

# Potpourri - Recent and relevant literature in 2018

Potpourri is an attempt to provide precise summary of relevant literature published in last one year related to various aspect of Orthopaedics

## Whats New in Shoulder Surgery -2018

MN Basu Mallick<sup>1</sup>

**1. Optimum Treatment for Displaced Midshaft Clavicle Fractures:** The debate between conservative vs operative treatment in displaced midshaft clavicle fracture and also the ideal implant for fixation has been going on for years. Evidence from previous RCT and meta-analysis have been mixed. In a recent large multi centre RCT published in JBJS(Am) in January 2017[1], 160 patients were compared head to head between operative (ORIF with plate) and nonoperative treatment (sling), results were overwhelmingly in favour of operative treatment in terms of union/ mal union rates, return to function, DASH scores, pain. However secondary surgery was also higher in operative group - for infection, implant failure , implant removal. Secondary surgery in conservative group was mainly to tackle nonunion at fracture site. This was further corroborated by another large RCT (The Clavicle Trial) published in JBJS, August 2017 [2], which similarly stated that union rates were much higher in the operative group than the conservative group. Another relevant study comparing plate fixation to nail fixation for clavicle midshaft fractures [3], found no difference in operative time, delayed union rates, implant failure rates and incidence of secondary procedures between the two groups. However, ROM, DASH scores, cosmesis, patient satisfaction, union times were significantly better for intramedullary nails in clavicle.

**2. High re-tear rates for bursal side partial thickness tears repaired after completion.** For partial thickness cuff tears, conservative treatment remains the first line management. However, those with more than 50%tears often end up in surgery. Two techniques are commonly employed for

repair- insitu fixation or completion of tear and refixation. Both techniques have had positive and equivalent outcomes. However a recent study by Kim et al[4] showed that a high re-tear rate in the tear completion group, and almost all of them in the bursal side partial tears. The tear completion group in partial thickness articular side tears behaved exactly like in situ repair group. This was similar to a study comparing trans tendon repair vs tear completion and repair for articular side partial thickness tears of supraspinatus [5]

**3. Does open Bankart repair have any role today?** Surprising though it may seem, it does. In a study published as recently as 2015[6], a meta analysis of 3 RCT and 12 clinical trials evaluating a total of 827 shoulders was conducted. All cases of SLAP and Hill Sachs lesion were excluded. Results showed that arthroscopic repair resulted in better ROM in flexion and external rotation. However they also had a significantly higher incidence of recurrence and also reoperation. Open repair patients had equivalent satisfaction, functional outcomes, lesser complications, less failures, less reoperation. Does this really mean that open Bankart repair is a better surgery or that surgeons were slow to pick up skills of Arthroscopic Bankart repair? Or, were surgeons too aggressive in selecting patients for Arthroscopic Bankart repair just because it was a new kid on the block? Another single centre RCT [7], including 196 patients looking at the same question arrived at the same conclusion that Arthroscopic Bankart repairs had a higher recurrence rate especially those having an associated Hill Sach lesion.

**4. Is Operative intervention in proximal humerus fractures worse than**

**conservative treatment for proximal humerus fractures in elderly patients (> 65 yrs).** A meta-analysis and Systemic review of 7 RCTs and 15 Observational studies comparing functional outcomes between operative - non-operative treatment in above fracture found no difference in outcomes as regards to functions in the above two groups. The average age was 68.3 years and 75% of patients were female [8]. However, the operative group were found to have a higher re-intervention rate and higher incidence of AVN. As a consequence of this study, the authors recommended non-operative treatment for all displaced proximal humerus fractures in elderly. This study has two major limitations. One, it included RCT / Observational studies from 1980 onwards- when locking plate systems have not been developed, concept of shoulder arthroplasty in fracture was poorly developed and reverse shoulder arthroplasty had not arrived. Meaning many of the included studies were looking at primitive modes of fixation only [9]. Two, most studies pooled data from NEER 1 to NEER 4 fracture patterns together, essentially pitching best results of surgery in NEER 3 & 4 fractures against best results of conservative in NEER 1 & 2 fractures.

**5. Subacromial decompression is no different from sham surgery for shoulder impingement syndrome (SIS).** An elaborate RCT [10] comparing outcomes between ASD( Arthroscopic subacromial decompression - which included bursectomy+ spur excision+ acromioplasty), DA(diagnostic arthroscopy only) and supervised rehab among 210 patients aged 35-65 yrs without significant rotator cuff tear, found no difference in pain at rest and pain in activity outcomes between ASD & DA groups over a 24

month period. This included comparable improvement at each visit. However both surgery groups fared better than the rehab group in pain and function score upto 12 months, though all three groups improved significantly and had equivalent satisfaction and return to function at 24 months. This study suggests that both ASD and DA might be helpful in early recovery in SIS but are no different from each other. Does that imply that major benefit of surgery might be coming from the anaesthesia, including scalene block, which breaks the pain cycle and allows patients to comply with rehab better?

