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A Role of Physical Activity and Diet in Patients with Systemic Lupus Erythematosus – A Literature Review

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Abstract

Introduction: Systemic lupus erythematosus (SLE) is a chronic multisystem autoimmune disease of unknown cause. Inflammation and immune-mediated damage to multiple organ systems are the hallmarks of this condition. It is capable of affecting virtually every organ of the body, including but not limited to the hematologic, kidney, mucocutaneous,

musculoskeletal, and kidney systems. Immunologic abnormalities, specifically the production of numerous antinuclear antibodies

Purpose of work: Collect information on the impact of physical exercise and diet on SLE patients and the possibilities of their therapeutic use.

Summary: Being active helps patients with SLE maintain a lower body weight, improve their mental state, relieve their fatigue, and increase their general satisfaction. There are some findings that indicate that physical activity is not as important in therapy for patients with SLE as adding exercise to the basic treatment program. Nevertheless, physical activity is beneficial for the overall well-being of individuals, regardless of whether they have SLE or not. Therefore, it is recommended that patients with SLE engage in physical activity, as it has been widely acknowledged to have significant positive health benefits.

Key-words: Systemic Lupus Erythematosus, Connective Tissue Diseases, Physical Activity, Exercises

Introduction

Systemic lupus erythematosus (SLE) is a chronic multisystem autoimmune disease of unknown cause. Inflammation and immune-mediated damage to multiple organ systems are the hallmarks of this condition. It is capable of affecting virtually every organ of the body, including but not limited to the hematologic, kidney, mucocutaneous, musculoskeletal, and kidney systems. Immunologic abnormalities, specifically the production of numerous antinuclear antibodies (ANA), constitute a prominent aspect of the disease, occurring at some point during the disease in over 95% of patients with SLE (1, 2). The prevalence of SLE is variable and influenced by ethnicity, ranging from 40 to 200 per 100,000 individuals. People of African and Asian ancestry are more likely to have SLE than Europeans. It has a significantly greater impact on women than men, with up to 90% of individuals diagnosed with SLE being female (2-5).

The criteria for assessing SLE are different and there are no officially accepted ones (6). Notwithstanding this, the classification criteria developed for scientific study by the 2019 European Alliance of Associations for Rheumatology (formerly the European League Against Rheumatism)/American College of Rheumatology criteria (the 2019 EULAR/ACR classification criteria) are estimated to have a sensitivity of 96.1% and specificity of 93.4%, compared with 82.8% sensitivity and 93.4% specificity of the the American College of Rheumatology (ACR) 1997 and 96.7% sensitivity and 83.7% specificity of the Systemic Lupus International Collaborating Clinics 2012 criteria (7). Another study showed that the 2019 EULAR/ACR classification criteria for SLE are estimated to be 86.6% sensitive and 91.2% specific for SLE. In patients with a short disease duration, their sensitivity remained high (87.6%). The emergence of numerous new medications for SLE underscores the importance of identifying and treating patients as soon as possible (8).

These criteria include assessment of the presence of fever, and hematological symptoms such as leukopenia, thrombocytopenia, or autoimmune hemolysis. The criteria also include neuropsychiatric symptoms such as delirium, psychosis, and seizure. Symptoms from mucous membranes and skin are also included in these criteria: alopecia, oral ulcers, subacute lupus erythematosus (SCLE)/discoid lupus erythematosus (DLE), acute cutaneous lupus erythematosus (ACLE) and also from serous membranes such as effusion or acute pericarditis. SLE may also cause musculoskeletal symptoms such as joint involvement and may affect the kidneys, causing proteinuria and lupus nephritis. Antiphospholipid antibodies, anti-Sm, and anti-dsDNA antibodies may also be positive in serology. The complement components C3 and/or C4 are also reduced (7).

It is a very diverse set of clinical symptoms that may affect the daily functioning and physical condition of patients suffering from SLE in various ways. In this review, the focus is on ways to improve the quality of life and physical fitness of patients with SLE. Furthermore, the examination of the impact of diet on individuals with SLE was also conducted.

Physical Activity in Patients with Systemic Lupus Erythematosus

In 2024, was published an article by Blaess et al. about recommendations for physical activity and exercise in patients with SLE. This consensus was reached through the efforts of an

international task force. A systematic literature review and an expert's opinion were used to establish three overarching principles and 15 recommendations, which were adopted by the Delphi consensus (9). Three overarching principles for physical activity and exercise in SLE include the following: the decision regarding physical activity and exercise should be made jointly by those with SLE and their physician (9-12). It is imperative that patients are informed about the anticipated advantages of physical activity and exercise (9, 13). Notifying other healthcare providers of individuals with SLE of the absence of contraindications to physical activity and exercise is crucial (9, 14).

