

A Systematic Review of Oral Nutritional Supplement and Wound Healing

Ghazal S. Daher, MD; Karen Y. Choi, MD; Jeffery W. Wells, MD; Neerav Goyal, MD, MPH

Department of Otolaryngology – Head and Neck Surgery, The Pennsylvania State University, College of Medicine, Hershey, PA, USA



Background

- Head and neck cancer (HNC) affects approximately 66 thousand patients per year in the United States
- Up to 80% of patients with head and neck cancers are malnourished due to the risk factors associated with the disease
- Patients experience wound healing complications associated with surgery, radiation therapy and chemotherapy
- 40-60% of patients undergoing salvage surgery for HNC suffer from wound healing complications
- Nutritional status has a negative impact on quality of life in HNC patients compared to patients with prostate, breast and lung cancer
- Implementing a nutrition supplement plan may aid mitigate wound healing complications in surgical patients

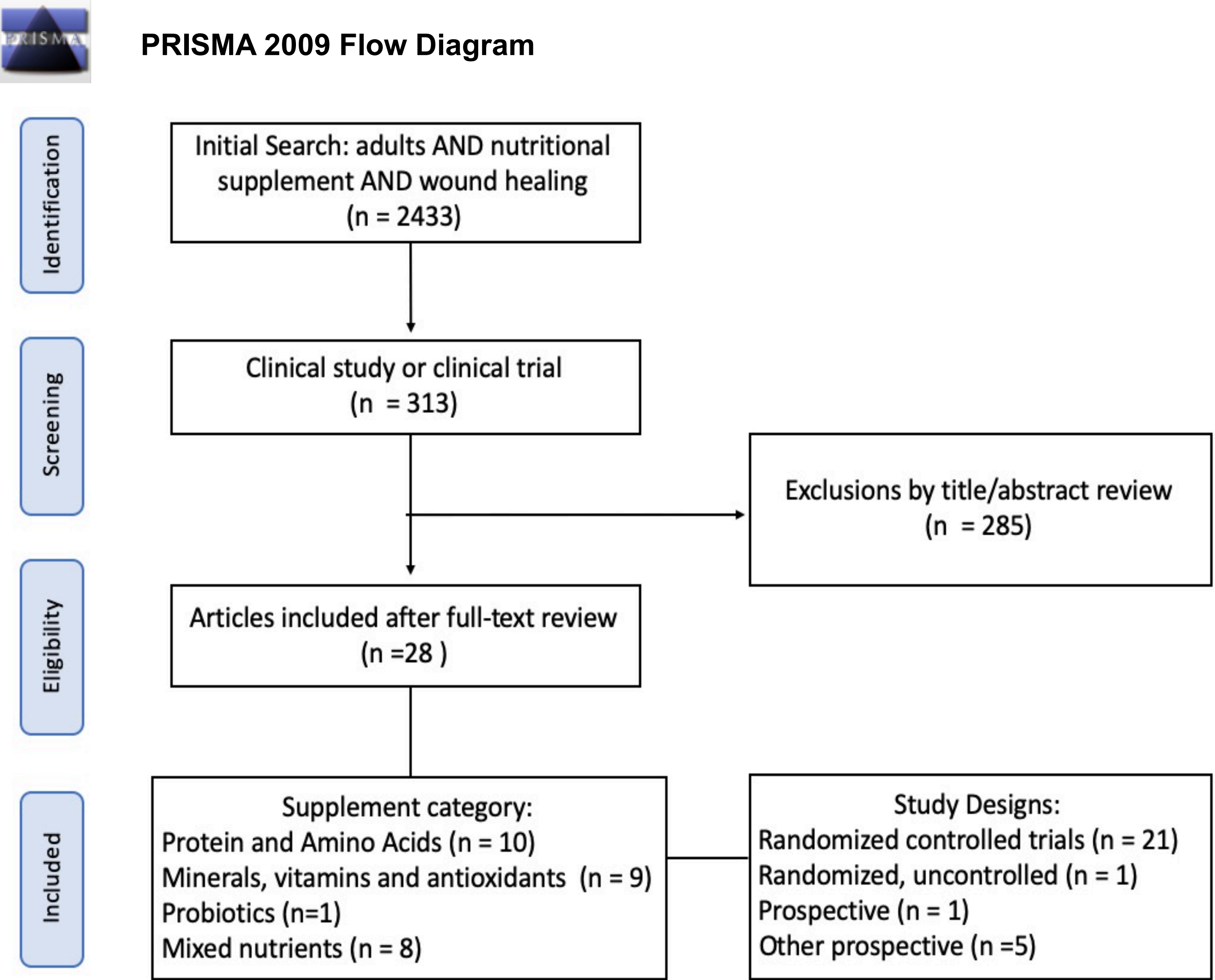
Research Question

- In adult patients, can you enhance wound healing with the use of oral nutritional supplement?

