

## **Preventive Care and Prehab**

### **Goals and Objectives**

#### **Course Description**

“Preventive Care and Prehab” is a live (real-time) interactive webinar for rehabilitation professionals examining their role in providing wellness and prehabilitation services. This course includes a review of current literature related to the promotion of a healthy lifestyle and strategies to improve fitness level prior to and enhance recovery following surgical procedures that stress multiple body systems.

#### **Course Rationale**

The purpose of this course is to provide the clinician with knowledge to broaden their role in performing assessments and developing programs focusing on holistic care for clients seeking to improve their physical and mental health, manage chronic disease, and augment recovery following surgery or receiving medical treatments.

#### **Course Goals and Objectives**

Upon completion of this course, participants will be able to:

1. Distinguish between practice models: direct access, preventive care, and prehabilitation.
2. List opportunities for rehabilitation professionals to provide preventive care services.
3. Identify components of healthy lifestyle management within the physical and occupational therapy scope of practice.
4. List methods of assessment to include in preventive care evaluations.
5. Detail the benefits of physical activity to enhance health status of individuals with chronic disease.
6. Identify physiological and psychological mechanisms of exercise on depression.
7. Identify how pre-operative exercise influences post-operative physiologic responses.
8. Identify exercise, nutrition optimization, lifestyle modification and psychological preparation components of prehabilitation.
9. Compare and contrast prehabilitation delivery models.
10. Detail the proposed benefits of prehabilitation for individuals undergoing surgery or receiving medical interventions.

**Course Provider** – Innovative Educational Services

**Course Instructor** – Jodi Gootkin, PT, MEd, CEAS

**Target Audience** – Physical Therapists, Physical Therapist Assistants

**Course Educational Level** – This course is applicable for introductory/intermediate learners.

**Course Prerequisites** – None

**Method of Instruction/Availability** – Live Interactive Webinar available on scheduled dates/times.

**Criteria for Issuance of CE Credits** – Attendance at live interactive webinar and a score of 70% or greater on the course post-test.

**Continuing Education Credits** – Three (3) hours of continuing education credit.

**Course Fee** - \$39.95

**Conflict of Interest** – No conflict of interest exists for the presenter or provider of this course.

**Refund Policy** - Unrestricted 100% refund upon request. The request for a refund by the learner shall be honored in full without penalty or other consideration of any kind. The request for a refund may be made by the learner at any time without limitations before, during, or after course participation.

# Preventive Care and Prehab

Live Interactive Webinar  
Presented By  
JODI GOOTKIN, PT, MED, CEAS  
JODIEMAIL@COMCAST.NET

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## Course Overview

- ▶ "Preventive Care and Prehab" is a live (real-time) interactive webinar for rehabilitation professionals examining their role in providing wellness and prehabilitation services. This course includes a review of current literature related to the promotion of a healthy lifestyle and strategies to improve fitness level prior to and enhance recovery following surgical procedures that stress multiple body systems.

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## Course Rationale

- ▶ The purpose of this course is to provide the clinician with knowledge to broaden their role in performing assessments and developing programs focusing on holistic care for clients seeking to improve their physical and mental health, manage chronic disease, and augment recovery following surgery or receiving oncology treatments.

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## Course Outline and Schedule



3-hour live interactive webinar

Topic	Time
Practice Models	0:00-0:20
Preventive Care Assessment	0:21-0:30
Health and Wellness Promotion	0:31-0:50
<b>Interactive Discussion of Clinical Applications</b>	<b>0:51-1:00</b>
Chronic Disease and Physical Activity	1:01-1:15
Mental Health and Exercise	1:16-1:40
Prehabilitation Physiologic Responses	1:41-1:50
<b>Interactive Discussion of Clinical Applications</b>	<b>1:51-2:00</b>
Prehabilitation Components	2:00-2:10
Exercise, Lifestyle, Nutrition, Psychological	2:11-2:30
Outcomes for Specific Populations	2:31-2:40
Delivery Models	2:41-2:50
<b>Interactive Discussion of Clinical Applications</b>	<b>2:51-3:00</b>

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## How To Obtain CEUs For This Course

- ▶ Course review and summary for post test at the end of the webinar.
- ▶ After the live interactive webinar and prior to 11:59 pm TONIGHT go to [cheapceus.com](http://cheapceus.com)
- ▶ Complete the post test with score of at least 70%
  - ▶ May be retaken multiple times
- ▶ Submit online payment for course
- ▶ Print certificate



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## Course Post Test

- ▶ Slides with "Consider This" icon in bottom right corner will be helpful in completing the post-test.



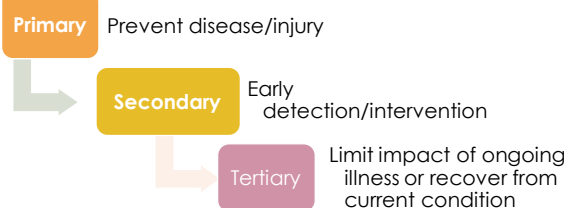
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## Today's Healthcare Landscape

- ▶ Support health promotion, prevention of disease, wellness, and optimize independence across the lifespan



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Occupational Therapy's Role in Health Promotion. American Journal of Occupational Therapy, 74(Supplement 2), 7412410015. <https://www.ajot.org>

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## Practice Models

- ▶ Traditional Rehabilitation
  - ▶ Referral based in response to injury or illness
- ▶ Direct Access
  - ▶ Early care initiated by patient
- ▶ Prehabilitation
  - ▶ Prepare for surgery or treatment to strengthen physiologic reserve and psychological resilience
- ▶ Preventive Care
  - ▶ Lifelong for ongoing wellness and risk reduction



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## Preventive Care

- ▶ Strategies to prevent injury, illness, or functional decline through risk reduction and health promotion
- ▶ Expand early intervention opportunities
- ▶ Opportunity to broaden services beyond impairment treatment

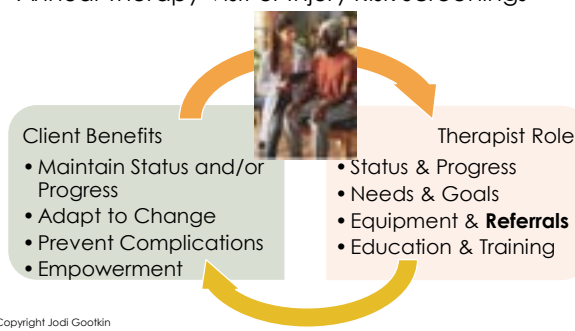
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## Preventive Care Assessment

- ▶ Annual Therapy Visit or Injury Risk Screenings



Copyright Jodi Gootkin APTA. Annual Physical Therapy Visit. Retrieved from <https://www.apta.org/patient-care/interventions/annual-checkup>

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## Health History and Personal Factors

- ▶ Medical/surgical background
- ▶ Medications & risk factors
- ▶ Fall history, sleep, activity level, nutrition, occupation, environmental factors
- ▶ Interests and goals

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## Systems Screening

- ▶ Cardiopulmonary: BP, HR, aerobic capacity
- ▶ Neuromuscular: Gait, balance, coordination
- ▶ Musculoskeletal: ROM, posture, strength, pain
- ▶ Integumentary: Skin integrity, swelling
- ▶ Genitourinary: incontinence
- ▶ Sensory: sensation, vision, hearing
- ▶ Other: Nutrition, sleep, mental health, cognition

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## Functional and Movement Assessment

### Transitions

5 Times Sit to Stand, Timed Up From Floor

### Walking speed

10 Meter Walk Test, Incremental Shuffle Walk Test

### Walking endurance

6 Minute Walk Test

### Balance

STAR Excursion, Peds Balance Scale

### Joint Movement & Strength

Action Research Arm Test, Wolf Motor Function Test

### Posture

Rib/pelvis distance

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## Incremental Shuttle Walk Test (ISWT)

- ▶ Standardized, externally paced exercise test to assess functional exercise capacity
- ▶ Surrogate marker for VO2Peak



Dennis, A. T., et al. (2024). Hemodynamic, ventilatory and gas exchange responses to exercise using a cycle ergometer and the incremental shuttle walk test in pregnant women. *American Heart Journal*, 272, 56-68.  
Filipow, N., et al. (2024). Using reference equations to standardise incremental shuttle walk test performance in children and young people with chronic conditions and facilitate the evaluation of exercise capacity and disease severity. *BMJ open*, 14(3), e075733.

