

Treatment of Acute Ankle Syndesmodic Injury by Elastic Fixation

M.R.M.Hassan, M.I.Kandil and A.R.M.Hassan

Othopedic Surgery Dept., Faculty of Medicine, Benha Univ., Benha, Egypt
E-Mail: Ali114@gmail.com

Abstract

Anatomic decrease of the syndesmosis of intense lower leg syndesmodic injury is fundamental for improving useful results and maintaining a strategic distance from posttraumatic osteoarthritis. The point of the examination was to assess the clinical, useful and radiological result of flexible obsession (Nylon Tape stitches Ethibond sutures) in treatment of intense lower leg syndesmodic injury. Patient and strategies : The investigation included 20 patients with intense syndesmodic injury; which was finished by Elastic obsession (Nylon Tape stitches Ethibond stitches). All patients were followed up at about fourteen days, 6 weeks, 6 months postoperatively. Evaluation will be done through Radiographic and useful results, AOFAS lower leg hindfoot scores and intricacy identified with a medical procedure. Results: The mean subsequent period was 9.4 ± 2.2 months, the interim of WB was 6.65 ± 0.9 weeks. All Patients had association before the finish of the investigation. The mean AOFAS score was 94.5 ± 7.1 . 6 patients (30%) had gentle agony, while 14 patients (70%) had no torment. 16 patients (80%) had no limit of development, while 4 patients (40%) had restrictions of every day action. 18 patients (90%) could walk >6 , while 2 patients (10%) strolled 4-6 in particular. 18 patients (90%) had no troublesome in strolling, while 2 patients (10%) had some trouble in strolling. 19 patients (95%) had no step anomaly, while 1 patient (5%) had clear stride variation from the norm. Decision: Elastic obsession is a substantial alternative for syndesmodic wounds. The inclusion procedure is straightforward and gives syndesmosis adjustment without taking out ordinary tibiofibular movement and furthermore deters the requirement for schedule second activity for equipment expulsion, making it possibly financially savvy. The astounding AOFAS score proposing high patient fulfillment.

Keywords: Acute ankle syndesmodic injury, Elastic fixation, Nylon tape sutures, Ethibond sutures.

1. Introduction

A syndesmosis is characterized as a sinewy joint in which two contiguous bones are connected by a solid layer or tendons. The distal tibiofibular joint includes the curved average part of the distal fibula and the inward horizontal part of the distal tibia which known as incisura fibularis that straightforwardly covered with articular ligament between the distal tibia and the fibula, in around 3/4 of patients [1].

Syndesmo dic injury is seen in Weber type C breaks happening because of the pronation-outer turn system, and in Maisonneuve wounds in which proximal fibula crack and average lower leg wounds coincide. Besides, the syndesmosis is harmed in some Weber type B cracks, albeit not saw in the radiographs [2].

The screw obsession technique is the ordinary treatment in syndesmodic fix. Unbending obsession is performed by means of the section of a cortical screw through the fibula at a degree of 2cm better than the tibiotalar joint and corresponding to the joint into the tibia and 300 anteriorly [3].

At times the entry of a subsequent screw might be required better than the first According to the investigations in the writing, no huge contrast has been seen between the section of the syndesmodic screws through 3 or 4 cortices. Cortical screws 4.5 mm, diameter were discovered to be biomechanically beneficial contrasted with the 3.5 mm screws [4].

As of late, it was discovered that 87% of specialists regularly eliminate the syndesmodic screw [5]. There has been controversial in the writing notwithstanding, concerning whether these screws ought to be held just as timing of expulsion [6,8].

One contention that has been made is that the screw ought to be eliminated because of reestablishing ordinary capacity and stress move component of the typical lower leg joint at around 8-12 weeks postoperatively [6,7].

