september 2008 - Issue - 1

IAS NEWSLETTER

Indian Arthroscopy Society

Editorial

Dr. Ashish Babhulkar

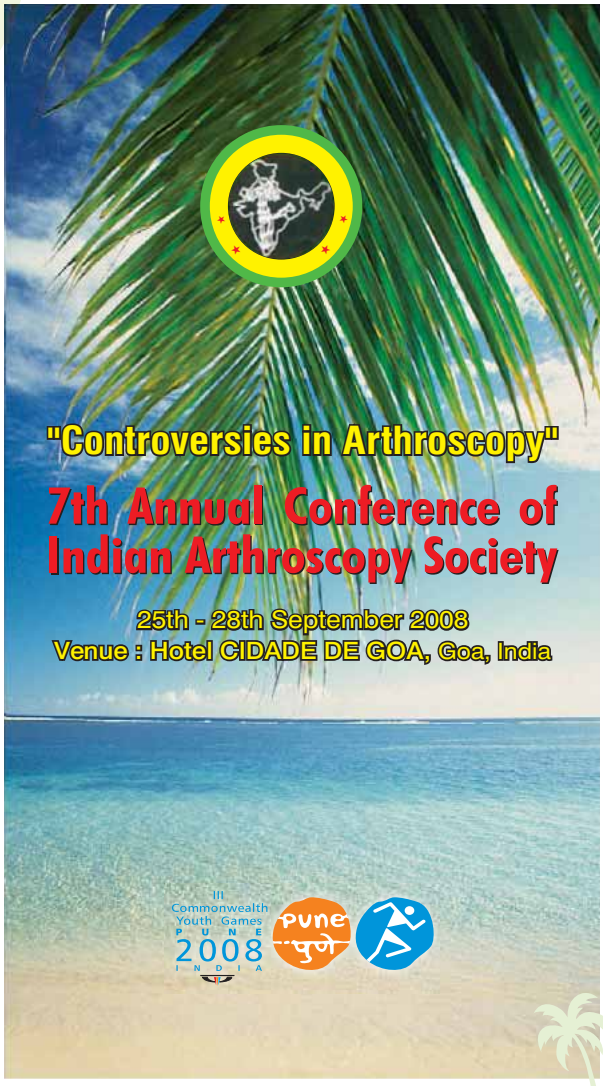
The knowledge corpus

Welcome to the newsletter of the Indian Arhroscopy Society. The newsletter comes to you just before the 7th IAS conference is about to begin at the luxury resort of Cidade de Goa from 25th September to 27th September 2008. Although the conference has an excellent academic programme which should satiate all the delegates, there remains a task unfulfilled. The vision to have the society's own journal over regular intervals still eludes us. We also need to address the training issues for the next generation of surgeons. Even this aspect will be covered by Dr David Rajan during the conference proceedings. The world of medicine is changing rapidly can we keep pace. Even more so are we the cause for the change or are we simple changing. I would like to believe that we have brought about the change - by design not accident.

The role of a journal or review publication is complimentary to that of an annual conference. All of us have to contribute to the growth of the Arthroscopy society rather than individual members. Only then will the bright Indian legacy proliferate. Time, inclination and effort are all required in equal measures but all the learned members need to put their combined wit and experience to realise this transition from a newsletter to a formal journal. A broad consensus on certain essential parameters maybe desirable, even essential, if the individual has also to be a significant part of the wider knowledge corpus - which all surgeons pooled together represent. The journal publication should not only make fascinating reading but also encourage a research paradigm. It will be a stage to display the enormous amount of work that is done in India and a common platform for academic celebration. No doubt the standards should be high, full of intellectual rigor and it should stand test of integrity & scientific probity

In some ways this newsletter is a predictor of times to come. This of course cannot be done without each of your individual contributions. I am immensely thankful to those who had contributed to this current newsletter at a very short notice. The foundation for the future was laid in the past by Dr.Nicholas Antao by dispatching IAS newsletter at regular intervals. We hope that this tradition will continue and evolve into a full fledged journal. There are others whose articles have been submitted in time but due to space constraints we will publish these in the next newsletter. I hope this will leave a good after taste and all of you enjoy the 7th IAS conference in Goa. May be you will want a second helping! Let the good times roll.

Content



Buy a good scope, make it last

Dr. C. V. Krishnakumar
Knee & Shoulder surgeon

Most doctors become doctors for the Simple reason that they have poor technical knowledge. When it comes to high tech instruments, that disadvantage increases. As far as routine orthopedic instruments are concerned, this is never a botheration. The mechanism of working of osteotomes and mallets has never been an issue.

But we, as arthroscopic surgeons, are in a different boat. What happens to light inside the arthroscope is an enigma to almost all surgeons, and the only thing that is obvious about shavers is the speed at which they rotate (if you choose to believe the numbers on the console)

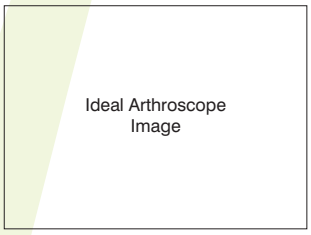
None of these facts make a difference in the lives of those who are already proud owners of this instrumentation, but for those who are going to buy a new one (or a second set), the question of where to put your money may be a costly one. Do you dare buy a used set? Add to that a big neighbor (who makes cheap copies of everything from I pods to ballistic missiles-read Ghauri) tempting us with cheaper versions of the same, and the roulette starts spinning at 12K in the oscillation mode. (Pun intended). keeping that old one ticking is also quite important.

So what do we look for in a used scope? (or a new one)

There are two ways

1. The Gandhi method
2. Kumar's technique

The Gandhi method (A time tested favorite for buying anything and


Ideal Arthroscope Image

everything. This method is meant for patriots who love the father of the nation so much that they always carry large bundles of paper with his face printed on them.)

Go for an expensive, branded instrument. Multinationals charge, they rarely cheat. Though they may not care much for you or your patient, reputation is paramount and bad publicity is a nightmare for them. They rarely cut corners. Whether the instrument is worth the money or not is not the question. You're paying for the brand and that's it.

