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Vasu Pai
Editor
Orthopaedic Surgeon
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17. Winter. Boxer,s #.Journal of Hand Surgery (European Volume, 2007) 32E: 6: 709–713
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13. Proximal Tibial Osteotomy. J Knee Surg. January 2008 / Vol 21 No 1. 62
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II FREE PAPER

Modified Standard Surgical Protocol to Treat Elbow Dislocations with Radial Head and Coronoid Fractures Pai VS, Pai V

III Notes: Genetics in Ortho. Pai VS

IV Current concepts: Long-term outcome of frozen shoulder J Campbell Hand,. Shoulder Elbow Surg March/April 2008

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1.Ramamurthy. Scaphoid Non-union. J bone joint surg 2007. 89-B, 5,625-32

This retrospective study identified variables which influence the outcome of surgical management on 126 ununited scaphoid fractures managed by internal fixation and non-vascular bone grafting.
The site of fracture was defined by a new method: the ratio of the length of the proximal fragment to the sum of the lengths of both fragments, calculated using specific views in the plain radiographs.
Bone healing occurred in 71% (89) of cases.
Only the site of non-union (p= 1 × 10-6) and the delay to surgery (p = 0.001) remained significant on multivariate analysis.
The effect of surgical delay on the probability of union increased as the fracture site moved proximally.
A prediction model was produced by stepwise logistic regression analysis, enabling the surgeon to predict the success of surgery where the site of the non-union and delay to surgery is known.
Nonunion was defined as persistence of a fracture gap at least three months after the initial trauma, with associated resorption of bone and cystic changes at the fracture

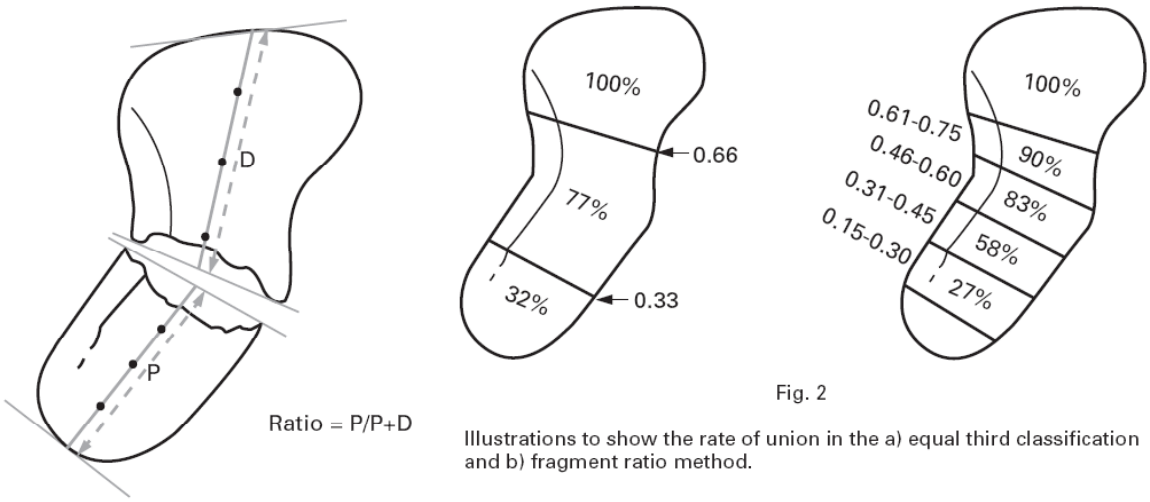

Fig. 2
Illustrations to show the rate of union in the a) equal third classification and b) fragment ratio method.

A predictive logistic regression model was created using the fragment ratio and time to surgery (Fig.3). The more proximal the fracture, the lower the probability of union, and the longer the delay before surgery the lower the probability of union. For example, if the fragment ratio is 0.6 then the probabilities of a successful outcome are 98% and 81% for surgery carried out at one year and ten years, respectively.

Describing the fracture site by the fragment ratio has a considerable advantage. .It describes the site of the fracture more adequately.

As the time delay to surgery has a direct effect on the outcome, the pattern of presentation can influence the overall rate of union in a given series of patients.

The age of the fracture has a large effect in proximal but only a weak effect in distal fractures. This is of practical importance when deciding how to treat these injuries.
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2. van den Bekerom. Open Vs Closed tibial osteotomy.J Knee Surg. 2008;21:68-74

This prospective cohort study compared opening wedge high tibial osteotomy with use of the Puddu plate versus closing wedge high tibial osteotomy with use of the AO/ASIF L-plate, focusing on complications (non-unions, infections, loss of correction, reoperations) and patient satisfaction (visual linear analogue scale).
During a 10-month period, we performed high tibial osteotomy for 40 patients experiencing medial knee osteoarthritis and a varus deformity. The average follow-up was 11 months.
The complication rate in patients treated with the opening wedge technique was significantly higher regarding tibial non-union, loss of correction, and material failure.
Patients in the closing wedge group were more satisfied with the postoperative result. This study found that the Puddu plate, despite 6 weeks of non-weight bearing facilitating the osseous consolidation with Vitoss cement, was not able to maintain the correction during the time required for bone healing.
1.Closed lateral wedge is blamed for patella baja. This can be prevented by early postoperative continuous passive motion treatment.
2 The general impression is that tibial slope decreases with closing wedge high tibial osteotomy and increases with opening wedge high tibial osteotomy.
3.With closed osteotomy: Patients in group B underwent a lateral closing wedge high tibial osteotomy. An oblique fibula osteotomy was made through a separate skin incision before the tibial osteotomy at the middle third of the fibula shaft
4

COMPLICATIONS, BASED ON TYPE OF HIGH TIBIAL OSTEOTOMY

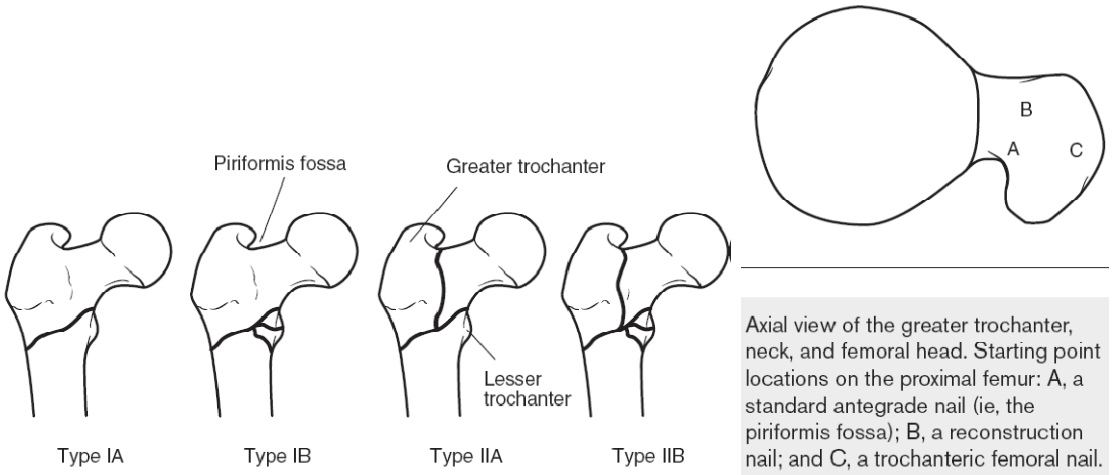
Variable	Opening Wedge	Closing Wedge	P
Right knee	7	9	
Left knee	13	11	
Follow-up, months (range)	8 (3-12)	14 (5-25)	
Complications	19 (in 11 patients)	6 (in 4 patients)	<0.000*
Tibial nonunion	7	1	0.018*
Fibular nonunion	NR	3	NR
Infections	2	1	0.0548
Loss of correction	3	0	0.072
Hardware failure	6	0	0.008*
Hardware loosening	1	1	1.0
Reoperations	3	3	1.0
Postoperative satisfaction score (range)	5.7 (1-10)	7.7 (3-10)	<0.05*

In vitro analysis revealed that the TomoFix plate was the more stable implant, compared with the Puddu plate. The Puddu and the TomoFix plate were able to maintain the correction for a load of more than 2500 N, (mean load: Puddu, 2537 N and TomoFix 2904 N),44 which is close to the axial compressive load
Under torsional load, failure occurred at a mean value of 19.3 N/m for the Puddu plate and 27.5 N/m for the TomoFix plate.
It is important to realize that stability is largely dependent on an unharmed lateral hinge. Currently, the modified Puddu plate does not support the lateral cortex and results in earlier failure due to fracture

3.Fracture Femur3. Sanderson. JOT.Volume 22 Supplement 3, March 2008, pp S9-S13

Lundy.Subtchanteric fractures. JAAOS Volume 15, Number 11, November 2007 663-671

Russel traction classification



Axial view of the greater trochanter, neck, and femoral head. Starting point locations on the proximal femur: A, a standard antegrade nail (ie, the piriformis fossa); B, a reconstruction nail; and C, a trochanteric femoral nail.

When placing three cannulated screws

To stabilize a femoral neck fracture, the inverted triangle pattern (ie, triangle apex distal) is less likely to be associated with a subsequent subtrochanteric femoral fracture than when the base of the triangle is distal (ie, triangle apex proximal)

The starting point for reconstruction nail

Is more anterior than is the point for standard antegrade nails (ie, the piriformis fossa. The axis of the femoral neck is anterior to the axis of the femoral shaft. Placing the nail more anteriorly in the proximal fragment allows the proximal screws to be directed in a straighter path into the femoral head rather than crossing from posterolateral to anteromedial.
French and Tornetta27 reported 100% union at an average of 13.5 weeks. These reports indicate that non-union is unusual in the management of subtrochanteric femoral fractures; however, non-union can be problematic when it does occur. Excessive soft-tissue stripping, placement of cerclage wires (Figure 7), or reckless handling of the medial fragments may well contribute to non-union. Subtrochanteric fractures treated with 135° compression screws are inherently unstable, and their application also may increase the risk of non-union.

118 antegrade nailing ot greater trochanter entry nail between January 2001 and April 2003 were included. Four patients who expired early in the postoperative period and 13 with insufficient follow-up were excluded from analysis.

Intervention: Patients were treated with either nailing through a greater trochanter starting point with the Trigen TAN nail (GT group) (n = 38) or through a piriformis fossa starting point with the Trigen FAN nail (PF group) (n = 53).

Outcome Measures: Operative time, fluoroscopy time, fracture alignment, fracture healing, 27complications, and functional outcome based on the lower-extremity measure (LEM).

Results

37 of the 38 fractures from the GT group and 52 of the 53 fractures from the PF group healed after the index procedure. There were 2 infectious complications, 1 from each group.

The average operative time was 75 minutes for piriformis insertion using the FAN nail and 62 minutes for trochanteric insertion using the TAN nail ($P = 0.08$).
The average fluoroscopy time was 61% greater for the PF group (153 seconds) than for the GT group (95 seconds) ($P < 0.05$).

Conclusions
A femoral nail specially designed for trochanteric insertion resulted in equally high union rates, equally low complication rates, and functional results similar to conventional antegrade femoral nailing through the piriformis fossa.

The greater trochanter entry portal coupled with an appropriately designed nail represents a rational alternative for antegrade femoral nailing with the benefit of decreased fluoroscopy time and decreased operative time in patients who are obese

The AO study group noted that “the nail should not be introduced through the top of the greater trochanter, but somewhat more laterally, so that neither the retinacular vessels nor the hip joint are damaged. The major problems associated with placing a straight nail (ie, without a trochanteric bend) through these starting points was comminution of the medial femoral cortex of the proximal fragment and varus fracture malalignment, especially for proximal fractures.

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4 Retrograde Vs Antegrade Femoral Nail. JOT. Sanders.Volume 22 Supplement 3, March 2008, pp S31-S38

283 consecutive adult patients; 140 retrograde nails and 153 antegrade nails.
The average clinical follow-up was 2 years
Both groups were comparable.

Results:
1. There were no significant differences in healing or incidence of malunion
2. Healing: 88% of the femurs No difference
3. In Group R, there were seven delayed unions (7 percent) and six non-unions (6 percent).
   In Group A, there were four delayed unions (4 percent) and six non-unions (6 percent).
   Healing ultimately occurred in 100 (96 percent) femurs
4.In Group R, there were 11% Mal-union; 13% in Group A.
5 The incidence of knee pain was significantly greater for Group R patients 36% [A = 9%]
6.The hip pain was significantly greater for Group A 10% [Group R=4%].

Conclusions: Retrograde and antegrade nailing techniques provided similar results in union and malunion rates. There were more complications related to the knee after retrograde nailing and more complications related to the hip after antegrade nailing.

In certain clinical situations, retrograde nailing is an attractive alternative to antegrade nailing for the treatment of patients with femoral shaft fractures.
1.These include patients with ipsilateral femoral neck or intertrochanteric fractures, in which a retrograde approach makes treatment of the proximal fractures easier.
2.Retrograde nailing does not violate the surgical approach for repair of ipsilateral acetabular or pelvic injuries.
3.In obese patients or patients with multiple fractures, retrograde nailing is technically easier,

We found no differences in malunion rates between the retrograde and antegrade nail treated groups. Eleven percent of the retrograde and 13 percent of the antegrade nail-treated femurs were malunited.

The reported limit of acceptable rotational deformities ranges from more than 5 degrees to more than 20 degrees. We used more than 5 degrees of angular deformity, more than one centimeter of length deformity, or more than or equal to 10 degrees of rotational deformity to define malunion of femoral shaft fractures because these criteria seem to be the most commonly cited definitions in the existing literature. We propose that these definitions be used in future reports to make future comparisons easier and more consistent.

5. Spondylolisthesis. J Bone Joint Surg Am. 2008;90:656-671

1.Dysplastic and isthamic are the two subtypes found in children, with the latter accounts for 85% of cases.

2.Traumatic spondylolisthesis is due to a fracture of the posterior elements, other than the pars interarticularis, leading to instability and olisthesis.

3.The dysplastic and isthamic patterns can be classified as congenital, whereas the degenerative, traumatic, and pathologic patterns are considered acquired3.

4.The majority (75%) of the cases of spondylolisthesis are grade I, and 20% are grade II.

5. More recently, in patients with high-grade spondylolisthesis as well as biomechanical studies have suggested that abnormalities of the sacral growth plate may be an aetiology of high-grade slippage

6. Natural History: The prevalence of a defect in the pars interarticularis is approximately 5% in the general population. Approximately 15% of individuals with a pars interarticularis lesion had progression to a spondylolisthesis. The slip was seen predominately during the growth spurt, with minimal change after the age 16 years.. No slip was >40%. Slip progression also appeared to slow with each decade and, of particular note, the results from a back pain questionnaire and a Short Form-36

7. Hamstring contracture is common, although the mechanism of this is unknown, but it resolves with spinal fusion

8. The degree of slip is the percentage of displacement, with a slip of >50% considered unstable and associated with progression

9. Unlike isthamic spondylolisthesis, degenerative spondylolisthesis occurs most often (in 85% of cases) at L4-L5. The L3-L4 level is the next most common level with L5-S1 rarely being involved.

10. The degenerative olisthesis, slip rarely progresses beyond grade I.

11. Degenerative spondylolisthesis is most common in the sixth decade of life and is more common in females than in males (a ratio of 6:1).

7. .Nutten. Nexgen Vs PCR knee. Journal of Bone and Joint Surgery; Jan 2008; 90B, 1

Prospective study; Double bind

Assess: Standard or high flex Nexgen Knee: functional outcome, ROM, Radiology
56: half of whom received each knee
1 year with electrogonometry

No difference

High flex knees: Posterior extension of femoral condyles, contact of the articular surface in flexion is maintained, allowing posterior translation of the femur and flexion beyond 120° without tibio-femoral impingement. Increased offset in flexion is achieved by removing an extra 2 mm of bone from the posterior condyles of the femur in order to accommodate the thicker condyles of the femoral component.

