

Clinical Policy: Articular Cartilage Defect Repairs

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[Coding Implications](#)

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Description

Cartilage transfer procedures include autologous chondrocyte implantation, osteochondral allograft transplantation (OAG or OCA) [i.e., including repair of anterior cruciate ligament and meniscus], and osteochondral autograft transplantation [mosaicplasty, Osteochondral Autograft Transplantation System (OATS)]. They are techniques for repairing articular cartilage that has been damaged by trauma or degenerative processes. This policy outlines the medical necessity criteria for each of these procedures.

Policy/Criteria

- I. It is the policy of health plans affiliated with Centene Corporation[®] that autologous chondrocyte implantation (ACI) is **medically necessary** when *all* of the following criteria are met:
 - A. Age 18 through 55 years, or documented skeletal maturity if < 18;
 - B. BMI < 35 kg/m²;
 - C. Focal, full-thickness (grade III or IV) articular cartilage defect involving the femoral condyle (medial, lateral, or trochlear);
 - D. Femoral condyle defect size 1 through 10 cm²;
 - E. Disabling symptoms such as locking, swelling, or knee pain that are unresponsive to conservative treatment for a minimum of two months (e.g., medication, physical therapy);
 - F. Previous unsuccessful arthroscopic or surgical revision/repair procedure;
 - G. Knee is stable with intact menisci and ligaments, has normal joint space by X-ray, and is in good alignment (a corrective procedure to stabilize the knee may be performed in combination with or prior to autologous chondrocyte implantation [ACI]);
 - H. Surgery is not intended to treat osteoarthritis of the knee;
 - I. No previous surgery to repair articular cartilage defects with cartilage transfer;
 - J. Member/enrollee is willing and able to comply with prescribed postoperative rehabilitative program;

- II. It is the policy of health plans affiliated with Centene Corporation that osteochondral allograft transplant OR osteochondral autograft transplant of the knee is considered **medically necessary** when *all* of the following criteria are met:
 - A. Age 18 through 55 years, or documented skeletal maturity if < 18;
 - B. BMI < 35 kg/m²;
 - C. Focal, full-thickness (grade III or IV) articular cartilage defect of the lateral or medial femoral condyle, or trochlear region of the knee;
 - D. For osteochondral autograft transplant (e.g., osteochondral autograft transplantation system [OATS]/mosaicplasty), lesion is ≤ 2 cm²; or for osteochondral allograft (OCA) transplant, unipolar lesion that is > 2cm²;

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- E. Disabling symptoms such as locking, swelling, or knee pain that are unresponsive to conservative treatment for a minimum of two months (e.g., medication, physical therapy);
- F. No evidence of arthritis on the corresponding tibial surface;
- G. Normal appearing hyaline cartilage surrounding the border of the defect, and absent or minimal changes in surrounding articular cartilage;
- H. Normal knee alignment;
- I. Not currently a candidate for total or partial knee replacement.

III. It is the policy of health plans affiliated with Centene Corporation that meniscal allograft transplant is considered **medically necessary** when all of the following criteria are met:

- A. Physically active and physiologically young, under age 55;
- B. Documented mild to moderate articular damage (Outerbridge grade II or less);
- C. Missing > 50% of a meniscus as a result of previous surgery or injury, or a meniscus tear that cannot be repaired;
- D. Disabling knee pain refractory to conservative treatment (e. g., medication, physical therapy);
- E. Normal alignment without varus or valgus deformities;
- F. None of the following contraindications to meniscal allograft transplant:
 1. Systemic metabolic degenerative disease (i.e., gout);
 2. BMI > 35 kg/m²;
 3. Arthritis of the knees or rheumatoid arthritis;
 4. Flattening of the femoral condyles or severe degenerative changes (> 50% joint space narrowing, bone on bone, or erosion to subchondral bone);
 5. Has undergone partial or total meniscectomy and does not presently have symptoms or problems with their knee.

IV. It is the policy of health plans affiliated with Centene Corporation that current evidence does not support the use of minced articular cartilage repair (allograft or autograft).

V. It is the policy of health plans affiliated with Centene Corporation that current evidence does not support the use of autologous chondrocyte implantation (ACI), osteochondral allograft transplant, or osteochondral autograft transplant for any other indication, or any other joint surface not listed above.

