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## Outcome of weaver Dunn acromio clavicular joint stabilisation

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### Abstract

**Introduction:** Acromio clavicular joint injuries represent nearly half of all athletic shoulder injuries and Weaver Dunn procedure remains the most common operation at our institute Robert Jones and Agnes Hunt Hospital, for this injury so we assessed the outcome by of this procedure by measuring oxford shoulder scores, perceived deformity, complications and overall patient satisfaction.

**Aim and objectives:** To access outcome of ACJ Weaver Dunn reconstruction by measuring shoulder Oxford scores, perceived deformity, complications and overall patient satisfaction.

**Methodology:** A retrospective study of 21 patients performed at our institution from 2008-2013. Data was collected from electronic records and a telephonic interview of all the patients.

**Results:** We had total 21 patients operated for Reconstruction of Acromioclavicular Joint Injuries Grad III and above using Modified Weaver Dunn Technique between 2008 to 2013 by four Orthopaedic consultants.

We lost one patients in follow up as he could not be contacted and one patient refused to give feedback. Average Oxford score for 19 patients is 21(Max 54 and minimum 12). Average satisfaction was 80. There were 14(82%) patients who were able to return to their sports but three (18%) patients could not resume pre injury level. In addition 13 (76%) patients recovered normally with none to only mild residual deformity. However, 6 (24%) patients had major residual deformity. Overall only three (14%) patients underwent revision procedure.

**Conclusion:** Modified Weaver-Dunn procedure gives a satisfactory long-term functional outcome in Type 3 ACJ dislocation. Firstly, it shows positive functional outcome and hence better patient' satisfaction due to fast recovery. Secondly there is no need for a planned secondary procedure which in turn again improves patient's satisfaction. As a result of above considerations it reduces financial burden for the hospital and patient alike.

**Keywords:** Modified Weaver Dunn, acromioclavicular joint, oxford shoulder score

### 1. Introduction

Acromioclavicular joint injuries represent nearly half of all athletic shoulder injuries, often resulting from a fall onto the shoulder with the arm in adduction [15]. Injuries to the acromioclavicular joint (ACJ) which result in disruption of the normal joint account for approximately 3-5% of trauma to the shoulder girdle [16]. Nonsurgical treatment is indicated for type I and II injuries; surgery is sometimes recommended for type III, IV, V, and VI injuries. Recommended techniques for stabilization in cases of acute and late symptomatic instability include coracoacromial ligament transfer (Weaver-Dunn procedure), screw fixation of the coracoid process to the clavicle and coracoclavicular ligament reconstruction. The studies have shown that anatomic acromioclavicular joint reconstruction is the most effective treatment for persistent instability [15]. The most popular and widely used CC ligament reconstruction technique for chronic injuries was originally described by Weaver and Dunn (WD) in 1972 [1]. Many publications exist which describe modifications to this method [17, 18, 19]. Nevertheless, this procedure remains the most common operation at our institute during the study duration. Also the vogue for acute fixation of these injuries has not been adopted by the surgeons at our institute.

The original series Weaver and Dunn reported a failure rate of 28%, and poor results have been reported in other series, with loss of reduction 1. We have observed the clinical outcome of ACJ reconstruction by measuring shoulder Oxford scores 21, perceived deformity, complications and overall patient satisfaction.

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**2. Methodology**

The patients operated for stabilisation of Acromioclavicular Joint with Weaver Technique from 2008 to 2013 at Robert Jones and Agnes Hunt Hospital were included in the audit. The time lag since injury to the shoulder varies from minimum three months up to maximum of ten years. Age range varies from 22 to 60 years with average age 40years. We included the patients on whom procedure was performed for injuries more than three months old. Also no acute fixations were performed on them.

Later on two of the patients were excluded as one was lost in follow up as he could not be contacted and one patient refused to give feedback. The sample was identified via clinical codes and verified on computer records

A form was designed to record the outcome of procedure in terms of Oxford score 21, perceived deformity, complications and overall patient satisfaction. The patients were asked to rate their satisfaction rate from 0 to 100 with 0 being not satisfied at all and 100 being fully satisfied.

**2.1 Data collection**

- Electronic Patient Records retrospectively
- Structured telephone interview with patients to fill in the Proforma
- Data validation – data was validated by review and discussion of the operation notes.

**2.2 Data analysis**

- Data analysis performed using MS Excel

**3. Results**

We had total 21 patients (17 males and 4 females) operated for Reconstruction of Acromioclavicular Joint Injuries Grad III and above using Modified Weaver Dunn Technique between 2008 to 2013 by four Orthopaedic consultants.

We lost one patient in follow up as he could not be contacted and one patient refused to give feedback.