Table I. Mean (standard deviation) of the pre- and post-operative measures for the standard, high flexion and control groups

					WOMAC‡		
	Age in yrs (range)	Active flexion (°)	SF-36* physical	KSS† function (max 100)	Pain (max 20)	Stiffness (max 8)	Function (max 96)
Standard	68 (52 to 85)						
Pre-operative		107 (15)	36.9 (4.0)	45.3 (15.4)	9.5 (3.1)	4.6 (1.3)	31.8 (10.8)
One year post-operative		106 (17)	47.7 (8.5)	84.3 (10.6)	3.8 (4.0)	2.3 (1.9)	14.7 (13.2)
High flexion	71 (38 to 87)						
Pre-operative		108 (15)	36.6 (5.6)	50.7 (15.9)	8.5 (8.5)	4.3 (1.3)	28.3 (10.7)
One year post-operative		110 (17)	45.0 (9.4)	76.9 (19.7)	3.0 (3.6)	2.1 (1.6)	13.1 (12.6)
Control	69 (54 to 79)	134 (6.4)	54.7 (5.9)				

* SF-36, Short Form-36
† KSS, Knee Society score
‡ WOMAC, Western Ontario and McMaster University osteoarthritis index

8.Lonner. What's new in knee reconstruction? J Bone Joint Surg 2007;89:2828-2837
Treatment of Unicompartmental Arthritis

UKA
In a prospective study of 142 UKA [Fisher]. found better knee scores and pain scores at one year in association with metal-backed tibial components as compared with all-polyethylene tibial components, although these differences were eliminated by three years.
At both one year and three years, the prevalence of radiolucent zones beneath the tibial implant was somewhat higher in association with all-polyethylene implants, but this finding did not correlate with pain or function.
Patients who were managed with the minimally invasive approach had significantly faster rehabilitation and a reduction in hospitalization, although there were no other significant differences between the two groups in terms of clinical or radiographic outcomes.

Patello-femoral arthroplasty
Is gaining popularity as a treatment method for isolated patella-femoral arthritis.
Not all studies have demonstrated clear advantages of minimally invasive techniques for total knee arthroplasty.

Patellar eversion
In the study by Laskin 72 TKA that had been performed without patellar eversion were compared with 52 TKA that had been performed with patellar eversion. The authors found that an acquired patella baja occurred in 37% of patients with patellar eversion during surgery, compared with 12% of those with no-eversion group.

Kim et al. Reported on 100 consecutive bilateral total knee arthroplasties in patients who were prospectively randomized to undergo either a standard parapatellar arthrotomy or a quadriceps-sparing arthrotomy. Pain scores, functional scores, range of motion, radiographic parameters, and blood loss were found to be similar between the two groups, whereas operating times, tourniquet times, and technical difficulties were greater in the quadriceps-sparing group. The investigators did not find any early benefit derived from the quadriceps-sparing approach.

Computer-Assisted Surgery
In a case-control study by Stulberg 78 patients underwent TKA with use of either a conventional or a computer-assisted approach. Postoperative radiographs were evaluated by a blinded observer.
There were no significant differences between the conventional and computer-assisted groups with regard to limb alignment or component positioning.

DVT
Venographic evidence of deep-vein thrombosis was observed in 28.3% of the patients in the enoxaparin group, compared with 6.6% of those in the pneumatic compression/aspirin group. While this difference was significant, the prevalence of adverse events was similar .

PCR and PCS TKA
Vessely [2006 Ranawat Award] from the Knee Society for their survivorship analysis of 1008 cemented cruciate-retaining modular condylar TKA. The average fifteen-year survival rate was 97%with component removal for mechanical failure as the end point and 98.8% with component removal for aseptic loosening as the end point. Sixty-one percent of the patients

reported participation in recreational sports, and 95% were fully satisfied with the overall result.

Rosenzweig reported cruciate-retaining bilateral TKA with the left and right sides being randomized for patellar resurfacing or non resurfacing. The authors noted equivalent results when considering range of motion, the Knee Society score, patella-femoral pain, and revision rates. There appeared to be a small preference among the patients for the non resurfaced side.

Complications

Patello-femoral complications after TKA have been mitigated by a greater appreciation of component rotation and position as well as design improvements.;
A recent focus on range of motion after knee replacement has led to substantial research on the causes of stiffness and the intra-operative factors contributing to the amount of knee flexion.

Gandhi et al.32 described the risk factors for the development of postoperative stiffness Patellar thickness and flexion: On the average, for every increase of 2 mm in patellar thickness, a decrease of 3_ in maximum passive flexion resulted. The authors observed no effect of patellar thickness on tracking. They concluded that patellar thickness has minimal effect on postoperative flexion and should not cause the surgeon to remove excessive patellar bone stock in an effort to gain more flexion.

Namba presented the results of early and late MUA . 102 patients underwent early MUA [<90 days] and 93 patients underwent late MUA [>90 days]. In the early manipulation group, the average flexion improved from 68_ to 101_. In the late manipulation group, the average flexion increased from 81_ to 98. All patients had a decrease in pain;

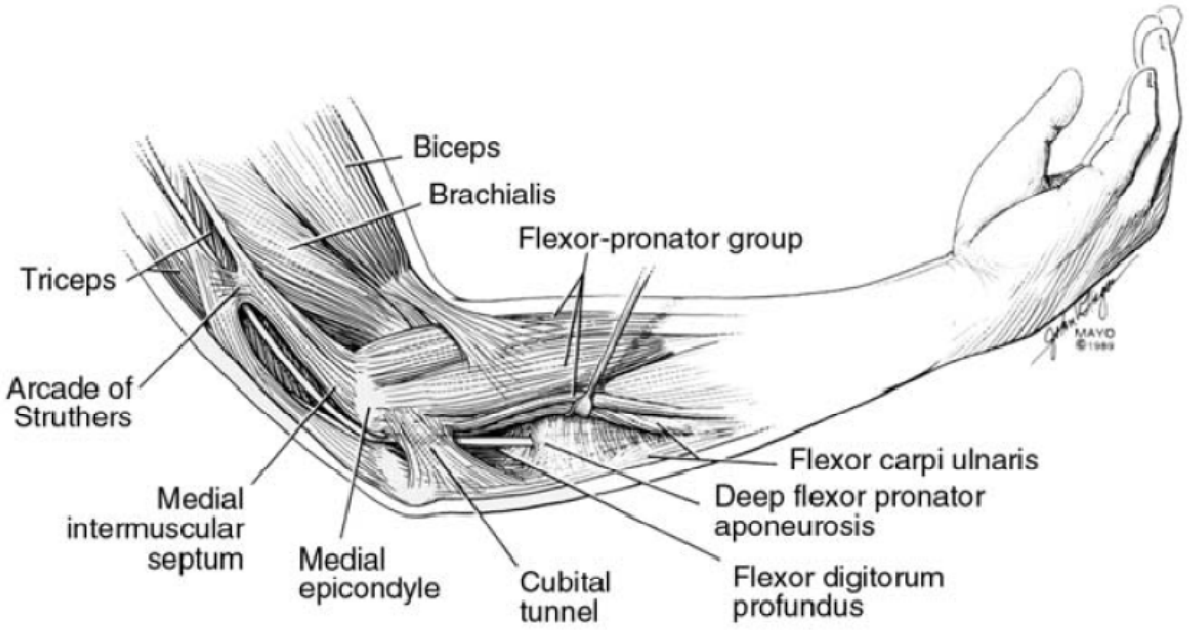
9. Elhassan. Entrapment of unlnar nerve. JAAOS 2007.Volume 15, Number 11,672-682

Ulnar nerve entrapment is the second most common nerve entrapment syndrome of the upper extremity. It is most common in the cubital tunnel.

Many patients benefit from nonsurgical treatment (eg, physical therapy, bracing)
When these methods fail or when sensory or motor impairment progresses, surgical release of the nerve at the site of entrapment should be considered. Surgical release may be done alone or with nerve transposition at the elbow.

Repetitive injury caused by vibrating hand tools as well as highly repetitive and forceful motion of the upper extremity have been implicated in ulnar nerve compression disorders at the wrist.

Rydevik demonstrated that 6.7 kPa extraneural compression applied for 2 minutes altered the shape of myelin sheaths. Axonal degeneration is noted in nerves subjected to compression for 4 weeks.



The five sites of potential ulnar nerve entrapment around the elbow: arcade of Struthers, medial intermuscular septum, medial epicondyle, cubital tunnel, and deep flexor pronator aponeurosis. (Copyright Mayo Foundation.)

The arcade of Struthers, which is present in approximately 70% of the population, is a thickening of the deep investing fascia of the distal arm. It extends from the medial head of the triceps to the intermuscular septum.

The proximal dorsal cutaneous sensory branch of the ulnar nerve helps to separate more proximal (cubital tunnel) from distal (Guyon's canal) compression neuropathy of the ulnar nerve.

Ulnar hammer syndrome is a likely diagnosis in the patient who works with vibrating tools.

Only when nerve compression results in Wallerian degeneration does the diminution in the density of innervations lead to increased two point discrimination (<6 mm, normal; >10 mm, poor).

Conduction velocity and latency are related to nerve myelination; electrical amplitude is related to the integrity of the axon.

The lower limit of normal with the elbow flexed to 135° should be >49 m/sec or within 11 m/sec of the forearm segment. The advantages of simple ulnar nerve decompression include simplicity of incision, and lack of postoperative immobilization.. Disadvantages include potentially inadequate decompression, ulnar nerve subluxation, and failure to address all potential pathology

In a prospective randomized study, Nabhan et al37 compared simple decompression with anterior subcutaneous transposition in 66 patients. 32 underwent simple decompression, and 34 underwent anterior subcutaneous transposition. No significant difference in pain, motor and sensory deficits, or nerve conduction velocity studies.

A subluxating ulnar nerve should be managed with anterior transposition. Submuscular transposition is recommended for the throwing athlete

10.League. Current Concepts Review: Plantar Fasciitis.Foot & Ankle International 29: 3. 2008:359-69

Plantar fasciitis is the most common cause of inferior heel pain.
It is estimated that 11% to 15% of all foot complaints
Plantar fasciitis is a self-limited condition
Symptoms resolve in 80% to 90% of cases within 10 months.
The most common site is near the origin at the medial tuberosity of the calcaneus.
General agreement in the literature favours a process where mechanical overload and excessive strain produce micro tears within the fascia, which eventually incites an inflammatory response.

Who is at risk
Advanced age, Abnormal foot posture, Elevated Body-Mass Index, and tight Achilles tendon, as well as extrinsic factors such as the use of poor footwear, the type and intensity of daily activity

MRI: May demonstrate thickening of the plantar fascia. The fascia of patients with plantar fasciitis has been measured at 7.40 mm ± 1.17, while in asymptomatic volunteers it measured 3.22 mm ± 0.44.

Treatment
1.Stretching
Although frequently utilized as a simple and inexpensive treatment for plantar fasciitis, recommendations for the optimal duration and frequency of stretching exercise have not been established unanimously.
The effect of stretching the Achilles tendon versus stretching of the plantar fascia in patients with plantar fasciitis has been investigated. and may be advantageous to Achilles tendon stretching alone

2.**Night Splints**: studies to support they are effective
A wide variety of prefabricated and custom-made orthoses, including heel cups, arch supports, and foot orthoses have been used to treat plantar fasciitis. Many studies evaluating the effects of orthotics on plantar fasciitis have compared multiple orthotic designs. The results of three trials demonstrate fair evidence to support the short-term use of foot orthoses in the treatment of plantar fasciitis (Grade B recommendation), with custom orthoses providing no measureable benefit over prefabricated orthoses.

3. The collective results of these investigations suggest that the relief from pain provided by the use of **anti-inflammatory agents** may be limited to the first month of treatment

4. **Extracorporeal US** Rx: The evidence to support the use of ESWT delivered by an electro-hydraulic, electromagnetic, or piezoelectric generator is fair yet conflicting, and the trials investigating these techniques are flawed due to inconsistencies in their methodology. For these reasons, ESWT receives a Grade C recommendation in the management of plantar fasciitis.

5.Surgery: Isolated partial or complete release of the plantar fascia or a fascial release combined with resection of the plantar calcaneal spur, excision of abnormal tissue, or nerve decompression are surgical treatment options for recalcitrant plantar fasciitis.

Summary

Due to the natural history of this condition and the lack of high-quality evidence to support one particular intervention, the initial treatment of plantar fasciitis should be limited to nonoperative methods. This may include the use of night splints, over-the-counter foot orthoses and routine stretching of the plantar fascia and/or the Achilles tendon. The use of anti-inflammatory agents administered orally, topically or by injection may be included in the initial management regimen. Further, the capacity of these agents to relieve pain has not been demonstrated to extend beyond the first month of use.

The evidence currently available to assess the efficacy of extracorporeal shock wave therapy lacks the quality and consistency to support its unconditional use in the management of plantar fasciitis. For those patients who have complied with a monitored course of nonoperative treatment and have failed to respond within six months, the use of extracorporeal shock wave therapy may be considered.

No study directly comparing the efficacy of the ESWT devices currently available has been published.

High quality evidence to support the surgical release of the plantar fascia alone or in combination with a neurolysis of the posterior tibial nerve and its branches is lacking. The absence of randomized, controlled trials in a well-defined cohort prevents the clear determination of the role, timing and effectiveness of these operations in the treatment of plantar fasciitis.

11. Bolland..Rheumatoid Forefoot Reconstruction: First Metatarsophalangeal Joint Fusion. Combined with Weil's Metatarsal. 47: 2, 2008,80-90

This study evaluates the outcome of rheumatoid forefoot reconstruction with arthrodesis of the first metatarsophalangeal joint (MTPJ) combined with multiple Weil's metatarsal osteotomies (WMO) to the lesser rays

A retrospective study on 17 consecutive patients (26 feet) was performed with subjective, clinical, and radiological analysis. At an average follow-up of 26.2 months, patients rated the result in 88% of cases as excellent or good with 76% improvement in pain, 74% improvement in function, and 70% improvement in footwear.

Weil's Metatarsal Osteotomy
A dorsal approach was used with an incision made over the dorsum of the first intermetatarsal space for a lateral release of the first MP joint. A further incision was made on the dorsum of the third space completed by a lateral incision if an osteotomy of the fifth metatarsal was necessary.

Technique
Z lengthening to the tendons along with longitudinal incision of the joint capsule allowed reduction of the proximal phalanx and good exposure to the metatarsal heads of all lesser rays.

A transverse cervico-cephalic osteotomy parallel to the plantar aspect of the foot was first performed on the second metatarsal and then for each of the remaining lateral metatarsals. Upon completion of the osteotomy, the metatarsal heads automatically recoiled and shortened.
A second thinning parallel cut was also performed in revision cases to further offload the metatarsal head. All osteotomy cuts were performed before stabilization.

The degree of reduction required was determined using a combination of preoperative templating (on weight-bearing radiographs) and the natural recoil of the metatarsal head postosteotomy

Fixation of the osteotomy was achieved using Twist off screws (De Puy UK, Leeds, England) Finally, the dorsal overhang of the proximal end of the metatarsal was removed. The extensor tendons were repaired and the wound was closed in 2 layers, subcutaneous and skin, maintaining the toe in flexion.