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## Plan of Care

- ▶ Promote self-management and life participation
- ▶ Referrals if needed (e.g., MD, nutritionist)
- ▶ Home or supervised exercise



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## Health and Wellness Coaching

- ▶ Lifestyle redesign guidance
- ▶ Virtual home exercise programs and mobility check-ins
- ▶ Remote ergonomic assessments
- ▶ Behavior change support (increasing activity, reducing screen time, medication compliance)

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### Sports and Activity Injury Prevention

- ▶ Return-to-play and performance optimization services
- ▶ Technology, backpack and sport gear safety
- ▶ Pre-participation evaluations
  - ▶ Physical Activity Readiness Questionnaire for Everyone (PAR-Q+)
  - ▶ ACSM Exercise Preparticipation Screening Algorithm

Copyright Jodi Gootkin, Weise, A., Könsgen, N., et al. (2025). Pre-participation evaluation of recreational and competitive athletes—A systematic review of guidelines and consensus statements. Sports Medicine-Open, 11(1), 33. 20

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### Physical Activity Readiness Questionnaire for Everyone (PAR-Q+)

- ▶ Identifies individuals who may need medical clearance before increasing physical activity

<b>Section 1: Core Health Questions</b> Heart conditions, dizziness, high blood pressure, chronic medical conditions
<b>Section 2: Follow-Up Questions (if needed)</b> Specific conditions
<b>Section 3: Health Professional Advice</b> Exercise is safe or physician consultation required

Copyright Jodi Gootkin, Warburton, D. E. R., et al. (2011). The Physical Activity Readiness Questionnaire for Everyone (PAR-Q+) and Electronic Physical Activity Readiness Medical Examination (ePARmed-x+). Health & Fitness Journal of Canada, 4(2), 3-23. <https://eparmedx.com/> 21

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### ACSM Exercise Preparticipation Screening Algorithm

- ▶ Examines signs/symptoms, current activity level, and medical conditions

Currently Active		
Continue any intensity No disease or symptoms	Clearance needed for vigorous Disease & No symptoms	Discontinue and seek medical clearance Symptoms
Not Currently Active		
Start light to moderate, no clearance No disease or symptoms	Clearance recommended Disease & No Symptoms	Clearance recommended Symptoms

Copyright Jodi Gootkin, Whitfield, G. P., et al. (2017). Applying the ACSM Preparticipation Screening Algorithm to US adults, NHANES 2001–04. Medicine and science in sports and exercise, 49(10), 2056. 22

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### Occupation Assessment

- ▶ Pre-employment or change of job demands assessment to identify potential injury risk, equipment needs, and specialized training
- ▶ Check-ins with youth on school and recreation participation abilities and future vocation

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### Workplace Health

- ▶ Office and industrial ergonomic assessments
- ▶ Driver safety
- ▶ Injury prevention programs for workers
- ▶ Wellness education on posture, lifting, and body mechanics
- ▶ Assessment of workstations, body mechanics, and home environments
- ▶ Instruction on safe movement patterns and equipment use
- ▶ Development of return-to-work or return-to-activity programs

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### Community & School-Based Wellness Programs

- ▶ Motor development screening and fitness programs for children
- ▶ Stress management and mindfulness workshops
- ▶ Inclusive recreational program development for people with disabilities
- ▶ Transitioning from pediatric to adult health care for adolescents with disabilities

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### Fall Risk Screening and Balance Training

- ▶ Community-based fall prevention programs
- ▶ Home safety assessments and modification planning
- ▶ Older adult mobility check-ups

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### Aging in Place Services

- ▶ Home modification consulting
- ▶ ADL (activities of daily living) and IADL (instrumental activities) assessments
- ▶ Cognitive wellness and dementia risk reduction education

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### Nutrition and Weight Management Support

- ▶ Exercise program development
- ▶ Basic education on healthy eating patterns (within state scope of practice and training)
- ▶ Obesity and double burden of malnutrition interventions especially with neurologic population
- ▶ Collaboration with dietitians for behavior change support
- ▶ Addressing the role of nutrition in healing, energy, and disease prevention

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### Malnutrition Considerations

- ▶ Correlate with other information and refer when beyond scope of practice.



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### Malnutrition Screening Tool (MST)

Within the last 6 months, have you lost weight without trying?



Have you been eating less food than usual because you have not been hungry?

≥ 2 Risk

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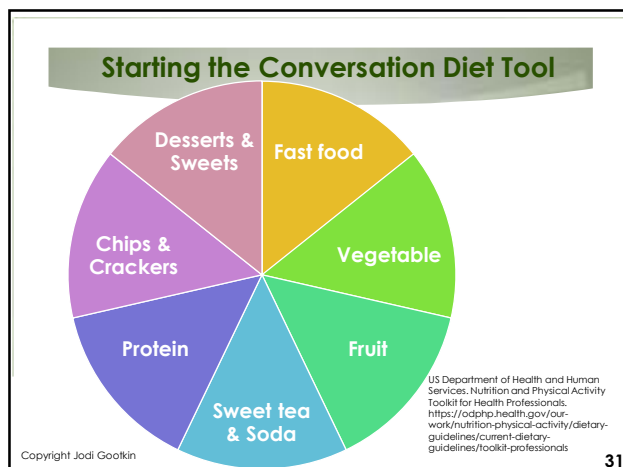
Skipper, A., et al. (2021). Position of the Academy of Nutrition and Dietetics: malnutrition (undernutrition) screening tools for all adults. *Kompass Nutrition & Dietetics*, 1(2), 38-40.