**6. Patients can reduce their dislocated shoulder as well as a Physician.** In a RCT study involving 60 anterior shoulder dislocations [11], comparing successful shoulder reduction by the DAVOS TECHNIQUE (which is a physician guided self assisted technique) and SPASO TECHNIQUE (physician executed technique), results showed that DAVOS technique resulted in significant lesser treatment pain at an equivalent success rate

and lesser time required. This suggests that this technique of self reduction can be used as a primary reduction technique in the ER, as also taught to people suffering recurrent dislocations.

Only reservation against this study being that all procedures were performed under controlled settings and under the supervision of a single physician. The applicability of this technique outside a health centre remains untested.

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## What's new in foot and ankle surgery – 2018

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### Calcaneal Fracture

Calcaneal fracture is the most common of the tarsal bones. CT scans are obtained in most cases, as they are integral for fracture classification, treatment decision-making and operative planning. Roll et al. investigated whether 3-dimensional reconstructions provided any additional information to the interpreting surgeon<sup>1</sup>. They found that it significantly improved fracture pattern evaluation, especially among inexperienced surgeons and with

complex fracture types. Hence, operating on fracture calcaneum, in today's time & age, without a CT scan, would be deemed suboptimal.

The extensile lateral approach to the calcaneus involves sectioning the calcaneofibular ligament. A Level-II study by Wang et al. used radiographic evaluation to determine whether this technique had a negative effect on ankle joint stability<sup>2</sup>. They found no significant difference in talar tilt or anterior drawer on stress

radiographs between the injured and uninjured sides at 6 months postoperatively. The authors concluded that calcaneofibular ligament repair following this approach is unnecessary.

### Charcot arthropathy

Charcot arthropathy is often distinguished from infection using MRI, although correlation with systemic inflammatory markers has also been suggested. Because Charcot arthropathy is considered a local

inflammatory process, it is thought that C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) are less likely to be elevated. However, a recent study by Hingsammer et al. casts doubt on this assumption<sup>3</sup>. They found elevated CRP and ESR levels in non-infected patients with Charcot arthropathy, with higher levels correlating with acute stages of the disease. Although elevated inflammatory markers may not be reliable exclusion criteria for Charcot arthropathy, they may be useful in distinguishing between acute and subacute stages of the disease.

#### Achilles tendon ruptures

In an era of cost-containment medicine, the use of ultrasonography as a diagnostic modality for Achilles tendon ruptures will likely continue to expand. Griffin et al. compared a novel dynamic ultrasound technique and conventional static ultrasonography among a group of patients with magnetic resonance imaging (MRI)-confirmed Achilles tendon ruptures<sup>4</sup>. In this Level-II study, a real-time Thompson test under ultrasound was performed, with Achilles rupture defined as a loss of the quadrilateral shape of the tendon. The authors found that the dynamic test had superior sensitivity, specificity, and inter-observer reliability and can be performed with minimal training in ultrasonography. Chronic Achilles tendon ruptures typically require augmentation at the time of repair.

Guclu et al. investigated long-term results following the use of V-Y tendon plasty with fascia turndown in a retrospective comparative study<sup>5</sup>. At the 16-year follow-up, no patients experienced re-rupture, and their clinical outcomes were comparable with those reported in the literature for chronic ruptures. The authors concluded that V-Y plasty with fascial turndown is a good, economic alternative to other methods, as it is straightforward to perform and does not require synthetic materials or allografts for augmentation.

Some surgeons have augmented primary repairs of acute tendon ruptures with fascial flaps to promote healing, to reduce re-rupture risk, and to prevent tendon elongation. A Level-I study by Heikkinen et al. evaluated long-term outcomes in patients randomized to either a repair-only group or a repair and augmentation group<sup>6</sup>. At the 14-year follow-up, there were no significant differences in strength, tendon elongation, or re-rupture rate between the two groups.

