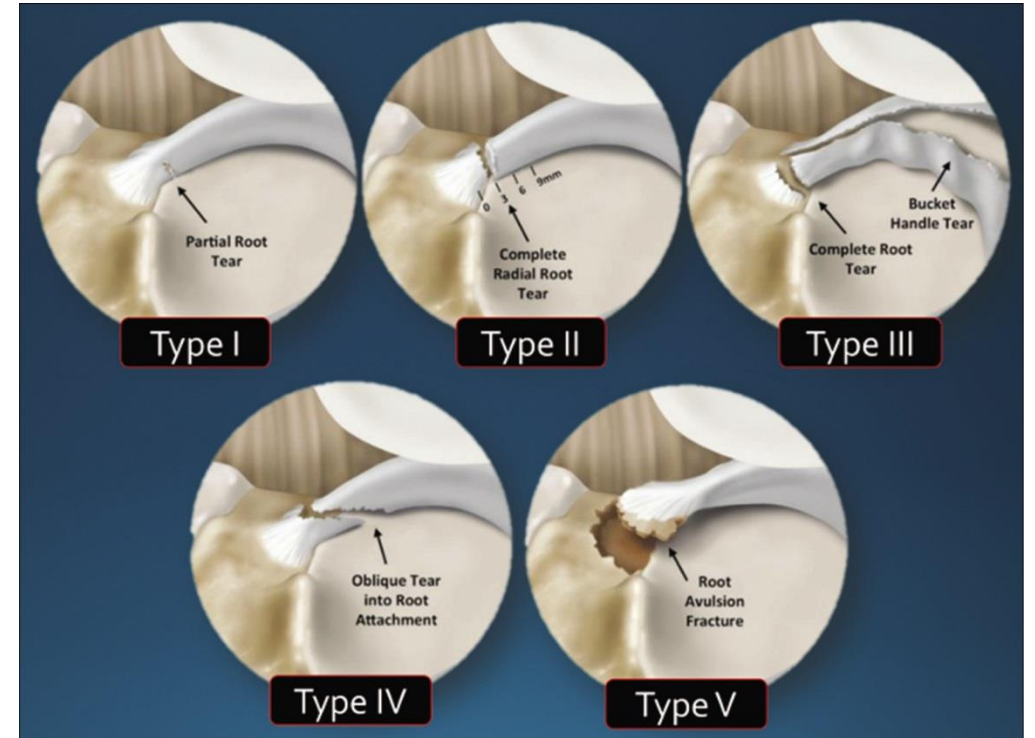
MPRA: medial (meniscus) posterior root attachment

LARA: lateral (meniscus) anterior root attachment

LPRA: lateral (meniscus) posterior root attachment

How does the root get injured?

- Medial root injury mechanism and population
 - Middle aged patient (often female), feel a pop/pain in a deep knee bend
 - Ongoing pain, sense of fullness often at the back of the knee
- Lateral root injury mechanism and population
 - Younger patient (more often male), often associated with an ACL injury



Images from: LaPrade CM, James EW, Cram TR, Feagin JA, Engebretsen L, LaPrade RF. Meniscal root tears: a classification system based on tear morphology. The American journal of sports medicine. 2015 Feb;43(2):363-9.



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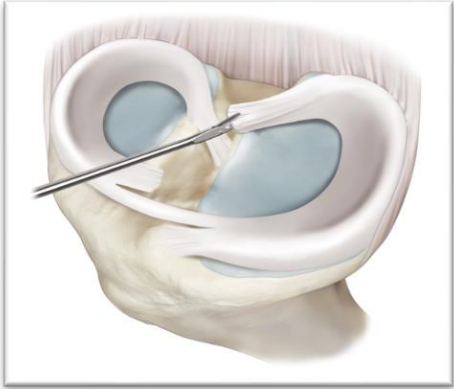


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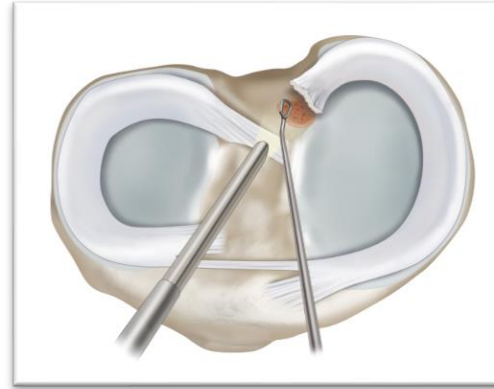
Why should it be repaired?

