

Stener-Like Lesions in the Hand: A Qualitative Review

HAND

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Abstract

A Stener-like lesion is defined as the interposition of the sagittal band between the torn collateral ligament of the metacarpophalangeal (MCP) joint of a finger and its origin or insertion. Owing to the rarity of this injury, standardized protocols on the diagnosis and care of these injuries are not currently available. PubMed Central and Google Scholar were searched for published studies from 1962 to 2022. Inclusion criteria admitted any injury of the MCP joints of any nonthumb fingers involving a torn collateral ligament with sagittal band injury that trapped the collateral ligament. Eight studies were ultimately included in our analysis and contained 11 cases of Stener-like lesions. Eight of the 11 cases presented radial collateral ligament injury to the ring and little fingers. All 11 cases presented showed that detailed physical examination was a primary step in diagnosis of these lesions. Metacarpophalangeal joint laxity was present in all cases reported. Imaging-aided diagnosis was used in majority of the cases presented and included arthrography, ultrasound, or magnetic resonance imaging. All cases presented in this review were managed surgically. Following surgical repair, a majority of authors opted to use immobilization techniques immediately postoperatively. As awareness of this injury pattern increases, a standardized treatment algorithm may develop.

Keywords: hand, metacarpophalangeal, collateral ligament, sagittal band, Stener-like lesion, nonthumb fingers

Introduction

Stener lesions were originally described as an interposition of the adductor aponeurosis of the thumb when in 1962, Bertil Stener reported the pathological anatomy of a total rupture of the ulnar collateral ligament of the metacarpophalangeal (MCP) joint of the thumb.^{1–3} Similar injuries in nonthumb fingers have since been denoted as Stener-like lesions in the literature. A Stener-like lesion is characterized by interposition of the extensor hood or the sagittal band between the torn collateral ligament of the MCP joint of a finger and its origin or insertion. In these cases, the collateral ligament ruptures and its stump is trapped superficially by an open window of the injured sagittal band (Figure 1). A radially or ulnarly directed palmar-to-dorsal force is the typical mechanism of trauma in Stener-like lesions.⁴ Collateral ligament injury in the index finger is more commonly of the ulnar collateral ligament, reflecting the protective role of the middle finger against radial stress on the index finger.⁴ Alternatively, collateral ligament injuries of the fourth and fifth fingers are more frequently of the radial collateral ligament (RCL). Unlike the other fingers, the middle finger does not have a clear side predominance based on the published literature.^{3–5}

It is widely accepted that rupture of the collateral ligament of the MCP joint of a finger is rare compared with collateral ligament injury of the thumb, making Stener-like lesions in the fingers rarer than Stener lesions in the thumb. This is secondary to the proximal position within the Web space which protects the MCP joints of the fingers from extreme stress, their lateral support from interosseous muscles, the presence of adjacent fingers for support unlike the isolated thumb, and finally, the collateral ligament of the MCP joint of the finger is relaxed in a neutral position.⁶ Owing to the rarity of this injury and the limited existing literature on the treatment of these injuries, we have constructed a review of Stener-like lesions to help guide clinicians in the recognition and treatment of these injuries.

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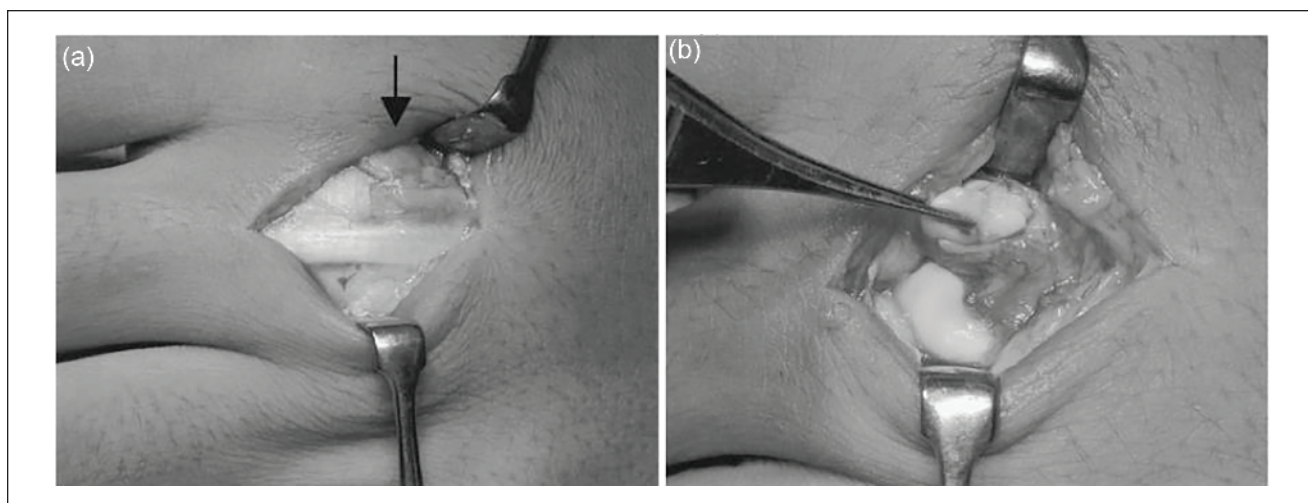


