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Research Article

The Importance of Nutritional Status in Oral and Maxillofacial Surgery and Postoperative Healing.

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Abstract

Nutritional status plays a critical role in patient outcomes following oral and maxillofacial surgery. This article explores the physiological demands of surgery, highlighting the relationship between preoperative and postoperative nutritional status, wound healing, and recovery. The importance of assessing a patient's nutritional status before surgery is outlined, alongside practical dietary recommendations to optimize healing. Special attention is given to the role of key nutrients such as proteins, fats, vitamins, and minerals, along with pre- and postoperative diet strategies. Additionally, a 7-day pre-surgical meal plan, a 14-day postoperative vegan meal plan, and the use of digital tools for healthy food selections are provided to aid clinicians in improving surgical outcomes through nutrition.

Introduction

Oral and maxillofacial surgery (OMFS) involves a range of complex procedures that place significant physiological demands on the body. The patient's nutritional status is an often overlooked but vital component of both surgical planning and postoperative recovery. Malnutrition, both undernutrition and overnutrition, can compromise immune function, delay tissue regeneration, and increase the risk of postoperative complications, such as infection and poor wound healing. Research indicates that optimized nutrition supports the body's healing capacity by providing essential nutrients needed for collagen production, wound closure, and immune system support (Martinez & Rodriguez, 2019).

This article aims to establish the significance of evaluating nutritional status in OMFS patients and to provide evidence-based dietary recommendations for pre- and postoperative care to enhance recovery outcomes. Additionally, the integration of digital tools and applications that assist patients in making healthy food selections is discussed to support ongoing nutritional management.

Objectives

- Explore the gaps in nutrition education in medical and dental schools and their impact on healthcare.
- Adding a nutrition health questionnaire to patient intake forms

- Evaluate the impact of nutritional status on surgical outcomes.
- Explain the physiological demands of surgery and the role of nutrition in supporting healing.
- Review critical nutrients necessary for postoperative recovery.
- Provide dietary recommendations for pre- and postoperative care, including vegan-specific plans.
- Introduce digital tools and applications that aid in maintaining a healthy diet for surgical patients.

The Lack of Nutritional Training in Dental and Medical Schools and Its Impact on Patient Healing

Despite the well-documented importance of nutrition in patient outcomes, both medical and dental schools often fail to adequately incorporate nutritional training into their curricula. This oversight limits practitioners' ability to use dietary interventions as part of comprehensive patient care, including post-surgical recovery in oral and maxillofacial surgery. Studies suggest that the lack of nutritional education contributes to a major gap in care, where patients are not adequately informed or supported in making dietary choices that could significantly enhance healing.

Lack of Nutritional Training in Medical and Dental Schools

1. **Minimal Nutrition Education Hours:** Research shows that most U.S. medical schools provide only 19 to 24 hours of nutrition education across four years of training, which is far below the recommended 25–30 hours proposed by the National Academy of Sciences (Adams et al., 2010). Dental schools tend to allocate even fewer hours, focusing primarily on procedural and technical aspects of care, rather than integrative approaches that include nutrition (Maguire & Franklin, 2016).
2. **Impact on Patient Outcomes:** The lack of formal nutritional education is problematic because inadequate dietary guidance can hinder healing, particularly in surgical patients. Patients are often unaware that consuming nutrient-dense foods before and after surgery can enhance immune function, reduce inflammation, and accelerate tissue repair. Without proper knowledge from healthcare providers, patients miss the opportunity to make informed dietary choices, leading to suboptimal recovery outcomes (Frantz et al., 2011).
3. **Surgeons and Dentists Feel Underprepared:** Surveys of physicians and dental professionals consistently report that they feel ill-equipped to provide dietary counseling. A 2018 study revealed that fewer than 14% of practicing physicians felt confident in offering nutritional advice, and the numbers are even lower among dentists (Vetter et al., 2008). This gap highlights how the lack of nutritional training fails to meet patient needs, especially in surgery where recovery is directly impacted by nutritional status.

4. **Inadequate Focus on Clinical Nutrition:** Many dental and medical programs place little emphasis on clinical nutrition, which involves understanding how specific nutrients affect recovery from trauma, surgery, or illness. For example, medical students may learn about vitamins and minerals in a general context but not about the practical application of dietary changes in surgical recovery (Crowley et al., 2019). This leaves future practitioners underprepared to integrate nutrition into their treatment plans for oral and maxillofacial surgeries, where targeted dietary interventions could significantly reduce complications and improve healing times.

Nutritional Health Questionnaire for Patient Intake

To address the gap in dietary assessment during the pre-surgical planning phase, the following **Nutritional Health Questionnaire** should be included in the preliminary intake forms for all patients undergoing oral or other types of surgery. This questionnaire aims to identify potential nutritional deficiencies or issues that could impact the patient's healing process:

Nutritional Health Questionnaire

Patient Name: _____

Date of Birth: _____

Date of Surgery: _____

1. Weight and Appetite Changes

- Have you experienced any significant weight loss or gain in the past six months?
  - ☐ Yes
  - ☐ No
  - If yes, please explain: _____
- Has your appetite changed recently?
  - ☐ Yes
  - ☐ No
  - If yes, please explain: _____

2. Dietary Habits

- How would you describe your typical daily diet?
  - ☐ Balanced (includes a variety of proteins, fruits, vegetables, grains, and fats)

- ☐ High in processed foods (fast food, packaged snacks, etc.)
- ☐ Low in essential nutrients (fruits, vegetables, whole grains, proteins)
- ☐ Other: _____

3. Protein Intake

- Do you regularly consume sources of protein such as meat, fish, eggs, dairy, or plant-based alternatives (e.g., beans, tofu)?
  - ☐ Yes
  - ☐ No
  - If no, please explain why: _____

4. Vitamin and Mineral Intake

- Are you currently taking any vitamins or supplements (e.g., multivitamins, vitamin D, vitamin C, zinc, calcium)?
  - ☐ Yes
  - ☐ No
  - If yes, please list: _____

5. Hydration

- How many glasses of water or other hydrating fluids do you consume daily?
  - ☐ 0-3
  - ☐ 4-7
  - ☐ 8-10
  - ☐ More than 10

6. Food Allergies or Intolerances

- Do you have any known food allergies or intolerances?
  - ☐ Yes
  - ☐ No
  - If yes, please list: _____

7. Special Diets

- Are you following any specific dietary pattern (e.g., vegan, vegetarian, gluten-free)?
  - ☐ Yes

- ☐ No
- If yes, please specify: _____

8. Recent Illnesses

- Have you had any recent illnesses that might affect your nutritional status (e.g., gastrointestinal disorders, infections)?
  - ☐ Yes
  - ☐ No
  - If yes, please describe: _____

9. Alcohol and Tobacco Use

- Do you consume alcohol?
  - ☐ Yes
  - ☐ No
  - If yes, how often? _____
- Do you smoke or use tobacco products?
  - ☐ Yes
  - ☐ No
  - If yes, how often? _____

10. Physical Activity

- How often do you engage in physical exercise?
  - ☐ Never
  - ☐ 1-2 days per week
  - ☐ 3-5 days per week
  - ☐ Daily

11. Stress and Eating Patterns

- How would you describe your current stress level?
  - ☐ Low
  - ☐ Moderate
  - ☐ High
- Does stress affect your eating habits?

- ☐ Yes
- ☐ No
- If yes, please explain: _____

This **Nutritional Health Questionnaire** aims to uncover potential nutritional risk factors that could compromise healing. By integrating it into the standard patient intake process, healthcare providers can identify areas where intervention, such as dietary recommendations or supplementation, may improve post-surgical outcomes.

1. The Role of Nutritional Status in Surgical Outcomes

Surgical outcomes, particularly in oral and maxillofacial procedures, are closely linked to the patient's nutritional state. Key elements of nutrition, such as protein, micronutrients, and fat reserves, influence tissue healing, immune response, and recovery time.