- The meniscus is an essential shock absorber for the knee joint
- Without the meniscus, more load is transferred to the cartilage of the knee joint which can lead to earlier or more significant arthritis changes, which can not be reversed.

How is it repaired?



1. Identify the meniscus root



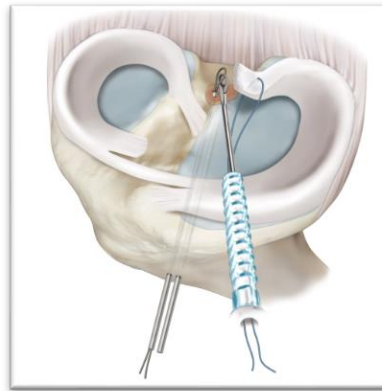
2. Rasp the bone under the root



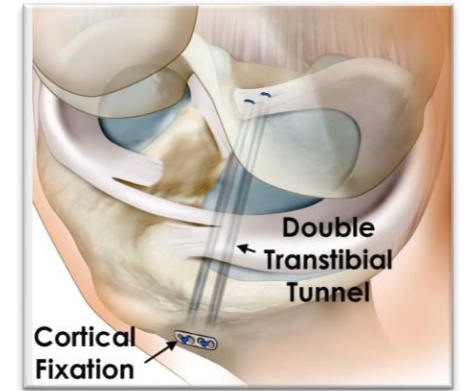
3. Guide pins placed



4. Tunnels drilled



5. Thread the root & pull wires through bone



6. Secure with a button

How do we protect the root repair?

AVOID weight bearing initially after surgery

- Weight bearing through the surgical limb with standing and walking places load and tension on the root repair

Patients remain **non-weight-bearing (NWB)** for 6 weeks

- This means the foot is lifted off the ground while walking and performing stairs so NO weight goes through the limb

**please refer to videos in the appendix for NWB techniques for mobility*

How do we protect the root repair?

AVOID deeper knee bending

- Deeper knee bending places tension on the root repair

Bending for stretching:

- Limit knee bending to no more than 90 degrees for the first 2 weeks
 - After 2 weeks gradually progress toward full knee motion with PT supervision
 - Avoid aggressive stretching, but rather work gradually, gaining 5-10 degrees per week

Bending for strengthening (after weight bearing strength is allowed):

- Avoid deeper squatting, stepping or lunging >70 degrees x 4 months
 - Gradually progress squatting activities once permitted
- Shallow → deeper, light → heavier, 2 → 1 leg

How do we protect the root repair?

AVOID aggressive hamstring muscle pulling

- The hamstring attaches at the back of the knee joint and can tug and place tension on the root repair with activation of the muscle

With exercises for motion:

- **PASSIVE knee bending only for the first 6 weeks after surgery**
 - This means NO pulling through the hamstring muscles

With exercises for strengthening:

- **Avoid aggressive, resisted hamstring curling for 4 months after surgery**

How do we protect the root repair?

AVOID twisting/pivoting motions

- These motions place higher amounts of tension on the root repair

With everyday activity:

- AVOID cross-legged sitting for 4 months after surgery

With exercise and recreational activities:

- AVOID faster directional movements or pivoting for 6 months after surgery (lateral shuffling, pivoting for swinging a bat or golf club, plant and pivot motions for racquet or ball sports)

Post-Surgical Precautions Summary

	2 weeks	6 weeks	10 weeks	16 weeks	24 weeks
Knee flexion (KF) motion limit: ≤ 90 degrees	$\leq 90^\circ$ KF x 2 weeks				
Passive knee flexion (KF) only (no muscle pulling)	Passive KF x 6 weeks				
Non-weight-bearing	NWB x 6 weeks				
No squatting	No squatting x 8-10 weeks				
No squatting > 70 degrees	No squatting $> 70^\circ$ x 4 months				
No aggressive hamstring curling into knee flexion	No aggressive hamstring curling x 4 months				
No cross-legged sitting	No cross-legged sitting x 4 months				
No twisting/pivoting	No twisting/pivoting x 6 months				

