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CASE REPORT

Effective Non-Operative Management of Lacertus Syndrome: Two Case Reports and A Review of Literature

Bayan A. Ghalimah[1], Omar A. Bokhary[2], Abdulrahman F. Bukhari[3]

[1]*King Abdulaziz University, Department of Orthopedic Surgery, Rabigh, Saudi Arabia*

[2]*King Abdulaziz University Hospital, Department of Orthopedic Surgery, Jeddah, Saudi Arabia.*

[3]*Al Habib Medical Group, Department of Occupational Therapy, Jeddah, Saudi Arabia*

Address for correspondence:
Dr. Omar A. Bokhary
King Abdulaziz University Hospital, Department of Orthopedic Surgery, Jeddah, Saudi Arabia

E-mail:
Obokhary@gmail.com

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Abstract

Lacertus syndrome (LS) is a condition characterized by median nerve entrapment at the Lacertus Fibrosus (LF), a fibrous band distal to the elbow joint, presenting with pain, numbness, and weakness in the forearm and hand. Due to its rarity, LS is often overlooked in the diagnosis of these symptoms. Management can be surgical or non-surgical, depending on preference and symptom severity. Most studies published on this syndrome showed symptom relief only after surgical intervention. We present two case reports describing the successful non-surgical management of lacertus syndrome in two males in the dental field who presented with bilateral and unilateral LS. Grip strength, pain score, and functional scores were used to assess pre- and post-treatment outcomes. Treatment involved a combination of myofascial release, nerve gliding exercises, and strengthening protocols. The grip strength of the affected hand improved significantly in both patients. In the first patient, the grip strength of the right hand increased from 12 kg to 38 kg, while the left hand's grip strength improved from 36 kg to 48 kg. In the second patient, grip strength progressed from being unable to perform any grip strength to 46 kg. Additionally, the Visual Analog Scale (VAS) score improved for both patients, decreasing from 8/10 to 1/10. To our knowledge, these are the first two cases in the literature managed successfully without surgical intervention. The successful management of lacertus syndrome in both patients illustrates the importance of a multifaceted, non-surgical approach. This report supports the notion that tailored conservative treatments can lead to significant improvements in function and quality of life.

Keywords: Lacertus Syndrome; Non-operative Case Reports; Literature Review

Introduction

Lacertus syndrome (LS) was initially outlined by Henrik Seyffarth in 1951. This condition involves compression of the median nerve at the elbow, occurring either between the two heads of the pronator teres muscle or at the proximal arch of the flexor digitorum superficialis [1]. Later, the involvement of the lacertus fibrosus (LF) in the compression of the median nerve has been recognized [1]. LF is one possible location for proximal median nerve entrapment (PMNE), which generally involves compression caused by seven different anatomical structures that can impact the median nerve [2]. These structures consist of the brachialis muscle, Struther's ligament, the bicipital aponeurosis, the pronator teres, the flexor digitorum superficialis, the accessory head

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of flexor pollicis longus (often called Gantzer's muscle), and various vascular components [3].

LS often presents with forearm pain, numbness in the thenar eminence and/or lateral three digits and lateral half of the fourth, and weakness or fatigue in the forearm and hand [1]. These symptoms are commonly confused with Carpal Tunnel Syndrome (CTS) due to similarity in presentation as well as cognitive bias of clinicians, as it is perceived to be more prevalent, neglecting the importance of thorough examination to rule out all possible differential diagnoses [3]. Clinicians may overlook LS in the differential diagnosis of complaints related to the forearm and hand. The Hagert clinical triad that includes weakness in Flexor pollicis longus (FPL), Flexor digitorum profundus (FDP2), and Flexor carpi radialis (FCR); positive scratch collapse test (SCT); and pain over the median nerve at the level of the LF provided a more organized approach to this syndrome [1]. Options for LS management range from a conservative approach to injections, and finally, surgical intervention [1]. Most studies published on this syndrome have shown symptom relief only after surgical intervention [2,4–13]. Despite efforts to understand this syndrome in recent years, the literature on this syndrome and its management is limited. These two cases illustrate the non-surgical treatment options that effectively manage a patient's symptoms and restore function.

Case 1

A 24-year-old male, a dental intern and a professional video game competitor, presented with bilateral forearm pain and numbness that had persisted for 10 months. He had no relevant medical history and reported no history of trauma. Initially misdiagnosed by a neurologist as multiple sclerosis, this prompted the request for a brain magnetic resonance imaging (MRI) scan. results revealed a normal brain MRI, and he was subsequently discharged without resolution of symptoms. Electromyography (EMG) was done and found to be negative for any peripheral nerve compressions. On clinical examination, there was notable tenderness over the LF and a positive SCT. Additionally, the patient exhibited bilateral weakness in the FDP2, FPL, and FCR, alongside numbness throughout both hands. These clinical findings pointed towards a diagnosis of LS based on the Hagert triad.