Kumar's technique (for tightfisted misers and the economically challenged. A laborious process designed specially for government servants, greenhorns & wannabes with fresh smelling degree certificates, and children from underprivileged families who don't own their own hospitals)

It consists of the following steps

1. Look through the scope. Connect the scope to a camera and look at the TV image carefully. There should be no dark spots, blotches, lines, or dim areas.
2. All viewing to be done with a good camera & monitor, not with the naked eye
3. It's no use looking at a room. Since the aperture of the lens is small, the room will look dark. You have to look at a bright object like a sheet of paper, and that, too, with the light source connected.
4. Bring the sheet as close as possible to the lens and adjust the focus. That is, focus as close as possible to the lens tip. Scratches may show up.
5. Microscopy of the tip would be the best, but this may not be practical. But don't forget the magnification of the scope itself ! View the tip through another scope. Scratches are bound to show up.

"The best way to inspect any arthroscopy instrument is through the arthroscope itself."

6. Finally, compare the view , brightness and Colour with a good, new scope. Cheap scopes use cedarwood oil instead of DPX adhesive to hold together the lens system without air-gaps. This turns yellow with age. Invisible micro-scratches cause only a light loss and may not be visible even through a microscope at 10x . they just produce a comparatively darker image.
7. Instruments for measuring loss of transmitted light from the light source are available to assess whether the illumination system is working but this may not be practical. Comparison with another scope may help. Ideally, one should be able to clearly see an object at least 4 finger breadth's distant from the scope.
8. Waterproofing -watch out! a damaged scope kept in storage may not show any water droplets! So do these tests

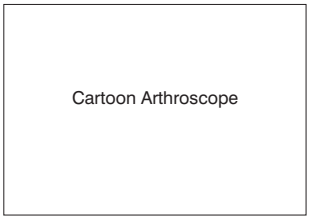
   The ether test Put a couple of drop of ether on the lens, wait a few minutes, and wipe off . look for condensation inside the scope

   24 hr water Immersion test (the gold standard) leave in water for a day and look for leakage/ condensation droplets in the scope
9. Eyepiece If everything else is alright, don't reach for superglue to fix that eyepiece. They're easily available and cheap- look up the net. A cracked eyepiece will not turn smoothly inside the coupler . **Screw off the old one and screw in a new**
10. Scopes can be fixed, but repairs may be costly. Scratch removal may be possible, but deep scratches may need lens replacement.

Care of the scope"make it last"

I sincerely hope that those of you who already own scopes have probably skipped the previous headings and are now tying to find out how to keep your precious instrument ship-shape. First I'd like you to tell you something about heat and the definition of the word

" hot". To the blacksmith, "hot" means a temperature of over 700 degrees. To the miner, only a temperature above 1000 can melt his raw material and to the doctor the temperature at which bugs meet their maker is 134 degrees, under pressure.


Cartoon Arthroscope

When the Germans proudly write "Autoklav" on the product, 134 is the temperature that they're talking about. So if you want, you can autoclave, but you cant put it in the flash autoclave. The "cement" used to keep the lenses in place is DPX . Though a single cycle will not destroy it, repeated heating will reduce the total life of the scope.

The best bet is a 24 hr formalin chamber, but cidex (glutaraldehyde) for half an hour will also do fine. If you're in a hurry, cidex OPA has a sterilization time of 15 minutes.

Wiping the lens on your apron is an equally bad idea. Remember the micro scratches that we were talking about? Well, this is how they're made. It causes a progressive loss of brightness & clarity that's hard to perceive. That's why an occasional peep through the cystoscope or Sinuscope with the same camera that you use would be a good idea.

Lens grade tissue paper is easily available in photography shops and these are the ones that'll help keep your view clear.

Per operative forceful manipulation is the easiest way to break a scope. Arthroscopic adhesolysis does not mean breaking the adhesions with an arthroscope . The journal of arthroscopy had conducted a study on scope breakage during forceful insertion into the posterior compartment through the intercondylar notch. It's smarter to use the stillete during these manouvres and re-insert the telescope once you're in the area of interest.

There have been reports of scopes breaking when dropped onto the floor. However, there have been no trials and these reports are hitherto unpublished in indexed journals. Those who insist on evidence based medicine are free to drop your scopes till North American or European journals conduct scientific studies on this subject. It would, however, be a good idea to make a habit of sheathing the scope with the protective plastic tube as soon as it's taken out, with the emphasis on the word "habit".

Needless to say, a careful surgeon always cleans his own instruments, and in no other field is this routine more relevant. Nurses and ward boys should not be entrusted with this job.

Hoping this info will help. Detailed reviews on the working of scopes, shavers, and the like are expected to come in the journal. Till then, happy scopy .

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De-misting Arthroscopes11# Knife

- The unsterile interface between the arthroscope & camera often fogs, spoiling the view on screen. As this area is under the sterile cover & hence unapproachable there is always a chance of compromising sterility in cleaning the arthroscope. A useful tip is to place a swab into the sterile tube drape before sealing the sterile cover. Place the swab just next to the viewing end of the arthroscope. If fogging occurs, one can delink the camera from the scope, without opening the sterile cover & clean both the opposing ends of scope & camera with the swab through the cover itself.

THROWING INJURIES & SLAP LESIONS

Clement Joseph J, David V. Rajan

Sports that require overhead arm action (e.g. volleyball, swimming, tennis) and throwing (eg. baseball, cricket, javelin) place significant demands on the shoulder. Approach to the athletic shoulder is quite different from that of normal shoulders. More than 50% of the force of throwing is generated from lower limbs and trunk rotations. The shoulder is the main link in this **kinetic chain**.[1,2] This article discusses the pathomechanisms involved in the problematic overhead shoulder and the prevention and management of superior labral lesions, which put an end to the athletic career.