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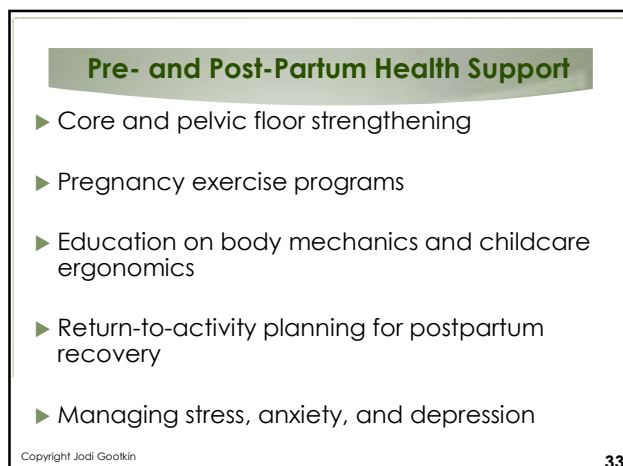
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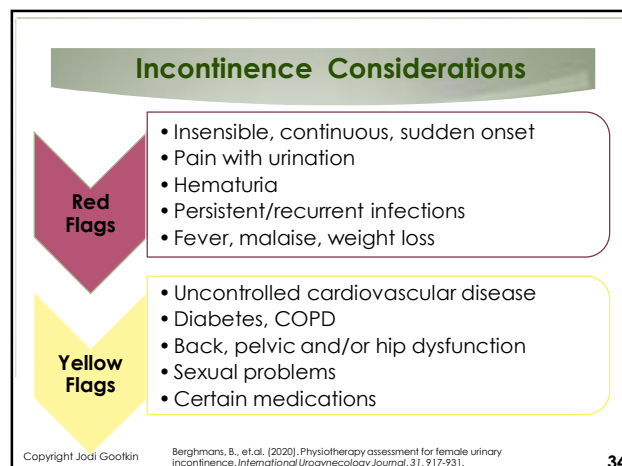
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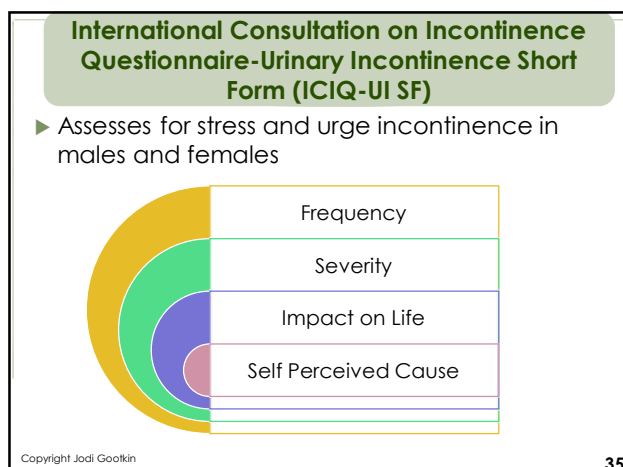
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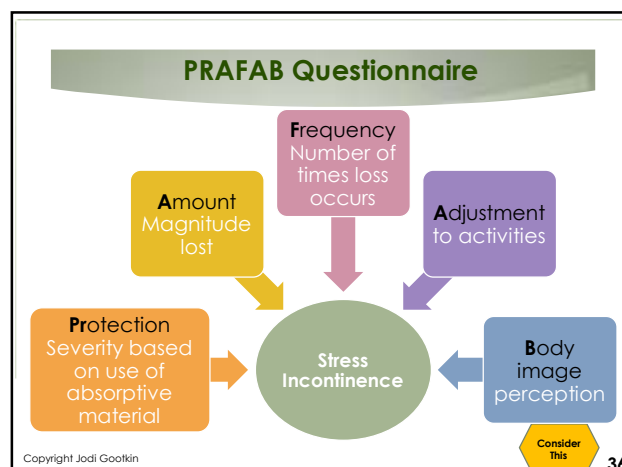
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Incontinence Management				
Type	Stress	Urge	Overflow	Functional
Description	Leakage with pressure	Must go now	Doesn't completely empty	Can't get there
Cause	Weakness	Irritation, neurologic condition	Blockage, nerve damage, medication	Cognition, mobility impairment
Treatment	Pelvic floor exercise, therapy, lifestyle	Exercise training, lifestyle, medication	Surgery, catheter, medication, training	Schedule, equipment, environment

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Chronic Disease
<ul style="list-style-type: none"> <li>▶ Personalized, long-term habit changes can positively influence prevention and management</li> <li>▶ Children, adolescents and teens with chronic disease are experiencing better outcomes with evolving needs across their life span</li> </ul>

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Chronic Disease Prevention & Management
<ul style="list-style-type: none"> <li>▶ Lifestyle coaching for prediabetes, obesity, and cardiovascular risk</li> <li>▶ Exercise prescription and equipment modification for at-risk populations with existing neurologic conditions</li> <li>▶ Energy conservation strategies for those with fatigue-prone conditions</li> <li>▶ Support services for Veterans to regain, maintain and optimize independence</li> </ul>

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Physical Activity Snacks
<ul style="list-style-type: none"> <li>▶ Multiple short bouts of exercise throughout the day</li> </ul>
<div> <div> Insulin sensitivity Glucose metabolism Cardiorespiratory Fitness Endorphins Muscle mass Cognition Adherence </div> <div> Blood pressure Cholesterol BMI Fatigue Inflammation </div> </div>

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Brown, N. I., et al. (2025). Health-related benefits and adherence for multiple short bouts of aerobic physical activity among adults. *American Journal of Lifestyle Medicine*, 19(1), 58-72.  
Weston, K. L., et al. (2025). Application of exercise snacks across youth, adult and clinical populations: a scoping review. *Sports Medicine-Open*, 11(1), 27.

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Exercise for Chronic and Neuropathic Pain	
Ant-inflammatory	Downregulates glial cells ↓ Proinflammatory cytokines ↑ Anti-inflammatory cytokines
Neurotransmission	↑ GABA (inhibitory transmission) ↓ Glutamate (excitatory transmission) Balance serotonin and dopamine
Neurotrophic	↑ BDNF

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Vieira, W. F., et al. (2025). The Role of Exercise on Glial Cell Activation in Neuropathic Pain Management. Cells, 14(7), 487.

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Vieira, W. F., et al. (2025). The Role of Exercise on Glial Cell Activity in Neuropathic Pain Management. *Cells*, 14(7), 487.

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## Chronic Pain Exercise Outcomes

Cohort	Outcome
Fibromyalgia <ul style="list-style-type: none"><li>• Aerobic, strength, and mind-body</li></ul>	Improved quality of life, physical function and psychological distress
Chronic low back pain <ul style="list-style-type: none"><li>• Aerobic and strength with motivational interviewing</li></ul>	No significant improvement in pain, disability, or physical function

National Institute for Health and Care Excellence (NICE). [2012]. Chronic pain (primary and secondary) In over 16s: assessment of all chronic pain and management of chronic primary pain. Akraoie, O., et al. (2023). Effect of motivational interviewing and exercise on chronic low back pain: a systematic review and meta-analysis. *Musculoskeletal care*, 23(1), e70048.

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National Institute for Health and Care Excellence (NICE). (2012). Chronic pain (primary and secondary) in over 16s: assessment of all chronic pain and management of chronic primary pain..  
Akinrole, O., et al. (2025). Effect of motivational interviewing and exercise on chronic low back pain: a systematic review and meta-analysis. *Musculoskeletal care*, 23(1), e70048.

