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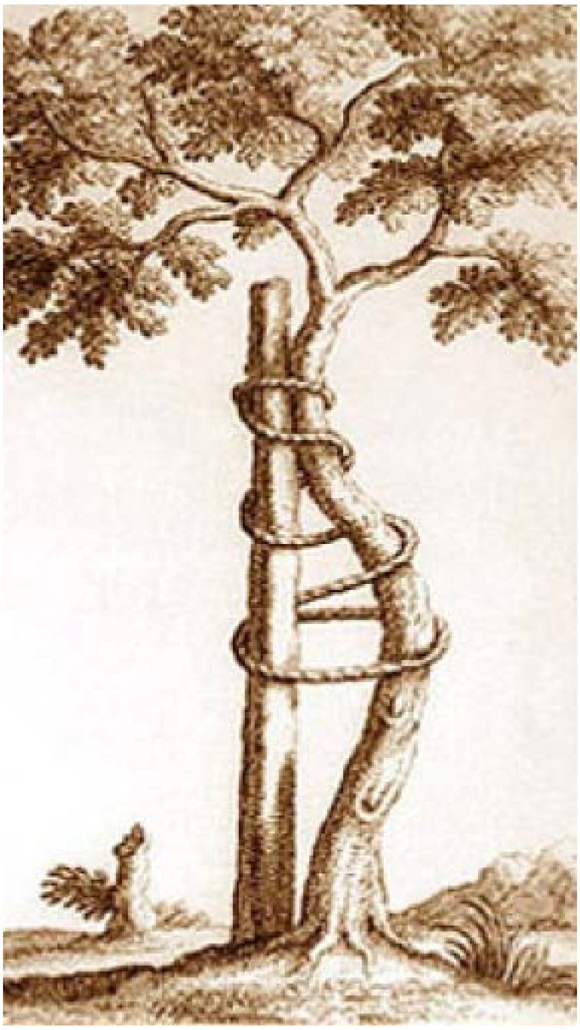

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Contents

1.Surgical Management of Hip Fractures: An Evidence-based Review of the Literature. Femoral Neck Fractures. Zuckerman. JAAOS Volume 16, Number 10, October 2008

Globally, the mean age of the population is increasing, and the number of hip fractures is expected to triple in the next 50 years. One-year mortality rates currently range from 14% to 36%.

Management of hip fractures is based on individual patient factors, such as preinjury ambulatory status, age, cognitive function, and comorbidities, and on fracture factors, including fracture type and the degree of displacement.

Treatment options include nonsurgical management, percutaneous fixation, closed reduction and internal fixation, open reduction and internal fixation (ORIF), and arthroplasty (ie, hemiarthroplasty, total hip arthroplasty

Nondisplaced Femoral Neck Fracture

Whether to manage nonsurgically or surgically is a topic of debate.

Elderly patients with medical conditions that place them at high risk for anesthesia- and surgery-related complications can be treated nonsurgically. Nonambulatory patients and patients suffering from severe dementia who have minimal discomfort may also be treated nonsurgically.

Surgical fixation for nondisplaced fractures allows early patient mobilization and ensures that a nondisplaced fracture does not subsequently displace.

An 86% union rate was reported in one study of 170 consecutive patients with impacted femoral neck fractures who were treated with early mobilization and weight bearing.6

Conn and Parker noted a nonunion rate of 6.4% and an osteonecrosis rate of 4.0% with internal fixation. In this study, the conversion rate to arthroplasty was 7.7%.

Displaced fracture neck femur

Internal Fixation

A recent review of the Cochrane database revealed: 9 None of the implants had significantly superior results for outcomes related to fracture healing, osteonecrosis, wound infection, pain scores, reoperation rate, use of walking aids, periprosthetic fracture, or mortality.

Shorter surgical times with cancellous screws (average, 11 minutes). There was a tendency toward increased blood loss (average, 84 mL), and deep wound infection with DHS [Dynamic hip screw].There was not a significant difference in mortality between the groups.

Based on the available evidence,there appear to be minimal differences between implants used for internal fixation of displaced femoral neck fractures

Internal Fixation Versus Hemiarthroplasty

Multiple studies have been done on the outcomes of internal fixation of femoral neck fractures versus arthroplasty (eg, hemiarthroplasty, THA).

The risk of osteonecrosis, nonunion, and revision following internal fixation of displaced intracapsular fractures must be balanced against the potential complications following arthroplasty.

A total of 2,091 patients treated with either internal fixation or hemiarthroplasty.

Eight studies assessed the length of surgery, and all reported decreased surgical time for the patients treated with internal fixation (average, 22minutes).15 Additionally, the internal fixation group had a more favourable outcome in terms of blood loss, need for postoperative blood transfusions, and infection rates. No differences between the groups were found regarding mortality rates, pain, or mobility; however, there was a higher reoperation rate with internal fixation than with hemiarthroplasty (31% vs 8%; relative risk,3.66).

The prosthesis group was notable for a high dislocation rate (7 of 47 patients). No differences in patient mortality were noted at either 2- or 5-year follow-up.

Parker et al17 reported on 455 patients randomized to either internal fixation or hemiarthroplasty and found no differences in outcomes for pain, mobility, or mortality at 3-year follow-up. However, the authors did note a lower rate of revision in the hemiarthroplasty group (5%) than in the group treated with internal fixation (40%).

Nonunion developed in 33% of patients, and osteonecrosis in 16%, with reoperation rates in patients who had IF

The current data indicate that internal fixation of femoral neck fractures is associated with a greater number of significant problems (eg, osteonecrosis, nonunion, revision) than is hemiarthroplasty.

Cemented Versus Cementless Hemiarthroplasty

Cemented fixation has become the preferred technique with current femoral components.

Numerous reports have documented improved outcomes with cemented implants.

Patients with cementless stems experienced a markedly higher level of hip pain and dependency on walking aids.

In a Cochrane database review, Parker and Gurusamy23 evaluated five trials with a total of 482 patients. Although there was no difference in complication or mortality rates, there was a higher rate of failure to regain preoperative mobility in the cementless prosthesis group.

Unipolar Versus Bipolar Hemiarthroplasty

A review of the Cochrane database included seven randomized trials involving 857 patients undergoing unipolar or bipolar hemiarthroplasty for femoral neck fracture. The results indicated no significant difference in acetabular wear, functional outcomes, length of surgery, blood loss, wound infections, or mortality.

The bipolar endoprosthesis provided no advantage in the treatment of displaced femoral neck fractures.

Surgical approach

Most frequently, an anterolateral or a posterior approach is performed. The question is whether there is an ideal surgical approach that minimizes complications and causes the least possible morbidity.

Sikorski followed for 2 years 57 patients who had undergone either an anterolateral or a posterior approach for displaced subcapital femoral fracture. A cemented Thompson prosthesis was used for all patients. The rates of dislocation, prosthesis loosening, acetabular protrusion, wound infection, and revision were similar between the groups. Of note, medical complications, including pneumonia, congestive heart failure, and urinary tract infections, were higher in the posterior approach group, as was postoperative mortality (25% vs 42% at 2-year follow-up).

The postoperative protocol followed at that time (ie, prolonged bed rest to prevent posterior dislocation) may have contributed to these findings.

Keene and Parker37 conducted a prospective study of 531 patients who underwent hemiarthroplasty with either an anterior or a posterior approach. The anterolateral approach was associated with increased surgical time (8 minutes longer), blood loss (54 mL), and superficial infection (6% versus 2.6%). However, the report also indicated that the posterior approach was associated with a higher dislocation rate (4.3% versus 1.7%) and more thromboembolic complications (9.2% versus 1.3%). There was no difference in hospital stay or mortality, and the authors suggested that surgeon comfort with the approach should dictate the exposure used.

Internal Fixation Versus Total Hip Arthroplasty

Indications for THA following a displaced femoral neck fracture have included the presence of pre-existing osteoarthritis, rheumatoid arthritis, and degenerative joint disease secondary to Paget’s disease. At 2-year follow-up, the complication rate (36% versus 4%, P <0.001) and revision rate (42% versus 4%, P < 0.001) were significantly higher in the internal fixation group than in patients treated with THA. Hip function in terms of quality of life (P < 0.05), comfort ($P < 0.005$), motion ($P < 0.05$), and walking ability ($P < 0.05$) were all significantly better in this group of independent, cognitively intact patients treated with THA.

The mortality rate at 2-year follow-up was 21% for both groups, with a higher mortality rate among men (33% versus 18%). Managing displaced femoral neck fractures with THA in the cognitively intact elderly patient is well-supported in the literature,

2. Volar Plate Fixation. J Bone Joint Surg Am. 2008;90:1297-1304.Ring

Plate fixation of the distal part of the radius is believed to improve wrist motion by allowing earlier exercises. We performed a clinical trial comparing mobilization of the wrist joint within two weeks (early motion) or at six weeks (late motion) after volar plate fixation of a fracture of the distal part of the radius 60 patients with an isolated fracture of the distal part of the radius that was treated with a single, fixed angle volar plate and screws were enrolled. Thirty patients were randomized to the early motion group, and thirty were randomized to the late motion group. Three and six months after surgery, patients underwent range of motion measurements, grip strength measurements, and radiographic evaluation. The patients also were evaluated according to the modified Gartland and Werley score and the Mayo wrist score, rated pain on a 10-point ordinal scale, and completed the Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire.

Results: There were no significant differences between the early motion group and the late motion group with regard to the average flexion-extension arc of the injured wrist at three months (104_ compared with 107_; p = 0.61) or six months (124_ compared with 126_; p = 0.65) after surgery. In secondary analyses, there were no significant differences in terms of selected other motions, grip strength, radiographic parameters, or the Gartland and Werley, Mayo, pain, or DASH scores.

Conclusions: The initiation of wrist exercises six weeks after volar plate fixation of a fracture of the distal part of the radius does not lead to decreased wrist motion compared with the initiation of wrist motion within two weeks after surgery.

3. Long Head of Biceps Tendon Pathology: Management Alternatives. Curtis. Clin Sports Med 27 (2008) 747–762

The long head of the biceps originates within the glenohumeral joint from the supraglenoid tubercle at the glenoid labrum. Habermeyer and colleagues[1] found the origin to be off the supraglenoid tubercle in 20% of cases, whereas 48% originated from the superior posterior aspect of the labrum, and 28% of tendons originated from both.

The course of the biceps tendon from its origin within the glenohumeral joint to the musculotendinous junction is approximately 9 cm long. The cross section of the tendon changes from flatter and slightly larger at the intra-articular portion to smaller and more circular into the groove portion.[1]

The amount of intra-articular tendon varies with arm position, with the maximum intra-articular tendon length of approximately 35 mm occurring with the arm in a position of adduction and extension.

As the tendon passes out of the joint, through the rotator interval, and into the bicipital groove, it is stabilized proximally by the ‘‘biceps pulley’’ mechanism, composed of the coracohumeral ligament and superior glenohumeral ligament. Reinforcing fibers from the subscapularis and supraspinatus tendons surround the biceps tendon at its entrance to the bicipital groove.