Case 2

A 38-year-old male, a Dentist, athlete, and working as a university faculty staff. He presented complaining of right-hand and forearm pain; he had no relevant medical history and reported no history of trauma. On clinical examination, right forearm pain, numbness, and weakness were detected in the FPL and FDP muscles. In addition to positive SCT on the ulnar and median side. These clinical findings pointed towards LS based on Hagert's triad.

Management and Outcome

Both patients underwent a structured therapy program under the supervision of a skilled occupational therapist, aimed at modifying activities, using conservative energy strategies, releasing muscle tension, and strengthening targeted areas to restore functionality and alleviate pain. The therapy began with a thorough analysis of the patient's posture and movement patterns during dental procedures, desk work, and gym training. Based on this assessment, specific ergonomic adjustments were implemented, including modifications of dental chair height, instrument positioning, and desk setup. Techniques for maintaining proper posture during desk work were introduced, alongside supportive strategies for gym activities. To reduce strain, the patient's exercise intensity and duration were scaled back for the first two weeks, and frequent breaks were encouraged during both dental procedures and gym sessions.

Energy conservation strategies were also prioritized. The patient was educated on how to allocate energy efficiently by focusing on essential activities, adopting postural changes that minimized exertion, and scheduling regular rest periods between tasks to prevent overexertion. Gentle stretching exercises were incorporated during breaks to promote flexibility and relieve tension.

Addressing muscle tension was a key component of the program. Shockwave therapy was applied to the targeted points of the muscles to ease tension; Participants underwent radial extracorporeal shockwave therapy (rESWT). The treatment was administered at a pressure of 1.0 bar, delivering 2000 shocks per session at a frequency of 8 Hz. Sessions took place twice a week over a period of two weeks, resulting in a total of four treatment sessions. The therapy focused on the flexor bundle of the forearm and wrist. While customized stretches targeted specific muscle groups, including the pronators, supinators, wrist and elbow flexors, and extensors. Myofascial release techniques focused on relieving the tightness in the lacertus fibrosus and the surrounding areas. Thermal modalities were employed to enhance relaxation and recovery, starting with hot packs to improve circulation and then applying cold packs post-activity to reduce inflammation and alleviate discomfort [14].

Throughout the therapy, kinesiology tape was utilized to provide support and improve mobility [15]. Lacertus fibrosis taping method enhanced the mobility of the median nerve and supported the forearm. The patient also performed neurodynamic gliding exercises for the median nerve, completing repetitions multiple times daily to maintain flexibility and reduce nerve tension.

TABLE 1: PRE AND POST-MANAGEMENT OUTCOMES FOR BOTH CASES

Outcome Measures	Case 1	Case 2
Pre-management grip strength using a dynamometer	Right: 12 Kg Left: 36 Kg	Right: Unable to perform due to pain Left: Not available
Post-management grip strength using a dynamometer	Right: 38 Kg Left: 48 Kg	Right: 46 Kg Left: 39 Kg
Pre-management pain level on VAS	8/10	8/10
Post-management pain level on VAS	1/10	1/10
Pre-management QuickDash score	65.9/100	Not available
Post-management Quickdash score	9.1/100	4.5/100
Pre-management SF-36 score	Physical functioning: 95%. Role limitations due to physical health: 5%. Role limitations due to emotional problems: 66.7%. Energy/fatigue: 40%. Emotional well-being: 60%. Social functioning: 87.5%. Pain: 67.5 %. General health: 7%. Health change: 50%	Not available
Post management SF-36 score	Physical functioning: 100%. Role limitations due to physical health: 100%. Role limitations due to emotional problems: 33.3%. Energy/fatigue: 75%. Emotional well-being: 88 %. Social functioning: 87.5 %. Pain: 90 %. General health: 75%. Health change: 100%	Physical functioning: 9%. Role limitations due to physical health are 100%. Role limitations due to emotional problems: 66.7 %. Energy/fatigue: 40%. Emotional well-being: 60 %. Social functioning: 87.5 %. Pain: 67.5 %. General health: 70%. Health change: 50%