KINEMATICS

Fig. 1
Deceleration (follow-through) phase - the most violent phase

The throwing action is divided into many phases. In the **wind-up** phase, the player gets ready with build-up of potential energy. During the **cocking phase** the player takes the arm high and back (abduction and external rotation). At this stage, the anterior capsule is stressed and rotator cuff, especially subscapularis is very active. The **acceleration phase** is from the cock-up position to the ball release. Though significant forces are generated in this phase, the shoulder is minimally stressed. The most violent phase is the **deceleration phase**, which is the arm follow-through, after the ball release. The arm is slowed down by the eccentric **contraction** (contraction while lengthening) of cuff muscles. During this phase the posterior capsule is stressed to maximum and is responsible for the **reactive hypertrophy** of the capsule resulting in **contracture** and **loss of internal rotation**.[3]

PATHOMECHANISM

Two schools of thought exist regarding the basic pathomechanism of the disabled shoulder. The first one regards the **stretched out anterior capsule** as the primary pathology.[4] The second one regards the **acquired posterior capsular contracture** resulting in a **glenohumeral internal rotation deficit (GIRD)** as the primary pathology. The latter is gaining widespread acceptance currently.3,5

Posterior Capsule tightness

Significant internal rotation loss occurs in dominant shoulders when the players are not doing proper stretching exercises. With the rotations of humeral head, the capsule and glenohumeral ligaments also move accordingly. During external rotation, the tight band of posteroinferior capsule comes to lie inferior to the humeral head and pushes the glenohumeral rotation point posteriorly and superiorly(fig2). This **altered resting position** clears the greater tuberosity off the posterosuperior glenoid and allows excessive external rotation. Because of the excessive external rotation, the long head of biceps starts to pull on the superior labrum from a posterior direction. This **altered force vector** of the biceps results in avulsion of superior labrum resulting in **SLAP lesions.**[3,5,6]

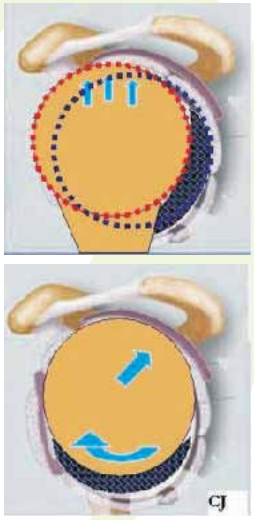


Fig.2 The tight posteroinferior capsule comes to an inferior position with external rotation and causes postero-superior shifting of gleno-humeral rotation point

ROTATOR CUFF PATHOLOGY

As we have already seen, the stress during **eccentric contraction** of rotator cuff can lead to fiber failure.[3] In addition, the excessive external rotation of humeral head causes twisting of the cuff fibers causing an additional **torsional overload**.[3] In extreme external rotation the articular side of posterosuperior cuff can impinge against the posterosuperior glenoid resulting in fraying and partial tears (**Internal impingement**).[7,8] All these mechanisms are involved in rotator cuff pathology and in athletic shoulders most of the rotator cuff problems lie on the articular side of the cuff, hence subacromian injections and acromioplasty rarely help.

BICEPS TENDON

Lesions of the long head of biceps could be minor fraying, partial or complete tears and subluxations. Subluxation is demonstrated by abducting and external rotating the arm while simultaneously palpating the tendon.

SCAPULA

The scapula and associated muscles provide the platform for the shoulder function. A **drooped and protracted shoulder** (tennis shoulder) is commonly seen in overhead athletes, which is due to fatigue of scapular muscles and heaviness of the hypertrophied playing arm. The malpositioned scapula can lead to **impingement pain** (altered acromion position, reducing the subacromial space) **coracoid pain** (traction tendinitis of pectoralis minor).[5] The scapula rhythm is observed as the athlete elevates both the arms. Winging or prominence of medial border also indicate scapular muscle imbalance The management consists of rehabilitation by strengthening, flexibility and plyometric exercises.1,2

NEUROLOGICAL PROBLEMS

Mononeuropathies involving suprascapular nerve and nerve to latissimus dorsi are commonly seen. The **suprascapular nerve** can sustain injuries due to **traction** due to overhead activity or compression by a **paralabral cyst** arising from a labral tear. If the suprascapular nerve is compressed at suprascapular notch, both supraspinatus and infraspinatus will be affected and if compressed at spinoglenoid notch only infraspinatus is affected. Clinical diagnosis is by observation of wasting and weakness on isolated muscle strength testing.9

INSTABILITY

Recurrent dislocations in the dominant shoulder preclude overhead athletic activity. Many an athlete have shoulders which are lax, but stable. **Laxity** (sign) should not be confused with **instability** (symptom). SLAP lesions can themselves create a **pseudolaxity,** which disappears after SLAP repair. Rarely a SLAP lesion occurs continous with a Bankart lesion. Gross **anterior capsular laxity** producing excessive external rotation (>1300) may need capsular plication.5 Any demonstrable anterior instability in a throwing athlete occurs as a tertiary phenomenon due to a tight posterior capsule and SLAP lesion.[3]

Table. EVALUATION OF ATHLETE SHOULDER - Outline

History	Involvement of shoulder in the particular sport, Training details, Overtraining? faulty techniques ? Expectations & Goals? **Pain** – aggravating & relieving factors, **Instability** – degree ? direction? frequency?
GENERAL	Posture, pelvic stability, spine- ROM, scoliosis & kyphosis, Hyperlaxity & Cervical spine examination – IVDP?
Scapula	Drooping, winging ,dysrhythmia, wasting
Inspection	Wasting, AC joint,
Palpation	Tenderness- biceps groove, GT, AC joint, Posterosuperior aspect & coracoid
Range of movements	Active & Passive, Compare, Painful range? **Rotations** - supine, arm at side (ER-S) and arm abducted to 900 (ER-A & IR-A)
Strength testing	Isolated strength testing of supraspinatus, infraspinatus, subscapularis & deltoid
Biceps	Fergusson's & Speed tests, subluxation in AB-ER position
Rotator cuff	Partial or Complete? Neer's impingement sign, Hawkins-Neer's test, Drop arm test
Instability	Anterior – Load & Shift test, Jobe's relocation test Posterior – Jerk test, Push pull test, MDI – Sulcus
SLAP lesions	Clicks? O'Brien's test, Jobe's test, Kim's biceps load test
Others	Local injections – Subacromial space, biceps groove and AC joint Adson's test, pulses - Thoracic Outlet syndrome NCS, EMG – neuropathies, MRI – Rotator cuff, labral tears and paralabral cysts

*Painful tests can be performed at the end of examination

*Painful provocative tests are highly positive if examined immediately after a game or exercise. Hence the athlete should be examined after a period of rest.