As it enters the bicipital groove, the tendon travels underneath the transverse humeral ligament formed between the greater and lesser tuberosities.

Cone found the anatomy of the intertubercular groove to have a depth of approximately 4.3 mm, ranging from 4 to 6 mm. The average length of the groove is 31 mm. The medial wall angle,as formed by the slope of the lesser tuberosity, averaged 56_, with a range from 40º

The tensile strength of a healthy tendon has been found to be between 150 and 200 pounds.[19,]

The blood supply to the long head of the biceps tendon originates proximally from branches of the anterior humeral circumflex artery and distally from branches of the deep brachial artery. Along the intertubercular sulcus, branches of the anterior circumflex

The primary function of the biceps muscle is flexion of the elbow and supination of the forearm. At the shoulder, it has been shown to be a weak abductor only with the arm in external rotation. The tendon’s role as a humeral head depressor and in glenohumeral stability is also highly debated

Release of the biceps tendon did not change the position of the humeral head.

In athletes, the shoulder and biceps tendons undergo a high amount of stress with overhead activities. It has been shown that there is increased biceps activity with an unstable shoulder, specifically in the overhead throwing motion.

PATHOLOGY

Shallow or oblique groove walls can increase the propensity for tendon subluxation and inflammation.This can lead to tendinosis.

Secondary biceps tendinitis occurs with associated as a result of impingement syndromes. Chen and colleagues39 also found that 76% of the tears were associated with pathology of the long head of the biceps, including all chronic tears.

Lafosse reported a 45% incidence of biceps stability, with 16% anterior instability

Arthroscopy is the gold standard for definitive diagnosis. A thorough evaluation of the glenohumeral joint and surrounding structures can be performed with arthroscopy.The origin, intra-articular portion, and, using a probe to pull, the inter-tubercular portion of the biceps tendon can be visualized. SLAP lesions, rotator cuff tears, pulley lesions, subscapularis tears, and arthritic changes can be identified.

MANAGEMENT

A combination corticosteroid and local anesthetic injection may be of value for diagnosis, injected into the subacromial space if rotator cuff pathology is suspected, intra-articularly if joint pathology may be a cause of symptoms, or into the biceps tendon sheath if pathology is felt to be isolated. One to 2 mL may be injected anteriorly along the bicipital groove at the point of maximal tenderness, taking care to avoid intra-substance injection into the actual tendon. Ultrasound may improve the accuracy of injection, but adhesions or synovitis within the groove may prevent effectiveness of the injection.

Arthroscopic debridement is a successful treatment option for grades I to II fraying of the long head of the biceps tendon when it is isolated or combined with minimal associated pathology in the shoulder. Grade I fraying is minor and involves less than 25% of the fibers. Grade II involves less than 50% of the tendon. Grade III is greater than 50% of the tendon, whereas grade IV is a complete tendon rupture. Grades III and IV may be treated with subacromial decompression and biceps tenodesis.

There is continued interest and controversy in the treatment of biceps tendon pathology with tenotomy versus tenodesis. Again, the patient’s age, activity and athletic level, as well as cosmetics must be taken into account. A simple biceps tenotomy may provide faster recovery and less surgery but may leave residual pain, muscle spasms, fatigue, or cosmetic deformity. Tenodesis requires more involved surgery and a longer, more difficult postoperative rehabilitation but may help to avoid cosmetic deformity or residual pain or spasms. Treatment will depend on the surgeon's and patient's preference and goals.

Mariani,[62–64] supported by other studies, showed in a series of 27 patients that when left unrepaired, the long head biceps tendon ruptures demonstrated a loss of 21% of supination strength and 8% to 20% of elbow flexion strength versus no loss of strength in the operatively repaired group.

Treatment of the biceps tendon pathology often depends on treatment of associated rotator cuff pathology. In a study of isolated arthroscopic biceps tenotomy or tenodesis for massive irreparable rotator cuff tears associated with biceps lesions, Boileau[61] demonstrated that either tenotomy or tenodesis could effectively treat severe pain or dysfunction. In another series of patients with average functional demand, Franceschi[74] showed that if the biceps tendon was included into the rotator cuff repairsuture, there was no difference in patient improvement with or without tenotomy at the glenoid.

Mazzocca: method preserves soft tissue and positions the biceps tendon in an anatomic position beneath the pectoralis tendon. It involves both arthroscopic and open techniques. Arthroscopic portals are established, and routine evaluation of the biceps tendon and intra-articular structures is performed. The proximal biceps is marked with PDS suture and then detached from its origin at the supraglenoid tubercle. It is removed completely from the bicipital groove. A short incision at the axilla is made to expose the inferior border of the pectoralis major muscle and to reach the long head of the biceps tendon.

A bone tunnel is created at the opening of the bicipital groove under the pectoralis tendon. A bio-tenodesis screw (Arthrex, Maples, FL) can be used to secure the tendon in the bone tunnel

4. Early Return to Surgery for Evacuation of a Postoperative Hematoma following TKA. Clarke. J Bone Joint Surg Am. 2008;90:2331-2336

Development of a postoperative hematomais a reported complication after primary total knee arthroplasty.
However, little is known about the clinical outcomes in patients who require surgical evacuation of an acute hematoma.
From 1981 to 2004, 17,784 primary TKA. 42 returned to the operating room within 30 days
Results: The rate of return to surgery within thirty days for evacuation of a postoperative hematoma was 0.24% . For patients undergoing postoperative hematoma evacuation, the two-year cumulative probabilities of undergoing subsequent major surgery (component resection, muscle flap coverage, or
amputation) or having a deep infection develop were 12.3%
Conclusions: Patients who return to the operating room within thirty days after the index total knee arthroplasty for evacuation of a postoperative hematoma are at significantly increased risk for the development of deep infection and/or undergoing subsequent major surgery. These results support all efforts to minimize the risk of postoperative hematoma formation.
The postoperative development of a wound hematoma is a known complication following primary total knee arthroplasty with minor and major bleeding rates reported to occur in 0% to 10% of patients. Only <1% needs wash out. While this is a low rate, the substantial morbidity associated with the development of a hematoma is clearly detailed in the results. The five-year rates of a subsequent major operation or deep periprosthetic infection in the study patients were 12.3% and 13.6%, respectively. In comparison, the five year rates of reoperation and deep infection in the remainder of the cohort were 0.9%
The absence of deep infection was assessed at the time of wash out by one of three methods: surgeon judgment at the time of evacuation if no cultures had been obtained at any point(twenty-two patients), preoperative aspiration with negative cultures (four patients), and negative cultures at the time of arthrotomy and hematoma evacuation (sixteen patients). We recommend that patients requiring hematoma evacuation have cultures obtained either preoperatively by means of aspiration or at the time of hematoma evacuation.

5.Cauda Equina Syndrome. Kim. J Am Acad Orthop Surg 2008;16:471-479

The term cauda equina, Latin for “horse’s tail,” refers to the terminal portion of the spinal cord and roots of the spinal nerves beginning at the first lumbar nerve root.

Cauda equina syndrome (CES) is a compression of some or all of these nerve roots, resulting in symptoms that include: Bowel and bladder dysfunction, Saddle anesthesia, Varying degrees of loss of lower extremity sensory and motor function.

Although a precise definition of CES has not been well established, most authors believe that an element of bladder dysfunction is required for the diagnosis.

Anatomy

The caudal end of the spinal cord is the conus medullaris and is attached to the coccyx by a thin non-neural filament, the filum terminale.

The conus contains the cell bodies and dendrites of the exiting L5 to S3 nerve roots.

The cauda equina is a collection of peripheral nerves (L1 to S5) in a common dural sac within the lumbar spinal canal.

During development, the spinal cord appears to migrate proximally because of the relatively greater growth of the vertebral spinal column. As a result, the first nerve roots that contribute to formation of the cauda equina, the L1 nerve roots, actually exit the spinal cord at the T10 vertebral level.

Bladder anatomy

Neurophysiologically, lesions involving the cauda equina are lower motor neuron lesions. Therefore, patients with CES may demonstrate varying degrees of lower extremity muscle weakness and sensory disturbance as well as decreased or absent reflexes.

Neurogenic bladder dysfunction is an essential element of CES.

The detrusor urinae muscle and internal sphincter of the bladder are smooth muscles. They are controlled by the parasympathetic nervous system via the S 2-4 nerve roots and the sympathetic nervous system via the hypogastric plexus (T11-L3).

The external sphincter of the bladder is a striated muscle that is controlled by the pudendal nerve, which arises from the S2-4

Bladder dysfunction can be divided into two broad categories: retention and incontinence.

CES causes a lower motor neuron lesion that interrupts the nerves forming those reflex arcs.

Consequently, patients lose both sensory and motor innervation to the bladder.

he loss of contraction and sensation leads to urinary retention and eventually to overflow incontinence.

Post discectomy: 1% and 6% of all lumbar disk herniations undergoing surgical treatment may present with CES In such a situation: All had a relative spinal stenosis at the involved level. Surgical re-exploration within 24 hours failed to identify a compressing hematoma, retained disk material, or any other apparent cause of ongoing thecal sac compression.

Causes of cauda equina

Disc, Stenoses, Trauma, Injury, epidural hematoma and abscess

Clinical

Patients with CES may present with a varying combination of signs and symptoms

Low back pain, Groin and perineal pain, Bilateral sciatica, Lower extremity weakness, Hyporeflexia or areflexia, Sensory deficits, Perineal hypoesthesia,Saddle anesthesia,Loss of bowel or bladder function. Early bladder dysfunction can be subtle and involve difficulty initiating the urinary stream. Dysfunction may then progress to urinary retention Eventually overflow incontinence, as mentioned.

2 distinct clinical presentations of CES: acute and insidious.

The acute presentation was characterized by the sudden onset of severe low back pain, sciatica, urinary retention requiring catheterization, motor weakness of the lower extremities, and perineal anesthesia.

The insidious presentation was characterized by recurrent episodes of low back pain occurring over periods of a few weeks to years, followed by the gradual onset of sciatica, sensorimotor loss, and bowel and bladder dysfunction. This latter presentation often occurs in the setting of long-standing spinal stenosis.

Signs

Sensation to pinprick in the perianal region (S2-S4 dermatomes), perineum, and posterior thigh is performed. These patients typically have preserved sensation to pressure and light touch, so if discrimination is not made between pinprick and light touch sensation, then the diagnosis of CES may be missed.

A rectal examination is performed on all patients with potential CES to assess the tone and voluntary contracture of the external anal sphincter. Decreased rectal tone is often an early finding in a patient with CES.

Both the anal wink test and a bulbocavernosus reflex should be evaluated.

The bulbocavernosus reflex is a segmental polysynaptic reflex with crossover in the sacral spinal cord (S1-3). The reflex is performed by applying pressure to the glans penis or clitoris and/or traction on the Foley catheter.

