

Nutrition and the Plastic Surgeon: Possible Interventions and Practice Considerations

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Summary: The objective of this article is to convey the importance of nutrition in plastic surgery, to offer possible outpatient nutritional interventions within the surgical care setting, and to guide the plastic surgeon in integrating nutrition as a key practice enhancement strategy for the care of wound patients and beyond. The impact of nutritional status on surgical outcomes is well recognized. Malnutrition is very frequent among the hospitalized patient population and up to 1 in 4 plastic surgery outpatient is at risk for malnutrition. Micro- and macronutrients are both essential for optimal wound healing and although specific patient populations within the field of plastic surgery are more at risk of malnutrition, universal screening, and actions should be implemented. Outpatient interventions to promote adequate nutritional intake and address barriers to the access of fruits and vegetables have included both exposure and incentive interventions. In the clinical setting, universal screening using validated and rapid tools such as the Canadian Nutritional Screening Tool are encouraged. Such screening should be complemented by appropriate blood work, body mass index measurements, and prompt referral to a dietician when appropriate. The notion of prehabilitation has also emerged with impetus in surgery and encompasses the nutritional optimization of patients by promoting the enhancement of functional capacity preoperatively. (*Plast Reconstr Surg Glob Open* 2018;6:e1704; doi: 10.1097/GOX.0000000000001704; Published online 7 August 2018.)

INTRODUCTION

Surgical outcomes are largely influenced by patients' preoperative health, including their nutritional status.^{1,2} Up to 45% of hospital inpatients are malnourished upon admission,³ and our own experience suggests that up to 25% of plastic surgery outpatients are at risk for malnutrition.⁴ Alarmed by the magnitude of this problem, we developed a universal nutritional screening platform based on the Integrated Nutrition Pathway for Acute Care⁵ and recommendations from the American Society for Parenteral and Enteral Nutrition.⁶ This screening platform involves 2 stages: universal triage with the 2-question Canadian Nutritional Screening Tool (CNST), and further screening and classification of those deemed "at risk" with the more

in-depth Subjective Global Assessment.⁷ Our nutritional screening strategy was easy to implement in a busy tertiary care center, feasible in an outpatient context, and accurate.⁸ However, the question remains as to how to address malnourishment in our patients. The objective of this editorial was to highlight the importance of nutrition in plastic surgery, to offer possible outpatient nutritional interventions within the surgical care setting, and to guide plastic surgeons in integrating nutrition as a key practice enhancement strategy for the care of their patients.

NUTRITION AND THE PLASTIC SURGEON

Adequate nutrition is important in surgical patients. Macronutrients are essential for all phases of wound healing. For example, protein depletion leads to a prolonged inflammatory phase by decreasing fibroblast proliferation, proteoglycan synthesis and neoangiogenesis.⁹ Not only does wound healing require adequate nutritional input, but wounds increase baseline caloric and protein demands.⁹ Micronutrients also play significant roles in the process of wound healing. Vitamin A stimulates fibroblasts,¹⁰ vitamin C promotes collagen synthesis and fibroblast proliferation,¹¹ and zinc is essential for protein and collagen synthesis.¹² Arginine and glutamine have been extensively studied.¹³ Although there exist no current guidelines with regard to their use in clinical practice, arginine supplementation has been shown to enhance wound tensile strength and glutamine to improve nitrogen balance and immune function post major surgery, trauma,

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Ask the patient the following questions*	Date:		Date:	
	Admission		Rescreening	
	Yes	No	Yes	No
Have you lost weight in the past 6 months WITHOUT TRYING to lose this weight? <small>If the patient reports a weight loss but gained it back, consider it as NO weight loss.</small>				
Have you been eating less than usual FOR MORE THAN A WEEK?				
Two "YES" answers indicate nutrition risk†				

* If the patient is unable to answer the questions, a knowledgeable informant can be used to obtain the information. If the patient is uncertain regarding weight loss, ask if clothing is now fitting more loosely.