SLAP LESIONS

The labrum serves as an attachment point for capsule, glenohumeral ligaments and long head of biceps. It acts as a bumper and deepens the glenoid. The long head of biceps inserts into the supraglenoid tubercle as well as superior labrum. This biceps superior labral complex is disturbed in sports as well as other injuries. These lesions were first described by Andrews10 and later classified by Snyder, who gave the acronym **SLAP** (Superior Labrum Anterior Posterior)11. The superior labrum-biceps complex exhibits normal anatomic variations that should be distinguished from tears. (Fig 3)

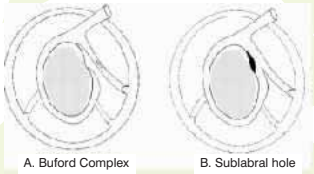


Fig 3. Normal variants

A. The Buford complex a thick MGHL originates from superior labrum and the anterior superial labrum is deficient

B. sublabral hole is present in 12% of normal shoulders

Classification

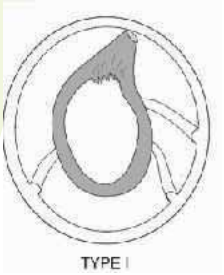
Type I - fraying of the superior labrum

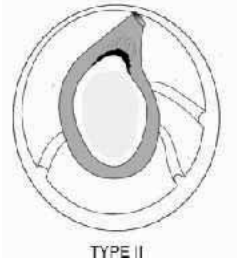
Type II - avulsion of the superior labrum off the glenoid.

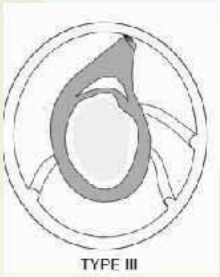
Type III - buckethandle tear of the superior labrum

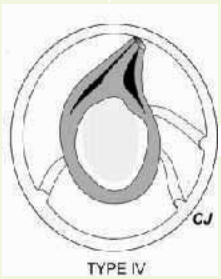
Type IV - The buckethandle tear of the superior labrum extends into the biceps anchor.

Other types include a combination of SLAP with Bankart lesion (Type V) and extension of superior labral tear into the anterosuperior capsule (Type VI)









Mechanisms of Injury

The many varieties of lesions suggest that more than one mechanism is involved in producing these lesions.

1. **Fall on outstretched hand.** A fall with abducted and forward flexed arm can cause the humeral head to compress against the superior labrum
2. **Traction injury:** Sudden inferior pulling of the arm as seen in water-skiing injuries can produce SLAP lesions[14].
3. **Torsional Peel Back:** In the cocking position (Abduction and Hyper-external rotation), the altered direction of pull of biceps tendon on the superior labrum can peel the superior labrum off the glenoid. This mechanism is also supported by recent biomechanical studies. This mechanism is responsible for the type II lesions seen in athletes.[3,6,12]
4. **Degeneration:** It is common to find degenerative changes of superior labrum as well as long head of biceps in the elderly athletes.

Diagnosis:

The diagnosis of SLAP lesions is clinical. SLAP lesions can be missed in routine MRI and a normal MRI does not exclude a SLAP lesion. The sensitivity of an MRI can be improved by an MR arthrogram with intraarticular gadolinium. On the other hand **no SLAP test is specific** and considerable overlap exists between other conditions like cuff, biceps and AC joint pathology.

O'Brien test (active compression test): In this test the subject's arm is forward flexed to 90o and adducted to 20o and internal rotated to maximum. The examiner places his hand over the forearm and applies a downward force and the patient is asked to resist it. The test is repeated with the forearm supinated. In a positive test, pain produced with pronated foream is reduced in supination. Pain, which is unaltered with supination, indicates other pathology like AC joint arthritis.[13]

Jobe's test: Initially described for instability, the pain produced in the abducted external rotated position is relieved by a posteriorly directed force (relocation maneuver) applied to the proximal humerus. This test is positive in posterior SLAP lesions[16]

Compression-rotation test: In this test, the shoulder is abducted to 900 and an axial compression force is applied by pushing the elbow and then the arm is rotated internally and externally. SLAP lesions produce pain, or crepitus with this maneuver.[14]

Anterior Slide Test (Kibler): With the subject's hand on his hip, the examiner stabilizes scapula with one hand and applies a superiorly directed force to the elbow and the patient is asked to resist the force. Pain or click indicates a positive test.[14]

Kim's Biceps Load Test: With the subject supine, the arm is abducted to 1200 and elbow flexed to 90 and forearm pronated, the subject is asked to flex the elbow against the resistance. Pain indicates positive test. [15]

PREVENTION

Having seen that the posterior capsular contracture being the root cause of SLAP lesions, most of them are preventable. There exists a stage of "SHOULDER-AT-RISK" in which the GIRD exists without any pathology. Posterior capsular stretching exercises (fig 6) at this stage will stop the progression to SLAP lesions. [3]

MANAGEMENT

The basic principle of treatment depends on whether the biceps anchor is intact or not. If the biceps anchor is detached it has to be reattached. Preoperative **stretching exercises** for posterior capsule are advised. Rotations are examined under anaesthesia; gross loss of internal rotation (IR < 250) may need selective **posteroinferior capsulotomy** at the end.[5,16]

Superior labral fraying in **Type I** lesions requires debridement alone. Avulsions of superior labrum (**Type II)** require reattachment of the superior labrum to the glenoid. This is accomplished by the placement of suture anchors into the glenoid and the repairing the labrum on to it. The glenoid and labral tissue are freshened before the repair. (Fig 5)

In **type III** lesions, the inner rim of the labrum is detached from the rest and the biceps' attachment to the labrum is intact. All that is needed is excision of the buckethandle segment. But in **Type IV** lesions, the buckethandle tear extends into the biceps root. The management depends on the involvement of biceps root. If the tear involves less than 50% of the biceps root, it can be excised and if it is more than 50% the torn segment is repaired to the remaining tissue