Measurement of a patient’s post void residual volume provides an accurate assessment of urinary retention.

Urodynamic studies should be performed in all patients both preoperatively and postoperatively, such a comprehensive preoperative evaluation is often not feasible, may delay treatment, and is not widely practiced.

The postoperative spine patient presents a unique clinical scenario to the practitioner. Increasing back pain followed by unilateral or bilateral leg pain may be potential signs of developing CES.

Treatment

Consensus exists that the most appropriate treatment of CES

Timing of Surgery

The optimal timing of surgery remains a topic of great controversy.

Traditional practice has been surgical decompression within 24 hours.

Kostuik found no correlation between the timing of surgery and the extent of neurologic or bladder recovery. However, despite a conclusion that decompression did not have to be performed within 6 hours, the recommendation was made that surgery be performed as soon as possible to prevent further potential progression of neurologic deficits.

The current literature does not demonstrate improved outcomes with surgery performed within 24 hours as opposed to within 48 hours.

6. Radiographic Measures as a Predictor of Ulcer Formation in Diabetic Charcot Midfoot. Tomlinson. Foot & Ankle International/Vol. 29, No. 6/June 2008

Plantar midfoot ulceration in diabetic patients with midfoot Charcot neuroarthropathy is a risk factor for infection that can require amputation. The aim of this study was to determine a simple radiographic predictor of the individual risk of subsequent ulcer formation in this group of patients. *Materials and Methods:* A retrospective review of all patients seen at our institution between January 1998 and July 2004 with diabetic Charcot neuroarthropathy was performed. Exclusion criteria were previous reconstructive foot surgery, absence of weightbearing foot radiographs and absent pedal pulses. Weightbearing anteroposterior and lateral radiographs were assessed using standard measurements. *Results:* Nineteen patients with radiographs of 24 feet were included. Fifty-eight percent were female, and the mean age was 54 (SD ± 13) years. Ninetyfive percent had type II diabetes mellitus, and the median duration of illness was 20 (range, 14 to 25) years. Midfoot ulceration and callus formation were seen in 6 (25%) and 2 feet, respectively. When radiographic measures of feet with and without midfoot skin pathology were compared, the lateral talar-first metatarsal angle was significantly associated with skin pathology ($p < 0.001$).
Conclusion: The lateral talar-first metatarsal angle measured on weightbearing radiographs is simple means of monitoring patients' risk of development of midfoot ulceration. Only patients with a lateral talar first metatarsal angle of greater than -27 degrees had an ulcer. This may be a clinically useful threshold for increased

Stages are:

stage 0, prodrome, an acute sprain or fracture in a patient with neuropathy which places them at risk of development of Charcot neuroarthropathy;

stage I, developmentfragmentation,

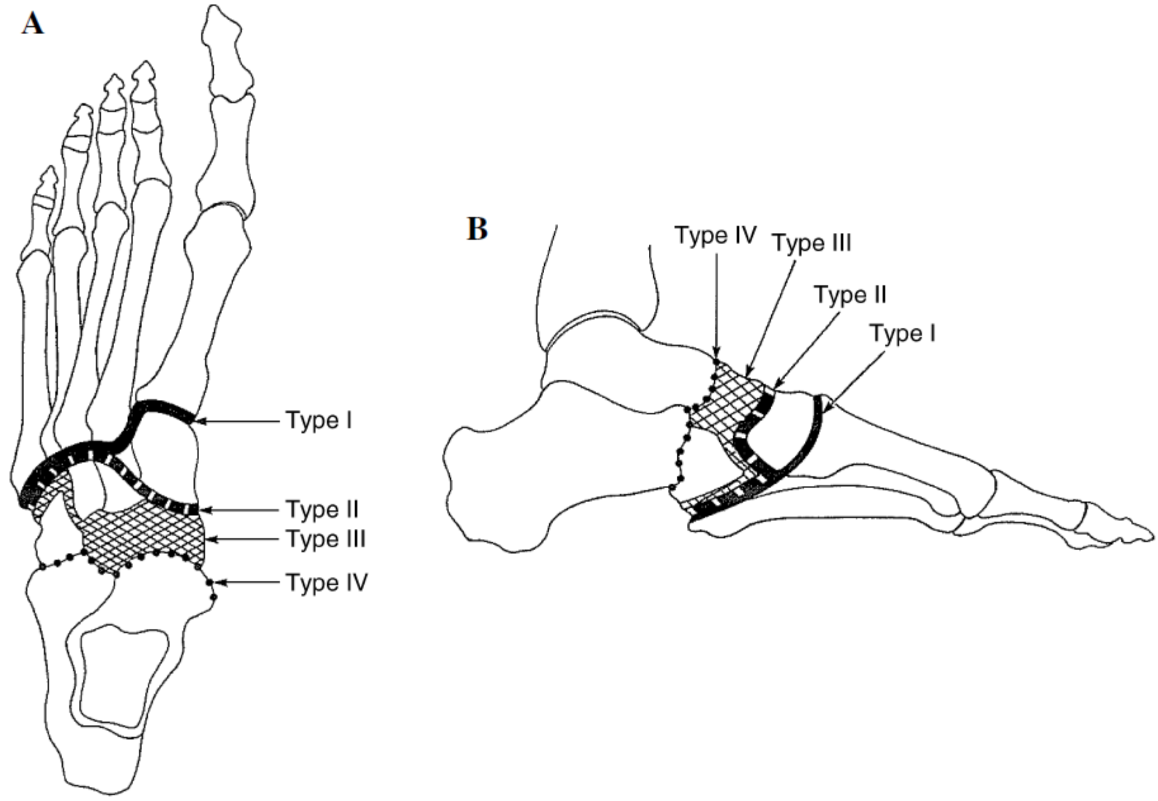
a warm, swollen erythematous foot with radiographs that may initially be normal but in time reveal juxta-articular debris, subchondral fragmentation, joint fractures, and subluxation;

stage II, coalescence, improvement in clinical appearance is associated with radiographs showing signs of early healing, absorption, and new bone formation with coalescence and bony sclerosis;

stage III, reconstruction-consolidation, further healing and resolution of the process with loss of generalized warmth, swelling, and erthyema, although swelling may persist in association with persistent nonunion and dislocation. In stage III, radiographs show ongoing healing, with bony remodeling and decreased sclerosis

Foot ulceration is a complication of diabetes, and its location corresponds to foot shape/deformity. Charcot midfoot deformity is a risk factor for the development of plantar ulceration in patients with diabetes.

Schoan
classification



1. Limited joint mobility and the presence of a tight heel cord have also been shown to be associated with plantar ulceration.

2. The presence of plantar callus is shown to be highly predictive of subsequent ulceration

3. Mueller et al. have shown that characteristic deformities are seen in the diabetic foot, andwhen present in association with insensitivity lead to ulcers at predictable sites.

4. a lateral talar first metatarsal angle of greater than -27 degrees had an ulcer. This may be a clinically useful threshold for increased

7. Patellar instability. West. J Bone Joint Surg Am. 2008;90:2751-2762.

Recurrent patellar instability can result from osseous abnormalities, such as patella alta, a distance of >20 mm between the tibial tubercle and the trochlear groove, and trochlear dysplasia, or it can result from soft-tissue abnormalities, such as a torn medial patellofemoral ligament or a weakened vastus medialis obliquus.

Nonoperative treatment includes physical therapy, focusing on strengthening of the gluteal muscles and the vastus medialis obliquus, and patellar taping or bracing.

Acute medial-sided repair may be indicated when there is an osteochondral fracture fragment or a retinacular injury.

The recent literature does not support the use of an isolated lateral release for the treatment of patellar instability.

A patient with recurrent instability, with or without trochlear dysplasia, who has a normal tibial tubercle-trochlear groove distance and a normal patellar height may be a candidate for a reconstruction of the medial patellofemoral ligament with autograft or allograft.

Distal realignment procedures are used in patients who have an increased tibial tubercle-trochlear groove distance or patella alta. The degree of anteriorization, distalization, and/or medialization depends on associated arthrosis of the lateral patellar facet and the presence of patella alta. Associated medial or proximal patellar chondrosis is a contraindication to distal realignment because of the potential to overload tissues that have already undergone degeneration.

The incidence of primary patellar dislocation is 5.8 per 100,000 and this increases to twenty-nine per 100,000 in the ten to seventeen-year-old age group

The recurrence rate ranges from 15% to 44%

It has been reported that up to 55% of patients fail to return to sports activity after a primary patellar dislocation[4].Instability

Patellar stability relies on the limb alignment, the osseous architecture of the patella and the trochlea, the integrity of the soft-tissue constraints, and the interplay of the surrounding muscles.

Under normal conditions, The patella usually engages by 20_ of flexion.

1. The Q angle is largest in full extension because the tibia rotates externally in terminal knee extension (the so-called screw-home mechanism), moving the tibial tuberosity more laterally

If the patella is unstable, it subluxates laterally, resulting in a falsely low Q-angle measurement.

2.The iliotibial band attaches to the Gerdy tubercle distally but also has attachments to the patellar and quadriceps tendons. It has been found that tension in the iliotibial band causes the patella to track in a more lateral position. There are three layers that make up the lateral side of the patellar attachments. The superficial layer is confluent with the iliotibial band. The intermediate layer is the lateral patellofemoral band,. The deep layer is confluent with the knee capsule

3.The medial patellofemoral ligament is the primary passive soft-tissue restraint to lateral patellar displacement. It provides 50% to 60% of lateral restraint from 0_ to 30_ of knee flexion[12].

The superficial fibers of the medial patellofemoral ligament pass over the saddle between the epicondyle and the adductor tubercle and insert 1.9 mm anterior and 3.8 mm distal to the adductor tubercle[13]. The medial patellofemoral ligament provides an important stabilizing force on the medial side of the knee. A study of cadavers showed that cutting the medial structures results in a 50% decrease in the force required to move the patella 10 mm laterally

4. The vastus medialis obliquus is the first part of the quadriceps to weaken and the last to strengthen when function is inhibited

5.X ray: Standard radiographs for assessment of patellar instability include posteroanterior weight-bearing views of both knees in 45^{o} of flexion, lateral views, and Merchant views.

