

Enhanced recovery through nutrition: A paradigm shift in postoperative care and recovery.

Peter Davis*

Department of Nutrition and Dietetics, University of Tokyo, Japan

Introduction

In recent years, the concept of enhanced recovery after surgery (ERAS) has revolutionized postoperative care, emphasizing the importance of improving patient outcomes through a multidisciplinary approach. While traditional recovery strategies have focused primarily on pain management and physical rehabilitation, emerging evidence has highlighted the significant role nutrition plays in optimizing recovery and reducing complications. Nutritional interventions, particularly in the perioperative period, have been shown to support immune function, enhance wound healing, improve muscle function, and reduce the risk of infections. This paradigm shift in postoperative care emphasizes that nutritional optimization is a key component in accelerating recovery and improving long-term outcomes after surgery [1].

Nutrition is central to the body's ability to heal, regenerate, and combat infection, particularly following surgical procedures that place significant stress on the body. During surgery and the immediate recovery period, patients undergo physiological changes such as increased metabolic rate, reduced oral intake, and heightened inflammation, all of which can impede healing if not properly managed. Nutritional support is critical in addressing these challenges by providing essential nutrients that support cellular repair, immune function, and tissue regeneration. By improving nutritional status before, during, and after surgery, healthcare providers can help minimize the risk of postoperative complications and enhance the recovery process [2].

One of the most important aspects of postoperative nutritional care is protein supplementation. Protein plays a pivotal role in muscle preservation, immune function, and wound healing, all of which are essential for recovery after surgery. Surgical stress can lead to muscle catabolism, where the body breaks down muscle tissue to meet energy demands, resulting in muscle weakness and delayed recovery. Adequate protein intake, particularly in the form of high-quality proteins, helps prevent muscle loss and supports the body's ability to rebuild tissues. Branched-chain amino acids (BCAAs), which are found in proteins like those from eggs, lean meats, and dairy products, have been shown to stimulate muscle protein synthesis and improve recovery after surgery. Studies have demonstrated that patients who receive protein supplementation in the perioperative period have faster recovery times, reduced muscle wasting, and better functional outcomes [3].

In addition to protein, carbohydrates are another key component of postoperative nutrition. During the perioperative period, the body undergoes metabolic changes that increase energy demands. Adequate carbohydrate intake ensures that the body has sufficient energy to fuel recovery processes and combat fatigue. It has been shown that carbohydrate loading prior to surgery, where patients consume a high-carbohydrate drink a few hours before surgery, can reduce insulin resistance, enhance postoperative recovery, and reduce muscle loss. Postoperatively, maintaining adequate carbohydrate intake continues to support energy levels and helps manage the catabolic state induced by surgery [4].

Fats also play a crucial role in supporting recovery after surgery. Healthy fats, particularly omega-3 fatty acids, found in foods like fatty fish, flaxseeds, and walnuts, have anti-inflammatory properties that can aid in reducing postoperative inflammation and improving immune function. Omega-3 fatty acids have been shown to improve wound healing, reduce the risk of infection, and enhance muscle recovery. By including these healthy fats in the postoperative diet, patients can experience better overall healing outcomes and a reduction in complications such as wound infections and delayed recovery [5].

Micronutrients also play a significant role in supporting recovery after surgery. Vitamins and minerals such as vitamin C, vitamin D, zinc, and iron are essential for immune function, collagen synthesis, and tissue repair. Vitamin C is especially important for the production of collagen, a protein that provides structural support to tissues and wounds. It also acts as an antioxidant, helping to reduce oxidative stress, which is elevated after surgery. Zinc supports immune function and cell division, which is necessary for wound healing, while vitamin D plays a crucial role in bone healing and immune response. Inadequate intake of these micronutrients can impair recovery, leading to prolonged healing times and increased susceptibility to infections [6].

Preoperative nutrition is another critical component of the enhanced recovery strategy. Studies have shown that malnourished patients who are nutritionally optimized before surgery have better recovery outcomes, fewer complications, and reduced hospital stays. Nutritional screening and intervention before surgery are vital to ensure that patients are not at risk of malnutrition, which can exacerbate the stress of surgery and impair healing. Nutritional support in the form of

*Correspondence to: Peter Davis, Department of Nutrition and Dietetics, University of Tokyo, Japan. E-mail: davispeter@qq.jp

Received: 01-Feb-2025, Manuscript No. AAJFSN-25-162271; Editor assigned: 03-Feb-2025, PreQC No. AAJFSN-25-162271(PQ); Reviewed: 12-Feb-2025, QC No. AAJFSN-25-162271; Revised: 20-Feb-2025, Manuscript No. AAJFSN-25-162271(R); Published: 28-Feb-2025, DOI: [10.35841/aaifsn-8.1.285](https://doi.org/10.35841/aaifsn-8.1.285)

oral supplements, enteral feeding, or parenteral nutrition may be necessary for patients who are identified as malnourished or at risk for malnutrition. Early intervention helps to improve protein stores, enhance immune function, and promote better overall recovery after surgery [7].

The concept of early enteral nutrition (EEN) has also gained traction in postoperative care. Instead of waiting for patients to resume normal eating patterns, EEN involves providing nutrients through the gastrointestinal tract as soon as possible after surgery, even if patients are unable to eat by mouth. Research has shown that early enteral nutrition reduces the risk of complications such as infections, promotes faster recovery of gastrointestinal function, and improves overall patient outcomes. By maintaining gut integrity and providing essential nutrients, EEN supports the immune system, reduces the catabolic effects of surgery, and accelerates the return to normal function [8].

Hydration is another often overlooked but vital aspect of postoperative care. Dehydration can lead to impaired wound healing, constipation, and increased risk of urinary tract infections. Ensuring that patients are adequately hydrated throughout their recovery is essential for maintaining cellular function, supporting metabolic processes, and promoting faster healing. In some cases, intravenous fluids may be required if oral intake is insufficient, but the emphasis should always be on maintaining optimal hydration levels during the postoperative period [9].

As the benefits of nutritional interventions in postoperative care become increasingly evident, many healthcare systems are adopting multidisciplinary approaches to ensure that patients receive optimal nutrition before, during, and after surgery. In addition to surgeons and anesthesiologists, dietitians, nutritionists, and nurses play an integral role in implementing tailored nutrition strategies that address individual patient needs. This collaborative approach not only improves patient outcomes but also reduces healthcare costs by shortening recovery times and decreasing the incidence of complications [10].

Conclusion

The paradigm shift towards enhanced recovery through nutrition represents a critical evolution in postoperative care. Proper nutrition during the perioperative period significantly contributes to improving health outcomes, accelerating recovery, and reducing the risk of complications. By

focusing on providing the right balance of macronutrients, micronutrients, and hydration, healthcare providers can optimize patient recovery, improve functional outcomes, and enhance overall well-being. The integration of nutrition into recovery protocols is not just a supplementary measure but a central pillar of modern surgical care, and its role in enhancing recovery will continue to be a critical area of focus in the years to come.

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