Background

Articular cartilage is a highly resilient, viscoelastic material that plays an essential role in reducing stress on subchondral bone and minimizing friction within the joint. Articular cartilage is hyaline cartilage, which consists primarily of matrix, water and only a small number of chondrocytes (cartilage cells). Hyaline cartilage has a low capacity for regeneration because of its avascular and relatively acellular composition.^{23,24}

Osteochondral (OC) surfaces that are damaged by trauma or degenerative process usually fill in with fibrocartilage which is less suitable for absorbing stress than is hyaline cartilage. In younger adults, trauma is the most frequent cause of articular cartilage damage. Indications for OC repair

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include tears, chondral flaps, and loose bodies. All of these defects can result in joint pain, swelling, locking, and giving way.^{23,24}

Other causes of articular defects include degenerative conditions such as osteonecrosis, osteochondritis dissecans, and osteoarthritis. Osteonecrosis is the death of bone en masse and may arise spontaneously or can result from chronic steroid use. The etiology of this condition is uncertain, although it is thought to result from loss of the blood supply to an area of the subchondral bone. Osteoarthritis, or degenerative arthritis, is the most common form of arthritis in the United States and is characterized by the erosion of articular cartilage.²⁴

Autologous chondrocyte implantation (ACI) is a two-stage process in which healthy cartilage cells are harvested and cultured and then reimplanted into the defect under a membranous patch at a later date. Allograft transplant involves the transplant of a cadaveric graft consisting of viable articular cartilage and underlying subchondral bone to cover large (> 2 cm²), full-thickness cartilage defects of the knee. Autograft procedures consist of removing small osteochondral cylinders from low weight-bearing surfaces of the affected joint or another joint in the same patient and inserting them into the affected area to create a mosaic of islands of hyaline cartilage in an area that would otherwise remain without cartilage or fill with only fibrocartilage.^{16,23,24}

Meniscal allograft transplantation is a surgical procedure that involves grafting a donor meniscus into the knee of a recipient. The goal of meniscal transplant surgery is to replace the meniscus cushion before the articular cartilage is damaged. The donor cartilage supports and stabilizes the knee joint, and therefore relieves knee pain.²

Nonsurgical treatment options for damage to articular cartilage include weight reduction, physical therapy, braces and orthotics, intra-articular injection of hyaluronic acid derivatives, and non-steroidal anti-inflammatory agents. A realignment osteotomy (i.e., proximal tibial, distal femoral) is a surgical option to reduce the compressive stress on the damaged articular cartilage in the medial or lateral compartments of the knee. This can be performed instead of, or in addition to, a cartilage replacement procedure listed above. Total joint replacement provides a surgical option but is not advised for younger patients because implants might not withstand the higher levels of physical activity for an extended period of time. A 2003 National Institutes of Health (NIH) Consensus Conference advised that other options should be considered for patients under the age of 55.⁸

The American Academy of Orthopaedic Surgeons (AAOS) believes that for appropriate patients musculoskeletal allografts represent a therapeutic alternative. These tissues should be acquired from facilities that demonstrate compliance, use well-accepted banking methodology, and follow Food and Drug Administration Good Tissue Practices. The AAOS urges all tissue banks to follow rigorous national guidelines and standards and recommends the use of tissue from banks that are accredited by the American Association of Tissue Banks.²

The AAOS has information on meniscal transplant surgery and notes that patient eligibility for this procedure includes missing more than half of a meniscus as a result of previous surgery or injury, or a meniscus tear that cannot be repaired.²

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In summary, there have been several randomized controlled studies as well as non-comparative studies that have noted improvement in repairing articular cartilage that has been damaged by trauma or degenerative processes, using the procedures noted within this policy.

Coding Implications

This clinical policy references Current Procedural Terminology (CPT®). CPT® is a registered trademark of the American Medical Association. All CPT codes and descriptions are copyrighted 2020, American Medical Association. All rights reserved. CPT codes and CPT descriptions are from the current manuals and those included herein are not intended to be all-inclusive and are included for informational purposes only. Codes referenced in this clinical policy are for informational purposes only. Inclusion or exclusion of any codes does not guarantee coverage. Providers should reference the most up-to-date sources of professional coding guidance prior to the submission of claims for reimbursement of covered services.

