COMPARATIVE ANALYSIS OF OUTCOME FOLLOWING ARTHROSCOPIC BANKART'S REPAIR USING SINGLE VS DOUBLE PORTAL

DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REGULATION FOR THE AWARD OF M.S. DEGREE IN ORTHOPAEDIC SURGERY

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CERTIFICATE

This is to certify that the work **"COMPARATIVE ANALYSIS OF OUTCOME FOLLOWING ARTHROSCOPIC BANKART'S REPAIR USING SINGLE VS DOUBLE PORTAL (PROSPECTIVE STUDY)"** which is being submitted for M.S. Orthopaedics, is a bonafide work of **Dr. G.THIYAGARAJAN**, Post Graduate Student at Department of Orthopaedics, Madurai Medical College, Madurai.

The Dean,
Madurai Medical college,
Madurai.

CERTIFICATE

This is to certify that this dissertation titled **"COMPARATIVE ANALYSIS OF OUTCOME FOLLOWING ARTHROSCOPIC BANKART'S REPAIR USING SINGLE VS DOUBLE PORTAL (PROSPECTIVE STUDY)"** is a bonafide work done by **Dr.G.THIYAGARAJAN** postgraduate student of Madurai Medical College, Govt Rajaji Hospital.

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CERTIFICATE

This is to certify that this dissertation **"COMPARATIVE ANALYSIS OF OUTCOME FOLLOWING ARTHROSCOPIC BANKART'S REPAIR USING SINGLE VS DOUBLE PORTAL (PROSPECTIVE STUDY)"** is the bonafide work done by **Dr. G.THIYAGARAJAN** under my direct guidance and supervision in the Department of Orthopaedic Surgery, Madurai MedicalCollege, Madurai-20.

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DECLARATION

I, **Dr.G.THIYAGARAJAN**, solemnly declare that the dissertation titled **"Comparative Analysis of Outcome Following Arthroscopic bankart's repair using single vs double portal (PROSPECTIVE STUDY)"** has been prepared by me. This is submitted to **The Tamil Nadu Dr. M.G.R. Medical University, Chennai,** in partial fulfillment of the regulations for the award of M S degree branch II Orthopaedics.

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CONTENTS

PART A

PART -B

ANNEXURES

INTRODUCTION

Shoulder joint has high range of motion at the risk of dislocation and instability due to its biomechanics and bone geometry. Shoulder joint most commonly dislocates anteriorly (85-95%) and its the most common joint going for recurrent dislocations also. Recurrence rate depends on age of patient during first dislocation, closed reduction methods, immobilisation time, severity of trauma, associated fractures and soft tissue injury. Nearly all the traumatic shoulder dislocations have Bankart lesion and hill sachs lesion.

Its proven that all patients with Bankart lesion need some surgical management. Up to date over 300 surgical techniques have been reported for Bankart lesion like bony procedure, open, mini-open and arthroscopic procedure. Arthroscopic stabilisation procedures have been progressing over the past twenty years. Improvement has been seen in instrumentation, fixation and tissue implants.

Arthroscopic stabilisation has the advantage of early mobilisation, good functional outcome, less blood loss, infection rate and cosmetic issues.

REVIEW OF LITERATURE

Arthroscopic treatment of anterior shoulder instability has evolved significantly during the past decade. Currently, most techniques include the use of suture and suture anchors. (1) In properly selected patients and with good surgical technique, outcomes should approximate or exceed traditional open stabilization techniques.

Thirty-six patients (72.0%) had excellent results, whereas seven patients (14.0%) had good results. The mean pre- and postoperative range of external rotation was 80.38° and 75.18°, respectively. Eighty-six percent patients had stability compared with the normal sided shoulder and were able to return to sports. There were no cases of Redis location observed in this study; however, three cases had mild laxity of the joint. (3) Arthroscopic Bankart repair with the use of suture anchors is a reliable treatment method, with good clinical outcomes, excellent postoperative shoulder motion and low recurrence rates. (3)

The technique described here facilitates the procedure of repairing the detached labrum using MiTek anchors. It avoids the potential of tangling the sutures around the arc of the anchor, which could lead to a loose knot at the end. It also facilitates the process of tying the knot and stabilizes the labral tissues while the anchor is being placed and the knot

tied. The whole procedure could be performed through a single anterior portal (4)

There was no significant difference (5) between the groups regarding the surgical failure rate (group AS 5.8%; group AD 7.7%; $p = 0.62$). Group AS presented a better mean Carter-Rowe score (group AS 94.4; group AD 88.6; $p < 0.05$) and greater return to the same sports level (group AS 79.1; group AD 72.1; $p < 0.05$). Use of anchors with double thread loading did not show any clinical advantage for arthroscopic repair of traumatic anterior shoulder instability, in relation to use of single-thread anchors, over a 2-year follow-up.

Twenty-five recurrent traumatic unidirectional anterior shoulder dislocators were stabilized arthroscopically with a trans glenoid absorbable suturing technique. A Bankart lesion was documented and repaired in all cases. Postoperative follow-up averaged 17 months (range 1 year to 30 months). All results were rated excellent. All patients achieved full, painless range of motion (ROM), and no instances of postoperative instability occurred. There were no complications (6)

Arthroscopic Bankart repair with the use of suture anchors is a reliable treatment method, with good clinical outcomes, excellent post-operative shoulder motion and low recurrence rates (7)

Arthroscopic Bankart repair using trans glenoid sutures or bioabsorbable tacks results in a higher rate of recurrence of instability compared to open techniques. (8) Studies comparing open repair to newer arthroscopic techniques using suture anchor fixation and capsular plication are necessary.

Arthroscopic and open repair techniques for the treatment of recurrent traumatic shoulder instability yield comparable results if the procedure is selected on the basis of the pathological findings at the time of surgery. (9)

Three comparative studies were identified, which included 146 patients; 74 of them underwent isolated BR, and 72 BR + remplissage procedure. The isolated BR results in significantly higher risk of recurrence and Redis location. There was no significant difference in the rates of reoperation and time to return to sport between the two procedures. Rowe and UCLA scores were lower in the isolated BR group compared with the BR + remplissage group (10).

The treatment of Bankart lesion in recurrent shoulder dislocation achieved good and excellent results in more than 90% of the cases using either arthroscopic or open techniques. Although arthroscopic surgery is the treatment of choice for most surgeons nowadays, the open repair remains an excellent option and should not be forgotten. (11)

There are no differences in shoulder stability and function in patients with anterior shoulder instability and a lesion of the anteroinferior labrum and patients with an extended lesion of the anterior and superior labrum after arthroscopic shoulder stabilization. (12)

In this retrospective investigation the open Bankart procedure demonstrated good functional results. The arthroscopic treatment without capsular shift resulted in a better range of motion, but showed a tendency towards more frequently and earlier recurrence of instability. Sensitive patient selection for arthroscopic Bankart repair is recommended especially in patients with more than five dislocations. (13)

First-generation arthroscopic techniques demonstrated higher recurrence rates than the more modern arthroscopic techniques, but as techniques and implants continued to improve, results have become comparable to the open gold standard. Initial arthroscopic fixation was performed by staple capsulorrhaphy, which resulted in unacceptable levels of recurrent instability. Other methods of fixation have included trans osseous suturing and bioabsorbable tacks, both of which have had lower success rates than open repairs. As technology evolved, modern day suture anchors were developed that have improved the success of arthroscopic repair. (14)

Thirty-four patients (85.00%) had satisfactory results, whereas six patients (15.00%) had unsatisfactory results. Eighty five percent patients had stability compared with the normal-sided shoulder and were able to return to sports. There were no cases of Redis location observed in this study.

Arthroscopic Bankart repair using suture anchors to reattach the torn labroligamentous complex is a treatment method with good functional outcomes, reliable results and satisfactory postoperative shoulder motion with low recurrence rates (15)

AIM OF THE STUDY

To compare the outcome following arthroscopic Bankart's repair using single and double portal in recurrent shoulder dislocation.

FUNCTIONAL ANATOMY

Shoulder joint

Consists of 3 bones and 4 articulations

Three bones are

1.clavicle

2.scapula

3.humerus

Four articulations

1. Acromioclavicular joint
2. Sternoclavicular joint
3. Glenohumeral joint
4. Scapulothoracic joint

Stabilizers of shoulder joint

Static - Bone geometry

Glenoid labrum

Capsule & ligaments

Intra articular pressure

Dynamic - primary stabilizer

Secondary active stabilizers

Neuro muscular control

Clavicle

It extends from the sternum (convex end) to the acromion(concave). Due to its S-shape, the lateral end undergoes more rotation during arm elevation compared to its medial end. The joint capsules of both the sternoclavicular and the acromioclavicular are further stabilized by ligaments.

Scapula

It's a flat bone and it acts as site of muscle attachment around the shoulder. It has 3 borders, 3 angles and 4 process. Its medial border is vertical and parallel to the spine. The inferior angle of scapula is at the level of spinous process of D7.

The four processes of scapula are coracoid process, acromion, spinous process and glenoid fossa (articular process).

It is convex in the dorsal aspect. Its divided into two fossae by the spinous process:

Supraspinous fossa

Infraspinous fossa.

Humerus

The articular area of the head of humerus, which is retroverted and medial, is separated from the greater and lesser tuberosities by its anatomical neck.

Glenoid cavity

Glenoid fossa is at the lateral end of the scapula. It is pear shaped, having an inferior surface which exceeds the superior surface by 20%. Its alignment is anterolateral with a cranial tilt. It is 25% the size of the head of humerus. This is why, Shoulder joint enjoys mobility at the cost of stability.

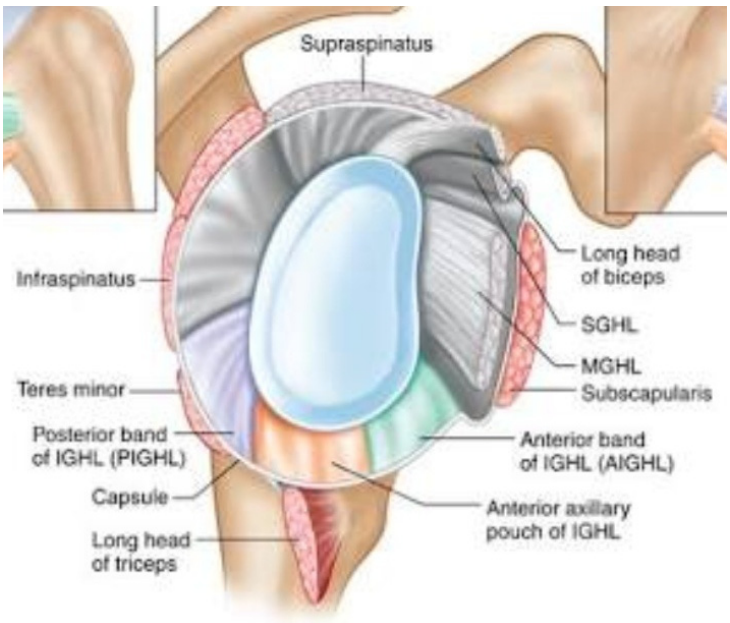
Glenoid labrum

Its fibro cartilaginous rim located along the glenoid fossa s border. It attaches to peripheral margin of glenoid cavity except above. It deepens the glenoid fossa and forms pliable cushion for ball to roll. It gives attachment to glenohumeral ligaments

Gleno-humeral ligaments

They are located in front of the joint and are construed as the capsule's thickened areas.

- Superior gleno humeral ligament
- Middle gleno humeral ligament
- Inferior gleno humeral ligament



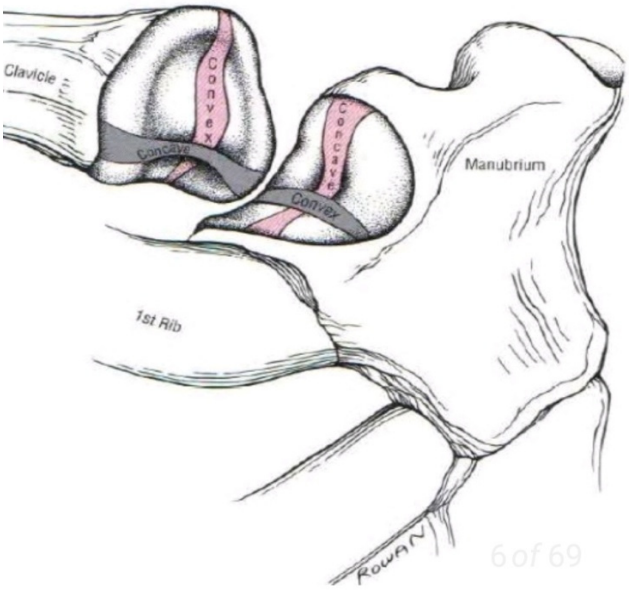
SGHL -extends from the glenoid labrum's upper part and the coracoid base to the humeral head, precisely in between the lesser tuberosity's superior part and the anatomical neck. Along with coraco humeral and supraspinatus, it prevents the downward displacement of humeral head.

MGHL- extends from the glenoid fossa's anterior margin below sghl attachment and passes to the humeral neck. It stabilizes the joint anteriorly in the mid abduction.

IGHL- extends from anterior-posterior margins of the lower glenoid labrum and forms an inferior pouch. the thick anterosuperior part is called the superior band. The inferior part is named the axillary pouch. The lower component of the IGHL offers buttress -like support for the joint's anterior and inferior parts. This segment stabilizes the joint in the upper abduction ranges, while negating subluxation and dislocation anteriorly.

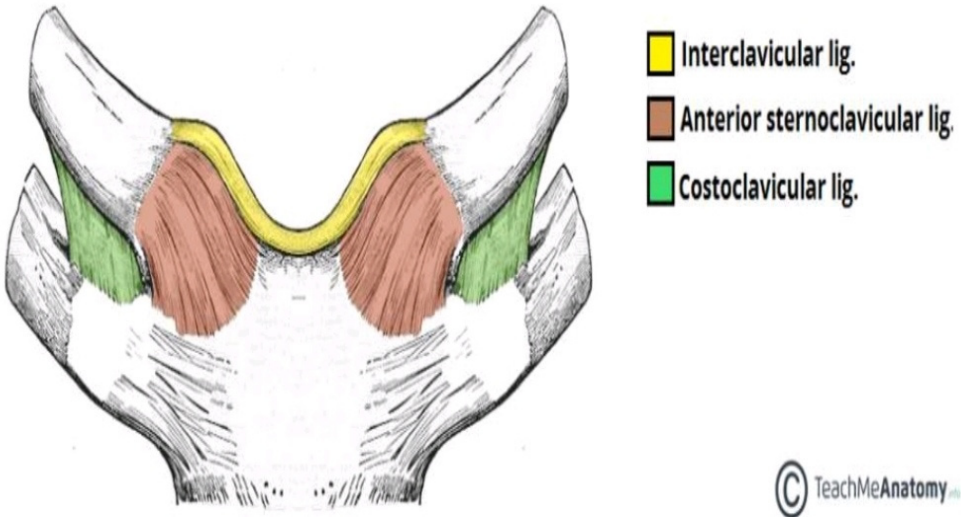
Sterno clavicular joint

The SC articulation consists of two saddle-shaped surfaces one at the sternal or medial end the clavicle and one at the notch formed by the manubrium of the sternum and first costal cartilage.