Figure 1. (a) Ruptured distal end of the collateral ligament is trapped by the open window of the ruptured sagittal band. (b) Ruptured end of the ligament was grasped by the forceps.⁵
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Methods

We searched PubMed Central for published studies over the time period 1962 to 2022, as well as Google Scholar. The following terms were used to generate a search: “Metacarpophalangeal (MCP) joint, collateral ligament, injury, treatment, finger.” Duplicates were removed before the abstracts were screened. One reviewer screened the abstracts, and 3 reviewers reviewed the resulting abstracts. Abstracts without full texts available were excluded from the search. A total of 256 studies were identified. An additional 4 studies were identified through the process of “pearling,” which searches the reference lists of published papers. Thirty-six studies were found to fit our inclusion criteria after initial abstract screen and were considered in the initial analysis. However, 28 of those studies ultimately did not fit our inclusion criteria after full manuscript screen and were excluded. Our inclusion criteria admitted any injury of the MCP joint of any finger other than the thumb that involved a torn collateral ligament with corresponding sagittal band injury that ultimately trapped the collateral ligament. Eight studies remained and ultimately fulfilled our inclusion criteria and were included in our qualitative analysis.

Case Presentations

Eleven cases in 5 studies on Stener-like lesions met the inclusion criteria for this review.^{3,5-8} Of the 11 cases, 7 cases were presented with comments on physical examination, additional imaging, treatment, and outcome.^{3,5-8} One study did not provide full case reports for 4 of the 6 total cases presented.⁵ Of the 11 cases reported, 10 were a result of an injury to the RCL, most of which in the fourth and fifth digits (Table 1). In

addition, 10 of the 11 cases reported described the avulsion location of the ligament as distal, or at the insertion of the ligament (Table 1). On physical examination of the Stener-like lesions, common symptoms were appreciated across many cases, such as tenderness, swelling, bruising, pain, and instability at the MCP joint.^{3,5-8} Further physical examination maneuvers commonly included stress testing of the affected MCP joint, which would usually reveal instability and possible extension lag.^{3,5,6,8} One study identified significant MCP joint laxity while the patient was under anesthesia.⁷ Many of the presented cases involved additional imaging to better visualize the injury. In some cases, arthrography with contrast dye injection into the MCP joint was used to identify leakage of the dye, indicating the location of the injury.^{5,6} One case used magnetic resonance imaging (MRI) to better visualize the injury.⁸ The most recent case reports involved the usage of ultrasound technology to identify the injury pattern.³ Surgical findings of all reported injuries involved trapping of the ruptured end of the collateral ligament between the proximal portion of the extensor hood and the ruptured sagittal band.^{3,5-8} Surgical reattachment of the ruptured collateral ligament to its original location was performed in all cases.^{3,5-8} The reported cases differed greatly in their postoperative care, with inconsistent time of immobilization, position of immobilization, and use of active motion exercises. Regardless, most patients experienced a near full recovery of motion in the joint without pain or limitation.^{3,5-8} Only 1 patient experienced slight residual limitation of joint movement after surgery.⁵

Discussion

Ten of the 11 Stener-like lesions presented in this review included injury of the RCL with only 1 case reporting a

Table 1. Summary of Reported Stener-Like Lesion Cases.