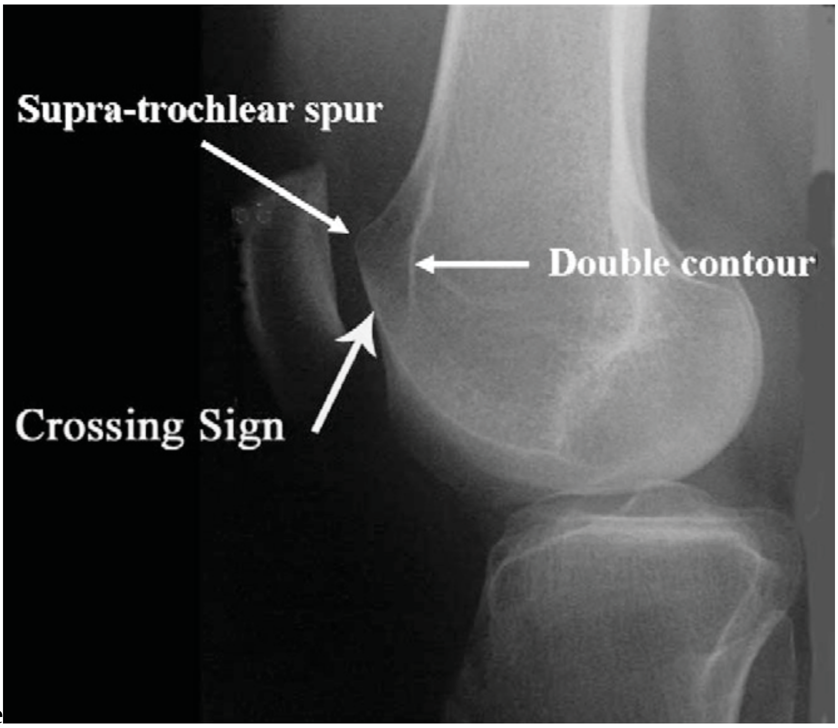
This view is used to assess for patellar tilt, patellar subluxation, and trochlear dysplasia

5.The sulcus angle is formed by the highest points of the medial and lateral femoral condyles and the lowest point of the intercondylar sulcus and is approximately 138_ ± 6_[18]. A sulcus angle of >145_ is indicative of trochlear dysplasia[19].

6. The lateral patellofemoral angle, as described by Laurin et al., is used to assess patellar tilt and is best evaluated on an axial radiograph of the patella with the knee 7. Patella alta can be assessed on lateral radiographs with use

7. Blackburne-Peel ratio, which appears to rely less on the anatomy of the patella and the location of the tibial tubercle and more on consistent osseous landmarks; it has better interobserver reliability[21,22] than the Insall-Salvati ratio.flexed 20

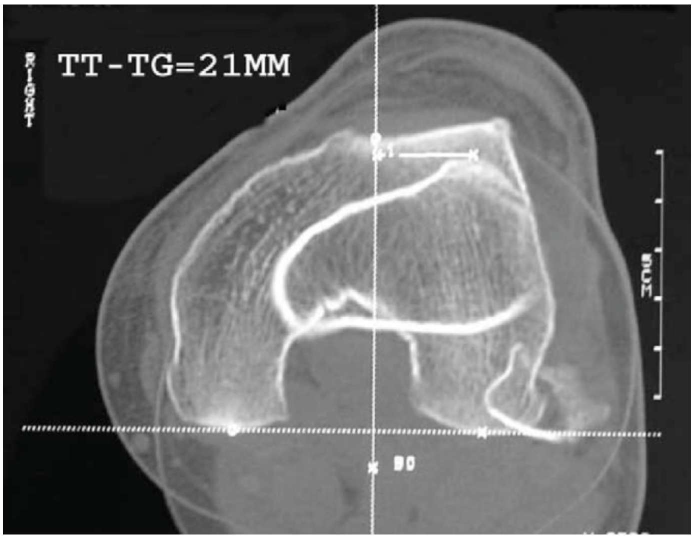
8. Trochleardysplasia is represented on a perfect lateral radiograph by the



so-called crossing sign, a line represented by the deepest part of the trochlear groove crossing the anterior aspect of the condyles

CT

Cross-sectional imaging with transverse computed tomography slices at different positions along the lower limb can provide a three-dimensional view of the patellofemoral joint and be used to assess the lateral offset of the tibial tuberosity from the deepest point in the trochlear groove (Fig. 3). A distance between the tibial tuberosity and the trochlear groove exceeding 20 mm is nearly always associated with patellar instability



Operative Treatment

The so-called gold-standard treatment for patellar instability has yet to be defined.

1.Lateral Release

An isolated lateral release is the only procedure that has been shown to be ineffective for the treatment of patellar instability.

Although there was an average 80% patient-satisfaction rating in the short term, this rating had dropped to 63.5% after more than four years of follow-up[4]

2.Medial Repair

Advocates for medial imbrication cite the potential for overload of the patella with a graft reconstruction[43].Medial imbrication is a nonanatomic procedure,it can result in excessive medialization of the patella or abnormal tracking. In a biomechanical study, Ostermeier et al.found that the combination of a lateral release and a medial imbrication tensioned with the knee at 45_ resulted in significantly medialized ($p < 0.01$) and internally tilted ($p < 0.01$)

patellar movement

Palmu et al. found that the rates of redislocation (approximately 70%) were similar in patients who had been treated with repair of the medial structures and those who had had nonoperative treatment

3. Reconstruction of the Medial Patellofemoral Ligament

Reconstruction MPFL

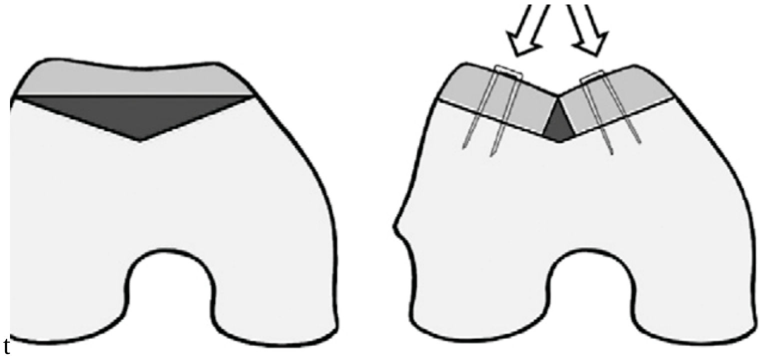
There was no consensus with regard to the choice of graft, graft positioning, graft tension, or static versus dynamic reconstruction.

However, reconstruction of the medial patellofemoral ligament does not address potential osseous problems and can also result in overload of the medial patellofemoral cartilage

Trochleoplasty

Trochleoplasty has been used with equivocal results, as reported in the European literature. Concerns about possible serious and irreversible articular and subchondral injury to the trochlea have limited its use in the United States.

In a trochleoplasty, cancellous bone is exposed in the trochlea by elevating a strip of cortical bone a.



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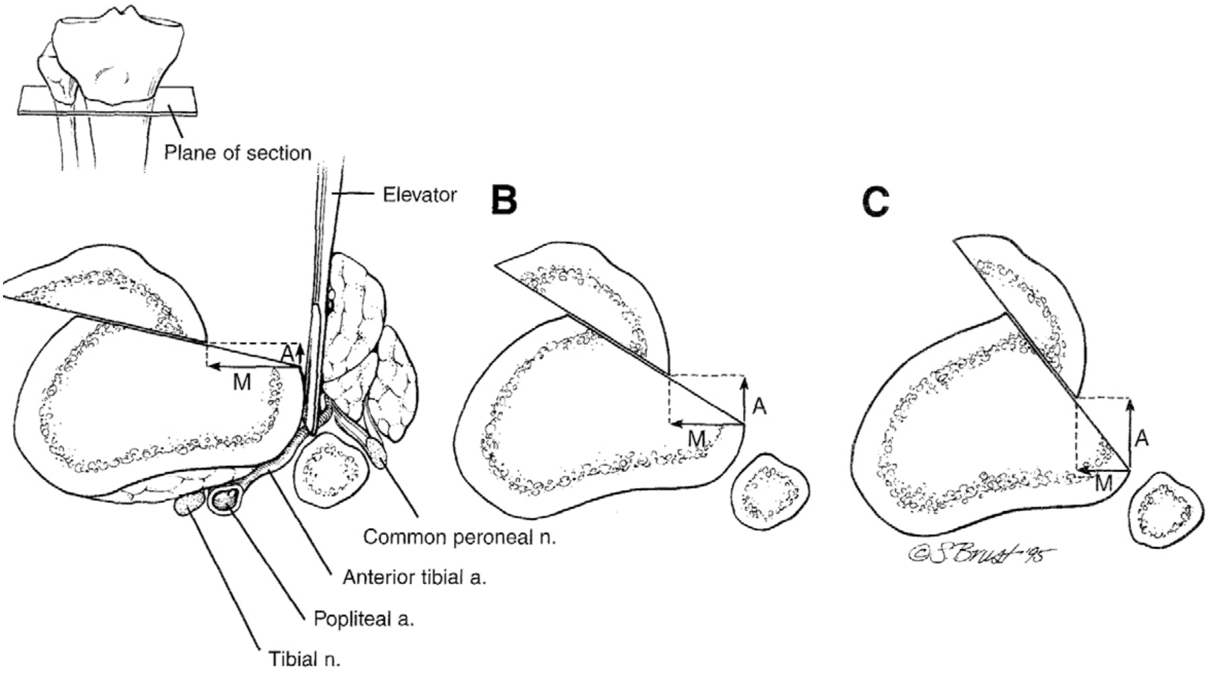
Tibial Tubercle Transfer

1. A medial transfer of the tibial tubercle (an Elmslie-Trillat procedure)[78] and anteromedialization of the tibial tubercle[79] have both been successful

Anteromedial tibial tubercle transfer has had success as a treatment both for instability due to patellar malalignment and for pain due to distal or lateral articular damage[42].

Tibial tubercle realignment. A: A flat (no-angle) osteotomy allows medialization of the tibial tubercle. The elevator protects the neurovascular bundle. B: A steeper cut for equal anteriorization and medialization of the tibial tubercle. C: A very steep cut provides maximumanteriorization of the tibial tubercle with less medialization. (Reprinted, with permission, from: Buuck DA, Fulkerson JP.Anteromedialization of the tibial tubercle: a 4- to 12-year follow-up. Op Tech Sports Med. 2000;8:136-7

Cadaver studies have also demonstrated that anteromedialization decreases the contact pressures on the trochlear side overall



Reconstruction of the medial patellofemoral ligament can be performed in patients with recurrent instability, with or without trochlear dysplasia, who have a normal tibial tubercle-trochlear groove distance and a normal patellar height. Distal realignment procedures can be used in patients who have an increased tibial tubercle-trochlear groove distance or patella alta.

8. Perilunate Fracture Dislocations Herzberg. Current Concepts JHS Vol 33A, 1599, 2008

Accounting for 7% of all carpal injuries that we treat in our hand emergency unit. Both are high-energy carpal injuries, which usually occur in young males in their 20s or 30s.

Paresthesias in the median nerve distribution are found in 1/3 of these cases.

Approximately 20% of perilunate injuries are misinterpreted on the initial x-ray evaluation.

Closed reductions and cast treatments have shown an unacceptable failure rate in terms of quality of reduction and outcome.[3] For this reason, surgical treatment is recommended. The aim of surgery is to achieve and maintain an anatomic reduction of the carpal bones, whether they are dislocated or fractured.