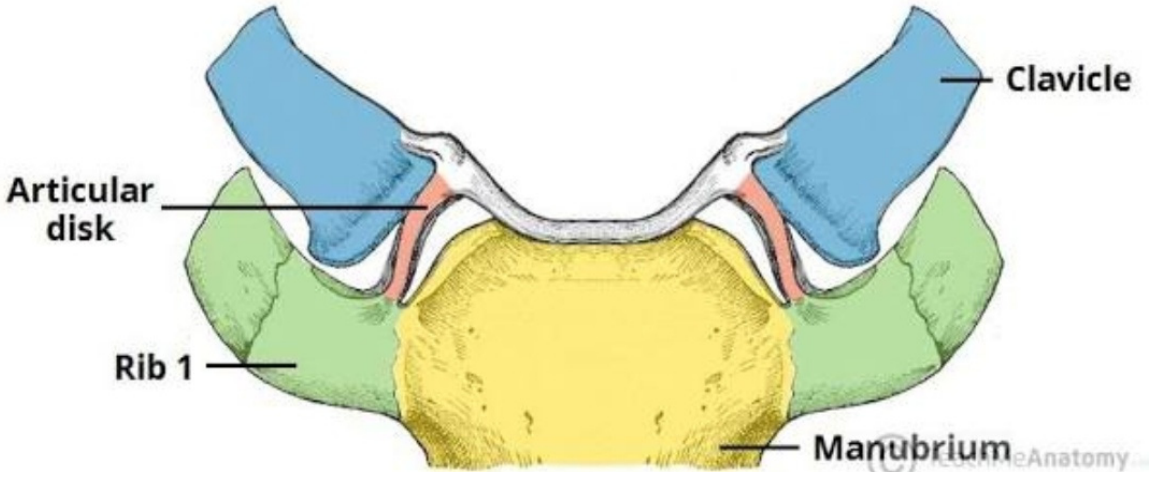
Ligaments of sternoclavicular joint:

- Capsular ligaments
- Sternoclavicular ligaments – anterior & posterior
- Interclavicular ligaments
- Costo clavicular ligaments
- Articular disc



Articular disc

It is a fibrocartilaginous disc to increase the congruency b/w incongruent articular surface. It diagonally transects the SC joint space and divides the joint into 2 separate cavities. It is considered part of the manubrium in elevation /depression and thus the upper attachment of the disc serves as pivot point and the disc acts as the part of the clavicle in protraction / retraction with lower attachment serving as pivot point.



Acromio clavicular joint

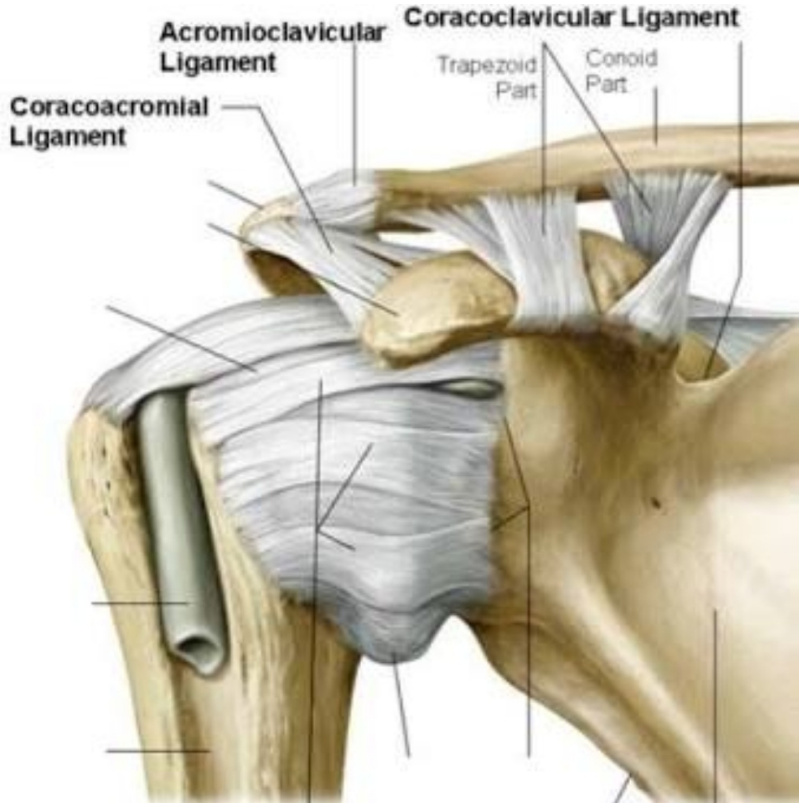
It allows the scapula additional range of rotation on the thorax and allow for adjustments of the scapula outside the initial plane of the scapula in order to follow the changing shape of the thorax as arm movement occur. In addition, the joint allows transmission of forces from the upper extremity to the clavicle.

Ligaments of acromio-clavicular joint:

- Fibrous capsule
- Acromio-clavicular ligaments
- Coraco-clavicular ligaments

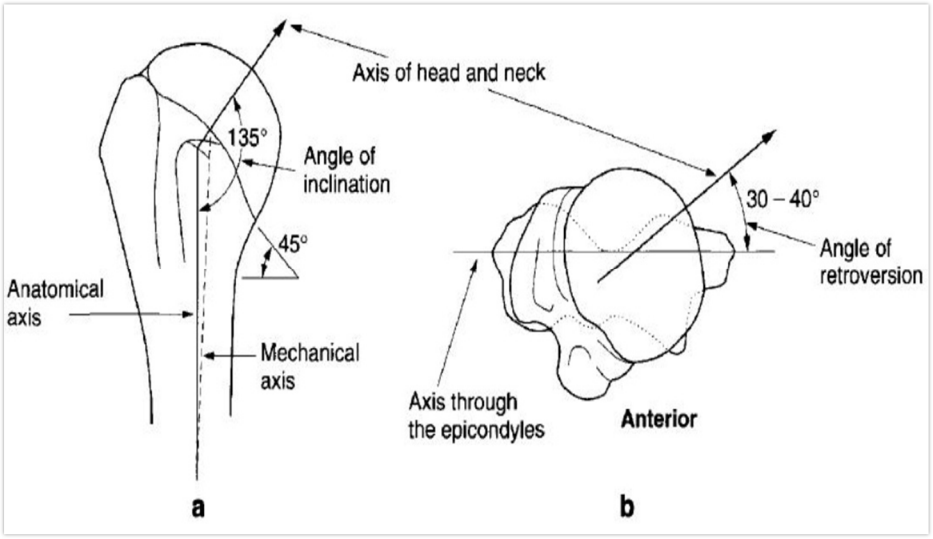
  conoid part -oriented vertically, resists superior & inferior forces

  trapezoid part -oriented horizontally
- Coraco-acromial ligament



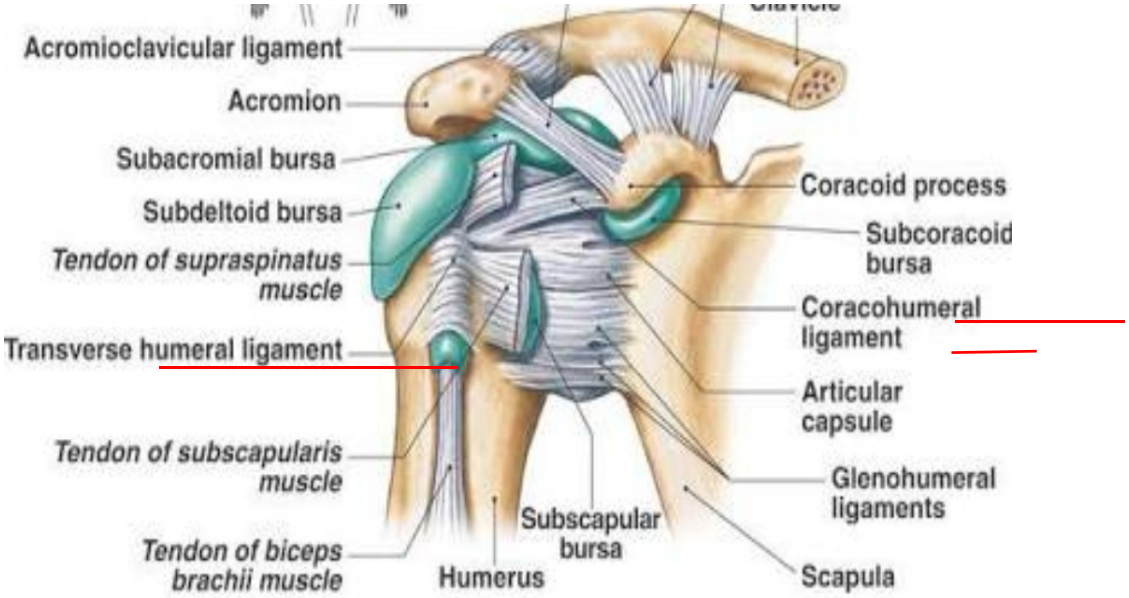
Glenohumeral joint

It is a ball -socket joint type. The articulating surface of the head of humerus is spherical, comprising an arc of 160˚of articular cartilage. The humeral articular surface has a radius of 25mm. The glenoid articular surface's curvature radius is 2-3mm larger than that of head of humerus. The neck shaft angle is 45˚. Humeral head is retroverted 55˚ and glenoid is 2˚ of anteversion to 7˚ of retroversion.



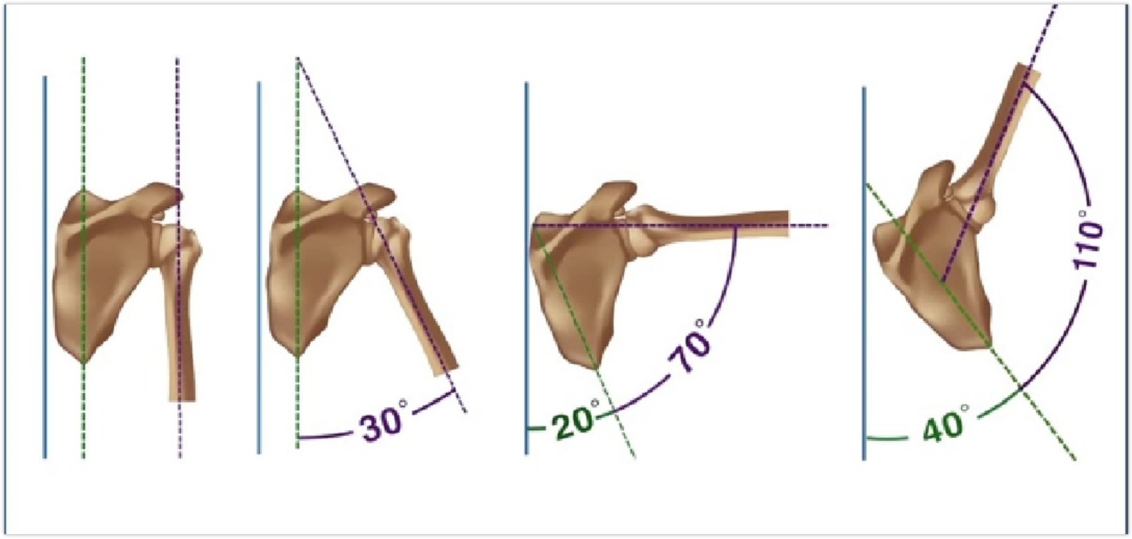
Ligaments of Glenohumeral joint:

- Fibrous capsule
- Glenohumeral ligaments
- Coraco humeral ligament
- Transverse humeral ligament



Scapulothoracic joint

It is not a true anatomic joint. The functional ST joint is part of a true closed chain with the AC and SC joint and the thorax. Example, When the arm is abducted, scapula undergoes upward rotation, external rotation and posterior tipping (all movements in combination)



Shoulder movements:

- Flexion

  pectoralis major

  biceps brachii

  anterior deltoid

- Extension

  posterior deltoid

  teres major

  latissimus dorsi

- Abductors

  supraspinatus

  deltoid

  trapezius & serratus anterior

- Adductors

  subscapularis

  infraspinatus

  teres minor & major

  latissimus dorsi

- Internal rotation

  subscapularis

  latissimus dorsi

  anterior fibres of deltoid

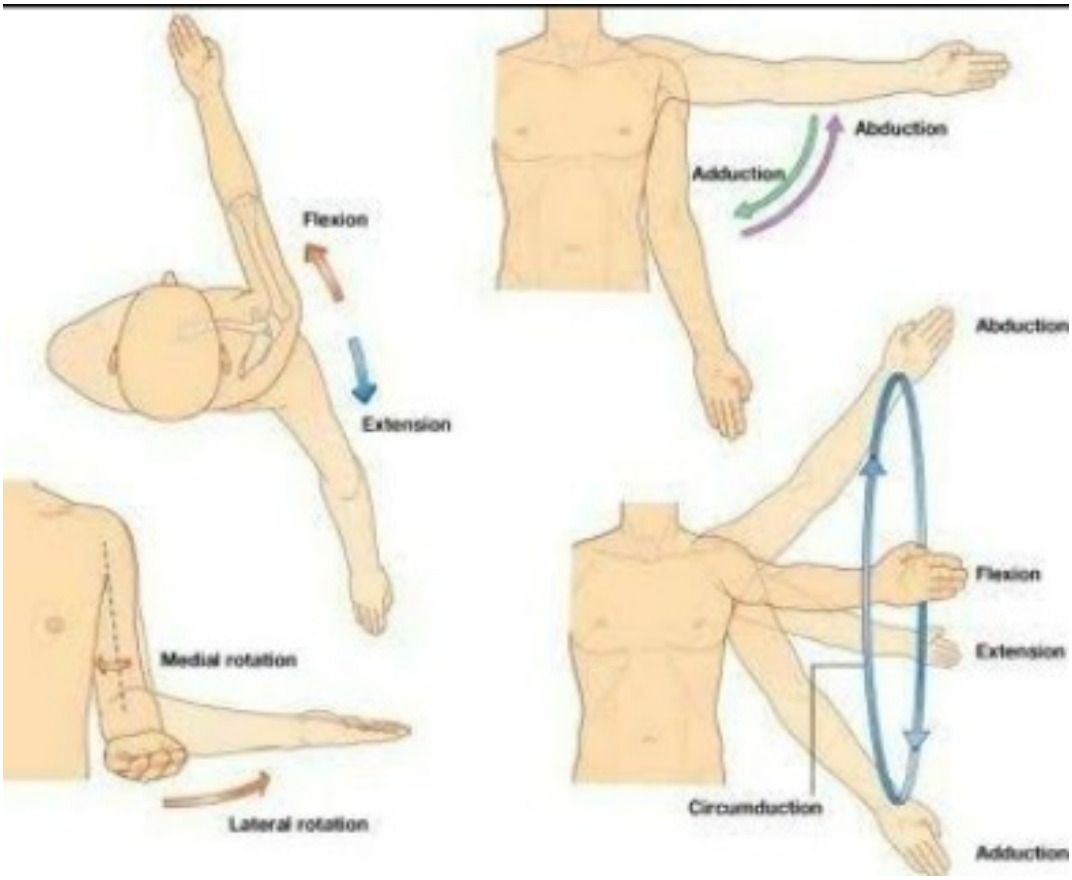
  pectoralis & teres major

- External rotation

  infraspinatus

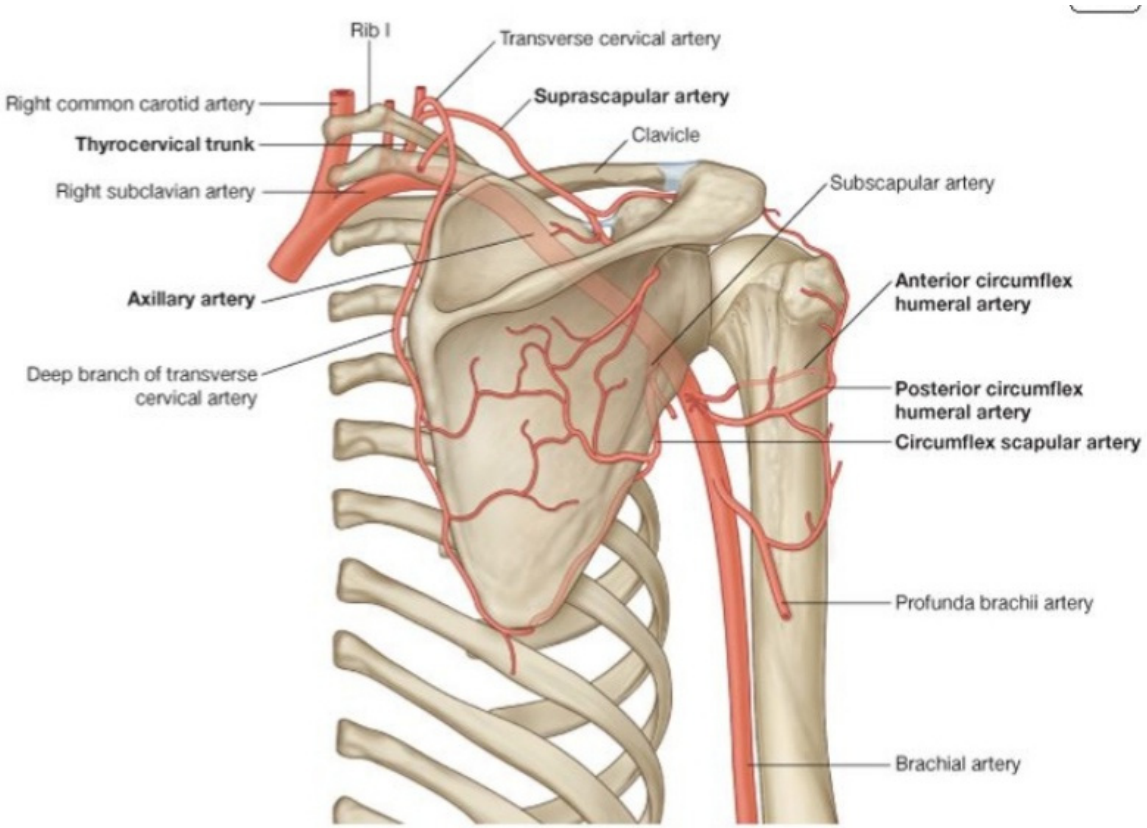
  teres minor

  posterior fibres of deltoid



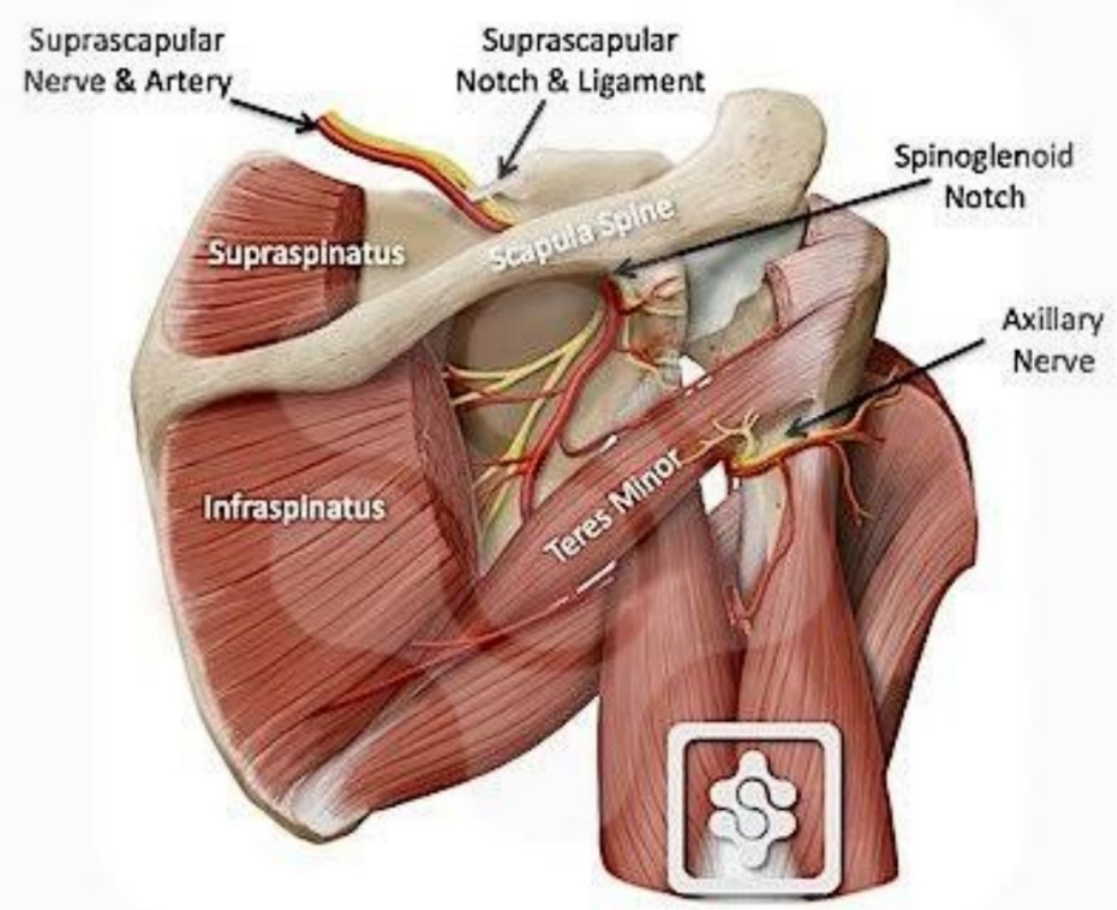
Vascular supply

Anterior & posterior circumflex humeral, suprascapular & circumflex scapular vessels



Nerve supply

The capsule is supplied by the suprascapular nerve (posterior & superior parts) and axillary nerve (anteroinferior)



MATERIALS AND METHODS

Purpose of the study

To compare the functional outcome following arthroscopic Bankart's repair in recurrent shoulder dislocation using Rowe score.

Data collection and methods:

Collection of data as per the proforma with consent from the patients admitted in the arthroscopic sports injury clinic, orthopedic department, govt Rajaji hospital, Madurai medical college, Madurai

Design: Prospective study

Period: Oct 2016 to sep 2018

Sample size: 20 cases were taken up for our study

Inclusion criteria:

-Patients in the age group of 18 to 60 years

-Both male and female

-Patients with traumatic recurrent anterior shoulder dislocations

Exclusion criteria:

-Age less than 18 years

-Posterior shoulder dislocation

-arthritis of shoulder

-bony bankarts lesion

-Associated rotator cuff tear

-Multidirectional instability

PHYSICAL EXAMINATION

1. Apprehension test

Patient in supine position with the affected shoulder off the table. The arm is slowly abducted and externally rotated and anterior force is directed on the proximal homers. A positive test produces the sensation of impending dislocation.

Grading of stability

Grade 0-Normal

Grade 1-Humeral head moves up glenoid but not over rim

Grade 2-Humeral head sub luxates over glenoid rim and reduces spontaneously when the stress is removed

Grade 3-Humeral head dislocates over glenoid rim and remains dislocated even removal of stress

Sulcus sign

Patient in standing position, examiner by the side the arm is pulled in the downward direction while the shoulder is held in 0 degrees of abduction & neutral rotation. The acromio humeral interval is measured to assess inferior glenohumeral laxity.

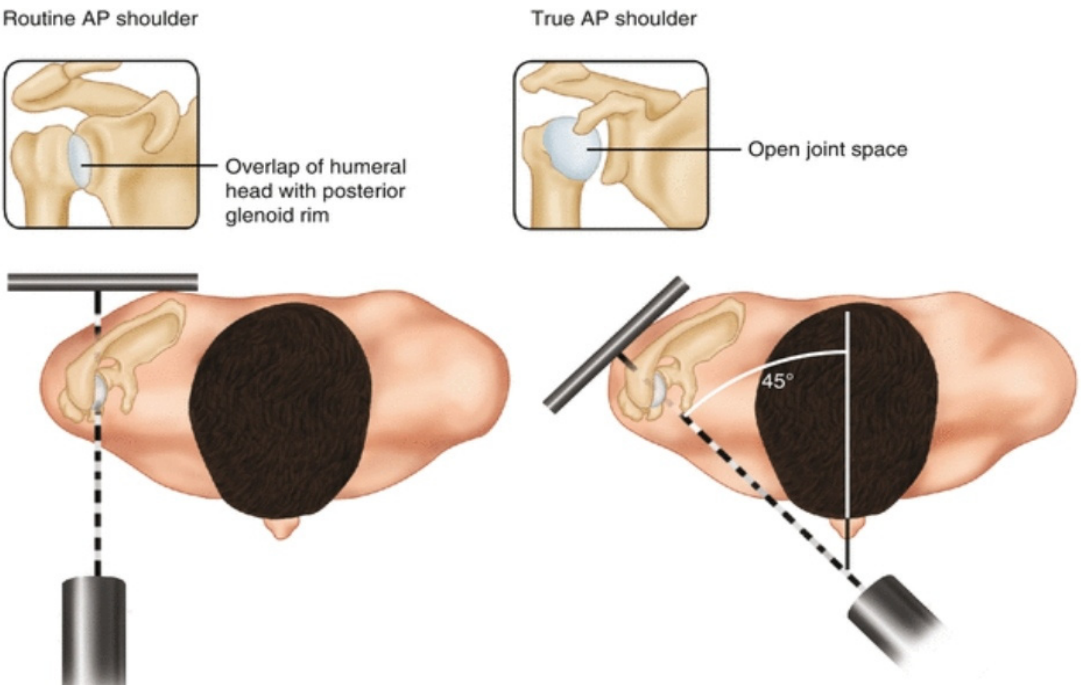
Jerk test

Keep the arm forward-flexed and adducted and then posterior directed force will cause posterior translation in posterior instability. Moving the arm into the coronal plane may reduce the humeral head.

Radiographic evaluation

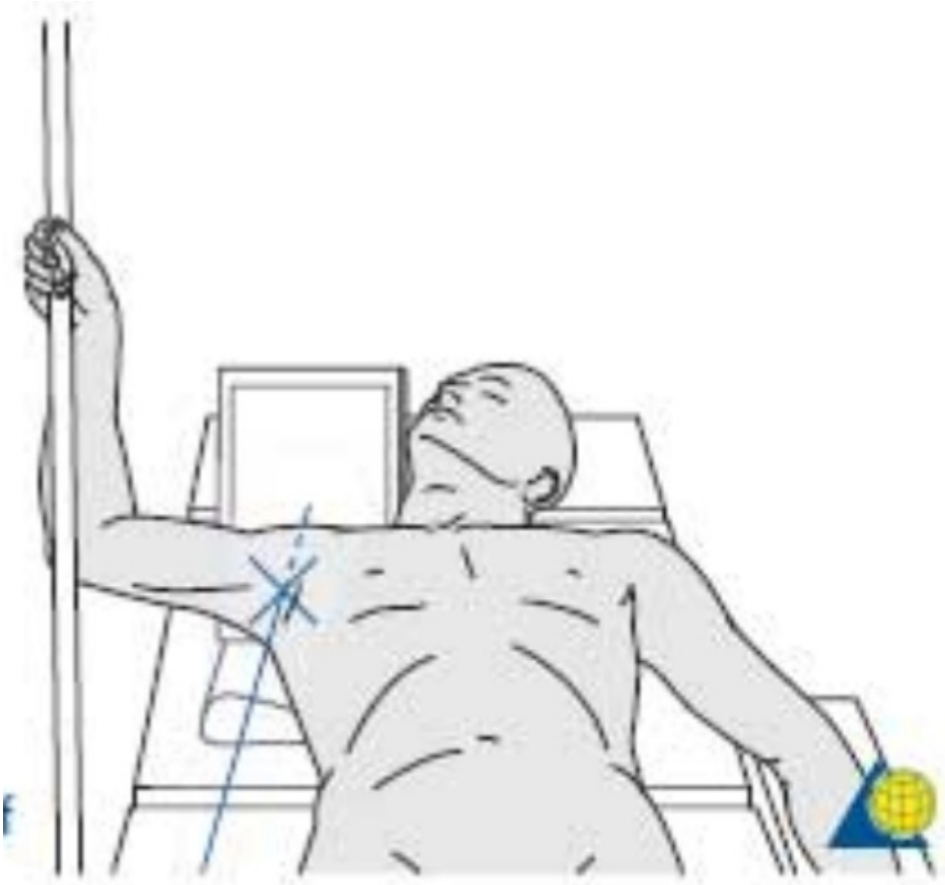
True AP view (grashey view)

It is an ap x ray in the plane of the scapula unlike the standard ap that is in the plane of the thorax. It can demonstrate erosion or fracture of anterior glenoid rim.



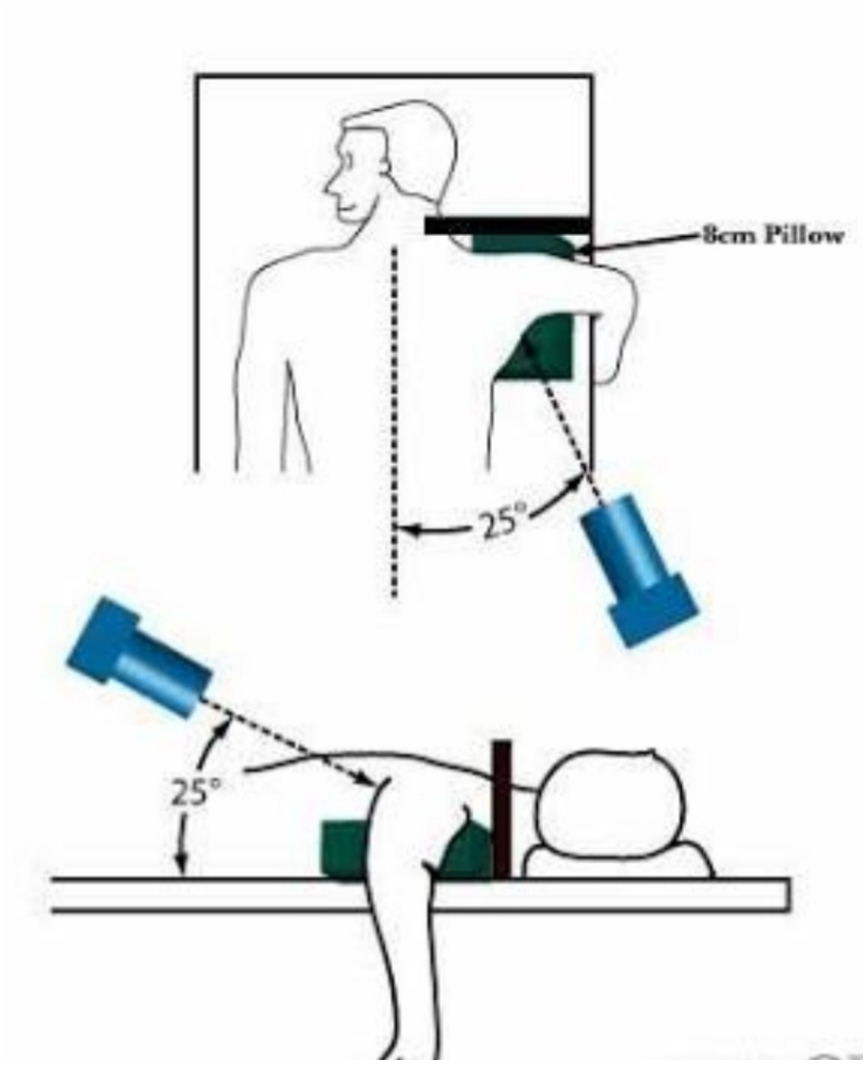
Axillary view:

Patient s arm in abduction and the cassette placed on the superior aspect of shoulder. X ray beam is passed through the axilla aimed at the ipsilateral coracoid process. It demonstrates erosion in the anteroinferior portion of the glenoid rim



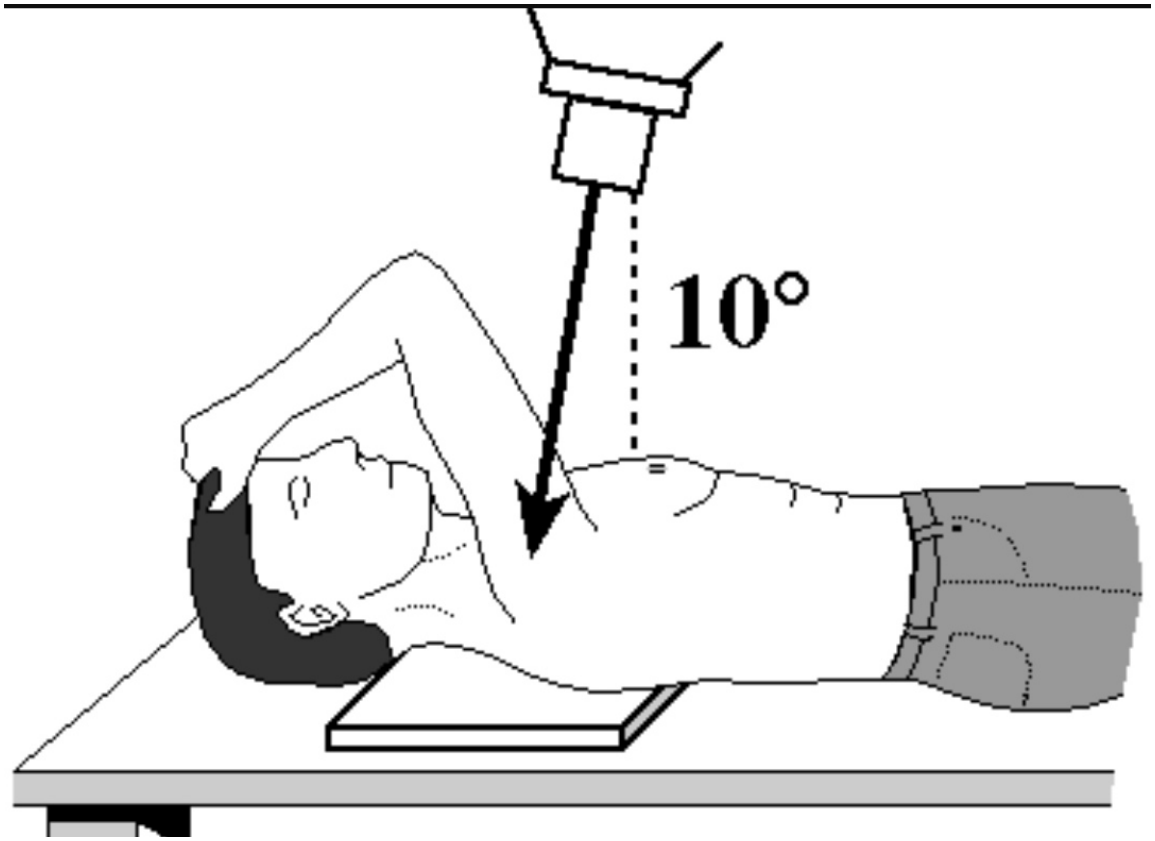
West point axillary lateral view

Patient in prone position and shoulder abducted to 90˚ and the elbow bent and hanging over the edge of the table. The cassette is held at the superior aspect of the shoulder. The x ray beam is tilted 25˚ anteriorly and medially to demonstrate the anteroinferior glenoid rim.