Year	Journal	Authors	Digit(s)	Ligament	Avulsion location	Additional investigation ^a	Treatment	Outcome
1988	<i>Journal of Hand Surgery</i>	Ishizuki ⁶	L 4th	RCL	Distal (insertion)	Arthrography	Surgical reattachment followed by immobilization and active motion exercises	At 2 mo postoperatively, patient had nearly full ROM with little pain or instability of the joint
2002	<i>Chir. Main</i>	Faivre et al ⁷	R 5th	RCL	Distal (insertion)	Check for MCP joint laxity while under anesthesia	Surgical reattachment followed by active motion exercises with buddy taping	Full ROM, no joint instability, and complete pain relief at 45 d postoperatively. However, a small extension deficit of the MCP joint persisted, even at 6 mo postoperatively
2008	<i>Hand</i>	Dennison ⁸	L 5th	RCL	Distal (insertion)	MRI	Surgery (suture anchor) followed by immobilization, moderate activity, then full activity with buddy taping	Patient recovered 0°-80° of MCP motion with a stable joint and full interphalangeal motion and returned to his job
2009	<i>J. Orthop. Sci.</i>	Ishizuki ⁵	L 5th	RCL	Distal (insertion)	Arthrography	Surgical reattachment followed by active motion exercises with buddy taping	Active adduction of the finger became possible after 2 wk
2009	<i>J. Orthop. Sci.</i>	Ishizuki ⁵	L 5th	RCL	Distal (insertion)	Unknown	because authors did not publish full case reports for these patients.	
2009	<i>J. Orthop. Sci.</i>	Ishizuki ⁵	L 5th	RCL	Proximal (origin)			
2009	<i>J. Orthop. Sci.</i>	Ishizuki ⁵	R 5th	RCL	Distal (insertion)			
2009	<i>J. Orthop. Sci.</i>	Ishizuki ⁵	R 5th	UCL	Distal (insertion)			
2009	<i>J. Orthop. Sci.</i>	Ishizuki ⁵	L 3rd	RCL	Distal (insertion)	Exploratory surgery	Surgical resection and reattachment. Postoperative care not specified	Pain markedly reduced 6 mo postoperatively, but slight residual limitation of the joint remained
2017	<i>Hand Surgery and Rehabilitation</i>	Toffoli and Chammas ³	R 3rd	RCL	Distal (insertion)	Ultrasound	Surgery (suture anchor) followed by immobilization, then splinting, and then physical therapy	Patient achieved full ROM and joint stability 3 mo postoperatively
2017	<i>Hand Surgery and Rehabilitation</i>	Toffoli and Chammas ³	R 4th	RCL	Distal (insertion)	Ultrasound	Surgery (suture anchor) followed by immobilization, then splinting, then physical therapy	Patient achieved full ROM and joint stability 3 mo postoperatively

Note. RCL = radial collateral ligament; UCL = ulnar collateral ligament; ROM = range of motion; MCP = metacarpophalangeal; MRI = magnetic resonance imaging.
^aIn addition to radiograph.

Stener-like lesion with injury to the UCL. In addition, the injuries reported here afflicted mostly the ring and little finger (Table 1). This may suggest that there is a degree of protection afforded to the UCL of the ring and little finger by the long finger to prevent excessive ulnar stress on these fingers. This is similar to the explanation provided by Draghi et al,⁴ which describes the long finger as preventing ulnar stress on the index finger and thus decreasing the probability of injury to the RCL of the index finger. This differs from Stener lesions of the thumb which have been reported to occur most frequently with injury to the UCL.

Clinical assessment in patients presenting with Stener-like lesions represents an important noninvasive technique to guide diagnosis. These lesions often result in the clinical examination findings of ecchymosis, soft tissue swelling, and focal tenderness of the MCP joint.² Targeted physical examination should include a determination of joint stability and extensor mechanism stability which can reveal coronal plane instability of the MCP joint, excessive deviation of the finger, bruising or subcutaneous hemorrhage, tenderness and loss of voluntary adduction function.^{3,5-8} Notably, all cases of Stener-like lesions presented in this review had instability on initial physical examination (Table 1). Lateral instability was observed in the cases when ulnar stress was applied to the flexed MCP joint. In addition, 2 authors reported cases with an extension limitation,^{6,7} with 1 author reporting an extension lag of 30°.⁷

Two cases we present in this review report extensor limitations on physical examination (Table 1). Instability in the extended position represents instability of the accessory collateral ligament, which originates volar to the collateral ligaments.² Furthermore, an inability to extend or maintain extension at the MCP joint suggests a sagittal band injury that may be associated with a subluxed extensor tendon.⁸

While physical examination may be sufficient to indicate surgical intervention,⁸ additional imaging may be helpful in making the diagnosis of a Stener-like lesion. When evaluating any injury to the hand, plain film radiograph is used to assess potential fractures and joint instabilities.² In the case of trauma to the MCP joint, a strict face, three-quarters, and Brewerton view may be helpful.³ For Stener-like lesions specifically, an avulsion fracture attached to the collateral ligament in the MCP joint may be noticed on plain film radiograph (Table 1).³ However, better visualization of a Stener-like lesion may require additional imaging modalities. Arthrography with MRI evaluation is considered the gold standard of collateral ligament injuries, with a reported sensitivity of 96% and a specificity of 95%.⁸ Arthrography/MRI of a Stener-like lesion may allow for better visualization of an avulsed ligament from its origin or insertion, as well as reveal a ruptured sagittal band and any ligament displacement.⁸ In addition, this modality may be able to show the presence of anechoic fluid in the MCP joint.⁵ However,