1.1 **Tissue Healing and Regeneration**

The body's capacity for tissue repair during OMFS is contingent upon an adequate supply of essential nutrients. Protein, specifically amino acids like arginine and glutamine, is vital for collagen production, which forms the backbone of tissue regeneration (Weimann & Braga, 2021). Deficiencies in these nutrients can impair wound healing, increase infection risk, and prolong recovery time.

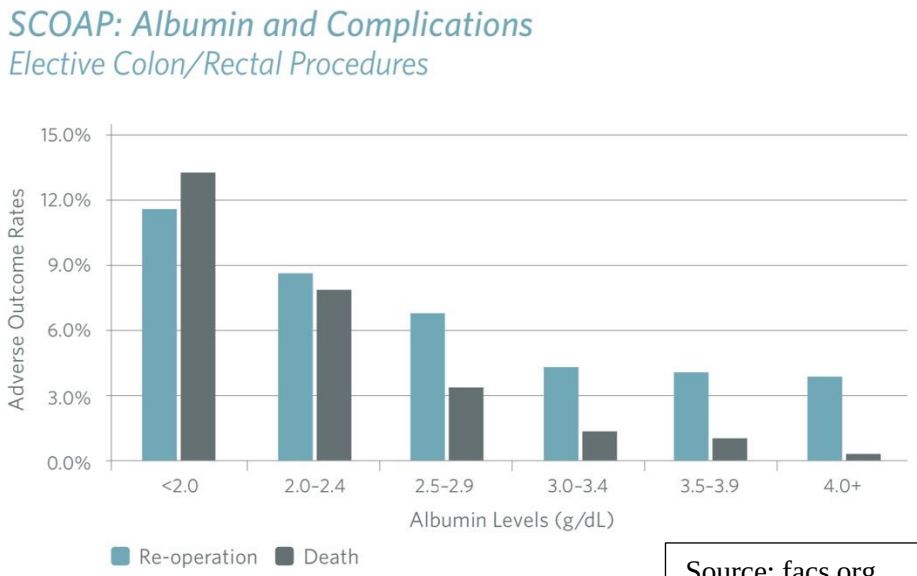
1.2 **Immune Function**

Surgical stress exacerbates the body's immune demands. Nutritional deficiencies, particularly in vitamins A, C, and D, as well as zinc, impair the immune response, increasing susceptibility to infection and inflammation (Kahn & Chang, 2021). Adequate intake of these micronutrients preoperatively can enhance immune function and reduce postoperative complications.

1.3 **Nutritional Risk Factors**

Patients with malnutrition, obesity, or chronic conditions such as diabetes exhibit higher rates of surgical complications. Studies indicate that poor preoperative nutritional status increases the risk of postoperative complications three- to fourfold (Zikria & Bianchi, 2020). Additionally, the American College of Surgeon (2024) demonstrated that patient with albumin levels lower than 3.0 have higher post-op complications in GI

surgeries.



Source: facs.org

1.4 **Inflammation and Catabolism**

Surgery induces a catabolic state, wherein the body's muscle protein breakdown accelerates, leading to muscle atrophy and delayed recovery (Ferlay et al., 2018). Adequate preoperative nutrition, particularly a diet rich in high-quality protein, mitigates these risks by providing the necessary reserves to support the increased metabolic demands.

2. Physiological Demands of Surgery and Nutritional Support for Healing

Surgical recovery is divided into three distinct phases, each with specific nutritional requirements.

2.1 **Phases of Wound Healing**

- **Inflammatory Phase (Days 0–3):** Key nutrients such as protein, vitamin C, and zinc are critical for modulating inflammation and supporting tissue repair (McKenzie & Jenkins, 2022).
- **Proliferative Phase (Days 3–21):** Collagen synthesis peaks, requiring increased protein intake, particularly amino acids like glutamine and arginine, alongside vitamin C (Weimann & Braga, 2021).
- **Remodeling Phase (Weeks 3–12):** Long-term nutritional support is needed to ensure tissue strength and function are fully restored, with a continued emphasis on protein, vitamins A, C, and D (Patel & John, 2021).

2.2 **Key Nutrients for Surgery and Recovery**

- **Protein:** Vital for collagen formation, immune support, and tissue repair (Kahn & Chang, 2021).
- **Fats:** Essential fatty acids, such as omega-3s, reduce inflammation and support cellular repair (Weimann & Braga, 2021).
- **Vitamins and Minerals:** Vitamins C and D, zinc, and iron are critical for collagen production, bone healing, and immune function (Martinez & Rodriguez, 2019).

3. Pre- and Postoperative Nutritional Recommendations

A well-structured diet plan, beginning at least 7 days pre-surgery and extending to 14 days post-surgery, can significantly enhance recovery outcomes. The goal is to optimize nutritional status to support recovery, boost the immune system, and reduce the risk of post-operative complications. For a detailed meal plan example see Appendix A. Exodontia patients should avoid eating small seeds postoperatively which can potentially get trapped in the extraction site.

3.1 **Preoperative Diet (7 Days Before Surgery)**

- **Protein:** Patients should consume 1.2–2.0 grams of protein per kilogram of body weight per day. Sources include lean meats, fish, legumes, and plant-based proteins (Ferlay et al., 2018).
- **Hydration:** Maintaining hydration with at least 8–10 glasses of water daily is essential for blood flow and healing (National Institutes of Health, 2019).
- **Micronutrients:** Ensure adequate intake of vitamins A, C, and D, and zinc to promote immune function and wound healing (Zikria & Bianchi, 2020).

3.2 **Postoperative Diet (14 Days After Surgery)**

- **Days 1–3:** Focus on soft, easy-to-eat foods such as blended vegetable soups, protein shakes, and mashed fruits to minimize discomfort (Kahn & Chang, 2021).
- **Days 4–7:** Gradually reintroduce soft solids, emphasizing high-protein meals and anti-inflammatory foods such as leafy greens and omega-3-rich fish (Patel & John, 2021).
- **Days 8–14:** Introduce more textured foods while maintaining high protein intake and focusing on hydration and fiber to prevent constipation (Weimann & Braga, 2021).

3.3 **Nutritional Supplements**

For patients unable to meet their nutritional needs through diet alone, consider recommending:

- **Protein Supplements:** Whey or plant-based protein powders to ensure adequate protein intake (Ferlay et al., 2018).
- **Multivitamins:** A high-quality multivitamin can help fill nutritional gaps (McKenzie & Jenkins, 2022).
- **Omega-3 Fatty Acids:** Supplements can aid in reducing inflammation (Zikria & Bianchi, 2020).

3.4 **Digital Tools and Applications for Healthy Food Selection**

Incorporating digital tools can assist patients in maintaining a healthy diet by providing easy access to nutritional information and personalized meal planning.

- **Yuka:** An app that scans food products to provide detailed information on their nutritional quality and potential health impacts. It helps users make informed choices by highlighting healthier alternatives (Yuka, n.d.).
- **MyFitnessPal:** A comprehensive app for tracking diet and exercise. It offers a vast database of foods, making it easier for patients to monitor their nutrient intake and stay within their dietary goals (MyFitnessPal, n.d.).
- **Lifesum:** Provides personalized diet plans based on user preferences and health goals. It helps users track their meals and offers suggestions for healthier food choices (Lifesum, n.d.).
- **Fooducate:** An app that grades foods based on their nutritional value and offers healthier alternatives. It educates users on reading food labels and understanding ingredient lists (Fooducate, n.d.).
- **Cronometer:** Offers detailed nutrient tracking, ensuring that patients meet their micronutrient needs. It is especially useful for those following specific dietary restrictions, such as vegan diets (Cronometer, n.d.).

These applications can empower patients to take control of their nutritional intake, ensuring they receive the necessary nutrients to support their surgical recovery. **See Appendix B**

4. Special Considerations: Vegan Meal Plans

For vegan patients, tailored meal plans focusing on plant-based proteins and nutrient-rich vegetables are essential to meet pre- and postoperative nutritional needs. A 7-day pre-surgery and 14-day post-surgery vegan meal plan are provided in this article, emphasizing foods rich in vitamins A, C, zinc, and omega-3s (Simopoulos, 2002). See Appendix C.