**Refer to the appendix for instructional videos associated with each precaution*

2 Week Precautions

**Knee bending limited to 90 degrees
(passive motion only)**

Watch Video: <https://vimeo.com/647355196>



6 Week Precautions

Non-weight bearing
Example: walking



Watch Video:

<https://vimeo.com/647355598>

Non-weight bearing
Example: up stairs



Watch Video:

<https://vimeo.com/647355629>

Non-weight bearing
Example: down stairs



Watch Video:

<https://vimeo.com/647355702>

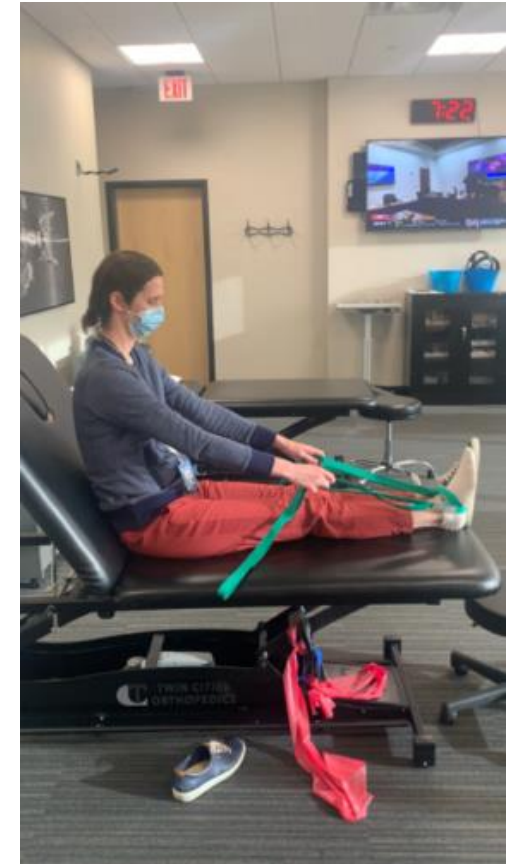
6 Week Precautions

Passive knee bending (flexion)

- Avoid pulling through the hamstring muscles (back of the thigh) as you pull your foot back to bend your knee, even as you progress beyond 90 degrees
- Use a belt, strap, hands, or opposite foot to help pull your knee back into a bend



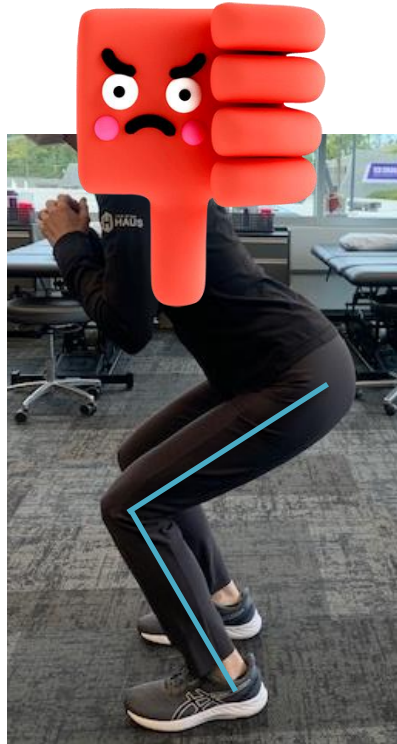
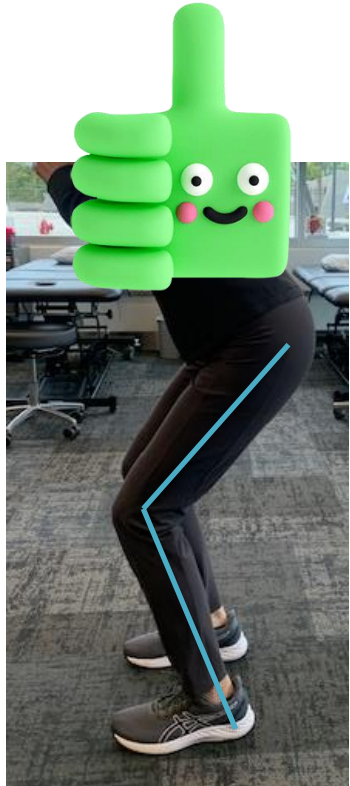
Watch Video:
<https://vimeo.com/647355451>



