



WHITE PAPER

Functional Wellness Domains

Research/References

Intro

With more than half of our population reporting living with musculoskeletal (MSK) disorders and pain, it's logical that more people than ever before are seeking solutions for these problems. Unfortunately, the first step in finding a solution is often a confusing one.

The confusion lies in trying to determine if the best first step is to seek the advice of a healthcare professional or can this be solved through fitness and wellness advice. Adding to their confusion are healthcare providers who prescribe exercise for their patients regardless of risk factors for injury and a fitness industry that, all too often, attempts to use its limited tools to solve health problems. Communication between the two worlds of health and fitness is not as good as it could be, stalling the progress of motivated individuals.

MORE THAN **50%**
of the population reports MSK pain/
disorders

The risk factors for musculoskeletal injury are broad in scope and compounding in nature. Many MSK risk factors are not in areas of our lives that are currently thought of as directly related to movement.

As movement health professionals, we learned that to successfully return our patients and clients to health, we had to go upstream from the current problems and often look outside of movement altogether. We had to expand our toolbox, learn from the experts and research in other disciplines and consider all of the domains that harbor known risk factors for movement health.

That is why we developed the Functional Wellness Screen - which screens eight categories of MSK risk factors. Through this screening process we can then rate and rank the data to determine the best recommendation and path forward. Since this can be an overwhelming endeavor, we created a platform that can assist professionals in this process. This platform is called Symmio which has shown to be an effective tool at identifying MSK risk factors¹. It allows the professional to easily deploy the Functional Wellness Screen to individuals or groups, thus allowing a more efficient process to collect the data and deliver recommendations.

Symmio delivers two basic outcomes: Referral along with self-guided solutions. If Symmio's screens recognize a current health problem or pain, the person will receive referral guidance concerning the appropriate professional to consult. If they present as healthy, but with dysfunctions or other risk factors, Symmio will direct the individual to the protective or corrective actions they need to take today.

Symmio offers screening and daily guidance regarding Movement Health as well as the intertwined domains of Behavioral Health, Injury History, Breathing Quality, Physical Activity, Body Composition Sleep Wellness, and Nutritional Awareness. Symmio screens for specific criteria in each of the domains to consider its effect on risk for MSK injury.



Movement Health

Movement health plays a significant role in an individual's overall wellness and can serve as an indicator of potential deficiencies and areas needing attention in other health domains. Moving with poor quality can increase your risk of future musculoskeletal injuries.^{2,3} Specific examples of poor quality movement or movement dysfunctions that are known risk factors for future injury are movement asymmetry,⁴ decreased or asymmetrical dynamic balance,⁵ and decreased or asymmetrical ankle mobility.⁶ Pain with movement is a risk factor for MSK health and must also be considered.^{5,7}

Movement is so integral to our daily lives that we often overlook the importance of moving well. Quality of movement, encompassing your ability to balance, rotate, reach, squat, and bend, is crucial for performing everyday activities without pain or dysfunction that could lead to musculoskeletal (MSK) problems. Symmio guides you through screening these fundamental movements, helping ensure your movement serves you well.

Behavioral Health

Behavioral health considers the emotions, behaviors, and biology that contribute to your mental wellbeing and the ability to function in everyday life. Being able to screen behavioral health early and often will provide the feedback to identify potential problems before they manifest into bigger issues. Stress, anxiety and depression can all negatively impact overall wellbeing and have a strong link with MSK disorders. Depression, anxiety and stress have a cyclical relationship with MSK conditions - increasing an individual's likelihood of having an MSK condition, while also making that condition more difficult to manage.^{5 8 9 10} Integrating care for mental and physical health is vitally important, as half of individuals with a musculoskeletal condition state that it has a negative impact on their mental health, with the vast majority (93%) saying that their entire lives are negatively affected.¹¹

Symmio uses the Whooley questionnaire and the Patient Health Questionnaire -9 (PHQ-9), which are both widely recognized screening tools for identifying major depression and, primarily used in primary care settings. The Whooley consists of two main questions

designed to evaluate whether an individual has been bothered by feelings of depression or a lack of interest in activities for more than half the days in the past two weeks. These questions aim to quickly determine if further diagnostic evaluation for depression is needed.

