Keywords: prehabilitation program
Problem: Major surgery is taxing on patients. Many never return to normal activity capabilities, increasing the risk of complications.
Solution: Prehabilitation programs aim to improve functionality during the perioperative and postoperative periods. This article overviews the four key pillars of an effective prehabilitation program.

Enhancing Post-Surgical Functionality with Prehabilitation Programs

Surgical advancements, such as minimally invasive techniques, produce less internal trauma and boast better recovery with reduced narcotic use. Anesthesia has also become safer and more accessible even for older and high-risk patients. Yet approximately 30% of patients undergoing major abdominal surgery have postoperative complications. For those without postoperative complications, 40% experience reduced physical and functional capabilities.

In the past, surgical therapies focused on postoperative rehabilitation. However, studies show that increasing muscular and functional reserves improve recovery and reduce complications. Clinicians predict postoperative complications by assessing VO$2peak$, a 6-minute walk and anaerobic threshold.

Prehabilitation is an evidence-based preoperative strategy to reduce postoperative complications. Prehabilitation typically lasts six to eight weeks. It focuses on physical training, nutritional conditioning, psychological support and inspiratory muscle training (IMT). Keep reading to learn how to implement these strategies into surgical preparations.

Key Takeaways

- Major surgery is taxing on patients. Many never return to normal activity levels, increasing their risk of complications.
- Recent studies suggest that by assessing VO$2peak$, a 6-minute walk and anaerobic threshold, clinicians can evaluate functional reserve and predict postoperative morbidity and mortality.
- Prehabilitation programs aim to improve functionality during the perioperative and postoperative periods. These programs focus on physical training, nutritional conditioning, psychological support and inspiratory muscle training.
- Aerobic activities, strength exercises and IMT increase preoperative functional reserves. Consequently, patients enjoy better postoperative outcomes.
- Nutrition and mental health are essential in promoting prompt recovery. Adequate nutrition reduces inflammation and infection. Psychological support promotes resilience, leading to better patient compliance.

Preoperative physical training

Preoperative physical training focuses on endurance and strength exercises. Cardiopulmonary exercise testing should be performed before beginning prehabilitation training. These tests assess VO2$peak$, a 6-minute walk and anaerobic threshold. A physiotherapist evaluates the test results and considers the patient's age and comorbidities. This information helps the therapist create a personalized training plan.

Walking and biking are aerobic exercises that are easily accessible and adaptable. These endurance **activities improve hemodynamic parameters, such as blood pressure and heart rate.**

Strength training is physically and psychologically valuable. Hospitalization and surgery often result in decreased physical activity. Strengthening the muscles ahead of time helps the body cope with postoperative changes. Prehabilitation strength training aims to fortify all muscle groups used for daily activities:

- Shoulders
- Arms
- Chest
- Abdomen
- Back
- Hips
- Legs

Resilience is the ability to adapt to life's twists, turns, traumas and tragedies. Not only does strength training increase physical resilience; it also improves psychological resilience. According to the National Institute of Health (NIH), exercise shapes how the brain reacts to stressful events.

Exercise increases functional reserves, improves resilience and prepares patients for surgery. Physiotherapists should educate patients on exercise rate, time and type. The NIH recommends patients commit to at least a 6-week physical training plan.

Nutritional conditioning

Malnutrition results in increased postoperative morbidity, mortality, readmissions, hospital stays and hospital costs. Many assume malnutrition is a problem only for underweight individuals. However, people with a high body mass index (BMI) often have micronutrient deficiencies. **Nutritional conditioning focuses on providing the body with appropriate micro- and macro-nutrients.**

Protein enhances the body's ability to sustain weight during surgical stress. Protein supplements are an easy way to ensure patients receive 20 to 40 grams of protein daily. Eating

carbohydrates and protein three hours before exercising helps patients perform training activities. Additionally, consuming 10 grams of protein before exercise elevates muscle strength by 25%.

Insufficient micronutrients negatively impact immune and inflammatory responses. Antioxidants neutralize free radicals caused by surgical trauma. For example, arginine promotes lymphocyte function, improving wound healing. Omega-3 fatty acids reduce inflammation and infection. A nutritionist creates a plan based on the patient's preferences, age and comorbidities.

Psychological wellness

Life is demanding. Surgery is stressful. The unknowns are anxiety-inducing. With psychological support, patients can improve resiliency and postoperative outcomes. The primary goal of psychological prehabilitation is to **reduce anxiety and enhance compliance.**

Anxiety and depression are associated with extended hospital stays, increased infections, reduced functional capacity and poorer recovery. Additionally, heightened anxiety elevates pain perception. When pain is heightened, patients cancel rehabilitation sessions and require more pain medication. Psychological support using integrated therapeutic modalities include:

- Patient education
- Breathing exercises
- Meditation
- Prompt access to mental health services

Patients improve resilience by practicing mindfulness, utilizing mental health resources and educating themselves. Psychological support is a vital component of prehabilitation.

Preoperative inspiratory muscle training

Inspiratory muscle training (IMT) is **resistance training that targets respiratory muscles.** These breathing exercises improve the respiratory muscles' capacity. IMT promotes respiratory wellness in the following ways:

- Enhanced ability to adapt and overcome inspiratory resistance
- Increased diaphragm thickness and strength
- Decreased dyspnea during physical exertion
- Decreased oxygen demands for normal activities

Using a handheld device, the patient inhales to a predetermined percentage of the maximal inspiratory strength. The inspiratory threshold-loading device provides resistance against inhalation. Regular IMT prepares patients for surgery. Additionally, patients who smoke should stop smoking and use nicotine replacement therapy.

Promoting surgical fitness with a prehabilitation program

Surgery has become commonplace. More and more conditions are treated with surgical interventions. These operative innovations improve health and wellness. However, medical professionals must remember that even minor surgeries produce measurable stress. With proactive prehabilitation, patients and providers combat these physical, nutritional and emotional strains.

We understand that **even the most minor surgeries are not minor to your patients.** We treat each individual with attentive and personalized care. If you need surgical services that promote positive postoperative outcomes, look no further. We are your partner in care. Click the "Refer" button to contact us today.

Resources

"Prehabilitation in Patients before Major Surgery: A Review Article." NIH: National Library of Medicine, 2022, Prehabilitation in Patients before Major Surgery: A Review Article - PMC.

"The concept of prehabilitation: What the surgeon needs to know?" ScienceDirect: Journal of Visceral Surgery, 2016, The concept of prehabilitation: What the surgeon needs to know? - ScienceDirect.

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