Conclusion

Proper nutrition before and after oral and maxillofacial surgery is crucial for optimizing healing and reducing complications. By incorporating nutritional assessments, tailored diet plans, and digital tools into surgical care, practitioners can significantly improve patient outcomes. Further studies are encouraged to explore the long-term impact of nutritional interventions on surgical recovery, particularly in vegan populations.

Appendix A: Detailed Meal Plans and Recipes

7-Day Preoperative Meal Plan

Day 1: Building Nutritional Reserves

- **Breakfast:** Oatmeal with chia seeds, topped with fresh blueberries and a drizzle of honey. *Why:* Oats are a great source of fiber for gut health, while chia seeds and blueberries provide antioxidants and omega-3s for inflammation control (Simopoulos, 2002).
- **Snack:** Greek yogurt with a handful of almonds. *Why:* Greek yogurt is high in protein and probiotics for gut health, and almonds provide healthy fats and vitamin E (Weimann & Braga, 2021).
- **Lunch:** Grilled chicken salad with mixed greens, cucumbers, tomatoes, and olive oil vinaigrette. *Why:* Chicken provides lean protein, essential for tissue repair, while olive oil and leafy greens add vitamins A and C for reducing inflammation and promoting skin healing (Kahn & Chang, 2021).
- **Snack:** Apple slices with natural peanut butter. *Why:* Apples are rich in fiber and antioxidants, while peanut butter adds protein and healthy fats (Zikria & Bianchi, 2020).
- **Dinner:** Baked salmon with steamed asparagus and quinoa. *Why:* Salmon is rich in omega-3 fatty acids, which have anti-inflammatory properties, while asparagus and quinoa are loaded with essential vitamins and protein for recovery (Patel & John, 2021).

Day 2: Focus on Anti-inflammatory Foods

- **Breakfast:** Scrambled eggs with avocado and a side of whole grain toast. *Why:* Eggs are an excellent source of high-quality protein, and avocados provide healthy fats and potassium to reduce inflammation and support tissue health (Weimann & Braga, 2021).

- **Snack:** A small bowl of mixed berries (strawberries, raspberries, and blueberries). *Why:* Berries are high in antioxidants and vitamin C, which support immune function and collagen production (McEvoy et al., 2018).
- **Lunch:** Grilled turkey breast wrap with spinach, cucumbers, and hummus in a whole wheat tortilla. *Why:* Turkey is a lean protein source, while hummus provides plant-based protein and fiber. Spinach offers iron and vitamin C, which are crucial for healing and immune support (Zikria & Bianchi, 2020).
- **Snack:** Cottage cheese with pineapple chunks. *Why:* Cottage cheese offers protein and calcium, and pineapple contains bromelain, an enzyme that reduces swelling (Ferlay et al., 2018).
- **Dinner:** Lentil soup with carrots, celery, and onions, served with whole grain bread. *Why:* Lentils are high in plant-based protein and fiber, which help maintain energy and support digestion during recovery (Weimann & Braga, 2021).

Day 3: Hydration and Vitamin Boost

- **Breakfast:** Smoothie with spinach, banana, Greek yogurt, and a scoop of protein powder. *Why:* Spinach is rich in iron and folate, Greek yogurt provides probiotics, and bananas add potassium for hydration (Patel & John, 2021).
- **Snack:** Carrot sticks with hummus. *Why:* Carrots provide beta-carotene (vitamin A precursor), which is essential for skin healing, while hummus adds plant-based protein (Li & Zhou, 2016).
- **Lunch:** Grilled tilapia with brown rice and steamed broccoli. *Why:* Tilapia is a lean protein source, and broccoli offers vitamin C and fiber, essential for immune function and collagen formation (Weimann & Braga, 2021).
- **Snack:** A handful of walnuts and a small orange. *Why:* Walnuts are rich in omega-3 fatty acids, and oranges provide vitamin C for collagen production and immune support (Simopoulos, 2002).
- **Dinner:** Chicken stir-fry with bell peppers, onions, and mushrooms, served over quinoa. *Why:* Chicken is a high-quality protein, while bell peppers and mushrooms are rich in vitamins C and D, both essential for tissue repair and immune health (Patel & John, 2021).

Day 4: Focusing on Zinc and Vitamin C

- **Breakfast:** Whole wheat toast with smoked salmon and a side of sliced tomatoes. *Why:* Smoked salmon provides omega-3s and protein, and tomatoes are rich in lycopene and vitamin C, aiding immune function and collagen synthesis (Ferlay et al., 2018).
- **Snack:** Hard-boiled eggs and a kiwi. *Why:* Eggs are high in protein, while kiwis are packed with vitamin C, which is essential for collagen production and immune function (Martinez & Rodriguez, 2019).
- **Lunch:** Tuna salad with cucumbers, tomatoes, olive oil, and lemon juice over mixed greens. *Why:* Tuna is rich in omega-3s, and olive oil and lemon juice provide antioxidants and healthy fats to support healing (Simopoulos, 2002).
- **Snack:** Almonds with dried apricots. *Why:* Almonds are rich in vitamin E, a powerful antioxidant, and apricots provide beta-carotene, which is converted to vitamin A in the body (Li & Zhou, 2016).
- **Dinner:** Beef stir-fry with mixed vegetables like broccoli, carrots, and bok choy, served over brown rice.
  Why: Beef is a good source of zinc, which is essential for wound healing, and the vegetables provide fiber and vitamins A and C for immune support (Weimann & Braga, 2021).

Day 5: Omega-3 and Antioxidant Focus

- **Breakfast:** A bowl of steel-cut oats topped with flaxseeds, blueberries, and a dollop of Greek yogurt. *Why:* Oats offer fiber, flaxseeds provide omega-3s, and blueberries are rich in antioxidants that help reduce inflammation (Simopoulos, 2002).
- **Snack:** Smoothie with mixed greens, berries, and almond milk. *Why:* This provides a nutrient-dense snack rich in vitamins, minerals, and antioxidants essential for healing (Martinez & Rodriguez, 2019).
- **Lunch:** Turkey and avocado wrap with spinach in a whole wheat tortilla. *Why:* Turkey offers lean protein, while avocados provide healthy fats and vitamin E (Zikria & Bianchi, 2020).
- **Snack:** Chia pudding made with almond milk and topped with raspberries. *Why:* Chia seeds are an excellent source of omega-3s, which help reduce inflammation, and raspberries provide antioxidants to support recovery (Simopoulos, 2002).
- **Dinner:** Baked cod with sautéed spinach and sweet potatoes.

Why: Cod provides lean protein, spinach is rich in vitamins A and C, and sweet potatoes supply beta-carotene and fiber for immune support (Weimann & Braga, 2021).

Day 6: Hydration and Protein Focus

- **Breakfast:** Egg white omelet with mushrooms, spinach, and a side of whole grain toast. *Why:* Egg whites provide lean protein, mushrooms offer immune-boosting properties, and spinach adds iron for blood oxygenation (Li & Zhou, 2016).
- **Snack:** A protein shakes with almond milk, protein powder, and a banana. *Why:* Protein shakes are a quick way to ensure adequate protein intake, and bananas provide potassium for hydration and muscle function (McEvoy et al., 2018).
- **Lunch:** Grilled chicken breast with roasted sweet potatoes and sautéed green beans. *Why:* Sweet potatoes are rich in fiber and beta-carotene, while chicken offers lean protein for tissue repair (Patel & John, 2021).
- **Snack:** Celery sticks with natural peanut butter. *Why:* Peanut butter adds protein and healthy fats, while celery is hydrating and low-calorie (Simopoulos, 2002).
- **Dinner:** Lentil curry with carrots and zucchini, served over quinoa. *Why:* Lentils provide plant-based protein and fiber, and carrots and zucchini add beta-carotene and vitamins C and A for immune function (Gopinath et al., 2015).