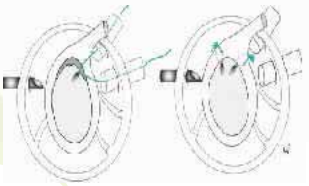


Fig. 5. The suture anchor is placed in the glenoid and one suture limb is taken into the labral tissue. Usually two suture anchors are required for a SLAP II lesion

REHABILITATION

After SLAP repair, pendular exercises are started from 3rd day onwards. Sling is used for 3 weeks. Posterior capsular stretching is continued indefinitely. Flexion, extension, passive external rotation with arm at side and posterior capsule stretching (sleeper stretches) are started immediately. (fig 6) onwards. External rotation in abduction is started from 4 6 weeks. Rotator cuff strengthening and biceps strengthening are started from 6th & 8th weeks respectively. Rehabilitation of scapula muscles is also given importance. Gradual return to full overhead activity by 7 8 months is advised. 5,16

Fig 6. Sleeper's stretch

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Arthroscopy Triangulation.

- It is a matter of experience in mastering triangulation skills. One can practice safely outside the patient by "scoping" a water melon and making portals to introduce a grabber to pick up the seeds.
- Another method to polish your skills and make the learning curve less steep is to hold the scope with the index finger pointing down its length. Hold the probe in a similar manner in the other hand. Imagine pointing both the index fingers at the target ex. Meniscus. The natural co-ordination of the index finger is so powerful that acquiring this 3-D orientation will be quicker. =Of course there is no substitute for practice.

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Traumatic dislocation of knee : an orthopedic conundrum

Vivek Pandey, P. Sripathi Rao

Introduction

Dislocation of knee, though uncommon, is a serious problem that might impair patient's return to physical employment and recreational activity. Awareness of possibility of multiple ligamentous injuries in the traumatized knee is the first and foremost step towards a successful management of an injured knee. Many of these are spontaneously reduced dislocations or near dislocations. The dislocated knee may not be initially recognized because of a spontaneous relocation. The fact to be kept in mind is that passage of time does not ensure stability. Moreover in spontaneously relocated joint, the severity of the ligamentous disruption may be underestimated.1 The situation is perplexing owing firstly to the relative infrequency of occurrence, which is duplicated by the paucity of literature on the subject.

Etiology

Low velocity trauma like sports injury contributes to less than 30% cases of knee dislocation, the major contribution (50%) is from high velocity trauma, sustained during road traffic accidents, industrial trauma or fall from more than five feet height. 2 More important is the fact that there is much higher incidence of injuries to popliteal artery, common peroneal and tibial nerve as well as peri-articular fractures in cases of high velocity trauma. Patients with these high-energy injuries often have other significant injuries to their head or chest, which precludes early aggressive treatment of their knee ligaments. 2 Low velocity injuries happen due to athletic trauma and fall from less than five feet height. Low velocity dislocations have a better prognosis because of fewer vascular injuries, lesser meniscal damage, and fewer osteochondral fractures. Rarely, ultralow-velocity dislocations occur during activities of daily living in morbidly obese patients. The markedly overweight body habitus presents unique treatment challenges. 3

Classification

Conventionally, knee dislocations are classified according to the position of the tibia in relation to the femur. Kennedy's classification system described knee dislocations as anterior, posterior, medial, lateral, and rotational. Anterior dislocations are most common (40%), followed by posterior (33%), lateral (18%), medial (4%), and rotational (5%). 4 This classification system is limited because most dislocations reduce spontaneously and do not provide the details of ligaments injured.

Schenk describes a KD (knee dislocation) classification system based on which ligaments are torn (Table 1) which was modified by others. 2,5,6

Type	Ruptured ligaments	Intact ligament
KD 1	ACL or PCL, Collateral	PCL/ACL
KD 2	ACL, PCL	Collaterals
KD 3 M	ACL, PCL, MCL	LCL
KD 3 L	ACL, PCL, LCL	MCL
KD 4	ACL, PCL, MCL, LCL	
KD 5	All + Periarticular fractures	

Subtype: N- neurological deficit ; V- vascular deficit

Table 1. Schenk classification of knee dislocation

This KD classification is useful with regards to a specific ligament diagnosis and associated fractures with or without neurovascular involvement. It provides a clearer picture for the management as type and severity of injury are specified.5,6

Associated injuries

Regarding the association of neurovascular injuries with knee ligament disruption, dictum is that the neurovascular status of the limb and its subsequent management should be performed under the assumption that a dislocation has occurred until proven otherwise.7 A knee dislocation should always raise suspicion for a possible vascular injury. The most serious, limb-threatening injury associated with a knee dislocation is popliteal artery disruption or thrombosis. As per the numerical values, there is 30-50% incidence of popliteal artery injury reported with knee dislocations.8 More commonly seen with high velocity injury, usually because of tethering of the artery between Hunter's canal and soleal arch.9 Incidence of nerve injuries with knee dislocations varies between 16% and 40%. 4,10,11 Tibial and common peroneal nerves are at risk of getting injured during dislocation of the knee. Common peroneal nerve injury is more frequent and might occur in both high and low velocity trauma. During high velocity trauma, axontmesis occurs that carries a poor prognosis, while low velocity trauma causes traction neuropraxia with a comparatively good prognosis. (Table 2). More or less, in 30% patients complete recovery, 30% partial and in remaining 30% no recovery can be predicted.

Evaluation

	Low velocity	High velocity
Type	Traction Neuropraxia	Severe axonotmesis
Prognosis	Good	Poor

Table 2. Comparision between low and high velocity nerve injury

Arthroscopic ACL reconstruction with Quadrupled Hamstring

- At time s the harvested hamstring graft is inadequate. A minimum length of 12cm is desirable. In such cases pursue the following
- Suture the short tendon to the central portion of the long tendon. When doubled, there would be for strands inside the knee joint
- Use a three stranded graft instead of quadrupled graft.
- Could switch over to bone- Patella bone graft instead.
- Can use the other leg provided appropriate consent is taken & opposite leg has been prepped.