Surgery should proceed emergently in 2 situations: 1) in the rare case of an irreducible midcarpal joint, or 2) Associated fracture of the proximal scaphoid

What is the best surgical approach? There is considerable debate about the best surgical approaches to achieve anatomical repair of the proximal row.[3]

A limited or extended dorsal approach has the potential for exposing and fixing all the proximal row bones and joints. A palmar Russe approach allows visualization of the entire scaphoid for fixation and can be extended into the carpal tunnel to release the canal and expose the palmar ligamentous disruptions. This approach allows direct visualization and reduction of a midcarpal or lunate dislocation that has failed closed reduction. A combined palmar and dorsal approach improves exposure, but it increases the possibility of postoperative fibrosis and stiffness.

Treatment

1. Fix all carpal fractures
2. A scapholunate dissociation is best seen through a dorsal approach
3. Use bone anchors
4. The scaphoid and lunate reduction can be achieved by using K-wires as joysticks to control the rotational position of each carpal bone. Temporary screw fixation of the scapholunate interval has gained popularity as a means to provide stronger fixation than K wires.
5. Chronic unreduced require scapholunate ligament reconstruction.
6. A capitate fracture is best visualized through a dorsal approach. The proximal fragment (head) is often severely rotated, and fixation requires headless screw fixation.
7. A lunotriquetral dissociation is best seen from a dorsal approach.
   The lunotriquetral joint reduction is maintained by K-wires until ligamentous healing occurs.

Outcome

1. 25 transscaphoid PLFDs

Scaphoid fractures had screw fixation through a dorsal approach.+ The dorsal part of the lunotriquetral ligament was repaired using a bone anchor inserted into the lunate + the lunotriquetral joint was stabilized with K-wires.

At a mean follow-up of 45: No arthritis was noted in any patient. 88% of patients were able to return to their occupations. Combined wrist flexion-extension averaged 113° and grip strength averaged 80% of the uninjured side.

2. A recent series of 22 dorsal PLDs

Used a combined dorsal and volar approach with intraosseous scapholunate wiring.+ The dorsal part of the lunotriquetral ligament was repaired using a bone anchor and the lunotriquetral joint was stabilized with K-wires.

At average follow-up of 49 months, the scapholunate angle was maintained after surgery and averaged 48°. 45% patients were able to return to their occupations.Combined wrist flexion-extension averaged 106°,and grip strength averaged 77% of the uninjured side.

9. Avoid complications following tibial Nailing. J Bone Joint Surg Am. 2008;90:1760-1768

1. Intramedullary Fixation of Proximal Tibial Fractures: Prone to malalignment, with the prevalence of that complication reported to be as high as 84%[2-4]. The most common type of malalignment is apex-anterior and valgus angulation[2-6].

a. The position of the knee should be semiflexed to overcome pull by the quad

;b.The starting point for the intramedullary nail should be lateral [medial to lateral eminence] and proximal

c. Guide wire should be parallel to the anterior cortex: I.I

d. Nail geometry: Tibial nails have a proximal posterior bend (Fig. 1), of up to 14°. The position of the bend in the nail showed that the more proximal the bend of the nail, the lesser the chance for proximal fracture malalignment

e. Reduce and retain reduction by medial femoral distractor, and/or augmentation of the fixation with a short plate. [Locking 6 holed, medially with unicortical fixation

f. Blocking screw [Lateral and Posterior]

2. Infection: The infection rate following closed tibial shaft fractures is approximately 1%[8].
Open fractures are associated with higher infection rates: 5% for Gustilo I, 10% for Type II, and >15% for Type III[8]

Avoid:

1.Meticulous debridement in open fracture

2. Coversion of EF to Nail within 7 days

3. Early soft tissue cover: 5 days

4. Use of PMME beads

5. IV antibviotics

6. If unstable fixation ➔ change to stable

7. Look for comorbidities: Diabetes, alcohol, smoking, nutrition, drugs NSAID,vascular insufficiency

8. When the infection develops early, the patient should be treated with aggressive d´ebridement, wound closure, and suppressive antibiotics without removal of the hardware.When this is done, the healing rate can approach 90%

3. Non-union: 3% with closed fracture and 15% with open fractures

1. Smoker

2. Nutrtion

3. Transverse fracture, high velocity injury, open fractures

Options:

1. Dynamisation : not well documented

2. Exchange nailing: good for T I, II, IIIa. Infection rate is higher

3. Remove nail, Plate and bone graft; NWB [good for malalignment]

4.Ilizarov

5. BMP2,7

10.DVT, Haas. J Bone Joint Surg Am. 2008;90:2764-2780.

Unfortunately, this ideal method of prophylaxis does not exist

LMWH Bleeding Major 1%

Minor 9%

Warfarin: Less bleeding

Requires monitoring

More useful in proximal DVT than distal DVT

Aspirin: may provide sufficient prophylaxis against thromboembolic disease when it is used in combination with mechanical prophylaxis.

Mechanical Prophylaxis:

Foot pumps, calf pumps, and calf/thigh pumps are the three major types of mechanical prophylaxis devices.These compression devices are associated with extremely low complication rates, compliance issues may decrease their effectiveness.

In a randomized prospectivestudy by Westrich and Sculco[28], the combination of pneumatic plantar compression and acetylsalicylic acid was compared with acetylsalicylic acid alone for prophylaxis for patients treated with total knee replacement. The trial included 164 knees in 121 patients

The rate of deep venous thrombosis in the group treated with compression and acetylsalicylic acid (27%, twenty-two of eighty-one) was significantly lower ($p < 0.001$) than that in the group treated with acetylsalicylic acid alone (59%,forty-nine of eighty-three).

The mechanical compression led to a significantly lower rate of deep venous thrombosis (8%, four of fifty) compared with that associated with the use of prophylactic stockings (22%)

Inferior Vena Cava Filters

Inferior vena cava filters do not prevent deep venous thrombosis, but they can prevent pulmonary embolization.

In a large study from our institution, Gonz´alez Della Valle et al.[41] found that a multimodal approach of preoperative and intraoperative measures combined with pneumatic compression,knee-high elastic stockings, early mobilization, and chemoprophylaxis with acetylsalicylic acid (83% of patients)or warfarin (17%) for four to six weeks following THA was safe and efficacious.

AAOS Clinical Guidelines Orthopaedic surgeons have been affected by the ACCP guidelines for the prevention of deep venous thrombosis in patients treated with total hip or knee arthroplasty. Deep venous thrombosis (generally asymptomatic, detected by venography or ultrasonography) was the primary outcome measure in the development of these guidelines. These guidelines emphasize prophylaxis with strong pharmacologic agents and seem to underrate the risks of bleeding and ignore other adverse outcomes, such as infection and joint stiffness, related to these agents.

Fatal PE: 0.22% after 44,785 total hip arthroplasties and 0.15% after 27,000 TKA

Despite the introduction of the ACCP guidelines,there appears to have been no change in the rate of symptomatic or fatal pulmonary embolism over the past ten to fifteen years

TABLE V General Recommendations Derived with the Consensus Process

Recommendation	Level of Evidence/ Strength of Recommendation*
Assess all patients preoperatively to determine whether risk of pulmonary embolism is standard or high	III/B
Assess all patients preoperatively to determine whether risk of bleeding complications is standard or high	III/C
Consider use of vena cava filter in patients who have contraindications to anticoagulation	V/C
Consider intraoperative and/or immediate postoperative mechanical compression	III/B
Consider regional anesthesia for the procedure (in consultation with anesthesiologist)	IV/C
Consider continued use of mechanical prophylaxis postoperatively	IV/C
Rapid patient mobilization	V/C
Routine screening for thromboembolism is not recommended	III/B
Educate patient about symptoms of thromboembolism after discharge	V/B

*See Tables III and IV.

Overview

This critical literature review and analysis demonstrated no differences, in terms of the total pulmonary embolism rate, rate of fatal pulmonary embolism, total death rate, or rate of death from bleeding, among the different thromboembolism prophylaxis interventions.

The prevalence of major bleeding associated with the combined intervention of mechanical prophylaxis and aspirin was very low compared with the prevalence associated with the other interventions.

II. Free Paper: Unusual case of irreducible fracture dislocation of great toe

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Vishal Pai

Key Words

Metatarsal fracture, MTP dislocation, Irreducible dislocation, floating metatarsal

Abstract

The floating metatarsal is an extremely rare type of injury in which the first metatarsal is dislocated or fractured both proximally and distally. We describe an report of type of unusual variant of floating metatarsal consisting of fracture base of the first metatarsal with an irreducible dislocation of first metatarsophalangeal joint.

Introduction

Trauma to foot carries a high potential for chronic secondary disability, especially when it is misdiagnosed. The floating metatarsal is a unique type of injury in which the first metatarsal is dislocated both proximally and distally. Leibner et al first described this unique entity in 1997 [1]. Since the first description of this injury there have been only a few case reports [1-4,7] in the literature, and this entity remains quite rare. We report a variant of such injury where a closed reduction of MTP joint was impossible requiring open reduction

Case Report

A 45-year-old woman presented to emergency department after sustaining an injury to her right foot after a fall from a horse. At her presentation she required significant pain requiring large amount of morphine. Foot examination revealed swelling and tenderness on the dorsal aspect of the midfoot. There was obvious dislocation of the great toe. Sensation and vascularity of the foot were normal, and the skin on the dorsum of the foot was viable.

Radiographs of the injured foot showed dislocation of the first MTP with significant displacement of the head of the I metatarso-phalangeal joint under the plantar aspect of the third toe ray [Fig 1] . In addition, there were minimally displaced fractures of neck of second and third metatarsals.

The patient was operated on the same day. As closed reduction of the metatarsophalangeal joint of the first toe could not be achieved, an open reduction of the metatarso-phalangeal joint was performed with a dorso-medial incision . There was buttonholing of the head through the capsule. Intersesamoid ligament had to be divided to reduce the joint. Once reduced, the joint was further stabilized with an oblique K wire. The capsule was sutured. Intraoperative, C-arm images showed acceptable reduction. The basal fracture of the I metatarsal was reduced and fixed with a wire [Fig 2]. A below-the-knee slab was given postoperatively. Progressive weight-bearing was started at 6 weeks after removing the Kirschner wire, and the patient was full weight-bearing at the end of 2 months. At 2 years' follow-up patient is totally symptom-free.-

Discussion

The capsule of the metatarsophalangeal joint has several reinforcements that contribute to the joint stability: a plantar plate consisting of local thickening of the capsule; medial and lateral collateral ligaments; the tendons of the flexor hallucis longus and brevis, adductor and abductor hallucis, and the extensor hallucis longus and brevis [5]. The joint is relatively unprotected on the dorsal side, making the dorsal dislocation more common.

Concomitant dorsal dislocation was first described by Leibner et al in 1997 and was referred to as the “floating metatarsal” [1]. In 2003, Kasmaoui et al [2] reported a case of concomitant plantar Lisfranc dislocation and plantar metatarsophalangeal joint dislocation of the hallux.

