A Psychologically-Informed Guide to Promoting Physical Activity in Routine Physical Therapy Practice

Full Reference Guide

Kelsi Kazmierczak

Table of Contents:

Introduction:

Defining the Problem

The “whole person” is more than the sum of their ‘parts’ or ‘impairments’, yet individuals are still being treated by clinicians as less than whole. We live in a society which values ‘quick fixes’ and symptom masking over lifestyle-related behavior changes and self-management. To quote the documentary, *Escape Fire,*[1] we have become more of a ‘disease care’ system than a ‘health care’ system. To best serve our patients and communities, we must be able to consider the many factors which may influence wellbeing and move beyond strictly biomedical or pathoanatomical explanations.

According to research from the Centers for Disease Control & Prevention (CDC),[2] 6 in 10 adults in the US suffer from a chronic disease and 4 in 10 have been diagnosed with 2 or more. Chronic diseases are the leading cause of death and disability in the U.S., and the leading drivers of the nation’s $3.5 trillion in annual health care costs. Healthy behavior changes are the primary and most effective interventions for addressing disease burden and improving wellness for those suffering from them.[3] As PTs, we are well positioned to spearhead these efforts by providing services due to the frequency, duration, and nature of our patient interactions.

Physical activity is well-supported by unequivocal evidence of its positive effects, and appears to be the most important and effective intervention PTs can incorporate into every patient/client plan of care to promote health and wellness.

See the APTA’s position statement below regarding: The PT’s Role in Prevention, Wellness, Fitness, Health Promotion, and Management of Disease and Disability [HOD P06-19-27-12]:

> Physical therapists play a unique role in society in prevention, wellness, fitness, health promotion, and management of disease and disability by serving as a dynamic bridge between health and health services delivery for individuals and populations. This means that although physical therapists are experts in rehabilitation and habilitation, they also have the expertise and the opportunity to help individuals and populations improve overall health and avoid preventable health conditions. Physical therapists’ roles may include education, direct intervention, research, advocacy, and collaborative consultation. These roles are essential to the profession’s vision of transforming society by optimizing movement to improve the human experience.

Purpose

The primary focus of this manual is the promotion of physical activity and exercise in our PT patient populations using psychologically-informed models of health behavior change. This manual is to be used as supplemental material to the shortened clinician manual & workbook that can be accessed here: Clinician Manual & Workbook. The following sections provide an in-depth discussion of the research, background, and theory underlying the strategies proposed in the shortened manual.

Learning Objectives

After reviewing these materials, learners will be able to:

I. Describe what psychologically informed PT practice is and how it can improve the quality & deliverance of physical activity health promotion.
II. Describe strategies that can be utilized to better tailor PA-promoting interventions based on screening results.
III. List barriers to increasing physical activity levels and describe potential ways to overcome these barriers.
IV. Perform a self-reflection on current practices and name 1 or more strategies they are able and willing to implement in their own practice to better promote physical activity in their patients.
V. Identify resources for learning more about psychologically informed strategies and physical activity promoting approaches.

How this Manual is Organized

The first part helps prepare PTs for making a practice change. We will begin with an activity to help you (the PT) identify your current beliefs and practices. Then, we will discuss the competencies, training requirements, and barriers to change.

The second part outlines the theories and approaches that help guide health promotion behaviors, including various models of behavior change and the psychological, social, and ecological theories and approaches one can use. We will also discuss the background & basics of PA health promotion & the key competencies required by physical therapists.

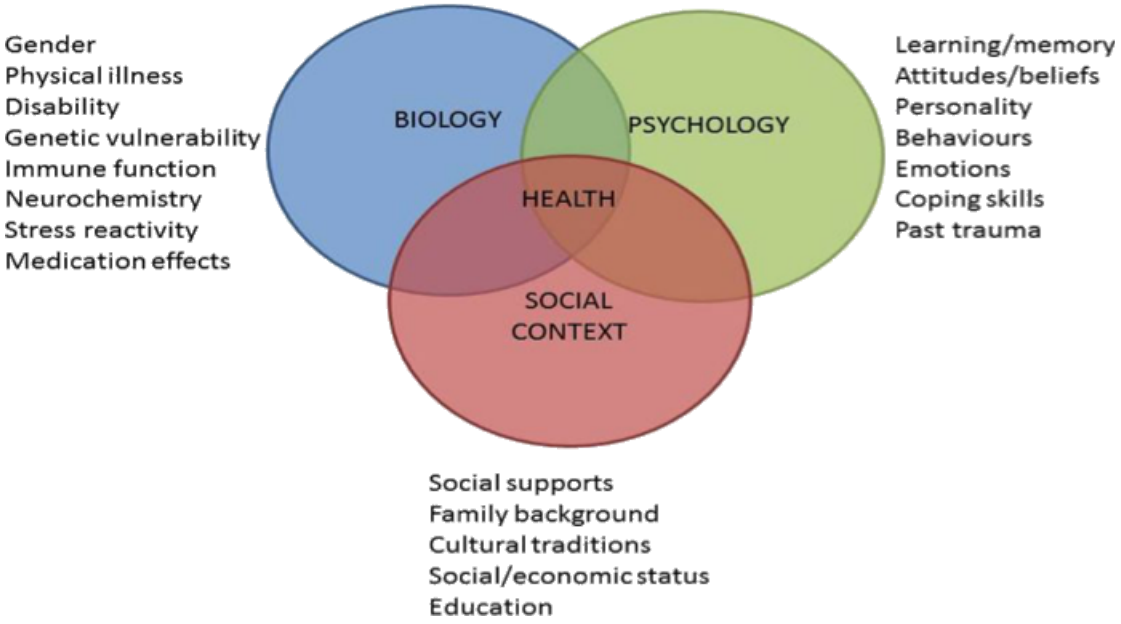
The third part describes the utility of PA health promotion and the essential skills & specific strategies PTs can employ with patients in their routine practice.

Activities are embedded throughout this manual to assist PTs in putting these theories and strategies into action.

Terms & Definitions Used within this Manual:

Holistic PT Practice recognizes the whole person as greater than the sum of their 'parts' or impairments through a multidimensional, person-centered approach to care. This definition encompasses the biopsychosocial model, psychologically informed PT, health behavior change, and health promotion & wellness.

The Biopsychosocial Model expands the biomedical model to take a multidimensional, integrated approach to care. This model considers the biological, physical, psychological, emotional, spiritual, and social factors of an individual within the plan of care.



Health Promotion & Wellness*:* Methods which promote participation in healthy behaviors and cessation of unhealthy behaviors. Health promotion focuses on prevention and risk minimization of preventable and chronic health conditions to enhance overall well-being. When discussing health promotion, we generally consider 5 domains, including:

1. Physical Activity
2. Stress Management
3. Sleep & Sleep Hygiene
4. Nutrition, Dietary Habits, and Weight Management
5. Cessation of Smoking and Substance Use & Abuse

Psychologically Informed Physical Therapy Practice (PIPT): the utilization of psychological and socioecological theories and strategies, with an emphasis on human behavior change, to better guide patient management. PIPT considers patient beliefs, attitudes, expectations, coping styles, emotional responses, health behaviors, social supports, contextual factors, and overall self-efficacy (psychosocial aspects), and their effects on the health, wellness, and wellbeing of that individual. (Table 1)

Major Types of Interventions Used in Psychologically Informed Practice Approaches

Intervention	Brief Description
Educational	Threat reduction and activation[46]
Behavioral change	Explicit focus on incorporating adaptive behaviors in response to pain[47]
Cognitive-behavioral	Principal focus on cognition and coping strategies[48]
Psychophysiological focus	Variants of stress reduction and mindfulness[48,49]
Contextual cognitive-behavioral therapy	Acceptance and commitment therapy[10,50,51]

Part 1: Preparing for Change

Why Change?