Watch Video:
<https://vimeo.com/647355401>

4 Month Precautions

Squat/step/lunge depth limit of 70



No resisted hamstring curls



4 Month Precautions

No cross-legged sitting



Post-Surgical Healing Phases

Hemostasis & Inflammation (Immediately through day 3)

- Hematoma
- Inflammatory mediators released
- Macrophages clear wound site
- Growth factors & cytokines released
- VEGF (vascular endothelial growth factor) stimulates angiogenesis

Proliferation (3 days to 14 days)

- Scaffold of specific tissue type is built (type III collagen, bone callus, etc.)
- Ground substance
- Scarring
- Ongoing angiogenesis

Remodeling & Maturation (14+ days)

- Mature tissue type fills in scaffold (Type 1 collagen. Bone, etc.)
- Collagen fibers align, diameter increases, cross-links form
- Tissue adapts, strengthens (influenced by mechanical stress)

Recovery Priorities for Each Phase

Hemostasis & Inflammation (immediately through day 3)

- Quiet the knee
- Manage swelling & pain
- Rest, elevate, ice
- Gently initiate therapeutic activities
- Protect the repair (crutches, immobilizer, precautions)

Proliferation (3 days to 14 days)

- Guide the healing process
- Progress knee motion
- Activate and strengthen the muscles (especially the quadriceps)
- Continue to protect the repair & manage symptoms

Remodeling & Maturation (14+ days)

- Gradually re-introduce load to the limb (standing, walking, exercise)
- Restore full motion
- Progress demand with strength & fitness activities
- Continue to protect the repair & manage symptoms

Expectations: symptoms after surgery

Weeks Post-Op	2 weeks	4 weeks	6 weeks	10 weeks	16 weeks	24 weeks
Daytime sleepiness, painful and swollen knee, leg muscle soreness						
Interrupted night-time sleep						
Noticeable knee swelling	Swelling gradually reduces, becomes more related to activity level during the day					
Sense of weakness at surgical limb	Gradually improves with exercise and therapy					
Knee soreness in daily life (walking, standing)	Normal during the first 4 months, resolves gradually					
Knee stiffness	Gradually less severe, takes longer to come on, resolves faster					

***NOTE:** Recovery timelines listed above for symptoms after surgery are general guidelines and will vary person to person based on the complexity of surgery, baseline knee health, baseline activity level, compliance with therapy activities, compliance with post-operative precautions, and confounding health factors. Consult the MD and PT teams for specific questions or concerns about your individual recovery process.

Expectations: function after surgery

Weeks Post-Op	2	4	6	8	10	12	16	24
Driving (surgery at left limb) *must be off narcotic pain medication								
Driving (surgery at right limb) *must be off narcotic pain medication	Once able to bear weight and push through pedals confidently							
Return to desk work (4+ hours)	*3-4 weeks off work is helpful							
Walking short distances without crutches	Wean from crutches weeks 6 to 9, then tolerance gradually improves for shorter walking distances with no crutches							
Walking longer distances without crutches	Gradually progress walking distances every 2 weeks per tolerance (helpful to track with phone, app, smart watch)							
Going up stairs “step-over-step”	Use handrail initially for confidence, comfort							
Coming down stairs “step-over step”	Use handrail initially for confidence, comfort							
Performing cardiovascular fitness exercises	Swim: weeks 6-8, bike: weeks 7-8, elliptical: week 12							
Performing gym exercises for strength	Basic exercises weeks 10-12, cautious intensity progressions weeks 12-16, improved comfort and confidence at 16+ weeks							