Day 7: Pre-Surgery Nutrient Boost

- **Breakfast:** Smoothie with kale, pineapple, Greek yogurt, and chia seeds. *Why:* Kale is rich in vitamins A and C, pineapple contains bromelain for reducing swelling, and yogurt provides probiotics and protein (Martinez & Rodriguez, 2019).
- **Snack:** A small bowl of mixed nuts and dried cranberries. *Why:* Nuts offer healthy fats and protein, while cranberries provide antioxidants to support tissue repair (Ferlay et al.2018).

POST-OP

Day 1:

- **Breakfast:** Oatmeal topped with fresh berries and a tablespoon of almond butter**.**
    - *Why:* Oatmeal is a great source of carbohydrates for energy, while berries are high in antioxidants that support immune function (Martinez & Rodriguez, 2019). Almond butter adds healthy fats and protein for muscle maintenance (Weimann & Braga, 2021**).**
- **Snack:** Greek yogurt with honey**.**
    - *Why:* Greek yogurt provides probiotics and protein that can help enhance gut health and support recovery (National Institutes of Health, 2019).
- **Lunch:** Grilled chicken salad with mixed greens, cherry tomatoes, cucumbers, and olive oil dressing.
    - *Why:* Chicken provides lean protein essential for tissue repair (Kahn & Chang, 2021), while the vegetables offer vitamins A and C, promoting skin healing and reducing inflammation (Ferlay et al., 2018).
- **Snack:** Apple slices with peanut butter.
    - *Why*: Apples are a source of fiber and vitamins, while peanut butter offers healthy fats and protein (Zikria & Bianchi, 2020).
- **Dinner:** Baked salmon with steamed broccoli and quinoa**.**
    - *Why:* Salmon is rich in omega-3 fatty acids, which have anti-inflammatory properties, while quinoa is a complete protein that supports muscle repair (Patel & John, 2021).

Day 2:

- **Breakfast:** Smoothie with spinach, banana, and protein powder.
    - *Why:* Spinach provides iron and vitamins necessary for blood health (Martinez & Rodriguez, 2019), while bananas provide potassium, which helps with hydration (National Institutes of Health, 2019).
- **Snack:** Cottage cheese with pineapple.
    - *Why:* Cottage cheese is high in protein and calcium for bone healing, and pineapple contains bromelain, which may reduce inflammation (Ferlay et al., 2018).
- **Lunch:** Lentil soup with carrots and celery.
    - *Why:* Lentils are rich in protein and fiber, helping maintain energy levels and support digestion (Weimann & Braga, 2021).
- **Snack:** Carrot sticks with hummus.

- *Why***:** Carrots provide beta-carotene, supporting immune function, while hummus offers plant-based protein (Patel & John, 2021).

- **Dinner:** Turkey meatballs with whole wheat pasta and marinara sauce.
  - *Why***:** Turkey provides lean protein, while whole grains are essential for sustained energy (Zikria & Bianchi, 2020).

Day 3:

- **Breakfast:** Chia seed pudding made with almond milk and topped with bananas.
  - *Why:* Chia seeds are high in omega-3 fatty acids and fiber, supporting heart health and digestion (Martinez & Rodriguez, 2019).
- **Snack:** Protein bar (low sugar**).**
  - *Why:* A protein bar can offer a quick source of energy and nutrients (Weimann & Braga, 2021).
- **Lunch:** Tuna salad on whole grain bread.
  - *Why:* Tuna is high in protein and omega-3s, which help reduce inflammation (Kahn & Chang, 2021).
- **Snack:** Trail mix with nuts and dried fruit.
  - *Why:* Nuts provide healthy fats and protein, while dried fruits offer antioxidants and quick energy (Ferlay et al., 2018**).**
- **Dinner:** Stuffed bell peppers with quinoa, black beans, and spices.
  - *Why:* This dish is rich in fiber, protein, and vitamins, promoting overall health and recovery (Patel & John, 2021).

Day 4:

- **Breakfast:** Scrambled eggs with spinach and tomatoes.
  - *Why:* Eggs provide high-quality protein for muscle repair, while spinach and tomatoes are high in vitamins A and C (Zikria & Bianchi, 2020).
- **Snack: Yogurt with granola.**
  - *Why:* Yogurt offers probiotics for gut health and granola provides complex carbohydrates for sustained energy (Weimann & Braga, 2021).
- **Lunch:** Chicken and vegetable stir-fry with brown rice**.**
  - *Why:* This meal is high in protein and vitamins, supporting recovery and energy levels (Kahn

& Chang, 2021).

- **Snack:** Celery sticks with almond butter**.**
  - *Why:* Celery provides hydration and fiber, while almond butter adds healthy fats (Ferlay et al., 2018).
- **Dinner:** Baked cod with sweet potato and asparagus.
  - *Why***:** Cod is a lean protein source, sweet potatoes are high in vitamins A and C, and asparagus offers additional nutrients for healing (Martinez & Rodriguez, 2019).

Day 5:

- **Breakfast:** Whole grain toast with avocado and poached egg.
  - ***Why:*** Whole grains provide fiber, avocado offers healthy fats, and eggs provide protein (Patel & John, 2021).
- **Snack:** Smoothie with kale, mango, and protein powder.
  - *Why***:** Kale is high in vitamins and minerals, while mango adds sweetness and antioxidants (National Institutes of Health, 2019**).**
- **Lunch:** Quinoa salad with chickpeas and cucumbers.
  - *Why:* Quinoa is a complete protein, while chickpeas provide fiber and protein for digestion and satiety (Weimann & Braga, 2021).
- Snack: Hard-boiled eggs.
  - *Why***:** These are easy to prepare and provide a good source of protein (Zikria & Bianchi, 2020).
- **Dinner:** Vegetable curry with lentils and brown rice.
  - *Why:* This meal is packed with protein and complex carbohydrates, promoting energy and recovery (Ferlay et al., 2018).

Day 6:

- **Breakfast:** Greek yogurt with walnuts and honey**.**
  - *Why***:** Greek yogurt provides protein and probiotics, while walnuts are high in omega-3s for anti-inflammatory effects (Kahn & Chang, 2021).
- **Snack:** Apple slices with almond butter**.**
  - *Why***:** Apples offer fiber and hydration, while almond butter adds healthy fats (Patel & John, 2021).

- **Lunch:** Baked chicken breast with roasted Brussels sprouts and quinoa**.**
    - *Why:* This meal is high in protein and fiber, supporting muscle recovery and digestion (Martinez & Rodriguez, 2019).
- **Snack:** Rice cakes with cottage cheese**.**
    - *Why:* Rice cakes are light and easy to digest, while cottage cheese offers protein and calcium (Weimann & Braga, 2021).
- **Dinner:** Stir-fried tofu with mixed vegetables and brown rice.
    - *Why:* Tofu provides plant-based protein, while vegetables offer essential vitamins (Zikria & Bianchi, 2020).

Day 7:

- **Breakfast:** Protein pancakes made with oats and topped with fresh fruit.
    - *Why:* Oats provide complex carbohydrates, while fruit adds vitamins and antioxidants (Kahn & Chang, 2021).
- **Snack:** Cottage cheese with a sprinkle of cinnamon.
    - *Why:* Cottage cheese is rich in protein, and cinnamon may help regulate blood sugar (National Institutes of Health, 2019).
- **Lunch:** Salmon salad with leafy greens and vinaigrette**.**
    - *Why***:** Salmon is high in omega-3s, supporting heart health and reducing inflammation (Ferlay et al., 2018).
- **Snack:** Hummus with carrot and cucumber sticks**.**
    - *Why:* Hummus provides protein and fiber, while carrots and cucumbers offer hydration and vitamins (Martinez & Rodriguez, 2019).
- **Dinner:** Vegetable and bean chili with whole grain bread.
    - *Why:* This meal is high in fiber and protein, promoting overall health and recovery (Weimann & Braga, 2021).