Stryker notch view:

It is a variant of the AP view with the arm abducted and externally rotated by placing the hand over the head. The cassette is placed behind the shoulder. The beam is directed 10˚ cephalad. It demonstrates the hill sachs lesion in the humeral head.



Instruments and implants

History

1912	Danish surgeon, Severin nordent invented an endoscope and reported that it could be used for exploring the intricacies of the knee joint and coined the term 'ARTHROSCOPY'
1918	Takagi of japan used a 7.3 mm cystoscope to explore the knee of a cadaveric specimen
1921	Bircher published the first paper on arthroscopy and is credited with the first ever arthroscopy
1970	Detrisac and Johnson were the pioneers in staple capsulorrhaphy.
1981	Dandy is credited with the first arthroscopic ACL reconstruction
Snyder and Strafford	Invented arthroscopic suture anchors for anatomical fixation of the capsule and labrum.
Caspari	Revolutionised trans glenoid suture technique.
Savoie et al	Recurrence rate of 4% using caspari technique in patients >16 years and 8% in patients <16years.
Thai et al	Advised better capsular tensioning.

Antoniou and harryman	Interval closure when the interval gap is greater than one cm.
Sugaya et al	Arthroscopic repair of bony Bankart lesion with 27% bone loss associated with the fragment
Kim et al	Arthroscopic repair of 23 Bankart lesions that required revision for one dislocation and two subluxations.
Burkhart and debeer	Observed increased recurrences in contact athletes with significant glenoid bone loss
Mazzocca	Observed recurrence rates of 11% after arthroscopic reconstructive procedures
Saito et al	Pioneered 3D CT evaluation for glenoid bone loss in recurrent dislocation
Wolf	Described HAGL in one-tenth of his patients included in his study on shoulder instability

ARTHROSCOPE

Basically, it is an optical instrument. Its optical characteristics depend on

- Diameter of the arthroscope
- Angle of inclination
- Field of view

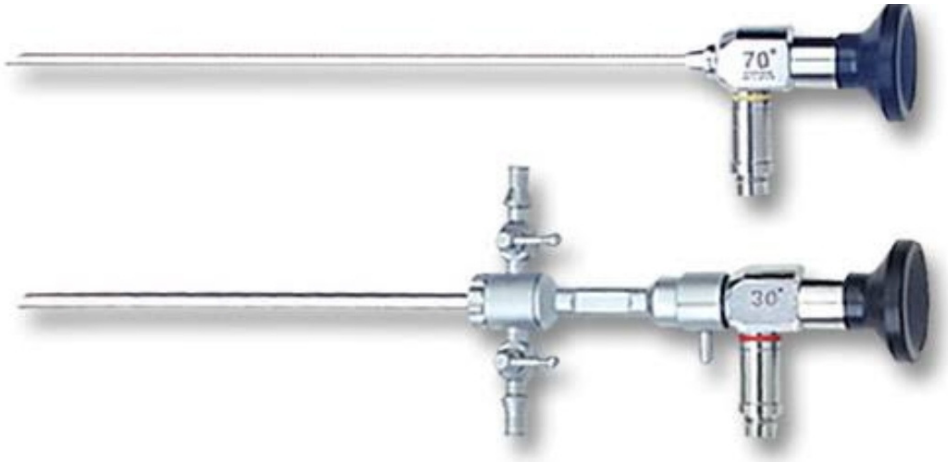
The angle of inclination is the angle between the axis of the arthroscope and a line drawn perpendicular to the surface of the lens. It varies from 0 to 120 degrees.

The 25 and 30-degree arthroscopes are most commonly used. The 70 and 90-degree arthroscopes are useful in viewing the corners of the joint.

Field of view is defined as the viewing angle encompassed by the lens and varies according to the type of arthroscope.

- 1.9mm scope has a 65˚ field of view
- 2.7mm scope has a 90˚ field of view
- 4.0mm scope has a 115˚ field of view

Wider viewing angles make orientation by the observer much easier. Arthroscopes vary in diameter from 1.7 to 7mm and 4mm is the most common size.



Fibre optic light source

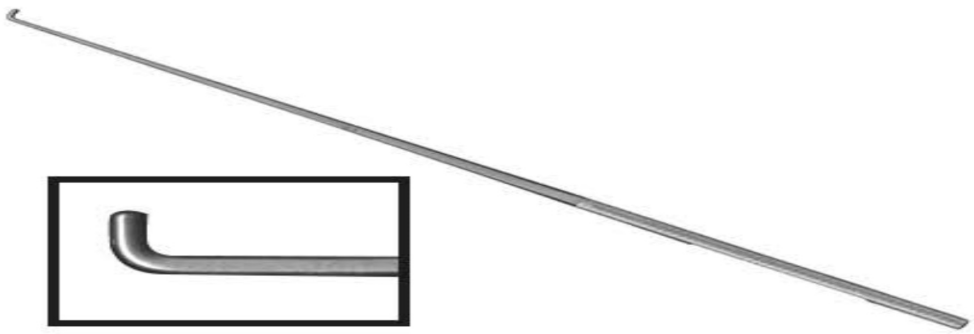
To enable visualisation through an arthroscope, tungsten, halogen and xenon arc light sources producing around 300 to 350 watts were developed connected to television system.

The fibre optic cable is a bundle of glass fibres encased in a protective sheath, one end of which is attached to a light source that is present distant from the operative field and the other end is attached to the arthroscope, which is surrounded by fibre optic fibrils.

Probe

The probe, “the extension of the arthroscopist’s finger” is right - angled with tip size of 3mm. it is the safest instrument that one can use in learning triangulation techniques. The probe can be used for

- Structure consistency determination
- Depth and lesion size estimation
- Identification and palpation of loose bodies



Motorized shaving system

It includes an outer hollow cannula and an inner rotating cannula with fenestration of the tip. The inner sheath's window rotates at a high velocity and functions as a two-edged cylindrical blade. Soft tissue segments are sucked into the window of inner cannula to the outside and collected in a suction trap.

Equipment set up

A tower comprising a video monitor, light source, shaver power source, video recorder and irrigation pump is positioned opposite the surgeon. A mayo stand is positioned distal to the first assistant and should contain the basic equipment, and back table behind the assistant with procedure specific instruments.

Arthroscopic pump

Bleeding during shoulder arthroscopy is common because

- Deeper tissue plane penetration
- Vascularity of muscle plane
- Tourniquet cannot be used

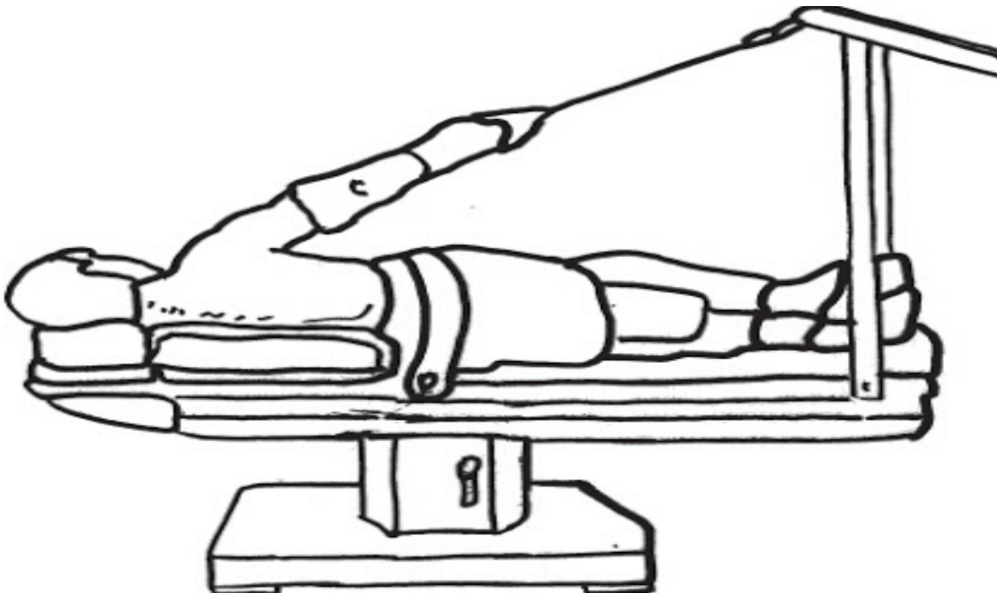
To prevent intra-articular bleeding, an arthroscopy pump was used for inflow and a constant flow at pressure of 60mmhg was maintained. Hypotensive anaesthesia of 90 to 100mmhg was preferred. Radiofrequency cold ablation are the other methods of controlling bleeding. If the pressure used was too high or benign pressure of prolonged time can cause fluid extravasation into subcutaneous and muscular plane.

Patient positioning:

Two basic positions

-lateral decubitus position

-beach chair position



Lateral decubitus position can be modified by tilting the patient 20 to 30˚posteriorly, so that the glenoid surface is placed parallel to the floor. This modification has advantages

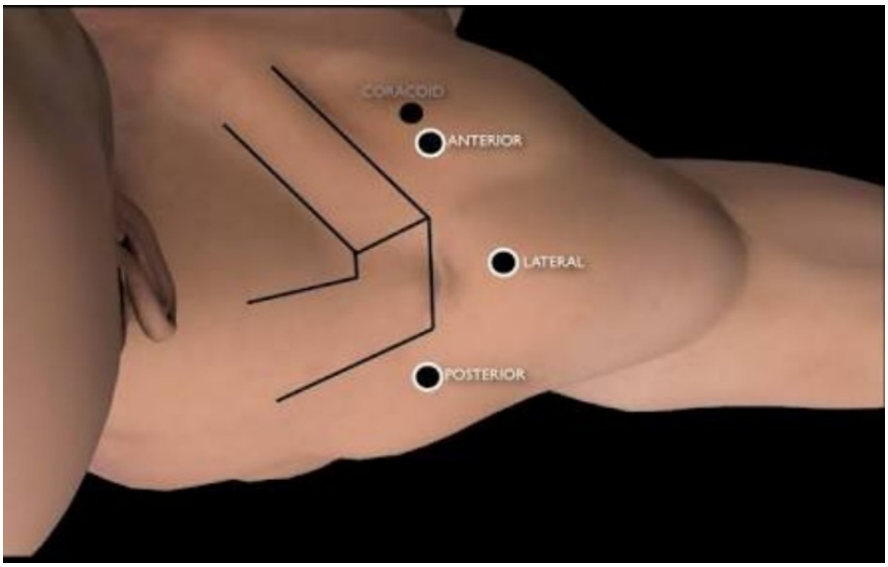
- Less traction
- Improved access to the inferior third of labrum & capsule

-10 to 13lb of traction usually applied

-Mostly 30 to 60˚ of abduction and 20 to 30˚ forward flexion.

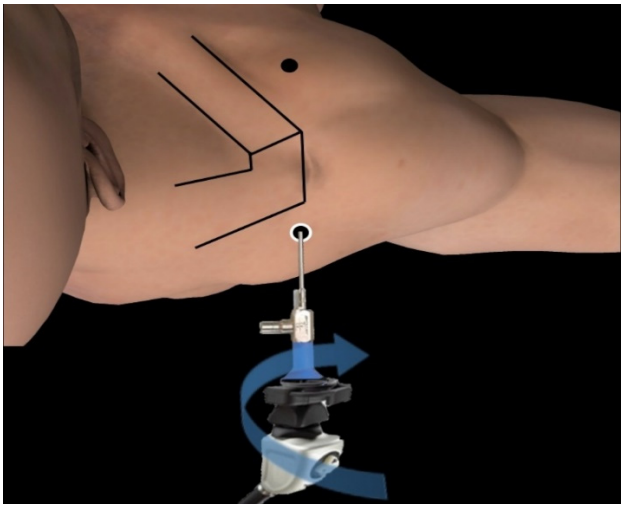
Portals:

All the bony landmarks were marked using sterile marker. One Posterior portal-viewing portal One or two anterior portal- working portal



Posterior portal

It allows exploration of the majority of the joint. It was placed 2cm inferior and 1cm medial to the posterolateral tip of acromion. To locate this spot, the coracoid process is palpated with the middle finger and the posterior soft spot with the thumb. The superficial skin layer is to be incised with no.11 blade over the soft spot. A cannula and blunt trocar are inserted anteromedial and parallel to glenoid articular surface toward the coracoid process. The trocar is slide laterally immediately lateral to glenoid ridge to enter the joint. Suprascapular nerve is injured if it placed too medial and to axillary nerve if it placed too inferior and lateral.

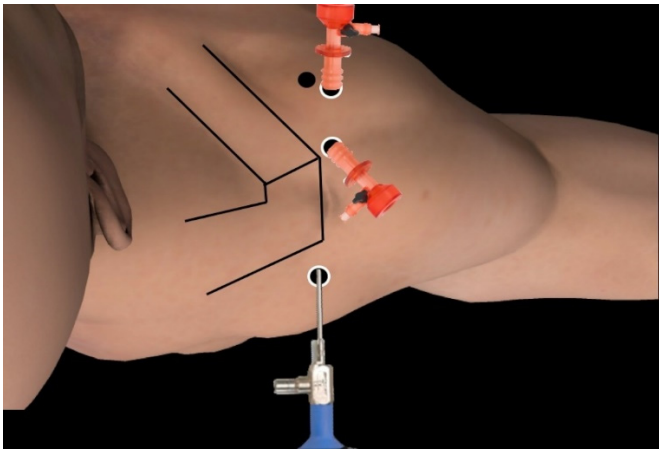


Anteroinferior portal

It is made by means of an outside-in technique using a wissinger rod. Spinal needle is inserted into safe triangle (by glenoid rim, subscapularis, biceps tendon). After confirming the spinal needle position, skin incision made and wissinger rod is inserted. Pass a 4.5mm cannula over the rod into the joint. The rod is removed to establish the portal.