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### Sleep Hygiene and Fatigue Management

- ▶ Assessment of routines and sleep-related functional barriers
- ▶ Education on sleep posture, environment, and activity planning
- ▶ Implementation of energy conservation and pacing strategies
- ▶ Sleep apnea exercises, weight management, and posture training

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### STOP-BANG Questionnaire

- ▶ Assessment for obstructive sleep apnea
- ▶ Lower, intermediate or high risk

Snoring  
Tired  
Observed  
Pressure

BMI  
Age  
Neck size  
Gender

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### Mental Health and Exercise

- ▶ Exercise as medicine
- ▶ Use of mindfulness, relaxation, and energy conservation techniques
- ▶ Cognitive-behavioral strategies to manage pain and emotional stress
- ▶ Engagement in meaningful and purposeful daily activities
- ▶ Caregiver support and injury prevention

Mental health conditions

Mental well-being

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### Patient Health Questionnaire (PHQ-9)

- ▶ Assesses the presence and severity of depressive symptoms

0-4	5-9	10-14	15-19	>20
Minimal or none	Mild	Moderate	Moderately Severe	Severe
Monitor	Repeat	Refer	Active Treatment	Active Treatment

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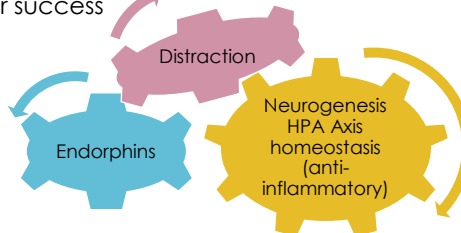
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### Benefits of Movement on Mental Health

- ▶ Supplementary treatment
- ▶ Fosters mental resilience
- ▶ Personal contact with practitioner important factor for success



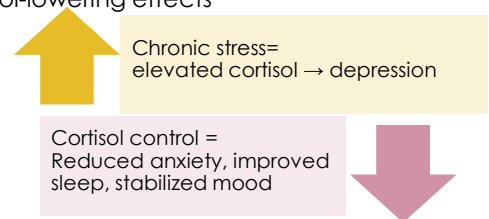
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### Hypothalamic-Pituitary-Adrenal Axis (HPA)

- ▶ Moderate, regular exercise downregulates cortisol production and improves HPA axis function
- ▶ Resistance and aerobic training both demonstrate cortisol-lowering effects



Copyright Jodi Gootkin de Almeida, J. R. V., et al. (2025). Effect of Physical Exercise on Sleep Quality and Depressive Symptoms in Adults: A Systematic Review and Meta-Analysis. Sleep Science.

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## Brain Derived Neurotrophic Factor(BDNF)

- ▶ BDNF supports neurogenesis, synaptic plasticity, and neuronal survival
- ▶ Low BDNF levels are associated with depression
- ▶ Exercise increases BDNF levels

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Cavaleri, D., et al. (2023). The role of BDNF in major depressive disorder, related clinical features, and antidepressant treatment: Insight from meta-analyses. *Neuroscience & Biobehavioral Reviews*, 149, 105159.

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## Exercise and Depression Outcomes

Cohort	Outcome
Depression compared to control cohort	Walking or jogging, yoga, and strength training more effective
Major depressive disorder	Improved overall cognitive function with aerobic exercise

Noetel, M., et al. (2024). Effect of exercise for depression: systematic review and network meta-analysis of randomised controlled trials. *BMJ*, 384.  
Ren, F. F., et al. (2024). Effects of aerobic exercise on cognitive function in adults with major depressive disorder: A systematic review and meta-analysis. *International Journal of Clinical and Health Psychology*, 24(2), 100447.

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## Exercise, Depression, and Neurologic Comorbidity Outcomes

Cohort	Outcome
Healthy active/sedentary and neurologic diagnosis individuals with depression	Short and long-term exercise increased BDNF levels
Stroke survivors	Mind-body exercises promising

Jemni, M., et al. (2023). Exercise improves depression through positive modulation of brain-derived neurotrophic factor (BDNF): A review based on 100 manuscripts over 20 years. *Frontiers in Physiology*, 14, 1102266.  
Chen, R., et al. (2024). Effects of home-based exercise interventions on post-stroke depression: A systematic review and network meta-analysis. *International Journal of Nursing Studies*, 104698.

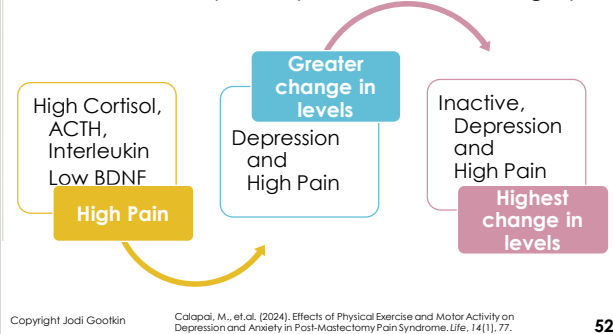
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## Post-Mastectomy Pain Syndrome

- ▶ Chronic neuropathic pain after breast surgery



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Calapai, M., et al. (2024). Effects of Physical Exercise and Motor Activity on Depression and Anxiety in Post-Mastectomy Pain Syndrome. *Life*, 14(1), 77.

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## Post-Mastectomy Outcomes

Intervention	Outcome
Aerobic, resistance and aquatic exercise	Decrease pain severity Improved quality of life general
Manual therapy, myofascial release, exercise, dry needling, TENS	Promising with evidence evolving

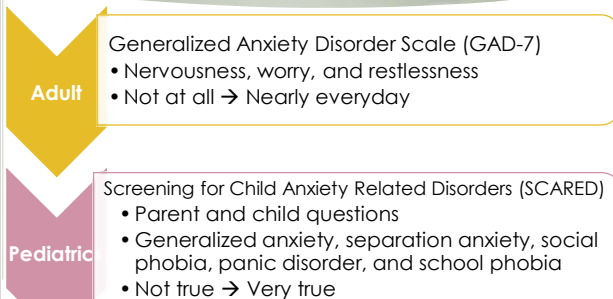
Kannan, P., et al. (2022). Efficacy of physical therapy interventions on quality of life and upper quadrant pain severity in women with post-mastectomy pain syndrome: a systematic review and meta-analysis. *Quality of Life Research*, 31(4), 951-973.  
Valero, E. G., et al. (2024). Non-Pharmacological Interventions for Post Mastectomy Pain Syndrome-A Systematic Review of the Literature. *Clinical Breast Cancer*.

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## Anxiety Screening Tools



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American Physical Therapy Association. (2023). APTA Practice Advisory: Screening Patients for Anxiety.

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## Exercise and Anxiety Outcomes

Cohort	Outcome
Healthy vs. chronic disease <ul style="list-style-type: none"> <li>All modes of physical activity</li> </ul>	Medium symptom reduction Higher intensity and shorter-term → greater results
Older adults <ul style="list-style-type: none"> <li>Mind body exercises</li> </ul>	Treatment effect Tai Chi > Qigong > Yoga > Dance > control group

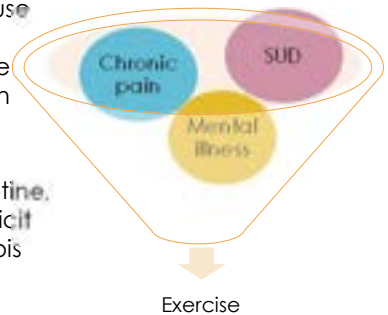
Singh, B., et al. (2023). Effectiveness of physical activity interventions for improving depression, anxiety and distress: an overview of systematic reviews. *British journal of sports medicine*, 57(18), 1203-1209.  
Dong, Y., et al. (2024). The effects of mind-body exercise on anxiety and depression in older adults: a systematic review and network meta-analysis. *Frontiers in Psychiatry*, 15, 1305295.

