Metabolic Considerations for Common Musculoskeletal Conditions

Editorial

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Abstract

Musculoskeletal conditions such as osteoarthritis, osteopenia, osteoporosis, and tendinopathies are common reasons individuals seek physical therapy. Traditional rehabilitation approaches often focus solely on the affected joint or tissue, relying heavily on passive modalities like massage and ultrasound for symptom relief. However, these methods often overlook the broader impact of metabolic health on tissue quality and function. Conditions like obesity, diabetes, and metabolic syndrome share inflammatory pathways and tissue degradation processes with musculoskeletal disorders, including muscle loss and fatty infiltration. Effective rehabilitation should shift from passive care to promoting general health improvements by increasing lean muscle mass and enhancing aerobic capacity. Addressing metabolic health alongside targeted rehabilitation may improve tissue quality and long-term outcomes for these populations. This integrated approach can potentially reduce the prevalence of musculoskeletal conditions and enhance recovery by targeting underlying metabolic dysfunctions rather than merely alleviating localized pain symptoms.

Key Words: musculoskeletal disorders, metabolic health, rehabilitation strategies

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Introduction

Some of the most common musculoskeletal conditions that cause individuals to seek physical therapy are osteoarthritis, osteopenia and osteoporosis, and tendinopathies. 1 in 5 adults experience osteoarthritis[1], low bone mass (osteopenia) is present in about 43% of older adults[2], almost 13% of older adults are diagnosed with osteoporosis[2], and tendinopathies account for about 30% of adult visits with a general practitioner[3], ultimately resulting in a physical therapy referral**.** Traditional injury rehab treatment models tend to focus only on the specific joint or tissue when addressing these musculoskeletal conditions. These traditional methods often prioritize passive modalities (massage, ultrasound, dry needling, and e-stim) directly to the site of pain to temporarily decrease symptoms[4]**,** while never addressing the need for enhancing general fitness, strength of the tissues surrounding the painful or injured body part in conjunction with the entire body and utilizing gradual progressions to improve tissue capacity and tolerance for long-term improvements.

This reliance on relatively passive care for these conditions becomes further problematic when the relationship between osteoarthritis, osteopenia and osteoporosis, tendinopathies and metabolic health are explored, especially with consideration for the prevalence of metabolic health issues like obesity (over 42% of adults[5]), diabetes (nearly 15% of adults[6]), and metabolic syndrome (over 30% of adults[7]**)**. Shockingly, it is suggested that only 12% of Americans meet the definition for "metabolically healthy[8]."

In exploring this relationship between these musculoskeletal conditions and metabolic health, findings suggest common inflammatory pathways in tissues that are present in osteoarthritis, osteopenia and osteoporosis, and tendinopathies are also seen in metabolic disorders like obesity, diabetes, and metabolic syndrome[9]. Additionally, hallmark characteristics of metabolic syndrome are expressed in the musculoskeletal system: muscle loss, fatty infiltration into muscle tissue, and connective tissue deposition into muscle tissue[9], further suggesting the need to zoom out from a specific tissue lens with passive care and instead focus on a metabolic lens and promoting general health improvements in musculoskeletal treatment.

The overlap of muscle loss and muscle tissue quality degradation in the most common musculoskeletal conditions and metabolic disorders underscores the urgent need to shift rehabilitation focus away from passive care or isolated, tissue-specific interventions. Instead, the emphasis should be placed on comprehensive strategies that target overall health improvement, prioritizing the enhancement of lean muscle mass, strength, and aerobic capacity. By adopting a metabolic-centered approach to rehabilitation, clinicians can address underlying systemic issues contributing to poor tissue quality, rather than merely alleviating localized pain symptoms. This paradigm shifts towards optimizing metabolic health through integrated training programs has the potential to not only enhance musculoskeletal function but also reduce the prevalence and severity of conditions like osteoarthritis, osteoporosis, and tendinopathies. Incorporating progressive resistance training, cardiovascular fitness, and nutritional strategies aimed at improving metabolic health will provide more robust, long-term improvements for these highly prevalent populations.

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