The subsequent 15 statements state that physical activity is recommended for individuals with SLE following a medical evaluation for contraindications. A medical evaluation should be done before starting exercise in SLE to identify potential contraindications and allow for adaptations based on physical abilities, preferences, and comorbidities. In the event of osteonecrosis or Jaccoud's syndrome, a medical professional should conduct an assessment before commencing physical activity. It is imperative to revisit potential contraindications to physical activity and exercise in the event of a flare. It is suggested that you avoid involving inflamed joints during physical activity and exercise. Before starting physical activity, it is suggested to use questionnaires or the number of steps per day to measure the baseline level of physical activity. In order to promote and sustain physical activity over a prolonged period, it is imperative to adjust the frequency and intensity of physical activity for each individual, taking into account their abilities, preferences, and comorbidities. The gradual implementation of exercise should involve adjusting the frequency and intensity to suit the individual's capabilities and comorbidities. In order to make exercise programs more personal, it is important that experts like physiotherapists or people who know how to adjust physical activity supervise them. It is recommended to incorporate a low-intensity warm-up and a cooling-down period into every exercise session. Exercise regimens should be executed in three to five sessions per week, including both aerobic and resistance training exercises. The recommended duration for resistance training is 1 to 3 sets per exercise, comprising 8 to 12 repetitions, followed by rest periods of 1 to 3 minutes. Individuals with SLE with inactive disease or mild disease activity should gradually reach the WHO recommendations and engage in moderate-intensity activities of 150–300 minutes per week, with a minimum of two days per week devoted to strengthening activities. In the context of outdoor activities, it is imperative to implement adapted measures, such as photoprotection, and to utilize appropriate clothing against cold in the event of

Raynaud's phenomenon. Individuals with SLE who receive anticoagulant or antiaggregant treatment should exercise caution when engaging in physical activities that may result in injury (9).

Fatigue that's severe is linked to more discomfort, shorter sleep duration, and less restful sleep. Patients with SLE who regularly engage in physical activities exhibit lower levels of fatigue than those who do not. Furthermore, exercise is associated with less pain and improved sleep in patients with SLE. Dog owners experience a greater sense of well-being compared to other patients. What's more, fatigue levels are similar in both employed and unemployed individuals with SLE (15). Progressive aerobic exercise for a duration of 12 weeks has the potential to enhance pertinent fatigue indicators in women diagnosed with SLE (16). On the other side, the physical and executive abilities of individuals with SLE are enhanced by regular moderate-intensity aerobic exercise, in conjunction with resistance training (17). Furthermore, individuals with SLE who engage in regular physical activity exhibit a reduction in depression and an enhancement in their quality of life (18). In particular, there is a potential correlation in SLE between emotional abnormalities, including depression, and microvascular impairment (cerebral oxygenation and endothelial dysfunction) (19). SLE patients may have a lower level of oxygen in their brains when they exercise, even if they don't have any symptoms of mental illness (20). What a fascinating, healthy lifestyle can lower the level of dsDNA antibodies in the blood (18). The impact of physical activity on leukocytes in patients with SLE remains unclear, but leukocytes from SLE patients, irrespective of disease activity, showed a down-regulation of inflammatory gene expression immediately after intense aerobic exercise, followed by a rebound (21). Acute aerobic exercise does not cause inflammation in individuals with SLE, according to other findings (22). It's possible that exercising can reduce inflammation in women with SLE (23). The reduction in macrovascular dysfunction observed in patients may be attributed to a decrease in inflammatory markers because physical activity can reduce inflammation (24). The implementation of exercise-based interventions leads to improvements in fatigue, depression, and physical fitness but a multimodal approach may be needed (25-27). For these reasons, it is important to consider regular physical activity as an integral component of modern therapeutic approaches for patients with SLE (28).

The correlation between physical fitness and body composition in women with SLE is evident. The body composition parameters, including body mass index, fat mass index, waist

circumference, waist-to-height ratio, and waist-to-hip ratio, are significantly lower in fit women with SLE compared to those who are not fit. Also, body mass index, fat mass index, waist circumference, and waist-to-height ratio are all negatively related to cardiorespiratory fitness and upper-body muscle strength in women with SLE (29). In patients with SLE, the intensity of physical activity and duration of sedentary time are not associated with arterial stiffness (30). In women with SLE, 12 weeks of progressive treadmill aerobic exercise improved cardiorespiratory fitness without increasing arterial stiffness, inflammation, or oxidative stress (31). Furthermore, the results suggest that enhanced cardiovascular fitness and flexibility may mitigate the detrimental effects of increased body mass and adiposity on inflammation in women with SLE (32). Another study showed muscle strength and cardiorespiratory fitness in women with SLE with mild disease activity are positively related to health-related quality of life, but flexibility is not (33). All of these results indicate that it is important for women with SLE to remain physically fit (29, 31-33). Furthermore, there is a significant discrepancy between the pediatric SLE population and the published norms in body composition, muscle strength, and cardiovascular endurance (34). As well as pediatric SLE patients experience fatigue as a significant symptom (35). It is imperative to consider these facts and prioritize exercise programs that can enhance aerobic capacity and muscle strength in the pediatric SLE population, which is high-risk (34).

