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## Research Article

### A BRIEF REPORT ON ALTERED KINETICS IN PATIENTS WITH SUBACROMIAL IMPINGEMENT SYNDROME

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The upper limb motions are very important in order to carry out day to day activities<sup>1</sup>. Shoulder disorders are the third most common musculoskeletal condition presenting in general practice, with a point prevalence of 7-26%<sup>2</sup>. Subacromial impingement syndrome (SIS) is mechanical compression of the rotator cuff and subacromial bursa between the humerus and coracoacromial arch which was one of the common cause of shoulder pain, in almost 40% of shoulder disorders<sup>3</sup>. Intrinsic factors such as subacromial space, degeneration of rotator cuff muscles, anatomical anomalies and extrinsic like muscle imbalances, postural dysfunction, motor problems of rotator cuff muscles contributes for altered kinematics and kinetics<sup>4</sup>. Kinetics deals with the action of forces that produces change in motion. In this report we tried to collect information on significant differences in activation of shoulder girdle muscles in shoulder impingement syndrome using EMG while performing various tasks compared to healthy controls. Various EMG studies revealed limited upward rotation of scapula due to parascapular weakness of the serratus anterior and the lower trapezius muscles that results in inefficient action of the rotator cuff muscles in impingement syndrome<sup>5</sup>. However, increased activity of upper trapezius and pectoralis minor along with significant differences in onset of recruitment between serratus anterior and lower trapezius muscle in patients with shoulder impingement was observed in some studies. Due to repetitive eccentric overload occurs to rotator cuff muscles, results in increased activity of anterior and middle deltoid muscle during flexion and abduction movements. That resulted in decreased subscapularis activity during internal rotation was found in impingement syndrome compared to healthy people<sup>6</sup>.

According to Ludewig *et al.* (2004) decreased upward rotation of the scapula during humeral elevation contributes for abnormal scapulohumeral rhythm due to muscle imbalances in force production of the upper and lower portions of the trapezius and the serratus anterior muscle. That leads to increased activity of these muscles in impingement syndrome<sup>7</sup>. From the above information we found alterations in various force couples which leads to abnormal kinetics in shoulder impingement syndrome.

Normal external and upward rotation of scapula requires coordinated activity of all parts of trapezius and serratus anterior to avoid impingement during scaption which needs to be addressed<sup>8</sup>. In chronic patients with shoulder impingement syndrome due to abnormal postural changes, strategies to reduce over activity of upper trapezius, serratus anterior, lower trapezius muscles should be focused. In addition, activation of key rotator cuff (RC) and deltoid muscles is a fundamental contributor to centre the humeral head into the glenoid and to produce efficient force production during arm elevation, rotation and overhead activities in patients with shoulder impingement syndrome. Additionally a focus on Pectoralis major, latissimus dorsi, and teres major to produce coordinated adduction moments during glenohumeral elevation and abduction should be addressed. So to correct such abnormal force couples, strengthening of rotator cuff muscles and scapular stabilization exercises in shoulder rehabilitation should not be over looked in patients with shoulder impingement syndrome. From the present report, we may recommend addressing and treating altered shoulder muscle

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function among patients with shoulder impingement syndrome along with routine physiotherapy interventions.

There are numerous studies discussing about the alterations in shoulder kinetics due to presence of impingement syndrome, but while literature search, we did not encountered a study or meta-analysis reporting detailed information on altered pathomechanics of shoulder in impingement syndrome. In this report we tried to summarize the findings of various studies which presented the abnormal muscle activity levels during various tasks and movements of upper extremity in impingement syndrome. This would guide the clinical therapist to address the accurate muscles around the shoulder joint for effective management.

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