Most current Clinical Practice Guidelines recommend a biopsychosocial perspective when treating patients with musculoskeletal conditions due to the known multidimensional nature of pain and a patient's experience. Factors to consider include physical, psychological, social, and lifestyle-related factors. However, current training interventions do not sufficiently help PTs feel confident in delivering these types of interventions. (Holopainen 2020)

Before taking steps to change your own practice, you first have to reflect on your current practice methodology, skills, behaviors, and beliefs. This includes your own levels of physical activity and other health & wellness practices you participate in. Evidence supports that role modeling health behaviors is one of the central skills necessary for effective health promotion by physical therapists. Further, research indicates that a PTs personal level of physical activity is one of the strongest predictors of their inclusion of PA health promotion in practice.

Activity: **Answer the questions below to identify your current practices, beliefs, skills, and methodologies. These baselines will help you identify areas for further development.**

- What are your personal values related to physical activity? What types of physical activity do you participate in each day/week?

- How would you describe your current PT practice methodology?

- Do you screen for psychosocial factors? If so, how? If not, why?

- Do you integrate physical activity health promotion in your routine practice? If so, how? If not, why? What barriers & challenges exist?

- What types of patient education do you provide? How often do you do this?

- How often do you refer patients to other providers or to community resources?

- What training have you received with regard to psychologically informed practice, health behavior change, or health promotion and wellness practices? How comfortable are you with using these approaches in your practice?

- How well do your current practices align with your values and beliefs? Identify areas for improvement in your own practice. Then, make 1-3 goals for change, emphasizing ways to better align your beliefs & values with your routine PT practice.

Great job! You just participated in a self-reflection activity that utilizes Value Based Goal Setting to help you prepare for change. This is a strategy we will discuss later which can be used with patients to help improve motivation for change.

We will now discuss some of the most commonly identified barriers to including health promotion in routine PT practice, and some potential solutions to overcome them.

Identifying Barriers & Solutions

Below you will see common barriers & proposed solutions to utilizing psychologically-informed approaches to promote health behaviors in PT practice.

Barrier: *Lack of Knowledge, training, or confidence*

Solution: *More didactic & experiential training guided by well-developed & focused competencies.*

> Training in biopsychosocial approaches often necessitates a change in PT attitudes and beliefs, which requires extensive time and exposure. Most DPT programs are underdosed & thus do not provide an adequate stimulus for change. Programs should base modules off of behavior change theories. Existing, effective training programs generally include didactic, experiential, and mentored training totalling >100 hours.

Barrier:

- Traditional expectations by PTs and employers: “we are not doing PT because this is not PT in the traditional sense”
- Lack of emphasis and education on role boundaries “we are *physical* therapists, not psychologists” … “that’s not my job.”

Solutions: *Changing public expectations about PT and what it encompasses takes time and exposure through various mediums/formats.*

> Change can only go so far on the individual level. Further, you need a strong understanding of your own scope of practice. Refer to your state practice act for more information.

Barrier*: Patient expectations “Well I didn’t really come in here to have my thinking challenged or changed, I just came to get the exercises”*

Solution: *This type of methodology is not appropriate for every patient you see.*

> Our goal is not to force behavior change onto every person we see. Like any skill set, the real expertise is knowing how to pick and choose what is helpful for an individual, and then waving it into their plan of care.

Barriers: *Not enough time*

Solutions: *Integrating health promotion into PT practice comes down to a communication style difference, not necessarily the specific addition of activities.*

Having a strong grasp on strategies such as motivational interviewing, the use of screening tools that allow you to identify appropriate candidates, a solid bank of patient education materials, and a strong referral network are crucial to streamlining care.

Barrier: *Not reimbursed.*

Solution: *Patient education is firmly within our scope of practice and is reimbursable when integrated within the plan of care.*

Advocacy for continued expansion of reimbursable services is one solution to help facilitate this shift. Some practices have adopted models that allow cash-pay for wellness services by patients.

Effects of PIPT & Health Promotion Training Programs

Studies report that after participating in more extensive biopsychosocial training programs, PTs report the following:

4 Key Themes

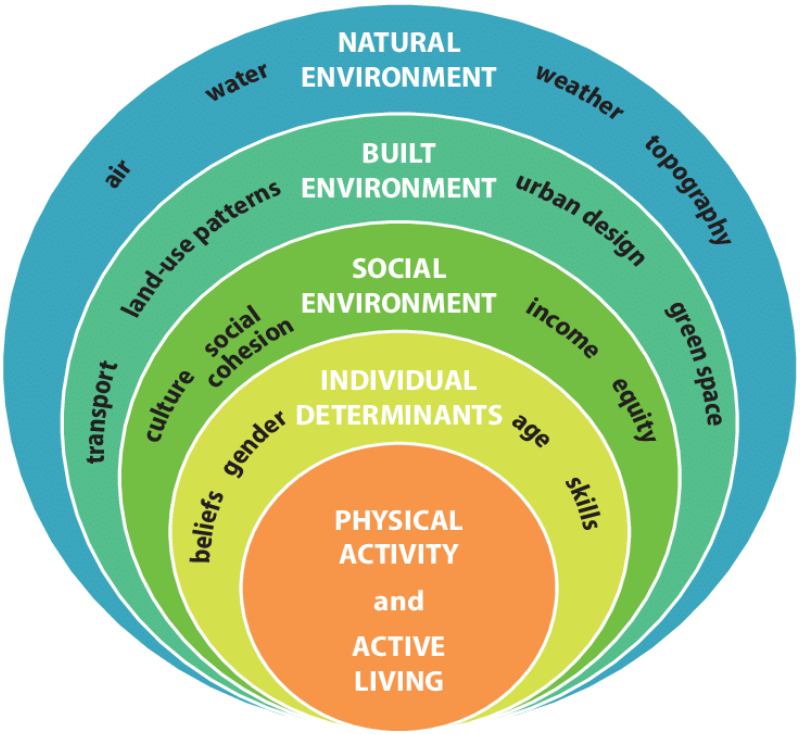
1. **A Changed Understanding & Practice**: leading to enhanced therapeutic alliance, improved person-centered care, and wider application of new skills, especially communication
2. **Professional benefits**: including increased personal self-efficacy, increased job satisfaction, more efficient caseload management, faster discharge times, and overall better management of service constraints
3. **Adequate learning requires extensive & ongoing training**: significant and meaningful changes require extensive and ongoing didactic, experiential, and supervised instruction. Training was most beneficial when many learning formats were provided, including workshops, manuals, practice sessions, mentorship, role playing, etc
4. **Clinical challenges remain post-training:** remaining discomfort when dealing with psychosocial factors, conflict and confusion over professional role; resistance & questioning of new approach by self or others, difficulty with changing and sustaining new style of practice, traditional patient's beliefs & expectations, time constraints, and reimbursement

Part 2: Background, Theories, & Approaches to Change

Theories & Models of Health Behavior Change

It is important to have a firm understanding of the models & theories which underlie the basis of human behavior change. Below is a brief discussion of some of the key models considered when discussing the physical activity promoting approaches & strategies in part 3 of this manual.

Social Ecological Model (SEM): A framework commonly used for health promotion and prevention which illustrates the complex interactions and interdependence of: intrapersonal and interpersonal factors, institutional factors, community factors, and public policy factors. Below is one example of a model adapted to considerations for physical activity and active living.



