Effect of Functional Electrical Stimulation and Exercise in Muscle Functional Position in Quadrilateral Pain Syndrome: - A Case Report

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Abstract

Introduction: - Quadrilateral pain syndrome or quadrilateral space syndrome is an extremely rare disorder characterized by compression of the axillary nerve and posterior humeral circumflex artery within the quadrilateral space. FES uses electrical stimulation to stimulate motor neurons to contract muscle groups. A 23 year old volleyball player was diagnosed with quadrilateral pain syndrome in our OPD.

Treatment: - For the treatment, FES was administered along with shoulder active range of motion exercises and scapular stabilizers strengthening. The treatment was followed for 8 weeks.

Result: - After 8 weeks there was significant improvement in range of motion and power of the muscle.

Conclusion: - As there is a lack of literature present on quadrilateral pain syndrome, the idealized protocol is unknown. However, our patient showed a significant improvement when he was administered with an adjunct of functional electrical stimulator and exercises in muscle functional position. We cannot say that this is the idealized protocol for the management of quadrilateral space syndrome, but this can help in supporting further studies about the role of functional electrical stimulation and exercise therapy in the above-mentioned syndrome.

Keywords: NIL

Introduction

Functional Electrical Stimulation/Stimulator (FES) is a technique which involves the use of electrical impulses which stimulate the motor neurons of the selected muscle groups in such a way that the muscle groups can contract. FES can also help in augmentation of the moment about a joint.(1) Quadrilateral pain syndrome or quadrilateral space syndrome is an extremely rare disorder characterised by compression of the axillary nerve and posterior humeral circumflex artery within the quadrilateral space.(2) The clinical features of quadrilateral pain syndrome include diffuse pain around the shoulder; paraesthesia in a nondermatomal distribution; point tenderness above the quadrilateral space and positive angiogram finding in provocative positioning.(3) Repeated over head activities are commonly considered as the culprit for development of this syndrome; however, other pathologies such as lipomas, hematomas, and labral cysts can also cause compression in the quadrilateral space.(4)

Case Report

A 23-year-old male, right hand dominant volleyball player came to our physiotherapy department with the chief complaint of pain over his right shoulder since 3 months. There was no history of fall on the right shoulder or direct trauma to the same. The pain developed gradually and the intensity was increasing.
in nature. Patient also experienced pain while lifting hand forward or while doing any overhead activities. Pain intensity was 7 as per numerical pain rating scale. On observation, an increase in cervical lordosis was seen in lateral view and forward drooping of shoulders were seen. On palpation of the right shoulder, patient complained of grade 3 tenderness over the teres minor, teres major and infraspinatus muscle. Further more physical examination was done which included range of motion assessment and manual muscle testing. (Table 1). On flexion of the right shoulder the patient complained of pain above 40 degrees actively and when done passively, the patient experienced pain after 80 degrees of forward flexion. On abduction of the shoulder joint, patient complained of pain at 30 degrees of abduction actively and 50 degrees of abduction passively. The patient was unable to do external rotation neither actively nor passively due to immense pain.

<table>
<thead>
<tr>
<th>MUSCLE</th>
<th>RIGHT SHOULDER</th>
<th>LEFT SHOULDER</th>
</tr>
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<tbody>
<tr>
<td>Anterior fibres of deltoid</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Middle fibres of deltoid</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Posterior fibres of deltoid</td>
<td>4</td>
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<tr>
<td>Supraspinatus</td>
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<tr>
<td>Infraspinatus</td>
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<tr>
<td>Teres major</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Teres minor</td>
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A detailed assessment of the shoulder joint and cervical spine was done to rule out impingement of the rotator cuff, referred pain syndromes, and suprascapular nerve injuries. The MRI revealed an atrophy of the teres minor on the right side. Hence, the patient was diagnosed with quadrilateral pain syndrome.

**Treatment**

The plan of treatment was to strengthen the scapular stabilizers and to maintain and improve the shoulder range. We incorporated functional electrical stimulation for the above purposes. The patient was told to visit OPD for 7 consecutive days where he was made to do active shoulder range of motion exercises while being administered with FES at the same time. Later, he was made to do shoulder shrugs,
scapular protractions and scapular retractions using resistance bands. After completion of 7 days, the patient was called for a weekly follow up. Home programme was also advised to him which included shoulder active range of motion exercises, shoulder strengthening and scapular stabilizers strengthening. On every follow up, FES was administered to him. This continued for 8 weeks.

Results

After 7 days-

1. Pain- At the end of first 7 days, there was a significant reduction in pain. According to numerical pain rating scale, the rating was 4.
2. Range of motion- There was a significant increase in the range of motion. The active range of motion for shoulder flexion increased to 110 degrees pain-free and for shoulder abduction, it increased up to 100 degrees pain-free.
3. Manual muscle testing- There was significant improvement in the power of the muscle.

After 4 weeks

1. Pain- After 4 weeks, the patient stopped experiencing any pain, either at rest or while doing activities. All the activities were pain-free.
2. Range of motion- Due to absence of pain, there was an improvement in range of motions of the shoulder joint.
3. Manual Muscle Testing- After 4 weeks, there was significant improvement in muscle power. The MMT score was grade 4.

After 8 weeks, the patient had no complaints of pain, had an improved range of motion and the power of the muscle significantly improved to grade 5

Discussion

Due to dominance of case reports in the literature associated with it, there is a high variability in treatment methodologies used for quadrilateral space syndrome. However, most of the time conservative management i.e., physical therapy along with steroids and NSAIDS is preferred.(5) Application of functional electrical stimulator can help in reduction of pain as well as scapular stabilizers strengthening is recommended.(8) Studies suggest that functional electrical stimulation is an effective way to improve muscle volume. (9)

Conclusion

As there is a lack of literature present on quadrilateral pain syndrome, the idealised protocol is unknown. However, our patient showed a significant improvement when he was administered with an adjunct of functional electrical stimulator and exercises in muscle functional position. We cannot say that this is the idealised protocol for the management of quadrilateral space syndrome, but this can help in supporting further studies about the role of functional electrical stimulation and exercise therapy in the above-mentioned syndrome.

References


