



Skeletal Muscle Function in Patients with Diabetes



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Introduction

Musculoskeletal disorders of upper and lower extremities are often reported by patients with diabetes and frequently neglected. Literature explained the cause for musculoskeletal disorders as abnormal changes in non-contractile structures due to known glycosylation process in diabetes. However, some abnormal changes in histopathology, strength, endurance and morphology of skeletal muscles in diabetes were discussed by number of authors. This report presents the impact of diabetes on skeletal muscles as a potential cause for development of musculoskeletal problems which wasn't discussed earlier.

Muscle quality i.e. strength per unit skeletal muscle mass was impaired in diabetic polyneuropathy due to slowing of contractile fibres. Accelerated skeletal muscle loss and volume, increased protein catabolism, sarcopenia in diabetes; eventually causes reduced muscle strength contributing for disability. In addition, some studies stated evidence of mitochondrial dysfunction in diabetic skeletal muscles. Smaller size and reduced activity of complex I of the electron transport chain in mitochondria, triglyceride/lipid accumulation, and increased fat infiltration in skeletal muscle was observed which contributed for reduced oxidative activity and maximal aerobic capacity of muscles due to increased insulin resistance [1].

Abnormal changes in morphological properties in both slow and fast muscles during muscle regeneration process were observed in diabetes. Redistribution of muscle fibres from decreased proportion of type 1 fibres (slow twitch and responsible for endurance capacity of muscles) to increased type 2 muscle fibres (fast twitch fibres) will increase muscle fatigability in patients with diabetes [2]. Muscle strength in terms of grip strength and isometric knee and ankle muscle strength was remarkably reduced in patients with diabetes who contributed for impaired functional mobility [3,4].

Therefore, various pathophysiological mechanisms occurring in skeletal muscles due to diabetes mellitus causes reduced muscle strength, power and endurance. These functional impairments in muscles may be important contributing mechanism for musculoskeletal disorders in diabetes. Practicing physiotherapists won't address the assessment and management of impaired muscle function quite frequently in patients with diabetes, with or without musculoskeletal problems. Addressing muscle function in diabetes would help to prevent further debilitating impairments. Therefore, there is need of qualitative studies to evaluate and treat muscle function in diabetic patients with various musculoskeletal disorders to postpone functional decline, prevent disability, and preserve independence and quality of life. These studies will guide the practicing physiotherapists to recognize and consider the detrimental effects of diabetes on skeletal muscle function; to help take appropriate clinical decisions regarding therapy focusing on muscles of these patients with musculoskeletal impairments.

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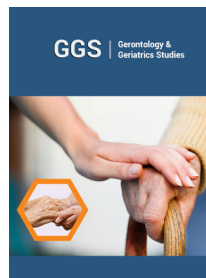
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