Expectations: function after surgery

***NOTE:** *Recovery timelines listed on the previous slide for function after surgery are general guidelines and will vary person to person based on the complexity of surgery, baseline knee health, baseline activity level, compliance with therapy activities, compliance with post-operative precautions, and confounding health factors. Consult the MD and PT teams for specific questions or concerns about your individual recovery process.*

Additional Support: TCO BASE Camp

- Group exercise class for root patients
- Criteria for admission:
 - Minimum of 4 months post-op
 - Tolerate walking without crutches x 20 minutes
 - Clinical testing with PT:
 - Knee ROM: 0-0-120 deg or greater
 - 1+ effusion or lower
 - Quad strength $\geq 50\%$ LSI
 - One leg balance: 30+ seconds

Additional Support: Nutrition

- Maintaining a healthy body weight is helpful for knee joint health but can be difficult to manage when you can't exercise!
- The body needs good nutrition to heal after surgery. Cutting back on nutrition in unhealthy ways is not helpful.
- How do we reconcile managing healthy weight while also supporting post-surgical healing?
- Our dietitian team at TCO can help!

For a more personalized consultation, connect with our TCO Nutrition Team:

NutritionServices@TCOmn.com

Additional Support: Mental Health

- The recovery process following this surgery can be long and frustrating, even for strong, mentally durable people.
- It can be useful to work with a mental health provider to process common frustrations, learn strategies to remain emotionally resilient, and maintain an optimistic attitude about your recovery.

Reach out to schedule a consult with one of TCO's partner in mental health, Achieve Performance

Psychology:

Dr. Allie Wagener

Allie@AchievePerformancePsych.com

OR

- Contact your insurance company to learn about mental health clinics and providers covered within your health plan
 - Look over provider biographies to determine which provider may be a good fit for you and your needs.

Additional Support: Bone Health

- Recovery from surgery, especially when a patient is unable to put weight through the surgical limb for a period of time, can contribute to a loss of bone mineral density.
- This is already a critical area of health concern for women.
- Strategies related to exercise, nutrition, and sometimes medication may be useful to minimize bone loss associated with precautions following surgery and to recover bone density following surgery.

For basic educational resources, [click here](#).

For a more personalized consultation, connect with our TCO Bone Health Team:
BoneHealth@TCOmn.com

Appendix

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



Transferring from Sit to Stand: NWB

Sit to Stand Transfer - chair with arms

1. Move to the front edge of the chair.
2. Place the crutches together and hold the hand grip with one hand.
3. Place your other hand on the arm of the chair for a stable push-off point.
4. Lean forward to push up using only your non-surgical leg and your hand at the arm of the chair.



Watch Video:

<https://vimeo.com/647355489>

Transferring from Sit to Stand: NWB

Sit to Stand Transfer - chair without arms

1. Move to the front edge of the chair.
2. Place the crutches together and hold the hand grip with one hand.
3. Place your other hand on the arm of the seat of the bench/chair for a stable push-off point.
4. Lean forward to push up using only your non-surgical leg and your hand at the seat of the bench/chair.



Watch Video:

<https://vimeo.com/647355539>

Walking: Non-weight bearing (NWB)

1. Stand on your non-surgical leg and move both crutches slightly out to the front.
2. Lean your body weight forward over the crutches (keep your shoulder and trunk muscles strong) and swing forward, keeping your surgical foot off the floor, then place your non-surgical foot back on the floor in line with or just in front of the crutches.
3. Repeat in this fashion.
4. Have a family member walk near you and move slowly with small crutching steps when first learning.
5. It is helpful to practice this technique BEFORE surgery.



Watch Video:

<https://vimeo.com/647355575>



Watch Video:

<https://vimeo.com/647355598>

Going Up Stairs: Non-weight bearing (NWB) with 2 crutches, no handrail

1. Stand on your non-surgical leg at the bottom of the first step with your crutches.
2. Support your weight through the crutches (keep your shoulder and trunk muscles strong) as you lift your non-surgical foot up to the first step (do NOT put your surgical foot down on the floor).
3. Once your non-surgical foot is securely up on the first step, press through this leg to raise yourself up the step, bringing your surgical limb and crutches up with you.
4. Repeat for each step in this fashion, leading with your non-surgical leg.
5. Have a caregiver stand behind you when you are first learning.
6. It is helpful to practice this technique BEFORE surgery.