Materials and Methods

- Databases searched included PubMed and Medline Complete
- Search terms included “nutritional supplement” and “wound healing” full-text articles from inception to 2020
- All types of wounds were included due to the scarce amount of literature on surgical wounds
- Inclusion criteria: clinical study and clinical trials
- Exclusion criteria: retrospective studies and studies with no direct quantitative measure of wound healing

Literature Search Flow Diagram

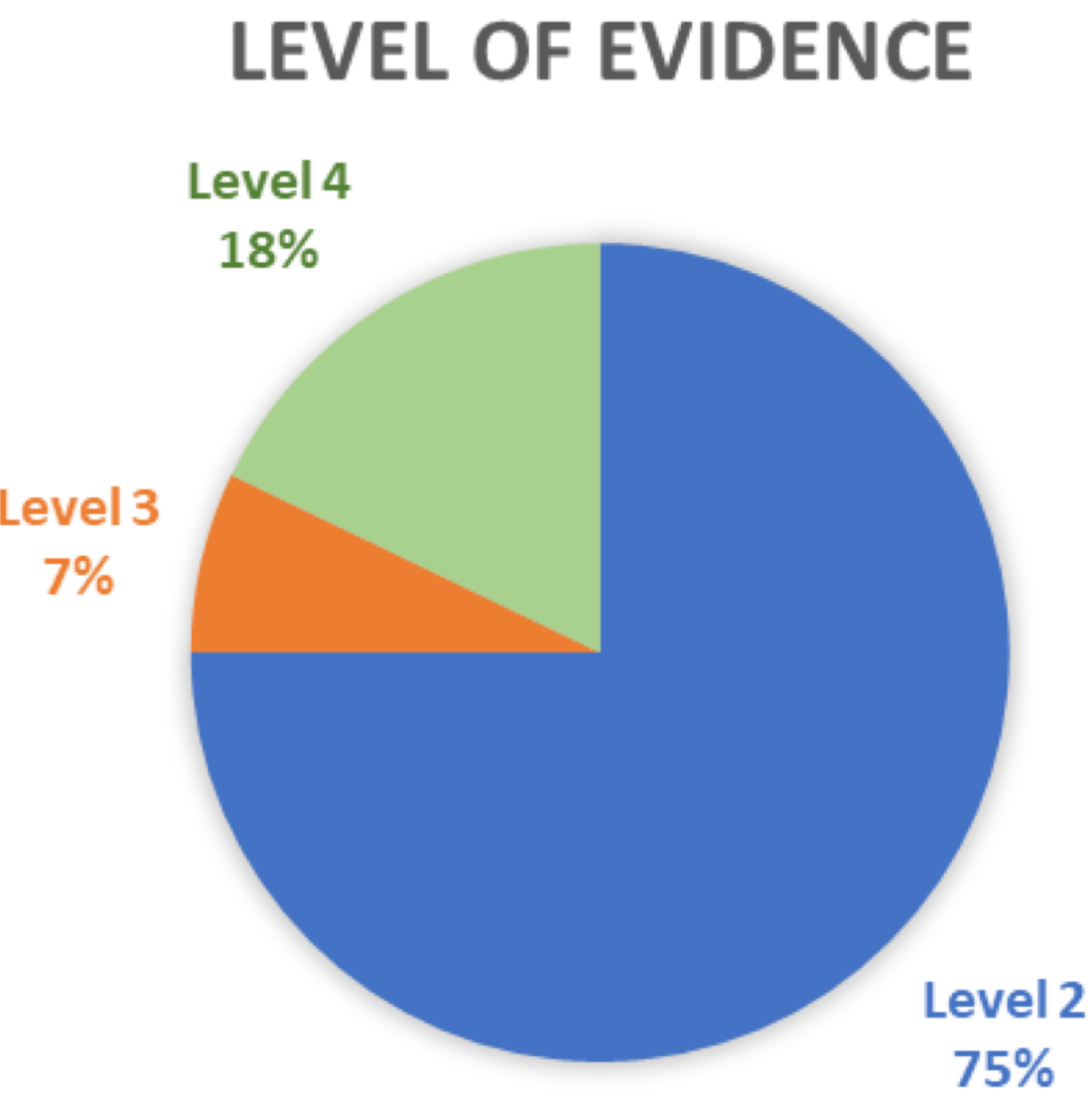


Literature Synthesis

- 1696 patients were included in the review
- Included papers were broadly categorized into the following four categories:
 - ❖ Protein and Amino Acids
 - Hydrolyzed collagen improved healing of pressure ulcers
 - Arginine use in HNC patients had mixed results thus potential benefit is unclear
 - Short term use of arginine, glutamine and β -hydroxy- β -methylbutyrate did not reduce wound size in surgical wounds
 - ❖ Mixed Nutrients
 - Antioxidant and glutamine supplementation shortened time to wound closure in trauma patients suffering post-surgical wound healing disorders
 - High protein, arginine, zinc, vitamin C significantly accelerated healing in various types of wounds
 - ❖ Minerals, Vitamin and Antioxidants
 - Magnesium and Vitamin E combination had a robust effect on ulcer healing
 - Zinc accelerated wound healing in healthy adults by 3-fold, and in pressure ulcers by 2.5-fold
 - Arginine and Omega-3 reduced wound healing complications in HNC patients
 - Antioxidants and proteases reduced wound healing time by 2-3 days in healthy adults
 - ❖ Probiotics
 - Short term supplementation had a benefit on wound healing in patients with diabetic foot ulcers

Results

- Twenty-eight articles were identified and included in the final study
- Level of evidence rated using evidence pyramid published by Long and Gannaway (2015) and appraisal checklists by Brown (2018)



Conclusion