arthrography with MRI evaluation comes with a high cost and limited availability. Faivre et al claim that even though this form of imaging may provide a better description of the injury, it is not necessary for the diagnosis of a Stener-like lesion. Rather, they argue that standard radiographs and a thorough physical examination are enough to separate mild sprains from more serious joint injuries such as Stener-like lesions.⁷ However, a majority of the cases reported in this review used at least 1 imaging modality to confirm the diagnosis of a Stener-like lesion,³⁻⁸ suggesting that preoperative imaging is often needed to make the diagnosis.

Ultrasound evaluation of the injury has also been reported in the diagnosis of a Stener-like lesion.³ This imaging modality is noninvasive, cost-effective, and less time-consuming than other imaging modalities.³ The use of ultrasound to help diagnose a Stener-like lesion may be helpful if the diagnosis cannot be confidently made by radiographic evaluation and physical examination alone.

For all cases of Stener-like lesions found in the literature and reported in this review, surgical treatment was performed, which follows the suggested recommendations for Stener lesions. Lucerna and Rehman² report that if significant laxity of the MCP joint is present and ultimately neglected, chronic pain, instability, and osteoarthritis can follow. Joint laxity was a finding shown in the cases reported in this review consistent with the warnings of Lucerna et al. Therefore, this functional impairment similarly necessitates surgery.

In all cases presented in this review, operative treatment included restoration of the avulsed ligament to its anatomical position. Surgical repair may be completed with either suture repair for intrasubstance tears or suture anchor repair of avulsion injuries. Operative repair is especially reliable in the acute setting and is typically completed through a dorsal approach. When the distal ligament avulsion has ruptured through the sagittal bands, it is important to be certain that the extensor tendon is centralized and not subluxed following repair of the sagittal band. The sagittal band should be evaluated and repaired if there is subluxation of the extensor tendon, and proper gliding of the tendon should be observed following repair.

According to the papers included in this study, outcomes of treatment for Stener-like lesions greatly vary. In addition to the various surgical techniques used to manage these injuries, the wide range of postoperative immobilization may also account for such variation in functional outcomes. No guideline exists for postoperative management of Stener-like lesions. Therefore, management is typically dependent on provider preference. Although most of the cases described in this article use immobilization techniques immediately after surgery, the exact method of achieving immobilization varies.

The most common postoperative management in the papers included in this study was immediate postoperative

immobilization of the affected MCP joint at 30° to 60° of flexion for 3 weeks.^{3,5,6,8} Dennison⁸ and Toffoli and Chammas³ performed buddy taping to adjacent fingers and allowed for flexion and extension of the MCP joint early in the postoperative period. Ishizuki et al⁶ allowed for active motion exercises after the 3 weeks of immobilization. Conversely, Faivre et al described a case in which active motion exercises were allowed immediately following surgery. Notably, the patient in this case experienced a deficit in extension of the MCP joint.⁷

Additional research including prospective studies comparing different operative techniques and postoperative management is needed. Such research could elucidate whether there is a superior surgical technique and method of postoperative immobilization that optimizes functional outcomes for these patients.

Conclusion

Stener-like lesions represent a rarely reported hand pathology in the literature. The case reports published on this injury and presented in this review currently represent a framework that can be used to assess and treat these lesions. Review of the literature suggests several practices to maximize efficiency and clinical outcome. Stener-like lesions can most often be diagnosed with a physical examination in combination with imaging. Multiple modalities of imaging are viable, including arthrography, MRI, and ultrasound. Radiograph imaging allows detection of avulsion fractures. Ultrasonography is valuable in diagnosing Stener-like lesions due to its availability and efficiency, and can effectively detect ligament injury as well as avulsion fractures. Magnetic resonance imaging can be used in the case of negative radiographs and continued suspicion of Stener-like lesions.⁹ Treatment of these injuries constitute surgical intervention due to the interposition of soft tissue preventing the appropriate healing of the ligament. As awareness of this injury pattern increases, the frequency of reported cases in the literature may rise allowing for the refinement of the treatment algorithm for this condition.

Ethical Approval

This study was approved by our institutional review board.

Statement of Human and Animal Rights

This article does not contain any studies with human or animal subjects.

Statement of Informed Consent

The data provided in this article contain publically available published information.

Data Availability

Publically available data were used.

Declaration of Conflicting Interests

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