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## Substance Use Disorder (SUD) Recovery

- ▶ SUD is ongoing use of substances despite negative effects on health and life
- ▶ Alcohol, tobacco/nicotine, prescription/illicit drugs, cannabis



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Nock, N. L., et al. (2024). Exercise as Medicine for People with a Substance Use Disorder: An ACSM Call to Action Statement. *Current Sports Medicine Reports*, 23(2), 53-57.

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## Barriers to SUD Exercise Implementation

- ▶ Stigma, low self-efficacy and distress tolerance
- ▶ Reduced cardiopulmonary fitness compared to age-matched population
- ▶ Fear and physical limitations
- ▶ Medication side effects

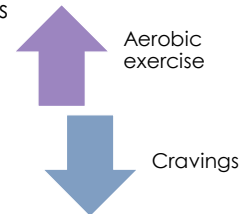
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Nock, N. L., et al. (2024). Exercise as Medicine for People with a Substance Use Disorder: An ACSM Call to Action Statement. *Current Sports Medicine Reports*, 23(2), 53-57.

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## SUD Exercise Outcomes

- ▶ Increased abstinence rates
- ▶ Reward substitution effects
- ▶ Re-centering habits
- ▶ Enhanced mood
- ▶ Decreased pain



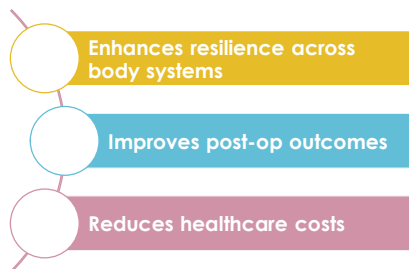
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Ding, F., et al. (2024). Effect of exercise on cravings levels in individuals with drug dependency: A systematic review. *Addictive behaviors*, 108127.  
Nock, N. L., et al. (2024). Exercise as Medicine for People with a Substance Use Disorder: An ACSM Call to Action Statement. *Current Sports Medicine Reports*, 23(2), 53-57.

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## Prehabilitation

- ▶ Intervention initiated before surgery or medical treatment to enhance recovery outcomes



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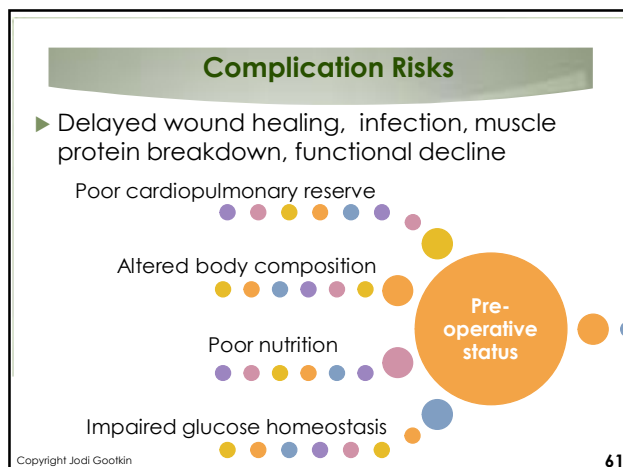
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## Surgical Stress Response

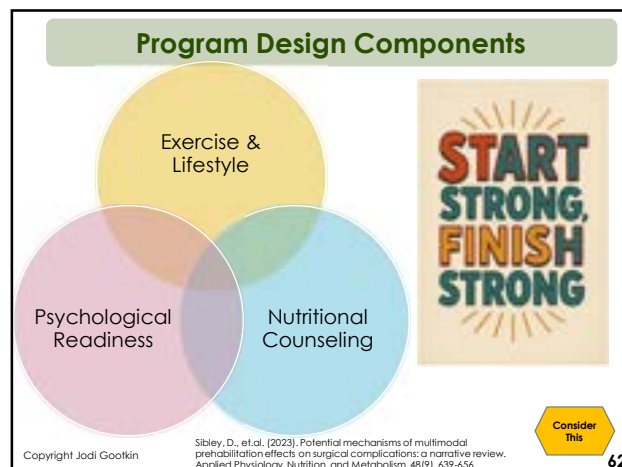
- ▶ Purpose is to maintain homeostasis and promote survival during tissue trauma
- ▶ Sympathetic Nervous System Activation
  - ▶ Catecholamine surge for energy demands
- ▶ Hormonal Cascade
  - ▶ Cortisol release for catabolism and glucose production
- ▶ Inflammatory Response
  - ▶ Cytokine and acute-phase protein activation

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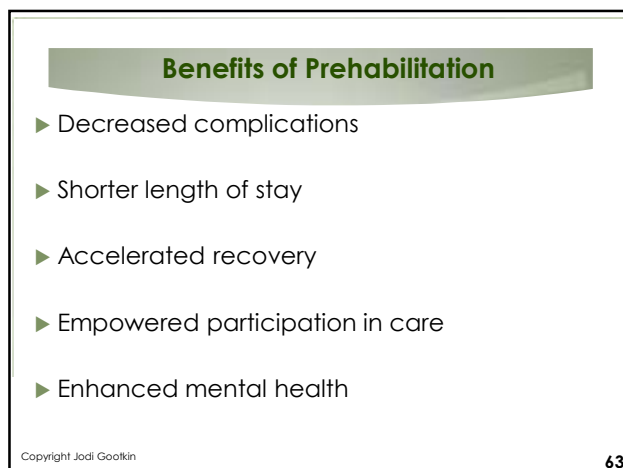
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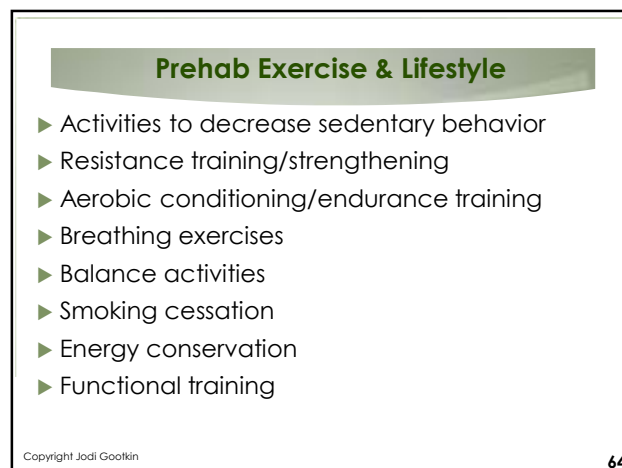
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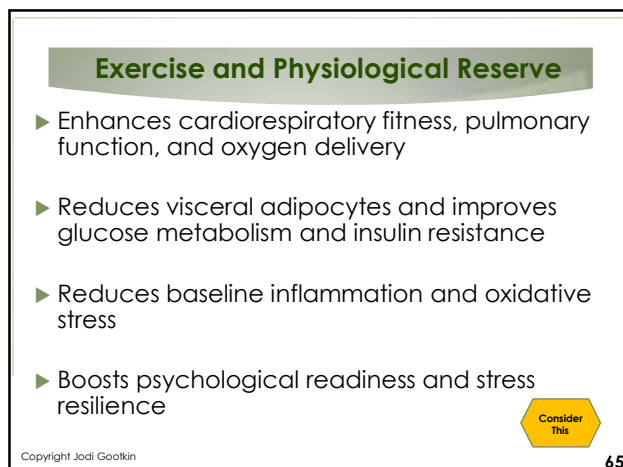
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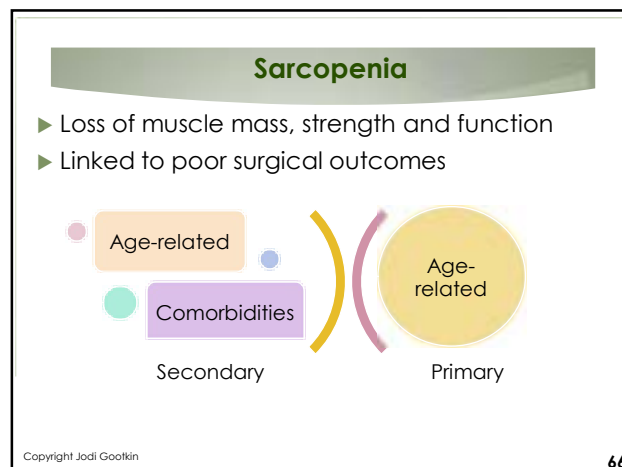
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## Sarcopenia Consequences