Physical Examination

A knee dislocation is one of the few true orthopedic emergencies as a wide array of structures is typically injured; popliteal artery and peroneal nerve being at the highest risk. More than 50% of knee dislocations spontaneously reduce before a physician's evaluation. Immediate determination of perfusion status of limb, is of cardinal importance which at times can be limb saving. Examination to determine whether the knee joint is open or closed, dislocated, subluxated, or reduced, is the next step of evaluation. At this point of time, document the neurovascular status by noticing arterial (dorsalis pedis, posterior tibial) pulse, capillary filling, pin prick, temperature, sensation and movement. Reduce the dislocation, and repeat the neurovascular examination. A posterior splint should then be applied keeping the leg in extended or slight flexed position. Again the limb perfusion should be verified by serial examination of pulses and supplemented with an angiography, if required. Ecchymosis around the joint is a reflection of major ligament injury inside and is due to the extravasation of blood in the soft tissue space. (Fig 1) Compartment syndrome and delayed arterial thrombosis is a known phenomenon. So, repeated examination is the key. If the joint is subluxated, support it in 200 flexion and apply a splint in same position. If irreducible (usually postero-lateral), carefully look for medial skin dimple, lateral subluxation and widened medial joint space. This type of dislocation always requires open reduction due to button holding of medial femoral condyle through medial retinaculum.

Figure 1. Extensive Ecchymoses around knee

Investigations

X-ray: Antero-posterior (AP), lateral and oblique views are routinely obtained to look for peri-articular fractures, avulsion fractures (Segond's) and also to visualize the position of patella. Widened joint space can be the only radiographic indication of a reduced knee. High riding patella may indicate rupture of patellar tendon.

X-ray showing Segond's fracture

Magnetic Resonance Imaging (MRI):

Image (a)

Image (b)

MR images depicting bi-cruciate ligament injury (image a) and bi-collateral ligament injury (image b)

MRI is an important tool that assists in both diagnosis and treatment. Physical examination can be tricky and misleading because of pain, muscle spasm, swelling, ipsilateral fractures and vascular injuries. MRI illustrates the location and extent of ligament injuries, simultaneously distinguishing meniscal tears, bone contusions, occult fractures and capsular disruptions. It also helps in precise preoperative planning.

Arteriogram: A routine arteriogram for an injured knee is controversial and debatable as most of the studies have recognized clinical examination to be as good. 9,12,13 On clinical examination if pulse is not palpable, diminished even after reduction of dislocation, gradually diminishing on serial examinations or feeble Doppler (ABI<0.8) are definitive indications to perform an arteriography. (Table 3) Selective arteriography based on serial physical examinations is a safe and prudent policy following knee dislocation. There is a strong correlation between the results of physical examination and the need for arteriography. 6

However, if there is evidence of injury to three or more ligaments of knee, an arteriogram must be obtained to look for vascular integrity, in all cases. 14

Arteriogram	Arteriogram
required	not required
Absent distal pulse after reduction	Normal pulse
Decreased pulse after reduction	Low velocity injury
Gradually decreasing pulse after reduction	
Feeble Doppler or ankle brachial index< 0.8	

Management

Association of multi-ligament injuries with neurovascular compromise makes the precise management a challenging task. Immediate surgery is warranted in case of vascular disruption, open dislocation, compartment syndrome and irreducible dislocation. However, such situations are not very common. We have tried to group the various combinations as most common, difficult and special situations.

A) Most Common situation (Multi-ligament injury, reduced joint; no neurovascular deficit)

Obtain MRI to confirm the clinical findings. Allow skin to normalize, regularly perform serial vascular examinations. Then do an examination under anesthesia (EUA), repair collateral ligaments and postero-lateral corner. Immobilize for two to three weeks, after which mobilize in hinged brace. Once the joint is painless and range of motion is more than 900, posterior cruciate ligament (PCL) and anterior cruciate ligament (ACL) reconstruction, staged or simultaneously, is performed. Single stage reconstruction of all ligaments also has been attempted with success. However, it should be performed only when appropriate resources and skills are available.

11# Knife

- Especially in shoulder arthroscopy or ankle arthroscopy it is preferable to use a disposable 11# knife. As the shoulder is a deep joint changing the direction or twisting the knife can break the blade. Searching for half the blasé, or even worse, multiple pieces, is frustrating and deprives the surgeon of vital time meant for the surgery. A disposable 11# knife is unlikely to break and costs only about Rs. 60.

Multi-ligament injury

↓

Reduced joint; No Neurovascular deficit MRI

↓

Allow skin to normalise; serial vascular exam

↓

Examination under anaesthesia

↓

Repair collaterals & corners Immobilise for 2-3 weeks

↓

Mobilise in ROM brace

↓

Once painless ROM> 90 degree

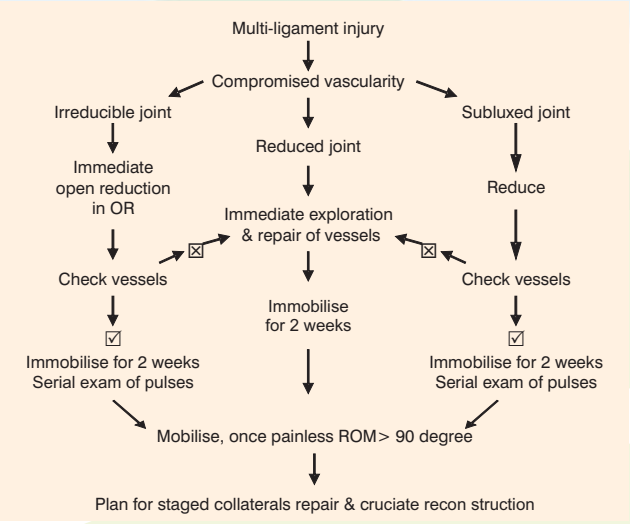
↓

Reconstruct cruciates: staged or simultaneous

B) Difficult situation (Multi-ligament injury, compromised vascularity)

This is a difficult situation where the dislocation is associated with compromised vascularity. The joint can be in reduced, subluxated or irreducible condition. On all occasions, after urgent reduction, utmost priority is given to the restoration of vascularity. Confirmed cases of vascular injury should be taken up for arterial repair. Urgent arterial bypass or reverse saphenous graft is done to restore vascularity as delay can result in amputation. Post vascular repair, fasciotomy of leg is a must to avoid compartment syndrome. Some surgeons prefer to repair collaterals in the same sitting. Cruciate reconstruction is always delayed; usually four to six months to let the vascular repair mature.

