Editorial Commentary: Autologous Chondrocyte Implantation Versus Microfracture

Abstract: Autologous chondrocyte implantation (ACI) shows greater durability, lower failure rates, and is effective for larger lesions, compared with microfracture. In addition, membrane-ACI (M-ACI) is technically simpler with fewer complications of cartilage hypertrophy than first-generation ACI using periosteum. However, second-generation, M-ACI is not yet approved for general use in the United States.

See related article on page 732

Last month, knee and cartilage expert Jack Bert, M.D., opined, and your editor-in-chief reiterated, that it may be time to abandon microfracture, which is nonanatomic due to destruction, in part, of the subchondral plate. In this issue, “Treatment of articular cartilage lesions of the knee by microfracture or autologous chondrocyte implantation: A Systematic Review,” Oussedik, Tsitskaris, and Parker conclude that, although microfracture has efficacy for smaller lesions, lack of durability and eventual failure is a concern, supporting Dr. Bert’s opinion. In contrast, autologous chondrocyte implantation (ACI) shows greater durability, lower failure rates, and is effective for larger lesions. In addition, membrane-ACI (M-ACI) or collagen membrane-ACI is technically simpler, with fewer complications of cartilage hypertrophy than first-generation ACI using periosteum; furthermore, M-ACI is shown to be superior to microfracture for larger lesions. However, second-generation, M-ACI is not yet approved for general use in the United States. Some statisticians describe durability as “survivorship,” which is critically important over the long-term. In last month’s issue, abrasion arthroplasty was reported to have a survivorship rate of approximately 66% at 20 years of follow-up. In this review by Oussedik et al., follow-up was only 5 years, and ultimately, accurate analysis of survivorship could not be determined due to “the absence of a clear, consistent, definition of failure across the literature.” From the standpoint of biologics, in ACI, the host provides the chondrocytes, which are expanded ex vivo, while the periosteum or matrix represents a scaffold. Questions arise: from whence come the growth factors? Must the subchondral plate be more conscientiously protected? Is ACI, in fact, an “enhanced” abrasion arthroplasty? And, if not, should ACI surgeons more aggressively abrade, but not violate, the subchondral plate? And finally, for American surgeons, at the risk of sounding like a Hollywood film promotion, when will we gain access to the matrix?

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References
2. Lubowitz JH. Editorial commentary. Arthroscopic microfracture may not be superior to arthroscopic debridement, but abrasion arthroplasty results are good, although, and admittedly, not great. Arthroscopy 2015;31:506.