

# Management of Patellar and Trochlear Chondral Injuries

Dennis E. Kramer, MD, and Mininder S. Kocher, MD, MPH

Patellofemoral chondral injuries are noted in a significant subset of patients with anterior knee pain. These injuries occur as a result of both acute traumatic events and chronic patellofemoral malalignment. Focal grade III and IV chondral defects of the patella or trochlea present a significant management challenge. Anatomic factors, including an increased quadriceps angle, tight lateral retinaculum and weakened vastus medialis oblique muscle produce maltracking, which results in overload of the lateral patellofemoral joint. Patella alta, trochlear dysplasia and hyperlaxity can result in patellofemoral instability and subluxation. These factors play a role in the development of patellofemoral chondral injuries and must be addressed. A trial of 6 months of conservative management is indicated for most patients. Surgical options often include a realignment procedure in addition to treatment of the chondral injury. Traditional cartilage resurfacing techniques including debridement, abrasion arthroplasty and microfracture have been used but are limited by the inferior wear characteristics of the fibrocartilage tissue which forms over the defect. Newer cartilage repair techniques include autologous chondrocyte implantation and osteochondral autograft transfer (mosaicplasty) attempt to repair the chondral defect with hyaline cartilage. Osteochondral allograft transfer is an option for large chondral defects in which the surface contour of the patella or trochlea has been lost. Patellofemoral arthroplasty may be superior to total knee arthroplasty in patients with isolated patellofemoral joint collapse. Newer techniques such as arthroscopic autologous chondrocyte implantation using biologic scaffolds in place of the periosteal cover are currently being investigated.

Oper Tech Orthop 17:234-243 © 2007 Elsevier Inc. All rights reserved.

**KEYWORDS** patellofemoral, cartilage, chondromalacia, trochlea, chondral defects, autologous chondrocyte implantation

Patellar and trochlear chondral injuries represent a subset of the broad spectrum of patients with anterior knee pain. In these patients, the chondral abnormality of the patellofemoral joint is thought to be the primary pain generator. The term patellofemoral chondromalacia encompasses a spectrum of chondral injuries ranging from diffuse softening and fissuring to well-defined high-grade focal defects. This article will specifically focus on the treatment options for International Cartilage Repair Society (ICRS) grade 3 or 4 chondral defects of the patellofemoral joint (Table 1).

Focal patellofemoral chondral defects are not uncommon. Aroen and coworkers<sup>1</sup> reported an 11% incidence of

ICRS grade 3 or 4 chondral injuries in 993 consecutive knee arthroscopy patients. These lesions occurred most commonly in the medial femoral condyle (43%), patella (23%), and trochlea (8%).<sup>1</sup> ICRS grade 3 chondral defects of the patella were the most common cartilage lesion found in Curl and coworkers<sup>2</sup> series of 31,516 consecutive knee arthroscopy patients. In another series, Hjelle and coworkers<sup>3</sup> reported a 19% incidence of focal chondral defects with a mean area of 2.1 cm<sup>2</sup>. Sixty percent of these were ICRS grade 3 or 4, and they were often located in the patella (11%) or trochlea (6%).

Anatomic factors often produce patellofemoral malalignment and maltracking in these patients. An increased quadriceps or Q angle, weakened vastus medialis oblique muscle, and contracted lateral retinaculum produces lateral patellar tilt with increased pressure across the lateral patellofemoral joint.<sup>4</sup> Chronic lateral patellar overload can result in chondral injury as studies have reported the greatest prevalence of patellofemoral chondral wear is observed on the lateral facet

---

Division of Sports Medicine, Department of Orthopaedic Surgery, Children's Hospital Boston, Harvard Medical School, Boston, MA.

Address reprint requests to Dennis E. Kramer, MD, Division of Sports Medicine, Department of Orthopaedic Surgery, Children's Hospital Boston, Harvard Medical School, 319 Longwood Ave, Boston, MA 02115.  
E-mail: dennis.kramer@childrens.harvard.edu



**Table 1** ICRS Grading of Chondral Defects

ICRS Grade	Description
1	Superficial lesions, soft indentation and/or superficial fissures
2	Lesions extending down to <50% of cartilage depth
3	Cartilage defects extending down to >50% of cartilage depth, including cartilage blisters
4	Osteochondral lesions extending just through the subchondral boneplate or deeper defects down into trabecular bone

of the patella.<sup>5,6</sup> In addition, radiographic malalignment has been noted in up to 85% of patients requiring patellofemoral arthroplasty.<sup>7</sup> Other anatomic factors such as patella alta, trochlear dysplasia and hyperlaxity may result in patellofemoral instability and subluxations. Chondral injuries may occur during subluxation episodes.