Fig. 1. Screening for the risk of malnutrition using the CNST. Used with the permission of the Canadian Malnutrition Task Force. The Canadian Nutrition Screening Tool form can be accessed from <http://nutritioncareinacanada.ca/sites/default/uploads/files/CNST.pdf>.

or sepsis.¹³ Malnourished patients are overall at higher risk for wound infection due to their impaired immune system following a decreased in T-cell function, phagocytic activity, and complement and antibody levels.¹⁰ Delayed wound healing and increased risk of postoperative wound complications and infections due to a reversible nutritional cause should be of concern to the plastic surgeon.

The recognized importance of nutrition in holistic patient care has started a nutritional revolution over the past decades.¹⁴ Pivotal innovations have included the advent and implementation of total parenteral nutrition in the late 1960s.¹⁵ The need to establish a nutritional care plan was emphasized by the recognition of the high incidence of protein-calorie malnutrition in hospitalized and surgical patients.^{16,17} Various nutritional assessments and quantification of nutritional deficits have been subsequently developed to identify patients at risk.^{18,19} Nutrition is particularly relevant to the plastic surgeon in relation to head and neck reconstructions, burns, patients receiving chemo or radiotherapy such as breast oncologic reconstructions, and wounds.¹⁴

LARGE-SCALE OUTPATIENT INTERVENTIONS

The vast majority of lower income adults do not consume the recommended amounts of fruits, vegetables, and whole grains and instead have high intake of processed meat, sweets, and sugar-sweetened beverages.²⁰ Economic barriers can partly explain such a phenomenon,²¹ but lower diet quality has also been associated with limited access to fruits and vegetables.^{21–23} Interventions should focus on improving access to healthier food options and promoting their affordability.²⁴ Exposure interventions encourage familiarity with and acceptance of nutrition products²⁵ and include activities such as tastings or educational sessions.²⁶ Incentive interventions facilitate access to adequate nutrition options²⁵ such as programs increasing the purchasing power of low-income consumers to buy healthy foods,^{26–28} or placement of markets in underserved neighborhoods.^{24,29–31} Although implementing these interventions requires large-scale policy changes, governments are in-

creasingly aware of the need for access to affordable and healthy food. On a smaller scale, dietitians can be your allies to direct your patients toward local programs that can benefit their long-term nutritional, surgical, or wound healing status.

PRACTICE CONSIDERATIONS FOR THE PLASTIC SURGEON

Importantly, malnutrition is a reversible diagnosis once it is recognized. Upon clinical assessment, we would encourage plastic surgeons to promote the recognition and screening of malnutrition risk by implementing a rapid nutritional screening tool like the CNST (Fig. 1) in addition to recording patients' body mass index. Nursing staffs can perform these measurements as routine brief clinical assessments preceding clinical encounters. If limitations or shortage in personnel occur, patients' self-report of the CNST's 2 questions upon presentation to the clinic could be an acceptable alternative. If clinical suspicion for risk of malnutrition is present, as indicated with 2 "Yes" answers on the CNST, blood work including albumin/prealbumin levels can be ordered by the plastic surgeon as a first-line investigation. Prompt referral to a dietician for perioperative nutritional optimization should also be reinforced as part of the "prehabilitation" framework.^{32,34,35} After appropriate nutritional expertise consultation, further investigations like blood work to review patients' macro- (eg, albumin) and micronutrient status (eg, vitamins A, B12, C, D, E, iron, folate) are also highly valuable to identify specific reversible deficiencies. Prehabilitation represents the metabolic enhancement of patients' preoperative status to increase physiologic reserves and encompasses physical activities, psychological assessment, and nutrition care.³² Preoperative interventions include guidance to improve glycemic control, access to weight loss programs, or support in individually adapted exercises. System, practice, and patient limitations may influence one's ability to screen or intervene on patients' nutritional status. There is a definite discrepancy between evidence of nutritional support's benefits and clinical applications of this knowledge.³³ In this era of patient-centered care, the provision of quality

care should allow nutritional optimization especially in perioperative patients at risk for malnutrition.

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