The WMO is a joint-preserving shortening osteotomy and **has been used to treat metatarsalgia, intractable plantar keratoses, and/or MTP joint dislocation**. All of these deformities are often encountered in the rheumatoid forefoot. In addition to preserving the multi-segmental tie-bar system and the weight-bearing parabola, the WMO provides a greater surface area (MT head versus end of MT shaft) for weight bearing versus a cut end of a metatarsal shaft. It also provides the surgical option of revision or resection in the future should persistent symptoms occur.

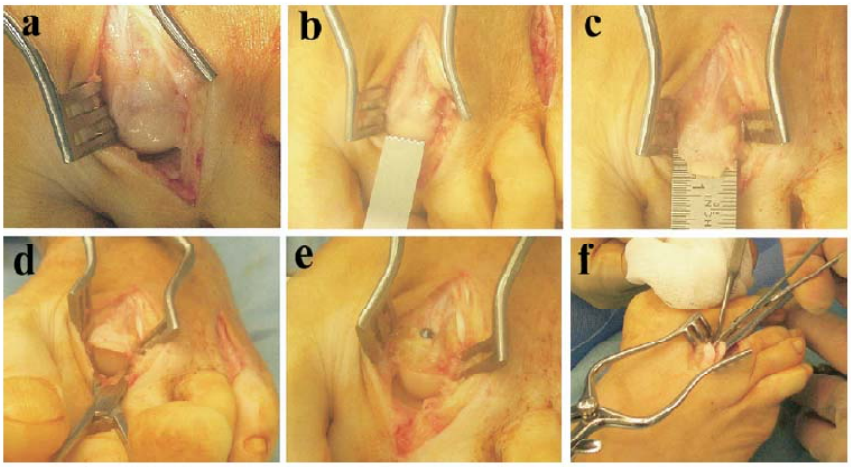


Figure 3 (a) Dorsal exposure in intermetatarsal space allowing exposure of metatarsal head. (b) Transverse cervicocephalic osteotomy parallel to the plantar aspect of the foot. (c) Degree of shortening measured to ensure maintenance of distal metatarsal arcade. (e) Osteotomy fixed and compressed with single twistoff screw with removal of protruding metatarsal superior cortex. (f) Second thinning parallel cut with removal of bone slice performed to further offload the metatarsal head.

In this series the success rate of WMO was 88%, with persistent/recurrent symptoms present in 12%. In those who had persistent metatarsalgia, a revision WMO was possible in 4 rays (36%); in 7 toes (64%) a Fowlers was performed because of joint surface destruction. Symptoms resolved in all cases.

A direct comparison to the literature remains difficult, as series have often described recurrence rates with respect to number of feet rather than toes. However, values for recurrent painful plantar callosities range from 12% to 66% and the rate of forefoot reoperation from 8% to 36%. The primary WMO success rate (12%reoperation rate) compares favorably and additionally provides a greater scope for revision procedures.

In all cases of recalcitrant metatarsalgia when revision WMO was possible with excision of an additional slice of bone to elevate the metatarsal head (an option that would not be present after resection procedures, all symptoms were resolved, again emphasising the versatility of this technique in the revision scenario.

12.Acute Patellar Dislocation JBJS A 90: 463-470

The treatment of acute patellar dislocation in children is controversial. The present report describes the long-term subjective and functional results of a randomized controlled trial of nonoperative and operative treatment of primary acute patellar dislocation in children.

Methods

36 operative Vs 28 Non-op Prospective

Operative treatment consisted of direct repair of the damaged medial structures if the patella was dislocatable with the patient under anaesthesia (twenty-nine knees) or lateral release alone if the patella was not dislocatable with the patient under anesthesia (seven knees). All but four patients who underwent operative treatment had a concomitant lateral release.

The rehabilitation protocol was the same for both groups.

The patients were seen at two years, and a telephone interview was conducted at a mean of six years and again at a mean of fourteen years.

At the time of the most recent follow-up, the subjective result was either good or excellent for 75% in nonoperatively treated knees and 66% in operatively treated knees. The rates of recurrent dislocation in the two treatment groups were 71% (twenty of twenty-eight) and 67% (twenty-four of thirty-six), respectively. The first redislocation occurred within two years after the primary injury in twenty-three (52%).

Instability of the contralateral patella was noted in thirty (48%) of the sixty-two patients. The only significant predictor for recurrence was a positive family history of patellar instability. The mode of treatment and the existence of osteochondral fractures had no clinical or significant influence on the subjective outcome, recurrent patellofemoral instability

Conclusions:

The long-term subjective and functional results after acute patellar dislocation are satisfactory Initial operative repair of the medial structures combined with lateral release did not improve the long-term outcome, despite the very high rate of recurrent instability.

A positive family history is a risk factor for recurrence and for contralateral patellofemoral instability. Routine repair of the torn medial stabilizing soft tissues is not advocated for the treatment of acute patellar dislocation in children and adolescents.

13.Arthroscopic findings in patient requiring UTO. *J Knee Surg*. 2008;20:63-67

ABSTRACT: This study determines the occurrence of significant, arthroscopically correctable intra-articular pathology at the time of valgus-producing high tibial osteotomy for symptomatic medial compartment arthrosis with varus malalignment.

32 knees scheduled for the procedure underwent concomitant knee arthroscopy.
In the lateral compartment, meniscal tears occurred in 50%, unstable chondral flaps in 13%, and loose bodies in 9%.
In the anterior compartment, unstable chondral flaps occurred in 31%. In the medial compartment, meniscal tears occurred in 91%.

The 5 knees with mechanical symptoms did not demonstrate a higher occurrence of loose bodies, chondral flaps, or meniscal tears compared with knees without mechanical symptoms. There was a significant occurrence of correctable pathology in all three compartments in knees undergoing valgus-producing high tibial osteotomy for the treatment of symptomatic medial osteoarthritis with varus malalignment. Prior studies have not systematically documented these findings.

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14.Metal on Metal resurface arthroplasty. *J Bone Joint Surg Am.* 2008;90:637-654.

a. Advantages of hip resurfacing arthroplasty.

Bone conservation: Improves biomechanical restoration
Easy revision THR
Reduced dislocation rates
Normal femoral loading and reduced stress-shielding
Easy [post- trauma or osteotomy]

b. Prosthetic bearing surfaces for hip resurfacing operations are currently manufactured from high-carbon (0.20% to 0.25%)

c. The large-diameter metal-on-metal components could potentially result in very low wear if other important factors such as surface smoothness and, in particular, diametric clearance (the difference between the diameters of the femoral head and acetabular cup are optimized

d. Wear of Retrieved Components
Metal-on-metal articulations produce small but measurable quantities of mostly nanometer to submicrometer-sized metal particles that can migrate systemically
In terms of actual in vivo wear, early data from analyses of retrieved McKee-Farrar prostheses showed an average linear wear rate of 0.003 mm/yr and 0.004 mm/yr for the femoral head and the acetabular cup, respectively

d. Hip Resurfacing Arthroplasty in Women of Child-Bearing Age
Recent studies have raised the possibility of DNA and chromosomal changes occurring in patients with a metal-on-metal or non-metal-on-metal bearing
As yet there have been no confirmed cases of defects in infants attributed to these effects, but studies specifically designed to detect such changes have yet to be undertaken, to our knowledge.

Recently, Ziaee et al.76 confirmed previous reports that both cobalt and chromium ions cross the placenta. It was also established that the placenta has a modulatory (reducing) effect on the concentration of these ions that reach the fetus.

At this time, women of child-bearing age should be informed of the theoretical risks to the fetus associated with metal ion exposure. Because of these theoretical risks, these patients should consider conventional total hip arthroplasty with bearing surfaces other than those consisting of metal on metal. Ziaee et al. recommend that women of child-bearing age who strongly desire a metal-on-metal hip resurfacing arthroplasty delay childbirth for approximately two years after implantation, when the run-in wear phase has finished

Biomechanical Reconstruction
1.Close reproduction of the normal anatomy of the proximal part of the femur
2.It is generally recommended a relative valgus placement of 5° to 10° while avoiding notching of the superolateral cortex of the femoral neck.

Results of Clinical Series
99.8% survivorship at a mean of 3.3 years in a group of 446 hips
At another center, a 94.4% survivorship was reported at four years after 400 hip resurfacing

prostheses performed with hybrid fixation in a group of patients
The Australian Joint Replacement Registry [113,327 primary THR]
Men with a hip resurfacing implant who are less than 65 years old have the same revision rate at four years as do men of the same age who have a conventional THR
The revision rate for women with a hip resurfacing implant is twice that for men with a hip resurfacing implant.

Femoral Neck Fracture
The most common complication of hip resurfacing arthroplasty: 0-12%
In Australia a fracture rate of 1.46% at a mean of 15.4 weeks
Causes:
Technique: Notching, varus
The rate of fracture in women is twice that reported in men
This high fracture rate may be a consequence of the reduced bone density in postmenopausal women or the increased risk of over penetration of cement in osteoporotic bone.

The periprosthetic tissues of patients who have had revision surgery because of suspected metal sensitivity are typically characterized by the presence of extensive perivascular or diffuse infiltrates of both B and T lymphocytes

To distinguish these lesions from T-cell-dominated delayed-type hypersensitivity, the term ALVAL (aseptic lymphocytic vasculitis associated lesions).

Serum and Whole-Blood Metal Ions
Typically, blood testing has been done for research, and use of metal ion testing to monitor the wear of metal-on-metal bearings is controversial
Reports of metal ion levels include the variability in the units of measurement and the specimens used (serum, whole blood, red blood cells, or urine). The majority of reported results are based on serum levels. Recently, Daniel et al.131 questioned the appropriateness of using serum levels and recommended using whole-blood levels

Radiographic Monitoring
1. Changes in the angle between the peg of the femoral component and the femoral shaft. Progressive change in this angle may indicate early failure.
2. Implant subsidence. The distance fromthe tip of the femoral peg to the lateral femoral cortex over time likely indicates implant subsidence and instability.
3. Femoral neck narrowing. This is a common phenomenon after hip resurfacing arthroplasty. A retrospective review of the results of 160 hip resurfacing arthroplasties at a maximum of six years revealed some degree of femoral neck narrowing in 70% of the patients
4. Femoral neck scalloping. Scalloping can be either superior or inferior. : due to either bone resorption or femoroacetabular impingement.
5. Radiolucent lines. Observations of radiolucencies around the femoral peg
A so-called pedestal sign at the tip of the implant
6. Osteolysis. Periprosthetic osteolysis and its evolution

15. Romereo. The Clinical Consequences of Flexion Gap Asymmetry in Total Knee Arthroplasty. The Journal of Arthroplasty Vol. 22 No. 2 2007. 235

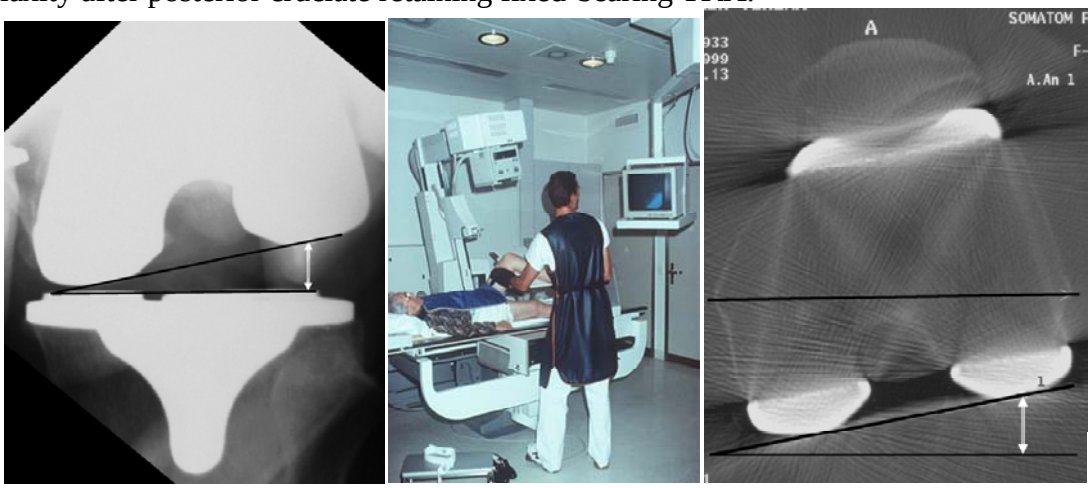
This study was carried out to compare femoral component rotation of 18 knees from 18 patients who suffered from lateral flexion instability after TKA.

The symptomatic patients showed increased lateral joint laxity a determined by fluoroscopic stress radiography. Femoral CT was determined by computed tomography scans. The femoral component rotation was more internally rotated in symptomatic patients (5.58) than in controls (1.08) (P = .04).

Varus laxity in flexion was higher in symptomatic patients (11.08) than in controls (7.08) (P b .001). Increased lateral flexion laxity is associated with increased internal femoral component rotation and a less favourable clinical outcome.

Flexion instability has recently been recognized as one possible source for postoperative discomfort such as pain on the medial tibial metaphysis, soft tissue tenderness involving the tendons of the pes anserine, a sense of instability, and recurrent knee joint effusion. Increased anteroposterior flexion laxity has been attributed to widening of the flexion gap due to early, progressive incompetence of the posterior cruciate ligament in PCR TKA.

Increased varus flexion laxity may occur as a consequence of flexion gap asymmetry due to internal malrotation of the femoral component
!8 patients with a persistent painful knee and clinically identified increased lateral flexion laxity after posterior cruciate retaining fixed-bearing TKA.



Internal rotation of the femoral component is determined by the angle between the transepicondylar axis (TEA) and the tangental line of the posterior condyles (PCAs) of the femoral component. For the measurement, the line of the TEA is moved parallel(lowest line). The angle between the TEA and the PCA measures 108 (right side of the computed tomography picture corresponds to lateral, left to medial).

Table 1. Femorotibial Laxity (in Full Knee Extension and 90° of Flexion), Coronal and Axial Alignment as Determined by Fluoroscopic Stress Radiography, Long-Standing X-Rays, and Computed Tomography Scans for Symptomatic Patients (n = 18) and Controls (n = 10) (Median and 25%/75% values)

		Symptomatic (n = 18)	Controls (n = 10)	*P*
Extension	Varus laxity	4.0° (3.0°/4.0°)	4.0°(3.8°/4.3°)	.44
	Valgus laxity	2.0° (1.3°/3.8°)	2.0° (2.0°/4.3°)	.46
Flexion	Varus laxity	11.0 (9.5°/12°)	7.0°(6.4°/8.0°)	<.001
	Valgus laxity	4.0° (3.0°/4.0°)	5.0° (4.3°/6.5°)	.36
Femoral component rotation*		+5.5° (+4°; +8°)	+1.0° (0°; +6°)	.04
Hip-knee-ankle axis†		0.0° (−1.0; +2.0)	0.0° (−2.0; +0.6)	.64

*Internal rotation, +.
†Varus, +; valgus, −.

Increased varus or valgus laxity in flexion because of femoral component malrotation has extensively been examined in cadaveric studies under loaded and unloaded conditions . Although femoral component malrotation is considered the major cause for flexion gap imbalance, little is known on the clinical consequences.

The application of fluoroscopic stress radiography on a patient lying relaxed on a designated radiolucent bench proved to be a feasible, inexpensive, fast, safe, and reproducible method for detecting increased varus-valgus laxity of the knee in flexion on a routine base.

Attfield et al reported also on knees that were not balanced in flexion but were fully balanced in extension. Proprioception was reduced in such knees compared with knees that were properly balanced in flexion and extension.

In summary, increased flexion gap imbalance yields poorer clinical results and is associated with increased internal femoral component malrotation..

