

Editorial

“In My Experience...Nutrition and Orthopaedic Surgery”

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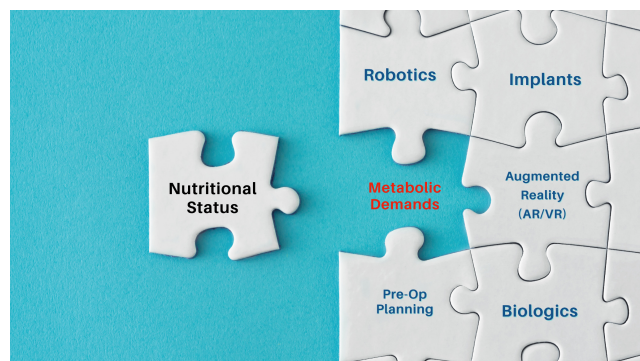
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The author discusses his experience with nutritional supplementation in orthopaedic surgery.

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"In My Experience...Nutrition for Healing Orthopaedic Procedures

As an orthopedic surgeon specializing in sports medicine, my practice encompasses a wide range of procedures, with approximately 50% focusing on knee surgeries including multi-ligament injuries, and the other 50% complex shoulder, including arthroplasty, revision reconstructive cases, and failed rotator cuff repairs. Over the years, I have

encountered numerous challenging revision cases where, despite our best surgical efforts and state-of-the-art implants, patients struggled with healing. Ultimately, addressing the mechanical issues alone is not enough. We need to address the whole patient, including their nutritional status, to truly optimize recovery.

In orthopedic surgery, we have reached a plateau with hardware technology. While we can repair structures with precision, it doesn't always guarantee successful healing. We often attribute complications to "bad protoplasm," but what does that mean? My background in skeletal metabolism encouraged me to explore this issue further, focusing particularly on the role of nutrition in the healing process.

Traditionally, we have been trained to repair what is broken, torn, or misaligned—or to replace what cannot be salvaged. This approach is reminiscent of the Nicholas Andry tree symbol of the American Board of Orthopaedic Surgery, where we fix the branches but often overlook nourishing the roots. Although we have become skilled at the technical aspects of surgery, healing requires more than just good hardware.

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There remains a gap, which has led to a growing interest and implementation of biologics, including blood-derived products like PRP or Bone Marrow Aspirate Concentrate (BMAC) as well as collagen scaffold patches. These augmentations are an important step in the right direction in enhancing the biological environment by increasing growth factors, cytokines, or providing structural scaffolds for tissue integration. However, they still fail to address the body's metabolic needs and specific building blocks required for effective tissue healing.

I was inspired to elevate my understanding when I treated a former NASA nutritionist for his revision ACL reconstruction which also required an osteotomy. Despite the successful surgery, he had the expected muscle atrophy that we see after an extended period of non-weight bearing. He asked me why we don't use supplements as a countermeasure to muscle loss—a common issue for astronauts in microgravity environments. His question made me realize that, as orthopedic surgeons, we were missing a critical aspect of patient care: nutrition. This realization led me to take a sabbatical to better understand the advances in nutritional sciences, gaining insights from fields such as burn care and diabetic wound management, where nutritional support is crucial for recovery. I also explored the potential benefits of targeted nutritional supplementation for orthopaedic patients.

We assembled a team of experts, the Xcelerated Recovery Science Organization, drawing on the expertise of aerospace and wound nutritionists, as well as burn specialists, to explore how we could optimize the biological environment for musculoskeletal healing. The principles used to enhance healing in burn and chronic wound patients—such as increased angiogenesis and collagen synthesis—are also applicable to orthopedic patients, particularly those undergoing reconstructive surgeries. By utilizing specific amino acids that promote muscle protein pathways, as used to counter muscle wasting in spaceflight and sarcopenia, we can mitigate muscle loss and expedite functional recovery.

Optimizing the nutritional status of our patients can significantly improve their outcomes, as detailed in the recently published 2024 JAAOS article, "The Role of Amino Acid Supplementation in Orthopaedic Surgery".

Orthopaedic surgery induces a hypermetabolic-catabolic event that affects all patients. The body's stress response to surgery increases the demand for nutrients, particularly amino acids, which are crucial for the healing process. Without adequate nutritional support, the body resorts to breaking down muscle tissue to meet these demands, leading to significant muscle loss and impaired recovery. The first two weeks after surgery appear to be the most catabolic. Fortunately, this is a modifiable factor that we can positively impact. Research supports increased muscle tissue resilience by starting supplementation one week prior to surgery. Based on multiple clinical studies supporting these findings, we developed a practical perioperative nutritional supplementation program. Patients begin the regimen one week before surgery and continue it for two weeks postoperatively.

We have now streamlined the process, allowing surgeons to recommend this protocol during preoperative consultations. Patients are then directly contacted with resources and shipped the supplements, without adding any extra burden to our busy practices. This approach addresses common patient concerns about the recovery process and how they can expedite it. Providing straightforward, patient-centric resources has successfully engaged patients in their care during the perioperative period. It's crucial that this process remains simple and practical, fitting seamlessly into our existing workflow without adding additional work or time constraints.

This becomes especially important with our focus on value based care and cost-containment, where optimizing nutritional status not only improves outcomes but also reduces complications, leading to considerable cost saving.

As we move forward, ensuring a successful outcome for our patients will require a holistic approach. It involves not only our technical skills as surgeons but also about engaging our patients in their care. Relying solely on surgical techniques and advanced implants is no longer sufficient. A comprehensive strategy is needed, which includes optimizing the biological environment and providing targeted nutritional support. By doing so, we can better meet the high metabolic demands of healing and recovery, ultimately improving patient outcomes. This strategy also empowers patients to take an active role in their recovery journey. Optimizing our patients' nutritional status is a low-hanging fruit that we should not overlook.

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