- ▶ Reduced muscle mass
  - ▶ Pulmonary complications and falls
  - ▶ Impaired wound healing
- ▶ Altered metabolic resilience
  - ▶ Insulin resistance
- ▶ Prolonged catabolic response
  - ▶ Accelerated functional decline
- ▶ Impaired immune function
  - ▶ Infection susceptibility

Copyright Jodi Gootkin Knoedler, S., et al. (2023). Impact of sarcopenia on outcomes in surgical patients: a systematic review and meta-analysis. *International journal of surgery*, 109(12), 4238-4262. 67

67

## SARC-F Sarcopenia Screening Tool

- Strength { Lift and carry 10 pounds
- Assistance walking { Walk across room
- Rising from chair { Transfer chair to bed
- Climbing stairs { Flight of 10
- Falls { Number in past year

- ▶ Combined with calf circumference for improved screening accuracy(SARC-Calf)

Consider This

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## Sarcopenia Outcomes

Cohort	Outcome
Elderly orthopedic procedures	Increased mortality Psoas:lumbar vertebral index may be predictive of outcomes Lower functional scores at discharge
Pre- and post- liver transplant	Resistance training more pronounced effect than aerobic

Bzenczynski, F., et al. (2022). The effect of sarcopenia on outcomes following orthopaedic surgery: a systematic review. *The Bone & Joint Journal*, 104-B(3), 321-330.  
Vellatt, S., & Soldara, J. (2023). From Prehabilitation to Rehabilitation: A Systematic Review of Resistance Training as a Strategy to Combat Sarcopenia in Pre- and Post-Liver Transplant Patients. *Livers*, 3(2), 25.

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## Cardiac Reserve

- ▶ Exercise capacity post operatively is need to satisfy increased oxygen demands
- ▶ Adequate perfusion essential for immune cell migration
- ▶ Functional capacity provides safety buffer for recovery

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## Resistance and Aerobic Programs

- ▶ Symptom limited participation
- ▶ Moderate intensity aerobic exercise
  - ▶ Borg or % Heart Rate
  - ▶ Walking, treadmill, cycling, stairs
- ▶ Strengthening
  - ▶ Upper and lower extremity
- ▶ Breathing Exercises
  - ▶ Diaphragmatic and inspiratory muscle

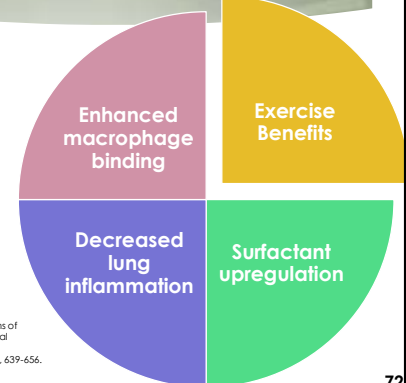
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## Alveolar Ventilation

- ▶ Surfactant prevents alveolar collapse and modulates immune response



Sibley, D., et al. (2023). Potential mechanisms of multimodal prehabilitation effects on surgical complications: a narrative review. *Applied Physiology, Nutrition, and Metabolism*, 48(9), 639-656.

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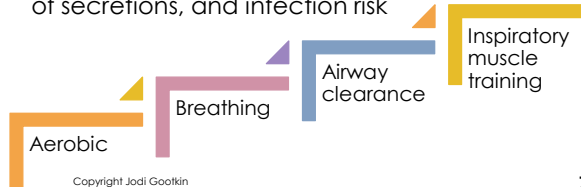
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## Respiratory & Pulmonary Exercise

- ▶ Increased respiratory muscle strength and aerobic capacity
- ▶ Builds respiratory drive and strengthens immune response
- ▶ Helps prevent atelectasis, impaired clearance of secretions, and infection risk



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## 6-Minute Walk Test (6MWT)

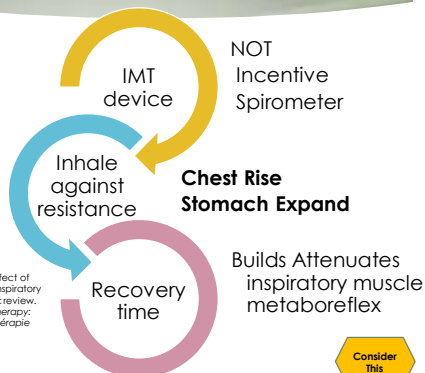
- ▶ Measures submaximal aerobic capacity and endurance
- ▶ Conducted on a flat, straight 30-meter course
- ▶ Patient walks as far as possible for 6 minutes at their own pace
- ▶ Standard encouragement is given at set intervals
- ▶ Distance walked (in meters) is recorded

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## Inspiratory Muscle Training (IMT)



e Lima, T. B. W., et.al. (2025). The effect of inspiratory muscle training on the inspiratory muscle metaboreflex: A systematic review. Canadian Journal of Respiratory Therapy. CJRT= Revue Canadienne de la Thérapie Respiratoire. RCTR, 61, 51.

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## Nutrition Associated Complications

### Systemic Catabolism

- Skeletal and inspiratory muscles
- Diaphragm atrophy
- Impaired proteoglycan and collagen synthesis

### Immunosuppression

- Alveolar macrophage reduction

### Cardiac Events

- Electrophysiologic dysregulation
- Hemodynamic dysfunction
- Chronic inflammation

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## Nutritional Support

- ▶ Provides substrates for protein synthesis and immune function
- ▶ Corrects deficiencies and maintains energy reserves
- ▶ Avoiding perioperative fasting counters insulin resistance
- ▶ Dietician guidance for protein intake and supplementation
- ▶ Hand grip strength monitoring



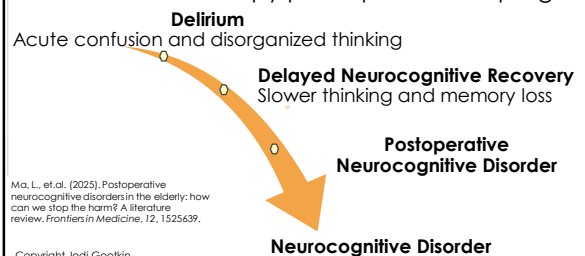
Copyright Jodi Gootkin Vaishya, R., et.al. (2024). Hand grip strength as a proposed new vital sign of health: a narrative review of evidences. Journal of Health, Population and Nutrition, 43(1), 7.