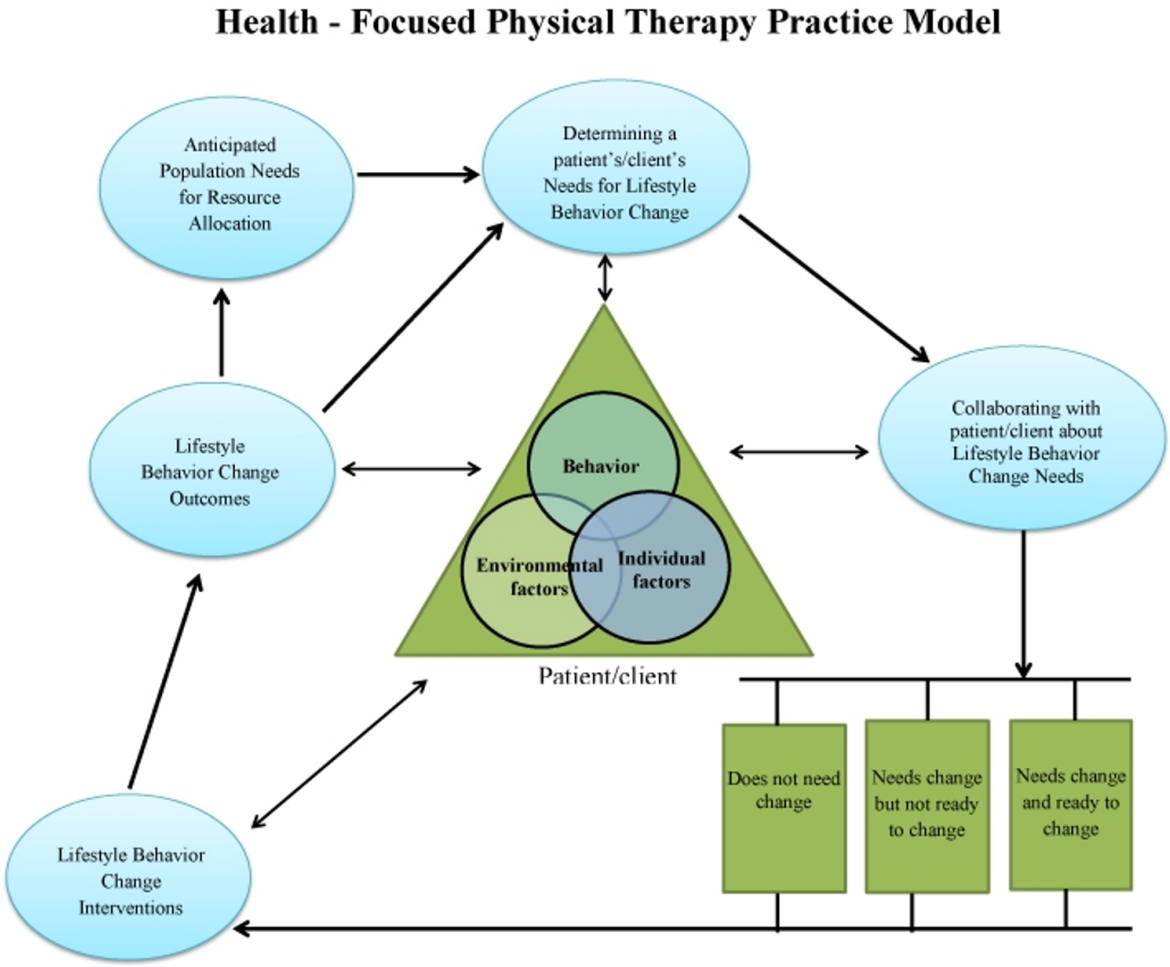
Transtheoretical Model (TTM): The premise of this approach is to match the intervention to the patients' cognitive readiness to change by increasing their self-efficacy. The stages of change are listed below:[5]

- *Precontemplation*- unwillingness or reluctance
- *Contemplation*- willing to discuss, don't plan to change in next 6 months
- *Preparation for change*- where action planning begins
- *Action*- had engaged in activity at least 3x/wk on a regular basis for less than 6 months
- *Maintenance*- Had engaged in activity at least 3x/wk for longer than 6 months

Theory of Self-Determination: This theory emphasizes self-efficacy and the ability to make decisions and set independent goals. Self-management training should include the promotion of an internal locus of control. This is accomplished through education, strategy development and practice, and regular assessment and feedback with the goal to improve self-efficacy.

Social Cognitive Theory: Describes the influence of individual experiences (expectations, beliefs, emotions, etc), the actions of others, & environmental factors on a person's health behaviors. Underlying this model is an emphasis on social support to help improve self-efficacy through use of observational learning, role modeling, & positive reinforcement to encourage behavior change.

The Health-Focused PT Practice Model is a newer model which integrates elements of all of the abovementioned theories, and has been used for competency development for DPT programs. It presents a good summary of what the strategies in this manual were based upon.



Psychologically Informed Physical Therapy (PIPT)

"Psychologically-informed practice, specifically, the integration of cognitive and behavioral focused strategies, as a method of delivery or as adjunct to routine physical therapy care, delivered by physical therapists, is effective at improving psychosocial and clinical outcomes related to pain interference, disability, and general mental and physical health, improving self-efficacy and reducing dysfunctional fear avoidance beliefs with moderate to large effect sizes."

This section describes the cognitive & behavioral approaches which underlie health promoting behavior change strategies emphasized in the brief clinician manual and in section 3 of this manual.

	Behavioral psychotherapy type	**Theoretical background**
First wave	Behavioral therapy	Behavior analysis takes into consideration every behavior, including overt and covert The therapist focuses on specific learned behaviors and how the environment influences such behaviors
Second wave	Cognitive behavioral therapy	CBT focuses on the development of individual strategies aimed to solve current problems and to change unhelpful patterns in cognitions (i.e., thoughts and beliefs), behaviors, and emotional regulation
Third wave	Acceptance and commitment therapy Dialectical behavioral therapy Integrative behavioral couples therapy Behavioral activation Cognitive behavioral analysis	Third wave therapies prioritize the holistic promotion of health and well-being and are less focused on reducing psychological and emotional symptoms. These therapies abandon key assumptions associated with traditional cognitive therapy and is informed by emerging research in cognitive psychology and neuroscience. Concepts such as metacognition, acceptance, mindfulness, personal values, and spirituality are frequently incorporated into what might otherwise be considered traditional behavioral interventions

Third wave contextual approaches take a more holistic approach and focus on enhancing positive factors contributing to health and wellbeing, rather than ameliorating or masking negative factors. It considers the intimately interconnected physical, psychological, and spiritual facets that together equate to an individual that is greater than the sum of their parts, and focuses on striving for the most satisfying, meaningful, and healthy life possible. Contextual CBT considers things like metacognition, acceptance, mindfulness, personal values, and spirituality.

How Cognitive & Behavioral Theories Guide Practice

Below are two subsets of therapies derived from the 3rd wave approaches described above, what these approaches are useful for, and strategies which are commonly used within these approaches.

Acceptance & Commitment Therapy (ACT): action-oriented, with a focus on accepting one's current experience rather than avoiding, denying, or further struggling with it, and on identifying and committing to one's personal values.

- Useful for: targeting ineffective & maladaptive coping strategies and experiential avoidance.
- Strategies: graded exposure & value-based goal setting

Mindfulness-Based Stress Reduction (MBSR): aim to enhance acceptance of one's experience by directing attention to a present moment of focus

- Useful for: improving pain perception & perceived disability, decreasing overidentification with symptoms, catastrophizing, etc
- Strategies: sitting and walking meditations, mind-body therapies such as yoga or tai-chi, diaphragmatic breathing, and visualization

Since we are mainly discussing the promotion of physical activity, our primary focus will be on the strategies and approaches that align with ACT.

We will now move on to an overview of physical activity health promotion, including its *Benefits, Barriers,*

Why Physical Activity?