14-Day Post-Surgical Meal Plan

General Guidelines After Surgery:

- **Soft Foods:** Focus on soft, easy-to-chew foods to avoid irritating the surgical site.
- **Hydration:** Drinking plenty of fluids, including water and broths, supports healing and prevents dehydration.
- **Protein:** Aim for 1.0–1.5 grams of protein per kilogram of body weight per day to promote tissue repair.
- **Anti-inflammatory Foods:** Include omega-3s, antioxidants, and vitamins A, C, and D to reduce inflammation and promote tissue healing.
- **Avoid Hard or Spicy Foods:** These can irritate the surgical site and delay healing.

Days 1–3: Soft, Nutrient-Dense, and Hydrating Foods

Day 1

- **Breakfast:** Smoothie with Greek yogurt, banana, and spinach.
  Why: Greek yogurt provides high-quality protein for tissue repair, bananas are easy to eat and provide potassium for hydration, and spinach adds iron and vitamin K for blood clotting (Martinez & Rodriguez, 2019).
- **Snack:** Applesauce (unsweetened).
  Why: Applesauce is easy to consume and provides natural sugars for energy without straining the mouth (Kahn & Chang, 2021).
- **Lunch:** Blended vegetable soup (carrots, sweet potatoes, and zucchini).
  Why: This provides vitamins A and C, crucial for skin repair and immune function. The soft texture prevents irritation at the surgery site (Patel & John, 2021).
- **Snack:** Cottage cheese with a drizzle of honey.
  Why: Cottage cheese is a soft source of protein and calcium, important for healing bones and soft tissues (Zikria & Bianchi, 2020).
- **Dinner:** Mashed potatoes with pureed chicken.
  Why: Mashed potatoes offer easy-to-digest carbohydrates for energy, while pureed chicken supplies lean protein for tissue repair (Ferlay et al., 2018).

Day 2

- **Breakfast:** Scrambled eggs with mashed avocado.
  Why: Eggs are a soft, protein-rich food that helps with healing, while avocado adds healthy fats that reduce inflammation and promote cell regeneration (Patel & John, 2021).
- **Snack:** Greek yogurt with blended berries.
  Why: Greek yogurt provides probiotics and protein, while berries add antioxidants and vitamin C (Kahn & Chang, 2021).
- **Lunch:** Creamy butternut squash soup.
  Why: Butternut squash is high in beta-carotene, aiding tissue regeneration and wound healing (Martinez & Rodriguez, 2019).
- **Snack:** Smoothie with protein powder, almond milk, and chia seeds.
  Why: This is a quick way to boost protein intake. Chia seeds are high in omega-3s, reducing inflammation (Zikria & Bianchi, 2020).
- **Dinner:** Blended lentil stew with carrots and celery.
  Why: Lentils are rich in plant-based protein and fiber, which support tissue repair and maintain digestion during inactivity (McKenzie & Jenkins, 2022).

Day 3

- **Breakfast:** Oatmeal with a dollop of peanut butter.
  Why: Oatmeal is soft and rich in fiber, while peanut butter provides protein and healthy fats for healing (Kahn & Chang, 2021).
- **Snack:** Blended fruit smoothie (mango, peach, and almond milk).
  Why: This offers hydration and vitamins A and C, which are key for collagen formation and immune response (Ferlay et al., 2018).
- **Lunch:** Creamy broccoli soup.
  Why: Broccoli is packed with vitamin C and fiber, helping both immune support and digestion (Patel & John, 2021).
- **Snack:** Mashed sweet potatoes with a small amount of butter.
  Why: Sweet potatoes are rich in beta-carotene and fiber, supporting skin health and energy (Weimann & Braga, 2021).
- **Dinner:** Poached salmon (pureed or finely mashed) with mashed peas.

Why: Salmon is a rich source of omega-3s, which help reduce inflammation, and peas provide protein and vitamin K for blood clotting (Zikria & Bianchi, 2020).

Days 4–7: Soft, Protein-Rich, and Anti-Inflammatory Foods

Day 4

- **Breakfast:** Greek yogurt with soft, mashed peaches.
  Why: Greek yogurt is high in protein for tissue repair, and peaches are rich in antioxidants (National Institutes of Health, 2019).
- **Snack:** Cottage cheese with a small drizzle of maple syrup.
  Why: Cottage cheese is an excellent source of protein and calcium for bone and tissue healing (Zikria & Bianchi, 2020).
- **Lunch:** Pureed pumpkin soup with a touch of coconut milk.
  Why: Pumpkin is high in vitamin A, which supports skin healing, and coconut milk adds healthy fats that reduce inflammation (Patel & John, 2021).
- **Snack:** Avocado mousse made with blended avocado and a bit of lime.
  Why: Avocado is full of heart-healthy fats and potassium, aiding cell recovery and hydration (Ferlay et al., 2018).
- **Dinner:** Mashed cauliflower and pureed ground turkey.
  Why: Cauliflower is rich in fiber and vitamins, while turkey provides lean protein for repair (Weimann & Braga, 2021).

Day 5

- **Breakfast:** Smoothie with Greek yogurt, blueberries, and almond milk.
  Why: This blend is rich in protein and antioxidants, promoting healing and reducing inflammation (Kahn & Chang, 2021).
- **Snack:** Applesauce (unsweetened).
  Why: Applesauce provides easy-to-digest carbohydrates and natural sugars for energy (National Institutes of Health, 2019).
- **Lunch:** Blended carrot and ginger soup.
  Why: Carrots are rich in beta-carotene, while ginger offers anti-inflammatory properties that help reduce post-operative swelling (Martinez & Rodriguez, 2019).
- **Snack:** Hummus with soft, pureed sweet potatoes.

Why: Hummus provides plant-based protein, while sweet potatoes offer beta-carotene and fiber (Zikria & Bianchi, 2020).

- **Dinner:** Shredded chicken with mashed butternut squash.
  Why: Chicken offers lean protein for tissue repair, and butternut squash provides vitamins A and C to promote healing (Ferlay et al., 2018).

Day 6

- **Breakfast:** Scrambled eggs with mashed avocado.
  Why: Eggs provide protein for healing, and avocados add healthy fats that reduce inflammation (Patel & John, 2021).
- **Snack:** Smoothie with protein powder, almond milk, and a banana.
  Why: A high-protein smoothie aids in repair, and bananas supply potassium for hydration (Kahn & Chang, 2021).
- **Lunch:** Blended lentil soup with carrots and celery.
  Why: Lentils are high in fiber and plant-based protein, helping in recovery and digestion (McKenzie & Jenkins, 2022).
- **Snack:** Mashed bananas with a little peanut butter.
  Why: Bananas provide potassium and are easy to eat, while peanut butter adds protein (Zikria & Bianchi, 2020).
- **Dinner:** Baked salmon (pureed) with mashed peas.
  Why: Salmon is rich in omega-3s for anti-inflammatory effects, and peas are soft, fiber-rich, and high in vitamin K (Weimann & Braga, 2021).

Day 7

- **Breakfast:** Creamy oatmeal with almond butter.
  Why: Oats are gentle on the mouth and provide fiber, while almond butter adds protein and healthy fats (Kahn & Chang, 2021).
- **Snack:** Greek yogurt with pureed strawberries.
  Why: Greek yogurt is rich in protein for healing, and strawberries offer vitamin C for collagen formation (Martinez & Rodriguez, 2019).
- **Lunch:** Blended zucchini and basil soup.
  Why: Zucchini is soft and full of vitamins A and C, aiding tissue regeneration (Ferlay et al., 2018).
- **Snack:** Cottage cheese with a little bit of soft mashed peaches.

Why: Cottage cheese is a great source of protein, and peaches provide easy-to-eat vitamins and antioxidants (Kahn & Chang, 2021).

- **Dinner:** Pureed turkey and mashed carrots.
  Why: Turkey provides lean protein for healing, while carrots offer essential vitamins for tissue repair (Patel & John, 2021).