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## Perioperative Neurocognitive Disorder(PND)

- ▶ Cognitive decline around surgery is more common in older adults after major surgery
- ▶ Can hinder therapy participation and progress



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### Preoperative Neurocognitive Optimization

- Reduce neuroinflammation**  
Primes glial cells in the hippocampus and prefrontal cortex
- Maintain blood brain barrier**  
Limits peripheral immune cell infiltration
- Enhance neuroplasticity**  
Angiogenesis and increased BDNF
- Regulates stress response**  
Lowers cortisol and enhanced cognitive reserve

Copyright Jodi Gootkin Nemoto, A., et al., (2025). Prehabilitation brings benefits to neurogenesis and peri-operative neurocognitive disorders in amyotrophic rats. *European Journal of Anaesthesiology* | EJA, 42(6), 557-566.

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### PND Outcomes

Cohort	Outcome
Total knee arthroplasty • Aquatic program	Montreal Cognitive Assessment score increase
CABG • Treadmill walking "somewhat hard" to "hard" intensity	Lower incidence of cognitive decline and higher attention score

Copyright Jodi Gootkin Ekici, H. S., et al., (2024). The effect of pre-operative exercise training on post-operative cognitive function: a systematic review. *European Geriatric Medicine*, 15(5), 1259-1266.

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### Psychological Reserve

- ▶ Cognitive Behavioral Therapy
  - ▶ Identify and modify unhelpful thought patterns
- ▶ Supportive psychotherapy
  - ▶ Empathetic listening and therapeutic alliance
- ▶ Acceptance and Commitment Therapy
  - ▶ Enhance psychological flexibility

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### Psychological Reserve Outcomes

Cohort	Outcome
Various major surgical procedures • Cognitive Behavioral Therapy • Psychological Support • Acceptance & Commitment Therapy	Decreased length of stay, pain, depression and anxiety after surgery

Copyright Jodi Gootkin Hall, A. E., et al., (2025). The Impact of Psychological Prehabilitation on Surgical Outcomes: A Meta-analysis and Meta-regression. *Annals of Surgery*, 281(6), 928-941.

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### Acceptance and Commitment Therapy (ACT)

- ▶ Coping vs. suppressing or challenging
- Acceptance** { **Acknowledge fear of re-injury**
- Cognitive Defusion** { **Observe thoughts; not ruled by them**  
**Still engage in activity**
- Being Present** { **Not resisting sensations with movement**
- Self As Context** { **Symptoms are temporary**
- Values** { **Meaningful activity goal setting**
- Committed Action** { **Gradually increase activity level** **Consider This**

Copyright Jodi Gootkin Anusuya, S. P., & Gayatri Devi, S., (2025). Acceptance and Commitment Therapy and Psychological Well-Being: A Narrative Review. *Cureus*, 17(1), e77705.

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### ACT Strategies

- ▶ Shift focus from negative sensations and emotions
- ▶ Notice 5 Things Mindfulness
- ▶ Use metaphor tools
- ▶ Praise effort not outcome and self-capacity to initiate change
- ▶ Empathize with goal challenges

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ACT Outcomes	
Cohort	Outcome
Caregivers for individuals living with dementia	Decreased grief and anxiety. Improved psychological quality of life and engagement in meaningful activities.
Individuals with chronic pain	Positive impacts on pain intensity, physical function and psychological outcomes.

Han, A., et al. (2023). The feasibility and preliminary effects of a pilot randomized controlled trial: Videoconferencing acceptance and commitment therapy in distressed family caregivers of people with dementia. *Journal of Health Psychology*, 28(6), 554-567.  
Lai, L., et al. (2023). The efficacy of acceptance and commitment therapy for chronic pain: A three-level meta-analysis and a trial sequential analysis of randomized controlled trials. *Behaviour Research and Therapy*, 165, 104308.

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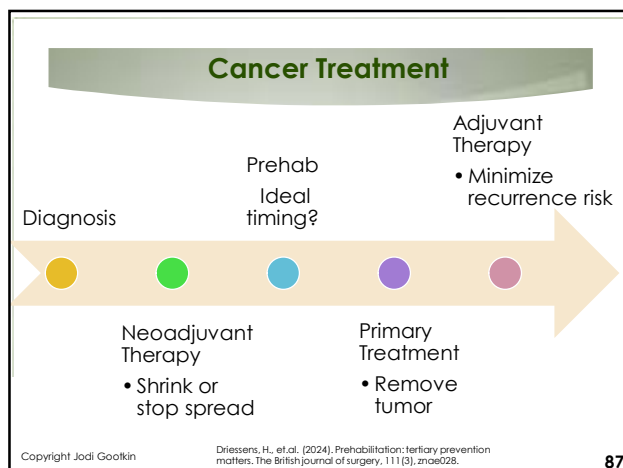
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Orthopedic Prehabilitation Outcomes	
Cohort	Outcome
Total hip and knee arthroplasty	Fewer postoperative complications Improved objective strength and function Improved patient reported function and quality of life
• Exercise only or multimodal	
Spine surgery	Reduced back pain Improved trunk muscle strength
• Exercise example: HIIT prior to fusion	No difference in quality of life or leg pain

Keogh, J. A., et al. (2025). The Effects of Structured Prehabilitation on Postoperative Outcomes Following Total Hip and Total Knee Arthroplasty: An Overview of Systematic Reviews and Meta-analyses of Randomized Controlled Trials. *Journal of orthopaedic & sports physical therapy*, 55(5), 344-365.  
Liu, Z., & Yang, D. (2025). The impact of prehabilitation on postoperative outcomes in spine surgery: A systematic review and meta-analysis. *Journal of Back and Musculoskeletal Rehabilitation*, 10538127251346600.

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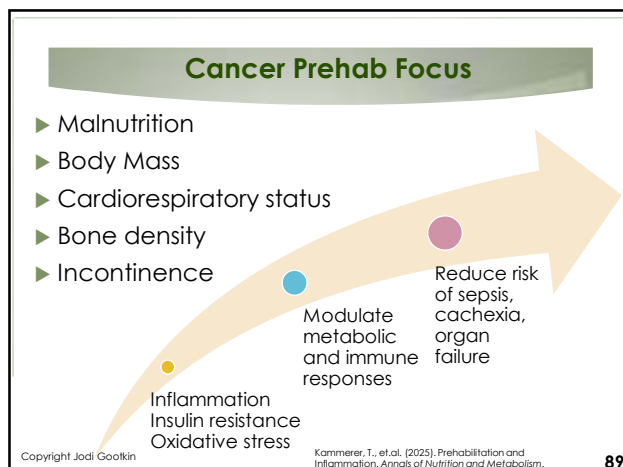
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Early Cancer Prehab Outcomes	
Cohort	Outcome
Radiation prior to lung resection	Elderly frail and younger non-frail similar post-operative outcomes
Concurrent neoadjuvant chemotherapy for esophageal tumors	Increased tumor-infiltrating lymphocyte and mature tertiary lymphoid structures

Goldsmith, L., et al. (2023). Pre-treatment optimisation with pulmonary rehabilitation of elderly lung cancer patients with frailty for surgery. *Journal of Cardiothoracic Surgery*, 18(1), 356.  
Rayner, C. J., et al. (2025). Prehabilitation during neoadjuvant chemotherapy results in an enhanced immune response in esophageal adenocarcinoma tumors: A randomized controlled trial. *Journal of Sport and Health Science*, 101063.