Average Oxford score for 19 patients is 21 (Max 54 and

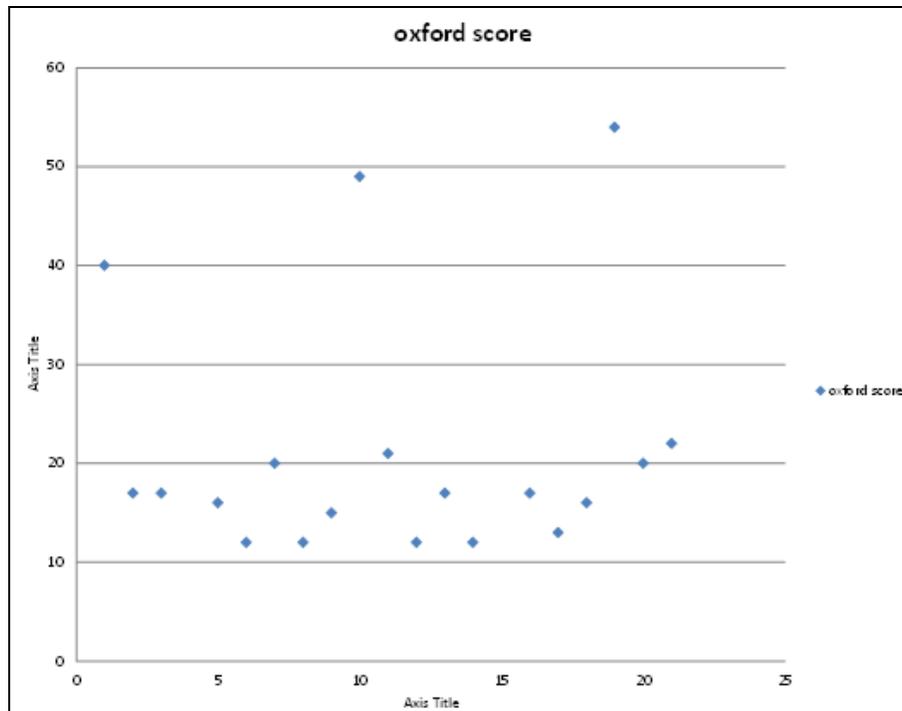
minimum 12). Average satisfaction was 80. Three patients were 100% satisfied and two patients were not satisfied at all. Out of these two, one had Revision procedure and other is under long term follow up.

There were 14(82%) patients who were able to return to their sports but three (18%) patients could not resume pre injury level. In addition 13 (76%) patients recovered normally with none to only mild residual deformity. However, 6 (24%) patients had major residual deformity. Overall only three (14%) patients underwent revision procedure.

The other complications that were noted in occasional cases were pain (2/19), wound infection (3/19) and frozen shoulder (1/19). (Table 1).

**Table 1:** Results in tabulated form

Total number of patients	21
Male	17
Female	4
Patients excluded	
Patient lost in follow up	1
Patients refused to give feedback	1
Oxford score	
Range	12-54
Average	21.11
Patient's satisfaction score	
Range	0-100
Average	79.9
Residual deformity	
Major	6
Minor	6
Nil	7
Complication	
No complication	10 (49%)
Pain	2
Wound infection	3
Frozen shoulder	1
Coracoids fracture	1
Failed revision	1
Recurrent deformity	1



**Fig 1:** Graph showing Oxford score in the patients undergone the Modified Weiver Dunn.

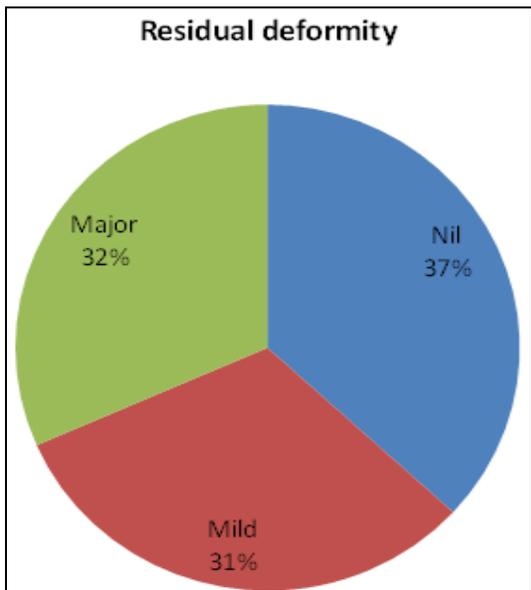


Fig 2: Graph showing Residual deformity in the patients undergone the Modified Weiver Dunn.

**Complications**

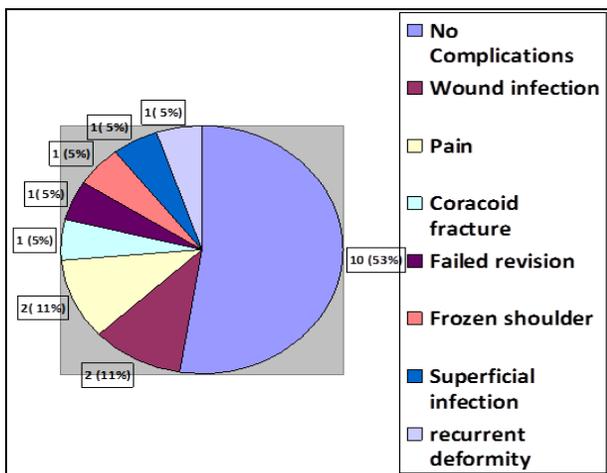


Fig 3: Graph showing range of complications noted in the patients undergone the Modified Weiver Dunn.