The unbalanced soft tissues may create higher strains in the surrounding tissues and consequently produce pain. Avoidance of an asymmetric flexion gap should be a surgical goal.

16. Peroneal tendon. Heckman. J Bone Joint Surg Am. 2008;90:404-418.

Peroneal tendon disorders are rare, are frequently missed
MRI is the standard method of radiographic evaluation; however, diagnosis are based primarily on the history and physical examination.
Peroneal tenosynovitis typically responds to conservative therapy
Operative treatment is frequently required for peroneal tendon subluxation [reconstruction of the superior peroneal retinaculum +/- deepening of the retromalleolar groove].
Operative treatment of tendinosis based on the amount of remaining viable tendon: tears involving <50% of the tendon, and tenodesis is indicated for tears >50%

When untreated, peroneal tendon disorders can lead to persistent lateral ankle pain and substantial functional problems.
Peroneal tendinitis and tenosynovitis usually result from prolonged or repetitive activity, particularly following a period of relative inactivity. These disorders frequently cause chronic ankle pain in runners and ballet dancers, and they have been reported in up to 77% of patients
The prevalence of incidental peroneus brevis splits found in cadaver specimens has ranged from 11% (fourteen of 124) to 37%
A cavovarus foot position may cause overloading of the peroneal tendons during activity, leading to tendinosis and tears, particularly of the peroneus longus tendon
Both peroneal tendons enter a common synovial sheath approximately 4 cm proximal to the tip of the lateral malleolus. They course posterior to the lateral malleolus through a fibro-osseous tunnel called the retromalleolar groove, with the peroneus longus tendon lying posterolateral to the peroneus brevis tendon.

The retromalleolar groove is formed by the superior peroneal retinaculum posterolaterally, the fibula anteriorly, and the posterior talofibular, calcaneofibular, and posterior-inferior tibiofibular ligaments medially. This sulcus is lined with fibrocartilage and varies in depth and shape.

The superior peroneal retinaculum is the primary restraint to tendon subluxation at the ankle. It is a fibrous band of tissue approximately 1 to 2 cm wide that originates from the posterolateral aspect of the distal part of the fibula and has a variable insertion. The most common type was found in 47% (fourteen) of thirty cadaver specimens and comprised two bands: a superior band that inserts on the anterior aspect of the Achilles tendon sheath and an inferior band that inserts on the lateral aspect of the calcaneus at the peroneal tubercle30.

Distal to the ankle, the tendon sheath bifurcates around the peroneal tubercle as the peroneal tendons traverse the lateral aspect of the calcaneus. The peroneal tendons pass through the inferior peroneal retinaculum approximately 2 to 3 cm distal to the tip of the fibula. The peroneus brevis tendon continues directly to its insertion onto the tuberosity of the fifth metatarsal. The peroneus longus tendon turns medially between the cuboid groove and the long plantar ligament and inserts onto the plantar surface of the base of the first metatarsal and the lateral aspect of the medial cuneiform.

The retromalleolar sulcus varies in size and shape, potentially affecting the stability of the peroneal tendons as they pass posterior to the fibula. 82% had a concave retromalleolar sulcus, 11% were flat, and 7% had a convex surface. The sulcus averages 6 to 7 mm in width and 2 to 4 mm in depth and is enhanced by a fibrocartilage ridge. The shape of the groove is determined by this cartilaginous ridge rather than by the concavity of the fibula

Peroneal tendon tears and ruptures can result from either acute or chronic injuries. Acute inversion ankle sprain, chronic ankle instability, and peroneal tendon subluxation have all been implicated as mechanisms of peroneus brevis tendon tears.

Longitudinal split tears of the peroneus brevis are usually found within the retromalleolar sulcus, indicating that they are likely due to mechanical trauma in this region.

Peroneus longus ruptures usually occur at the level of the cuboid, at the os peroneum, at the peroneal tubercle, or at the tip of the lateral malleolus. They can be associated with a fracture through the os peroneum, as they are in patients with painful os perineum syndrome.

Peroneal subluxation: Due to disruption of the superior peroneal retinaculum and allows the peroneal tendons to subluxate anteriorly over the lateral malleolus. Rupture of the superior peroneal retinaculum occurs infrequently.
Associated with 1.lateral ankle instability; 2 An inadequate retromalleolar groove; 3 laxity of the superior peroneal retinaculum due to a calcaneovalgus foot or neuromusculardisease; 4.congenital absence of the superior peroneal retinaculum

The examiner should assess for
1.Swelling and warmth along the course of the peroneal tendons.
2.Forefoot and hindfoot alignment [A cavovarus foot is associated with an increased rate]
3. A Coleman block test
4.Palpable thickening within the tendons
5. Pain is exacerbated by passive hindfoot inversion and ankle plantar flexion
6.Muscle strength may or may not be decreased.
7.These symptoms are usually severe in younger patients [elderly may be asymptomatic]
8. Patients may also describe a history of recurrent ankle sprains and chronic ankle instability.
9.The peroneal tunnel compression test is used to evaluate peroneus brevis tears. This maneuver involves applying manual pressure along the peroneal tendon sheath in the retromalleolar groove with the knee flexed 90° and the foot in a resting plantar flexed position 40°. Loss or limitation of plantar flexion of the first ray may indicate a peroneus longus rupture.
10 A painful snapping or popping sensation in the lateral aspect of the ankle.
11.Pain on active dorsiflexion and eversion or by active circumduction of the foot.
11. Palpable clicking, snapping, or crepitus of the tendons
12. Peroneal tendon subluxation can be visualized when the patient walks
15.A detailed history should include the presence of associated conditions. Rheumatoid arthritis, psoriasis, hyperparathyroidism, diabetic neuropathy, calcaneal fracture, fluoroquinolone use, and local steroid injections have all been reported to increase the prevalence of peroneal tendon dysfunction.
17. Weight-bearing AP and lateral
Dynamic high-resolution ultrasonography : identification of episodic peroneal subluxation and associated tendon splits that may be missed on magnetic resonance imaging. The positive predictive value of ultrasonography for detecting peroneal subluxation has been reported to be 100%. Ultrasonography can identify peroneal tendon tears with 90% to 100% accuracy, 85% to 100% specificity, and 100% sensitivity.

Peroneal tendon tears are also readily visualized with magnetic resonance imaging. A peroneus brevis tear may appear as a c-shaped or bisected tendon or as increased intratendinous T2 signal. A peroneus longus tear may demonstrate a linear or round area of

increased signal within the tendon, a fluid-filled tendon sheath, marrow edema along the lateral calcaneal wall, or a hypertrophied peroneal tubercle.

Conservative measures consist of Nonsteroidal anti-inflammatory medications, rest, ice, compression, and modification of activity. Physical therapy that includes stretching, strengthening, and proprioceptive exercises can be beneficial. Management with an orthotic device is based on the foot alignment . For refractory cases, immobilization in a rigid ankle-foot orthosis, a controlledankle- motion (CAM) boot, or a short leg walking cast for six weeks may be attempted.

Operative treatment of refractory peroneal tendinitis

Exploration; Debridement; tenosynovectomy

Recurrent subluxations
(1) anatomic reattachment of the retinaculum,
(2) bone-block procedures,
(3) reinforcement of the superior peroneal retinaculum with local tissue transfers,
(4) tendon rerouting behind the calcaneofibular ligament, and
(5) groove-deepening procedures.

Peroneal Tendon Tears
Operative treatment of peroneal tendon tears varies depending on the severity of the pathological involvement.. Krause and Brodsky proposed that tears involving <50% of the cross-sectional area be treated with excision of the affected area followed by tubularization and those involving >50% of the cross-sectional area be treated with tenodesis.
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17. Winter. Boxer,s #.Journal of Hand Surgery (European Volume, 2007) 32E: 6: 709–713

1. Boxer’s fracture: When palmar angulation exceeds 45° or when the patient presents a rotational
deformity of the little finger in flexion, reduction, with or without surgical treatment, is mandatory
2. Surgical: Intramedullary pinning (the ‘Bouquet’ technique) or transverse wiring
3. This injury has been described as ‘‘a tolerable fracture in an intolerable patient’’
4. Intramedullary wiring: The surgical approach may also endanger branches of the dorsal branch of the ulnar nerve
5. Aa 3 months, the functional results remained slightly better in the intramedullary pinning group.

Fig 1 Intramedullary pinning of a little finger metacarpal neck fracture.

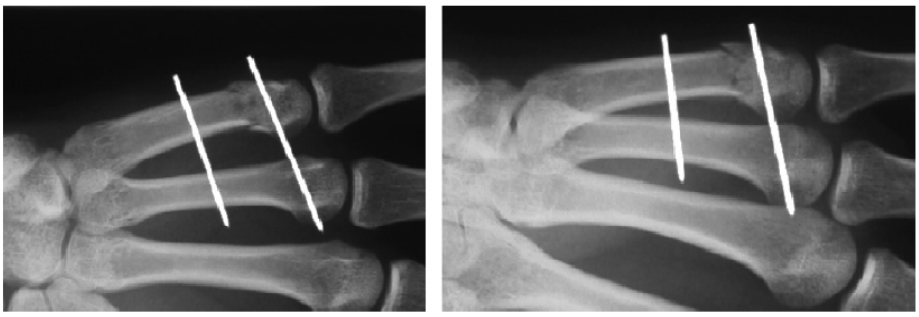

Fig 2 Transverse pinning of a little finger metacarpal neck fracture.

18. Glebke. Scaphoid Fracture. Journal of Hand Surgery (European Volume, 2007) 32E: 709–713

Percut fication Vs Cast for waist fracture acphoid:

5 weeks early healing [9weeks Vs 14 weeks]

7 weeks early back at work

9 weeks early for sports

II. FREE PAPER: MODIFIED STANDARD SURGICAL PROTOCOL TO TREAT ELBOW DISLOCATIONS WITH RADIAL HEAD AND CORONOID FRACTURES

Pai VS, Pai V

Terrible triad is an incapacitating injury that usually requires surgical repair. Improved understanding of the elbow constraints providing stability, the soft-tissue injury patterns, and better methods of surgical repair led us to develop a consistent surgical strategy for these injuries. This includes (1) fixation of the coronoid fragment or repair of the capsule anteriorly with an anchoring stitch, (2) fixation or replacement of the radial head, (3) repair of the lateral collateral ligament complex This protocol reliably restores congruent elbow stability, allows early motion, enhances functional outcome, and minimizes complications. This modification of standardised protocol with use of suture anchors to repair the capsule in addition to replacement of radial head was used in four patients All four patients had excellent to good results at 6 months.

KEY WORD:Terrible triad, Radial head fracture, Elbow dislocation, Coronoid fracture, Anchoring suture, Radial head replacement

INTRODUCTION

Traditional methods involve excision of radial head or replacement or radial head fixation or an additional procedure of MCL repair. With this treatment, this fracture has a well-deserved reputation for complications and poor clinical outcome[1,2]
Recent reports have introduced the idea of using standardised protocol [3,4]. to improve surgical outcome. The protocol includes : fixation or replacement or radial head, repair of lateral collateral ligament and fixation of the capsule to ulna through drill holes in the ulna.

The repair of the capsule to the ulna with suture anchors have multiple advantages of this technique over traditional methods: simplicity of the procedure, minimize exposure. In an effort to further expand on this new technique, we provide a detailed description of our method of treating terrible triad.

OUR SURGICAL TECHNIQUE

All had a modified standard protocol

1. Initial closed reduction of the dislocation
2. ORIF or Replacement of radial head [all 4 patients had radial head replacement]
3. Repair anterior capsule to coronoid using anchoring stitch
4. Repair lateral structures using anchoring stitch
5. Brace for 4 weeks and ROM commenced in the brace 10 days

The patient is placed in supine position and general anaesthesia is employed. The injured extremity is prepared and draped in the standard sterile fashion. A tourniquet is placed on the proximal arm and inflated after exsanguination. A dose of 1g of cephazole given at induction.

The surgical approach is a direct lateral incision. The most common injury is an avulsion of the lateral collateral ligament complex from the humerus, leaving a typical "bare spot" on the posterolateral aspect of the lateral condyle. [Figs 1]
All four patients in this series, the radial head was badly comminuted and required excision

[Generally, the primary goal is to fix the fracture if there are one or two fracture fragments of the head]. All four patiens in this study required an excision of the radial head. This dramatically improved visualization of coronoid.

The pilot hole is drilled to the approximate depth at the anterior aspect of the coronoid [Fig 2]. The suture anchor [2.0-mm titanium Mitek corkscrew suture anchors (Arthrex, Inc, Naples, Florida)] is inserted into the hole. Once the anchors are securely buried within the coronoid, the suture strands are used to capture the capsule.

Next attention is directed to prosthetic replacement. Metal implant is used because of its better mechanical properties and clinical results[5,6]. A modular prosthesis[Avante modular metal radial head] that allows independent alteration of the head diameter and height and the stem size is preferable since this allows the surgeon to exactly recreate the dimensions of the native radial head. Trial components are implanted, and then the elbow is put through a range of motion to determine the size that best restores joint stability. The definitive components are then inserted.[Fig 3]

Next the detachment of the lateral ligament complex from the humerus is repaired with non-absorbable sutures placed with suture anchors placed in the center of rotation of the elbow laterally [located at the center of the capitellum]

Prior to definitive closure, the elbow is examined for stability. The goal is concentric reduction with no observed posterior or posterolateral subluxation or dislocation through an arc of flexion-extension from 20° to 130°.
The splint is left in place for ten days, depending on the stability achieved and other associated injuries. Patients are allowed active and active-assisted exercises in ROM brace after 10 days for next four weeks. Full forearm rotation is allowed with the elbow at 90° of flexion.

MATERIALS AND METHODS

4 patients were operated by a single surgeon [VP] at 3 different hospitals [Dunedin Hospital[1], Hawkes Bay[2], Gisborne [1] between 2004-2006.

Diagnosis is usually made on radiographs [Fig 4] but CT imaging is always used [Fig 5]. All four patients underwent capsular repair using this suture anchor technique, radial head replacement and repair of the lateral collateral ligament. Patient details given in table 1

The patients were followed clinically and radiographically for 1 year.

Clinical evaluation included determination of pain, function, range of motion, and stability. Anteroposterior and lateral radiographs were assessed for fracture union, implant loosening, heterotopic ossification, degenerative changes, and joint congruity.[Fig 6]

CASE EXAMPLES

The narrative account of Patient #1 is included here as a case example. A 28-year-old white male fell on an outstretched hand from a mountain bike and presented with a painful, swollen elbow. There was clinical suspicion of fracture dislocation of the elbow. X rays [Fig 4] consistent with the diagnosis of a“Terrible triad of the elbow”

The patient initially underwent a closed reduction of the dislocation and elbow is held in flexion in a slab. Next morning, he had a CT scan of the elbow [Fig 5] which defined Type I coronoid fracture and a gross comminuted fracture of the radius. Patient was booked for modified Standard protocol and option of ORIF or replacement of the radial head.

Operative findings consisted of irrepairable fracture of the radial head, avulsion of the lateral collateral ligament and a type I fracture of the coronoid with extensive rupture of the anterior capsule from the coronoid..

Surgery was uneventful and at the end of one year, he was back at work with a range of movement of 10-125° with a full a range of rotation.

RESULTS

The mean duration of follow-up was twenty-six months, with a range of 1-3 years. The mean arc of flexion-extension (and standard deviation) was 116° ± 10°, the mean flexion contracture was 15° ± 10°.

At the time of follow-up, all four patients had maintained a concentric reduction of both the ulnotrochlear and the radiocapitellar articulation. When pain, ROM and functions are taken in to account all four had a good to excellent results.