Anterosuperior portal

It is located by viewing with the arthroscope in the posterior portal and then placing the 18-gauge spinal needle into the joint beneath the long head of the biceps tendon.



Shoulder arthroscopy instruments:

Operative procedure:

Through the posterior portal diagnostic arthroscopy was done, bankarts lesion was confirmed. Anterosuperior &/or anteroinferior portals are made. Switch the viewing portal to anterosuperior portal. The capsulo-labral tissue is mobilized from the anterior glenoid surface using a liberator or periosteal elevator. The goal is to mobilize the labrum such that it can be shifted to its anatomic position. The glenoid neck is abraded using a rasp for a vascularized bed.

Take a bite on the capsulo-labral tissue along with IGHL using suture passer. After drilling place, the first metal suture anchor of size 2.8mm at 5 0'clock position, 2mm on to the glenoid rim at the angle of 45 degree. Capsulo-labral tissue is secured with anchor using sliding knot. Second suture anchors are placed depends on the lesion and checked for bumper effect of repaired labrum. 2 to 3 suture anchors at a distance of 5 - 7mm apart are used

POST OP PROTOCOL:

0-2 weeks –

Arm sling pouch at all time

Pendulum exercise

Elbow and wrist mobilization exercises

3-4 weeks-

Flexion <160 degree

External rotation <30 degree

Internal rotation <45 degree

Scapular mobilization exercise

5-6 weeks-

Flexion <170degre

External rotation <45 degree

Internal rotation <45 degree

Abduction <45 degree

Use arm sling pouch during sleep

7-8 weeks-

Flexion to within normal limits

Abduction <90 degree

Avoid terminal external rotation &abduction

9-10 weeks-

External rotation to 90 degree

Rotator cuff strengthening exercise

Proprioceptive training

Weight bearing exercise

Follow up:

Regularly follow up at 2 weeks once for first 2 months and monthly once for next 4 months using Rowe score

Rowe score

Total -100

>90 -Excellent

75-90 -Good

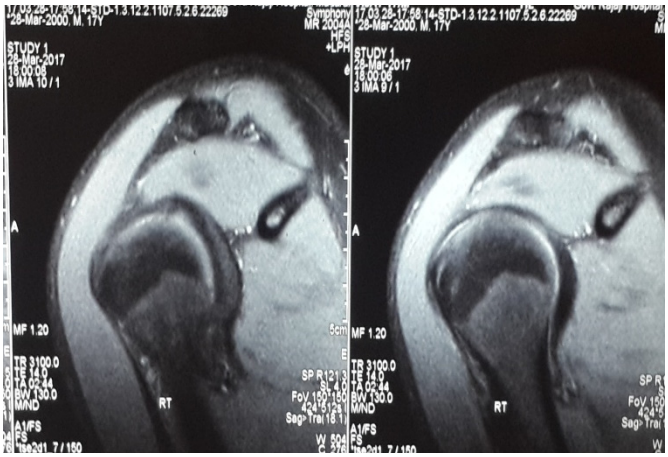
50-74 -Fair

<50 -Poor

STABILITY	**No subluxation or catching**	**50**
	Catching in certain positions	30
	Subluxation	10
	Recurrent dislocation	0
MOVEMENT	100%: anterior elevation (AE), int & external rotation	20
	75%: external rotation, anterior elevation; 100% IR	15
	50%: ER, 75%-IR & AE	5
	50%: ER, IR, AE	0
FUNCTION	Without limitation regarding work or sports	30
	Mild limitation	25
	Moderate limitation and discomfort	10
	Marked limitation and pain	0
TOTAL		100

