

Two Different Kinetic Chains of Sling Exercise Therapy for Vastus Medialis Oblique Muscle

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ABSTRACT

The muscle strength of vastus medialis oblique (VMO) is important for patellofemoral pain syndrome (PFPS). A suitable exercise for VMO muscle training in PFPS patients is still unknown. We followed the theories of open and close kinetic chain to design two exercises, which are sling open chain knee extension exercise and sling close chain knee extension exercise. The electromyography analysis was used to explore the different effects of the two exercises. We found that using sling exercise therapy (SET) for sling open chain knee extension exercise and sling close chain knee extension exercise had a recruitment effect of VMO, and are suggested for PFPS patients.

Categories and Subject Descriptors

The aim of our paper is to use electrocardiograph analysis assessment for sling exercise therapy, and the correct category is "Measurement."

Keywords

Vastus medialis oblique, sling exercise therapy, electromyography

1. INTRODUCTION

The lack of muscle strength of vastus medialis oblique (VMO) causes the muscle imbalance of knee and the medial tension decreasing of patellar [1]. It causes a common clinical injury in knee joint, eg. patellofemoral pain syndrome (PFPS)[2]. In current study, through VMO exercise training can effectively prevent and reduce the incidence of PFPS [3]. A suitable exercise for VMO muscle training in PFPS patients is still unknown. Sling exercise therapy (SET) system is new training equipment for athletes and orthopedic patients in recent years [4]. Because of its' convenience and practicability, it has been more and more common in rehabilitation clinic and fitness training center [5]. Lower limb exercise training contains open chain and close chain exercises.

Open kinetic chain is one movement which the distal end of the extremity is not fixed to a relatively stable surface. In the closed kinetic chain, movement of one joint cannot occur without causing predictable movements of the other joints in the extremity [6]. Close chain exercise can cause quadriceps and knee extensor co-contraction to reduce displacement of knee joint and intra articular pressure and increase joint stability. In the clinic exercise therapy, open chain knee extension movement has often been used to rehabilitation. It has lower loading for patient than close chain exercise. Close chain exercise has significant effect for VMO exercise training [1]. But the studies about using SET for open chain and close chain on VMO muscle training in PFPS patients are rare. Therefore, we followed the theories of open and close kinetic chain to design two exercises using SET.

2. METHODS

The electromyography analysis was used to explore the different effects of two SET exercises. Two kinds of SET including sling open chain knee extension exercise and sling close chain knee extension exercise (Fig. 1 and 2) were designed to train the strength of VMO in sports medical field. Seven healthy college students were recruited and received three times tests for each exercise.

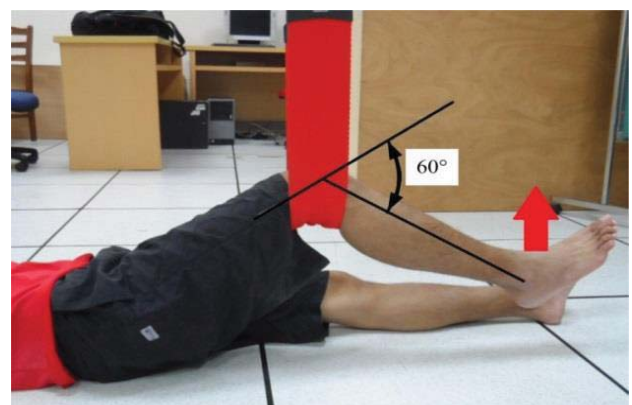


Fig. 1 Sling open chain knee extension exercise