VAS: Visual Analogue Scale Kg: Kilogram

After two weeks, a gradual strengthening program commenced, as the case 1 patient had an initial grip strength measured at 19 kg (right hand) and 36 kg (left hand) (Table 1). Case 2's initial grip strength was too weak to be measured due to pain. Resistance training focused on pronators, supinators, wrist and elbow flexors, and extensors, utilizing tools such as resistance bands and resistance bars. Meanwhile, forearm stability was improved through exercises targeting supinators and pronators. Proprioception exercises, including the use of power webs and gyroballs, enhanced coordination and endurance through timed holds with grip strengtheners[15]. A home exercise program complemented the therapy, focusing on upper limb strengthening through resistance band exercises. The program was structured with two sessions per week, spanning approximately four weeks in total. During the first two weeks, the emphasis was on pain management and tension relief, utilizing therapeutic modalities, stretching exercises, and lifestyle adjustments. The second phase also lasted for two weeks, with sessions held twice a week, and focused on gradual strengthening exercises. Each session lasted 45 minutes for both participants.

By the end of the therapy program, the patient exhibited remarkable improvement. Grip strength, measured with the JAMAR hydraulic hand dynamometer, increased significantly in case 2 to 46 kg in the right hand, and in case 1 to 38 Kg in the right hand, and 48 Kg in the left hand (Table 1). In both cases, pain levels, initially recorded at 8/10 on the Visual Analog Scale (VAS), had resolved, dropping to 1/10. The scratch collapse test was negative bilaterally for both cases. The QuickDash and the 36-item Short Form quality of life survey (SF-36) scores were assessed for both cases (Table 1).

The Patients were further followed up in the clinic for three months without any worsening or relapse of symptoms. This comprehensive approach restored the patient's functionality and comfort, enabling a return to daily activities without pain or limitation.

Discussion

This case highlights the effectiveness of non-surgical treatment methods for LS. Previous cases reporting LS have mostly resorted to proceeding with a surgical release of LF to successfully relieve symptoms among their patients (Table 2). Our cases demonstrate that a structured, non-surgical management approach, which includes a combination of myofascial release, nerve gliding exercises, kinesiology taping, and an organized

TABLE 2: PREVIOUS STUDIES HAVE BEEN CONDUCTED ON LACERTUS SYNDROME IN THE LITERATURE

Author	Year	Type of Study	Country	Sample Size	Non-Operative Treatment Attempted	Outcome post non-operative management	Outcome post-operative management
Laha KL et al. [4]	1978	Case Report	USA	1	No	-	Successful Relief
Swiggett et al. [5]	1986	Case Report	USA	3	Yes	Failure	Successful Relief
Seitz Jr et al. [7]	2007	Case series	USA	7	Yes	Failure	Successful Relief
Elisabet Hagert [8]	2013	Prospective	Sweden	44	No	-	Successful Relief
Mehl A et al. [6]	2021	Case Report	USA	1	Yes	Failure	Successful Relief
Apard T et al. [9]	2022	Prospective	France	15	No	-	Successful Relief
Azocar et al. [10]	2023	Retrospective	Chile	24	Yes	Failure	Successful Relief
Gupta et al. [11]	2023	Case Report	India	1	No	-	Successful Relief
Hagert et al. [12]	2023	Retrospective	Sweden	275	No	-	Successful Relief
Ahmad et al. [13]	2023	Retrospective	Malaysia	93	Yes	Failure	Successful Relief
Cline J A et al. [2]	2024	Retrospective	USA	7	No	-	Successful Relief

USA: United States of America

strengthening program, can result in significant symptom relief and functional recovery for patients.

Our review encompassed 11 studies investigating the management of patients diagnosed with LS (Table 2). The studies included four case reports, four retrospective studies, two prospective studies, and one case series. Only five of the studies reported an attempt at nonoperative management prior to moving forward with surgery, and all of these indicated that nonoperative management was unsuccessful.

The five studies that reported failure of nonoperative management did not specify the approaches or therapies that were attempted [5–7,10,13]. We believe that a well-organized treatment plan, which includes a combination of myofascial release, nerve gliding exercises, kinesiology taping, and a structured strengthening program, can lead to significant symptom relief and functional recovery for patients after 3 months. Furthermore, involving a hand or occupational therapist in the management of these patients, as demonstrated in our cases, could accelerate their recovery. As noted by Brutus et al. (2024), by focusing on symptom management and preventive strategies, therapists can help patients alleviate the symptoms of lacertus syndrome, optimize functional outcomes, and improve occupational status [16].