CPT® Codes	Description
27407	Repair, primary, torn ligament and or capsule of knee; cruciate
27412	Autologous chondrocyte implantation, knee
27415	Osteochondral allograft, knee, open
27416	Osteochondral autograft(s), knee, open (e.g., mosaicplasty) (includes harvesting of autograft[s])
28446	Open osteochondral autograft, talus (includes obtaining graft[s])
29866	Arthroscopy, knee, surgical; osteochondral autograft(s) (e.g. mosaicplasty) (includes harvesting of the autograft[s])
29867	Arthroscopy, knee, surgical; osteochondral allograft (e.g., mosaicplasty)
29868	Arthroscopy, knee, surgical; meniscal transplantation (includes arthrotomy for meniscal insertion), medial or lateral

HCPCS Codes	Description
J7330	Autologous cultured chondrocytes, implant
S2112	Arthroscopy, knee, surgical, for harvesting of cartilage (chondrocyte cells)

Reviews, Revisions, and Approvals	Revision Date	Approval Date
Policy created and approved	10/08	10/08
Osteochondral implants: added requirement for “absent or minimal changes in surrounding articular cartilage.”	04/18	04/18
In I.A., changed criteria to state age 18 through 55, or documented skeletal maturity if <18, instead of age 15 through 55, or documented skeletal maturity if < 18.	06/18	
References reviewed and updated. Specialist reviewed.	03/19	03/19
References reviewed and updated. Specialist reviewed.	02/20	03/20

Reviews, Revisions, and Approvals	Revision Date	Approval Date
Annual review. References reviewed and updated. Replaced “member” with “members/enrollees” in all instances.	01/21	02/21
Annual review. "Changed “review date” in the header to “date of last revision” and “date” in the revision log header to “revision date.” “Experimental/investigational” verbiage replaced in criteria IV. And V. with descriptive language. References reviewed, updated, and reformatted. Reviewed by specialist.	02/22	02/22
Annual review completed. Removed "AND arthroscopic or other repair" from I.E. and added separate criteria I.F. as well as new criteria I.I regarding no previous articular cartilage transfer to treat the defect. Changed "patient" to "member/enrollee" in I.J. Added age and BMI requirements as II.A and B. Updated verbiage in criteria II.D. Added examples to III.D. and BMI criteria to III.F.2. ICD-10 diagnosis code table removed. Background updated with no clinical significance. Dashes removed from ranges. References reviewed and updated. Reviewed by external specialist.	02/23	02/23

References

1. American Academy of Orthopaedic Surgeons. Information statement use of musculoskeletal tissue allografts. <https://aaos.org/globalassets/about/bylaws-library/information-statements/1011-use-of-musculoskeletal-tissue-allografts.pdf>. Published March 1991. Updated June 2011. Accessed January 3, 2023.
2. American Academy of Orthopedic Surgeons. Meniscal transplant surgery. <https://orthoinfo.aaos.org/en/treatment/meniscal-transplant-surgery>. Updated March 2021. Accessed January 3, 2023.
3. Chahal J, Gross AE, Gross C, et al. Outcomes of osteochondral allograft transplantation in the knee. *Arthroscopy*. 2013;29(3):575 to 588. doi:10.1016/j.arthro.2012.12.002
4. Chui K, Jeys L, Snow M. Knee salvage procedures: The indications, techniques and outcomes of large osteochondral allografts. *World J Orthop*. 2015;6(3):340 to 350. Published 2015 Apr 18. doi:10.5312/wjo.v6.i3.340
5. Filardo G, Kon E, Perdisa F, Balboni F, Marcacci M. Autologous osteochondral transplantation for the treatment of knee lesions: results and limitations at two years' follow-up. *Int Orthop*. 2014;38(9):1905 to 1912. doi:10.1007/s00264-014-2322-1
6. Frank RM, Lee S, Levy D, et al. Osteochondral allograft transplantation of the knee: analysis of failures at 5 years. *Am J Sports Med*. 2017;45(4):864 to 874. doi:10.1177/0363546516676072
7. Gracitelli GC, Moraes VY, Franciozi CE, Luzo MV, Belloti JC. Surgical interventions (microfracture, drilling, mosaicplasty, and allograft transplantation) for treating isolated cartilage defects of the knee in adults. *Cochrane Database Syst Rev*. 2016;9(9):CD010675. Published 2016 Sep 3. doi:10.1002/14651858.CD010675.pub2
8. Hand CJ, Lobo JJA, White LM, et al. Osteochondral autograft resurfacing. *Sports Medicine & Arthroscopy Review*. 2003;11(4):245 to 263.

