

Editorial Commentary: Trends in Cartilage Surgery—Who Is Steering the Ship?



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Abstract: With myriad cartilage surgery techniques available, including marrow stimulation, autologous osteochondral transfer, osteochondral allograft transplantation, and autologous chondrocyte implantation, treatment of knee articular cartilage injuries has become increasingly complex. Recent evidence suggests that advanced cartilage restoration procedures may provide improved outcomes and durability when compared with marrow stimulation techniques. When investigating orthopaedic surgeons early in practice, it appears that utilization of marrow stimulation techniques has decreased, an encouraging trend that is in line with recent evidence. However, it is important to consider how other factors not investigated, including insurance approval and payor reimbursement, may influence these trends moving forward.

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The complex world of cartilage surgery remains full of uncertainty, with each additional study seemingly providing more questions than answers. Over the past 20 years, myriad cartilage procedures have been introduced or reinvented, including marrow stimulation techniques (MSTs), autologous osteochondral transfer (AOT), osteochondral allograft transplantation (OCA), and autologous chondrocyte implantation (ACI), just to name a few. Each procedure has shown promising early outcomes when applied in the appropriate setting prior to succumbing to long-term follow-up with deteriorating outcomes, high rates of morbidity, complications, or reoperation. In the article “Cartilage Restoration Surgery: Incidence Rates, Complications, and Trends as Reported by the American Board of Orthopaedic Surgery Part II Candidates,” Frank, Cotter, Hannon, Harrast, and Cole¹ explore the utilization of several cartilage surgery techniques over the past 13 years by orthopaedic surgeons who are presumably early in their clinical practice. The authors

should be commended for their work, which helps us understand where we have been to give us a better sense of where we may be going with respect to cartilage surgery.

The authors demonstrate several interesting findings that expand on work that our group previously published using American Board of Orthopaedic Surgery (ABOS) data, which identified a decrease in the overall number of cartilage surgery procedures performed by ABOS Part II candidates in more recent years, driven primarily by declining chondroplasty and microfracture utilization.² Frank et al.¹ expand on our previous work by individually categorizing cartilage procedures, including arthroscopic and open AOT and OCA, ACI, and MSTs while excluding chondroplasty, which has become increasingly difficult to accurately analyze owing to recent billing and coding changes.³ The authors similarly report an overall decrease in the number of cartilage procedures performed, driven primarily by decreased utilization of MST, whereas the incidence of open AOT and OCA procedures increased. Although still the most frequently performed cartilage surgery procedure, decreased utilization of MST in recent years may be influenced by recent literature suggesting deteriorating long-term results following MST compared with more advanced cartilage procedures.⁴⁻⁶ Additionally, there is a growing body of literature to suggest that ACI outcomes may be negatively influenced by prior surgery with MST, insinuating that MST may indeed burn a bridge if advanced surface-based cartilage procedures are being

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considered.⁷⁻¹⁰ In our opinion, these are encouraging trends, because AOT and OCA, despite being more invasive, offer a better opportunity to restore a hyaline or hyaline-like cartilage matrix that theoretically better replicates the anatomy and biomechanical characteristics of the native knee joint. Given the unique practice situation of the surgeon cohort being investigated, these trends likely serve as a surrogate measure for evolving practice patterns at institutions with residency and fellowship training programs.

In recent years, decision making in cartilage surgery has become arguably more complex than any other area of orthopaedic surgery. Cartilage surgery options for symptomatic patients requires careful analysis of the pertinent lesion characteristics, including the size and location of the cartilage lesion, the degree of subchondral bony involvement, and any prior treatment(s), as well as a careful understanding of the patient's goals and expectations. Decision making is not significantly aided by the largely equivocal results reported in well-designed randomized controlled trials,¹¹⁻¹³ further fueling the orthopaedic training mantra that when multiple procedures exist for a given entity, it is because no singular procedure provides consistently great outcomes. Still, it is important for readers to understand that other extraneous factors not reported within the ABOS dataset, namely insurance and payor status, may ultimately dominate the decision-making process. In our experience, it has become more and more common for third-party payors to decline reimbursement for any advanced cartilage restoration procedures, including AOT, OCA, and ACI, unless the patient has failed prior MST. This potentially payor-influenced decision is in conflict with several previously mentioned studies demonstrating inferior long-term outcomes when comparing MST with other cartilage surgery techniques⁴⁻⁶ and often leaves the patient and treating physician in a difficult situation. The payor influence is not captured by the ABOS dataset, and this makes us question how this may influence decision making for ABOS Part II candidates.

In conclusion, the investigation by Frank et al.¹ of recent ABOS Part II candidates demonstrates interesting trends in cartilage surgery. In what has become a fascinatingly complex area within orthopaedics, we interpret their data as an encouraging sign that evidence-based practice is being employed by recent trainees and training institutions teaching cartilage surgery techniques. However, it is important to consider that factors beyond the characteristics of the cartilage lesion and patient in question, including approval and reimbursement by third-party payors, may influence decision making and are not considered within the ABOS dataset and many other datasets

frequently used for big data orthopaedic research. Moving forward, it will be increasingly important for physicians performing cartilage surgery to thoughtfully and accurately report the outcomes of these procedures to allow physicians to appropriately treat a heterogeneous collection of cartilage lesions within a diverse patient population without undue external pressures.

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