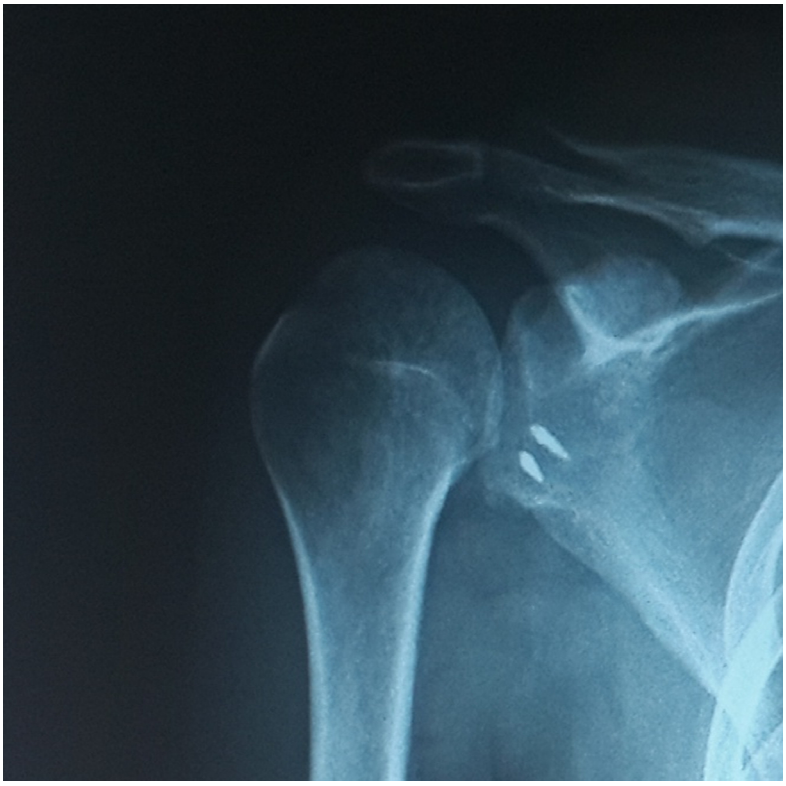
Case no:1

Vijay 19/m



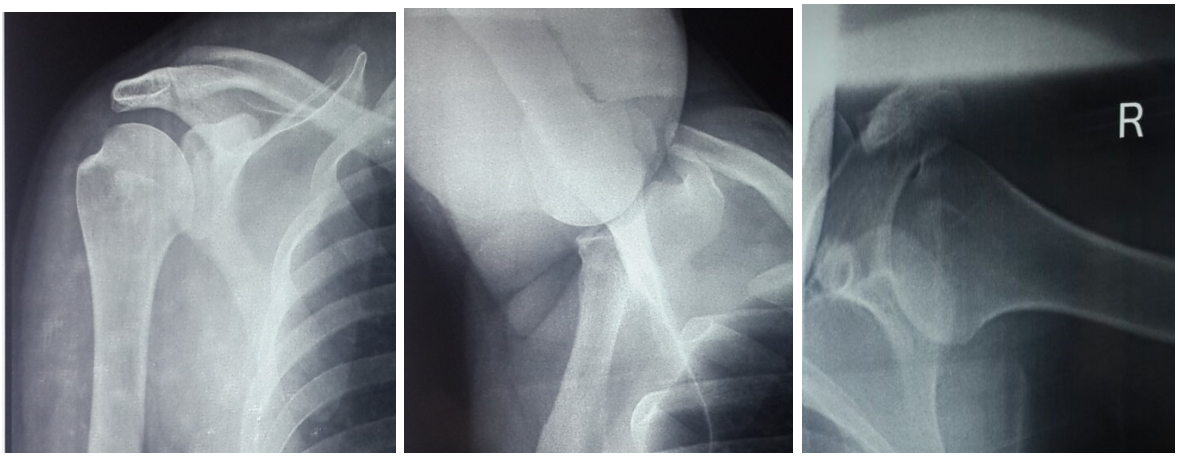
2 Months Follow Up

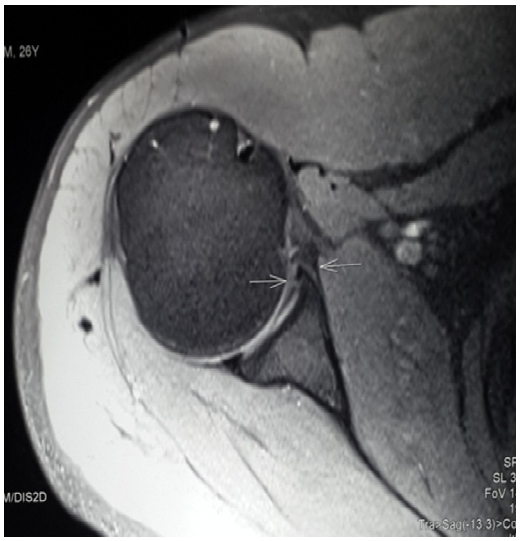
6 Months Follow Up

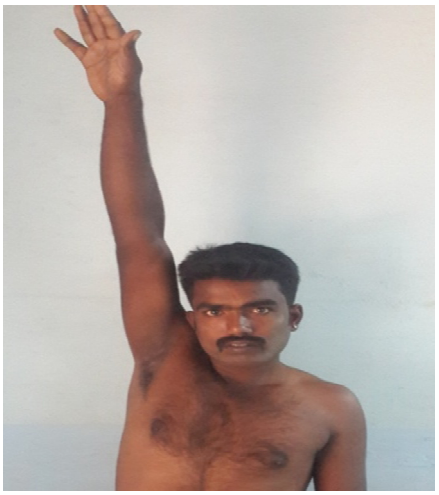


CASE NO:2

Victor 28/m

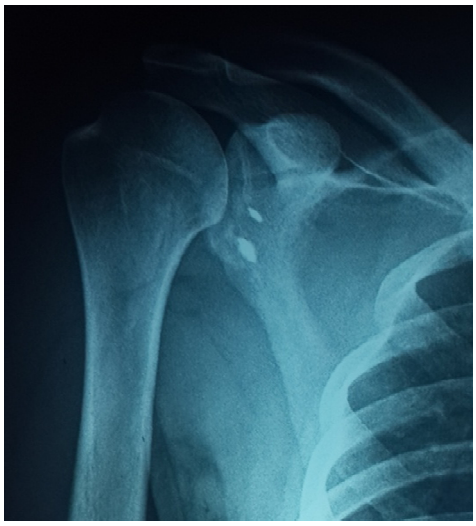






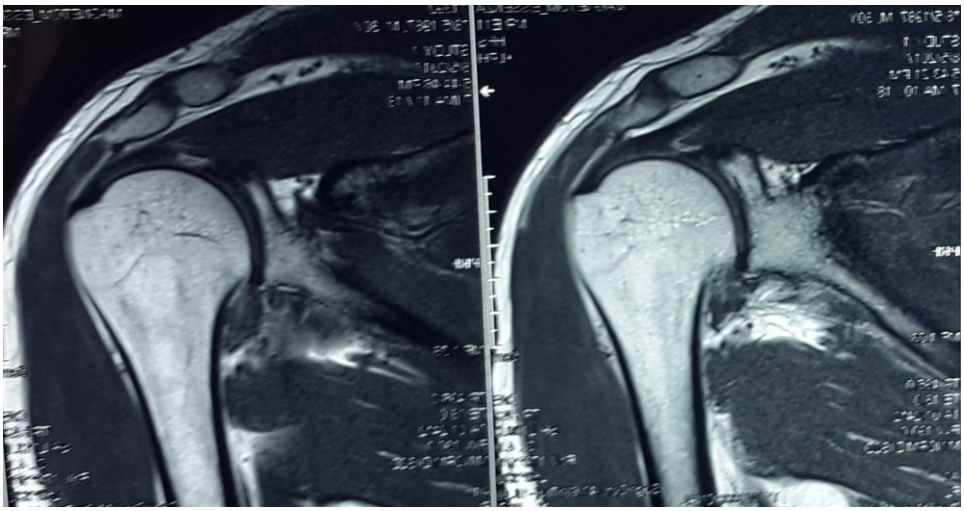
2 Months Follow Up

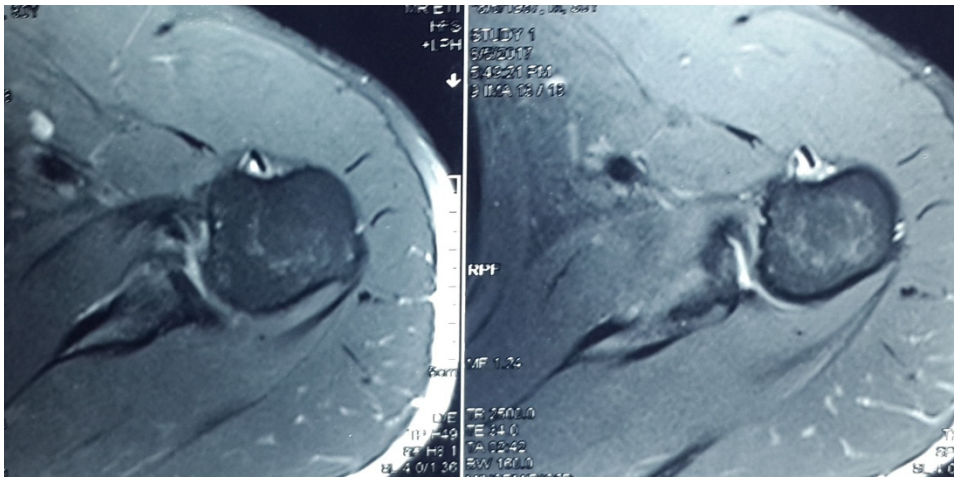
6 Months Follow Up



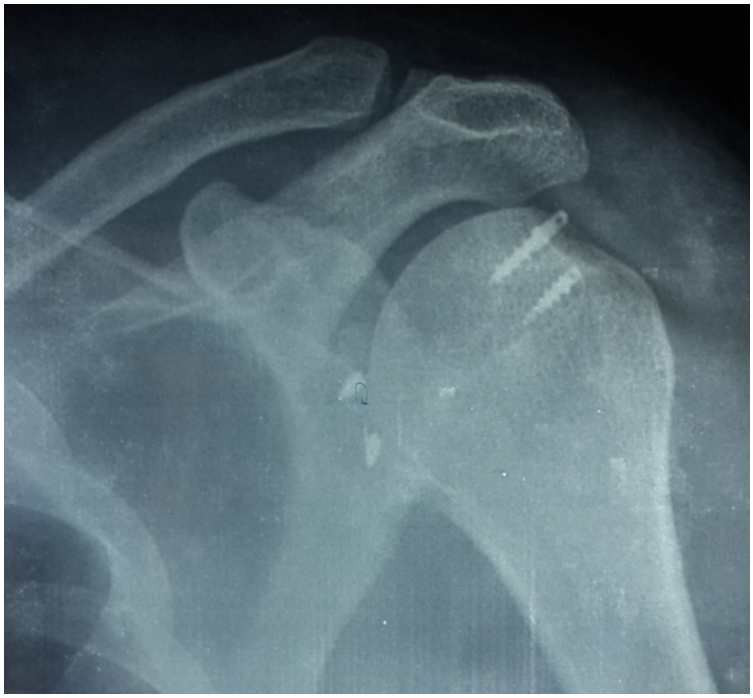
Case no: 3

Sivamurugan 28/m





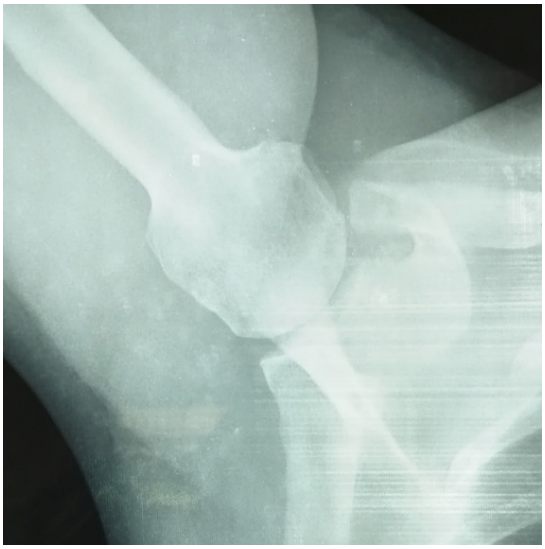
2 Months Follow Up

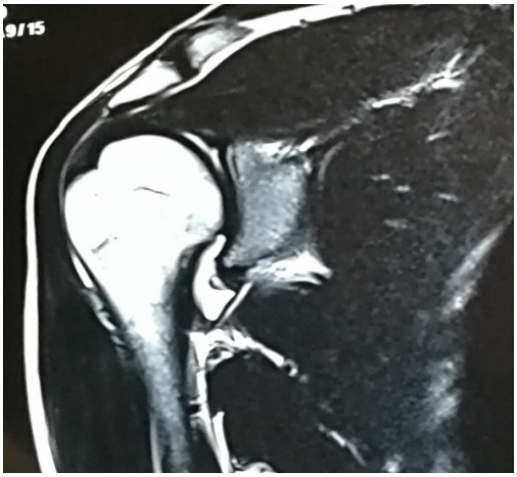


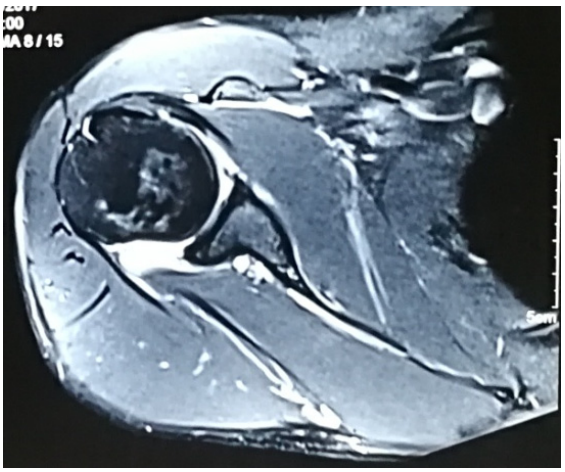
6 Months Follow Up

Case no.4

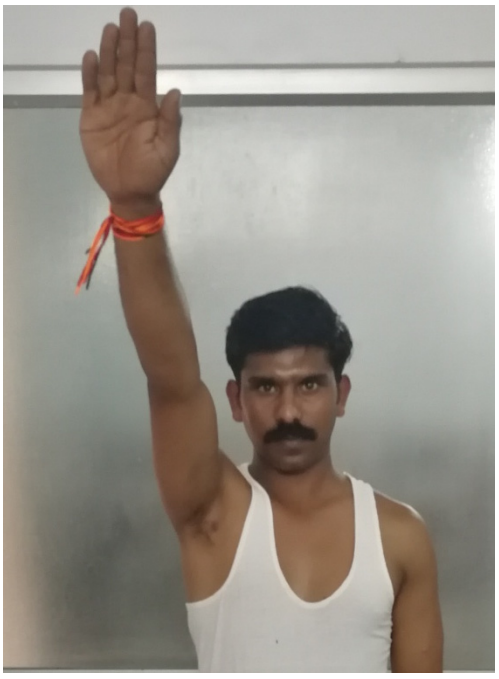
Rajeev 30/m

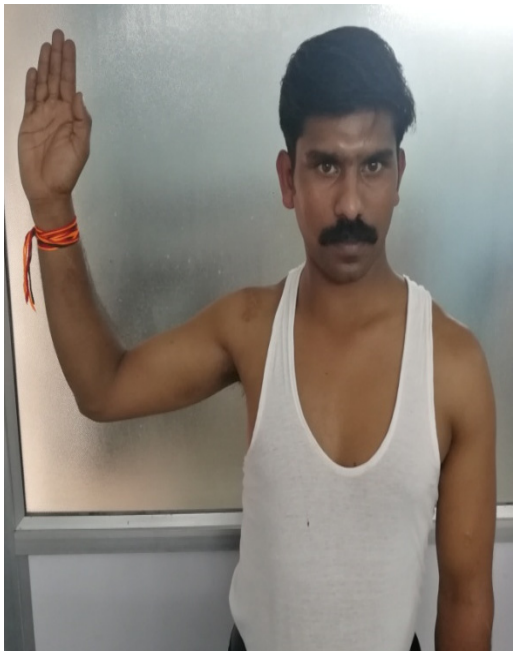


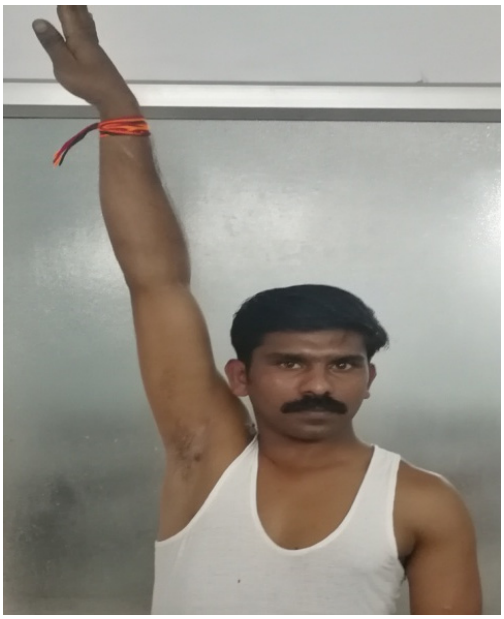


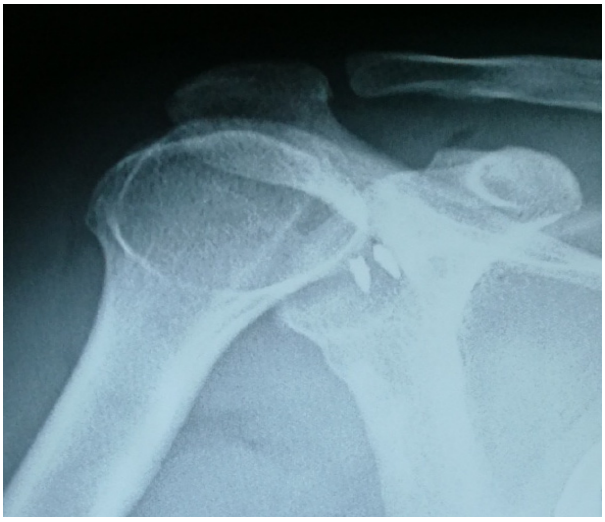



honor8Pro



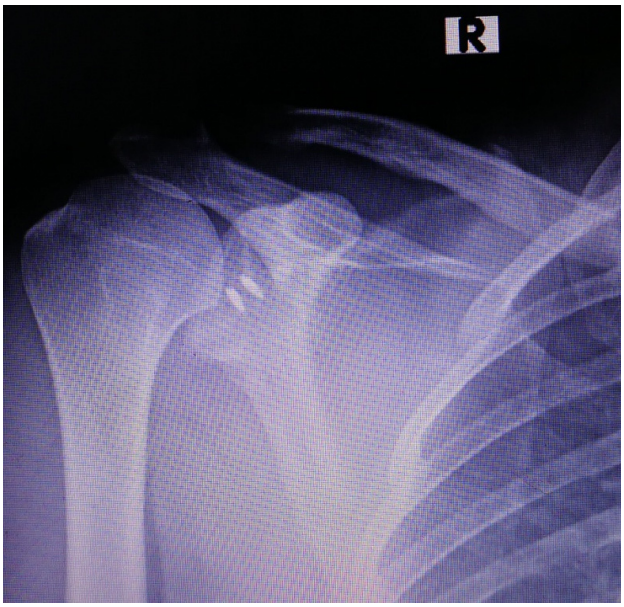






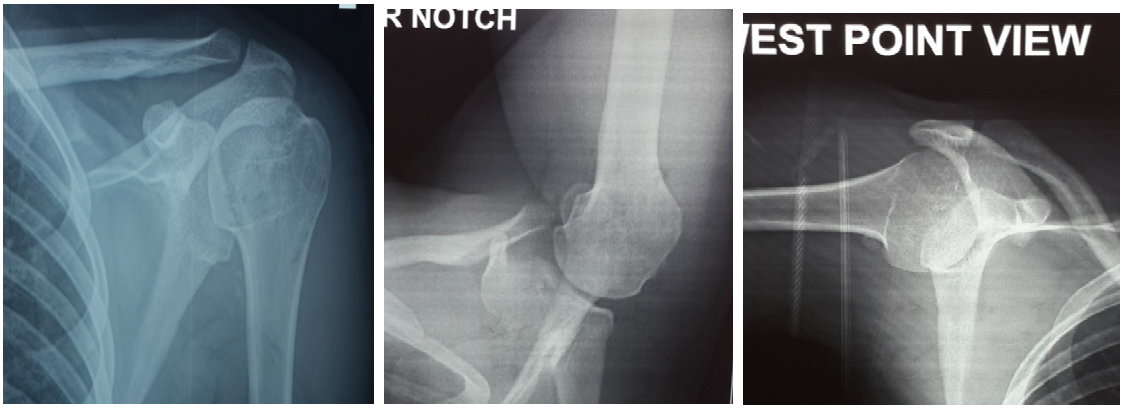
2 Months Follow Up

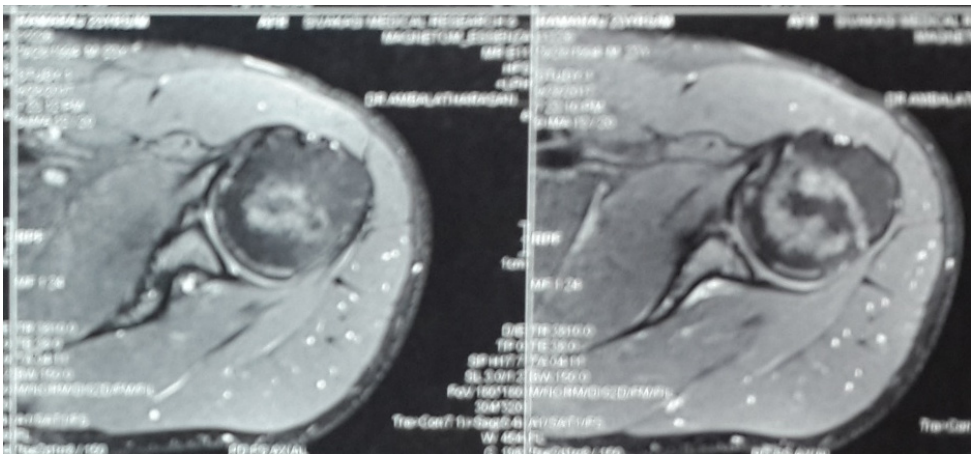
6 Months Follow Up

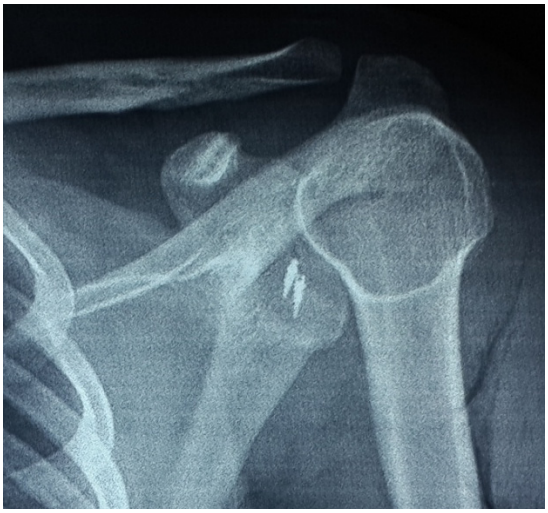


Case no.5

Ramraj 23/m







2 Months Follow Up

6 Months Follow Up

For single portal

MEAN AGE

Obs	Total	Mean	Variance	Std Dev
10.0000	329.0000	32.9000	122.3222	11.0599

Minimum	25%	Median	75%	Maximum	Mode
20.0000	23.0000	32.0000	41.0000	52.0000	32.0000

FREQ [MODE OF INJURY]

MODE OF INJURY	Frequency	Percent	Cum. Percent
RTA	3	30.00%	30.00%
Accidental fall	5	50.00%	80.00%
Sports injury	2	20.00%	100.00%
Total	10	100.00%	100.00%

Exact 95% Conf Limits

1	6.67%	65.25%
2	18.71%	81.29%
3	2.52%	55.61%

FREQ [NO OF DISLOCATIONS]

NO OF DISLOCATIONS	Frequency	Percent	Cum. Percent
4	3	30.00%	30.00%
5	1	10.00%	40.00%
6	1	10.00%	50.00%
7	3	30.00%	80.00%
8	2	20.00%	100.00%
Total	10	100.00%	100.00%

Exact 95% Conf Limits

4	6.67%	65.25%
5	0.25%	44.50%
6	0.25%	44.50%
7	6.67%	65.25%
8	2.52%	55.61%

FREQ [REDUCTION METHOD]

REDUCTION METHOD	Frequency	Percent	Cum. Percent
Native treatment	2	20.00%	20.00%
Closed reduction	8	80.00%	100.00%
Total	10	100.00%	100.00%

Exact 95% Conf Limits

1	2.52%	55.61%
2	44.39%	97.48%

MEANS [PERIOD OF IMMOBILISATION (weeks)]

Obs	Total	Mean	Variance	Std Dev
10.0000	32.0000	3.2000	0.4000	0.6325

Minimum	25%	Median	75%	Maximum	Mode
2.0000	3.0000	3.0000	4.0000	4.0000	3.0000

FREQ [NO OF SUTURE ANCHORS]

NO OF SUTURE ANCHORS	Frequency	Percent	Cum. Percent
2	10	100.00%	100.00%
Total	10	100.00%	100.00%

Exact 95% Conf Limits

2	69.15%	100.00%

FREQ [TIME TAKEN FOR SURGERY]

TIME TAKEN FOR SURGERY (mins)	Frequency	Percent	Cum. Percent
110	2	20.00%	20.00%
120	3	30.00%	50.00%
125	1	10.00%	60.00%
130	4	40.00%	100.00%
Total	10	100.00%	100.00%

Exact 95% Conf Limits

110	2.52%	55.61%
120	6.67%	65.25%
125	0.25%	44.50%
130	12.16%	73.76%

MEANS [TIME TAKEN FOR SURGERY]

Obs	Total	Mean	Variance	Std Dev
10.0000	1225.0000	122.5000	62.5000	7.9057

Minimum	25%	Median	75%	Maximum	Mode
110.0000	120.0000	122.5000	130.0000	130.0000	130.0000

FREQ [INTRA OP COMPLICATION]

INTRA OP COMPLICATION	Frequency	Percent	Cum. Percent
Nil	1	10.00%	10.00%
Fluid extravasation	9	90.00%	100.00%
Total	10	100.00%	100.00%

Exact 95% Conf Limits

1	0.25%	44.50%
2	55.50%	99.75%

MEANS [POST OP MOBILISATION STARTED]

Obs	Total	Mean	Variance	Std Dev
10.0000	29.0000	2.9000	0.1000	0.3162

Minimum	25%	Median	75%	Maximum	Mode
2.0000	3.0000	3.0000	3.0000	3.0000	3.0000

MEANS [ROWE SCORE]

Obs	Total	Mean	Variance	Std Dev
10.0000	795.0000	79.5000	35.8333	5.9861

Minimum	25%	Median	75%	Maximum	Mode
65.0000	80.0000	80.0000	80.0000	90.0000	80.0000

FREQ [ROWE SCORE]

ROWE SCORE	Frequency	Percent	Cum. Percent
65	1	10.00%	10.00%
80	8	80.00%	90.00%
90	1	10.00%	100.00%
Total	10	100.00%	100.00%

Exact 95% Conf Limits

65	0.25%	44.50%
80	44.39%	97.48%
90	0.25%	44.50%

For double portal

MEANS AGE

Obs	Total	Mean	Variance	Std Dev
10.0000	251.0000	25.1000	16.7667	4.0947

Minimum	25%	Median	75%	Maximum	Mode
19.0000	21.0000	26.0000	29.0000	30.0000	21.0000

FREQ [MODE OF INJURY]

MODE OF INJURY	Frequency	Percent	Cum. Percent
RTA	4	40.00%	40.00%
Accidental fall	3	30.00%	70.00%
Sports injury	3	30.00%	100.00%
Total	10	100.00%	100.00%

Exact 95% Conf Limits

1	12.16%	73.76%
2	6.67%	65.25%
3	6.67%	65.25%

FREQ [NO OF DISLOCATIONS]

NO OF DISLOCATIONS	Frequency	Percent	Cum. Percent
3	2	20.00%	20.00%
4	2	20.00%	40.00%
5	5	50.00%	90.00%
7	1	10.00%	100.00%
Total	10	100.00%	100.00%