In 2003,Christodoulou et al [6] reported a case of double floating metatarsal—a combined proximal and distal dislocation of 2 adjacent metatarsals. In 2003, Milankov et al [3] reported a case of concomitant plantar tarsometatarsal (Lisfranc) and first and second metatarso- phalangeal joint dislocation. Espierrez et al [4], in 2003, reported one more case of floating metatarsal, with the dislocations in the dorsal direction.

In our patient, the mechanism of injury is probably axial compression. Extension-deforming force on the first toe caused dorsal dislocation of the first metatarsophalangeal joint, and the continuing force later applied to the fracture of the base of the first metatarsal.

When undertaking reduction of floating metatarsal, it is indispensable to evaluate the tension on the plantar fascia. In the case of dorsal dislocation, metatarsophalangeal joint reduction should be done first to alleviate the tension on the plantar fascia [7]. Similarly, in the case of concomitant plantar dislocation, reduction of the proximal side should precede the reduction of the metatarsophalangeal joint (2). However this rule could not apply to the present case because of the buttonholing.

When examining a patient with metatarsophalangeal joint injury, one should always look for injury at the tarsometatarsal joint and vice versa, because various concomitant injuries are possible and misdiagnose can cause long-term secondary disability.

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FIGURE 1 Preoperative radiographs showing the dorsal dislocation at the metatarsophalangeal and the fracture of the base of the metatarsal bone

FIGURE 2 Postoperative radiographs showing the joints reduced anatomically and Kirscher wire in place to stabilize the basal fracture

III. Notes LOWER LIMB CONGENITAL DEFORMITIES

I. INFANTILE COXA VARA

Clinical

Trendlenburg gait

Adduction is more than abduction

Supratrochanteric shortening

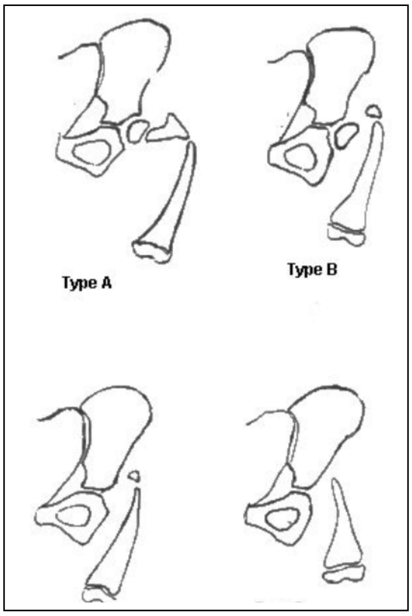
X ray

Coxa Vara <110º

Hilgenreiner epiphyseal angle > 60 º

Treatment Corrective Valgus osteotomy

II. PROXIMAL FEMORAL DEFICIENCY



Can be associated with absence of fibula.

tarsal coalition is common

Type A [congenital short femur]

Gap between proximal and distal femur, which ossifies by maturity

Femur is 80% short

Type B

The femoral head and acetabulum are hypoplastic;

The femoral gap does not unite

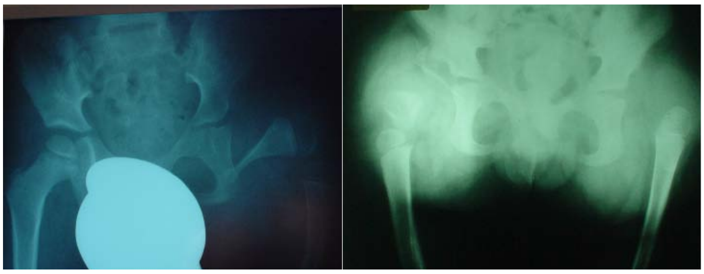
Type C

The Femoral head is absent

The Acetabulum is present but dysplastic

Type D

The femoral head and acetabulum: absent



Treatment

Type I Ilizarov lengthening of the femur

Type II Valgus osteotomy and fusion

Type III and IV

Extended prosthesis

Syme’s and extended prosthesis

Knee fusion and Syme’s [Brown]

Van Ness procedure: Informed consent and Psych evaluation

III. ABSENCE OF FIBULA

Absence of Fibula more common than tibia

Can be associated

PFFD,

ACL absence,

Toe ray absence

Tarsal coalition

Tibial bowing: Anteromedial bow

Treatment Syme’s amputation

IV POSTEROMEDIAL BOWING TIBIA

Postural

Posteromedial bowing of tibia

Is usually benign

Observe for shortening of the limb

Treatment: Regresses with stretching exercises

V. ANTEROLATERAL BOWING OF TIBIA

Rare but serious condition

Treatment

Protective brace

Bone graft and fixation of tibia

Some times repeat operation

May need disarticulation of the ankle

VI. CONGENITAL VERTICAL TALUS

Autosomal dominant

Associated with: trisomy of 13

Talus remain in plantar flexion both in dorsiflexion and plantarflexion.

Treatment: Soft release and plaster cast

IV. Current Concepts. Physeal Bridge Resection. J Am Acad Orthop Surg, Vol 13, No 1

Growth arrest secondary to physeal bridge formation is an uncommon.

Physeal bridges may cause angular and/or longitudinal growth disturbances

Physeal bridge resection + interposition: has become an accepted treatment option for patients with for those with at least 2 years or 2 cm of growth remaining.

The use of cartilage and cultured chondrocytes as interposition material after physeal bridge resection is an area of active research.

The cartilage has three main layers:

I resting and germinal cells,

II proliferating cells,

III hypertrophying cells.

Most physeal fracture separations occur at the layer of hypertrophying cells or at the chondro-osseous junction.[1] However, depending on the mechanism of injury, Salter-Harris type I and II physeal fractures sometimes involve the germinal cell layer.[2,3]

In experimental studies on immature bovine bones, Moen and Pelker[4] suggested that the rate of loading, the maturity of the physis, the specific type of joint, and sex may influence the pattern of the fracture and the layer involved.

Incidence of injury involving physis: 30%

Significant growth disturbances: 10% of physeal injuries

The location and size of the physeal bridge determine the clinical deformity.

Course:

1. Peripheral tether cause angular deformity.
2. Central involvement: causes metaphyseal tenting.
3. These physeal injuries occur most commonly in adolescents, who have limited growth remaining and may not need surgery
4. growth can continue normally after physeal bridging when the lesion is small.
5. Some physeal bridges resolve spontaneously

Because many bridges do not manifest until the adolescent growth spurt, young patients should be followed until skeletal maturity.

Size and results;

Animal studies suggest that damage to <7% of the cross-sectional area of the physis does not usually cause a permanent physeal bridge.

When a traumatic physeal bridge is identified early, treatment can be directed solely toward resolving the bridge. Treatment is indicated only in patients with existing or developing deformities who have significant growth remaining.

Treatment options:

1. corrective osteotomy,
2. completion of the epiphysiodesis and lengthening of the involved segment.
3. Epiphysiodesis and/or shortening of the opposite extremity
4. Combinations of these procedures
5. physeal distraction: controversial because premature complete Epiphysiodesis
6. Auto or allogenous physeal transplantation has had limited success
7. Surgical resection of the physeal bridge and insertion of an interposition material [Langenskiöld]. Excellent and good results in most series range from 62% to 90%.

1. Salter Harris Vs Growth arrest:

Physeal bridging occurs when there is contact between the epiphysis and the metaphysis, resulting in osseous consolidation in that region [unreduced type IV].

All five Salter-Harris types of physeal fracture, as well as Rang's sixth type (ie, injury to the perichondrial ring), have been reported to cause physeal bridges.

Type: IV >

III >

II [10% but in distal femur: 30%] and I.

Note: in distal femur: angular and shortening with II and IV are similar 60% and 40% respectively.

Patients with Salter-Harris type III fractures have a lower risk of growth abnormalities because these fractures usually occur near skeletal maturity.

In type V Salter-Harris injuries, no fracture is evident radiographically, but these injuries can cause growth abnormalities. Thus, the diagnosis often is made in retrospect from clinical and radiographic evidence, usually after deformity has occurred.

Type VI physeal injuries usually are the result of direct trauma or ligamentous avulsion. Peripheral physeal bridging may occur in these cases.

2. Site:

Lower extremity bars occur more frequently than do upper extremity bars because the injuries often are more violent.

Distal femur > Proximal Tibia > Distal Tibia. [Distal radius only 7%]

Although <3% of all physeal injuries occur at the distal end of the femur and the proximal end of the tibia, >50% of all physeal bridge resections occur at these locations.

3.**Velocity of injury**: High-energy injuries, especially with physeal comminution, usually are associated with physeal bridges. In distal femur, with high-energy trauma, the same undulations predispose the physis to damage. The metaphyseal surfaces are sheared against the physeal surface, producing direct injury to the undulations, with subsequent increased likelihood of physeal bridge formation.

4. **Type of reduction:**

Bridging is less with anatomic reduction

But anatomic reduction cannot rule out bridging ie., all epiphyseal needs long follow up.

Other causes physeal bridge formation:

osteomyelitis, systemic infection [eg, meningococcemia]),

tumors, irradiation, thermal

electrical burns (eg, laser beam damage,[27] lightning strike[36]),

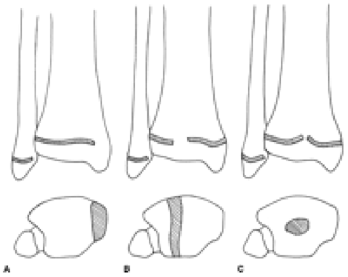
vascular insufficiency,

metabolic disorders (eg, vitamin Aintoxication[16]),

Iatrogenic: Physeal bridge formation secondary to iatrogenic placement of metal pins and screws across the physis depends on factors such as pin location, size, obliquity to the physis, duration of use, and, most important, whether the pin is smooth or threaded. A smooth pin of small diameter placed perpendicularly across the center of a large physis for 2 to 3 weeks rarely results in physeal bridge formation. However, a large, threaded pin placed obliquely across a physis and left in place for a few weeks has a greater risk of forming a physeal bridge.[16] The presence of a traction pin across or even close to a physis sometimes is associated with subsequent physeal bridging, especially in the proximal tibia.[27]

Congenital or developmental physeal bridges can occur with Blount’s disease, Madelung’s deformity (Fig. 3✦), or longitudinal bracketed epiphysis (ie, delta phalanx), or from no obvious cause.

Classification: [Peterson]



I Peripheral bridges cause considerable angular deformity

relatively easy to correct surgically.

II Elongated physeal bridges are longitudinal & involve the middle of the physis

Elongated bridges are unusual and most commonly occur III,IV

III Central bridges have a perimeter of healthy physis.

