



# The Hearing Aid Podcasts



## Episode 10.1

### Prehabilitation

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### Definitions

What is prehabilitation?

Prehabilitation refers to the process of increasing functional capacity prior to medical treatment to promote an enhanced ability to withstand the stress of the procedure, thereby leading to an accelerated recovery

[Ferreira V et al. Maximizing patient adherence to prehabilitation: what do the patients say? Support Care Cancer. 2018 Aug;26\(8\):2717-2723. PMID 29478189](#)

What are we pre?

- Surgery
- Chemotherapy and or radiotherapy
  - Prehabilitation in these scenarios happens before **and** during the course of the treatment.
- Immunotherapy
- Just Pre... see 'A Prehabilitation Program for Physically Frail Community-Living Older Persons' (linked below)

[Gill T M et al. A prehabilitation program for physically frail community-living older persons. Arch Phys Med Rehabil. 2003 Mar;84\(3\):394-404. PMID: 12638108.](#)

Episode 9.10 of the MDTea podcast - osteoporosis and resistance training - is mentioned on this episode for extra information on exercise interventions in physically frail older adults.

### **Key points:**

Findings indicate that a group of interventions such as exercise, nutrition and anxiety reduction in the preoperative/pre chemotherapy period can complement enhanced recovery programs and facilitate the return to baseline activities of daily living.

It is not clear at this stage whether the preoperative increase in functional capacity mitigates the burden of postoperative morbidity and that of cancer therapies (using outcome measures such as length of inpatient stays, complications and readmissions) in decisive large multicentre trials. Single centre trials, however, offer promising results.

[Effects and feasibility of a prehabilitation programme incorporating a low-carbohydrate, high-fat dietary approach in patients with type 2 diabetes: A retrospective study. PMID 32251900](#)

[Promoting a culture of prehabilitation for the surgical cancer patient  
PMID 28067101](#)

Prehabilitation is becoming a more researched topic - there were only 50 relevant articles on PubMed in 2000, and >450 articles in 2020, the first having been written in the 1940s!

Early research in prehabilitation programmes came from orthopaedic units, where improved muscle strength and function (from resistance and balance training) showed reduced the need for post-operative rehabilitation.

## **Main Discussion**

### **Benefits of prehabilitation**

We know from our knowledge of frailty that a physiological insult will lead to a potentially significant decline in functional ability.

(See MDTea podcast episodes 2.1 (frailty) and 8.2 (frailty scores) for further information).

There are times when we 'need' to put patients through this sort of strain.  
For example.....

- Major surgery for length of life increase (cancer surgery) or quality of life increase (hip replacements)
- Cancer - to improve both length and quality of life

Preparing patients for this insult seems logical...

If you were going to run a marathon you would do some training...

- The marathon would be really hard if you had only run 100m before
- A bit easier if you could run 10k
- Easier still if you have run 26miles in training
- Easier still if you regularly run 50miles

We need to look at the 'stressors' (surgery, systemic treatment etc) in the context of an ageing, multimorbid population.

We have an ageing population, with more people living longer and needing medical and surgical interventions - meaning more surgery is being done, and more of this is in an aged and comorbid group.

Despite this, at present the overall risk of death and major complications from surgery remains low at just under 2%.

Poorer outcomes are, however, seen in patients with impaired preoperative functional capacity.

- This 'high-risk' subgroup consists typically of elderly, multiply co-morbid patients undergoing major surgery and accounts for over 80% of postoperative deaths while representing only 12.5% of surgical admissions.
- Surgical patients are particularly at risk of 3 related, but distinct, conditions: frailty, sarcopenia, and reduced physical fitness

Prehabilitation is this process of training to enhance an individual's functional capacity to enable him or her to withstand the forthcoming stressor

- There are good outcome benefits including **reduced length of stay, less postoperative pain, and fewer postoperative complications**, but the evidence is limited.
- Large-scale, high-quality studies are needed to confirm the promise of the early evidence and determine the frequency, intensity, and duration of prehabilitation needed to produce optimal results.

A standardised operational definition for prehabilitation interventions (as there is for example in frailty), and agreement on/acknowledgement of the multidimensional nature of prehabilitation are needed to aid and enable the development of larger-scale studies, reviews and comparisons and deliver robust evidence which can be translated into practice.

One study of prehabilitation in abdominal cancer surgery found Prehabilitation programs in patients undergoing abdominal cancer surgery remain heterogeneous in:

- their composition,
- mode of administration,
- outcome measures of functional capacity that are used to evaluate their impact.

All these aspects require standardisation prior to the evaluation of prehabilitation on a larger scale.