There are certain cases where vascularity returns after the reduction of dislocation. However, there is a chance of delayed arterial thrombosis due to intimal damage. Hence, serial clinical examinations are mandatory and if necessary, coupled with arterial Doppler evaluation. The joint is usually immobilized for two weeks in a hinged knee brace. Addition of low molecular weight heparin for prevention of arterial thrombosis is controversial in the waiting period. After two weeks, joint is mobilized in the hinged knee brace. Once painless movement of atleast 900 is achieved, collaterals and postero-lateral corner can be repaired or reconstructed. Later, cruciates are reconstructed. Immediate reconstruction of all injured ligaments is a major surgical task and should be attempted only when appropriate surgical skills and resources are available to prevent arthrofibrosis.



A) Special situation (Reducible joint but unstable; no neurovascular deficit)

This is a special situation where joint is reduced but unstable. It has to be stabilized by external fixators or Steinmann pin for four to six weeks. Later, after removal of fixators, mobilization has to be started prior to reconstruction of collaterals and cruciates.

Irreducible joint requires immediate open reduction in operation theatre. 15,16 The repair of collaterals can be done in the same sitting. Thereafter, immobilize the joint for two weeks. Mobilization is started after two weeks and once painless range of motion is more than 900, cruciate reconstruction has to be planned, staged or simultaneous.

Common peroneal nerve injury may recover spontaneously in low velocity injuries. However, recovery in the case of high velocity injury is guarded as in 28% cases there can be complete disruption of nerve. 17 In case of damage to short segment of nerve, upto seven cm, exploration and nerve grafting can be tried .17 In other cases of no recovery, tibialis posterior transfer is a favorable alternative with gratifying results.

Multi-ligament injury

↓

Reducible joint but unstable; No NV deficit

↓

Reduce, stabilise with exfix/steinmann pin; serial vascular exam

↓

Immobilise for 6 weeks

↓

Remove exfix, mobilise in ROM brace

↓

Reassess after 3-4 weeks once movement is regained EUA if needed

↓

Reconstruct collaterals, cruciates in staged manner

Rehabilitation

Accelerated rehabilitation protocol, which is carefully supervised with hinged bracing gives good result and prevents knee stiffness. 18 However, there is no fixed regimen for multi-ligament injured knee. It is tailored and individualized for each patient and is in harmony with other injuries like associated fractures and neurovascular injuries. But, for sure, the rehabilitation protocol for multi-ligament injury should be more carefully implemented than for isolated ligament injury. 2,12,18 Usually, patient is allowed for toe touch immediately after surgery for next six to eight weeks in hinged brace and can progress to full weight bearing by three months. For residual stiffness, mobilization under general anaesthesia or arthroscopic adhesiolysis can be performed between three to six months.

Complications

Multiple-ligament knee injuries are far more devastating than are isolated ligament injuries.19 Arterial thrombosis and compartment syndrome are limb threatening early complications, while arthrofibrosis, residual instability, post-traumatic arthritis and heterotopic ossification are among late complications of multi-ligamentous knee injury. Better understanding of surgical timing, improved surgical technique, and advanced rehabilitation protocols has led to decreased incidence of arthrofibrosis and subsequent motion loss after low velocity injuries. However, motion loss from high-energy, multi-ligament injuries continues to compromise functional outcome. 20

Outcome

Outcome studies report variable results with this injury as there are only small retrospective series with significant heterogeneity in injury patterns and treatment methodology. However, no series has reported a perfect outcome. 2,12,21 Low velocity sports injuries, early mobilization; early repair of collateral ligaments coupled with reconstruction of cruciate ligaments has a proven chance of better results.

Conclusion

Traumatic dislocation of knee is a complex injury challenging the skills of even the most experienced surgeons. It should be suspected in multidirectional unstable knee even with normal radiographs. The principal priorities in initial evaluation of this injury are neuro-vascular status of the extremity. The extent of ligamentous, capsular, extensor mechanism and meniscal injury is ascertained by thorough physical examination and imaging studies. Reliable surgical and functional results are expected with repair and reconstruction of ligaments. Simultaneous repair and reconstruction of collaterals and cruciates should be attempted only when optimum surgical skills coupled with technical support is available. Otherwise, primary repair of collaterals and capsule followed by delayed reconstruction of cruciates is perfectly acceptable option. Spectrum of complications could be narrowed by meticulous surgical technique and supervised rehabilitation protocol. Though the results of ligamentous reconstruction after dislocation of knee are improving with our better understanding of the injury, still the patients should not be given false hopes. A guarded prognosis for recovery of function and warning of the long-term risks of osteoarthritis and residual instability are the two important cornerstones of counselling the patient with multi-ligamentous knee joint injury.

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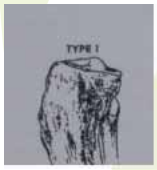
Simple And Effective Technique of Fixation of Tibial Spine Avulsion # With Pullout Suturing

Dr.Kothadia Swapnil D.(Orth) DNB(ORTH)

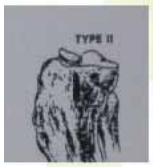
Introduction :-

The idea behind this article is to describe the use of simple, easily available instruments for fixation of tibial spine avulsion fracture. I have fixed 8 ACL avulsion fractures with pull out suture fixation with eithibond No.2 . I use only spinal needle gauge No.18 for fixing these fractures arthroscopically.

Meyer's and Mckeevers classified this fracture in 1959 as type I minimal or undisplaced fracture; type II partially displaced or hinged fracture, type III completely displaced fracture. It was modified further by Zaricznyj as type IV comminuted fracture.



Type I



Type II

Type III

Type IV

Type I is treated conservatively with cast and gives excellent results. But displaced fractures should be fixed surgically as they may land up in malunion, nonunion or restricted extension of knee.

Pull out suture fixation has been proved successful in comminuted fractures of tibial spine. I am fixing these fractures arthroscopically with use of eithibond No.2.

