53 - ANALYSIS OF MOVEMENT OF THE SHOULDER BY PHOTOGRAMMETRY SYNDROME IN THE IMPACT OF THE SHOULDER: A CASE REPORT

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INTRODUCTION

The shoulder is a joint which has three degree of freedom of movement. This mobility allows the positioning of the upper extremity in space to perform a wide range of tasks (LORI, 1989). The stabilization of this joint is given by a set of muscles called the rotator cuff muscles consist of the supraspinatus, infraspinatus, subscapularis and teres minor.

These muscles are inserted on the humeral head and act together to elevate the upper limb (NORKIN, 2001). During flexion and abduction of the shoulder, the rotator cuff and long head of biceps move under the coracoacromial arch, can promote an impact, causing pain and limitation of motion, providing the so-called Shoulder Impingement Syndrome (SIS) (CORSO, 1995). In recent years, the SIO has become an increasingly common diagnosis for people who have shoulder pain, being the most common manifestation of periarthritis (BIGLIANI, 1997; HERMANN, 1990).

In the initial phase characterized by an inflammatory process, progressing to fibrosis and ending with the rotator cuff tear (CANAVAN, 2001). The SIO is caused by inflammatory and degenerative changes of the supra-humeral structures that are attributed to repeated microtrauma to the muscles of the rotator cuff (RC) against the coracoacromial arch, associated with hipovascularidade terminal portion of the tendon of the supraspinatus muscle (CORSO, 1995; RATHBUN, 1970). Neer (1983), described the sign of impact as the production of pain in the anterosuperior shoulder when the affected extremity is high. Therefore, pain between 60° and 120° of abduction indicates some disorder in the subacromial region (Bigliani, 1997; NEER, 1983; KESSEL, 1977; MORRISON, 1997).

Many causes have been attributed to the SIO. The factors can be classified as intrinsic or extrinsic, and can still be characterized as primary or secondary. The primary cause may be due to intrinsic causes, such as muscle weakness, overuse of the shoulder, degenerative tendinopathy or extrinsic, due to anatomical morphology of the acromion, glenohumeral instability, acromioclavicular joint degeneration, which can cause the impact process. The etiology is secondary due to instability or neurological injuries (BIGLIANI, 1997).

The clinical picture is characterized by upper limb disability for activities above the head, very intense pain on movements at night, or adhesive capsulitis contracture, decreased muscle strength and range of motion (BIGLIANI, 1997). Treatment of SIO should be initially clinical, even in those cases where it is observed an anatomical cause, such as subacromial spurs or acromion hook.

The objective of the rehabilitation program is to reduce inflammation and pain improvement, improving range of motion and muscle strength further, restoring the function of the shoulder joint (MORRISON, 1997; SOUZA, 2001, MORELLI, 1993). To register your range of motion of the shoulder and have a quantification of the results, computed photogrammetry, also known as the angular geometry, can be used because it is a noninvasive method that has two great advantages in the effectiveness of its clinical application: low cost of photo-interpretation of images and the precision and reproducibility of results (RICIERI, 2005).

The photogrammetry program uses a computerized mathematical algorithm that transforms points in image coordinate axes Cartesian and quantifies, or a selected angle by marking three points in sequence, and the result has found a precision of 3 decimal places (MAGAZONI, 2000). This study aimed to examine the range of motion (ROM) of the shoulder joint with shoulder impingement syndrome by computed photogrammetry, after physiotherapy treatment.

METHODS

An individual female, with 50 years of age were randomly selected from patients enrolled in the Physiotherapy Clinic UNIOESTE, which was diagnosed by the doctor who referred with shoulder impingement syndrome. With clinical pain and damping on the right shoulder for over 10 years in 2004 was diagnosed with tendinitis in his right shoulder, underwent arthroscopic surgery and postoperative physiotherapy. There was no improvement of symptoms and after two years, underwent arthroscopic surgery again, without positive results.

This pain has evolved with greater frequency and intensity, there was pain at night, limitations in carrying out activities of daily living with loss of muscle strength in the right upper limb and joint range of motion in his right shoulder. In the evaluation, he complained of pain on palpation of the supraspinatus muscle and the upper trapezius on the right. Tests were conducted which helped to identify and highlight the dynamics of joint dysfunction. Were positive following tests: Test Neer Test, Hawkins / Kennedy test Jobe and Test Patte. Muscle function tests were performed by applying resistance against the movement, following the scale of Kendall.

