



autologous cultured
chondrocytes
on porcine
collagen membrane

HELPING RESTORE YOUR ACTIVE PATIENTS

MACI KNEE CARTILAGE REPAIR REHABILITATION OVERVIEW FOR PRACTICES

ACHIEVE ROUTINE >>>> BUILD STRENGTH >>>> BE ACTIVE

The content presented reflects clinical expertise derived from the Delphi technique—a method of congregating expert opinion through a series of iterative questionnaires, with a goal of coming to a group consensus—conducted with a panel of US orthopedic surgeons experienced with MACI implantation.¹

Indication: MACI (autologous cultured chondrocytes on porcine collagen membrane) is an autologous cellularized scaffold product that is indicated for the repair of single or multiple symptomatic, full-thickness cartilage defects of the adult knee, with or without bone involvement.

Important Safety Information: The most frequently occurring adverse reactions reported for MACI ($\geq 5\%$) were arthralgia, tendonitis, back pain, joint swelling, and joint effusion. Serious adverse reactions reported for MACI were arthralgia, cartilage injury, meniscus injury, treatment failure, and osteoarthritis.

Please see [Important Safety Information](#) and [Full Prescribing Information](#), or visit [MACI.com](https://www.maci.com)



Chris
MACI Patient



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MACI KNEE CARTILAGE REPAIR REHABILITATION OVERVIEW

“ Together with my surgeon, we built a rehab program tailored to my individual goals while incorporating activities I enjoy. I was given a timeline for weight bearing, driving, jogging, weight lifting, and running. Today, thanks to my surgeon and MACI, I've been able to reach a full recovery. I'm back (with a vengeance) to my old self.”

Chris
MACI Patient

*Paid testimonial by a MACI patient.
Individual results for rehab may vary.



Each patient's MACI rehabilitation physical therapy needs are unique.

A rehabilitation program should take into account the patient's specific medical history and individual goals. Modifications may be needed based on specifics of the cartilage lesion(s) as well as any concomitant procedures performed at the time of MACI implantation.

The information presented is not intended to be a substitute for your individual clinical judgment. Rehabilitation is a highly individualized process and the following recommendations are intended to help inform your development of a unique rehabilitation program specific to each patient's needs.

The goal is to restore optimal function in each patient as quickly and safely as possible. Rehabilitation progression is criterion-based. Although timeframes have been established as a guide, it is more important that goals are reached at the end of each phase prior to progressing to the next.

MACI is contraindicated in patients who are unable to follow a physician-prescribed post-surgical rehabilitation program.

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	0-3 months following surgery >>>>>	3-6 months following surgery >>>>>	6-9 months following surgery >>>>>
	ACHIEVE ROUTINE	BUILD STRENGTH	BE ACTIVE
	After the immediate post-surgery phase, patients work to quickly achieve pain-free and full passive knee extension while gradually increasing weight bearing and knee flexion range of motion. Over time, the goal is to achieve unassisted ambulation and activities of daily living while becoming thoroughly independent with rehabilitation exercises.	During this phase, patients should begin to feel comfortable returning to recreational activities. An exercise program will help re-build muscle strength and endurance. Patients may feel ready for more strenuous activity, so you may need to give explicit direction on what activities they are ready for at this stage.	Patients should be able to enjoy a return to recreational activities and sports by gradually increasing the difficulty of their exercises. Every patient's recovery is unique and should be guided by your assessment of graft maturation as well as mental preparedness of the patient and the general physical function and level of specific knee strength, stability, and support.
TISSUE PHASE	 <div>Implantation & Protection</div> <p>Cells adhere to bone and begin to proliferate throughout the defect</p>	 <div>Transition & Proliferation</div> <p>Continued proliferation forms a defect-spanning matrix</p>	 <div>Remodeling & Maturation</div> <p>Expansion of the cell matrix into puttylike consistency, progressive hardening until durable repair tissue forms</p>
FUNCTIONAL GOALS	<ul style="list-style-type: none"> • Mobile with crutches within first week • Limited weight bearing and pain-free, full knee extension by 2-3 weeks • Independent home exercise as early as 1 month • Patellofemoral defects—full knee ROM by 7-9 weeks Single defect—immediate weight bearing Multiple defects—full weight bearing by 5-6 weeks • Tibiofemoral defects—full weight bearing and full knee ROM by 7-9 weeks • Free from knee brace by 8-12 weeks post-surgery 	<ul style="list-style-type: none"> • Full and pain-free weight bearing and range of motion • Continue progression of strengthening exercises without pain or swelling • Transition to gym/home based rehab • Free from crutches 	<ul style="list-style-type: none"> • Increase distance, time, and difficulty of exercises • Ability to tolerate lengthy walking distances • Return to a pre-operative level of activity
ACTIVITY MILESTONES	<ul style="list-style-type: none"> • Return to light recreational exercise including walking and stationary cycling • Perform daily routine and activities of daily living (navigating stairs, showering, etc.) with the assistance of crutches • Start driving again and return to office or seated work 	<ul style="list-style-type: none"> • Return to low-impact recreational activities including: <ul style="list-style-type: none"> - cycling - golf - yoga & pilates - rowing/kayaking - swimming - dancing - elliptical/treadmill • Return to more physically active jobs such as nursing or construction (as directed) • Return to daily activities that require strength and endurance 	<ul style="list-style-type: none"> • Return to pre-injury sports-based recreational activities including: <ul style="list-style-type: none"> - running distances - skiing/snowboarding - weight training - tennis • Return to work for those in heavy labor fields such as military deployment or firefighting (as directed) • Over time, heavy impact activities such as cutting or pivoting can be reintroduced