A systematic review and meta-analysis of the diagnostic accuracy of the Whooley questions found that they have a high sensitivity (about 95%) but relatively modest specificity (around 65%) for detecting major depression. This implies that while the Whooley questions are effective at ruling out depression (with a negative test result being quite reliable), a positive test result does not confirm depression as definitively, necessitating further assessment.¹² The PHQ-9 (Patient Health Questionnaire-9) is a widely used self-administered tool for screening, diagnosing, monitoring, and measuring the severity of depression. It's composed of 9 questions that correspond to the diagnostic criteria for major depressive disorder. It has been validated against clinician-administered diagnostic interviews, showing high sensitivity (88%) and specificity (88%) for diagnosing major depression.

Combining the Whooley Depression Screen and PHQ-9 offers a robust approach to screening for depression in behavioral health settings. The initial use of the Whooley questions provides a quick and efficient method to identify individuals who may need further evaluation. Administering the PHQ-9 to those who screen positive ensures a detailed and accurate assessment of depressive symptoms, facilitating appropriate and timely interventions.¹³



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Injury History

Very few of us are able to live an injury-free life, but we may be discounting how serious these seemingly temporary speedbumps can affect us in the future. Not only can our previous injuries negatively influence movement ability, they are risk factors for future injury.^{5,6,13,14} Low perceived recovery from a previous injury is also a MSK risk factor.⁵

Many are at risk because rehabilitation or a lack of rehabilitation did not clear pain and properly vet function before they were released from care. The previous injury could have also resulted in a permanent physical change. Both incomplete rehabilitation and continued dysfunction could result in harmful movement compensation as well as negatively impact sleep and behavioral health. Most of us have experienced injuries at some point, and it is crucial to properly assess the severity and recovery level before starting any new wellness or fitness activities. Answering a few simple questions about your injury history and recovery can provide essential insights to tailor the most appropriate recommendations for you.

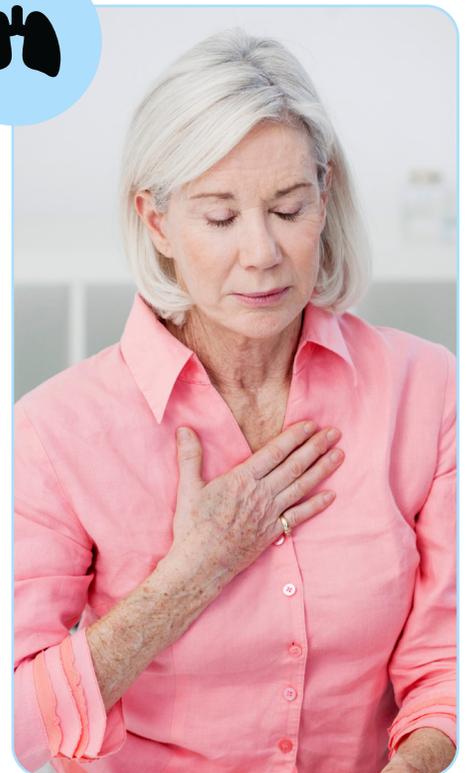


Breathing Quality

Breathing can be affected by specific medical, metabolic, and behavioral conditions - asthma, obesity and anxiety are common complaints. Breathing is also negatively impacted by behaviors like smoking or vaping and environmental factors like pollution. How efficiently and effectively a person breathes affects overall health and directly impacts sleep, movement, and behavioral health. Dysfunctional breathing can contribute to decreased pain thresholds, impaired motor control and balance issues, with the subsequent movement dysfunctions adversely impacting performance and overall wellbeing.¹⁵

A focus on breathing quality reinforces the complex and multifactorial nature of the wellness domains. Breathing quality can become compromised by a lack of physical activity, but it can also derail any attempts to regain physical fitness. By screening for breathing dysfunctions, we can determine how much of an impact it is having on other domains as well as ensure the most appropriate activities and recommendations are being given.

Symmio will guide you through an evidence-based screen of your breathing quality. This is done by having you answer a few questions as well as determine your ability to hold your breath. Based on these results, specific exercises or strategies will be given if needed.





Physical Activity



Physical activity levels and exercise have immediate and long-term health benefits. Most importantly, regular activity can improve overall quality of life and reduce the risk of developing life-threatening diseases. Being physically active can improve your brain health, help manage metabolism and weight, reduce the risk of cardiovascular and metabolic diseases, strengthen bones and muscles, and improve your ability to perform everyday activities.