Early momentary investigations of the versatile obsession have recommended it to make results similar to syndesmodic screw obsession, and as such it is presently viewed as an option in contrast to situating screw obsession. Know that these frameworks don't yet appreciate long haul follow-up, are as yet inclined to specialized complexities, stay doubtful for presenting any solidness in the sagittal plane, and keep on being badly characterized as for what may be a suitable number and situation of these gadgets. Since some information proposed that sagittal plane movement is more touchy and maybe significantly more significant than coronal plane movement for syndesmodic shakiness, it stays hazy if these gadgets can be just about as successful as screw obsession in balancing out the syndesmosis altogether physiologic tomahawks of development while it mends. [9,10]

The point of the examination was to assess the clinical, useful and radiological result of flexible obsession (Nylon Tape stitches Ethibond sutures) in treatment of intense lower leg syndesmodic injury.

2. Patient and method

The study included 20 patients with intense syndesmodic injury; which was finished by Elastic obsession (Nylon Tape stitches Ethibond stitches)

1. All patients were followed up at about fourteen days, 6 weeks, 6 months postoperatively.
2. Assessment will be done through Radiographic and practical results, AOFAS lower leg hindfoot scores and inconvenience identified with a medical procedure.

Consideration standards was Skeletally full grown patient and Acute syndesmodic injury with or without lower leg break as well as disengagement. While Exclusion rules was Pathological crack, Open break, Skeletally youthful, Neuropathic joint, Associated pilon crack, Syndesmodic injury in patients with terrible general condition/Unfit for a

medical procedure and Delayed presentation syndesmodic injury over 3 weeks.

The patients were overseen as indicated by cutting edge injury life (if necessary) uphold standards in the principal occurrence. Appraisal of the neurovascular status of the appendage is required. The patients were inspected clinically to assess the delicate tissue condition and x-beams were gotten in the antero-posterior, lateral and mortise views. Patients were placed in a back cast until season of a medical procedure.

The careful procedure for Elastic fixation (Nylon Tape stitches Ethibond stitches) was like that for screw fixation. On the off chance that there was a related fibula crack, it ought to be diminished and fixation put as shown by the break design.

A clinical report, be that as it may, found no distinction in result in patients who had a syndesmodic fixation put 2 cm proximal to the joint versus 3 to 5 cm proximal. In the cross over plane, the drill ought to follow a 25° to 30° diagonal heading from posterolateral to anteromedial in light of the fact that the fibula is found back to the tibia.

The drill ought to be focused on the fibula to try not to break the bone, decrease ought to be held with a clip to try not to move of the drill openings.

Organization of IV anti-microbials for 2 days postoperative. Medical clinic stay went from 1 day post-employment. Post-employment section was applied.

A regularly utilized post-employment routine incorporates no weight bearing until about a month and a half, to permit sufficient time for mending of the disturbed syndesmodic tendons.

The patient was kept non-weight bearing for about a month and a half after which the patient starts weight bearing in a short leg strolling cast for about fourteen days followed by the utilization of a delicate lower leg support for about a month.

Clinical and radiological follow up are planned at multi week, 3months, and a half year post operatively.

Results were evaluated toward the finish of this period concurring to American Orthopedic Foot and Ankle Society score (AOFAS).

The AOFAS framework is utilized globally as a mean of setting up typical degrees of lower leg work fitting for various age gatherings and to build up what establishes inability in ordinary people. It has additionally been utilized to build up differential paces of progress after injury or treatment.

The AOFAS is a 100-point practical lower leg and foot-appraisal apparatus in which higher scores reflect expanded capacity. It consolidates three separate subscales: emotional

torment (40 focuses), function (50 focuses), Alignment (10 points).

3. Results

60% of patients were found between 20-35 years. The age of the contemplated test went from 19-51 years with a mean of 32±7.76 years. There were 55% guys and 45% females. There were 45% right sided influenced and 55% left sided affected. There were 25% RTA, 25% direct injury and 50% contorting injury.

There were 65% Lat. Malleolus break, 10% Med. Malleolus break, 5% disengaged syndesmodic injury and 20% Bi-malleolar potts. There were 85% Class C and 15% Class B as per Weper characterization. Three patients (15%) had related ailments, the initially had hypertension, the second and third had diabetes mellitus.

