Emerging Biologics in Orthopedics

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The discipline of orthopedic medicine and surgery has dramatically advanced over the last several decades. Improved understanding of biomechanics, tissue healing, and the pathogenesis of musculoskeletal diseases has allowed us to make significant progress in the diagnosis, treatment, and rehabilitation of our patients. Despite these advancements, there is still much to be learned, especially in the field of orthobiologics and regenerative medicine. As our understanding of existing technologies, such as bone marrow aspirate, platelet-rich plasma, and adult stem cells, continues to evolve, even newer biologic treatment options are being developed. This issue of *The American Journal of Orthopedics* focuses on emerging biologics across the spectrum of orthopedic care.

In this issue, on pages 202-205, Mansour and Conway describe a new prone retrograde technique for obtaining bone graft using the Reamer/Irrigator/Aspirator (RIA) system (Synthes, West Chester, Pennsylvania). While iliac crest bone graft has been the gold standard for many years, use of the RIA system to obtain bone graft has been studied and has been shown to have decreased morbidity when compared with iliac crest harvest.[1] Additionally, intramedullary bone graft from the femur appears to be just as concentrated with biologically active bone marrow as iliac crest harvest.[2] This new technique allows increased efficiency, especially for surgeries that are done in the prone position.

Melamed and colleagues examine a new biologic to augment repair of rotator cuff tears (see pages 212-216). Chitosan, a linear polysaccharide, has been shown to help with soft-tissue healing. Although in the past its use has been limited secondary to problems with the compound precipitating at physiologic pH, new formulations mitigate that problem. In the authors' animal model of acute supraspinatus repair, the use of chitosan gel increased the number of fibroblasts and the amount of repair tissue when compared with untreated controls. Additionally, the experimental group showed a decreased inflammatory response when compared with the control group. This is very exciting research as the biologic enhancement of rotator cuff tendon healing could potentially help decrease the rate of rotator cuff repair failure.

Lenehan and colleagues analyze the long-term outcomes of anterior cruciate ligament reconstruction in a cohort of patients studied over an 8-year period (see pages 217-222). During this period, 99 patients were reconstructed with allograft tissue and 24 with autograft. Their analysis, like other recently published work, shows that the rates of revision were much higher for patients under 25 years of age who were reconstructed using allograft tissue. The rate of revision for NCAA (National Collegiate Athletic Association) Division I athletes reconstructed with allograft tissue was found to be 62%, while the revision rate for all patients under the age of 25 years who received an allograft was found to be 20.5%. Clearly, there is still a great deal to learn about the biology of graft incorporation and healing, especially as it relates to allograft tissue.

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These 3 articles exemplify the breadth of orthopedic biologics and their potential role in orthopedic surgery. Through efforts of investigators highlighted in this journal and in others, biologics will become better understood and more widely used when appropriate, leading to improved patient outcomes.

References

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