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Cancer Surgery Outcomes	
Cohort	Outcome
Major abdominal surgery	Reduced complications & length of stay Improved 6MWT Decrease apprehension
Digestive system	Reduced complications No difference in length of stay Maintained 6MWT gains post-op High completion rates
Non-small cell lung	Large reduction in pulmonary complications

Skofeja, P., et al. (2024). The impact of prehabilitation on outcomes in frail and high-risk patients undergoing major abdominal surgery: a systematic review and meta-analysis. *Clinical Nutrition*, 43(3), 629-648.  
Xu, S., et al. (2025). The role of exercise-based prehabilitation in enhancing surgical outcomes for patients with digestive system cancers: a meta-analysis. *BMC gastroenterology*, 25(1), 36.  
Granger C, and Cavalieri V. (2022). Preoperative exercise training for people with non-small cell lung cancer. *Cochrane Database of Systematic Reviews*, Issue 9. Art. No.: CD012020.

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## Cardiac Prehab

- ▶ Aerobic, strength, and respiratory training, energy conservation
  - ▶ Post-operative equipment restricts movement increasing risk of deconditioning
- ▶ Malnourished patients may be overlooked
- ▶ Waiting period contributes to physical and emotional deconditioning
  - ▶ Also consider acute patients



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## Cardiac Surgery Outcomes

Cohort	Outcome
Valve replacement • Inspiratory Muscle Training	Pre-op: Improved respiratory measures Post-op: Deteriorated less in treatment group
Elective surgery • Uni/multimodal programs	Improved functional capacity Reduced post-op complications
Pre-op acute inpatient • Nutritional support	50% reduction in 30-day mortality

Yu, P., et al. (2025). Preoperative inspiratory muscle training improves lung function prior to elective heart valve surgery and reduces postoperative lung function impairment and pulmonary complications: a randomised trial. *Journal of Physiotherapy*, 71(1), 27-34.  
Steinmetz, C., et al. (2023). Efficacy of Prehabilitation before Cardiac Surgery: A Systematic Review and Meta-analysis. *American Journal of Physical Medicine & Rehabilitation*, 102(4), 323-330.  
Baumgartner, A., et al. (2021). The impact of nutritional support on malnourished inpatients with aging-related vulnerability. *Nutrition*, 89, 111279.

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## Prehab Delivery Models

- ▶ Multi- or unimodal programs
- ▶ Initiated 1-8 weeks prior to surgery
- ▶ Supervised sessions encourage adherence and superior improvements
  - ▶ Facility based and home delivery models
  - ▶ Technology based delivery

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## Home Based Delivery Outcomes

Cohort	Outcome
Abdominal, orthopedic, non-cardiac major, cardiac and thoracic surgeries	Less complications Improved function  Lower anxiety and depression scores
• Log books, phone calls, video materials, activity trackers	High adherence

D'Amico, F., et al. (2025). Home-based prehabilitation: a systematic review and meta-analysis of randomised trials. *British journal of anaesthesia*, Apr;134(4):1018-1028.

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## Technology Based Delivery Outcomes

Cohort	Outcome
Liver transplant candidates • Home exercise app, live coaching, pedometer	Frailty index and 6-minute walk test improved Gained survival advantage
Thoracic cancer surgery • Virtual live mind-body fitness	Increased strength, connected to peers, prepared for surgery

Duarte-Rojas, A., et al. (2023). Use of a mobile-assisted telehealth regimen to increase exercise in transplant candidates: A home-based prehabilitation pilot and feasibility trial. *Clinical and translational gastroenterology*, 14(11), e00601.  
Mao, J. J., et al. (2023). Implementing a virtual mind-body prehabilitation program for patients undergoing thoracic surgery: A quality improvement project. *JTCVS open*, 14, 615-622.

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## Barriers

- ▶ Health limitations
- ▶ Weather constraints
- ▶ Emotional friction
- ▶ Desire for personalization and variety
- ▶ Delivery format

Barnes, K., et al. (2023). Barriers and facilitators to participation in exercise prehabilitation before cancer surgery for older adults with frailty: a qualitative study. *BMC Geriatrics*, 23(1), 356-356.  
Kersters, S., et al. (2024). Barriers and facilitators to smartwatch-based prehabilitation participation among frail surgery patients: a qualitative study. *BMC geriatrics*, 24(1), 129.

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## Facilitators

- ▶ Manageable and age appropriate
- ▶ Resources and tools
- ▶ Social support
- ▶ Sense of control and intrinsic value
- ▶ Enjoyment and past experiences

Info Person Time Channel Format

Barnes, K., et al. (2023). Barriers and facilitators to participation in exercise prehabilitation before cancer surgery for older adults with frailty: a qualitative study. *BMC Geriatrics*, 23(1), 356–356.  
Kerstiens, S., et al. (2024). Barriers and facilitators to smartwatch-based prehabilitation participation among frail surgery patients: a qualitative study. *BMC geriatrics*, 24(1), 129.

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## Conclusion

- ▶ Preventive rehabilitation is not just a treatment mode. It's a paradigm shift in how we promote health across the lifespan.
- ▶ Prehabilitation is a teachable moment to positively influence behavioral changes and enhance surgical outcomes.

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1. What is the term for interventions prior to surgery designed to strengthen physiologic reserve and psychological resilience to withstand a stressful event?

- A. Preventive Care
- B. Prehab
- C. Rehab Primary Care
- D. Direct Access Services

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2. What score on the Malnutrition Screening Tool (MST) suggests the individual is at risk for malnutrition?

- A. 0
- B. Less than or equal to 1
- C. Greater than or equal to 2
- D. 10

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3. Which of the following is NOT a component of the PRAFAB incontinence questionnaire?

- A. Pain with urination
- B. Magnitude of urine loss
- C. Number of times urine is lost
- D. Severity of the urine loss

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4. When a score of 11 is achieved on the PHQ-9 depression instrument, what is the clinician's course of action?

- A. None, depression is not suspected
- B. Incorporate mind-body interventions
- C. Refer individual to mental health professional
- D. Provide nutritional supplement recommendations

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5. Exercise induces the release of what brain substance that positively impacts depression?

- A. Insulin
- B. ATP
- C. Epinephrine
- D. BDNF

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6. Which of the following is NOT a component of a prehabilitation program prior to surgery?

- A. Nutrition optimization
- B. Psychological preparation
- C. Lifestyle modification
- D. Pharmacologic management

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7. How may pre-operative exercise contribute to improved metabolic functioning during the healing process?

- A. Increased hemoglobin A1C levels
- B. Increased insulin resistance
- C. Reduced visceral adipocytes
- D. Reduced insulin sensitivity

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8. What does the "R" stand for in the SARC-F sarcopenia screening tool?

- A. Resistance
- B. Raising from chair
- C. Retropulsive gait
- D. Rebound phenomenon

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9. When performing inspiratory muscle training, the chest should \_\_\_\_\_ and the stomach should \_\_\_\_\_.

- A. rise, expand
- B. remain still, expand
- C. rise, sink in
- D. remain still, sink in

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10. In Acceptance and Commitment Therapy (ACT), \_\_\_\_\_ refers to observing your thoughts without being ruled by them.

- A. Acceptance
- B. Cognitive Defusion
- C. Self as Context
- D. Being Present

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