Just as adequate physical activity can have positive effects across the domains, the negative effects of physical inactivity are fundamental to the development of chronic metabolic, cardiovascular, and musculoskeletal conditions.^{17 18} The reduced aerobic fitness that follows physical inactivity is also a risk factor for future MSK injury.^{5 6 19} Readiness for physical activity must also be a consideration, as exercise itself has become a significant risk factor for MSK injury.²⁰ Knowing the current level of physical activity can help determine what recommendations may best fit the individual.

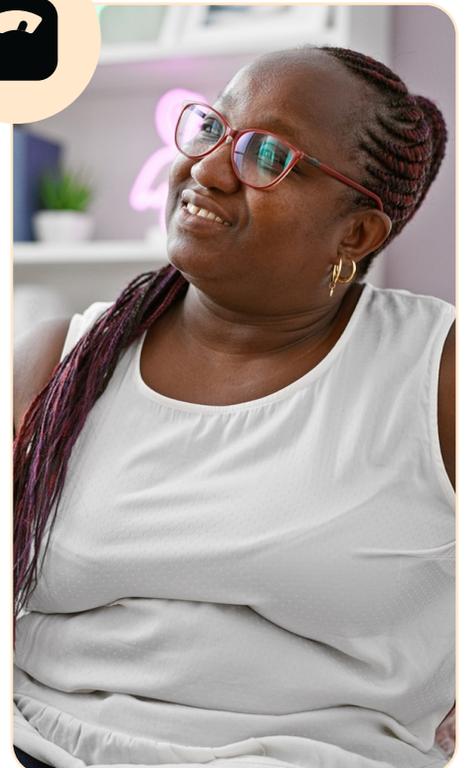
By using the American College of Sports Medicine's physical activity recommendations and comparing that to your current level of physical activity Symmio can determine your current activity-related risk and make appropriate recommendations.

Body Composition

Body composition considers the percentage of fat, bone, and muscle in an individual's body. The focus is primarily on the detrimental whole-health effects of overweight and obesity, as individuals having higher amounts of body fat are more likely to have increased health problems, including musculoskeletal, metabolic, breathing and sleep issues.²¹ Movement quality, pain and outcomes related to MSK injuries are negatively affected by high BMI.^{22 23}

We have become culturally, and possibly even medically, complacent when it comes to obesity, but the facts are clear. Per the World Health Organization, obesity and overweight conditions are categories of *malnutrition*.^{24 25} While we need to be sensitive, we must also address that overweight and obesity are not normal or healthy states of being. Viewing these conditions as normal hides their lasting health effects: Less than 1% of obese adults are metabolically healthy.^{26 27}

(cont.)



Symmio offers two straightforward methods for screening body composition: using a person's height and weight to calculate Body Mass Index (BMI) or measuring the hip to waist ratio. While these methods are not the gold standard for measuring body composition, they are efficient and easy for self-screening, providing valuable information. By comparing your BMI and hip to waist ratios to normative values based on age and sex, Symmio helps assess your musculoskeletal (MSK) risk and establishes a baseline for future comparisons.



Sleep Quality

Poor sleep quality and sleep deprivation are risk factors for physical injury. One study clearly states "There are clear negative effects of sleep deprivation on performance, including reaction time, accuracy, vigor, submaximal strength, and endurance. Cognitive functions such as judgment and decision-making also suffer."²⁸ Consider that information, knowing that nearly 3/4 of high school students get insufficient sleep²⁹ and are joined by 36% of adults under age 44.³⁰

Sleep complaints are present in most chronic pain disorders and over half of individuals with insomnia suffer from chronic pain.^{9,31} Further, both chronic pain and sleep disturbances share an array of physical and mental health

conditions such as obesity, type 2 diabetes, and depression.²⁶ Of Individuals With MSK Conditions, 72% have reported that their disorder affects their sleep.¹⁰ Screening for sleep quality provides yet another opportunity to identify an issue before it becomes a more serious problem. Because of sleep's influence on other domains, it is extremely important to monitor and when appropriate take action to improve it.

Symmio screens your sleep quality by using the Pittsburgh Sleep Quality Index (PSQI).³² This screen measures seven areas of sleep and differentiates between poor and good. If sleep is identified as an issue, basic recommendations can be provided. Consistent monitoring of your sleep moving forward will determine if more significant steps need to be recommended.