Days 8–14: Soft, Nutrient-Dense Regular Foods

Day 8

- **Breakfast:** Omelet with spinach and soft cheese.
  Why: Eggs and spinach provide high-quality protein and iron, essential for tissue repair and immune support (Martinez & Rodriguez, 2019).
- **Snack:** Soft mashed avocado with a small drizzle of olive oil.
  Why: Avocados are rich in healthy fats and antioxidants, promoting cell regeneration and inflammation reduction (Patel & John, 2021).
- **Lunch:** Soft quinoa salad with mashed avocado, cherry tomatoes, and olive oil.
  Why: Quinoa provides complete protein, while avocado and olive oil offer healthy fats for recovery, and tomatoes provide vitamin C to promote collagen production (McEvoy et al., 2018).
- **Snack:** Cottage cheese with mashed peaches.
  Why: Cottage cheese offers an easy-to-digest source of protein, while peaches provide vitamin C and fiber for immune support and digestion (Zikria & Bianchi, 2020).
- **Dinner:** Baked salmon (soft, flaked) with mashed sweet potatoes and steamed spinach.
  Why: Salmon is rich in omega-3s, which reduce inflammation, while sweet potatoes and spinach provide vitamins A and C to support tissue healing (Simopoulos, 2002).

Day 9

- **Breakfast:** Oatmeal with flaxseeds, bananas, and almond butter.
  Why: Oats are gentle on the mouth and provide fiber, flaxseeds add omega-3s for inflammation reduction, and almond butter provides healthy fats and protein for tissue repair (Simopoulos, 2002).
- **Snack:** Applesauce (unsweetened) and a handful of walnuts.
  Why: Applesauce offers an easy-to-eat source of natural sugars for energy, and walnuts add omega-3s and antioxidants to support healing (National Institutes of Health, 2019).

- **Lunch:** Lentil and vegetable soup with soft-cooked carrots and celery. *Why:* Lentils are a rich source of plant-based protein and fiber, while the vegetables provide vitamins A and C for immune support and collagen formation (Gopinath et al., 2015).
- **Snack:** Greek yogurt with a drizzle of honey. *Why:* Greek yogurt provides protein for tissue repair and probiotics for gut health, which is important for overall recovery (Patel & John, 2021).
- **Dinner:** Soft tofu stir-fry with steamed broccoli and mashed brown rice. *Why:* Tofu is an easily digestible plant-based protein, while broccoli is rich in vitamin C and antioxidants, and brown rice offers fiber to support digestion and immune function (Zikria & Bianchi, 2020).

Day 10

- **Breakfast:** Smoothie with almond milk, protein powder, spinach, and pineapple. *Why:* This smoothie provides protein for tissue repair, spinach offers iron for blood oxygenation, and pineapple contains bromelain, which helps reduce inflammation and swelling (Martinez & Rodriguez, 2019).
- **Snack:** Soft mashed avocado with a sprinkle of chia seeds. *Why:* Avocado provides anti-inflammatory fats, and chia seeds are a rich source of omega-3s, which promote faster healing (Simopoulos, 2002).
- **Lunch:** Mashed chickpeas with olive oil, lemon juice, and steamed vegetables. *Why:* Chickpeas provide plant-based protein, olive oil offers healthy fats, and vegetables like carrots and broccoli provide vitamins A and C for healing (McEvoy et al., 2018).
- **Snack:** Cottage cheese with mashed raspberries. *Why:* Cottage cheese is an easy-to-digest protein source, while raspberries are rich in antioxidants and vitamin C for immune support (Zikria & Bianchi, 2020).
- **Dinner:** Soft-baked cod with mashed peas and roasted butternut squash. *Why:* Cod is a lean protein source, while butternut squash and peas provide fiber and beta-carotene, essential for immune function and tissue healing (Ferlay et al., 2018).

Day 11

- **Breakfast:** Scrambled eggs with mashed avocado.

Why: Eggs provide protein to support tissue repair, and avocado offers anti-inflammatory fats and potassium to aid healing (Weimann & Braga, 2021).

- **Snack:** Smoothie with almond milk, chia seeds, banana, and spinach. *Why:* This smoothie provides essential vitamins and omega-3s for reducing inflammation and promoting collagen formation (Simopoulos, 2002).
- **Lunch:** Soft quinoa salad with shredded chicken, spinach, and a light lemon dressing. *Why:* Quinoa and chicken offer complete proteins, while spinach provides iron and antioxidants for healing (Kahn & Chang, 2021).
- **Snack:** Greek yogurt with honey and chia seeds. *Why:* Greek yogurt offers probiotics for gut health and protein for tissue repair, and chia seeds provide anti-inflammatory omega-3s (Weimann & Braga, 2021).
- **Dinner:** Mashed sweet potatoes with soft, steamed salmon and steamed spinach. *Why:* Sweet potatoes provide fiber and vitamin A, and salmon is rich in omega-3s, while spinach adds vitamin C and iron for collagen production and immune support (Simopoulos, 2002).

Day 12

- **Breakfast:** Smoothie bowl with blended strawberries, bananas, and Greek yogurt topped with chia seeds.
  Why: This nutrient-packed meal is rich in antioxidants, protein, and omega-3s to support healing and tissue repair (Martinez & Rodriguez, 2019).
- **Snack:** Applesauce and a small handful of walnuts. *Why:* Applesauce provides natural sugars for energy, and walnuts are rich in omega-3s, which reduce inflammation (National Institutes of Health, 2019).
- **Lunch:** Soft vegetable soup (carrots, celery, zucchini) with mashed lentils. *Why:* Lentils are high in protein, while vegetables provide fiber and essential vitamins for immune function and healing (Gopinath et al., 2015).
- **Snack:** Greek yogurt with mashed peaches. *Why:* Greek yogurt provides protein and probiotics, while peaches are rich in antioxidants for tissue repair (Weimann & Braga, 2021).
- **Dinner:** Flaked soft fish (tilapia) with mashed cauliflower and steamed green beans. *Why:* Tilapia is a lean protein source, while cauliflower and green beans provide fiber, vitamins C, and

essential minerals for tissue regeneration (Zikria & Bianchi, 2020).

Day 13

- **Breakfast:** Scrambled eggs with spinach and soft cheese. *Why:* Eggs and spinach are protein and iron-rich, essential for tissue repair and immune function (Martinez & Rodriguez, 2019).
- **Snack:** Smoothie with almond milk, banana, and spinach. *Why:* This nutrient-rich smoothie offers potassium, fiber, and vitamins A and C for healing and hydration (Simopoulos, 2002).
- **Lunch:** Soft mashed avocado with chickpeas, tomatoes, and olive oil. *Why:* Avocado and chickpeas provide healthy fats and plant-based protein, while tomatoes offer vitamin C to promote collagen production (Patel & John, 2021).
- **Snack:** Cottage cheese with a drizzle of honey. *Why:* Cottage cheese offers an easy-to-digest protein source for muscle and tissue repair, and honey provides natural sugars for energy (Ferlay et al., 2018).
- **Dinner:** Baked soft tofu stir-fry with mashed peas and roasted carrots. *Why:* Tofu is rich in plant-based protein, and peas and carrots provide fiber and vitamins A and C, essential for wound healing (Zikria & Bianchi, 2020).

Day 14

- **Breakfast:** Oatmeal with almond butter, mashed banana, and chia seeds. *Why:* Oats provide fiber and are easy on the stomach, while almond butter and chia seeds offer protein and omega-3s to reduce inflammation (Weimann & Braga, 2021).
- **Snack:** Smoothie with almond milk, spinach, and pineapple. *Why:* This smoothie provides anti-inflammatory properties from pineapple and essential vitamins for immune function from spinach (Martinez & Rodriguez, 2019).
- **Lunch:** Soft quinoa salad with shredded chicken, mashed avocado, and spinach. *Why:* Quinoa and chicken offer complete proteins, while avocado provides healthy fats, and spinach provides antioxidants for collagen production (Kahn & Chang, 2021).
- **Snack:** Applesauce with a handful of almonds. *Why:* Applesauce is gentle on the mouth and provides energy, while almonds add healthy fats and

vitamin E for tissue repair (Simopoulos, 2002).