Showed decreased muscle strength on the right side: biceps - Grade 4, infraspinatus, teres minor, subscapularis, supraspinatus and deltoid-grade 3. All movements were accompanied by pain. For analysis of range of motion of the right shoulder, a camera Sony DSCP9 (4.0 mega pixels) was placed at a distance of 1.80 meters from the patient, on a leveled tripod at a height of 1.10 meters. This was previously marked with yellow adhesive spherical 13mm diameter bilaterally on the anatomical landmarks (acromion, olecranon and styloid process of radius and ulna, anterior superior iliac spine). For image capture, the patient was positioned in the plane ortostatic front, rear, left and right sagittal performing active movements of abduction and adduction, flexion and extension, internal and external rotation of the shoulder. With a dark green background for better viewing of photographic images.

The images were digitized by the computer software program SAPO, thus getting the precise measurements of the angles of the shoulder allows the analysis of results. The ROM evaluation of the shoulder was performed before starting treatment and after completion of physical therapy, which was based on features such as electro-thermotherapy microwave, laser, exercise, manual therapy and guidelines for the restriction of activities of repetitive stress or use of upper limb above 90 degrees.

Laser therapy of type HeNe (690nm) was always used at the beginning of the sessions in a timely manner, forming a

circle around the right shoulder joint, making a total of twenty points. The patient was in sitting posture with the right arm uncovered points marked by the pen, the following parameters: 4J/cm2 intensity, time of 1 minute 30 seconds remaining with a pen for 4 seconds at each point and so perpendicular to the tissue. Before application, the local hygiene was performed with alcohol swab and during use, the therapist used goggles.

The microwave, applied at the end of every session was a continuous manner. With a distance of 5 cm and positioned at 90 degrees to the right shoulder of the patient who sat on the wooden chair for 10 minutes of application with an intensity of 70 Watts. Initially, kinesiotherapy passive mobilizations included the scapula and the glenohumeral joint, active stretching of the supraspinatus and the cervical spine in flexion, extension and lateral tilt.

Codman exercises were performed with 1 kg dumbbell with the individual standing and 90 degrees of flexion of the lumbar spine making clockwise and counterclockwise, latero-lateral and anteroposterior. Subsequently, exercises were conducted active glenohumeral joint against gravity, or using the stick and isometric strengthening with resistance manual therapist. In recent sessions, were added to isotonic exercises for strengthening the internal and external rotators of the shoulder with use of the elastic tube attached to the backrest, and proprioceptive exercises on the trampoline with the patient throwing a rubber ball.

Manual therapy was also performed at the beginning of all therapies after laser application, which consisted of rubbing and pompage cervical digital sliding and stretching on the upper fibers of trapezius, digital slide in the elevator of the scapula and the supraspinatus. The sessions were held in physiotherapy Physiotherapy Clinic Unioeste three times a week, making 36 visits lasting 45 minutes each.

RESULTS

The analysis of photogrammetry through range of motion in joints showed the shoulders (right and left), reduction in range of flexion, extension, abduction, internal and external rotation. Tables 1 and 2 shows the results before and after physiotherapy treatment.

Table 1. Range of motion of the right shoulder (RS) before and after physiotherapy treatment by photogrammetry

	RS pre	RS post
Flexion	116.1	83.9
Extension	16.9	15.4
Abdution	94.4	83.0
Internal rotation	55.0	34.0
External rotation	74.9	45.0

Table 2. Range of motion of the left shoulder before and after physiotherapy treatment by photogrammetry

	LS pré	LS post
Flexion	135.0	132.9
Extension	34.3	38.8
Abdution	125.1	123.0
Internal rotation	90.0	73.0
External rotation	90.0	88.8

DISCUSSION

In our case, the results showed that physical therapy interventions were not effective in reducing the limitation of range of motion of the right shoulder. This may be associated with advanced age. Bohmer et al. (1998) point out that conservative treatment in this type of syndrome in people aged between 30 and 45 years, is not always obtained a positive way.

Milgrom et al. (1995) studied the integrity of the rotator cuff in 90 shoulders, asymptomatic by ultrasound; ages ranged from 30 to 99 years and it was observed that rotator cuff injuries are related to aging regardless of the presence of clinical symptoms. Andrade et al (2004), attributed the pathophysiology of rotator cuff injuries of a degenerative process related to the natural aging of tendons associated with age. According to the patient evaluated in this study reported pain with limitation of movement in the right shoulder and the bone contact in the region of the coracoid process.

In literature, few studies report possible contact with the coracoid process adjacent soft tissues to the head of the humerus as a cause of pain. In 1985, Gerber et al. concluded that the pain located on the coracoid process and the sign of the impact of the coracoid process (90th abduction and internal rotation) are signs of greater sensitivity and specificity for the diagnosis of the impact of the coracoid process, because the movement of abduction associated with a horizontal internal rotation generates the smallest gap between the coracoid process and humeral head.