Just 1 patients required expulsion of the embed due to entanglements identified with the horizontal bunch. It was eliminated following 8 months on account of an unmistakable bunch causing skin disturbance. At the expulsion of the embed, there was no indication of diastasis on the radiographs.

2 patients (10%) had Med. Malleolus break, 4 patients (20%) had Bimalleolar potts, 13 patients (65%) had lat. Malleolus break, and 1 patient (5%) had Isolated syndesmodic injury. All patients were overseen by Elastic fixation by (nylon tape-ethibond stitch).

The mean subsequent period was 9.4±2.2 months, the interim of WB was 6.65±0.9 weeks. All Patients had association before the finish of the examination.

The mean AOFAS score was 94.5±7.1. 6 patients (30%) had mellow torment, while 14 patients (70%) had no agony. 16 patients (80%) had no impediment of development, while 4 patients (40%) had restrictions of day by day movement. 18 patients (90%) could walk >6, while 2 patients (10%) strolled 4-6 in particular. 18 patients (90%) had no troublesome in strolling, while 2 patients (10%) had some trouble in strolling. 19 patients (95%) had no step irregularity, while 1 patient (5%) had evident walk anomaly. sagittal movement was mellow in 17 patients (85%), and moderate in 3 patients (15%). rear foot movement was gentle in 18 patients (80%), and moderate in 2 patients (10%). Lower leg rear foot was steady taking all things together patients. Arrangement was acceptable in 18 patients (90%), and reasonable in 2 patients (10%).

13 patients (65%) had no entanglements, while 7 patients (35%) had intricacies; 1 patient had constraint of scope of movement mellow torment, 3 patients had gentle torment, 1 patient had skin disturbance, and 2 patients had impediment of scope of movement

Table (1) Type of fracture and procedure in the studied patients.

	N=20	%	
Fracture type	Med. malleolus	2	10.0%
	Bimalleolar potts	4	20.0%
	Lat. malleolus	13	65.0%
	Isolated syndesmodic injury	1	5.0%
Procedure (type of fixation)	Elastic fixation by (nylon tape-ethibond suture)	20	100.0%

Table (2) Follow up in the studied patients.

		N=20	%
Follow up (months)	mean \pm SD	9.4 \pm 2.2	
	Range	6-12	
Time of WB (Weeks)	mean \pm SD	6.65 \pm 0.9	
	Range	6-8	
Union	Yes	20	100.0%

Table (3) AOFAS Score in the studied patients.

		N=20	%	
Function (50 points)	Pain (40 points)	Mild +30	6	30.0%
		None +40	14	70.0%
	Activity limitation (10 points)	No limitation +10	16	80.0%
		No limit of daily activity+7	4	20.0%
	Maximal walk distance (5 point)	Greater than 6 +5	18	90.0%
		4-6 +4	2	10.0%
	Walking surface (5 points)	No difficult +5	18	90.0%
		Some difficult +3	2	10.0%
	Gait abnormality (8 points)	None +8	19	95.0%
		Obvious +4	1	5.0%
	Sagittal motion (8 points)	Normal to mild +8	17	85.0%
		Moderate +4	3	15.0%
	Hind foot motion (6 points)	Normal to mild +6	18	90.0%
		Moderate +3	2	10.0%
	Ankle hind foot stability (8 points)	Stable +8	20	100.0%
	Alignment (10 points)	Good +10	18	90.0%
		Fair +5	2	10.0%
AOFAS SCORE		mean \pm SD	94.5 \pm 7.1	
		Range	80-100	

Table (4) Complications in the studied patients.

		N=20	%			
Complication	Yes	No	13	65.0%		
		Limitation of range of motion-mild pain		1	5.0%	
			Mild pain	3	15.0%	
			Skin irritation	1	5.0%	
			Limitation of range of motion		2	10.0%

4. Discussion

Flexible obsession offers the capability of syndesmosis adjustment without wiping out typical tibiofibular movement. This may thus prompt better target lower leg movement just as a diminished emotional solidness and discomfort [11].