Like any health promotional domain, the promotion of physical activity is a means to an end. Supported by unequivocal evidence of its positive effects, physical activity appears to be the most important & effective intervention PTs can incorporate into every patient/client plan of care to promote health and wellness (Bezner 2015).

Benefits

Widespread evidence exists supporting that people who are more physically active enjoy better physical, psychological, and cognitive health, are more productive, able to work longer, more socially engaged, and have an overall better quality of life.

We evolved as hunter gatherers with high levels of daily physical activity. This is the state in which our body systems, muscles, heart, and brain developed, and the state in which our mental systems responsible for memories, learning-abilities, decision-making and planning abilities, and attention abilities developed.

More active lifestyles and more physical activity allows for more blood vessel branching, increased antioxidant capacity, boosts the immune system, and renders the body less vulnerable to both disease and cognitive decline. as common cellular pathways for neurogenesis and plasticity appear synergistically promoted by physical exercise.

"Until recently, all of us were athletes."

In short, physical activity is backed by extensive research in its ability to:

- Improve general health, physical functioning, & overall quality of life
- Slow the progression of chronic conditions
- Enhance sleep
- Effectively help with stress management
- Act as adjunct support to smoking cessation & substance abuse recovery

We should not just be encouraging people to be more active, but to be less sedentary

Having brief, memorable phrases about the benefits of physical activity is one effective strategy to help effectively promote it. Here are some examples to get you started:

- “Stand Up, Sit Less, Move More, More Often.”
- “Motion is lotion.”
- “The best posture is your next posture.”

Barriers & Challenges

We know physical activity is good for you…so why don’t adults do it? Research indicates that it often comes down to low levels of motivation and/or failures of self-regulation & control. Other commonly mentioned barriers are included below:

- Limited free time
- Fear of falling or getting injured
- Lack of knowledge of parameters
- Cost
- Transportation
- Pain & lack of self-management strategies
- Lack of enjoyment
- Environmental barriers
    - In the US, especially in cities, there are less opportunities to incorporate PA into daily routines because everyone drives, takes escalators, etc
    - People residing in unsafe neighborhoods may be unable to run or walk outside

---

We will now move on to the *Building Blocks of Physical Activity Health Promotion*.

Building Blocks of Physical Activity Health Promotion

Effective self-management programs that promote physical activity to adults with chronic conditions consists of 3 main parts:

1. Education

a. Disease-specific
b. Health-focused
    i. Physical activity & exercise basics
    ii. Other domains of health

2. Core Self-Management Skills Practice

a. Communication with health care providers
b. Health decision making
c. Action planning
d. Problem solving
e. Value-based goal setting
f. Self-monitoring of health status
    i. Self-relaxation & stress management
    ii. Healthy coping skills
    iii. Activity modification

3. Intentional & Explicit Prescription of Physical Activity

a. Aerobic exercise
b. Resistance training

Below, we will discuss our approach to physical activity health promotion strategies:

Approach to Physical Activity Health Promotion

Lachman et al[6] support the use of a personalized approach to motivation and behavior change through emphases on the following strategies:

1) Enhancing Social Support
2) Utilizing Value-Based Goal Setting
3) Use of Effective Communication with Positive Reinforcement
4) Cognitive Restructuring for Negative & Self-Defeating Attitudes & Beliefs

These findings have been shown to significantly improve:

- Exercise Self-Efficacy
- Positive Health Beliefs
- Self-Management Skills
- Long Term (1+ years) PA Level Increases

Specific Skills Needed for PA Health Promotion

- Ability to ask the question: “Are you physically active?”
    - Ability to provide guidance when the answer is “no”
- Role Modeling: personal experience with physical activity
- Exercise Prescription
- Counseling Skills, such as Motivational Interviewing
- Time management (ie, fitting regular physical activity into daily lifestyle)

Now that we have discussed some foundational theories, models, and approaches, let’s look at some key competencies one must be proficient in to effectively integrate health promotion and wellness into their own practice.

The Key Competencies below are discussed throughout this manual in detail, with activities to help guide your learning. Note that we have already discussed the self reflection aspects, the skills & competence section, & the need for continuing education & training for ongoing skill development.

Key Competencies:

We commonly pull from and integrate theories from other bodies of research and fields of study to help guide our own interventions. Further, most all current CPGs recommend taking a multidimensional approach to care/management of musculoskeletal conditions, which requires the consideration of the whole person.

Taking a more holistic, multidimensional, and biopsychosocial approach to care necessitates understanding and competency with a few key actions, skills, and resources, including:

Screening: the ability to screen patients efficiently and effectively with use of validated tools and knowledge of differential diagnosis and red flags

Referral: to another provider or resource

- Appropriateness for PT or not
- The ability to identify the best provider, and
- The ability to determine whether or not the patient will need a formal referral from a physician for reimbursement purposes

Appropriateness, Need, & Identification of Contributing Factors

- PT plan of care, PT diagnosis, current & prior level of function
- Consideration of patient beliefs, values, expectations, coping styles, goals, stage of change, financial ability & insurance, health literacy level, etc
- Identification and prioritization of needed health behavior change(s)
- Identification of psychosocial factors, barriers, or facilitators
- The ability to match strategies and interventions to PT goals, health behavior change goals, & present psychosocial factors

Skills & Competence: the necessary skills and competence to carry out these differing interventions or strategies to facilitate behavior change

- ***Understanding Key Skills & Competencies***
  - ***o*** Understanding of the skills and levels of competence required to effectively carry out interventions & strategies
  - ***o*** Understanding your scope of practice as a PT in your state
- ***Self-Assessment or Assessment by Others:***
  - o Of one's current beliefs, abilities, skills, and training history with regard to these types of interventions, and
- ***Ongoing Learning & Practice Plan***
  - ***o*** To address holes in your skill set and to improve competency.

Follow-up & Follow-through with your patient whether from session to session, between sessions, or over time to promote long-term adherence.

- Utilization of problem-solving strategies, identification of barriers & facilitators, and appropriate action-planning
- Utilization of goal and activity trackers or other methods to increase patient involvement and to promote incremental improvements (PSFS)
- Evidence indicates that patients require intermittent follow-ups to continue with progress and to help prevent backslides.
- This can be accomplished through follow-ups spaced out over months, phone or email communications, or establishing annual wellness visits.

Resources:

- ***Strong Referral Network***: establishing a network of providers and community resources for referral and as adjunct to care.
- ***Patient Education Materials***: disease specific, population specific, health promotion or wellness-specific, appropriate health literacy levels, varying forms of media, availability in different languages, sizes of text, loudness or closed captioning for audio or video, etc
- ***Continuing Education & Skills Practice****:* different continuing education courses and opportunities, networks of people or self-assessment methods that allow for continued practice of skills.

We will now continue on through the competencies in Part 3 to discuss essential skills & specific strategies.

Part 3: Essential Skills & Specific Strategies for Physical Activity Health Promotion

Subjective: Essential Skills

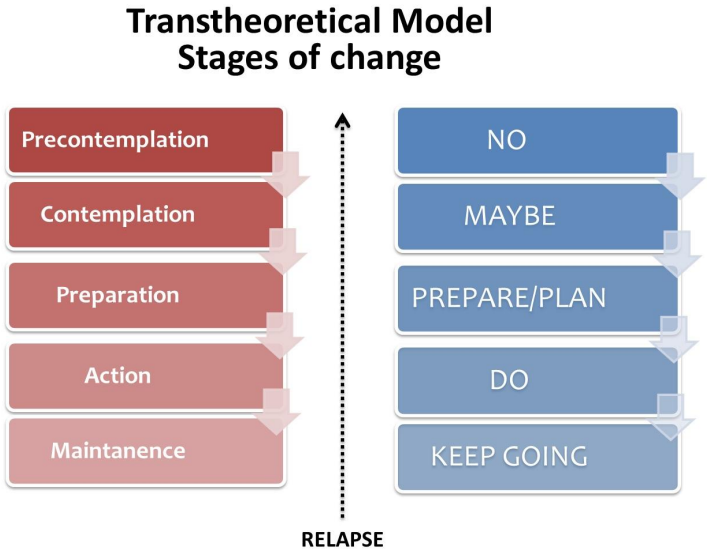
Our initial goals during the subjective/ patient interview are to build a strong therapeutic alliance and to begin to determine current patient beliefs and perceived self-efficacy.

