

Myofascial Pain Syndrome: Physical Activity, Nutrition and Health

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Abstract Myofascial Pain Syndrome (MPS) is a term used generally as a whole that denotes pain arising from the musculoskeletal system. An estimated 23 million or 10% of the general American population have this type of chronic disorder of musculoskeletal origin. MPS is the leading cause of disability among the working population as it is an overuse or repetitive stress syndrome. MPS is a common debilitating condition which is characterized by the presence of myofascial trigger points, defined as palpable and hyperirritable nodule located in the vicinity of taut bands of muscle fibers. Studies have found an association between sedentary lifestyle (physical inactivity and obesity) and nutritional deficiencies (water soluble vitamins and minerals) with chronic myofascial pain syndrome. Correcting the perpetuating factors is the key to maintaining optimal health and wellness.

Keywords: Myofascial Pain Syndrome, physical activity, nutrition, health

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1. Introduction

The term 'Myo' refers to muscles whereas 'Fascia' is a thin sheath of fibrous connective tissue enclosing a muscle or other organ. Myofascia thus refers to the muscles along with their connective tissue sheath. Myofascial Pain Syndrome (MPS) is a term used generally as a whole that denotes pain arising from the musculoskeletal system [1,2]. The musculoskeletal system, as the name suggest constitutes the muscles and the skeleton of the human body. They include the bones, muscles, ligaments, tendon, bursae and the joints.

An estimated 23 million or 10% of the general American population have this type of chronic disorder of musculoskeletal origin [3]. A study conducted by Simons DG found that, of the 164 patients referred to pain clinic, half of population were diagnosed with MPS [4,5]. It has been estimated that myofascial pain is responsible for upto 85% of all patients who present at pain clinic [2]. MPS is a common debilitating condition characterized by the presence of myofascial trigger points (MTrPs) and their clinical symptoms of motor, sensory and/or autonomic phenomena [5].

MTrPs is defined as palpable and hyperirritable nodule located in the vicinity of taut bands of skeletal muscle fibers [5]. The characteristic features of MTrPs include muscle tightness which causes stiffness of the adjoining muscle thereby restricting its range of movement and weakness of muscles due to presence of pain. Compression or snapping palpation of MTrPs may elicit a

referred pain and/or localized twitch response (LTR). MTrPs are also characterized by their autonomic phenomena such as increased sweating, lacrimation, salivation and pilomotor activity [5].

Based upon their clinical presentation of spontaneity and referral pattern of pain, trigger points can broadly be grouped into either an active or latent one. An active trigger point causes spontaneous pain with a referral type of pain. A latent trigger point is associated with non spontaneous pain i.e. pain elicited only by compression with a non referral pain pattern [5].

MPS is the leading cause of disability among the working middle-aged population as it is an overuse or repetitive stress syndrome [6]. The exact etiology and mechanism of MPS is still controversial and equivocal in the understanding of its etio-pathophysiology. The general belief is that trigger points develop as a result of muscle injury i.e. acute trauma or due to chronic overuse (chronic repetitive strain) and muscle overload (sustained muscle contraction) [2,5,7,8]. Empirical evidences also shows an association between sedentary lifestyle (physical inactivity and obesity) and nutritional deficiencies (water soluble vitamins and minerals) with chronic myofascial pain syndrome [5,9,10,11,12,13].

According to World Health Organization (WHO) 2018, lack of sufficient physical activity and poor nutrition is a key risk factor for developing non-communicable diseases (NCD) viz. cardiovascular diseases, diabetes, cancer and stroke [14]. Sedentary lifestyle such as physical inactivity and obesity, use of tobacco and consumption of alcohol decreases the overall quality of life and longevity of life [14,15]. Nutritional deficiency of certain water soluble

vitamins and minerals also contributed in the mechanism for the development of myofascial pain syndrome [12,13].

2. Myofascial Pain on Physical Activity and Health

Physical activity increases the overall quality of life and longevity of life. Lack of sufficient physical activity is one of the key factors for global mortality. Individuals who are physically active reduced the risk of pre mature death by 20 to 30 percent when compared with less physically active individuals. An individual is said to be physically active by performing at least a moderate intensity level of physical activities [14,15].

According to WHO (2018), the levels of physical activities recommended for adult individuals aged 18-64 are the following [14];

- Moderate intensity- physical activities of at least 150 minutes per week (equivalent to 30 minutes of brisk walking at least 5 days a week)
- Vigorous intensity- physical activities of at least 75 minutes per week (equivalent to 20 minutes of jogging at least 4 days a week)

The importance of maintaining physical health and activity can be confirmed by numerous research evidences. The benefit of regular physical activity on cardiovascular diseases is well documented. Physical inactivity is directly correlated with cardiovascular diseases thereby increasing the risk of developing cardiovascular diseases. Regular physical exercises reduce the risk of developing hypertension, high cholesterol, heart disease, diabetes and stroke [16].

