New Procedures for Joint Resurfacing of the Knee

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by Susan Hull, MPH, RHIA, CCS, CCS-P

For 2005, CPT added a number of codes to reflect the continuing evolution of reconstructive knee procedures, especially those that address resurfacing of the articular surface of the joint following loss of normal chondral tissue. The fact that chondral tissue is avascular and has limited regeneration potential on its own precipitated interest in resurfacing the knee with techniques that produce normal, articular hyaline cartilaginous tissue. Earlier techniques such as debridement, microfracture, and abrasion arthroplasty resulted in healing by fibrocartilage only. Hyaline tissue is much smoother than fibrocartilage and provides a much better joint surface.

ACI Implantation

One added code to CPT 2005 is 27412, Autologous chondrocyte implantation (ACI), knee. ACI can be used to treat patients with cartilaginous defects of the femoral condyle. The three-part process involves:

- Obtaining healthy chondrocyte cells from a patient's knee (reported with CPT code 29870)
- Culturing the cells through a process termed Carticel
- Implanting the cultured chondrocytes back into the patient via a surgical procedure (reported with CPT code 27412)

In the first procedure, approximately 200 to 300 mg of healthy cartilage is obtained arthroscopically from a nonweight-bearing area on the patient's knee. This material is shipped to a lab, where the chondrocytes are separated from the remaining soft tissue and cultured for approximately four to five weeks, until five to 10 million healthy chondrocytes have grown. The tissue is then returned for implantation.

During the implantation procedure, the knee is opened, the chondral defect is neatened up, and a small piece of periosteum, the dense membrane composed of fibrous connective tissue that closely wraps all bone, is taken from the patient's tibia and sutured over the defect. The surgeon injects the cultured chondrocytes under the periosteum, where they will grow and mature, effectively obliterating the defect.

The indications for this procedure are quite specific. The patient should have a traumatic (not arthritic) defect, with a single, clinically significant, symptomatic lesion, which affects a load-bearing surface of the medial femoral condyle or the lateral femoral condyle. The lesion must involve only cartilage and measure between one and 10 cm2 in area. The knee should be stable and have intact, fully functional menisci and ligaments, normal alignment, and normal joint space. The patient should have attempted and failed both appropriate nonsurgical treatment (e.g., a minimum of two months of physical therapy) and traditional surgical intervention (i.e., microfracture, drilling, abrasion, osteochondral graft). Finally, the patient should be younger than 60 years old (average age is 35), have a body mass index less than 35, and be capable and willing to follow the rehabilitation protocol.

Illustrations of this procedure, as well as results of the clinical trials conducted on the procedure in the 1990s, can be found at the Genzyme Tissue Repair Web site www.arthroscopy.com/ sp08001.htm.

Osteochondral Allograft

A second resurfacing procedure, code 27415, Osteochondral allograft, knee, open, is significantly different from ACI. Code 29867 has been added to describe this procedure when performed via arthroscope. Codes 27415 and 29867 are mutually exclusive codes.

These procedures, unlike code 27412, in which donor tissue comes from the patient's own body, involve the transplantation of a piece of articular cartilage and attached subchondral bone from a cadaver donor to a damaged region of the articular surface

of a joint. The goal is again to provide viable chondrocytes and supporting bone that will be sufficient to maintain the cartilage matrix and thereby relieve pain and reduce further damage to the articular surface of the joint.

Osteochondral allograft is indicated for the treatment of chondromalacia, osteochondritis dissecans, avascular necrosis, traumatic arthritis, and osteoarthritis. The typical candidate for this procedure is a younger, more active individual for whom other forms of traditional treatment have failed. Individuals who are considered inappropriate for this procedure include those with steroid-induced osteonecrosis, inflammatory or advanced degenerative joint diseases, uncorrected instability or malalignment of the knee, or who have displayed noncompliance with an extended period of nonweight-bearing and physical therapy.

Fresh (as opposed to frozen) cadaveric tissue is typically used. No tissue typing is required, as the cartilaginous tissue is considered minimally immunogenic, but the size of the tissue must match in order to ensure proper grafting. Thus, the donor and the recipient should be about the same physical size. Ideally the tissue should be used within 48 to 72 hours of harvest, although it may remain useful for up to five to seven days.

Arthroscopy Knee Surgery

A third resurfacing procedure—reported with code 29866, Arthroscopy, knee, surgical; osteochondral autograft(s) (e.g., mosaicplasty)—includes harvesting of autograft. In this procedure, small pieces of graft tissue are used instead of one large piece. Like code 27412, this procedure uses autologous tissue (tissue from the patient). Unlike 27412, this repair is accomplished with a single visit to the operating room.

This procedure is indicated for patients under the age of 45 with osteochondritis dissecans, post-traumatic chondral lesions, and biomechanical chondropathy. The defect should not exceed 2 x 2 cm in diameter.

The procedure involves the harvesting of small circular (4 to 8 mm diameter x 15 to 20 mm deep) autogenous grafts from nonweight-bearing regions of the knee and transplanting the grafts into the defect until it is filled. Typically the grafts are harvested from the superior and lateral intercondylar femoral notch. Alternatively, the superomedial portion of the trochlea can be used if additional grafts are required. The harvest tunnels are kept 1 to 2 mm apart to avoid weakening the bone. Donor sites are routinely left open; they fill with cancellous bone and fibrocartilage within four to eight weeks.

In the recipient area of the knee, an impaction type drill is used to drill out the defect to a depth 5 mm deeper than the harvest graft length. The grafts are then packed into the defect in a mosaic type pattern until the defect is filled.

Slides of this procedure can be found at www.indiaorth.org/orth/cases/mosaicplasty/sld001.htm. In addition, extensive discussion of years of experience with the technique, including excellent photographs, can be found at www.maitrise-orthop.com/corpusmaitri/orthopaedic/ mo76_mosaicplasty/index.shtml.

Coverage Issues

Medicare covers all four of the resurfacing procedures in APC 042 Level II Arthroscopy for hospitals, although they are not all arthroscopic procedures. This APC has a status indicator “T,” relative weight of 43.5802, and a payment rate of $2,483.33. For physician reimbursement, the four procedures are considered major procedures, with a 90-day global postoperative period. In addition, codes 27412 and 27415 have a cosurgeon status of “1,” meaning that a cosurgeon will be reimbursed with appropriate documentation of medical necessity for two surgeons. Both surgeons must submit an operative report and each should append modifier 62 to the code. The assistant surgeon status is “2,” meaning that an assistant surgeon will be reimbursed with the appropriate modifier (80, 81, or 82).

All four procedures are reimbursed at 150 percent when performed bilaterally. Code 27412 has a total relative value unit (RVU) of 42.36; 27415, a total RVU of 35.37; 29866, a total RVU of 27.61; and 29867, a total RVU of 32.98.

Although Medicare does cover these procedures, not all commercial carriers do, considering some or all of them to be investigational. An example of a statement of noncoverage for code 27412 (autologous chondrocyte implantation) can be found at www.viahealthplan.com/providers/ patient_care/medical_policies/pdfs/autochondrocyt_tsplt.pdf. Prior to performing the procedure the physician or hospital should carefully review the individual patient’s insurance coverage to ensure appropriate reimbursement.

Susan Hull *(susan.hull@ahima.org) is a coding practice manager at AHIMA.*

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