On the other hand, it was found that changing lifestyle for 6 months did not improve cardiovascular risk factors in patients with SLE who have a high-risk profile (36). What's more, Despite having no obvious cardiovascular disease or risk factors, patients with SLE exhibit decreased microvascular reactivity during reperfusion compared to healthy individuals. This indicates that skin microvascular dysfunction is present in patients with SLE, irrespective of the cardiovascular burden they bear (37). Moreover, the low-certainty evidence also suggests that the addition of physical activity to conventional medical care may have minimal or no impact on tiredness, functional capacity, and disease activity (38). Lifestyle modifications may not prove to be efficacious in reducing weight among individuals with SLE (39).

The health-related quality of life in SLE is significantly lower compared to that of the general population (40, 41). Generally, a decreased frequency of exercise and lower exercise capacity are reported by patients with SLE. Furthermore, patients who experience greater organ damage report a greater decrease in physical activity. The primary focus of intervention programs aimed

at encouraging increased physical activity and exercise in SLE should be on these patients and those who engage in passive lifestyles (42).

Other lifestyle modification interventions ought to be incorporated not as a substitute for pharmacotherapy but as a complement to general therapy. There is evidence that a low-fat diet and a Mediterranean diet may be beneficial for lowering cardiovascular risk, but there are no large-scale interventional studies. Depressive symptoms, anxiety, and health-related quality of life are improved by psychological interventions in patients with SLE. Patients with SLE should also use photoprotection, avoid smoking, and avoid drinking alcohol (43).

EULAR recommendations for the non-pharmacological management of SLE and systemic sclerosis have been published recently (44). There were 12 recommendations and four overarching principles developed. According to EULAR recommendations, non-pharmacological management should be directed towards improving the health-related quality of life of patients with SLE. Self-management support and patient education should be offered. In patients diagnosed with SLE, it is imperative to evaluate their smoking habits and implement effective cessation strategies. For patients with SLE, it is significant to avoid cold exposure in order to prevent Raynaud's phenomenon. Considering physical activity is important. Patients with SLE should consider patient education and self-management support to improve their physical exercise outcomes and health-related quality of life. For the prevention of flares, photoprotection should be recommended. Improving health-related well-being, anxiety, and depressive symptoms can be improved with psychosocial interventions. It is imperative to consider aerobic exercise as a means of augmenting aerobic capacity and mitigating fatigue and depressive symptoms (44).

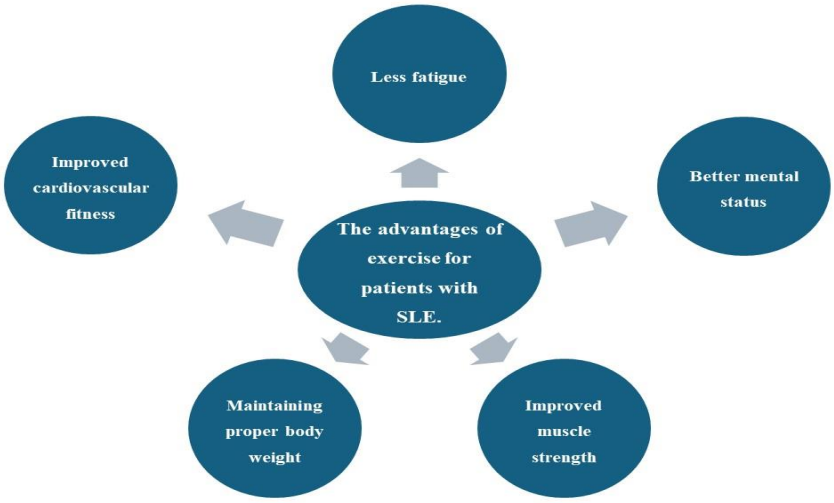

Figure 1. The advantages of exercise for patients with SLE.

Conclusions

SLE is a persistent, multisystem autoimmune condition that can affect numerous body organs, leading to limitations. Being active helps patients with SLE maintain a lower body weight, improve their mental state, relieve their fatigue, and increase their general satisfaction. There are some findings that indicate that physical activity is not as important in therapy for patients with SLE as adding exercise to the basic treatment program. Nevertheless, physical activity is beneficial for the overall well-being of individuals, regardless of whether they have SLE or not. Therefore, it is recommended that patients with SLE engage in physical activity, as it has been widely acknowledged to have significant positive health benefits.

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