Material and Method:-

Eight tibial spine fractures have been fixed between Oct. 2006 to Jan. 2008 with arthroscopic reduction and pull out suture fixation. Two patients are of type II; three with type III and 3 patients with type IV. They have been operated between 5 to 30 days from the history of trauma. The average age was 23 years (15 to 30 years).

The mean follow up was 12 months

(6 month 18 months). All patients were presented with pain and swelling around knee with restricted movements. Clinically Latchman test was positive. Two of them have done MRI which shows avulsion of tibial spine with intact ACL.

Surgical technique.:-

Under spinal anesthesia and tourniquet with patient in supine position, anteromedial and anterolateral portals were made. Haematoma drained & diagnostic scopy was done to rule out any other associated injury. Then debridement and refreshning of fracture edges was done. The fracture was reduced with use of probe and moving the knee in extension and fixed with K- wire.

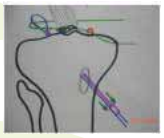
Then spinal needle gauge No. 18 passed inside from medial aspect of knee joint across the bundle of ACL to enter in lateral compartment (Fig1). Then ethibond No.2 was passed through the spinal needle across ACL and the needle was removed.


(FIG : 1)


(FIG :2)

The eithibond in lateral compartment was retrieved through anteromedial portal. (FIG 2). Then 2 tunnels were made in tibia with the use of ACL aimer jig. There should be bone bridge of at least 8 mm between two drill holes over tibial cortex7


(FIG :3)


(FIG :4)


(FIG :5)


(FIG : 6)

Two spinal needles with the loop of ethibond were passed retrogradely through tibial tunnels inside the joint to pull the ethibond down (FIG 3 ,4, 5). The K wire which holds the reduction was removed. The two ethibonds were then passed through the endobutton and knotted tightly while confirming the reduction and tension with the help of probe (FIG 6). (The probe can be used to hold or manipulate the fragment once K wire is removed.)

Postoperatively all patients were put in long knee brace and non-weight bearing walking for 3 weeks. Static quadriceps, ankle and SLR with brace started after 3 days postop.

Case - I


Pre op Type IV


Post op radiograph
Showing excellent reduction

Result: -

The average follow up was up to 12 months. Out of eight, seven patients did very well. Their ranges of movements were from active full extension to full flexion. None of these patients complains of instability or pain while walking. The time of union was between 8 weeks to 14 weeks.

One patient got arthrofibrosis and did not get good range of movements (15* 80*) This patient lost follow up after 8 months.

Discussion:

Tibial spine avulsion fractures are rare injuries by itself. Usually, it occurs in adolescent age group and mostly are isolated injuries.

All the 8 cases, I have managed, are displaced fractures that needed fixation surgically. In the literature review, fixation with cancellous screw or pull out wire suturing both gives good result. Cancellous screw fixation is better for large fragment fractures which holds the screw nicely. In this series, I have not documented the cases fixed with cancellous screws.

In this series, all the 8 cases includes are either comminuted or with small fracture fragment. All of these were fixed with pull out suturing using my technique of spinal needles.

The main idea in this article, is to explain that using simple spinal needles which also gives comparable results as expensive instruments does.


Pre Op Type II


Immediate post op radiograph
showing excellent reduction


10 months follow up with
good consolidation at fracture

Conclusion:

We can achieve excellent results using spinal needles for arthroscopic pull out suture fixation of tibial spine fractures.

With this simple and easily available indigenous instrument, we can drastically reduce the cost of instrumentation

Group Photo

Hotel Cedade De Goa

Highlights of 7th Indian Arthroscopy Society Annual Conference 2008
Organised by IAS, Pune 2008

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How to subscribe?

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Retrieval of loose bodies Arthroscopically

- Loose bodies once captured, are usually removed via the portal through which the grasper is placed. Often the portal is too small & one may struggle to pull the loose body successfully through it.
- Occasionally the loose body is lost, either back into the joint or worse; into the subcutaneous tissue. To avoid these problems, once the loose body is grasped, push it against a suitable area overlying skin, such that the skin tents. Cut down onto the loose body. It is much easier to push out, rather than pull out the loose body.
- Whilst pulling out the loose body keep the end of the grasper (With the loose body in it) continuously visualized. In case the grasper loses the loose body you will know exactly where it was dropped off.
- Offer surgery for symptoms of locking or catching & not merely because X-ray suggests a loose body. Pre-operatively warn the patient that the loose body may not be found. If it cannot be seen during arthroscopically, an arthrotomy is less likely to reveal it. On visualizing the intercondylar notch, push a finger into the popliteal fossa the loose body may appear in sight.

Shoulder

- When using a marking pen for the shoulder arthroscopy, mark the outer edge of the acromion and clavicle. As swelling sets in a marking on the inner side will mislead the bony edges.
- Using a twenty cc syringe one can inflate the Gleno-humeral joint without starting the fluid irrigation. The surgeon can perform a diagnostic round easily & the colours of tissues are much brighter. For example in a rotator cuff repair if there is no intervention required in the GH joint, unnecessary fluid irrigation could be avoided in the GH joint.
- Loose bodies in the shoulder tend to gravitate in the axillary pouch while operating in the beach chair position and in the Subscapularis pouch in the lateral position. If not found the surgeon may search for them in these places.
- Use minimal traction weight for the distraction of the joint for shoulder arthroscopy in lateral position. This will avoid post op brachial neuropraxia. Occasionally the nail bed circulation can be hampered due to excess weight. Using a pulse oximeter reading on the fingers after applying the traction apparatus will avoid this.
- The incisions for posterior viewing portal in shoulder arthroscopy must be made only fascia deep to allow the scope sheath to enter the shoulder joint. Unlike in the knee do not attempt to cut the capsule. This will prevent constant leakage of the joint fluid. The other portals must also be made smaller than the cannula to prevent fluid extravasation into periarticular tissues.
- Cannulas must ideally be clear & transparent. The ends of cannulas must be smooth as sutures can get cut off prematurely. The diaphragm of the cannula once damaged compromises the function of the cannula allowing for turbulence & Eddy currents distorting the intra-articular vision.

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