75%
of high school
students get
insufficient sleep

36%
of adults under
age 44 also get
insufficient sleep

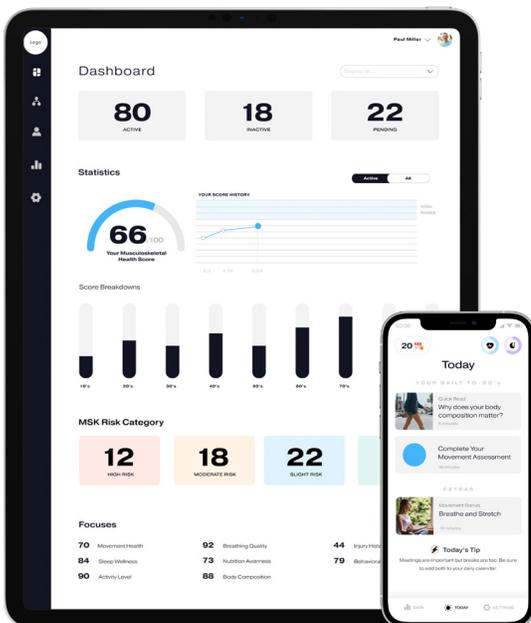
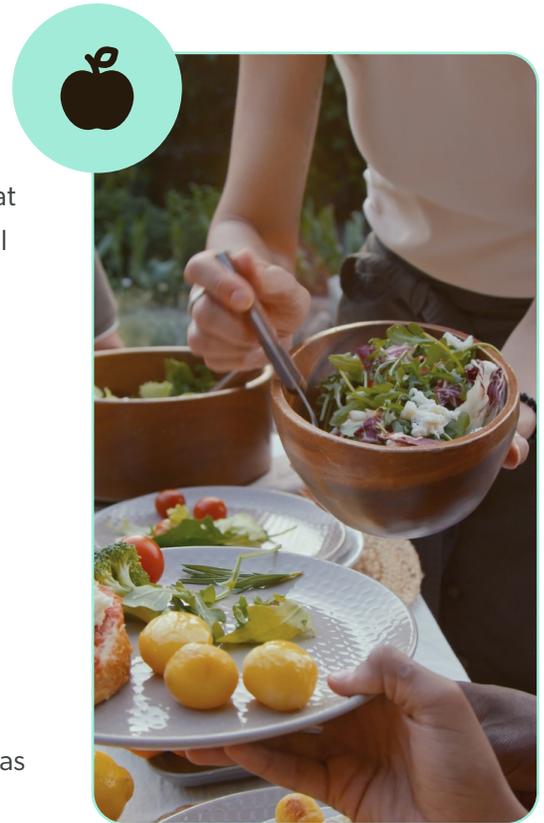
72%
reporting MSK pain/
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Nutritional Awareness

Like the other basic cycles of breathing and sleep, proper nutrition and hydration are vital for wellness. The qualities and quantities of what we consume strongly impact not only our MSK health, but our physical development and health of our entire being.⁷ Increased nutritional awareness is related to a reduction in BMI³³ and improvements in nutrition can be helpful to reduce the burden associated with MSK disorders and risk.

Only 10% of adults meet the recommended intake for fruits and vegetables³⁴, often leading to a reliance on medications to address the deficiencies and health issues that arise from poor diets. Establishing good food habits starts with reliable information. Enhanced nutritional knowledge and practical guidelines for creating a nutritious meal plan can significantly enhance your dietary choices. Consider whether you treat meals as a crucial part of your daily wellness routine or if nutrition has become an afterthought.

Symmio offers a questionnaire designed to assess your nutritional knowledge. If it reveals gaps in your understanding, Symmio can provide additional resources to help improve your awareness and guide you towards better nutritional practices.



Conclusion

Symmio's hierarchy identifies your biggest area of focus and works with you to protect it today and correct it over time. Clearly, some of these categories are actionable immediately and through appropriate activity, we can measurably improve them. Other factors are observable, and we will use those to track overall progress, and see if they are improved through indirect action. Symmio works with user feedback to determine the proper path the person needs as well as the most efficient and effective pace for them to follow.

At its core, Symmio is about enhancing your understanding and awareness. It efficiently screens and gathers responses across eight diverse health domains using a single application. This data is then analyzed, rated, and ranked to guide your next steps towards achieving optimal wellness and reducing health risks.

Symmio was designed to help you find a balance among these eight domains, whether you're looking to boost your overall health and wellness or aiming to increase your fitness level. For everyone, finding this balance is the key to a healthier life.

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