LS is often misdiagnosed as CTS or other neurological disorders. In our first case, it was initially misdiagnosed as multiple sclerosis (MS) by neurologists, who later ruled it out after a negative MRI. In a previous case report by Jaquet et al. (2023), a patient presented with symptoms typical of CTS [17]. This patient was diagnosed using ultrasound and electromyography (EMG), but continued to experience persistent tingling in the median nerve area, even after undergoing three carpal tunnel release (CTR) procedures on both wrists. It was only after observing weakness in the tip pinch of the FPL and FDP2 muscles, as well as loss of sensation in the proximal thenar region and digits 1–3, that physicians considered LS as a differential diagnosis [17]. A positive scratch collapse test also contributed to this consideration. Following a lacertus release procedure, the patient reported complete recovery [17]. This highlights the importance of considering LS in patients who exhibit symptoms of median nerve compressive neuropathy, especially those who fail to improve after CTS management. We hypothesize that increasing cognitive awareness during the diagnostic process will enhance the recognition of potential medical neuropathies among patients presenting with median paresthesia, particularly those with persistent or recurrent symptoms following CTR.

Challenges in our two cases include modifying the patient's daily activities due to their demanding role as a dentist and their interests as a professional gamer in

the younger case, which requires the implementation of energy conservation techniques. It is important to note that our patient's occupation may have increased his risk of compressive neuropathies, as previous studies done on dentists have revealed that there is a high prevalence of median nerve compression among them, and the risk increases with years of practice and age [18,19].

Based on our findings and the limited literature on optimal non-surgical management strategies for LS, we recommend that hand physicians and therapists prioritize implementing a structured rehabilitation program for these patients as an initial approach before considering surgical intervention.

Conclusion

To our knowledge, these are the first two cases in the literature to be reported on non-operative management of LS. The successful management of LS in these patients illustrates the importance of a multi-faceted non-surgical approach. These cases support the notion that tailored conservative treatments can lead to significant improvements in function and quality of life.

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العلاج غير الجراحي الفعّال لمتلازمة اللاسيرتوس: تقرير حالتين ومراجعة للأدبيات

[1]بيان ع. غليمة، [1]عمر أ. بخاري، [2]عبدالرحمن ف. بخاري
[1]قسم جراحة العظام، مستشفى جامعة الملك عبدالعزيز، جدة، المملكة العربية السعودية
[2]قسم العلاج الوظيفي، مجموعة مستشفيات الحبيب، المملكة العربية السعودية

المستخلص:
متلازمة اللاسيرتوس (Lacertus Syndrome - LS) هي حالة نادرة ناتجة عن انحباس العصب المتوسط عند الرباط الليفي اللاسيرتوس فايبروسوس (Lacertus Fibrosus) الواقع أسفل مفصل المرفق، وتظهر بأعراض تشمل الألم، التنميل، وضعف القوة في الساعد واليد. نظرًا لندرتها، غالبًا ما يتم تجاهلها في التشخيص التفريقي.
عادةً ما يُعالج هذا الانحباس جراحيًا، حيث تشير معظم الدراسات إلى تحسن الأعراض بعد التدخل الجراحي. في هذا التقرير، نعرض حالتين لرجلين يعملان في مجال طب الأسنان، أُصيبا بمتلازمة اللاسيرتوس (أحدهما إصابة ثنائية الجانب والآخر أحادية الجانب)، وتم تدبيرهما بنجاح باستخدام نهج غير جراحي.
تضمن العلاج تقنيات تحرير اللفافة العضلية، تمارين انزلاق العصب، وبرامج تقوية العضلات. وتم تقييم النتائج باستخدام قوة القبضة، ومقياس الألم البصري(VAS) ، والمقاييس الوظيفية.
في الحالة الأولى، تحسنت قوة قبضة اليد اليمنى من ١٢ كغ إلى ٣٨ كغ، واليسرى من ٣٦ كغ إلى ٤٨ كغ. وفي الحالة الثانية، تحسنت القبضة من عدم القدرة على الأداء إلى ٤٦ كغ. كما انخفضت درجة الألم من ١٠/٨ إلى ١٠/١ لدى كلا المريضين.
تُعد هاتان الحالتان أولى التقارير المعروفة التي توثق نجاح العلاج غير الجراحي لمتلازمة اللاسيرتوس. وتؤكد النتائج أهمية النهج التحفظي متعدد الجوانب، وإمكانية تحقيق تحسن وظيفي كبير دون اللجوء إلى الجراحة.

الكلمات الدالة: متلازمة اللاسيرتوس، علاج غير جراحي، تقارير حالات، مراجعة أدبيات.