The bridge acts as a central tether, resulting in tenting of the physis

Pathology

1. Destruction of the epiphyseal vascular supply leads to the development of a central physeal bridge
2. In contrast, destruction of the metaphyseal vascular supply may temporarily interfere with ossification but usually does not result in physeal bridge
3. # ➔ formation of fibrous tissue➔ undergoes calcification ➔ leads to early bony physeal bridging.[11]
4. At surgery, the abnormal physeal tissue has a grayish, translucent appearance, whereas the normal physis is usually opaque white with a blue tinge.[25]
5. The extent of microscopic physeal damage after infection is much greater than what is visible on radiographs. This explains the limited recovery potential after resection of the obvious bony physeal bridge.[11]

Radiological Evaluation:

X ray: confirms the site and extent of the bony bridge

Asymmetry of growth recovery lines (ie, Harris lines): may be the earliest sign

A sclerotic bridge of bone or narrowing of the physis

An elongated physeal bridge extending from anterior to posterior has a radiologic appearance similar to that of a central bridge in the anteroposterior projection. The distinguishing feature is the absence of tenting of the physis resulting from peripheral growth seen in central bridges (Fig. 4♠).

The presence of growth recovery lines is useful. These lines form at the location of the physis at the time of injury, presumably as a result of temporary slowing or cessation of growth secondary to trauma or illness.

The distance between the physis and the growth recovery lines indicates the amount of growth that has taken place since the injury.

When growth is normal, the growth recovery lines are parallel to the physis. When growth is arrested peripherally, the lines tend to converge toward the periphery

With slowing of growth rather than complete arrest, the line is oriented obliquely but is not converging.[2]

In a total physeal arrest, there is no growth recovery line.

Harris lines can be seen best on MRI scans, often 6 to 7 weeks earlier than their appearance on normal radiographs[13]

. **Skeletal age** PA left wrist. Grulich Pyle: future growth potential

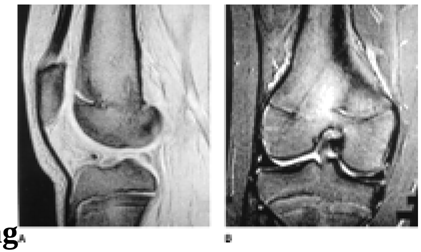
Computed Tomography Scans 

Axial computed tomography (CT) scans are sometimes difficult to interpret because of the normal undulations of the physis (Fig. 6✦). However, multiplanar reconstructions in the coronal or sagittal plane may show the physeal bridge.

Helical CT has improved imaging quality; also, positioning of the leg and physis in the gantry is not as critical as with conventional CT. Because the scanning time is reduced to approximately 20 seconds, it often can be done without sedation and with lower radiation exposure.[39] Helical CT imaging is accurate for mapping because the physeal cartilage is easily differentiated from the adjacent bone on the reformatted images[39]

Scintigraphy

Single-photon emission computed tomography can map the distribution of osteoblastic activity in the physis.

Magnetic Resonance Imaging 

Is the imaging method of choice for evaluation of physeal bridges.

MRI scans help to map the bridge (the physical dimension and distance from known landmarks) while demonstrating the injured and uninjured areas of the physes

T1.T2, Fat-suppressed

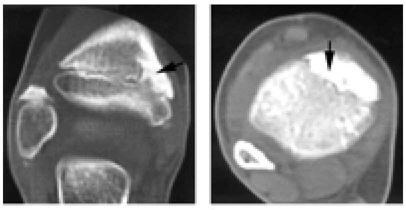
The area of involvement is best measured using a three-dimensional T1-weighted gradient. Physeal widening on gradient echo–weighted and T2-weighted images implies physeal dysfunction without bridge formation.[42]

The disadvantage of MRI is the considerable amount of time required for the child to lie still in the scanner. Younger children often require sedation or general anesthesia.

Hasler and Foster[23] recommend preoperative MRI to map the bridge; early postoperative MRI to detect incomplete resection; and MRI 6 months after surgery to detect bridge recurrence, migration, and necrosis of the interposition material (if fat graft is used) and to evaluate the remnant physis and its repair potential.

Before physeal bridge resection:

3 dimensions of the physeal bridge should be defined with MRI and CT software can now do the mapping . Eg below: peripheral bridge



When do you do physeal excision?

1. The mere presence of a premature partial physeal bridge is not an indication
2. Patients with documented developing deformities are candidates for resection.
3. At least 2 years or 2 cm of growth should remain,
4. The physeal bridge should be ≤50% of the physeal area.
5. The younger the patient, the greater the benefit of a successful resection.
6. In very young children, resecting physeal bridges of >50% of the physeal area could be considered because the alternatives (eg, repeated corrective osteotomies) are undesirable.

The smaller the bridge, the better the likely outcome because less resection is needed. Excellent results have been reported for bridges of <25%.[20]

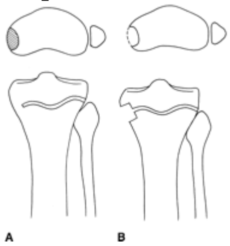
The shorter the time interval between the insult and surgery, the better the likely outcome. In such cases, the deformity is smaller and the bridge is easier to treat.

Central physeal bridges generally have a better long-term outcome than do peripheral bridges, although they are more difficult to remove.

Physes injured by infection or vascular insults often do not heal as successfully as do physeal bridges secondary to fracture.

Surgical Technique

1. Peripheral and elongated bridges are approached directly after localization with an image intensifier (Fig. 9).
2. First, the overlying periosteum is excised from the junction of the bridge with the intact perichondrial ring and across the extent of the bridge.
3. It is important to excise, not suture, the periosteum to prevent bridge reformation when the surgical approach necessitates periosteal violation.
4. The bridge usually is hard sclerotic bone that should be **removed with a high-speed burr** until healthy physis is seen surrounding the resection cavity.
5. After complete removal of the bridge, 2 to 3 mm more bone is removed along the metaphyseal and epiphyseal margins of the physis. This ensures good contact between

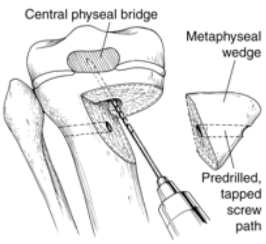
the physis and the interposition material, while avoiding contact between the epiphysis and the metaphysis. 

6. Constant irrigation should be used to prevent heat injury

6. Periodic imaging is helpful
7. Loupe magnification and a coaxial light source
8. Care must be taken not to elevate the periosteum when defining the limits of the bridge unless elevation is needed for the approach, because damage to the perichondrial ring can cause a new physeal bridge.
9. When an osteotomy is needed to correct the angular deformity, physeal bridge resection can be done simultaneously using the cut surface of the osteotomy to approach the bridge.

Central physeal bridges

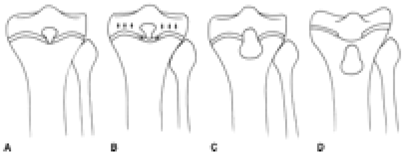
1. through a metaphyseal window or, by a metaphyseal osteotomy
2. With either approach, a curette should be used to remove cancellous bone down to the area of the bridge. This bone should be saved and used at the end of the procedure to fill the surgical defect.
3. Once the bridge is located, a high-speed burr can be used to completely remove the physeal bridge from the inside out.
4. Using a small dental mirror, the normal physis must be visualized thoroughly throughout the circumference of the resection cavity.
5. The following may aid evaluation: the physeal bridge usually is composed of dense bone similar to cortical bone; the surrounding bone is more cancellous; the physeal cartilage is usually straighter and wider, often with a blue tinge; and the epiphyseal bone feels spongy and, when pressed on, feels as though it were floating.[24]

Jacksons modification: 

Interposition material

1. Animal studies have shown that bridge reformation occurs consistently when interposition material is not used
2. Fat, polymethylmethacrylate (PMMA), bone wax, cartilage, muscle, and silicone have all been used as interposition materials. Fat and PMMA are the two most commonly used materials.

3. Autogenous chondrocytes, which are cultured in vitro and transplanted into the defect created by the resection of the physeal bridge, appear to be promising in animal models.[50,51] Tobita et al[51] reported that autogenous chondrocyte transplantation is better than fat graft for cases in which the damaged area is larger than two thirds of the physis
4. Lee et al[52] investigated the feasibility of using gene therapy and tissue engineering to treat tibial physeal defects in rabbits.
5. Regardless of the type of interposition material used, the material should remain at the original site of the physeal bridge and the adjacent metaphysis-epiphysis. The likelihood of physeal bridge reformation occurring across the physis increases when the epiphysis grows away from the interposition material (Fig. 12).



The PMMA is mostly in the metaphysis. When the physis grows away from the interposition material, the material becomes completely metaphyseal, which predisposes it to bridge reformation once the epiphysis comes into contact with the metaphysis.

Corrective Osteotomy With Bridge Resection

Absolute indications for corrective osteotomy at the time of bridge resection have not been firmly established. Although spontaneous correction of up to 35° has been reported, the degree of correction is variable and inconsistent.[20]

A current indication for osteotomy is correction of angular deformities >20° because they likely will not correct spontaneously after bridge resection.[16,24,25,27]

Williamson and Staheli[20] recommended corrective osteotomy at the time of bridge resection for all knee and ankle deformities >10°, especially when the area of growth arrest is >25% of the physis.

Initial spontaneous improvement in angular deformity was noted in the first year after bridge resection and was attributed to surgical stimulation of the physis.

Recurrence of the deformity by the time of skeletal maturity was attributed to early closure of the injured side of the physis.[20] The decision to perform an osteotomy at the time of bridge resection must be guided by the degree and location of the deformity as well as the area of the physeal bridge. A one-stage procedure can be done when corrective osteotomy can be performed without compromising either the physeal bridge resection or the level of the osteotomy.

All patients should be followed to skeletal maturity with scanograms to accurately determine the outcome.

Complications

1. Early or late physeal bridge reformation may occur, especially with bridges ≥50%. Early bridge recurrence can be repeatedly resected if the indications for resection are met (2 cm of

growth remaining and <50% of the area of the physis). When insufficient growth remains and the deformity is unacceptable, osteotomy is the procedure of choice.[34]

2. There is a small risk of fracture if excessive bone is removed during resection.

3. Infection is a risk, especially when the physeal bridge is secondary to osteomyelitis.

4. Premature closure of the involved physis, which is reported frequently, may not be a complication but rather a normal physiologic response to physeal injury.[21]

5. The recurrence rate was 18%, and the infection rate, 3%.

MCQ

1. Fracture Neck of femur:

a. One-year mortality rates currently range from 14% to 36%

b. In nondisplaced fracture neck: Surgical fixation allows early patient mobilization.A nonunion rate of 6.4% and an osteonecrosis rate of 4.0%.; the conversion rate to arthroplasty was 7.7%

c. In a displaced fracture: 9 None of the implants had significantly superior results for outcomes related to fracture healing, osteonecrosis, wound infection, pain scores, reoperation rate, use of walking aids, periprosthetic fracture, or mortality

d. Internal fixation Vs Joint replacement for displaced fracture neck: , there was a higher reoperation rate with internal fixation than with hemiarthroplasty (31% vs 8%;

e. Patients with cementless hemiarthroplasty stems experienced a markedly higher level of hip pain and dependency on walking aids.

f. Bipolar prosthesis has no advantage over unipolar hemiarthroplasty

2. Long Head of Biceps

1. 50% of the biceps tendon arose directly from the superior glenoid labrum with varying amounts of posterior to anterior labral contributions, and the remainder of the tendon attaching to the supraglenoid tubercle.
2. It has been found to be approximately 9 cm long from the origin to the musculotendinous junction.
3. The amount of intra-articular tendon varies with arm position, with the maximum intra-articular tendon length of approximately 35 mm occurring with the arm in a position of adduction and extension.
4. It is stabilized proximally by the ‘‘biceps pulley’’ mechanism, composed of the coracohumeral ligament and superior glenohumeral ligament.
5. 76% of the tears were associated with pathology of the long head of the biceps, including all chronic tears.