Interestingly, research studies found an association between physical activity and some types of cancer. A systematic review of 45 studies establishes a strong relationship between physical activity and reduced risk of colon cancer and breast cancer [17]. A Meta analysis of 52 studies found that physical activity decreases an individual's overall risk of developing colon cancer by an estimated 24 percent [18]. Despite lacking strong evidences, physical activity was also found to lower the risk of cancer of endometrial, lung, esophagus, pancreas and meningioma [19].

Inactivity or lack of physical activity (with reference to WHO norms) is a key risk factor for developing obesity and associated health conditions. Physical inactivity due to pain also causes weight gain in individuals subsequently leading to obesity. Sedentary lifestyle poses a threat particularly with obese individuals by increasing the risk of developing chronic low back pain [20]. Studies have found an association between sedentary lifestyle (physical inactivity and obesity) and chronic myofascial pain [5,9,12].

Musculoskeletal muscles in the human body can be broadly divided into dynamic muscles and postural muscles [10]. With sedentary lifestyle, dynamic muscles (rhomboids, gluteus medius) are more lax, while the postural muscles (scalene, quadratus lumborum) become progressively taut [11]. An imbalance between the dynamic and postural muscles may gradually lead to myofascial pain. Acute trigger point is commonly found in the postural muscles of the neck, shoulder and pelvic

girdle. The commonly involved postural muscles associated with MTrPs are the upper trapezius, scalene, sternocleidomastoid, levator scapulae and quadratus lumborum [12].

3. Myofascial Pain on Nutrition and Health

A balanced diet includes eating the right amount of calories and nutrients for maintaining an ideal weight and health. Weight is gained when the amount of calories of food intake exceeds the amount of those calories burned. Eating right reduces the risk of developing chronic illnesses such as cardiovascular diseases and diabetes [14,15,16].

Obesity plays a key factor for certain serious health diseases and chronic pain condition. The co-morbidities of obesity in chronic diseases include heart disease, high blood pressure, high cholesterol, diabetes and stroke. Myofascial pain accounts for over 60 percent of the population among obese individuals. A significant co-morbidity is found between obesity and chronic pain condition, thus impacting each other. Physical inactivity as a result of chronic pain leads to obesity, and pain is also a common complaint among obese individuals [14,15,16,21].

Certain vitamins and minerals insufficiencies may perpetuate myofascial pain syndrome. *Travell and Simons* noted that half of their patients with MPS required resolution of vitamin inadequacies for lasting relief. According to *Travell and Simons*, particular nutrients requiring special concern in patients with myofascial pain are the following [12,13];

- Water-soluble vitamins. Vitamin B1 (Thiamine), vitamin B6 (Pyridoxine), vitamin B12 (Cyanocobalamin), folic acid, vitamin C
- Minerals. Iron, calcium, potassium, magnesium.

Recent research articles reported an association between low levels of vitamin D and musculoskeletal pain conditions. It is found to be more common in the female population than their male counterparts. Poor bone mineralization as in the case with vitamin D deficiency causes achiness and pain of muscles and joints that comprise the musculoskeletal system. The chief minerals associated with mineralization of bone are calcium and phosphorous, along with trace amounts of carbonate and magnesium. Lack of vitamin D is also found to be more common in obese individuals. It is also reported that obese women who were diagnosed with knee osteoarthritis have greater chance of developing vitamin D deficiency and thus reported greater pain [21,22].

These multi vitamins and minerals are essential key components for maintaining the optimum health and overall physical wellness, and in preventing myofascial pain conditions. They are vital for functions of the nervous system and brain, production of red blood cell (RBC), production and functioning of white blood cells (which aids in immunity), energy metabolism and production, alleviating depression and anxiety [12,13,23]. Iron is essential for a number of enzymes involved in neurotransmitter synthesis and prevention of anemia [24].

Lack of these vitamins and minerals can cause generalized muscle pain and irritability susceptible to

cause trigger points, fatigue and generalized weakness [12,13,23,24,25]. Individuals with poor dietary control, consumers of alcohol, smokers and other chronic diseases are more prone to have water soluble vitamin deficiencies [12].

4. Conclusion

Physical activity is important for maintaining the normal musculoskeletal framework and physiological condition of the human body. Regular physical exercises not only prevent non communicable diseases, but also combat obesity, depression and insomnia. It also increases the longevity of life and the overall quality of life. Therefore, correcting the perpetuating factors of MPS by following regular physical activity and well nourished nutrition is the cornerstone and pillars for maintaining optimal health and physical wellness.

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