Exact 95% Conf Limits

3 2.52% 55.61%

4 2.52% 55.61%

5 18.71% 81.29%

7 0.25% 44.50%

FREQ [REDUCTION METHOD]

REDUCTION METHOD	Frequency	Percent	Cum. Percent
Native treatment	3	30.00%	30.00%
Closed reduction	7	70.00%	100.00%
Total	10	100.00%	100.00%

Exact 95% Conf Limits

1 6.67% 65.25%

2 34.75% 93.33%

MEANS [PERIOD OF IMMOBILISATION (weeks)]

Obs	Total	Mean	Variance	Std Dev
10.0000	32.0000	3.2000	0.6222	0.7888

Minimum	25%	Median	75%	Maximum	Mode
2.0000	3.0000	3.0000	4.0000	4.0000	3.0000

FREQ [NO OF SUTURE ANCHORS]

NO OF SUTURE ANCHORS	Frequency	Percent	Cum. Percent
2	9	90.00%	90.00%
3	1	10.00%	100.00%
Total	10	100.00%	100.00%

Exact 95% Conf Limits

2	55.50%	99.75%
3	0.25%	44.50%

FREQ [TIME TAKEN FOR SURGERY]

TIME TAKEN FOR SURGERY	Frequency	Percent	Cum. Percent
80	1	10.00%	10.00%
90	5	50.00%	60.00%
100	3	30.00%	90.00%
120	1	10.00%	100.00%
Total	10	100.00%	100.00%

Exact 95% Conf Limits

80	0.25%	44.50%
90	18.71%	81.29%
100	6.67%	65.25%
120	0.25%	44.50%

MEANS [TIME TAKEN FOR SURGERY]

Obs	Total	Mean	Variance	Std Dev
10.0000	950.0000	95.0000	116.6667	10.8012

Minimum	25%	Median	75%	Maximum	Mode
80.0000	90.0000	90.0000	100.0000	120.0000	90.0000

FREQ [INTRA OP COMPLICATION]

INTRA OP COMPLICATION	Frequency	Percent	Cum. Percent
Nil	10	100.00%	100.00%
Total	10	100.00%	100.00%

Exact 95% Conf Limits

1	69.15%	100.00%

MEANS [POST OP MOBILISATION STARTED]

Obs	Total	Mean	Variance	Std Dev
10.0000	20.0000	2.0000	0.0000	0.0000

Minimum	25%	Median	75%	Maximum	Mode
2.0000	2.0000	2.0000	2.0000	2.0000	2.0000

MEANS [ROWE SCORE]

Obs	Total	Mean	Variance	Std Dev
10.0000	885.0000	88.5000	72.5000	8.5147

Minimum	25%	Median	75%	Maximum	Mode
75.0000	80.0000	92.5000	95.0000	95.0000	95.0000

FREQ [ROWE SCORE]

ROWE SCORE	Frequency	Percent	Cum. Percent
75	2	20.00%	20.00%
80	1	10.00%	30.00%
90	2	20.00%	50.00%
95	5	50.00%	100.00%
Total	10	100.00%	100.00%

Exact 95% Conf Limits

75	2.52%	55.61%
80	0.25%	44.50%
90	2.52%	55.61%
95	18.71%	81.29%

Comparison of single vs double portal

MEAN AGE

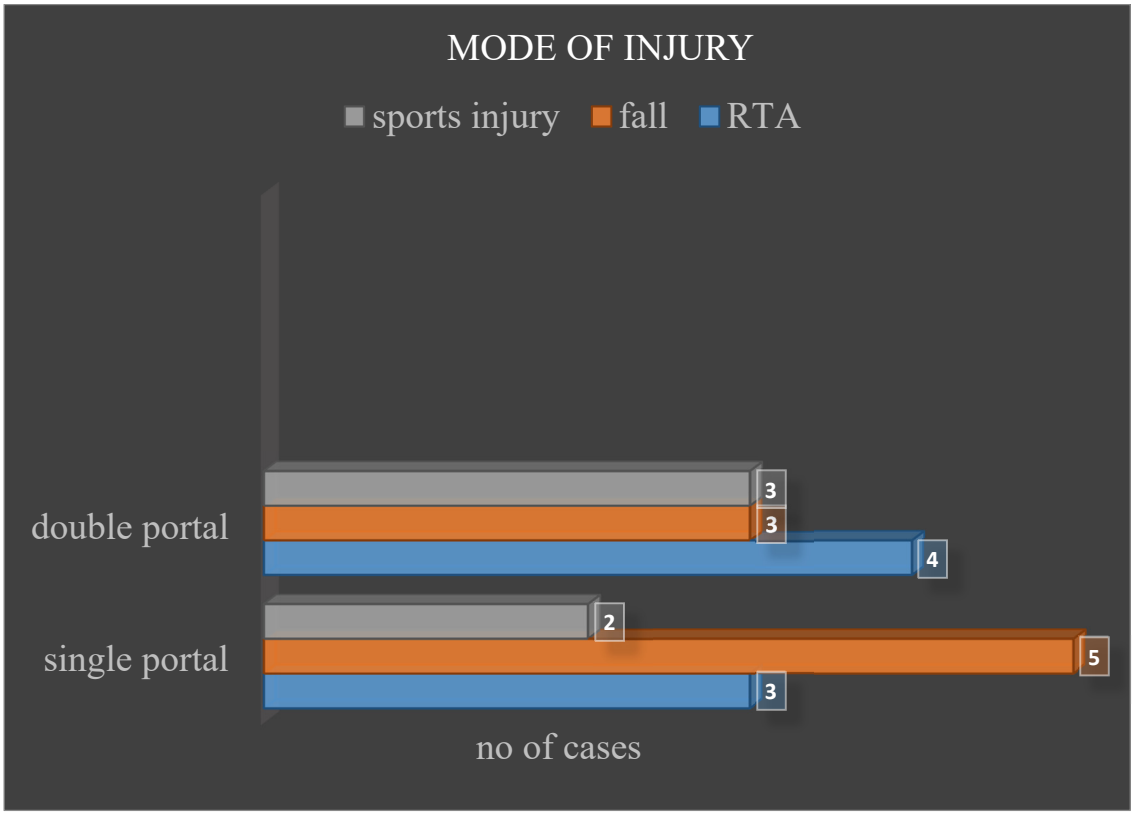
Obs	Total	Mean	Variance	Std Dev	
20.0000	580.0000	29.0000	81.8947	9.0496	
Minimum	25%	Median	75%	Maximum	Mode
19.0000	21.5000	27.0000	32.0000	52.0000	21.0000

FREQ [MODE OF INJURY]

MODE OF INJURY	Frequency	Percent	Cum. Percent
RTA	7	35.00%	35.00%
Accidental fall	8	40.00%	75.00%
Sports injury	5	25.00%	100.00%
Total	20	100.00%	100.00%

Exact 95% Conf Limits

1	15.39%	59.22%
2	19.12%	63.95%
3	8.66%	49.10%


MODE OF INJURY
sports injury
fall
RTA
double portal
single portal
3
3
4
2
5
3
no of cases

MEANS [AGE OF PROBLEM (months)]

Obs	Total	Mean	Variance	Std Dev
20.0000	398.0000	19.9000	179.7789	13.4082

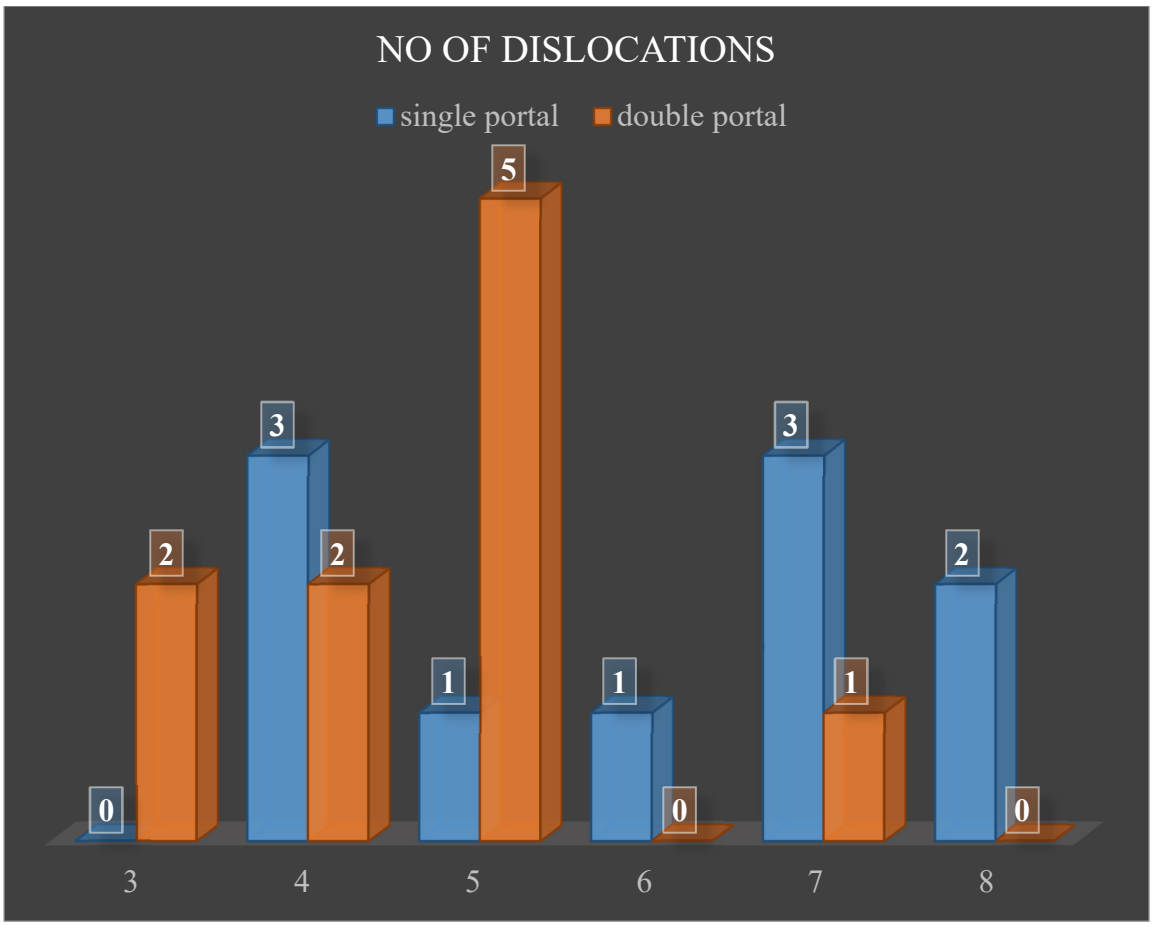
Minimum	25%	Median	75%	Maximum	Mode
7.0000	12.0000	13.5000	24.0000	60.0000	12.0000

FREQ [NO OF DISLOCATIONS]

NO OF DISLOCATIONS	Frequency	Percent	Cum. Percent
3	2	10.00%	10.00%
4	5	25.00%	35.00%
5	6	30.00%	65.00%
6	1	5.00%	70.00%
7	4	20.00%	90.00%
8	2	10.00%	100.00%
Total	20	100.00%	100.00%

Exact 95% Conf Limits

3	1.23%	31.70%
4	8.66%	49.10%
5	11.89%	54.28%
6	0.13%	24.87%
7	5.73%	43.66%
8	1.23%	31.70%


NO OF DISLOCATIONS
single portal
double portal
0
2
3
2
1
5
1
0
3
1
2
0
3
4
5
6
7
8

FREQ [REDUCTION METHOD]

REDUCTION METHOD	Frequency	Percent	Cum. Percent
Native treatment	5	25.00%	25.00%
Closed reduction	15	75.00%	100.00%
Total	20	100.00%	100.00%

Exact 95% Conf Limits

1	8.66%	49.10%
2	50.90%	91.34%

MEANS [PERIOD OF IMMOBILISATION (weeks)]

Obs	Total	Mean	Variance	Std Dev
20.0000	64.0000	3.2000	0.4842	0.6959

Minimum	25%	Median	75%	Maximum	Mode
2.0000	3.0000	3.0000	4.0000	4.0000	3.0000

FREQ [NO OF PORTALS]

NO OF PORTALS	Frequency	Percent	Cum. Percent
1	10	50.00%	50.00%
2	10	50.00%	100.00%
Total	20	100.00%	100.00%

Exact 95% Conf Limits

1	27.20%	72.80%
2	27.20%	72.80%

FREQ [NO OF SUTURE ANCHORS]

NO OF SUTURE ANCHORS	Frequency	Percent	Cum. Percent
2	19	95.00%	95.00%
3	1	5.00%	100.00%
Total	20	100.00%	100.00%

Exact 95% Conf Limits

2 75.13% 99.87%

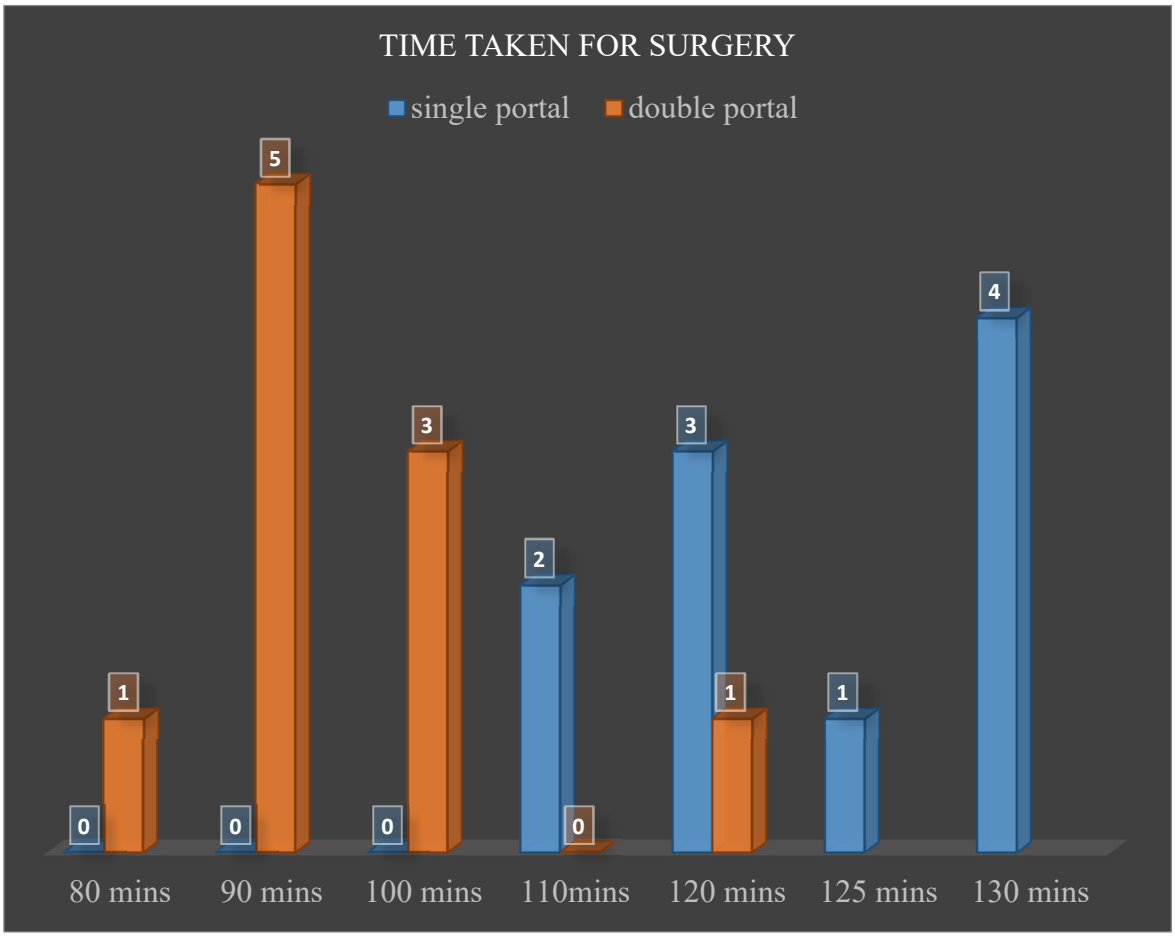
3 0.13% 24.87%

MEANS [TIME TAKEN FOR SURGERY]