Building a Strong Therapeutic Alliance

- The working, collaborative relationship between the patient & the PT
- A strong therapeutic alliance is associated with better outcomes
- Common features include:
  - trust
  - open-ended questions
  - empathetic & reflective listening
  - nonjudgement
  - individualized treatment plan that considers goals and values
- Strategies: Utilize motivational interviewing, validate their experience, & incorporate the above features

Identifying Current Stage of Change

- Our goal is to help move patients from “pre-contemplation” & “contemplation” into and through preparation into “action”.
- Strategies: We can use motivational interviewing to accomplish this through emphasis on motivation for change and self-efficacy



Determine Patient Beliefs & Perceived Self-Efficacy

- Who is responsible for their experience? An external locus of control is correlated with worse prognosis compared with internal LoC.
- Strategies: we should encourage active coping to improve a patient's perceived self-efficacy, as this is associated with better pain-related function, and should promote acceptance.

Internal Locus of Control	External Locus of Control
“I am going to focus on what I can control.” “I know that I can learn how to be more physically active.” “I make things happen.” “My passion & hard work can help me reach my goals.” “I take responsibility for my failures and will try better next time.”	“I don’t have any control, why did this have to happen to me? I’m just unlucky.” “This is just how I was born. No one in my family exercises.” “Things happen to me.” “There is nothing I can do about this.” “It's not my fault!”

We will now move on to screening methods. The subjective & objective sections of this manual overlap, but have been organized so that you can see some structure of how this might look during your exam. These strategies and methods are woven into care when performed skillfully, and are fluid within the session as a difference in communication patterns.

Essential Skills: Objective / Screening

Outside of routine screening of red flags and through use of outcome measures, we can use additional tools to screen for:

- Psychosocial Factors & Yellow Flags
- Current lifestyle-related health behaviors
- Self-efficacy

Below, there is a brief discussion of the various domains of health (Sleep, Stress Management, Eating Habits, & Substance Use) and their significance, potential referral sources, patient education points, and how they are affected by improving physical activity levels. Further detail on these other health behaviors is beyond the scope of this manual.

Poor sleep quality:

Poor sleep quality is common in people experiencing pain and has been shown to be a better predictor of disability than pain intensity

- **Referral Sources:** to providers (psychologists who practice CBT-I, psychiatrists, clinical counselors, physicians for sleep studies), online resources and apps, etc
- **Patient education materials** on hand for sleep hygiene, app recommendations for sleep meditations or white noise, as well as other resources to learn about different types of external supports, etc
- **What we can do:** provide education on sleep hygiene practices and training on patient-specific positioning, use of external supports for comfort, types of pillows and mattresses, etc.
- **Physical Activity & Sleep:** Increasing physical activity during the day, especially through use of aerobic exercise outside first thing in the morning is an effective evidence-based method for improving sleep quality.

Stress, Anxiety, & Depressive Symptoms:

Mental health conditions augment pain perception and the perceived impact of pain on function. These symptoms are also associated with decreased levels of self-efficacy & increased experiential avoidance or maladaptive beliefs.

- **Referral Sources** to providers (psychologists, psychiatrists, clinical counselors, physicians), community resources (support groups, stress management workshops, free clinics), and online resources (apps for mindfulness and stress reduction, meditations, yoga & mind-body practices including tai-chi, etc.)

- **Patient Education Resources:** on hand and in multiple media formats including stress management strategies, self-care strategies, and education on specific techniques.
- **What we can do:**
    - Utilize provided scripts on mindfulness practice, diaphragmatic breathing, progressive muscle relaxation, visualization, etc.
    - De-catastrophizing is an essential strategy for those with higher symptoms of stress, depression, anxiety, fear avoidance beliefs, or pain catastrophizing to help decrease perception and perceived impact of pain
- **Physical Activity & Stress:** Increasing physical activity is one of the most effective strategies for improving and managing stress levels.

Healthy Eating & Disordered Eating

Eating habits play a significant role in overall wellbeing, overall physical and mental health, and risk of developing further complications or eating disorders. Considerations regarding protein intake and musculoskeletal healing should be understood.

- **Referral Sources:** registered dietitian, physician, psychologist, psychiatrists, community resources (free clinics, food pantries/kitchens)
- **Have patient educational materials** on hand regarding general nutritional guidelines, useful apps & websites, myplate.org, etc

Smoking, Drinking, Substance Abuse

Substances, including cigarette smoking and alcohol use and abuse, contribute to and exacerbate almost all chronic conditions and impair tissue healing. They are associated with worse long-term outcomes across the spectrum and are commonly associated with development or exacerbation of neuropsychological and mental health disorders, including development of degenerative conditions such as dementia.

- **Referral** sources to providers (MD or other physician, psychologist, psychiatrists, social workers, clinical counselors), community resources (support groups, rehabilitation centers, free clinics), and online resources (anonymous groups, virtual groups, forums, etc)

We will now move on to more physical-activity specific screening measures.

Screening for Physical Activity

This information is crucial for establishing baselines, determining current stage of change, identifying motivation, and guiding goal setting and interventions. It all begins with asking one question:

"Are you physically active?"

Other questions to follow up with include:

"What does a normal day look like for you?"
"What does your exercise routine look like?"
"What do you normally enjoy doing? What do you want to get back to doing?"
"What would being more active look like for you?"

One of the most significant predictors of screening for physical activity by PTs is the level of physical activity that clinician participates in personally. Role modeling health behaviors is one of the essential skills for effective physical activity health promotion by PTs.

Outcome Measures to Consider

Many outcome measures exist for screening for physical activity (or other health domains) and for yellow flags. These tools can help guide referral and interventions. Two suggested measures are included below:

OSPRO Yellow Flag (YF) Questionnaire

- Similar accuracies between forms: 17 item (85%), 10 item (81%), 7 item (75%)
- The Academy of Orthopaedic Physical Therapy offers a free scoring tool
- 3 domains:
    1. Negative Mood (psychological distress, cognitive distortions)
    2. Fear Avoidance (maladaptive beliefs)
    3. Positive Affect/Coping (self-efficacy, locus of control, acceptance)

Patient Specific Functional Scale (PSFS)

- A reliable & valid measure that can be utilized for individualized goal-setting & tracking. Allows patients to see change over time.

Below is an activity to help you build your bank of screening tools. A few suggestions are provided to help you get started.

Activity: Fill out the tool below with additional screening tools of your choice to help build a base of useful, validated screening options. This is not an exhaustive list, nor are all required.

	Description	**MCID & Scale**	**Trigger for Referral**
Ospro Yellow Flag			
PSFS			
Pain Self Efficacy Questionnaire			
Beck Depression Index			
PHQ-9			
FABQ			
Perceived Wellness Survey			
RMDQ			

We will now move on to referral sources & an activity to assist with building or growing your own.