Complications

None required a re-operation. One patient who had demonstrated neuropraxia of the radial nerve, recovered completely by 3 months.

One had a fair result clinically as his range of movement was 20-100°. He declined further intervention.

Radiographs

There was no evidence of dislocation of radial head prostheses. Ulnotrochlear joint is concentrically reduced. Isometric fixation LCL could be demonstrated in all cases [Fig 6].

DISCUSSION

The terrible triad of the elbow consists of posterior dislocation of the elbow, radial head fracture and coronoid fracture. This injury pattern is relatively uncommon, and little information has been published regarding its treatment. The results of terrible triad are often poor because of recurrent instability and stiffness from prolonged immobilization being the problem [8] {Table 2).

Coronoid fracture management

Regan [9] did not consider small coronoid fractures clinically significant. This was further confirmed by a Cadaveric study [10] What was not appreciated was that even a small fragment may have part of the anterior capsule attached to it, so reduction of the fragment contributes to the joint stability.

When injury to the elbow is so severe that the ligamentous structures experience massive disruption, reduction and splinting are inadequate to assure stability, and surgery is required. Such injuries are relatively rare, so individual practitioners may not recognize that standard closed treatment is inadequate and can result in chronic instability[11].

The common coronoid fractures that occur in the terrible-triad pattern of traumatic elbow

instability (posterior dislocation with fractures of the radial head and coronoid) usually are small transverse fragments [Type I]. The average height of the coronoid fracture fragment was 7 mm. [12]. Recent evidence suggested that coronoid tip [Type I] fractures are unstable. The distance from the tip of the coronoid to the proximal capsule was 2.5 mm. The location of the capsule insertions well within the Type I region and the most coronoid tip fractures is associated with disruption of the anterior capsule.[13].
Difficulty of management of complex injury is recognised recently in a large series by Papandrea et al [14] However, there were 4 cases of 21 in this series with Type I corocoid. Initial management did not include fixation of coronoid and all four had chronic instability. Authors suggested that instability that persists after the initial unsuccessful management of a coronoid fracture and an elbow dislocation is a difficult problem to salvage with subsequent reconstruction.
Josefsson [15] reported that each of 4 patients who experienced redislocation had a displaced small fragment of the coronoid process associated with a fracture of the radial head; the radial head was resected on the day of injury in 3 of the 4 patients. When coronoid injury is ignored, it can lead to insufficiency of coronoid and may result in posterolateral rotatory instability [11]

Ring[2] reported results of 11 patients each treated by a different surgeon who had varied training, experience, and familiarity with elbow trauma All patients had a repair or replacement of radial but none of the coronoid fractures had been repaired. Only four patients had a satisfactory outcome.

Presently, it is noted integrity of anterior capsule is important for stability of the elbow joint. King[16] suggested that the repair of the cornoid is more important than replacing head of the radius or repair of collateral ligament [12].

McKee and Pugh [1,2] suggested a surgical protocol which included fixation or replacement of the radial head, fixation of the coronoid fracture if possible, repair of associated capsular and lateral ligamentous injuries, and in selected cases repair of the medial collateral ligament and/or adjuvant hinged external fixation. The concluded that this protocol for elbow dislocations with associated radial head and coronoid fractures restored sufficient elbow stability to allow early motion postoperatively, enhancing the functional outcome.
The advantages of our modification of the suture anchor technique for fixation of the coronoid, including 1)reduced operative time, 2) easy access to the implantation site, 3) better resistance of suture material, 4) minimization of stress along the suture line with range of motion and higher strength of repair and 5) Better anteroposterior stability . In fact, one of the attractive points of this technique is its relative simplicity. Suture anchors have enjoyed successful widespread application in many other areas of the body, making most surgeons familiar with the basic tenets of their use. Our early results have been very positive.

We believe that coronoid fractures typically occur from a shearing mechanism that produces a transverse fracture and results as the coronoid is driven against the unyielding distal part of the humerus (as the radius and ulna dislocate or subluxate posteriorly). The fracture fragment typically remains attached to the anterior capsule. Thus, in our opinion, a coronoid fracture is a pathognomonic sign of an episode of (posterior) elbow instability

A recent biomechanical study of patellar tendon repair methods revealed that repairs performed using suture anchors had less gap formation throughout cyclic loading in comparison to repairs performed with transpatellar drill tunnels.[18]. The anchor repair

method eliminates the “dead length” by providing an aperture-fixation construct in which only a very small amount of suture exists between the anchor eyelet and the interface with the tendon.

A goal of surgical treatment is to provide enough strength in the construct to permit early range-of-motion exercises, thereby reducing postoperative stiffness, improving function, and allowing earlier return to work or sport. The repair provides sufficient strength for starting range of motion very early in the postoperative period, although a direct comparison of techniques and rehabilitation protocols in a controlled study has not yet been performed.

Despite these and other advantages, the suture anchor technique does have its drawbacks. The first and most obvious is financial. A second concern is that of infection. Should the patient suffer a deep infection or septic arthritis, removal of all foreign material is much easier in a transosseous repair than a suture anchor case.

Radial head management
In “terrible triad” the radial head fractures are usually comminuted and options are

1. Open reduction and internal fixation: Not always repairable.
   Best when possible
2. Replacement of head of the radius
3. Excision of head of the radius: High evidence of Osteoarthritis [15]
   Is abandoned
4. Silicon replacement [14]. High incidence of synovitis and is abandoned.

Longitudinal forearm stability is maintained through the interaction of several anatomic structures. One such structure, the interosseous membrane. The interosseous membrane's load transferring ability reduces the forces placed on the radiocapitellar articulation, thereby protecting this joint. Large sustained loads occur after radial head resection with concurrent interosseous membrane tears, resulting in the proximal migration of the radius and disruption of the distal radioulnar joint. Broberg and Morrey[17] reported similar findings. At an average of ten years postoperatively, they noted arthrosis in twenty-two of twenty-four patients in whom a fracture-dislocation of the elbow had been treated without repair or replacement of the radial head

Management of lateral collateral ligament [LCL]
In the present series, lateral soft-tissue injury was a universal finding, and, consistent with observations in previous studies, the most common pathological finding was an avulsion of the lateral collateral ligamentous complex and capsule from the posterolateral aspect of the distal part of the humerus. Less common were midsubstance tears, and ulna-sided lesions were rare. Recognition of these patterns is important for two reasons: (1) defects in soft-tissue planes created by the trauma should be utilized in the surgical approach, and (2) these structures should be repaired as an integral part of the closure. Thus, repair of the lateral collateral ligament complex with suture anchors or drill holes in the distal, lateral part of the humerus was the most common form of lateral ligament repair.

In general, terrible triad injuries are difficult to treat, and, even with optimal care. When managed with a standard protocol, Pugh reported a mean arc of 112°, recurrent instability in 6% and the need for secondary intervention in 22%. They recommended application of articulated external fixator if instability persists after this conventional treatment. Although our series is small, none of the patient required this approach.

The mean duration of follow-up was twenty-six months, with a range of 1-3 years. The mean arc of flexion-extension (and standard deviation) was 116° ± 10°, the mean flexion contracture was 15° ± 10°

At a mean of 32 months postoperatively, the flexion-extension arc of the elbow averaged 116° ± 10° and forearm rotation averaged 136° ± 16° and the mean flexion contracture was 15°. . Concentric stability was restored in al four elbows.

Repairing the medial and lateral collateral ligaments and replacing the radial head or repair provide lateral stability only; the posterior stability is not restored. The anterior capsule usually tears on its ulnar aspect. We believe that reduction of the small fragment of the coronoid process partially repairs the anterior capsule and thereby reduces joint instability. Further study of the anterior capsule's role in the biomechanics of the elbow joint is needed.

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Table 1

	Occupation	Sex/Age	Injury	ROM at one year	Complication
Case 1	Labourer	M 28Y	Fall	10 -125	None
Case 2	Teacher	M 32Y	Bike	10-130	Radial N neuropraxia
Case 3	Bush work	M 28	Fall	10-130	None
Case 4	Engineer	M 34	Bike	20-100	Mild stiffness

Table 2 Comparative studies

	No	Type of Treatment	Good to excellent	Complications
Ring[2]	11	Radial head ORIF 5, Radial head excised in 4 ; in none the coronoid is repaired. LCL repaired in 3	4/11	5 post op dislocation [arthrosis, synostosis, deformity]
Pugh and Mckee [1]	36	Radius: ORIF or Replace Coronoid: Repair; LCL: Repaired [6MCL; 2 hinged brace]	28/36	2 synostosis 1 recurrent instability
Popovic[7]	11	Floating radial head replacement	8/11	-
Terada[11]	3	Repair radial head and LCL;osseous fixation of Type I coronoid	3/3	
Pai [Present study]	4	Radial head replacement; coronoid and LCL repair	4/4	Neuropraxia of Radial N

LEGENDS

Fig. 1 Intraoperative photograph made through a lateral surgical approach of a patient with the so-called terrible triad injury of the elbow. There is characteristic stripping of the lateral collateral ligament complex from the distal part of the humerus. A portion of the common extensor origin/lateral ligament complex can be seen hanging down from the bare lateral condyle

Fig. 2: The pilot hole is drilled to the approximate depth at the anterior aspect of the coronoid

Fig. 3: The definitive radial head replacement

Fig. 4: Plain X ray showing a posterior dislocation with comminuted fracture of the head of radius

Fig 5:CT following closed reduction:demonstrating type I coronoid fracture and a grossly comminuted fracture of head of the radius

Fig 6: Postoperative radiographs made following fixation of the coronoid fracture and replacement of the radial head. There is a concentric reduction. Anchoring sutures is in right place

Figure 1:

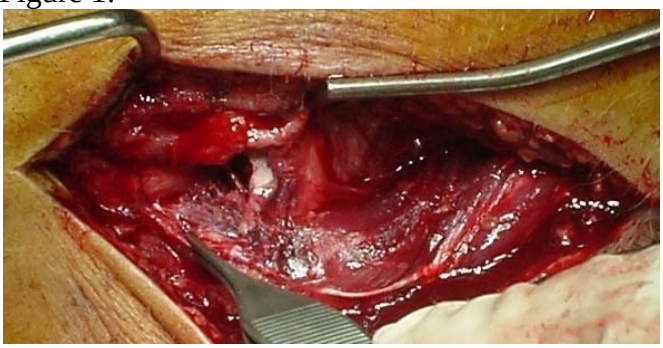


Figure 2

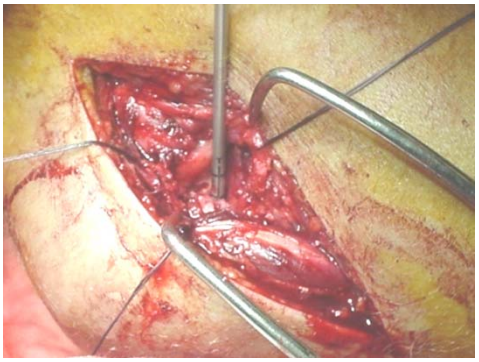


Figure 3:

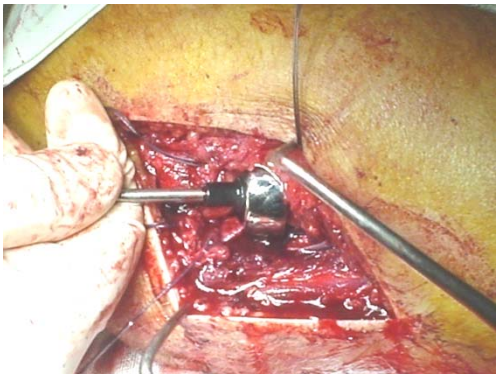


Fig.4

Figure 5:

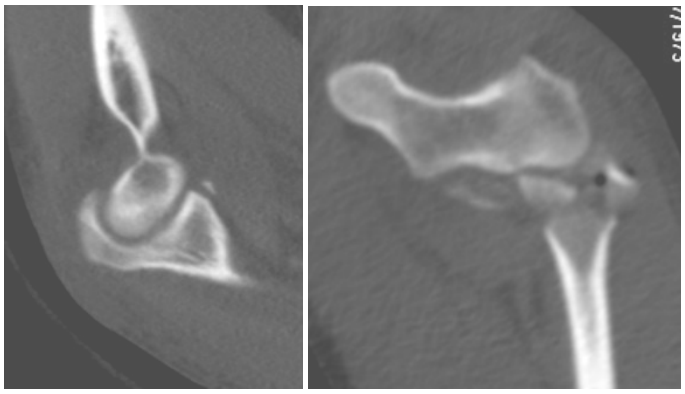
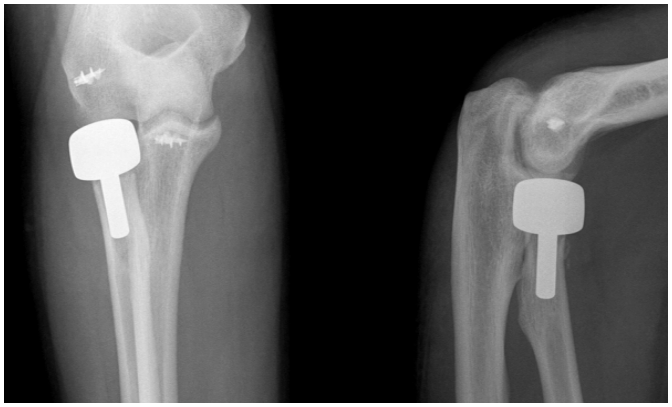


Figure 6



III NOTES. GENETICS

INHERITANCE

I. Mutant gene (Mendelian disorder)

II. Polygenic inheritance: Hypertension/Diabetes

III. Chromosomal aberration: Mongolism, Turners, Klenfelter's syndrome

	AD	AR	SLD
One affected parent	50%	None	Mother to son
Two affected carrier	100%	25% affect; 50% carry	50% son affect; 50% Daughter career
Age of onset	Onset delayed	Onset is early	Delayed
Penetrance	Variable penetrance	More uniform	Uniform
Consanguineous Marriage	Not affected	Affected	Royal family
Mutation	Common	Rare	Uncommon

AD	AR	SLD
Achondroplasia	Enzyme defect	Dominant
Neurofibromatosis	Sickle cell anemia	Hypophosphatemic rickets (Vitamin D refractory rickets)
Osteogenesis imperfecta	Osteogenesis imperfect	
Marfan's syndrome	Hypophosphatasia	
Ehlers Danlos syndrome	Vit D dependent rickets	
Multiple epiphyseal dysplasia	Homocystinuria	Recessive
Spinal epiphyseal dysplasia		Hemophilia
Multiple diaphyseal dysplasia		Duchene muscle dystrophy
Polydactyl		Hunter's syndrome

MENDELIAN TYPES

I Autosomal dominant [AD]
2. Autosomal recessive [AR]
3. Sex linked inheritance{SLD]
4. Multifactorial inheritance

POLYGENIC OR MULTIFACTORIAL INHERITANCE

When one parent affected, 5% chance to I degree relative (son)
5% changes of recurrence with each pregnancy
10% if two siblings affected
Monozygotic twins: range is 20-40%
Examples: Diabetes, hypertension, gout, Schizophrenics
Talipes, CDH:,Scoliosis: incidence sibling 5-30%
Rheumatoid arthritis

FEW EXAMPLES GENETIC DISORDER AND ABNORMAL PROTEIN

Disease	Chromosomal defect	Defective protein
Achondroplasia	4	FGFR3
Marfan's	15	Elastin
Osteogenesis imperfecta	17	Collagen I
Charcot Marie Tooth disease	17	Connexon
Neurofibromatosis	17	Neurofibrin
Fredrick's	9	Frataxin
Fibrous dysplasia		Gs protein