Watch Video:
<https://vimeo.com/647355629>

Going Up Stairs: Non-weight bearing (NWB) with crutches and a handrail

1. Stand on your non-surgical leg at the bottom of the first step, hold both crutches under one arm and grasp the handrail with the other hand.
2. Support your weight through the crutches and the handrail (keep your shoulder and trunk muscles strong) as you lift your non-surgical foot up to the first step (do NOT put your surgical foot down on the floor).
3. Once your non-surgical foot is securely up on the first step, press through this leg to raise yourself up the step, bringing your surgical limb and crutches up with you.
4. Repeat for each step in this fashion, leading with your non-surgical leg.
5. Have a caregiver stand behind you when you are first learning.
6. It is helpful to practice this technique BEFORE surgery.

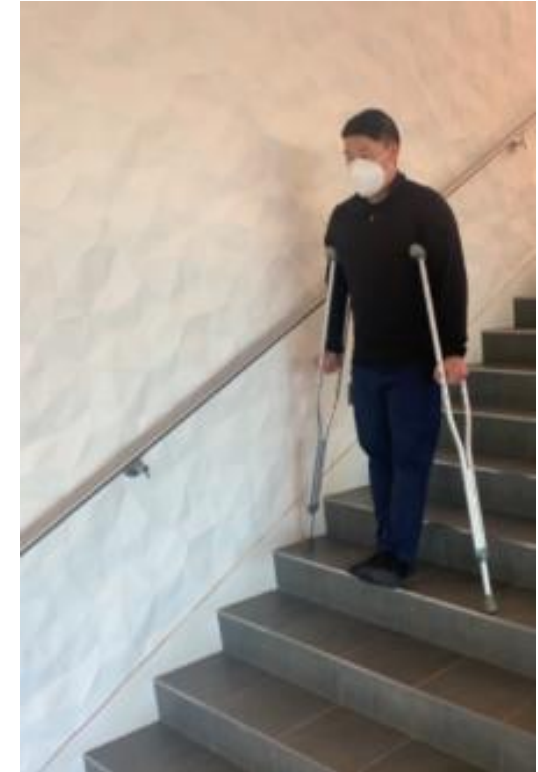


Watch Video:

<https://vimeo.com/647355661>

Going Down Stairs: Non-weight bearing (NWB) with 2 crutches

1. Stand on your non-surgical leg, with support from your crutches, above the first step.
2. Place both crutches securely on the step down in front of you.
3. Slowly shift your weight over your crutches (keep your shoulder and trunk muscles strong) and lower the foot of your non-surgical leg down to that same step (keep your surgical foot off the floor).
4. Assure your balance is stable and then advance your crutches down to the next step and repeat.
5. Have a caregiver stand in front of you when you are first learning.
6. It is helpful to practice this technique BEFORE surgery.



Watch Video:

<https://vimeo.com/647355702>

Going Down Stairs: Non-weight bearing (NWB) with crutches and a handrail

1. Stand on your non-surgical leg, with support from your crutches, above the first step. Place both crutches under one arm and firmly grasp the handrail with the other hand.
2. Place the crutches securely on the step down in front of you and maintain a strong grasp on the rail with your hand.
3. Slowly shift your weight forward over your crutches and the rail (keep your shoulder and trunk muscles strong) and lower the foot of your non-surgical leg down to the step (keep your surgical foot off the floor).
4. Assure your balance is stable and then advance your crutches down to the next step and repeat.
5. Have a caregiver stand in front of you when you are first learning.
6. It is helpful to practice this technique BEFORE surgery.



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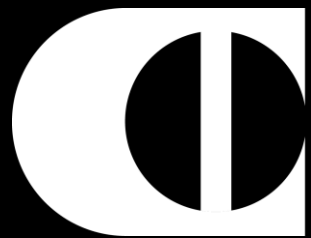
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Questions?

Please direct questions to:

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