Chris' MACI (autologous cultured chondrocytes on porcine collagen membrane) rehabilitation*

0-3 months

- Straight-leg lifts (1-2 weeks)
- Upper-body workouts (1-2 weeks)
- Driving (3 weeks)
- Stationary bike (4 weeks)
- Balancing exercises (4 weeks)
- International travel (6 weeks)
- Jogging (10 weeks)

3-6 months

- Return to gym for full-body workouts
- Able to run 2 miles

6-9 months

- Regular running program
- Attending all previous fitness classes

9+ months

"I'm close to being back to the best shape of my life and keep improving every day. I have been able to get back to all the physical activities I love doing, like running, squatting, jumping, lunging, weight lifting, taking fitness classes, boxing, hiking, and camping."

***Paid testimonial by a MACI patient. Recovery from MACI treatment is highly individualized. The rehabilitation program is tailored specifically to each patient's unique goals and objectives. Everyone heals at their own rate and cartilage will continue to mature over time. Patients should return to heavy impact activities such as cutting or pivoting as directed.**



Indication

MACI® (autologous cultured chondrocytes on porcine collagen membrane) is an autologous cellularized scaffold product that is indicated for the repair of single or multiple symptomatic, full-thickness cartilage defects of the adult knee, with or without bone involvement.

MACI is intended for autologous use and must only be administered to the patient for whom it was manufactured. The implantation of MACI is to be performed via an arthrotomy to the knee joint under sterile conditions.

The amount of MACI administered is dependent upon the size (surface in cm²) of the cartilage defect. The implantation membrane is trimmed by the treating surgeon to the size and shape of the defect, to ensure the damaged area is completely covered, and implanted cell-side down.

Limitations of Use

Effectiveness of MACI in joints other than the knee has not been established.

Safety and effectiveness of MACI in patients over the age of 55 years have not been established.

REFERENCE 1. Flanigan D, Sherman SL, Chillelli B, Gersoff W, Jones D, Lee CA, Toth A, Cramer C, Zaporozhan V, and Carey J. Consensus on Rehabilitation Guidelines among Orthopedic Surgeons in the United States following Use of Third-Generation Articular Cartilage Repair (MACI) for Treatment of Knee Cartilage Lesions. Cartilage [Internet]. First published October 30, 2020. Available from: <https://doi.org/10.1177/1947603520968876>

Important Safety Information

MACI is contraindicated in patients with a known history of hypersensitivity to gentamicin, other aminoglycosides, or products of porcine or bovine origin. MACI is also contraindicated for patients with severe osteoarthritis of the knee, inflammatory arthritis, inflammatory joint disease, or uncorrected congenital blood coagulation disorders. MACI is also not indicated for use in patients who have undergone prior knee surgery in the past 6 months, excluding surgery to procure a biopsy or a concomitant procedure to prepare the knee for a MACI implant.

MACI is contraindicated in patients who are unable to follow a physician-prescribed post-surgical rehabilitation program.

The safety of MACI in patients with malignancy in the area of cartilage biopsy or implant is unknown. Expansion of present malignant or dysplastic cells during the culturing process or implantation is possible.

Patients undergoing procedures associated with MACI are not routinely tested for transmissible infectious diseases. A cartilage biopsy and MACI implant may carry the risk of transmitting infectious diseases to healthcare providers handling the tissue. Universal precautions should be employed when handling the biopsy samples and the MACI product.

Final sterility test results are not available at the time of shipping. In the case of positive sterility results, health care provider(s) will be contacted.

To create a favorable environment for healing, concomitant pathologies that include meniscal pathology, cruciate ligament instability and joint misalignment, must be addressed prior to or concurrent with the implantation of MACI.

Local treatment guidelines regarding the use of thromboprophylaxis and antibiotic prophylaxis around orthopaedic surgery should be followed. Use in patients with local inflammations or active infections in the bone, joint, and surrounding soft tissue should be temporarily deferred until documented recovery.

The MACI implant is not recommended during pregnancy. For implantations post-pregnancy, the safety of breast feeding to infant has not been determined.

Use of MACI in pediatric patients (younger than 18 years of age) or patients over 65 years of age has not been established.

The most frequently occurring adverse reactions reported for MACI (≥5%) were arthralgia, tendonitis, back pain, joint swelling, and joint effusion.

Serious adverse reactions reported for MACI were arthralgia, cartilage injury, meniscus injury, treatment failure, and osteoarthritis.



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For more information, please see [Full Prescribing Information](#), or visit [MACI.com](https://www.vericel.com)