TRISOMIES

DOWN'S SYNDROME [TRISOMY 21]
Cardiac Malformation
Risk of Leukemia
Risk of Infection
Early onset of Dementia

EDWARD SYNDROME [TRISOMY 18]
Micrognathia,
Mental retardation
DDH
Rocker bottom feet,
Congenital heart

PATAU SYNDROME [TRISOMY 13]

Cleft lip and palate,
Cardiac,
Mental retardation
Polydactyl

KLENFELTER'S [XXY]

Tall
Infertility; testicular atrophy
Low IQ
Acne
Scoliosis

TURNERS [XO]

Short stature
Amenorrhea
Infertility
Webbed neck
No mental retardation
Cubitus valgus, Widely spaced nipple
Coarctation of aorta
Horse shoe kidney
Malignant Hypothermia

DOWN'S SYNDROME

Trisomy 21; Translocation 21-14 (4%);Mosaic type (1%)
Do not use the term "Mongol"
Effect of maternal age: older the mother, high the risk of child with Down's syndrome (1 in 25 in >45 years)

Diagnosis

Prenatal	Amniocentesis
Clinical	Mongoloid facies[Flat occiput; depressed nasal bridge, inner epicanthic fold], eyes are upslanted Brushfield spots Short neck Hand Lax joints Congenital heart problem Dementia

Non-orthopedic manifestation

Congenital heart disease	50%
Duodenal atresia Hirschprung disease	
Anorectal atresia	<10%
Leukemia	1-2%
Hypothyroidism	40%
Diabetes	2%

Premature ageing/ Alzheimer's Majority
Higher risk of infection
Higher risk of anesthesia
Sensitive to atropine

Cervical instability may be present

C1-C2
In 20% incidence, A-A distance is more than 5 mm
High risk for neurology
High incidence of Pseudarthrosis following spinal fusion

Careful neurological assessment: in patient participating in sports [X rays at 10 yrs]

Hip instability

10% and usually seen at 10 yrs and not at birth
Multidirectional
Young patient hip spika
Older: Capsular plication, osteotomy or femur and acetabuloplasty
Results are poor compared to CDH
For painful hip in adults: THR

Ligamentum laxity and excessive femoral anteversion
Patello-femoral subluxation or dislocation
Metatarsus adductus and Metatarsal. Primus Varus
Tarsal coalition may be more frequent.
Hand: Simian Hand
Little finger deviates radially (Delta phalanx)

Scoliosis: Thoracolumbar (50%)

IV. Current Concepts

Long-term outcome of frozen shoulder (J Shoulder Elbow Surg 2008;17:231-236.).

Two-hundred and sixty-nine shoulders in 223 patients with a diagnosis of primary frozen shoulder were
studied. The main outcome measure was the Oxford shoulder score. The mean follow-up from symptom onset was 4.4 years (range, 2-20 years). The mean age at symptom onset was 53.4 years; with women affected more commonly than men (1.6:1.0).Twenty percent of patients reported bilateral symptoms, but there were no recurrent cases. In the long term, 59% of patients had normal or near normal shoulders and 41% reported some ongoing symptoms. The majority of these persistent symptoms were mild (94%), with pain being the most common complaint. Only 6% had severe symptoms with pain and functional loss.Those with the most severe symptoms at condition onset had the worstlong-term prognosis, P <.001.

Primary frozen shoulder is a common, severely debilitating condition that is frequently difficult to manage. Its prevalence is reported as 2-5%.4,10,20 The diagnosis of frozen shoulder is made on clinical grounds utilizing a set of criteria described by Codman.15 Shoulder stiffness may also occur after fracture or in association with joint diseases, such as osteoarthritis;this is commonly referred to as a secondary frozen shoulder.There are few studies on the outcome of frozen shoulder, and these reports often involve small numbers of patients (range, 21-62 patients).1,17,18,28,34,37 Interpretation is difficult if patients studied are in the nontreatment arm of a clinical study. Our understanding of the natural history of the condition is, therefore, based on limited information. This evidence suggests that this is a condition that affects more women than men; is most common in the 40–60-year-old age group; is characterized by pain and stiffness in the shoulder passing through three phases: pain, stiffness,and resolution; and invariably leads to full functional recovery.1,17,28,34,37 Frozen shoulder has been reported to be associated with a number of conditions: Dupuytren's disease, 8,23,38 thyroid disease,2,44 Parkinson's disease,35osteoporosis and osteopaenia,26,30 cardiorespiratory disease,3,42 stroke,22 hyperlipidaemia,9 ACTH deficiency,13 upper limb minor trauma,39 cardiac33,40and neuro-surgery,5 and diabetes, where the condition is often longer lasting and moredifficult to treat.4,24,27,32.

A genetic basis has also been suggested.19 The pathology of frozen shoulder remains unclear; however, there is evidence to suggest that there is an initial inflammatory process7,29,36,41,43 leading to fibrosis.8,20,25,29 The aims of this study are to describe the medium and long-term outcome of primary frozen shoulder using a validated patient based questionnaire in a large clinic-based population of patients, and to identify any prognostic factors.

MATERIALS AND METHODS

Patients were identified from the register of diagnostic codes for a specialist shoulder clinic over a 5-year period (1997–2002). The diagnosis of frozen shoulder was confirmed from the patient records and was made using Codman's criteria; namely, shoulder pain that comes on slowly and is felt at the deltoid insertion; an inability to sleep on the affected side; atrophy of the spinati; and little in the way of local tenderness. In addition, there is restriction of both active and passive movement with painful and restricted elevation and external rotation. The pain is very trying, but the patient is able to continue with daily habits and routines. Shoulder radiographs are normal. Cases of secondary frozen shoulder and patients with a stiff shoulder associated with a fracture, arthritis, or any significant trauma were excluded. Cases where

there was any doubt about the diagnosis existed were also excluded.Following ethical approval (AQREC A03.027), patients identified by the above criteria were sent a detailed questionnaire inquiring about their frozen shoulder. The questionnaire was designed to gather information on current level of symptoms, symptoms at presentation, and associated conditions. Two-hundred and twenty-three patients with primary frozen shoulder in 269 shoulders were evaluated. The Oxford Shoulder Score (OSS) (Table I) was used as the outcome measure of the current level of symptoms.16 It is completed by patients unaided and contains 12 questions, each of which has 5 response categories. Scores from questions are added to produce a single score with a range from 12 (least difficulties) to 60 (most difficulties). The score can also be expressed as a percentage, where 12 points ¼ 100% and 60 points ¼ 0%. The assessment is based on the symptoms experienced in the shoulder during the preceding 4 weeks and, therefore, reflects their condition at the time of completion of the questionnaire. The OSS has been shown to be internally consistent, reliable (reproducible), valid, and sensitive to clinical change (responsive).16,31

Patients were separated into 3 categories of severity of shoulder symptoms based on the OSS (Table I). Patients were asked about associated conditions and about the onset and severity of their symptoms. Onset of symptoms was assessed as either slow or sudden (within 1-2 days) and severity of symptoms in the first 6 months as either none, mild, moderate, severe, or unbearable. Episodes of related minor trauma were documented. To investigate the genetics of frozen shoulder; patients were questioned about family history of frozen shoulder. They were asked if any of their siblings had been diagnosed by their GP or hospital as having a frozen shoulder. The same question was asked regarding the spouse (as a control) to allow relative risk calculations to be made. Relative risk (RR) was calculated using the formula below:
Relative risk ¼ % siblings with frozen shoulder % spouses with frozen shoulder A ratio of greater than 1:1 suggested an increased risk to siblings.
Data analysis :The data from all completed questionnaires were entered onto a secure database (Microsoft Access 2002, Microsoft Corporation, Redmond, WA). Statistical tests were performed using SPSS 12.0 (SPSS Inc, Chicago, IL). The Oxford shoulder scores were not normally distributed (Shapiro-Wilk test); therefore, the Mann Whitney U test (Wilcoxon rank test) was used to analyze the OSS data.

RESULTS

Completed questionnaires from 223 patients with information on 269 shoulders were evaluated. The mean age of patients at condition onset was 53.4 years (range, 27-85 S.D. +/- 8.9). Of the 223 shoulders, 137 (61%) were female and 86 (39%) were male: (1.6:1.0). Mean time from onset of symptoms was 52.3 months (range, 24-240 months) with 90% of shoulders followed up at a minimum of 36 months. Symptoms were reported as slow in onset in 61% (163 shoulders) and sudden in 39% (106 shoulders). Twenty percent of patients (45/223) reported bilateral symptoms (31 females and 15 males, a ratio of 2:1); none occurred simultaneously. Right shoulders were affected in 46% (124) and left in 54% (145). Two-hundred and forty-four patients were right-hand dominant and 25 left-hand dominant. The dominant arm was affected in 48% (129) and nondominant in 52% (140). In 22% (60 shoulders), a history of minor trauma to the limb was reported prior to the onset of symptoms. There were no recurrent cases. Of the 223 patients, 31 (14%) were diabetic; 7 (3%) had Dupuytren’s contracture; 5 (2%) hyperthyroidism; 14 (6%) hypothyroidism; 6 (3%) osteoporosis; 38 (17%) high cholesterol; 5 (2%) stroke; 15 (7%) heart disease; 8 (4%) lung disease; and only 1 patient (0.5%) reported having Parkinson’s disease.

The mean interval from symptom onset to completion of OSS was 4.4 years (52.3 months), range, 2- 20 years. The mean OSS for all patients was 18 (87.5%), range, 12-54 points (standard deviation 9.2). In 59% of patients, symptoms were near normal, in 35% mild to moderate, and in 6% severe (Table II). The proportion of shoulders with these symptoms within each follow-up period is shown in Figure 1.In 35% of patients reporting persistent mild to moderate symptoms, the most common problems were related to pain (Q1, Q8, Q11, Q12) (Figure 2 and Table II). In 6% of patients with persistent severe symptoms, the reported problems were more varied and included functional as well as pain related issues (Figure 3). Analysis of the severity of presenting symptoms yielded a subgroup at risk of a worse prognosis. Those patients who reported unbearable symptoms in the first 6 months had a significantly worse outcome compared to those who reported severe, moderate, or mild symptoms at presentation (P ¼.009). The mean OSS's for these groups were 24.02, 17.46, 16.60, and 16.25, respectively. Twenty-one percent of patients (9/42) with unbearable symptoms at onset went on to have persistent severe symptoms, compared to the 3.1% (7/227) without unbearable symptoms, P <.001 (chi-square test). Patients received a variety of treatments and often received more than one modality of treatment; including no treatment (95); physiotherapy (55); steroid injection (139); manipulation under anesthesia (MUA) (5); MUA and arthroscopic release (5); and MUA and arthroscopic hydrodistension (20). This plurality of treatments leads to loss of independence between intervention groups and, unfortunately, makes meaningful comparisons among interventions impossible. Patients were grouped according to a number of demographic factors. The OSS of the subgroups closely approximate the overall mean. With regard to worse outcome, the greatest differences are seen in the diabetic and injury groups, which did not reach statistical significance, P ¼ .456. Although more common in women, there was no difference in outcome between the sexes P ¼ .642. There was also no significant difference in outcome for those with Dupuytren's disease or sudden versus slow onset, or for dominant arms. No significant difference in OSS was seen in those with a family history of the condition, P ¼.211. Ninety-one percent of patients (203/223) were successfully contacted to confirm their marital status, number of siblings, and family history of frozen shoulder. There were 269 siblings and 176 spouses, of whom 13 and 10 reported a positive history of frozen shoulder, respectively. This gives a relative risk of 0.85.

DISCUSSION

This is the largest study of outcome in frozen shoulder to date. The OSS has been used as the principle outcome measure. Use of a patient based outcome measure rather than a physician based score gives a validated subjective score of the patients symptoms, free of clinician bias, but it does not give precise measurements of strength and range of movement. The study confirms a female preponderance (1.6:1.0) and that symptom onset is most common in the 6th decade. Bilateral involvement was found in 20% of cases, but rates of up to 34% have previously been reported.37

Full resolution of symptoms does not always occur, but persistent symptoms are most commonly mild. At the mean follow-up of 52.3 months, 59% had a near normal shoulder, 35% had mild/moderate symptoms, and 6% had severe symptoms. These categories of the OSS were developed to ease interpretation of individual scores by grouping the data. The most commonly reported problems in the 35% of patients reporting persistent mild to moderate symptoms were in response to the questions exclusively related to pain: questions 1, 8, 11, and 12 (Table II and Figure 2). The reported problems in the 6% of patients with persistent severe symptoms were more varied and included functional problems, as well as pain related issues (Figure 3). Fifty-six percent of shoulders reviewed at less than 3 years

reported higher rates of mild/moderate symptoms than near normal shoulder symptoms (41%); however, near normal shoulder symptoms predominated thereafter (56% vs 33%).This suggests that symptoms improve in the first 3 years from onset and that this improvement then ceases. We attempted to identify subgroups of patients who may have a worse or better prognosis. Those patients who reported unbearable symptoms in the first 6 months from symptom onset—rather than severe, moderate, or mild symptoms—had a worse long-term outcome ($P < .01$). This is corroborated by the fact that 21% of patients (9/42) with unbearable symptoms at onset compared to 3.1% (7/227) without unbearable symptoms had persistent severe symptoms ($P < .001$). No other distinguishing characteristics to this subgroup were identified. Recall bias may have influenced this finding, in that patients with a poor outcome may have recalled their symptoms as initially being more severe. Most of the subgroups had very similar scores to the overall mean.Those with a worse mean OSS of more than 1 point were the diabetic group (mean OSS ¼ 19.7) and injury group (mean OSS ¼ 19.1), but neither was statistically significantly different. Diabetics have been reported to be affected more commonly and to carry a worse prognosis.4,24,27,32Our study supports this but does not reach statistical significance, most probably due to the small subgroup size, P ¼.456 (n ¼ 35/269) (Table III). Arm dominance has been suggested as affecting the prognosis,6,14 but no evidence of a difference was found in this study. Minor trauma to the affected limb was noted in 22% of patients prior to the onset of their symptoms; this was most frequently in the form of a very mild soft tissue injury to the upper extremity. It did not preclude the diagnosis of primary frozen shoulder and did not influence the final outcome. Codman stipulated an insidious onset of symptoms in his diagnostic criteria; 61% of shoulders in this study group reported slow onset of symptoms and the remainder described a sudden onset within 1-2 days. There was no difference in outcome between these groups. Frozen shoulder has been reported to be associated with a number of different conditions. Patients only reported comorbidity if their condition had been diagnosed by a hospital or family doctor. This is a specialist clinic population and assessment of disease association is, therefore, subject to bias. Of particular note is the small number of patients with Dupuytren's disease (3%) seen in this study, compared to rates of up to 52% reported in the literature.38 This low rate does not directly contradict these recent findings, 38 as the low rate could be due to under-reporting by patients who are often unaware that they have Dupuytren's disease.A recent twin study has suggested that genetic factors may play a part in the etiology of frozen shoulder.19 This is reportedly supported by the observed association with Dupuytren's disease, which is also believed to have a heritable component.11 Sibling relative risk, using spouses as controls, was used in this study as a method of assessing the presence of a genetic etiology. The use of relative risk and spouses as controls is well established.12,21 An increased sibling relative risk would indicate a possible genetic etiology to the condition.12 We found a relative risk of .85, which suggests that genetic susceptibility is not an important factor in the etiology of frozen shoulder. However, the drawbacks to reaching a conclusion are twofold. First, the study relied on the patient's knowledge of sibling and spouse disease, which may lead to significant under reporting. This is a comparison of the two, and because the same reporting error exists for both, we believe the result has validity. Second, the study relies on the accurate diagnosis of frozen shoulder for the sibling and spouse population made outside of the specialist clinic.