The same authors studied 50 cases of syndrome of impact of the coracoid process, and, among these, 23 were idiopathic. The initial treatment was physical therapy in all patients. Analgesics and NSAIDs were also used, without resolution of symptoms. The surgical technique used was coracoplasty posterolateral with excellent results in all patients. This corroborates with the study by Simoni et al., 1985 patients with impingement of the coracoid process have not improved after 3 months of conservative treatment underwent posterolateral coracoplasty.

In a follow-up period of at least six months and maximum of 10 years, observed that all patients were without pain and with normal mobility and strength (LECH, 2000; SIMONI, 2004). For treatment of SIO are still controversial, some suggest a more conservative approach, as Lima (2007), which considers the physiotherapy intervention the first choice of treatment for improving muscle balance in the region, increase the functionality of the affected limb and allow more feedback fast activities of daily living, with a reduction in pain. Nee (1972), recommends six months of nonsurgical treatment. Others prefer to adopt a more aggressive treatment for the disease is the continuing evolution (NIRSCHL, 1989; GIORDANO, 2000).

In this study, the use of laser aimed at reducing the inflammatory process and consequently the pain. Since the microwave, dry heat applied before exercise, the tissue become more elastic and relaxes the muscles in preparation for these exercises (BORGES, 1997; GARRICK, 2001).

Some authors describe the importance of strengthening the stabilizing muscles of the shoulder, especially the external rotators (trapezius and serratus anterior), because if they are weak, the scapular rotation, the scapulohumeral rhythm may be altered, precipitating impingement (GOULD, 1993). Doneux et al. (1998) point out that after the inefficiency of medical treatment for a period of three to six months, you should not delay the surgical treatment is indicated, because a small lesion of easy maintenance, may worsen and go to great injury with severe retraction of the tendons, which leads to difficult to repair and therapeutic approach. However, this patient, who has undergone physical therapy for 3 months, it was observed that there has been no notable development. He walked the patient to the doctor for a re-evaluation with a report containing a detailed description of the treatment used.

CONCLUSION

In the analysis of movements in the right shoulder joint, the patient studied by photogrammetry observed a reduction in range of motion and physiotherapy treatment proposed, did not improve the clinical picture.

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ANALYSIS OF MOVEMENT OF THE SHOULDER BY PHOTOGRAMMETRY SYNDROME IN THE IMPACT OF THE SHOULDER: A CASE REPORT

ABSTRACT

Introduction: The aims was to examine the range of motion of the shoulder with shoulder impingement syndrome, computed by photogrammetry. Methods: A female individual with 50 years of age selected randomly, a reduction of strength and presence of pain in the muscles of the right shoulder, grade 3. For analysis of shoulder movements was used in a camera image capture, in the frontal, side and rear, making the active movements of abduction and adduction, flexion and extension, internal and external rotation of the shoulder. The images were scanned by the software program SAPO, thus getting the precise measurements of the angles of the shoulder allows the analysis of results. The analysis was performed before and after physiotherapy treatment (electro-thermotherapy, exercise and manual therapy), at the Physiotherapy Unioeste three times per week, totaling 36 visits lasting 45 minutes each visit. Results: the analysis of the amplitude of all movements of the right shoulder and left consecutively we can see reduction: bending: -7.2% and -9.8%; extension: -9.1% and - 11.3%; abduction: -8.4% and -9.8%, internal rotation: -6.1% and -8.1% and external rotation: -6.0% and -9.8%. Conclusion: The analysis of motion of joints in the shoulders of this sample, the bifotogrametria, has observed that there was a reduction in range of motion, both on the right shoulder and left shoulder and that the proposed physical therapy did not produce satisfactory clinical results.