Obs	Total	Mean	Variance	Std Dev
20.0000	2175.0000	108.7500	283.8816	16.8488

Minimum	25%	Median	75%	Maximum	Mode
80.0000	90.0000	110.0000	122.5000	130.0000	90.0000

P value of <0.001 with unpaired t test value of 6.497

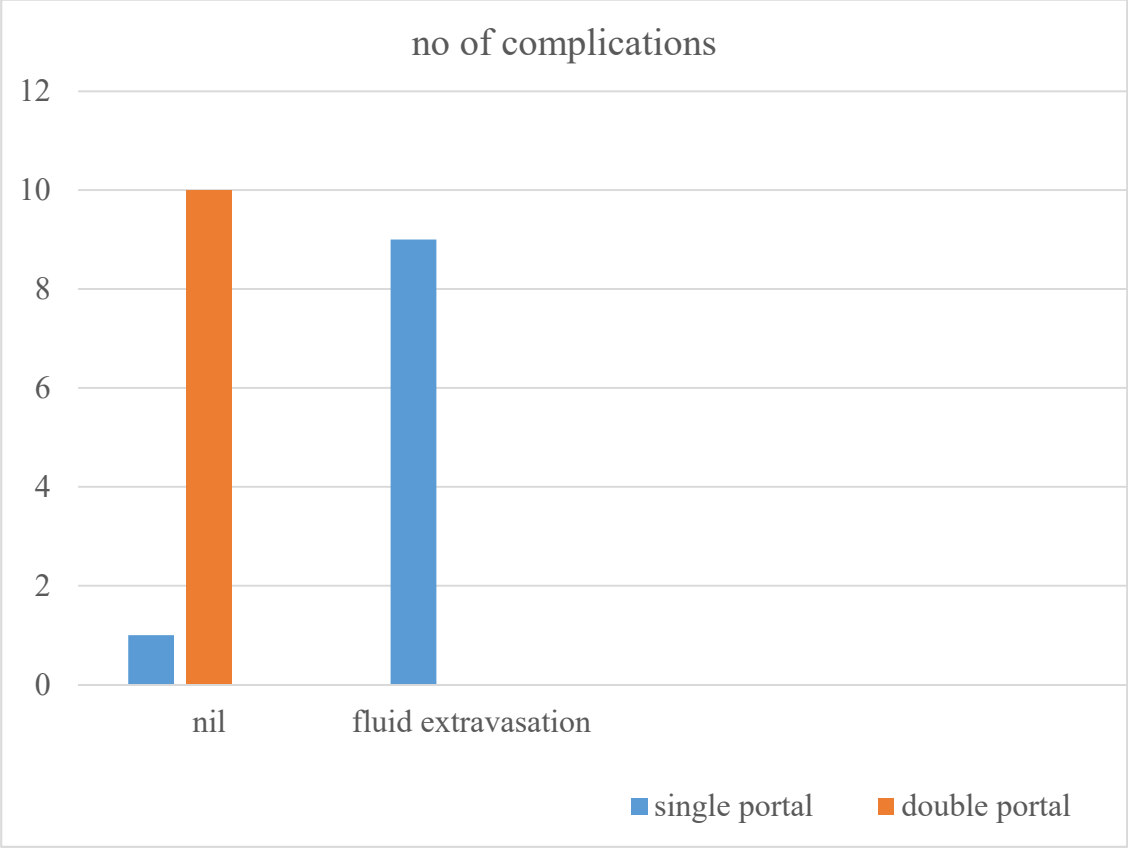

TIME TAKEN FOR SURGERY
single portal
double portal
0
1
0
5
0
3
2
0
3
1
1
4
80 mins
90 mins
100 mins
110mins
120 mins
125 mins
130 mins

FREQ [INTRA OP COMPLICATION]

INTRA OP COMPLICATION	Frequency	Percent	Cum. Percent
Nil	11	55.00%	55.00%
Fluid extravasation	9	45.00%	100.00%
Total	20	100.00%	100.00%

Exact 95% Conf Limits

1	31%	76.94%
2	23%	68.47%



MEANS [POST OP MOBILISATION STARTED]

Obs	Total	Mean	Variance	Std Dev
20.0000	49.0000	2.4500	0.2605	0.5104

Minimum	25%	Median	75%	Maximum	Mode
2.0000	2.0000	2.0000	3.0000	3.0000	2.0000

P value of <0.001 using unpaired t-test.

FREQ [ROWE SCORE]

ROWE SCORE	Frequency	Percent	Cum. Percent
65	1	5.00%	5.00%
75	2	10.00%	15.00%
80	9	45.00%	60.00%
90	3	15.00%	75.00%
95	5	25.00%	100.00%
Total	20	100.00%	100.00%

Exact 95% Conf Limits

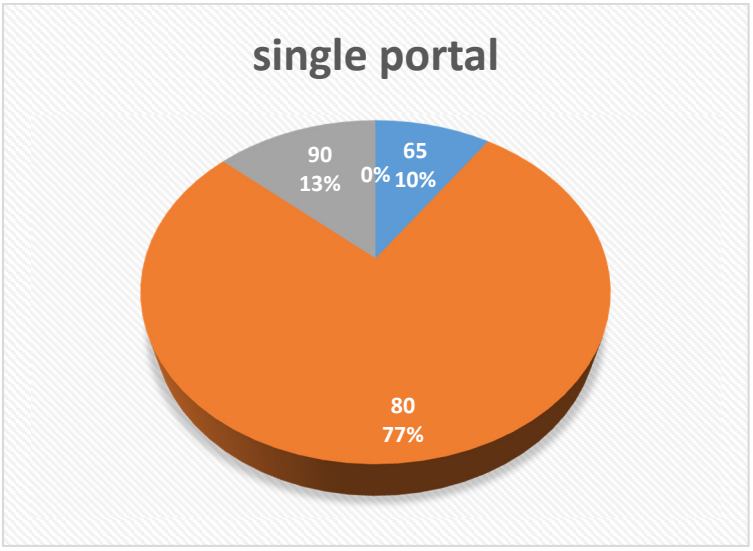
65	0.13%	24.87%
75	1.23%	31.70%
80	23.06%	68.47%
90	3.21%	37.89%
95	8.66%	49.10%

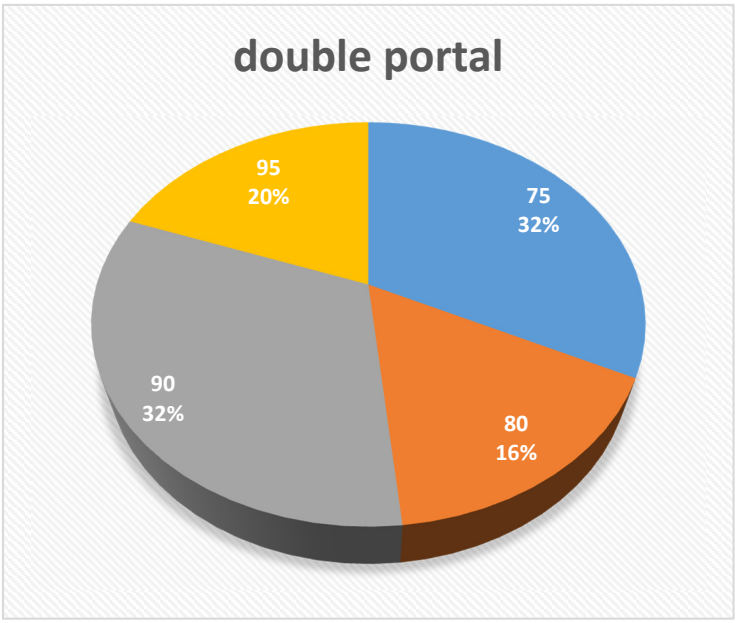
MEANS [ROWE SCORE]

Obs	Total	Mean	Variance	Std Dev
20.0000	1680.0000	84.0000	72.6316	8.5224

Minimum	25%	Median	75%	Maximum	Mode
65.0000	80.0000	80.0000	92.5000	95.0000	80.0000

P value of < 0.05 with unpaired t test value of -2.750





RESULTS

- Mode of injury dealt in this study were RTA, accidental fall and sports injury in both groups. Accidental fall was the most common occurrence, seen in 8 patients with the percentage of 40% followed by RTA in 7 patients with the percentage of 35%.
- Relatively younger individuals were offered double portal arthroscopic repair with the mean value of 25.1(25 years of age) and standard deviation of 4.09
- There was not much significance in the type of surgery adopted in the patients who were undergone closed reduction in hospitals and in native treatment by traditional bone setters.
- Most number of patients (6 patients) had five times of dislocations prior to surgery with the percentage of 30% and confidence limits of 54.28%.
- In the both groups, period of immobilisation following the first dislocation was mean value of 3.2 weeks.
- Arthroscopic repair by single portal was more time consuming than the double portal surgery with the unpaired t test value of 6.49 and p value of <0.001 since it was technically high demanding and required high surgeon s skill.

- Intra operative complications like fluid extravasation were more common in the single portal surgeries. Fluid extravasation into the tissues lead into more swelling which made quite difficult in reinserting the cannula. Thereby postoperative mobilisation was started in 3 weeks with the mean value of 2.9 which was slightly delayed when compared to the patients who were undergone repair by double portal technique with a mean value of 2 weeks.
- Excellent results of about 52% were observed in the patients who were undergone surgery in double portal technique, whereas only 13% in single portal surgery with the p value of <0.05.

DISCUSSION

There was no re dislocation in any patients of the both groups following arthroscopic bankarts repair.

Arthroscopic bankarts repair using single anterior working portal was possible due to the advent of sophisticated shoulder arthroscopic instruments like scorpion and arthropierce.

In single anterior working portal reduces the cost of second cannula.

In single working portal, placement of suture anchor at 6'o clock position was technically difficult and time consuming. Thereby fluid extravasation through anterior portal was real sequalae, outer migration of Cannula tip from the capsule due to extra vasation create in unfavourable environment to perform normal works through anterior working portal (Knot making and introduction of instruments). It is advisable to control extra vasation by reducing the surgical time and to control inflow of saline there by reducing intra articular pressure up to the optimum level for visualisation.

De Beer stressed the importance of using the outside strand for the post strand when tying the knot, because this places the knot outside the joint and rolls the soft tissues onto the edge of the joint, creating a pseudolabrum or buttress anteriorly. As it stands, the proposed use of a silastic catheter isolates the outside strand as a post strand for knot tying. This in turn places the knot in the proper position and facilitates the process

of tying the knot. A fine-bore silastic catheter is available in every operating room and does not add to the cost of the procedure. This modification also saves the cost of a second arthroscopic cannula.

In single working portal surgeries, placement of suture anchors at 6 o'clock position was difficult lead to prolongation of procedure. Thereby fluid extravasation was real concern.

CONCLUSION

Arthroscopic bankarts repair using double anterior working portal is gold standard, when comparing to single anterior working portal. Time consumption, intra and post operative complication are less in double anterior working portal.

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PROFORMA

Patient’s name

Age

Sex

Occupation

Address

Contact no

Ip. No

Date of injury

Mode of injury

Date of admission

INVESTIGATIONS: Complete hemogram,

Blood sugar, urea &serum creatinine

Bleeding time, clotting time

Ecg

Plain x-ray AP, Lat & special views of affected shoulder

MRI of affected shoulder

Age at first dislocation (age of the problem)

Closed reduction method used

Period of immobilization

No of dislocations

No of portals made

No of suture anchors

Time taken for surgery

Associated lesions

Diagnosis

Treatment

Date of surgery

Intra operative complications

Post-operative complications

Post op shoulder mobilization started at

CONSENT FORM

FOR OPERATION/ANAESTHESIA

I_____ Hosp. No._____ in my full senses hereby give my full consent for _____ or any other procedure deemed fit which is a diagnostic procedure / biopsy / transfusion / operation to be performed on me / my son / my daughter / my ward _____age under any anaesthesia deemed fit. The nature, risks and complications involved in the procedure have been explained to me in my own language and to my satisfaction. For academic and scientific purpose the operation/procedure may be photographed or televised.

Date: Signature/Thumb Impression

Name of Patient/Guardian: Guardian Relation ship

MASTER CHART

S. NO	AGE	MODE OF INJURY	AGE OF PROBLEM	NO OF DISLOCATIONS	REDUCTION METHOD	PERIOD OF IMMOBILISATION	NO OF PORTALS	NO OF SUTURE ANCHORS	TIME TAKEN FOR SURGERY	INTRA OP COMPLICATION	POST OP COMPLICATION	POST OP MOBILISATION STARTED	ROWE SCORE
1	27	fall	3years	4	native treatment	4weeks	2	2	90 mins	nil	nil	2 weeks	95
2	27	rta	1year	5	closed reduction	2weeks	2	2	100mins	nil	nil	2weeks	75
3	52	fall	2 1/2 years	7	closed reduction	4weeks	1	2	120mins	fluid extravasation	nil	3weeks	80
4	19	sports injury	7months	5	closed reduction	3weeks	2	2	80mins	nil	nil	2weeks	90
5	25	rta	15months	3	native treatment	4weeks	2	2	90mins	nil	nil	2weeks	95
6	24	fall	5 years	8	closed reduction	3weeks	1	2	110mins	fluid extravasation	nil	3weeks	80
7	39	fall	3 1/2 years	4	native treatment	4weeks	1	2	130mins	nil	nil	2weeks	80
8	30	rta	1year	4	closed reduction	4weeks	2	2	100mins	nil	nil	2weeks	90
9	30	rta	1 1/2 years	5	closed reduction	3weeks	2	2	90mins	nil	nil	2weeks	95
10	23	sports injury	2years	8	closed reduction	2weeks	1	2	120mins	fluid extravasation	nil	3weeks	90
11	22	sports injury	9months	3	closed reduction	2weeks	2	3	100mins	nil	nil	2weeks	75
12	21	sports injury	1year	5	closed reduction	3weeks	2	2	90mins	nil	nil	2weeks	95
13	32	rta	10months	4	closed reduction	3weeks	1	2	130mins	fluid extravasation	nil	3weeks	80

14	32	rta	1year	7	closed reduction	3weeks	1	2	125mins	fluid extravasation	nil	3weeks	80
15	21	rta	9months	4	closed reduction	3weeks	1	2	120mins	fluid extravasation	nil	3weeks	80
16	41	fall	2years	5	closed reduction	3weeks	1	2	110mins	fluid extravasation	nil	3weeks	80
17	29	fall	1year	5	closed reduction	3weeks	2	2	90mins	nil	nil	2weeks	95
18	20	sports injury	1 1/2 years	7	closed reduction	3weeks	1	2	130mins	fluid extravasation	nil	3weeks	80
19	45	fall	2years	6	native treatment	4weeks	1	2	130mins	fluid extravasation	nil	3weeks	65
20	21	fall	1year	7	native treatment	4weeks	2	2	120mins	nil	nil	2weeks	80

MADURAI MEDICAL COLLEGE
MADURAI, TAMILNADU, INDIA -625 020
(Affiliated to The Tamilnadu Dr.MGR Medical University, Chennai, Tamil Nadu)

ETHICS COMMITTEE CERTIFICATE

Name of the Candidate	:	Dr.G.Thiyagarajan
Course	:	PG in MS., Orthopedic
Period of Study	:	2016-2019
College	:	MADURAI MEDICAL COLLEGE
Research Topic	:	A study on comparative analysis of functional outcome of following Arthroscopic Bankart's repair using single vs double portal
Ethical Committee as on	:	21.11.2017

The Ethics Committee, Madurai Medical College has decided to inform that your Research proposal is accepted.

Member Secretary Chairman Dean/Convenor

DEAN
Madurai Medical College
Madurai-20

Prof Dr V Nagaraajan
M.D., MNAMS, D.M., Dsc.,(Neuro), Dsc (Hon)
CHAIRMAN
IEC - Madurai Medical College
Madurai

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