

Editorial Commentary: Early Operative Management of “Stable” Osteochondritis Dissecans Lesions Confers Greater Value in Skeletally Immature Patients



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Abstract: The ideal treatment of juvenile osteochondritis dissecans (OCD) varies according to the chronicity of symptoms and radiographic classification. Traditionally, “stable” OCD lesions of the knee are managed conservatively with limited weight bearing and nonoperative care. However, this can require up to 6 to 12 months of observation, and success rates are estimated at only 59%. By contrast, recent data suggest that early subchondral drilling of OCD lesions may more consistently facilitate new vascular channels and remodeling of the compromised osteochondral unit. When considering overarching health care costs and probabilistic modeling, contemporary treatment paradigms may preferentially suggest early surgical treatment of OCD lesions for greater cost-effectiveness and an optimized timeline for a return to full activity. Additionally, surgery may be prioritized for larger lesions, atypical locations, closing physes, and/or the presence of mechanical symptoms.

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Juvenile osteochondritis dissecans (OCD) of the knee remains a common source of pain and disability in pediatric and adolescent patients. Although the exact pathogenesis is not known, it is thought to stem from a transient disturbance in perfusion during skeletal growth.¹ With the emergence of novel biological solutions, a burgeoning focus on pediatric sports medicine, and innovative new research on OCD lesions, classical treatment paradigms are continually being re-evaluated for the modern era.² Galvanized by the work of the Research in Osteochondritis of the Knee (ROCK) study

group, our improved recognition and classification of OCD lesions have allowed us to identify unstable—or potentially unstable—lesions, for earlier treatment.^{3,4} Yet, although we have refined a range of options for arthroscopic-assisted or open treatment of unstable lesions and/or secondary cartilage restoration with reproducible clinical outcomes,^{2,5-7} there is no consensus for the management of persistently symptomatic, stable OCD lesions.

In their article entitled “Cost-Effectiveness Analysis of Nonoperative Management Versus Early Drilling for Stable Osteochondritis Dissecans Lesions of the Knee in Skeletally Immature Patients,” LeBrun, DeFrancesco, Fabricant, and Lawrence⁸ seek to challenge traditional dogma suggesting that continued nonsurgical treatment is the preferred strategy for stable OCD lesions. To this end, they designed a decision analysis to assess the cost-effectiveness of a trial of early nonoperative management (i.e., within 6 weeks of clinical presentation) versus early subchondral drilling of stable OCD lesions of the medial femoral condyle in skeletally immature patients. Terminal nodes, which are potential treatment outcomes, were defined alongside transition probabilities, or the likelihood of these endpoints that are typically based on published rates in the existing literature or expert opinion. For the current study, “success” was defined as not requiring any further surgical procedure,

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including both “normal” knees (experiencing a full return to preinjury activity) or “intermediate” knees (improved symptomatology with lower functional status). Similarly, patient utilities, or the strength of an individual’s preferences for specific health-related outcomes, were extracted and expressed in quality-adjusted life-years. On the basis of established willingness-to-pay thresholds, the primary outcome of this study was the incremental cost-effectiveness ratio, which provides a comparative assessment of cost for 2 interventions. Surprisingly, early drilling was found to be more effective and have a decreased overall cost, with an incremental cost-effectiveness ratio of \$5,839. Furthermore, 1- and 2-way sensitivity analyses were performed to vary the inputs of certain factors and account for the potential sampling bias in actual health care costs and/or publicly accessible outcomes data. Despite these modifications, sensitivity analysis maintained the dominance of early drilling as long as the comprehensive cost of drilling amounted to less than roughly \$20,000 and the probability of success exceeded 62%.

In the current health care climate in which subspecialty services are often rationed, economic analyses have increasingly been deployed in the orthopaedic literature to establish value of potentially competing interventions for a given condition. At a fundamental level, “value” in health care is defined as an equation of quality divided by cost,⁹ and higher upfront surgical costs must be justified for management of a stable OCD lesion of the medial femoral condyle. However, the success of nonoperative treatment may have been historically overestimated, given that LeBrun et al.⁸ report that these stable lesions successfully healed with early nonoperative care in fewer than 2 of 3 skeletally immature patients (59%). Conversely, treatment was classified as successful in 93% of patients who underwent drilling, with 92% of these patients reporting normal function and resolution of symptoms, as well as only a 7% rate of secondary failure. The authors also highlight the second-order effects of conservative treatment beyond direct health care costs, including indirect societal costs of time lost to injury and opportunity costs for families seeking medical care. This more holistic approach may better account for external factors that influence health care decision making, particularly when considering the prolonged 3-phase treatment protocol described by Kocher et al.⁶ that may require up to 6 to 12 months prior to a return to athletic function.

Whereas the juvenile OCD lesions have classically been managed with extensive observation and serial imaging, some authors have advocated earlier drilling to decompress these lesions, facilitate vascular channels, and allow remodeling of the compromised osteochondral unit.^{10,11} Several techniques have been

described, including retroarticular, transarticular, and notch drilling based on careful preoperative planning.¹² Regardless of technique, the decision for early surgery should be guided by lesion characteristics (i.e., size, depth, and location) and patient-based factors (i.e., age and activity level).⁷ In my practice, larger lesions, atypical locations, closing physes, and the presence of mechanical symptoms may be more appropriately considered for retroarticular drilling with multiple fine K-wires under fluoroscopic guidance and arthroscopic visualization to preserve the native articular cartilage. Limited weight bearing for a period of 4 to 6 weeks is also prudent to prevent subsidence or conversion to an unstable pattern while allowing early subchondral remodeling. Additionally, although compelling unanimous evidence may not yet exist, I recommend strong consideration of a biological adjunct such as bone marrow aspirate in the presence of atypical features.¹⁰

The classical treatment paradigm of juvenile OCD lesions of the knee may not yet be inverted, and we are still not ready to move on from initial nonoperative care. However, in select cases, early surgical treatment with retrograde drilling may be reframed as “conservative” treatment after introducing certain economic considerations. Our efforts to innovate and expedite the return to function among our young, active patients will increasingly be viewed through this lens of value-based health care in the 21st century, and it remains important for us, as orthopaedic surgeons, to drive this discussion forward in a meaningful and thoughtful way. Congratulations to LeBrun et al.⁸ on an excellent study and for laying the foundation for future substantive discussions.

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