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9. Hangody L, Ráthonyi GK, Duska Z, Vásárhelyi G, Füles P, Módis L. Autologous osteochondral mosaicplasty. Surgical technique. *J Bone Joint Surg Am.* 2004;86-A Suppl 1:65 to 72.
10. Jaiswal PK, Bentley G, Carrington RW, Skinner JA, Briggs TW. The adverse effect of elevated body mass index on outcome after autologous chondrocyte implantation. *J Bone Joint Surg Br.* 2012;94(10):1377 to 1381. doi:10.1302/0301-620X.94B10.29388
11. Lim HC, Bae JH, Song SH, Park YE, Kim SJ. Current treatments of isolated articular cartilage lesions of the knee achieve similar outcomes. *Clin Orthop Relat Res.* 2012;470(8):2261 to 2267. doi:10.1007/s11999-012-2304-9
12. Mandl LA, Martin GM. Overview of surgical therapy of knee and hip osteoarthritis. UpToDate. www.uptodate.com. Updated August 1, 2022. Accessed January 3, 2023.
13. Magnussen RA, Dunn WR, Carey JL, Spindler KP. Treatment of focal articular cartilage defects in the knee: a systematic review. *Clin Orthop Relat Res.* 2008;466(4):952 to 962. doi:10.1007/s11999-007-0097-z
14. Mayo Clinic. Advances in articular cartilage defect management. <http://www.mayoclinic.org/medical-professionals/clinical-updates/orthopedic-surgery/innovations-managing-articular-cartilage-defects-knee>. Published September 5, 2012. Accessed January 3, 2023.
15. Mistry H, Connock M, Pink J, et al. Autologous chondrocyte implantation in the knee: systematic review and economic evaluation. *Health Technol Assess.* 2017;21(6):1 to 294. doi:10.3310/hta21060
16. National Institute for Health and Care Excellence (NICE). Mosaicplasty for symptomatic articular cartilage defects of the knee. Interventional procedures guidance. <https://www.nice.org.uk/guidance/ipg607>. Published March 14, 2018. Accessed January 3, 2023.
17. Ogura T, Mosier BA, Bryant T, Minas T. A 20-year follow-up after first-generation autologous chondrocyte implantation. *Am J Sports Med.* 2017;45(12):2751 to 2761. doi:10.1177/0363546517716631
18. Nuelle CW, Nuelle JA, Cook JL, Stannard JP. Patient factors, donor age, and graft storage duration affect osteochondral allograft outcomes in knees with or without comorbidities. *J Knee Surg.* 2017;30(2):179 to 184. doi:10.1055/s-0036-1584183
19. Parkinson B, Smith N, Asplin L, Thompson P, Spalding T. Factors predicting meniscal allograft transplantation failure. *Orthop J Sports Med.* 2016;4(8):2325967116663185. Published 2016 Aug 19. doi:10.1177/2325967116663185
20. Robert H. Chondral repair of the knee joint using mosaicplasty. *Orthop Traumatol Surg Res.* 2011;97(4):418 to 429. doi:10.1016/j.otsr.2011.04.001
21. Vasiliadis HS, Wasiak J. Autologous chondrocyte implantation for full thickness articular cartilage defects of the knee. *Cochrane Database Syst Rev.* 2010;2010(10):CD003323. Published 2010 Oct 6. doi:10.1002/14651858.CD003323.pub3
22. Wang D, Rebolledo BJ, Dare DM, et al. Osteochondral allograft transplantation of the knee in patients with an elevated body mass index. *Cartilage.* 2019;10(2):214 to 221. doi:10.1177/1947603518754630
23. Health technology assessment: Matrix-induced autologous chondrocyte implantation (MACI) procedure for repair of articular cartilage of the knee. Hayes. www.hayesinc.com. Published August 26, 2020 (annual review August 17, 2022). Accessed January 3, 2023.