ANALYSE DES MOUVEMENT DE L´ÉPAULE PAR PHOTOGRAMMÉTRIE SYNDROME DE L´IMPACT DE L´EPAULE: UN RAPPORT DE CAS

RÉSUMÉ

Introduction: l´ objectif a été examiner l'amplitude du mouvement de l'épaule avec impingement syndrome épaule, calculé par photogrammétrie. Méthodes: Un individu femelle de 50 ans sélectionnés au hasard, une réduction de la force et la présence de la douleur dans les muscles de l'épaule droite, de grade 3. Pour l'analyse des mouvements de l'épaule a été utilisée dans une capture image de la caméra, dans la frontale, latérale et arrière, ce qui rend les mouvements actifs de l'enlèvement et l'adduction, flexion et d'extension, interne et rotation externe de l'épaule. Les images ont été numérisées par la SAPO logiciel, tout en obtenant la mesure précise des angles de l'épaule permet l'analyse des résultats. L'analyse a été réalisée avant et après traitement de physiothérapie (l'électro-thermothérapie, l'exercice et la thérapie manuelle), à la physiothérapie UNIOESTE trois fois par semaine, un total de 36 visites de 45 minutes à chaque visite. Résultats: l'analyse de l'amplitude de tous les mouvements de l'épaule droite et à gauche consécutivement nous pouvons voir de réduction: flexion: -7,2% et -9,8%; extension: -9,1% et -11,3%; enlèvement: -8,4% et -9,8%, la rotation interne: -6,1% et -8,1% et la rotation externe: -6,0% et -9,8%. Conclusion: L'analyse des mouvements des articulations des épaules de cet échantillon, le bifotogrametria, a observé qu'il y avait une réduction de l'amplitude des mouvements, à la fois sur l'épaule droite et l'épaule gauche et que le traitement proposé physique n'a pas produit de résultats satisfaisants cliniques.

ANÁLISIS DEL MOVIMIENTO DE LOS HOMBROS por fotogrametría SÍNDROME EN EL IMPACTO DEL HOMBRO: UN CASO

RESUMEN

Introducción: el objetivo fue examinar la amplitud de movimiento del hombro con el síndrome de pinzamiento del hombro, calculado mediante técnicas de fotogrametría. Métodos: Un individuo femenino de 50 años de edad seleccionados al azar, una reducción de la fuerza y la presencia de dolor en los músculos del hombro derecho, grado 3. Para el análisis de los movimientos del hombro se utilizó en una captura de imagen de la cámara, en la parte frontal y trasera, por lo que los movimientos activos de la abducción y aducción, flexión y extensión, en la residencia y la rotación externa del hombro. Las imágenes fueron escaneadas por la SAPO programa de software, obteniendo así las medidas exactas de los ángulos del hombro permite el análisis de los resultados. El análisis se realizó pré e pós tratamiento de fisioterapia (electro-termoterapia, el ejercicio y la terapia manual), en la fisioterapia Unioeste tres veces por semana, un total de 36 visitas de 45 minutos cada visita. Resultados: el análisis de la amplitud de todos los movimientos del hombro derecho e izquierdo consecutivamente podemos ver la reducción de: flexión: -7,2% y -9,8%, la extensión: -9,1% y - 11.3%; secuestro: -8,4% y -9,8%, la rotación interna: -6,1% y -8,1% y la rotación externa: -6,0% y -9,8%. Conclusión: El análisis del movimiento de las articulaciones en los hombros de esta muestra, el bifotogrametria, ha observado que hubo una reducción en el rango de movimiento, tanto en el hombro derecho y el hombro izquierdo y que la terapia física propuesta no produjo resultados clínicos satisfactorios.

ANÁLISE DO MOVIMENTO DO OMBRO PELA BIOFOTOGRAMETRIA NA SÍNDROME DO IMPACTO DO OMBRO: RELATO DE CASO

RESUMO

Introdução: objetivo foi analisar a amplitude de movimento do ombro com Síndrome de Impacto do Ombro, por biofotogrametria computadorizada. Métodos: um indivíduo do sexo feminino, com 50 anos de idade escolhida aleatoriamente, apresentando diminuição de força e presença de dor nos músculos do ombro direito, grau 3. Para análise dos movimentos do ombro utilizou-se uma máquina fotográfica na captação da imagem, nos planos frontal, lateral e posterior, realizando os movimentos ativos de abdução e adução, flexão e extensão, rotação interna e externa do ombro. As imagens foram digitalizadas pelo programa Software SAPO, obtendo as medidas precisas dos ângulos do ombro possibilitando a análise dos resultados. A análise foi feita pré e pós tratamento fisioterápico (eletrotermoterapia, cinesioterapia e terapia manual), na Clínica de Fisioterapia da Unioeste três vezes por semana, totalizando 36 atendimentos com duração de 45 minutos cada atendimento. Resultados: na análise da amplitude de todos os movimentos do ombro direito e esquerdo, consecutivamente podemos observar redução de: flexão: -7,2% e -9,8%; extensão: -9,1% e – 11,3%; abdução: -8,4% e -9,8%; rotação interna: -6,1% e -8,1%; e rotação externa: -6,0% e -9,8%. Conclusão: a análise do movimento das articulações dos ombros desta amostra, pela bifotogrametria, permitiu observar que houve redução na amplitude de movimento, tanto no ombro direito como no ombro esquerdo e que o tratamento fisioterápico proposto não produziu resultados clínicos satisfatórios.