[A systematic review of prehabilitation programs in abdominal cancer surgery](#)

### What are the components of prehabilitation?

Programmes are often referred to as a **'trimodal intervention'** - including exercise, psychological and nutritional support arms.

- Physical exercise
  - HIIT, moderate aerobic exercise and respiratory muscle training
- Psychological support.
  - Mindfulness, and/or more targeted active interventions.
  - This is important not just for emotional well being but also for self adherence and compliance with the exercise interventions in the prehab programme.
- Nutritional support
  - Healthy balanced diet
  - Adequate protein intake is encouraged to support an anabolic state.
- Medical optimization
  - This includes anaemia correction, medicines optimisation and review of chronic conditions etc.
  - Lifestyle changes recommended include smoking cessation and alcohol moderation (there is evidence for reduced complications post operatively for both of these interventions), as well as signposting to relevant support services.

[Banugo P, Amoako D, Prehabilitation. BJA Education. 17\(12\): 410-405 \(2017\)](#)

See episode 2.10 of the MDTea podcast - early interventions in dementia-for more information on exercise interventions slowing cognitive decline (as mentioned at this point in this episode)

A good review of the components of a multimodal approach to prehabilitation is an article in Clinical Medicine in 2019; [Durrand J, Singh SJ, Danjoux G. Prehabilitation. Clin Med \(Lond\). 2019 Nov;19\(6\):458-464. PMID: 31732585](#)

In a novel study in the preoperative period, a targeted multimodal prehabilitation programme incorporating a low-carbohydrate, high-fat diet as well as high intensity

resistance training improves diabetes control in patients with T2D awaiting elective surgery, demonstrated by a reduction in HbA1c levels.

The approach is novel as a LCHF diet has not previously been utilized in patients with diabetes within this context.

[Effects and feasibility of a prehabilitation programme incorporating a low-carbohydrate, high-fat dietary approach in patients with type 2 diabetes: A retrospective study. PMID 32251900](#)

### The importance of whole sector involvement

The discussions around the benefits of prehabilitation and what the services offer demonstrate the importance of the whole health sector being involved in patient care (from public health downwards) - linking primary care and community interventions to acute treatment (medical or surgical), rehabilitation and care for long term conditions.

- Every contact a patient has with a healthcare professional counts.
- This is something we advocate generally as specialists looking after older adults.
  - Lifestyle and wellbeing interventions shouldnt be left to be addressed only prior to major surgery, or cancer therapy, or at a time of crisis..
- Contact with prehabilitation services offers a unique and powerful '**teachable moment**' between a patient and the healthcare service
  - It promotes patient empowerment and autonomy
  - For example, advice on eg smoking cessation in a prehabilitation context anecdotally leads to long term changes in lifestyle - this is population health in action!

### The importance of patient education and involvement

Patient education is a key part of a successful programme and a qualitative study of 52 cancer patients enrolled in a prehabilitation program at the Montreal General Hospital, backs this up further.

Findings showed...

- Patients **enjoyed** their experience in prehabilitation, especially the exercise program and training sessions.
- The primary **motivating** factor for participation was to be physically prepared for the surgery.
- The most **challenging** exercise component was resistance training, while the most enjoyed was the aerobic training.

- Approximately 50% of patients were interested in group fitness classes as opposed to supervised individual training sessions for reasons related to social support.
- The preferred methods for exercise program delivery were home-based and one supervised exercise session per week.
- The biggest barrier to participation was related to transportation.

Conclusions : **These findings highlight the need to make prehabilitation programs more patient-centered.** This is critical when designing more effective therapeutic strategies tailored to meet patients' specific needs while overcoming program nonadherence.

[Ferreira, V., Agnihotram, R.V., Bergdahl, A. et al. Maximizing patient adherence to prehabilitation: what do the patients say?. Support Care Cancer 26, 2717–2723 \(2018\). PMID: 29478189](#)

### Examples of studies of prehabilitation programmes in different settings:

#### Colorectal Surgery

Some 112 patients (mean(s.d.) age 60(16) years) were randomized to

- A structured bike and strengthening regimen (bike/strengthening group, 58 patients)
- or a simpler walking and breathing regimen (walk/breathing group, 54 patients).
- Randomization was done at the surgical planning visit; the mean time to surgery available for prehabilitation was 52 days; follow-up was for approximately 10 weeks after surgery.

**Results:** There were **no differences** between the groups in mean functional walking capacity over the prehabilitation period or at postoperative follow-up.

The proportion showing an improvement in walking capacity was greater in the walk/breathing group than in the bike/strengthening group at the end of the prehabilitation period (47 versus 22 per cent respectively;  $P = 0.051$ ) and after surgery (41 versus 11 per cent;  $P = 0.019$ ).

