

## DIABETES AND PHYSICAL THERAPY

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The incidence of diabetes has increased in prevalence in recent years at a significant rate, and is expected to continue to rise accordingly. Incorporating a comprehensive treatment program including physical therapy can tremendously benefit the diabetic patient enhancing quality of life and providing optimal functional outcomes.

The many serious complications associated with diabetes include vascular problems, peripheral and autonomic neuropathies, atherosclerosis and impaired wound healing. Together atherosclerosis and neuropathy significantly increase the risk of skin ulceration, especially in the feet and ankles. Neuromusculoskeletal problems often involve the feet, hands, shoulders, and spine as well. As a result, a patient with diabetes will typically present decreased balance, insufficient proprioception, gait deficits, decreased range of motion (ROM), decreased strength, and painful extremities. Activities of daily living (ADL's) and functional capacities are compromised. Safety becomes an important issue since the patient is now at risk for falling.

Physical therapy, utilizing exercise, not only will help increase strength, but studies also show an improvement in balance, proprioception, endurance and flexibility. This decreases the chance for loss of balance and the complications which can accompany a fall. Exercise also will help increase carbohydrate metabolism resulting in lower glucose levels, improved circulation, decreased triglycerides, decreased blood pressure, as well as promote weight loss.

Physical therapy will help to manage and counter the detrimental effects of neuropathy and joint deterioration. Degeneration of the tarsal and metatarsal joints is commonly involved, characterized by inflammation. Upper extremity musculoskeletal changes can result in Syndrome of Limited Joint Mobility (SLJM or LJM), stiff hand syndrome, Dupuytren's contracture, flexor tenosynovitis, and adhesive capsulitis to the shoulder. Sensory, motor and autonomic neuropathy usually affects the feet and hands. It is estimated that 30-40% of the diabetic population has at least sensory neuropathy. Symptoms include burning, numbness, tingling, and total loss of sensation in the feet. Motor deficits cause muscle weakness and imbalances leading to severe biomechanical changes of the feet. Decreased balance and proprioception follow.

Physical therapy intervention should include appropriate ROM activities that address affected joints to improve mobility and limit the inflammatory process. Exercises may consist of weight bearing and non-weight bearing exercises focusing on neuromuscular re-education utilizing functional activities. Modalities to decrease painful symptoms prior or following exercises can be useful tools to help the patient with neuropathy symptoms.

Transcutaneous electrical nerve stimulation (TENS) has shown to be an effective treatment for managing severe, unrelenting pain associated with neuropathy. According to a case study by Somers and Somers in Physical Therapy, application of a TENS unit in physical therapy, along with pain medications provided significant relief of pain in a diabetic patient with neuropathic lower extremity pain. The patient was able to sleep throughout the night for the first

time in years after just 17 days of therapy. Other literature is cited as evidence indicating the effectiveness of TENS as a pain relieving modality for neuropathy.

Physical therapy intervention can play a key role by improving the quality of life, particularly with ADL's, decreasing painful episodes, improving strength, and significantly improving the level of safety with dynamic activities.

References: Pathology: Implications for the Physical Therapist, Goodman and Boissonnault; *Physical Therapy* 1999; 79:767-775. Somers, David L. and Somers, Martha F.