- **Dinner:** Soft-baked salmon with mashed sweet potatoes and steamed broccoli. *Why:* Salmon provides omega-3s to reduce inflammation, sweet potatoes offer beta-carotene for immune support, and broccoli adds vitamin C for collagen production (Ferlay et al., 2018).

Appendix B: Golden Milk for Post-Surgical Healing

Golden Milk Recipe:

- **Ingredients:**
  - 1 cup almond milk (or any plant-based milk)
  - 1/2 teaspoon turmeric powder
  - 1/4 teaspoon ginger powder (or fresh grated ginger)
  - 1/4 teaspoon cinnamon powder
  - A pinch of black pepper (to enhance curcumin absorption)
  - 1 teaspoon maple syrup or honey (optional for sweetness)
  - 1/4 teaspoon coconut oil (optional for added healthy fats)

Instructions:

1. Heat the almond milk in a small saucepan over medium heat, but do not bring it to a boil.
2. Whisk in the turmeric, ginger, cinnamon, and black pepper until well combined.
3. Let the mixture simmer for 5 minutes, stirring occasionally.
4. Remove from heat and add the maple syrup or honey for sweetness if desired.
5. Stir in the coconut oil to enhance the absorption of turmeric.
6. Pour the golden milk into a mug and enjoy while warm.

Why Golden Milk Helps Post-Surgery:

- **Turmeric (Curcumin):** Has strong anti-inflammatory properties that can reduce swelling and promote healing after surgery (Hewlings & Kalman, 2017).
- **Ginger:** Aids in reducing inflammation and supports digestion, which can be beneficial for recovery (Grzanna et al., 2005).
- **Cinnamon:** Offers antioxidant benefits that help reduce oxidative stress, supporting overall tissue repair (Aggarwal & Harikumar, 2009).
- **Black Pepper:** Enhances the absorption of curcumin, making the anti-inflammatory effects of turmeric

more potent (Shoba et al., 1998).

- **Coconut Oil:** Provides healthy fats that support cell regeneration and help in the absorption of fat-soluble vitamins (Hosseini & Houshmand, 2015).

This recipe can be recommended as a soothing, anti-inflammatory drink during the recovery period, particularly in the first two weeks post-surgery.

Appendix C:

7-Day Pre-Surgical Vegan Meal Plan:

Day 1:

- **Breakfast**: Oatmeal with flaxseeds, chia seeds, and fresh berries. **Why**: This meal is rich in anti-inflammatory compounds, omega-3s, and fiber, which help to reduce inflammation and support gut health before surgery (Simopoulos, 2002).
- **Lunch**: Quinoa salad with chickpeas, spinach, bell peppers, and a lemon-tahini dressing. **Why**: High in protein, iron, and vitamin C, this meal helps boost the immune system and supports collagen production (McEvoy, Woodside, & Young, 2018).
- **Dinner**: Lentil stew with carrots, celery, and sweet potatoes. **Why**: Lentils provide plant-based protein and fiber, while carrots and sweet potatoes are high in beta-carotene and antioxidants, crucial for immune support and tissue repair (Gopinath, Pal, & Nair, 2015).

Day 2:

- **Breakfast**: Smoothie with kale, banana, almond butter, and hemp seeds. **Why**: Kale is rich in calcium and vitamin K, while bananas provide potassium—both essential for muscle function and tissue repair (Pizzorno, Murray, & Joiner-Bey, 2013).
- **Lunch**: Zucchini noodles with pesto made from basil, spinach, walnuts, and olive oil. **Why**: This meal is high in omega-3s, vitamin K, and anti-inflammatory properties, promoting cell repair and reducing inflammation (Simopoulos, 2002).
- **Dinner**: Stir-fried tofu with broccoli, ginger, and brown rice. **Why**: Tofu is rich in plant-based protein, and broccoli offers vitamin C, essential for collagen production. Ginger is a powerful anti-inflammatory (Thomas, Erdman, & Burke, 2016).

Day 3:

- **Breakfast**: Avocado toast on whole grain bread with pumpkin seeds.

Why: Avocado provides healthy fats and vitamin E, which supports skin health and wound healing. Pumpkin seeds are rich in zinc, which is important for immune function (Wang & Quinn, 2000).

- **Lunch**: Black bean and corn salad with avocado and cilantro. **Why**: Black beans provide protein and fiber, and the vitamin E in avocado helps reduce inflammation and supports healing (Li & Zhou, 2016).
- **Dinner**: Mushroom and spinach risotto with nutritional yeast. **Why**: This dish is rich in B vitamins and iron, which are crucial for red blood cell production and tissue oxygenation (Hensrud & Heimburger, 2020).

Day 4:

- **Breakfast**: Chia pudding made with almond milk, topped with pomegranate seeds. **Why**: Chia seeds are an excellent source of omega-3s, while pomegranate provides antioxidants that help reduce inflammation (Simopoulos, 2002).
- **Lunch**: Butternut squash soup with coconut milk and turmeric. **Why**: Butternut squash is high in vitamin A, which supports tissue repair, and turmeric is a powerful anti-inflammatory spice (Li & Zhou, 2016).
- **Dinner**: Eggplant and chickpea curry with jasmine rice. **Why**: Chickpeas are rich in protein, and eggplant offers antioxidants like nasunin that support cellular health (Gopinath et al., 2015).

Day 5:

- **Breakfast**: Green smoothie with spinach, pineapple, spirulina, and chia seeds. **Why**: Spinach and spirulina are rich in iron and chlorophyll, which help in tissue oxygenation. Pineapple contains bromelain, an enzyme that reduces swelling (Hensrud & Heimburger, 2020).
- **Lunch**: Roasted beet and quinoa bowl with tahini dressing. **Why**: Beets are rich in iron and nitrates, which support blood flow, and quinoa provides complete protein, essential for recovery (Pizzorno et al., 2013).
- **Dinner**: Stuffed bell peppers with quinoa, black beans, and avocado. **Why**: The combination of fiber, protein, and vitamin C in this meal supports healing, boosts immunity, and promotes collagen production (McEvoy et al., 2018).

Day 6:

- **Breakfast**: Buckwheat pancakes with almond butter and strawberries. **Why**: Buckwheat is a gluten-free grain that is rich in fiber and protein. Almond butter provides healthy

fats, and strawberries are rich in antioxidants (Wang & Quinn, 2000).

- **Lunch**: Lentil and vegetable soup with kale and carrots. **Why**: This meal is high in iron, beta-carotene, and fiber, all essential for tissue repair and immune support (Gopinath et al., 2015).
- **Dinner**: Vegan shepherd's pie with mashed cauliflower and lentils. **Why**: Lentils provide protein and fiber, while cauliflower offers a low-carb alternative rich in vitamin C (McEvoy et al., 2018).

Day 7:

- **Breakfast**: Tofu scramble with spinach, bell peppers, and onions. **Why**: Tofu is a great source of protein, and spinach offers iron and vitamin C, necessary for immune function and tissue repair (Thomas et al., 2016).
- **Lunch**: Falafel wrap with hummus, cucumber, and tomatoes. **Why**: Falafel and hummus provide protein and healthy fats, and cucumbers and tomatoes are rich in antioxidants and water for hydration (Li & Zhou, 2016).
- **Dinner**: Roasted vegetables (carrots, sweet potatoes, Brussels sprouts) with a side of quinoa. **Why**: Roasted vegetables are full of antioxidants and vitamins like A and C, while quinoa adds complete protein to support tissue healing (Hensrud & Heimburger, 2020).

14-Day Post-Surgical Vegan Meal Plan:

Appendix A:

Detailed 14-Day Post-Surgical Vegan Meal Plan

Days 1–3: Soft and Easy-to-Eat Foods

Day 1

- **Breakfast:** Smoothie with almond milk, bananas, blueberries, and hemp seeds. *Why:* This smoothie is easy to consume and provides essential vitamins, minerals, and omega-3s from hemp seeds, which promote faster recovery and wound healing (Simopoulos, 2002).
- **Lunch:** Mashed sweet potatoes with olive oil and cinnamon. *Why:* Sweet potatoes are rich in vitamin A, critical for tissue repair, while olive oil adds anti-inflammatory fats to aid healing (Li & Zhou, 2016).
- **Dinner:** Creamy butternut squash soup with coconut milk.