A last purpose of thought is the extra expenses and ensuing expense adequacy of the Elastic obsession framework versus a syndesmodic screw. The extra expenses of a syndesmodic screw eliminated in day care a medical procedure in the Netherlands are around 700 Euro, which is roughly the expense of two Elastic obsession systems [11].

Notwithstanding, the use of Elastic obsession gadget can cause a fiery. Reaction on the site of bunch and actuate osteolysis and lead to osteolysis of the bone close to the embed and subsidence of the gadget.

In this examination, syndesmodic obsession by adjusted Elastic obsession (Elastic obsession framework) has a superior expense adequacy in contrast with Tight Rope obsession framework which is more costly and have the equivalent advantages and viability of Elastic obsession framework.

In 2011, Teramoto et al. assessed whether the Elastic obsession framework gives sufficient obsession to syndesmosis wounds. Applying foremost, back, and outer revolution powers to 6 typical new frozen corpse legs and along these lines estimating the diastasis of syndesmosis, they demonstrated that the Elastic obsession framework didn't give multidirectional adjustment to syndesmosis wounds. Be that as it may, it was hazy whether the rotational powers utilized in this examination were physiologic [12] This isn't in accordance with the discoveries of Wang et

al,[12] Klitzman et al, [13] and Soin et al, [14] Who found a satisfactory adjustment of the syndesmosis after Elastic obsession in comparative biomechanical contemplates.

The versatile bionic obsession gadget follows the upsides of cortical screw and stitch button method.

It fortifies the tibiofibular tractable power through the screw fastener and improves the term of strain in a few territories including

The flexible bionic obsession gadget doesn't influence the miniature movement which permits patients to take the lower leg practices prior without stressing over the danger of interior obsession instrument breakage.

- This gadget can not just evade the rate of unreasonably free or tight immobilization, yet additionally give indistinguishable tibiofibular settling power regardless of various lengths of working channels.
- More significantly, patients utilizing this gadget can straightforwardly take weight-bearing activities and don't need a second surgery to eliminate the gadget which mitigates torment and decreases the expenses.

In our investigation 20 patients were incorporated with a mean period old enough is 32 ± 7.76 years, 11 patients (55%) were guys and 9 patients (45%) were females. Three patients (15%) had related ailments, the originally had hypertension, the second and third had diabetes mellitus. The circumstance for the medical procedure shifts relying upon kind of crack, understanding bearableness for usable intercession and trusting that edema will die down if present. Open decrease was done all cases. Season of association in the contemplated patients went from about two months to 12 weeks with a mean 10.0 ± 1.33 weeks with an exemption of one case which gave skin disturbance and sinus. The last Constant score following a half year was 95.70 ± 13.55 . 19 patients had magnificent outcome, and 1 patient had helpless outcomes.

Additionally, the related ailment showed measurably critical relationship with the last score. In contrast with different investigations were the patients were athletic with no referenced clinical horribleness, patients in our examination showed related ailments; the patient with helpless outcome was uncontrolled diabetic. Accordingly, the ailment affects last score of patients.

in the examined gatherings; There were 13 patients (65%) had no entanglements, while 7 patients (35%) had intricacies; 1 patient had limit of scope of movement mellow torment, 3 patients had gentle agony, 1 patient had skin bothering, and 2 patients had impediment of scope of movement.

To sum up, Elastic obsession framework is a picture subordinate system demonstrated best for youthful medicinally free patients with intense straightforward syndesmodic injury. The most basic complexity is skin bothering which may end in skin hole and this is a result of the subcutaneous situation of the bunch and the Removal of the method isn't needed after complete radiological association.

Fundamental bit of leeway of our procedure is that it gives more fast free development of the lower leg and a

previous re-visitation of day by day exercises than the traditionalist treatment or syndesmodic screws.

In correlation with syndesmodic screws, the strategy is all the more simple procedure and less complicatin.

Nonetheless, this examination had a few restrictions:

1. The examination was directed distinctly on 20 cases.
2. It was a randomized imminent examination with no benchmark group.
3. Brief term of follow up.