- Current scientific literature is scarce on nutritional supplement use in HNC surgical patients
- Supplementing arginine and omega-3 were shown to improve wound healing in the HNC population
- Combination formula of arginine, zinc, vitamin C, magnesium, vitamin E, vitamin D and omega-3 is likely beneficial in accelerating healing of various types of wounds

References

1. Head and Neck Cancer - Types of Treatment. Cancer.Net. (2020, January 31). <https://www.cancer.net/cancer-types/head-and-neck-cancer/types-treatment>.
2. Robbins KT, Favrot S, Hanna D, Cole R. Risk of wound infection in patients with head and neck cancer. Head Neck. 1990;12(2):143-148.
3. Farsi NJ, Rousseau M-C, Schlecht N, et al. Aetiological heterogeneity of head and neck squamous cell carcinomas: the role of human papillomavirus infections, smoking and alcohol. Carcinogenesis. 2017;38(12):1188-1195.
4. Ravasco P, Monteiro-Grillo I, Camilo ME. Does nutrition influence quality of life in cancer patients undergoing radiotherapy? Radiother Oncol. 2003;67(2):213-220.
5. Wallace HA, Basehore BM, Zito PM. Wound Healing Phases.; 2020. <http://www.ncbi.nlm.nih.gov/pubmed/29262065>.
6. Moher D, Liberati A, Tetzlaff J, Altman DG. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. Int J Surg. 2010;8(5):336-341.
7. Eneroth M, Larsson J, Oscarsson C, Apelqvist J. Nutritional supplementation for diabetic foot ulcers: the first RCT. J Wound Care. 2004;13(6):230-234.
8. Lee SK, Posthauer ME, Dörner B, Redovian V, Maloney MJ. Pressure ulcer healing with a concentrated, fortified, collagen protein hydrolysate supplement: a randomized controlled trial. Adv Skin Wound Care. 2006;19(2):92-96.
9. de Luis DA, Izaola O, Cuellar L, Terroba MC, Aller R. Randomized clinical trial with an enteral arginine-enhanced formula in early postsurgical head and neck cancer patients. Eur J Clin Nutr. 2004;58(11):1505-1508.

Remaining references available upon request at ghazalstaity@gmail.com