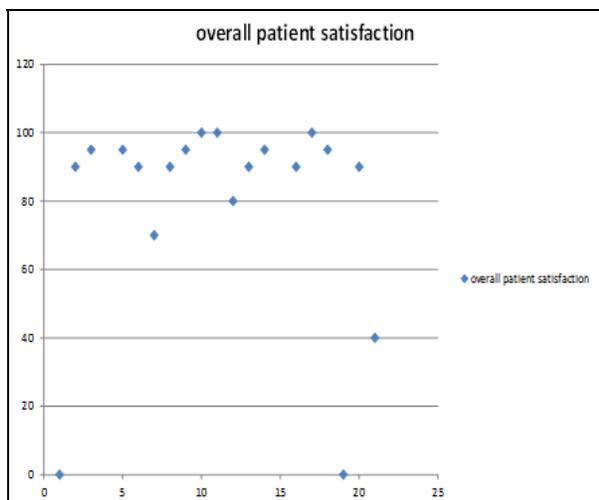


Fig 4: Graph showing overall patient satisfaction in the patients undergone the Modified Weiver Dunn.

**4. Discussion**

Over the past many years, many authors have supported nonoperative management for complete ACJ dislocations [2-5]. Patients are usually treated conservatively even if there is severe displacement [2, 6]. Systematic review by Spencer has shown that non-operative treatment is better than traditional operative treatment in the management of Grade III ACJ dislocation. However 20% to 40% of patients with conservative management after an acute AC joint dislocation have less than satisfactory results, with residual pain during shoulder motion, parasthesia, loss of strength and fatigue with overhead activities, and/or cosmetic concerns.<sup>7</sup>

Success rate of WD procedure ranged from 78 to 95% in various studies. 29 cases of WD procedure reviewed by Warren-Smith and Ward has 95% good result [8]. There were 9 cases of modified WD procedure by Copeland and Kessel which showed 89% success [9]. Also, 11 cases of Dacron coracoclavicular loop fixation by Bargren *et al.* had 91% success rate [10]. In their original series Weaver and Dunn reported a failure rate of 28%, and poor results have been reported in other series, with loss of reduction after surgery because of stretch or pullout of the transferred Coracoacromial ligaments.

The use of the native coraco-acromial ligament to re-establish AC joint stability was first described by Weaver and Dunn [1]. Since then it has been modified to include resection of the distal clavicle to avoid degenerative changes at the AC joint. The CA ligament is detached from the deep surface of the acromion with or without a chip of bone and is then transferred to the clavicle. This can be rather augmented with a suture loop that provides protection while the reconstructed ligament heals.

The study conducted at our institute concluded comparable results with the other literature. We found good patient satisfaction in 80%. The 53% of patient were able to return to pre injury level, 82% patients returned to sports. In regards to Oxford score although a very few patients (3/19) reached the score between 40-60, most of them fell between 10-30, which shows much better results when compared with the results observed by Sugathan <sup>20</sup>. The surgeon experience and familiarity with the technique is a contributory factor in successful outcome with a steep learning curve.

Recently, Lafosse *et al* <sup>5</sup> described an all-arthroscopic technique for CA ligament transfer in the setting of acute or chronic AC dislocations<sup>11</sup>. An alternative technique for ligament reconstruction is the use of a semitendinosus tendon autograft. This technique is combined with re-section of the distal clavicle. Jones *et al* <sup>12</sup> described the use of a looped semitendinosus graft around the coracoid process and clavicle in a revision AC joint reconstruction <sup>12</sup>. Mazzocca *et al* <sup>16</sup> modified this technique, incorporating a doubled semitendinosus graft inserted in a coracoids bone tunnel and secured in two separate clavicle bone tunnels <sup>13</sup>. Interference screws were used to approximate the anatomic location of the trapezoid ligaments. Biomechanical testing of this construct has been favorable. We have used anterior tibialis tendon allograft in reconstruction. Good clinical results have been achieved using hamstring tendons to reconstruct high-grade AC separations.<sup>14</sup> However, future studies must examine the extent to which two drill holes weaken the clavicle and how tunnel expansion influences the biomechanical and clinical outcomes of this treatment.

## 5. Conclusion

Modified Weaver-Dunn procedure gives a satisfactory long-term functional outcome in Type 3 ACJ dislocation. Although the final results, like any surgical procedure, are dependent on the surgeon experience and familiarity with the technique, modified WD procedure is recommended for failed conservative management of Grade 3 ACJ dislocation. Firstly, it shows positive functional outcome and hence better patient's satisfaction due to fast recovery. Secondly there is no need for a planned secondary procedure which in turn again improves patient's satisfaction. As a result of above considerations it reduces financial burden for the hospital and patient.

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