Acute patellar dislocation is another major source of patellofemoral chondral injuries. Stanitski and coworkers<sup>8</sup> arthroscopically evaluated 48 consecutive pediatric patients after acute patellar dislocation and noted 32 osteochondral injuries and 28 loose bodies, most of which were not found on preoperative radiographs. These injuries can occur in skeletally mature patients as well. Nomura and coworkers<sup>9</sup> arthroscopically evaluated 39 patients of mean age 18 (range, 12–38) after acute patellar dislocation. In total, 37 of 39 knees (95%) had a chondral injury which included 28 osteochondral fractures (most commonly at the medial patellar facet) with a mean size of 16 mm × 12 mm.

Osteochondritis dissecans (OCD) represents another source of patellofemoral chondral injuries.<sup>10</sup> OCD lesions of the patellofemoral joint are rare but have been reported,<sup>11</sup> including a recent case report of OCD involving the entire trochlea.<sup>12</sup>

## Clinical Evaluation

Patients with patellofemoral chondral defects often present with anterior knee pain, which is worse when the patient is climbing stairs or performing deep knee bends. Because the articular cartilage is aneural, pain may be secondary to capsular irritation or subchondral bone strain.<sup>13</sup> Activity-related swelling is common. Mechanical symptoms such as catching, clicking, or locking suggest the presence of a large unstable fragment or loose body. Physical examination should include a careful evaluation of patellar tracking and focus on identifying anatomic factors related to patellofemoral malalignment or altered patellofemoral biomechanics. These include generalized hyperlaxity, patella alta, tilt, or subluxation, contracted lateral retinaculum, weakened vastus medialis oblique muscle, and increased Q angle. The presence of a joint effusion suggests prolonged chondral irritation.

Lateral knee and sunrise patellar (Merchant) radiographs are helpful to identify patella alta, trochlear dysplasia, patellar tilt and patellofemoral joint space narrowing. In cases

where the clinical examination is difficult, a computed tomography (CT) scan performed with the knee extended and the quadriceps both contracted and relaxed can identify patellar subluxation.<sup>13</sup> Magnetic resonance imaging (MRI) protocols using intravenous gadolinium, a 1.5-T magnet for high-resolution scanning and appropriate orthogonal tilting have improved MRI sensitivity and specificity to 90–95% for localizing and characterizing patellofemoral chondral defects.<sup>4,13–16</sup> However, the use of MRI may cause one to underestimate the true defect size because partially attached chondral fragments have an irregular shape that may not correspond to the plane of the image.<sup>14</sup> Arthroscopy remains the gold standard for accurate identification and characterization of patellofemoral chondral abnormalities.

## Management

Patients with patellofemoral chondral defects are initially treated nonoperatively with a comprehensive patellofemoral rehabilitation program targeted at specific anatomic findings associated with altered patellofemoral biomechanics. Patellar braces or McConnell taping is used to centralize the patella in cases of lateral patellar maltracking. Foot pronation is treated with arch support orthotics. Dietary supplementation with glucosamine and chondroitin sulfate and viscosupplementation may also be beneficial. Patients with patellofemoral chondral defects who fail to respond to 6 months of nonoperative management are generally considered candidates for operative intervention.

Surgical options for patellofemoral chondral injuries include realignment procedures alone or in combination with a cartilage resurfacing or repair technique. Realignment is indicated for all chondral defects in the setting of significant malalignment. The optimal realignment procedure is unknown, although factors such as patient anatomy and location of the defect should be considered. A lateral retinacular release is often used for cases of patellar tilt combined with chondromalacia of the lateral facet of the patella. Medial retinacular plication may be added for significant laxity of the medial retinaculum but can increase medial patellofemoral contact forces and should be avoided in cases of chondral injury to the medial patella or trochlea. Distal realignment via tibial tubercle osteotomy (Fulkerson anteromedialization or Elmslie-Trillat medialization) is generally reserved for cases of lateral patellar subluxation associated with an abnormal Q angle.

Realignment procedures alone (without additional cartilage techniques) may be sufficient for certain patients. In particular, the Fulkerson anteromedialization tibial tubercle osteotomy transfers load from the lateral and inferior poles of the patella by anteromedialization of the tibial tubercle.<sup>17,18</sup> Pidioriano and coworkers<sup>19</sup> reported 87% good-to-excellent subjective results in 23 patients with chondral defects at the inferior pole or lateral facet of the patella treated with Fulkerson tibial tubercle osteotomy alone at a mean follow-up of 47 months.

Patients with chondral defects in the medial or proximal portion of the patella or on the trochlea generally require a



Download English Version:

<https://daneshyari.com/en/article/4079178>

Download Persian Version:

<https://daneshyari.com/article/4079178>

[Daneshyari.com](https://daneshyari.com)