Building Your Referral & Resource Network

Having a strong referral network of different providers and community resources is very important for providing care that is holistic, as holistic care often requires a multidisciplinary team. To build your network and refer effectively, you must first have an understanding of the various provider types you may encounter and what they can do. You must also consider that if the patient needs a referral for insurance purposes, you will need to be able to refer them back to their primary care provider. You should also be aware of local free clinics.

See a brief list below of many (not all) providers and personnel you may encounter based on your practice population. This is not an extensive list. If there are any you are unsure about, take this time to search for what they do. If you are feeling adventurous, go have a conversation with one of these providers in your area or attend a local networking event. These conversations can serve not only as education for yourself, but also for other providers with regard to what a PT can do.

Health Care Multidisciplinary Team Member

Medical Team:	***Allied Health:***	***Mental Health & Social Services:***	***Other Providers:***
Medical Doctor (MD) Doctor of Osteopathy (DO) Nurse Practitioner (NP) Physician's Assistant (PA) Certified Nursing Assistant (CNA) Registered Nurse (RN) Orthopedic Surgeon Neurologist Cardiologist Dermatologist Podiatrist Gastroenterologist Physiatrist/ Physical Medicine & Rehabilitation Physician Psychiatrist Optometrist	Physical Therapist PT Assistant Occupational Therapist OT Assistant Speech Language Pathologist	Psychiatrist Clinical psychologist Clinical counselor Social Workers	Registered Dietitian, Nutritionist Chiropractor (DC) Athletic Trainer Personal Trainer, Strength Coach, Performance Specialist Prosthetist Pharmacists

Activity: Now it's your turn to start to build your referral and resource network. Write down who you are already connected with, as well as options for future connections. This may take some networking and some time! Also keep in mind that many of these providers treat or specialize in specific populations.

Here is a list of tips to keep in mind and help guide you in making referrals. First, consider health care providers. Then, consider other potential community resources.

Step 1: Please use the list of providers above as a guide, keeping in mind the general population of your own practice, and make a list of useful provider types for your multidisciplinary team. Then, write down the names of 1 to 3 providers (or potential providers) for each category.

- Consider identifying local massage therapists, acupuncturists, or alternative medicine practitioners.
- Include local urgent cares & diagnostic imaging centers
- Remember to locate other PTs in your area, especially those with specialist training (pelvic floor, lymphedema, etc.)

Step 2: Next, explore local community resources and consider identifying:

- Free clinics in your area and/or those offering pro-bono services or discounted offers for cash-based or low-income clients
- Food banks, soup kitchens, and shelters in your area
- Community centers and recreation centers in your area, including places such as the YMCA or YWCA, and explore their programs. You may want to call and inquire about population-specific programs, evidence-based programs (ex: A Matter of Balance), classes they have, & pricing / discounts
- Local gyms (including alternative type facilities and specialty classes- dance, martial arts, yoga, etc), their rates, any offers they have (ex: Silver Sneakers), and the qualifications of their trainers or coaches.
- Online classes or educational programs or services, including free ones
- Adaptive equipment sellers
- Adaptive sports teams and programs
- Local support groups for various concerns, conditions, goals
- Local clubs, sport teams for all ages, etc
- Local parks and their accessibility
- Transportation services nearby, including the closest bus stops to you.
- Any other useful services, places, or programs you can think of that may be beneficial. Knowing your community well is key! Consider any health fairs, fundraisers, triathlons, or other community events for networking & referral

---

Below we will move on to the *Assessment* & discuss how to put it all together.

Assessment: Matching Needs to Interventions:

"Not every patient needs the psychological focus, but every patient will still benefit from being told they are doing well. People often do things because they are told to or because they think they should, but they often don't understand why. Validation, recognition, and education are key." -M.M.

Problem → **Strategies** → **Specific Interventions**

The stage of change will guide the communicative strategies you employ and emphasize. Motivational interviewing is a strategy which can be used to help facilitate the move into the 'preparation' & 'action' stages. Other strategies include graded exposure, patient education, and value-based goal setting. See some examples below of what this might look like in action:

Presence of Fear-Avoidance or other Maladaptive Beliefs	Education & Graded Exposure	• Educate on hurt vs harm & debunk maladaptive beliefs (pain neuroscience) • Build activity tolerance over time through interval training • De-emphasize pain with use of relaxation techniques
Low Self-Efficacy +/or external locus of control	Motivational Interviewing & Graded Activity	• Use motivational interviewing to emphasize self-efficacy • Start with goals and activities which guarantee early success • Validate & celebrate incremental progress • Teach self-management strategies to self-manage activity & pain • Relate past successes & patient values to future goals "You've done this before"
Low Levels of Motivation	Motivational Interviewing & Value Based Goal Setting	• Use motivational interviewing to emphasize how current behaviors align with patient values and encourage change behaviors • Educate on ways physical activity can improve wellbeing & introduce simple strategies that guarantee early successes • Relate patient values to goals through use of PSFS

Interventions: Essential Skills

Graded Exposure or Graded Activity

"Re-define winning. It does not take a big change to make a big difference over time."

Gradually increasing duration and intensity of exposure for patients with high-intensity pain or chronic pain, hyper- sensitization, or higher levels of perceived disability can help combat pain and psychological distress with introduction of or return to activity. We can emphasize that even incremental progress can make a big change.

Some specific strategies are noted below:

Self-management strategies for grading activity	"I want RPE around 6-7 (or 'medium') while you are doing this. But, if your pain/symptoms increase more than 2 points from where you started (10 pt scale), then ease off of the intensity!"
Find ways to integrate PA into daily routines	• Go for a 10-30 minute walk before or after meals. This can help improve sugar & insulin metabolism. • Any time you stand up from sitting, do it 2 more times. • Get off the bus a few stops early. • Take the stairs instead of elevators. • Park farther away in parking lots. • Set timers for every 30 min while working. When it goes off, move for 1 min (dance, walk, move!). This improves blood flow & metabolism.
Emphasize social support for accountability & improved self-efficacy	• Recommend community resources • Schedule daily walks with friends or group dog walks • During the kid's sports practice, recruit other parents to go walk around
Track & Encourage Progress	• Use tracking sheets • Recommend activity trackers • Have pedometers to loan or give out

Motivational Interviewing:

Motivational interviewing is a method of communication which helps to emphasize, guide, and motivate change. It is useful for building a strong therapeutic alliance and for facilitating healthy behavior change by moving people from the contemplation & precontemplation stages into the action stage.

As this is a specific communication style, this is a technique which you may begin to employ immediately from the moment you meet the patient in order to emphasize self-efficacy. It is included here because we commonly refer to it as an *Intervention*, but could be included in the *Subjective: Essential Skills* section.

Below is the **O.A.R.S.** technique, which provides a framework for use of motivational interviewing, along with some examples of how to put this into practice.

O	**O**pen-ended questions	"What would it look like for you to be more physically active?" "Tell me about a time in your past when you were physically active."
A	**A**ffirmations	"I appreciate your honesty and effort with self-reflection." "I understand that starting a new routine can be daunting and I want to recognize the hard work you have been putting in."
R	**R**eflections	"I am hearing that you are concerned about getting injured during exercising." "It sounds like you are feeling a bit overwhelmed about how to increase your activity levels."
S	**S**ummarization	"Here is what I understand so far. Let me know what I have missed, if anything..." "So I am hearing that you have been wanting to do X, but that you are having a hard time finding time to fit that into your schedule. Is that right?"

Everyone is working towards some kind of goal all the time, even if it isn't explicit. Our job is to facilitate that however we can.

Patient Education

Patient education is the foundation of health promotion and wellness, and is the essential first step to promoting self-efficacy with self-management. This foundational knowledge acquisition is necessary for developing successful self-management skills. The main communicative difference to be made here is to take the time to help the patient understand the "why".