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24. Modarresi S, Jude CM. Radiologic evaluation of the chronically painful knee in adults. UpToDate. www.uptodate.com. Updated August 20, 2021. Accessed January 4, 2023.
25. American Academy of Orthopaedic Surgeons. Articular cartilage restoration. <https://orthoinfo.aaos.org/en/treatment/articular-cartilage-restoration/>. Published February 2009. Accessed January 4, 2023.
26. Hunter CW, Deer TR, Jones MR, et al. Consensus Guidelines on Interventional Therapies for Knee Pain (STEP Guidelines) from the American Society of Pain and Neuroscience. *J Pain Res*. 2022;15:2683 to 2745. Published 2022 Sep 8. doi:10.2147/JPR.S370469
27. National Institute for Health and Care Excellence (NICE). Autologous chondrocyte implantation for treating symptomatic articular cartilage defects of the knee. Technology appraisal guidance. <https://www.nice.org.uk/guidance/ta477/chapter/1-Recommendations> Published October 4, 2017. Accessed January 18, 2023.
28. Niemeyer P, Albrecht D, Andereya S, et al. Autologous chondrocyte implantation (ACI) for cartilage defects of the knee: A guideline by the working group "Clinical Tissue Regeneration" of the German Society of Orthopaedics and Trauma (DGOU). *Knee*. 2016;23(3):426 to 435. doi:10.1016/j.knee.2016.02.001
29. Kowalczyk M, Musahl V, Fu FH. Cochrane in CORR®: Surgical Interventions (Microfracture, Drilling, Mosaicplasty, and Allograft Transplantation) for Treating Isolated Cartilage Defects of the Knee in Adults. *Clin Orthop Relat Res*. 2018;476(1):16 to 18. doi:10.1007/s11999-0000000000000016
30. Dekker TJ, Aman ZS, DePhillipo NN, Dickens JF, Anz AW, LaPrade RF. Chondral Lesions of the Knee: An Evidence-Based Approach. *J Bone Joint Surg Am*. 2021;103(7):629 to 645. doi:10.2106/JBJS.20.01161
31. Krych AJ, Saris DBF, Stuart MJ, Hacken B. Cartilage Injury in the Knee: Assessment and Treatment Options. *J Am Acad Orthop Surg*. 2020;28(22):914 to 922. doi:10.5435/JAAOS-D-20-00266

Important Reminder

This clinical policy has been developed by appropriately experienced and licensed health care professionals based on a review and consideration of currently available generally accepted standards of medical practice; peer-reviewed medical literature; government agency/program approval status; evidence-based guidelines and positions of leading national health professional organizations; views of physicians practicing in relevant clinical areas affected by this clinical policy; and other available clinical information. The Health Plan makes no representations and accepts no liability with respect to the content of any external information used or relied upon in developing this clinical policy. This clinical policy is consistent with standards of medical practice current at the time that this clinical policy was approved. "Health Plan" means a health plan that has adopted this clinical policy and that is operated or administered, in whole or in part, by Centene Management Company, LLC, or any of such health plan's affiliates, as applicable.

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This clinical policy is effective as of the date determined by the Health Plan. The date of posting may not be the effective date of this clinical policy. This clinical policy may be subject to applicable legal and regulatory requirements relating to provider notification. If there is a discrepancy between the effective date of this clinical policy and any applicable legal or regulatory requirement, the requirements of law and regulation shall govern. The Health Plan retains the right to change, amend or withdraw this clinical policy, and additional clinical policies may be developed and adopted as needed, at any time.

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Note: For Medicare members/enrollees, to ensure consistency with the Medicare National Coverage Determinations (NCD) and Local Coverage Determinations (LCD), all applicable NCDs, LCDs, and Medicare Coverage Articles should be reviewed prior to applying the criteria set forth in this clinical policy. Refer to the CMS website at <http://www.cms.gov> for additional information.

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