CONCLUSION

This study shows that frozen shoulder occurs most commonly in the 6th decade and affects women more than men 1.6:1.0. It is most commonly of gradual onset (61%) but may develop rapidly over a 24- 48 hour period (39%). It may be precipitated by minor trauma and is bilateral in 20% of cases. It does not appear to recur in the same arm. The OSS for patients

with frozen shoulder peaks and improves during a 1-3 year period after onset. In patients with frozen shoulder presenting to a shoulder clinic, more than 50% will have a near normal shoulder in the long term; 35% of patients will have persistent symptoms of mild pain and loss of function long term, with mild pain being the most common feature. Only 6% will have severe symptoms long term. Those patients with the most severe symptoms at onset carry the worst prognosis.

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Table I Categories of severity of shoulder symptoms

Near normal shoulder symptoms	= a score of	12 - 16	=	>90%
Mild to moderate symptoms	= a score of	17 - 36	=	50-90%
Severe symptoms	= a score of	≥37	=	<50%

Table II Number of shoulders at final follow-up

Time from symptom onset in years	2	3	4	5	6	7	>7	Total
Near normal shoulder symptoms	11	49	34	20	24	16	3	159 (59%)
Mild/moderate symptoms	15	29	16	14	10	8	1	94 (35%)
Severe symptoms	1	9	1	1	3	0	1	16 (6%)

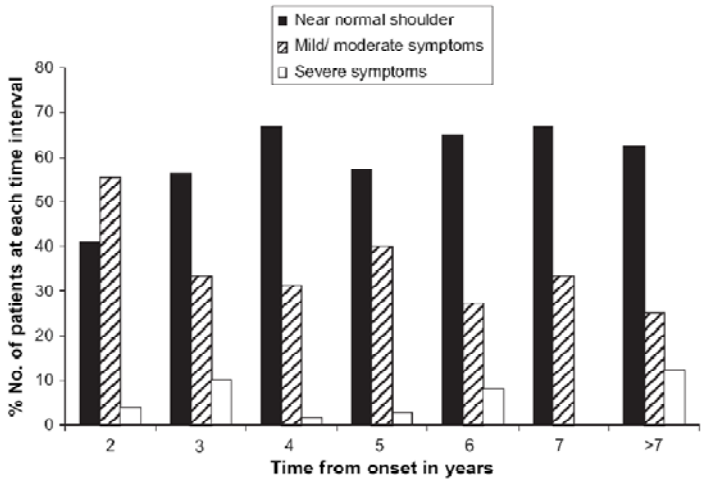


Figure 1 OSS at time from symptom onset.

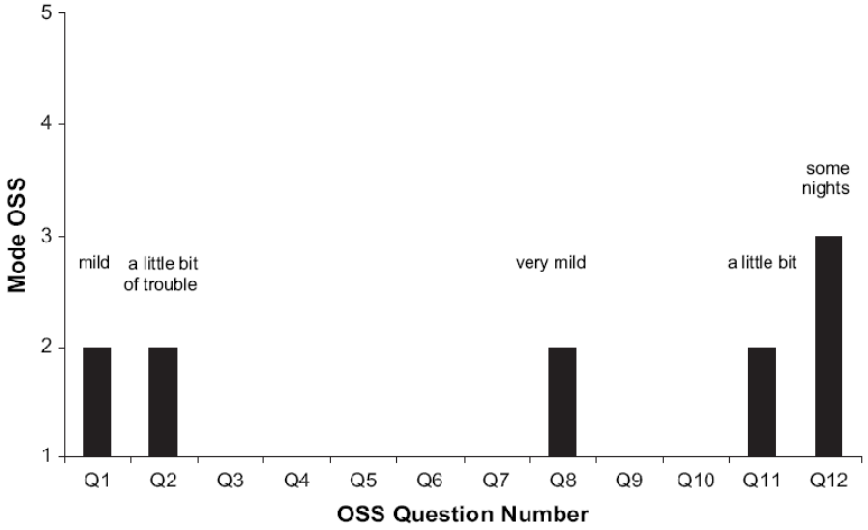


Figure 2 Most common OSS's for individual questions in the persistent mild/moderate symptoms group.

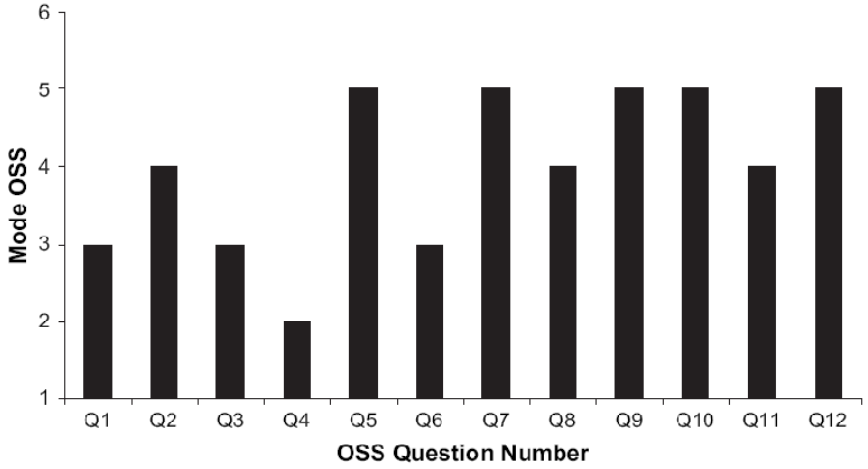


Figure 3 Most common OSS's for individual questions in the persistent severe symptoms group.

Table III OSS at final assessment; expressed as a mean score and as a % for various subgroups

	No. of shoulders	Mean OSS	Mean OSS as %
Total	269	18.1	87.3
Diabetes	35	19	85.4
Injury	60	19	85.1
Bilateral	45 (20%)	18.2	87.1
Right affected	124	18.6	86.3
Left affected	145	17.6	88.3
Dominant	129	18.1	87.3
Nondominant	140	18.7	86
Slow	163	18.2	87.1
Sudden	106	18	87.6
Female	167	18.2	87.1
Male	102	17.8	87.9
Sibling Hx	13	13.9	91.1
Dupuytren's	9	13.3	97.2

OSS, Oxford Shoulder Score

V. MCQ

a. Osteolysis

1. The traditional polyethylene cup is wearing at a rate of less than about 0.1 mm/yr
2.The mean particle size is smaller with highly cross-linked polyethylene and that, in equivalent volumes, smaller particles tend to be more likely to cause osteolysis
3. Estimates of the forces through the patella range from 1.5 times body weight at 30° of flexion to six times body weight at 90° of flexion
4. PF joint contact pressure: There is a increase in contact surface area from initial contact in early flexion to about 60°
5. Isolated patellofemoral arthritis occurs in up to 10% of patients who have osteoarthritis of the knee.

b.Hemochromatosis in Orthopaedics

1.Is common 1:250
2. Genetic C6; Iron metabolism, Triad: Pigmentation, Cirrhosis, Diabetes
3.Orthopaedic: II & III MPJ, Naviculocunieform joint, Shoulder joint
4.Venesection

c.Tennis elbow

1.The literature suggests that the best predictor of outcome is the amount of daily physical strain encountered as opposed to the specific treatment rendered.
2.Current data suggest that open and arthroscopic procedures are similarly effective. However, arthroscopic release tends to allow for a more rapid recovery.
3.In a long-term prospective study, following open release 40% had persistent pain at 6 weeks postoperatively. This number decreased to 24% at 1 year and to 9% at 5 years.
4.Recent study showed that there was minimal benefit of ECSW over placebo in managing lateral epicondylitis, regardless of whether the treatment was given early or late
5.Eccentric therapy has demonstrated a positive treatment effect without causing more disability,but significant gains over stretching alone
6.Approximately 80% of patients with newly diagnosed lateral epicondylitis report symptomatic improvement at 1 year
7.The ECRB origin is the most commonly cited anatomic location.[tendinoses]
8.Maximal tenderness in radial tunnel syndrome is typically noted 3to 4 cmdistal and anterior tothe epicondyle over the mobile wad
9. Lateral epicondylitis and radial tunnel syndrome may coexist in up to 5% of patients

d.Scaphoid

1. Nonunion was defined as persistence of a fracture gap at least three months after the initial trauma, with associated resorption of bone and cystic changes at the fracture
2. The more proximal the fracture, the lower the probabilityof union, and the longer the delay before surgery the lower the probability of union.
3.The age of the fracture has a large effect in proximal but only a weak effect in distal fractures. This is of practical importance when deciding how to treat these injuries
4.95% undisplaced fracture heals by plaster treatment

e. Femoral Non-union. JAAOS 2008: 16:2, 88-96

1.FDA definition of Non-union femur: as a fractured bone that has not completely healed within 9 months of injury and that has not shown progression toward healing over 3 consecutive months on serial radiographs.
2.Clinical studies analyzing the effects of reaming for femoral shaft fractures have shown a significantly greater risk of femoral non-union when a nail is inserted without reaming (7.5%) compared with cases in which the canal is reamed before nail insertion
3.The current literature suggests that dynamization has a 50% success rate of achieving union. The most notable is shortening of >2 cm, which is estimated to occur in 20% of patients treated with nail dynamization.
4.Dynamization may be more effective when performed early (3 to 6 months after injury) rather than late
5.External fixation may bemost useful for managing infected femoral nonunion.

f. . Spondylolisthesis. J Bone Joint Surg Am. 2008;90:656-671

1.Dysplastic and isthmic are the two subtypes found in children,with the latter accounts for 85% of cases.
2.Traumatic spondylolisthesis is due to a fracture of the posterior elements,other than the pars interarticularis, leading to instability and olisthesis.
3.The dysplastic and isthmic patternscan be classified as congenital, whereas the degenerative, traumatic, and pathologic patterns are considered acquired3.
4.The majority (75%) of the cases of spondylolisthesis are grade I, and 20% are grade II.
5.More recently, in patients with high-grade spondylolisthesis as well as biomechanical studies have suggested that abnormalities of the sacral growth plate may be an etiology of high-grade slippage
6.Natural History:The prevalence of a defect in the pars interarticularis is approximately 5% in the general population. Approximately 15% of individuals with a pars interarticularis lesion had progression to a spondylolisthesis. The slip was seen predominately during the growth spurt, with minimal change after the age 16 years.. No slip was >40%. Slip progression also appeared to slow with each decade and, of particular note, the results from a back pain questionnaire and a Short Form-36
7.Hamstring contracture is common, although the mechanism of this is unknown, but it resolves with spinal fusion
8.The degree of slip is the percentage of displacement,with a slip of >50% considered unstable and associated with progression
9. Unlike isthmic spondylolisthesis, degenerative spondylolisthesis occurs most often (in 85% of cases) at L4-L5. The L3-L4 level is the next most common level with L5-S1 rarely being involved.
10.The slip rarely progresses beyond grade I.
11. Degenerative spondylolisthesis is most common in the sixth decade of life and is more common in females than in males (a ratio of 6:1).

g. Ulnar nerve entrapment

1. Is the second most common nerve entrapment syndrome of the upper extremity.
2. It is most common in the cubital tunnel.
3. Many patients benefit from nonsurgical treatment (eg, physical therapy, bracing)
4.Rydevik demonstrated that 6.7 kPa extraneural compression applied for 2 minutes altered the shape of myelin sheaths.
5. Axonal degeneration is noted in nerves subjected to compression for 4 weeks.

6.The arcade of Struthers, which is present in approximately 70% of the population, is a thickening of the deep investing fascia of the distal arm.
7.Ulnar hammer syndrome is a likely diagnosis in the patient who works with vibrating tools.
8.Only when nerve compression results in wallerian degeneration does the diminution in the density of innervations lead to increased two point discrimination (<6 mm, normal; >10 mm, poor).
9. NCT: The lower limit of normal with the elbow flexed to 135° should be >49 m/sec or within 11 m/sec of the forearm segment.
10.In a prospective randomized study, Nabhan et al37 compared simple decompression with anterior subcutaneous transposition in 66 patients. 32 underwent simple decompression, and 34 underwent anterior subcutaneous transposition. No significant difference in pain, motor and sensory deficits, or nerve conduction velocity studies.
11.A subluxating ulnar nerve should be managed with anterior transposition. Submuscular transposition is recommended for the throwing athlete

i. Triple Arthrodesis
1. The most common indications include posttraumatic degenerative arthritis and rheumatoid arthritis.
2. The triple fusion takes 16 weeks
3. Excessive hindfoot valgus has been shown to increase the stress on the deltoid ligament by as much as 76% and to secondarily increase the force across the ankle joint.
4. Malalignment may require revision of the triple arthrodesis. If extensive calcaneal varus or valgus of the calcaneus remains, it can be corrected with a Dwyer-type calcaneal osteotomy
5. Nonunion of one of the fusion sites may occur, most commonly involving the talonavicular joint.

j.Rhematoid Foot
1.88% of cases as excellent or good with 76% improvement in pain, 74% improvement in function, and 70% improvement in footwear with MTF fusion of I and Weil's of lateral toes.
2. **Weil's:** Z lengthening to the tendons, capsulotomy, 2 mm wedge resection an shortening of the metatarsal to decompress the joint
3.Use Twist of screws
4.The WMO is a joint-preserving shortening osteotomy and **has been used to treat metatarsalgia, intractable plantar keratoses, and/or MTP joint dislocation**.
5.**Recurrent symptoms** present in 12%. In those who had persistent metatarsalgia, a revision WMO was possible in 4 rays (36%); in 7 toes (64%) a Fowlers was performed because of joint surface destruction.

k. Acute Patellar Dislocation

1. The risk of recurrence of dislocation following acute patellar dislocation is high in growing patients [60%]
2. The rate of recurrent patellar dislocation was not reduced by primary surgical repair.
3. Radiographic measurements at the time of acute patellar dislocation did not have prognostic value for the recurrence of patellar instability, a finding that is logical because the majority of our patients had dysplastic changes affecting the patellofemoral joint as demonstrated by the patellar height and the sulcus angle.

4. The patella alta and a shallow femoral sulcus were more common in patients with more than three episodes of recurrent patellar dislocation as compared with those with three redislocations or fewer.
5. A positive family history; Female sex: Risk factors for recurrent patellar dislocation in the affected knee and for acute patellar dislocation in the contralateral knee.
6. Despite a very high rate of recurrence, the majority of young adults who sustained an acute patellar dislocation during the growth period were satisfied with their knee function.

l. Boxer's Fracture

1. Boxer's fracture: When palmar angulation exceeds 45° or when the patient presents a rotational deformity of the little finger in flexion, reduction, with or without surgical treatment, is mandatory
2. Surgical: Intramedullary pinning (the 'Bouquet' technique) or transverse wiring
3. This injury has been described as ''a tolerable fracture in an intolerable patient''
4. Intramedullary wiring: The surgical approach may also endanger branches of the dorsal branch of the ulnar nerve
5. Aa 3 months, the functional results remained slightly better in the intramedullary pinning group

m.Percut fication Vs Cast for waist fracture Scaphoid

5 weeks early healing [9weeks Vs 14 weeks]
7 weeks early back at work
9 weeks early for sports

n. Metal-Metal resurphace

1. Prosthetic bearing surfaces manufactured from high-carbon (0.20% to 0.25%)
2..The large-diameter metal-on-metal components could potentially result in very low wear if other important factors such as surface smoothness and, in particular, diametral clearance
3. Women of Child-Bearing At this time, women of child-bearing age should be informed of the theoretical risks to the fetus associated with metal ion exposure. In this group, metal-on-metal hip resurfacing arthroplasty delay childbirth for approximately two years after implantation, when the run-in wear phase has finished
4. It is generally recommended a relative valgus placement of 5° to 10° of femoral head
5.Men with a hip resurfacing implant who are less than sixty-five years old have the same revision rate at four years as do men of the same age who have a conventional THR
The revision rate for women with a hip resurfacing implant is twice that for men with a hip resurfacing implant.
6. A fracture rate of 1.46% at a mean of 15.4 weeks (range, zero to fifty-six weeks) postoperatively
7. T-cell-dominated delayed-type hypersensitivity, the term ALVAL (aseptic lymphocytic vasculitis associated lesions) was introduced to describe these histological features in the retrieval cases.

p.Flexion Gap Asymmetry

1. The symptomatic patients showed increased lateral joint laxity a determined by fluoroscopic stress radiography.
2 Femoral component rotation was determined by computed tomography scans.
3.Flexion instability can result in: 1. Discomfort such as pain on the medial tibial metaphysis,

soft tissue tenderness involving the tendons of the pes anserine, 2. A sense of instability, 3.recurrent knee joint effusion.
4.Increased varus flexion laxity may occur as a consequence of flexion gap asymmetry due to internal malrotation of the femoral component

5. Femoral component malrotation is considered the major cause for flexion gap imbalance,

q. Peroneal tendon. Heckman. J Bone Joint Surg Am. 2008;90:404-418.