Patient education occurs in-session but is most effective when it is reinforced throughout that patient's daily lives and when it persists throughout the plan of care. We want to increase their exposure to this information however we can.

Activity: *Let's start building your own patient education repository based on your practice population(s). You can continue to build on this as your work through the manual and as you learn about or think of new resources. Please see the following tips as you grow your patient education bank. Remember, the best materials are the ones you actually hand out and that patients actually consume. Don't forget to follow up!*

Tips & Guidelines for Patient Education Resources:

- Remember to have resources for:
    - Population / disease-specific information with resources to learn more
    - Pain-neuroscience education
    - General health and wellness-related information and strategies with resources to learn more (include specific providers!)
        - Physical activity
        - Sleep hygiene, insomnia, and sleep-related issues
        - Stress-management
        - Nutrition, Healthy Eating Habits
        - Smoking cessation, substance abuse
- Try to include resources of various media formats.
    - Paper or PDF
    - Online websites, videos, lecture series, forums, social media pages
    - Support groups (in person and online)
    - Phone apps: accountability, goal setting, technique videos, guided workouts, habit trackers, activity trackers, etc
    - Podcasts, audiobooks
- Look for resources available in various languages & assess for cultural appropriateness
- Consider accessibility options, including but not limited to:
    - Closed captioning abilities

    - Pictures or videos opposed to written words
    - Audio-only with appropriate sound
- Assess for appropriate health literacy & avoid medical jargon.
- Remember to review patient education resources for understanding and for compliance and set aside time for any questions.
- Additional Strategies:
    - Consider keeping pedometers for patients to borrow or buy (or be given) to promote physical activity. Consider researching various activity trackers and watches of different price ranges to offer recommendations if indicated.

Here are some resources to get you started:

1. NCHPAD - Building Healthy Inclusive Communities The National Center on Health, Physical Activity, & Disability
2. Current Guidelines for physical activity
3. Physical Activity – CDC website great learning link for patients
4. National Council on Aging Map of Programs
    a. Evidence-Based Falls Prevention for Older Adults Programs
5. Health for Older Adults Various resources for each domain of health & wellbeing
6. Foundational Learning and Key Articles Other learning links
7. Tame The Beast — It's time to rethink persistent pain Pain Neuroscience Education video

Essential Skills: Plan

Value based goal setting is the main skill included in the *Plan* section. Use of the Patient Specific Functional Scale (PSFS) is also likely to be performed here, as it is a useful tool to help guide meaningful, patient-specific functional goal setting.

Action planning for these goals should also be accomplished during this time, and may include identifying perceived barriers & facilitators and making a plan to minimize the risk of setbacks and maximize the facilitators of success.

Value-Based Goal Setting

"Even among those with end-of-life diseases, interventions that enhanced meaning (or purpose) in life had benefits for mental health and overall quality of life. Meaning is what sustains us on the long, hard journey, no matter what we may find at the end."

Method:

- Help the patient identify values and meaning:
    - What are you doing when you feel most powerfully that "this is what I am meant to be doing"?
    - What brings you joy? What are you passionate about?
- Then, connect these values to participation-level goals, including findings from PT exam. Values are also insights into motivation.

Additional Strategy:

- Give them a copy of their plan of care with their goals and review it with them on their follow up visit to make sure you are on the same page. You can include tracking sheets with this or any other resources or educational materials to help guide them.
    - Research indicates that when patients have something to follow along with, it enhances both short and long-term outcomes and adherence.

Sample Script for Value Based Goal Setting

(Courtesy of Zachary Stearns. Script from the "Pain Prevention & Treatment Research Department of Psychiatry and Behavioral Sciences at Duke University. This script is used as part of DPT class materials at Duke.)

Many people find it helpful to identify longer term goals they would like to work towards.

When thinking about your longer-term goals it is helpful to think about the things you value in life.
There are many domains for our values—many different areas of meaning.
These areas include:

- Family relations
- Physical wellbeing
- Citizenship and community involvement
- Spirituality
- Recreation and hobbies
- Education
- Employment
- Friendships and social relationships
- Parenting
- Marriage or your intimate relationships

Values are what gives your life meaning, what is really important to you. Values are different from goals. Goals can be achieved. Whereas this goal sits within the larger realm of “education”.
Think about those different areas of life. Now pick 1 area that is especially important to you.
Let’s brainstorm goals related to this area. The more ideas, the merrier. Even if it seems unrealistic, write down that idea. Take a minute or two to write down at least 10 goals in this area.
Now that you have this list of goals, think about how we can set specific goals that are realistic to achieve within the next few months. Goals should be about our behavior, measurable, realistic, meaningful, and time-specific. Pick one goal from this list that you would like to achieve within the next few months.
Now, write two actions that you can do this week to work toward your goal.
Place your list of actions somewhere that will remind you of your plan for this week. These are your actions, which follow a goal, which is aligned with your values. This is what’s called “values-based goal-setting.”

We will finish up with what happens *After the Initial Evaluation.*

After the Initial Evaluation

Follow Up

- Provide follow-up phone calls, emails, or check-ins between sessions or even after discharge at 1 week, 1 month, 3 months, and 6 months to improve accountability and help problem-solve if needed.
- Schedule a maintenance check-up visit at 6 months or 1 year, or consider adopting a yearly wellness-visit or annual exam for your patients.
- Be sure to follow up each session, inquire how the patient is doing with goals & HEP, and reinforce learning points. Save time for questions and action planning for the next week.

Monitoring Adherence

Changing actions & beliefs takes repetition! When checking in, don't forget to...

- Validate their struggles
    - "It sounds like you really have a lot on your plate! That must be hard. It makes sense with all that going on that you would have some trouble trying to fit in something new."
- Ask open ended questions to help them problem solve & overcome barriers
    - "What would it look like for you to overcome these barriers?"
    - "What is a reasonable amount of X activity you could do?"
    - "What can you do today, tomorrow, this week?"
    - "What do you feel like is keeping you from doing x?"
- Don't tell them what to do, help them figure out what is right for them

Referral

We discussed referrals earlier on; however, now is another point in time where referrals may be warranted. Your community resources may be some of the most valuable during this time period. For example, please consider the following:

- Local parks
- Community & Recreation Centers
- Traditional & low-cost gyms
- Alternative style gyms (dance, martial arts, pilates, yoga)
- Pro-bono clinics
- Free educational classes & clinics
- Adaptive sport opportunities
- Evidence Based Programs

Summary / TL; DR

Key Points

- Personal Health Literacy is essential for health decision making, which is why an educational component is essential
    - Educate about the health benefits of physical activity
    - Make patients & clients aware of the current recommended minimum guidelines for physical activity
- Increased self-efficacy has been linked to sustainability and better long-term outcomes, so tools which emphasize self-efficacy are key.
    - Guide patients to understand the “why”
    - Utilize brief, meaningful, & memorable factual phrases
    - Promote an internal locus of control
- Explore barriers & facilitators to physical activity
    - Promoting recreational PA may better promote adherence over prescribed exercises since it can be better catered to patient preference and motivation.
    - Include strategies for helping patients and clients to prevent relapse
    - Recognize that people wanting to become more physically active may not always have a safe place to do so, so identifying community resources or other alternatives is necessary for improving inclusivity & accessibility
- Encourage Value Based Goal Setting and self-monitoring outcomes
    - Relate goals & specific interventions to patient values
- Behavior change requires time, exposure, and repetition! Find ways to further expose patients to positive health information through various media formats, external resources, & through following up
    - Phone calls, emails, or check-ins between sessions or after discharge (1 week, 1 month, 3 months, and 6 months)
    - Schedule a maintenance check-up visit at 6 months or 1 year
    - Consider adopting a yearly wellness-visit or annual exam
    - Set aside time each session for follow up, problem solving, & questions
- Others:
    - Emphasize social support
    - Emphasize incremental progress
    - Celebrate successes & utilize positive reinforcement
    - Validate emotions & struggles
    - Education, education, education
    - Repetition, repetition, repetition