Why: Butternut squash is soothing, easy to eat, and contains beta-carotene, which supports immune function and wound healing (McEvoy et al., 2018).

Day 2

- **Breakfast:** Silken tofu scramble with soft steamed spinach. *Why:* Silken tofu is soft, protein-rich, and easy to digest, while spinach provides iron to enhance oxygenation of tissues (Hensrud & Heimburger, 2020).
- **Lunch:** Soft avocado and chickpea mash on whole-grain bread. *Why:* Avocado provides healthy fats that promote tissue healing, and chickpeas offer fiber and plant-based protein for muscle repair (Wang & Quinn, 2000).
- **Dinner:** Pureed lentil and carrot soup. *Why:* Lentils are rich in protein and iron, while carrots provide beta-carotene, which supports immune function and tissue repair (Gopinath et al., 2015).

Day 3

- **Breakfast:** Oatmeal with mashed banana and almond butter. *Why:* Oatmeal is soft and provides slow-release carbohydrates, while almond butter and bananas offer healthy fats and potassium for muscle repair (Pizzorno et al., 2013).
- **Lunch:** Soft vegetable stew with carrots, zucchini, and soft tofu. *Why:* This meal is packed with fiber, antioxidants, and plant-based protein, promoting recovery while being gentle on the stomach (Li & Zhou, 2016).
- **Dinner:** Vegan creamy cauliflower soup with mashed peas. *Why:* Cauliflower is rich in vitamin C, which is critical for immune health, and peas are a soft, fiber-rich source of protein and iron (Thomas et al., 2016).

Days 4–6: Gradually Introduce More Texture

Day 4

- **Breakfast:** Smoothie with spinach, avocado, chia seeds, and apple. *Why:* This nutrient-dense smoothie is rich in omega-3s, fiber, and vitamin C, essential for reducing inflammation and promoting healing (Simopoulos, 2002).
- **Lunch:** Soft quinoa salad with cucumber, avocado, and lemon-tahini dressing. *Why:* Quinoa provides complete protein, and cucumber and avocado are hydrating and rich in healthy fats to support tissue repair (McEvoy et al., 2018).

- **Dinner:** Vegan chili with mashed black beans, tomatoes, and bell peppers. *Why:* Black beans offer protein, and tomatoes and bell peppers provide vitamin C and antioxidants that support collagen formation and wound healing (Li & Zhou, 2016).

Day 5

- **Breakfast:** Chia pudding made with almond milk, topped with pomegranate seeds. *Why:* Chia seeds are a rich source of omega-3s, essential for reducing inflammation, while pomegranate provides antioxidants to support recovery (Simopoulos, 2002).
- **Lunch:** Butternut squash soup with coconut milk and turmeric. *Why:* Butternut squash is high in vitamin A for tissue repair, and turmeric is a powerful anti-inflammatory spice that aids recovery (Li & Zhou, 2016).
- **Dinner:** Eggplant and chickpea curry with jasmine rice. *Why:* Chickpeas provide plant-based protein, while eggplant offers antioxidants that support cellular health and promote faster recovery (Gopinath et al., 2015).

Day 6

- **Breakfast:** Buckwheat pancakes with almond butter and strawberries. *Why:* Buckwheat is a gluten-free grain rich in fiber and protein, while almond butter provides healthy fats and strawberries are high in antioxidants (Wang & Quinn, 2000).
- **Lunch:** Lentil and vegetable soup with kale and carrots. *Why:* This soup is high in iron, beta-carotene, and fiber, essential for tissue repair and immune function (Gopinath et al., 2015).
- **Dinner:** Vegan shepherd's pie with mashed cauliflower and lentils. *Why:* Lentils provide protein and fiber, while cauliflower offers vitamin C and is easy to digest (McEvoy et al., 2018).

Days 7–9: Introducing More Fiber-Rich and Protein-Dense Foods

Day 7

- **Breakfast:** Tofu scramble with spinach, bell peppers, and onions. *Why:* Tofu is a great source of plant-based protein, and spinach offers iron and vitamin C, necessary for immune function and tissue repair (Thomas et al., 2016).
- **Lunch:** Falafel wrap with hummus, cucumber, and tomatoes. *Why:* Falafel and hummus provide protein and healthy fats, while cucumbers and tomatoes are rich in

antioxidants and water for hydration (Li & Zhou, 2016).

- **Dinner:** Roasted vegetables (carrots, sweet potatoes, Brussels sprouts) with quinoa. *Why:* Roasted vegetables are rich in antioxidants and vitamins like A and C, while quinoa adds complete protein for tissue repair (Hensrud & Heimburger, 2020).

Day 8

- **Breakfast:** Smoothie with almond milk, blueberries, spinach, and hemp seeds. *Why:* This smoothie offers a mix of vitamins, minerals, and omega-3s for inflammation reduction and wound healing (Simopoulos, 2002).
- **Lunch:** Soft quinoa and avocado bowl with roasted cherry tomatoes. *Why:* Quinoa provides protein and essential amino acids, while avocado offers healthy fats to promote healing (McEvoy et al., 2018).
- **Dinner:** Lentil and mushroom stew with mashed sweet potatoes. *Why:* Lentils are protein-rich, and sweet potatoes offer fiber and beta-carotene to support tissue regeneration and immune health (Pizzorno et al., 2013).

Day 9

- **Breakfast:** Smoothie bowl with blended strawberries, bananas, chia seeds, and almond butter. *Why:* This meal is easy to eat and provides vitamins, omega-3s, and healthy fats for recovery (Wang & Quinn, 2000).
- **Lunch:** Roasted bell peppers stuffed with quinoa and black beans. *Why:* This dish is high in protein and fiber, which helps with tissue repair and maintains gut health during recovery (Thomas et al., 2016).
- **Dinner:** Soft curry with chickpeas, spinach, and coconut milk. *Why:* Chickpeas offer protein and fiber, while coconut milk and spinach provide essential fats and iron for enhanced healing (Gopinath et al., 2015).

Days 10–14: Return to Normal Texture with Nutrient-Rich Foods

Day 10

- **Breakfast:** Oatmeal with flaxseeds, blueberries, and almond butter. *Why:* Oatmeal is rich in fiber for digestion, while flaxseeds and almond butter provide omega-3s and healthy fats to promote healing (Simopoulos, 2002).
- **Lunch:** Zucchini noodles with cashew cream sauce and cherry tomatoes.

Why: Zucchini noodles are hydrating and rich in vitamins, while cashew cream provides protein and healthy fats (McEvoy et al., 2018).

- **Dinner:** Roasted vegetable medley with soft quinoa and tahini dressing. *Why:* This nutrient-packed meal provides fiber, protein, and antioxidants to support ongoing recovery (Gopinath et al., 2015).

Day 11

- **Breakfast:** Smoothie with spinach, avocado, chia seeds, and apples. *Why:* This smoothie is packed with omega-3s, fiber, and vitamin C to continue supporting inflammation reduction and healing (Simopoulos, 2002).
- **Lunch:** Quinoa salad with cucumber, avocado, and lemon-tahini dressing. *Why:* Quinoa is a complete protein, while cucumber and avocado add hydrating fats for enhanced tissue repair (McEvoy et al., 2018).
- **Dinner:** Vegan chili with mashed black beans, tomatoes, and bell peppers. *Why:* Black beans provide protein, and tomatoes and bell peppers are rich in vitamin C and antioxidants for collagen formation (Li & Zhou, 2016).

Day 12–14:

Continue with soft, nutrient-dense meals, gradually introducing more texture and variety as tolerated, while maintaining a focus on protein, healthy fats, and fiber-rich vegetables to optimize tissue repair and overall healing.

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