#### **Conclusion:**

There was an unexpected benefit from the recommendation to increase walking and breathing, as designed for the control group. Adherence to recommendations was low. An examination of prehabilitation 'responders' would add valuable information.

[Carli F et al. Randomised clinical trial of prehabilitation in colorectal surgery. Br J Surg. 2010 Aug; 97\(8\):1187-97. doi:10.1002/bjs.7102.PMID: 20602503](#)

## In Cancer

There is increasing interest in prehabilitation in this field, and we touched on this a little in the geriatric oncology episode we have done before (see supporting patients in cancer care, episode 6.08).

As seen in other areas, multimodal interventions appear to be the way forward and this is consistent with frailty management strategies where multimodal interventions work best.

## Orthopaedic surgery

A number of studies have shown that prehabilitation helps in arthroplasty surgery.

[Jahic D et al. The Effect of Prehabilitation on Postoperative Outcome in Patients Following Primary Total Knee Arthroplasty. Med Arch. 2018 Dec;72\(6\):439-443. PMID: 30814777](#)

[Swank AM et al. Prehabilitation before total knee arthroplasty increases strength and function in older adults with severe osteoarthritis. J Strength Cond Res. 2011 Feb;25\(2\):318-25. PMID: 21217530.](#)

[Clode N et al. Does physiotherapy prehabilitation improve pre-surgical outcomes and influence patient expectations prior to knee and hip joint arthroplasty? International Journal of Orthopaedic and Trauma Nursing. 30:14-19 \(2018\)](#)

Cabilan et al (2015) reviewed patients undergoing hip surgery who had undergone prehabilitation interventions. While improvements in post-operative function or quality of life were not shown, a lesser need for rehabilitation post operatively was demonstrated.

[Cabilan CJ, Hines S, Munday J. The effectiveness of prehabilitation or preoperative exercise for surgical patients: a systematic review. JBI Database System Rev Implement Rep. 2015 Jan;13\(1\):146-87. PMID: 26447015.](#)

This might illustrate how data from these trials needs to be explored in a granular fashion. In this example, perhaps it is not the visible value of an intervention but the societal cost of disability that may result from the insult that can be mitigated by prehabilitation.

## What is the future direction for prehabilitation?

- As mentioned, there is a need for larger-scale, multicentre trials

- An agreed operational definition for prehabilitation to aid standardisation and comparability of research, to allow evaluation of research on a larger scale and to allow any findings to be translated into clinical practice.

The COVID-19 pandemic has fast-tracked the development of telemedicine and virtually delivered programmes.

- Patient populations are perhaps now less digitally naive
- The expansion of digital services give hope to increasing the scope of and progress in the field.

[Feasibility and preliminary effects of a tele-prehabilitation program and an in-person prehabilitation program compared to usual care for total hip or knee arthroplasty candidates: a pilot randomized controlled trial](#)

During the COVID-19 pandemic mandate lockdown of the country, patients reported that they missed the peer group support that they received from face to face sessions.

However, the benefits of digital engagement with healthcare professionals according to patients in prehabilitation programmes were the ability to be in the comfort of home surroundings, and not having to drive to appointments and navigate parking etc.

[Silver JK. Prehabilitation could save lives in a pandemic. BMJ. 2020 Apr 6;369:m1386. doi: 10.1136/bmj.m1386. PMID: 32253187.](#)

## Curriculum Mapping

NHS Knowledge Skills Framework

- HWB1 Promotion of health and wellbeing and prevention of adverse effects on health and wellbeing
- HWB2 Assessment and care planning to meet health and wellbeing needs
- HWB4 Enablement to address health and wellbeing needs
- HWB5 Provision of care to meet health and wellbeing needs

Foundation Programme

- Protection of vulnerable groups
- Interface with other healthcare professionals
- The frail patient

GPVTS

- 2.04 Enhancing professional knowledge
- 3.01 Healthy people - promoting health and preventing disease
- 3.05 Care of older adults

Internal Medicine Stage 1

- Other
  - Medical problems following surgical procedures
- Public health and health promotion



- Exercise
- Nutrition
- Oncology
  - Weight loss
- Geriatric medicine
  - Deterioration in mobility
  - Frailty

#### Geriatric Medicine Specialty Training

- CiP 1. Performing a comprehensive assessment of an older person, including mood and cognition, gait, nutrition and fitness for surgery in an in-patient, out-patient and community setting
- 3.7.1 Comprehensive geriatric assessment
- 3.7.1 Rehabilitation, multidisciplinary team working and discharge planning
- 3.7.1 Community liaison and practice
- 3.7.1 Orthogeriatrics