Physical Activity Promoting Approaches

Graded Activity + Daily Routine Integration + Specific Strategies	● Use an RPE scale and a pain scale as a self-management strategy: "I want RPE around 6-7 (or 'medium') while you are doing this. But, if your pain/symptoms increase more than 2 points from where you started (10 pt scale), then ease off of the intensity!" ● Give them an EXPLICIT goal to achieve day 1. Start small to ensure early success & emphasize incremental progress ● Walking even 1000 steps more per day has demonstrated a dose-response relationship with significantly decreasing all-cause mortality & CVD-related & metabolic disease-related morbidity & mortality. (5-36%) ● Integrate specific exercises around meal times. Going for a 10-30 minute walk before or after a meal has demonstrates significantly improved glucose and insulin metabolism in healthy, overweight, & obese adults, with & without diabetes ● One bout of 30 minute, moderate intensity walking (or other exercise) a day has demonstrated significant improvements in triglyceride levels in healthy, overweight, and obese adults, with &without metabolic diseases. ● Frequent activity breaks from prolonged sitting/standing, for as little as 1-3 minutes of walking or other light activity (dance party!) every 30+ minutes has demonstrated significant efficacy for improving metabolism of insulin & glucose and improving vascular flow ● "Any time you go to stand up, do it 2 more times!" ● Give patients a pedometer or suggest activity trackers or watches to help promote physical activity (step counts, challenges, social support, monitoring)
Patient Education	● Start with basics of exercise, goals, graded progressions, activity modifications, and self-management strategies ● Educate on hurt vs harm when indicated. ● Consider doing a weekly or monthly free-exercise class that focuses on education and form with exercise technique
Therapeutic Alliance & Emphasizing Self-Efficacy	● Give patients a copy of their evaluation or *at least* their goals ● Give patients a tracking sheet or suggest habit-tracking or activity-tracking apps for progress. You can use the PSFS as a handout for this. ● Start each session with follow-up questions about progress & barriers. End each session reiterating goals & talking about strategies to minimize/overcome barriers.

	● Don't tell them what to do, facilitate their own problem solving and let *them* come up with the answer ● Validate their struggles "It sounds like you really have a lot on your plate! That must be hard. It makes sense with all that going on that you would have some trouble trying to fit in something new." ● Ask open ended questions ○ "What would it look like for you to overcome these barriers?" ○ "What is a reasonable amount of X activity you could do?" ○ "What can you do today, tomorrow, this week?" ○ "What do you feel like is keeping you from doing x?
Social Support	● Look for community opportunities or local accountability groups or walking clubs. ● Suggest scheduling daily walks with friends, or even daily or weekly dog-walking groups! ● Meet up at the dog park or at your kid's sports practice & walk or exercise outside there with other parents/guardians.
Maximize Accessibility & Inclusivity	● Set up your clinic if resources allow so that patients can come in and use aerobic exercise equipment if needed. If they don't have access normally, this is one easy way to improve it. ● Utilize community resources including recreation centers, gyms, and parks to help facilitate this and find options the patient will enjoy. Afterall, the best kind of exercise is the one the patient actually participates in.

Bibliography

1. Lein DH, Clark D, Graham C, Perez P, Morris D. A model to integrate health promotion and wellness in physical therapist practice: development and validation. *Phys Ther*. 2017;97(12):1169-1181. doi:10.1093/ptj/pzx090

2. Mulligan H, Wilkinson A, Chen D, et al. Components of community rehabilitation programme for adults with chronic conditions: A systematic review. *Int J Nurs Stud*. 2019;97:114-129. doi:10.1016/j.ijnurstu.2019.05.013

3. Knight E, Werstine RJ, Rasmussen-Pennington DM, Fitzsimmons D, Petrella RJ. Physical therapy 2.0: leveraging social media to engage patients in rehabilitation and health promotion. *Phys Ther*. 2015;95(3):389-396. doi:10.2522/ptj.20130432

4. Vitoula K, Venneri A, Varrassi G, et al. Behavioral Therapy Approaches for the Management of Low Back Pain: An Up-To-Date Systematic Review. *Pain Ther*. 2018;7(1):1-12. doi:10.1007/s40122-018-0099-4

5. Holopainen R, Simpson P, Piirainen A, et al. Physiotherapists' perceptions of learning and implementing a biopsychosocial intervention to treat musculoskeletal pain conditions: a systematic review and metasynthesis of qualitative studies. *Pain*. 2020;161(6):1150-1168. doi:10.1097/j.pain.0000000000001809

6. Rethorn ZD, Covington JK, Cook CE, Bezner JR. Physical activity promotion attitudes and practices among outpatient physical therapists: results of a national survey. *J Geriatr Phys Ther*. 44(1):25-34. doi:10.1519/JPT.0000000000000289

7. Magnusson DM, Rethorn ZD, Bradford EH, et al. Population health, prevention, health promotion, and wellness competencies in physical therapist professional education: results of a modified delphi study. *Phys Ther*. 2020;100(9):1645-1658. doi:10.1093/ptj/pzaa056

8. Bezner JR. Promoting health and wellness: implications for physical therapist practice. *Phys Ther*. 2015;95(10):1433-1444. doi:10.2522/ptj.20140271

9. Lachman ME, Lipsitz L, Lubben J, Castaneda-Sceppa C, Jette AM. When Adults Don't Exercise: Behavioral Strategies to Increase Physical Activity in Sedentary Middle-Aged and Older Adults. *Innov Aging*. 2018;2(1):igy007. doi:10.1093/geroni/igy007

10. Ben-Ami N, Chodick G, Mirovsky Y, Pincus T, Shapiro Y. Increasing recreational physical activity in patients with chronic low back pain: A pragmatic controlled clinical trial. *J Orthop Sports Phys Ther*. 2017;47(2):57-66. doi:10.2519/jospt.2017.7057

11. Saeidifard F, Medina-Inojosa JR, Supervia M, et al. The Effect of Replacing Sitting With Standing on Cardiovascular Risk Factors: A Systematic Review and Meta-analysis. *Mayo Clin Proc Innov Qual Outcomes*. 2020;4(6):611-626. doi:10.1016/j.mayocpiqo.2020.07.017

12. Peddie MC, Kessell C, Bergen T, et al. The effects of prolonged sitting, prolonged standing, and activity breaks on vascular function, and postprandial glucose and insulin responses: A randomised crossover trial. *PLoS One*. 2021;16(1):e0244841. doi:10.1371/journal.pone.0244841

13. Wheeler MJ, Green DJ, Cerin E, et al. Combined effects of continuous exercise and intermittent active interruptions to prolonged sitting on postprandial glucose, insulin, and triglycerides in adults with obesity: a randomized crossover trial. *Int J Behav Nutr Phys Act*. 2020;17(1):152. doi:10.1186/s12966-020-01057-9

14. Peddie MC, Bone JL, Rehrer NJ, Skeaff CM, Gray AR, Perry TL. Breaking prolonged sitting reduces postprandial glycemia in healthy, normal-weight adults: a randomized crossover trial. *Am J Clin Nutr*. 2013;98(2):358-366. doi:10.3945/ajcn.112.051763

15. Hall KS, Hyde ET, Bassett DR, et al. Systematic review of the prospective association of daily step counts with risk of mortality, cardiovascular disease, and dysglycemia. *Int J Behav Nutr Phys Act*. 2020;17(1):78. doi:10.1186/s12966-020-00978-9