5. Conclusion

Elastic obsession is a legitimate choice for syndesmodic wounds. The addition procedure is straightforward and gives syndesmosis adjustment without killing typical tibiofibular movement and furthermore deters the requirement for schedule second activity for equipment expulsion, making it conceivably savvy. The phenomenal AOFAS score recommending high patient fulfillment.

References

- [1] J.Bartonicsek. Anatomy of the tibiofibular syndesmosis and its clinical relevance. *Surg Radiol Anat*, Vol.25,PP.379–86,2003.
- [2] D.Sanders. Fractures of the ankle and tibial plafond. In: Lieberman JR, editor. *AAOS comprehensive orthopaedic review*, Vol.8, PP.659–76,2009.
- [3] M.T.Nousiainen, A.J.McConnell, R.Zdero, M.D.McKee, M.Bhandari,E.H. Schemitsch. The influence of the number of cortices of screw purchase and ankle position in Weber C ankle fracture fixation. *J Orthop Trauma* 2008 August;22(7):473–8.
- [4] A.K.Wikeroy, P.R.Hoiness, G.S.Andreassen, J.C.Hellund, J.E.Madsen. No difference in functional and radiographic results 8.4 years after quadricortical compared with tricortical syndesmosis fixation in ankle fractures. *J Orthop Trauma* January, Vol.24(1),pp.17–23,2010.
- [5] T.Schepers . The management of acute distal tibiofibular syndesmodic injuries: results of a nationwide survey. *Injury*, Vol.43(10),pp.1718–23,2012.
- [6] D.C.Taylor. Aggressive surgical treatment and early return to sports in athletes with grade III syndesmosis sprains. *Am J Sports Med*, Vol.35(11),pp.1833–8,2007.
- [7] M.P.van den Bekerom. Complications of distal tibiofibular syndesmodic screw stabilization: analysis of 236 patients. *J Foot Ankle Surg*, Vol.52(4),pp.456–9,2013.
- [8] T.A.Lalli. Economic impact of syndesmosis hardware removal. *Foot (Edinb)*, Vol.25(3),pp.131–3,2015.
- [9] C.N.van Dijk. Conservative and surgical management of acute isolated syndesmodic injuries ESSKA-AFAS consensus and guidelines. *Knee Surg Sports Traumatol Arthrosc*, Vol.24(4),pp.1217–27,2016.
- [10] J.S.Xenos. The tibiofibular syndesmosis. Evaluation of the ligamentous structures, methods of fixation, and radiographic assessment. *J Bone Joint Surg Am*, Vol.77(6),pp.847–56,1995.
- [11] N.Espinosa, J.P.Smerek, M.S.Myerson. Acute and chronic syndesmosis injuries: pathomechanisms,

- diagnosis and management. *Foot Ankle Clin*, Vol.11,pp.639-657, 2006.
- [12] A.Teramoto, D.Suzuki, T.Kamiya, T.Chikenji, K.Watanabe, T. Yamashita. Comparison of different fixation methods of the suture-button implant for tibiofibular syndesmosis injuries. *Am J Sports Med*, Vol.39,pp.2226-2232, 2011.
- [13] L.Wang, B.Wang, G.Xu, Z.Song, H.Cui, Y.Zhang. Biomechanical comparison of bionic, screw and Endobutton fixation in the treatment of tibiofibular syndesmosis injuries. *Int Orthop*, Vol.40,pp.307-314, 2016.
- [14] R.Klitzman, H.Zhao, L.Q.Zhang, G.Strohmeyer, A.Vora. Suture-button versus screw fixation of the syndesmosis: a biomechanical analysis. *Foot Ankle Int*, Vol.31,pp.69-75, 2010.
- [15] S.P.Soin, T.A.Knight, A.F.Dinah, S.C.Mears, B.A.Swierstra, S.M. Belkoff. Suture-button versus screw fixation in a syndesmosis rupture model: a biomechanical comparison. *Foot Ankle Int*, Vol.30,pp.346-352, 2009.