3.Cauda equina

The caudal end of the spinal cord is the conus medullaris and is attached to the coccyx by a thin non-neural filament, the filum terminale.

The conus contains the cell bodies and dendrites of the exiting L5 to S3 nerve roots.

The cauda equina is a collection of peripheral nerves (L1 to S5) in a common dural sac within the lumbar spinal canal.

The L1 nerve roots, actually exit the spinal cord at the T10 vertebral level.

The detrusor urinae muscle and internal sphincter of the bladder are smooth muscles.

They are controlled by the parasympathetic nervous system via the S 2-4 nerve roots and the sympathetic nervous system via the hypogastric plexus (T11-L3).

The external sphincter of the bladder is a striated muscle that is controlled by the pudendal nerve, which arises from the S2-4

The loss of contraction and sensation leads to urinary retention and eventually to overflow incontinence.

1% and 6% of all lumbar disk herniations undergoing surgical treatment may develop cauda equina.

4. Diabetic ulceration in midfoot Charcot's. Predicting factors

1. Limited joint mobility and the presence of a tight heel cord have also been shown to be associated with plantar ulceration.
2. The presence of plantar callus is shown to be highly predictive of subsequent ulceration
3. Mueller et al. have shown that characteristic deformities are seen in the diabetic foot, andwhen present in association with insensitivity lead to ulcers at predictable sites.
4. a lateral talar first metatarsal angle of greater than -27 degrees had an ulcer. This may be a clinically useful threshold for increased

5. **Perilunate Fracture Dislocations**

1.Usually occur in young males in their 20s or 30s.

2. The median nerve involved in 1/3 of these cases.
3. Approximately 20% of perilunate injuries are misinterpreted on the initial x-ray evaluation.
4. Closed reductions and cast treatments have shown an unacceptable failure rate in terms of quality

5.Present treat: Fix carpal bones + in irreducibke lunte volar + Dorsal approach otherwise dorsal approach + K wires or screw fixation

6. Chronic unreduced require scapholunate ligament reconstruction.

6 Avoid malalignment in proximal tibial fractures

1. Intramedullary Fixation of Proximal Tibial Fractures: Prone to malalignment, with the prevalence of that

complication reported to be as high as 84%[2-4]. The most common type of malalignment is apex-anterior and valgus angulation[2-6].

a. The position of the knee should be semiflexed to overcome pull by the quad

;b.The starting point for the intramedullary nail should be lateral [medial to lateral eminence] and proximal

c. Guide wire should be parallel to the anterior cortex: I.I

d. Nail geometry: Tibial nails have a proximal posterior bend (Fig. 1), of up to 14°. The position of the bend in the nail showed that the more proximal the bend of the nail, the lesser the chance for proximal fracture malalignment

e. Reduce and retain reduction by medial femoral distractor, and/or augmentation of the fixation with a short plate. [Locking 6 holed, medially with unicortical fixation

f. Blocking screw [Lateral and Posterior]

VI.Case Report

A 27-year-old man presented with a left wrist mass of >1 year's duration. The mass had grown slightly during the previous month. Past medical and family histories were unremarkable. Physical examination revealed a 5X2 cm soft, nontender mass extending from the radial aspect of the wrist into the thenar eminence. Magnetic resonance imaging of the wrist was performed. Your diagnosis?

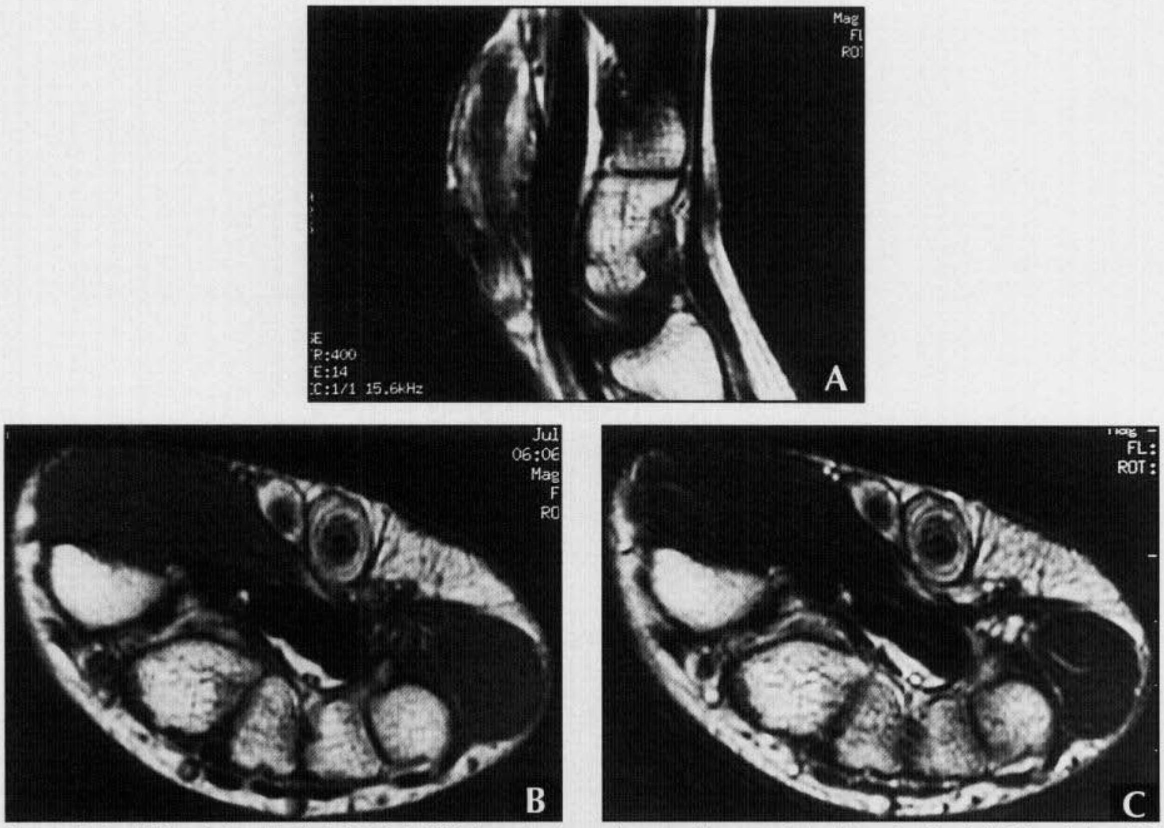


Figure: Sagittal T1-weighted (TR/TE 400/14) MRI through the capitate and lunate of the left wrist (A). Axial T1-weighted (B) (TR/TE 416/21) and T2-weighted (C) (TR/TE 4000/85) MRIs through the base of the left metacarpals.

RADIOLOGIC CASE STUDY

DIAGNOSIS: Fibrolipomatous hamartoma of the nerve.

FIBROLIPOMATOUS HAMARTOMA

Fibrolipomatous hamartoma of the nerve is a rare lesion of the peripheral nerves first described by Mason in 1953 as an anomalous growth of the fibroadipose tissue of the nerve sheath.1 It also has been reported as fibrolipomatous nerve enlargement, lipofibromatous hamartoma, lipofibroma, fibrofatty overgrowth, fatty infiltration of nerve, and neurolipoma. Fibrolipomatous hamartoma may occur as an isolated lesion or a feature of macrodystrophia lipomatosa, or may be associated with intramuscular fat deposition.

Fibrolipomatous hamartoma of the nerve has been described most commonly in the median nerve. Involvement of the radial, ulnar, digital, superfacial peroneal, plantar, and cranial nerves also has been reported.2,4-6 Rarely, it can occur in the branches of the median nerve, as in the present case, in which it was intraoperatively traced to the palmar sensory cutaneous branch of the median nerve.

Patients generally present before age 30 years with a mass that typically has been present for several years. Twenty-seven percent to 66% of cases may have associated macrodactyly due to bony overgrowth and proliferation of the subcutaneous fat.2,7 The mass may compress the nerve causing paresthesias, numbness, or weakness in the nerve distribution. Fibrolipomatous hamartoma of the median nerve may present with carpal tunnel syndrome.

ETIOLOGY

The etiology of fibrolipomatous hamartoma of the nerve is unclear, although a congenital cause has been suggested due to the young age at occurrence. A history of antecedent trauma may be elicited in some patients.

Histologically, these lesions are characterized by fibrofatty proliferation causing epineural and perineural fibrosis with normal or atrophic axons and fatty infiltration around the nerve bundles. Metaplastic bone formation within the lesion is rare.2,4

RADIOGRAPHic FINDINGS

Fibrolipomatous hamartoma has a typical appearance on magnetic resonance imaging (MRI).3 In the longitudinal plane, fusiform nerve enlargement is noted with the thickened nerve bundles appearing as serpentine, lowintensity, tubular structures on both T1- and T2-weighted images embedded in the hyperintense fat. In the axial plane, the enlarged nerve appears as a round, oval, or polylobulated structure with hypointense foci representing the nerve bundles embedded in the hyperplastic fat (Figure). Marom et alb referred to this as a coaxial cable-like appearance on the axial plane and a spaghetti-like appearance on the coronal plane.

The typical MRI features can help differentiate fibrolipomatous hamartoma from other nerve sheath tumors such as intraneuronal lipoma, traumatic neuroma, neurofibroma, and hemangiomas, thus allowing a preoperative diagnosis. Preoperative differentiation is useful because, in contrast to other tumors such as lipoma, fibrolipomatous hamartoma cannot be excised without sacrificing the involved nerve, which may result in considerable neurologic deficit.2 However, our patient had no postoperative neurologic deficit although a branch of the palmar sensory cutaneous branch of the median nerve had to be sacrificed. Magnetic resonance imaging also is useful in determining the extent and distribution of the lesion. Associated abnormalities such as intramuscular fat deposition and proliferation of the subcutaneous fat may be noted.

SUMMARY

Fibrolipomatous hamartoma is a rare lesion of the peripheral nerves, most commonly occurring in the median nerve. Magnetic resonance imaging demonstrates hypointense serpentine bundles on T1- and T2-weighted images embedded in hyperintense fat. This appearance is pathognomonic of fibrolipomatous hamartoma and obviates the need for a biopsy and can help guide further treatment.

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