1. MRI is the standard method of radiographic evaluation; however, diagnosis are based primarily on the history and physical examination.
2.Peroneal tenosynovitis typically responds to conservative therapy, and operative treatment is reserved for refractory cases.
3.Operative treatment is frequently required for peroneal tendon subluxation and consists of anatomic repair or reconstruction of the superior peroneal retinaculum with or without deepening of the retromalleolar groove.
4.Operative treatment of peroneal tendon tears is based on the amount of remaining viable tendon. Primary repair and tubularization is indicated for tears involving <50% of the tendon, and tenodesis is indicated for tears involving >50% of the tendon
5.The prevalence of incidental peroneus brevis splits found in cadaver specimens has ranged from 11% (fourteen of 124) to 37%
6.A cavovarus foot position may cause overloading of the peroneal tendons during activity, leading to tendinosis and tears, particularly of the peroneus longus tendon
7.The most common type of superior retinaculum is that it comes of posterolateral aspect of the lateral malleolus and comprised two bands: a superior band that inserts on the anterior aspect of the Achilles tendon sheath and an inferior band that inserts on the lateral aspect of the calcaneus at the peroneal tubercle.
8. The retromalleolar sulcus varies in size and shape, potentially affecting the stability of the peroneal tendons as they pass posterior to the fibula. 82% had a concave retromalleolar sulcus, 11% were flat, and 7% had a convex surface.
9.Peroneal tendon tears and ruptures can result from either acute or chronic injuries. Acute inversion ankle sprain
10.Longitudinal split tears of the peroneus brevis are usually found within the retromalleolar sulcus and Peroneus longus ruptures usually occur at the level of the cuboid

r. Hyponatremia
1.Symptoms are generally seen in an acute setting (developing over forty-eight hours or less) with serum sodium levels at or below 125 mEq/L (125 mmol/L) or in the chronic setting with levels at or below 110 mEq/L (110 mmol/L)
2.Clinical: cerebral edema that include anorexia, nausea and vomiting, confusion, slurred speech, lethargy, weakness, agitation, headache, and seizures
3. Postoperative confusion may occur after orthopaedic procedures such as lower extremity total joint arthroplasty, especially in elderly patients. Contributing factors commonly include the use of intravenous or oral narcotic analgesics, the use of phenothiazine antiemetic agents, and, rarely, fat embolism syndrome
4. The causes of hyponatremia are many.
    1. The stress of major surgery may increase the secretion of antidiuretic hormone
    2. There may be a dilution of IV sodium when excessive hypotonic saline solution
    3. A translational mechanism for hyponatremia, with an extracellular shift of free water to the vascular system in the postoperative period

4.. Elderly female patients may be at higher risk for this complication because of an impaired ability to maintain fluid homeostasis through water excretion and because of the smaller average intravascular volume in women compared with men

5. Thiazides

[1]

VI **Radiology quiz**

Question I

History

A 14-year-old boy complains of dorsolateral foot pain and difficulty when walking on uneven surfaces (Images 1 and 2).

(i) What is the diagnosis?

(ii) What does the MRI show and why?

Image 1 Lateral radiograph.

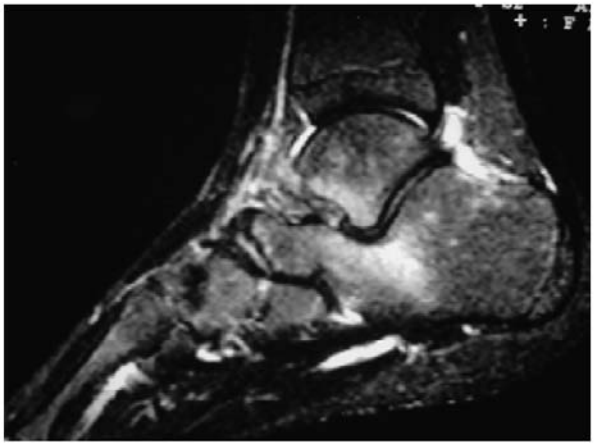


Image 2 MRI (sagittal STIR).

Answer I

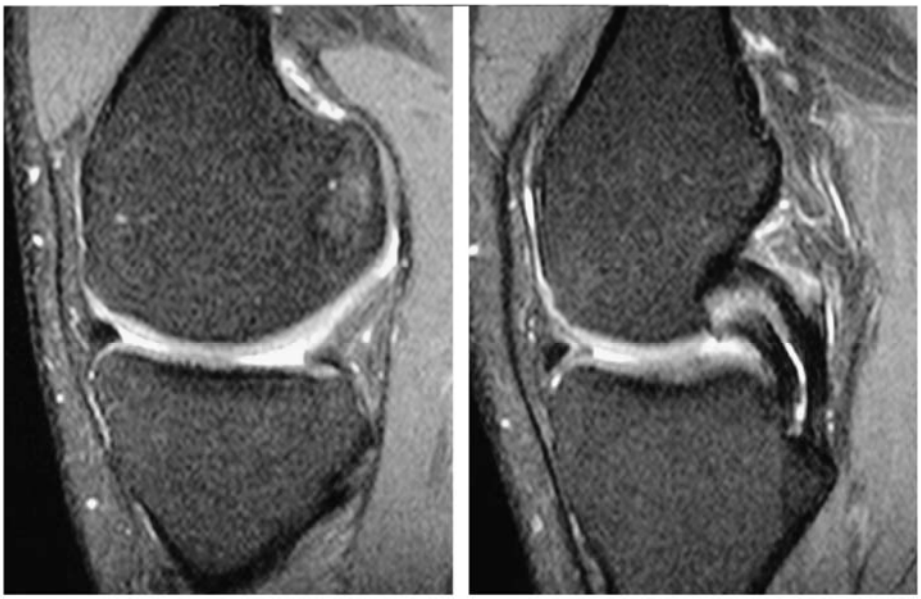
(i) There is complete fusion of the calcaneo-navicular joint representing osseous calcaneo-navicular coalition.

(ii) Increased STIR signal at the site of the coalition represents bone marrow oedema due to stresses secondary to limited joint movement.

Background—tarsal coalition

This condition occurs in <1% of the population (bilateral in 50%), and represents failure of segmentation of the tarsal bones. It usually presents in ear[y adolescence as the cartilaginous bar ossifies resulting in the typical rigid flat foot. Symptoms are due to limited motion in the hindfoot, increased stresses elsewhere in the tarsus and often an associated spasm of the peroneal musculature and tendons.

Question 2
History
Patient presents with pain in the knee (Images 3 and 4).
What is the diagnosis?

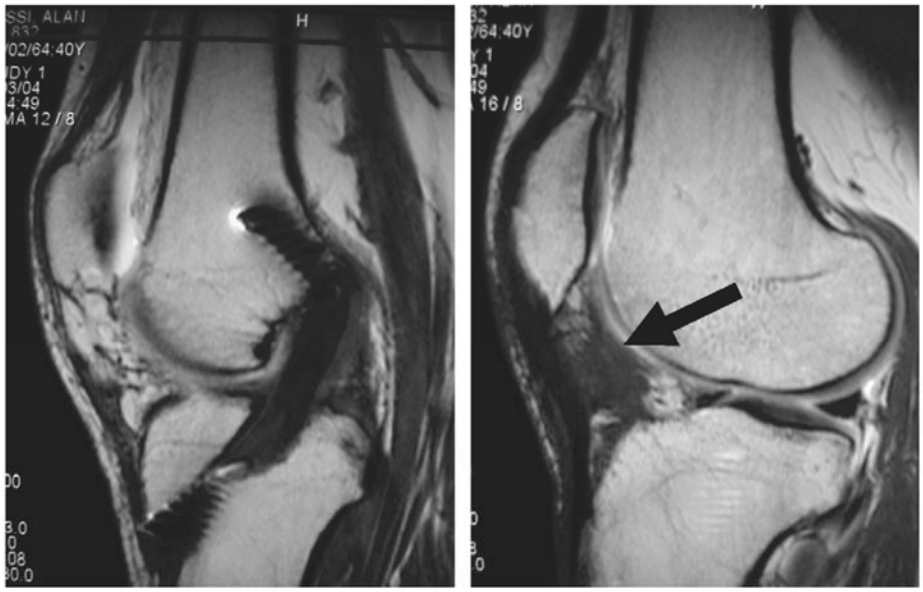


Images 3 and 4 Magnetic resonance images (proton density with fat saturation).

Answer 2
The posterior portion of the media[meniscus is largely absent consistent with a bucket handle meniscal tear (Image 3). The meniscal fragment is displaced beneath the PCL resulting in a 'double PCL' sign (Image 4).
Background—menisci on MRI scans
A sagittal slice through the body of a normal meniscus creates a 'bow-tie' configuration which should be seen on at least two consecutive sagittal MR images.
If part of the meniscus is absent ('absent bow-tie' sign), the most likely cause, with the exception of previous surgery, is a bucket hand[e tear and careful inspection is needed to locate the displaced meniscal fragment.

Question 3
History
This patient had post-operative pain on knee extension (Images 5 and 6).

What do the MRI images show?



Images 5 and 6 MRI (sagittal T1).

Answer 3
Image 6 shows the ACL graft is intact, seen as a taut low signal structure.
Fat returns high signal on Ti-weighted images and Hoffa's fat pad will therefore normally contain high signal material. Image 6 shows a rounded low signal mass (black arrow) within Hoffas fat pad which represents post-operative scar tissue; a[so known as arthrofibrosis or a 'Cyclops' lesion.

Background—approach to looking at ACL reconstruction on MRI
i. Graft integrity:
• the graft should be seen as taut intact low signal band,
• there maybe signal up to 2-years post-op periligamentous revascularisation).
2. Position of the femoral tunnel and hence graft isometry (tension):
• AP: 11 o'clock right knee and 1o'clock left knee.
• Lateral: At intersection of posterior femora[cortex & intercondylar roof.
3. Position of the tibia[tunnel and hence signs of impingement:
• the tibia[tunnel should be posterior and parallel to intercondylar roof,
• if it is too steep, graft will impinge on the femur in extension,
• if it is too flat, graft may be too lax.
4. Arthrofibrosis:
• Fibrous tissue seen anterior to the distal graft within notch or Hoffa's fat pad.
5. Infection:
• Donor site, tunnels, joint.
6. Hardware:
• Bone plug failure.

Question 4
History
8-year-o[d boy presents with pain in the wrist especia[[y at night (Images 7—10).
Describe the appearance of the [esion (b[ack arrow).
What wou[d be the differentia[diagnosis?

Images 7 and 8 AP and lateral radiograph of distal radius/ulna.

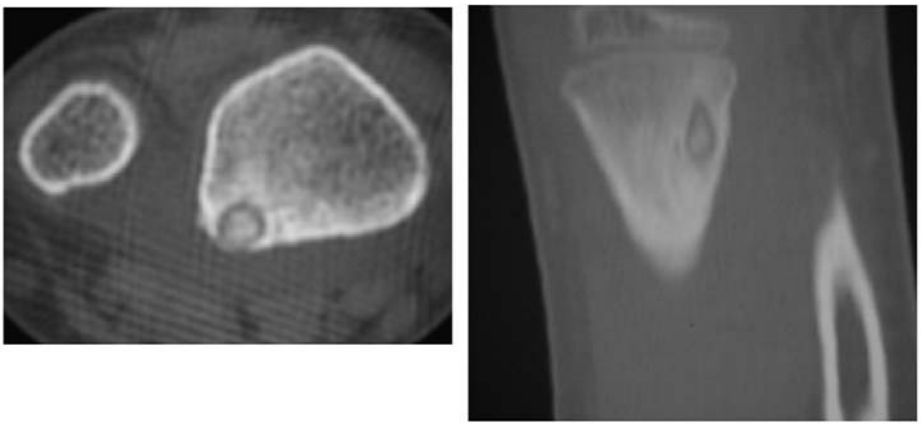


Image 9 and 10 Axial CT and coronal reformat CT slices.

Answer 4
(i) There is a small radiolucent lesion within the medial aspect of the distal radial metaphysis. There is adjacent cortical thickening best appreciated on the latera[view.
(ii) The differential diagnosis on the p[ain radiograph in a child includes osteoid osteoma, Brodie's abscess and eosinophilic granuloma.
The CT scan confirms the diagnosis of an osteoid osteoma by demonstrating a nidus.
Background information—osteoid osteoma
The characteristic clinical picture is pain worse at rest and night, which is typically relieved with salicylates. The radiologica[features are a central nidus (<1 cm) with surrounding sclerosis. The degree of this reactive sclerosis and periosteal new bone formation depends upon the site within bone. It is most marked in a cortical or subperiosteal location.

Question 5
History
A 12-year-o[d boy presents with an increasing hand deformity (Image 11).
Describe the radiograph. What is the diagnosis?

Image 11 Plain AP radiograph.

Answer 5

There are mutiple lytic, expansile, radiolucent lesions involving the metacarpals and phalanges, particularly on the ulnar aspect of the hand. These are consistent with multiple enchondromas. The diagnosis is Ollier's disease.

Background information—Ollier's disease

Ollier's is a non-hereditary generalized disorder of endochondral bone formation. It is often unilateral, both with respect to the side of the body and location within a bone.

The risk of malignant transformation is up to 30%.

Its close relation is Maffuci's syndrome, which combines multip[e enchondromas and soft tissue haemangiomas. The presence of haemangiomas in the soft tissues with calcified phleboliths differentiates this from Ollier's.

Question 6

History

This elderly patient presented with back pain and haematuria (Images 12 and 13).

(i) Can you correlate the pathology in the 2 images?

(ii) What is the diagnosis?

Image 12 Plain AP radiograph. Thoraco-lumbar junction

Image 13 Axial CT slice (through body of L1).

Answer 6

(i) The right T12 and L1 pedicles are absent on the plain radiograph.

(ii) The computerised tomogram image shows a soft tissue mass destroying the right L1 pedicle and a mass arising from the right kidney. The diagnosis is vertebra[metastases from a primary renal cell carcinoma.

Metastases

Metastatic lesions predominate in red marrow containing parts of the skeleton i.e. skull, spine, ribs and pelvis. They are rare beyond the knees and e[bows. Associated pathological fractures are common. They do not cross-joints or disc spaces.