#### Ankle arthroscopy

Ankle arthroscopy has gained favor in recent years, attributable to quicker patient recovery and preservation of local blood supply. This latter advantage is particularly beneficial in promoting fusion. Given its increasing rate of utilization, proficiency in arthroscopy has become an important facet

of surgical training. A Level-I study by Martin et al. showed that ankle arthroscopy simulation training improved basic surgical skills, efficiency, and anatomic recognition in residents in as few as four 15-minute sessions<sup>7</sup>. Future studies will focus on ways to improve training and define objective parameters to establish a curriculum with the goal of improving technical skill and maximizing patient safety.

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## Review of Relevant Spine articles published in 2018

### Bhavin Shial<sup>1</sup>

Treating Spine related disorders has been a challenge for spine surgeons all around the world due to its complex nature and patients suffering from pain and disability affecting their Activities of Daily Living

(ADL) i.e. sitting standing walking and other routine needs.

#### 1. Presurgery physiotherapy for patients with Lumbar spine disorders:

##### Randomized Control Trial:

Rehabilitation in the form of physiotherapy after spine surgery has been an integral part for the faster recovery of the patient. But no systematic studies have been performed to evaluate the benefits of

physiotherapy prior to surgery. Lindback and colleagues conducted a single blinded, two arm randomized control trial involving 197 patients that were consecutively seen in the spine outpatient department to determine the role of physiotherapy prior to surgery

The authors concluded that presurgery physiotherapy decreases pain, risk of avoidance behavior, and worsening of psychological well being with improvement in quality of life and activity levels before surgery compared with the control group but additional studies for presurgical physiotherapy are needed.

## **2. Effectiveness and safety of batroxobin, tranexamic acid and a combination in reduction of blood loss in lumbar fusion surgery.**

Lumbar fusion surgeries are known to be associated with significant blood loss which may require perioperative blood transfusion. Risk factors of blood transfusion are well established and thus we utilize it unless absolutely mandatory. Nagfabhushan et al conducted a prospective randomized double blinded placebo controlled study to compare and evaluate safety and efficacy of batroxobin, tranexamic acid and their combination in reducing perioperative blood loss in single level lumbar fusion surgeries.

100 patients were included in this study and randomized into four groups. Group B received batroxobin Group T received tranexamic acid group BT received both batroxobin and tranexamic acid group P received placebo. Mean intraoperative blood loss was 268, 340, 256 and 448 ml and mean postoperative blood loss was 218, 260, 191 and 320 ml in Group B, T, BT and P respectively. Mean postoperative blood collection in drain was statistically significant. No statistically significant differences were observed in fluid administration, blood transfusion, haemoglobin levels and deep vein thrombosis.

So in conclusion based on the data collected, the authors observed that batroxobin and combination of batroxobin with tranexamic acid significantly reduced perioperative blood loss when compared with placebo in single level lumbar fusion surgery.

## **3. Decompression with or without concomitant fusion in lumbar stenosis due to degenerative listhesis: a systematic review.**

Dijkerman et al performed a systematic review to compare outcome after decompression with or without concomitant fusion in patients with lumbar stenosis due to degenerative listhesis. Eleven studies which matched the criteria were analyzed involving 3119 patients in total. Majority of the studies including two randomized control trials clinical outcome results were comparable in both patient groups by most outcome measures. On the basis of the data authors concluded there is not enough evidence to add instrumented fusion to decompression to improve patient outcome in patients with lumbar stenosis with degenerative listhesis.

## **4. A minimum of 5 yr follow up after lumbar transforaminal epidural steroid injections in patients with lumbar radicular pain due to intervertebral disc herniations**

Lumbar epidural injections are routinely given to patients suffering from radiculopathy due to a prolapsed lumbar disc as part of treatment, however long term results are not well documented. Kennedy et al conducted a prospective cohort study to determine long term outcomes for a homogeneous group of patients with acute unilateral lumbar radicular pain due to a single level herniated nucleus pulposus after lumbar epidural injections at least for 5 years. On the basis of the data available the authors concluded that despite a high success rate at 6 months the majority of subjects experienced a recurrence of symptoms at some time during the subsequent 5 years, fortunately few reported current symptoms and a small minority required additional injections or surgery or opioid pain medications. Thus it was observed that lumbar disc herniations can be effectively treated with in the short term by epidural steroid injections or surgery but long term recurrence rates are high regardless of the treatment received.

## **5. Risk factors for surgical site infection after posterior lumbar spinal surgery**

Surgical site infections are a dreaded complication for every orthopaedic surgeon and many studies have identified different risk factors for postoperative infections after lumbar spine surgery but most of these studies were focused on the patient and procedure related factors. Liu et al performed a retrospective study carried out in a single institution on patients who underwent posterior lumbar spine surgery between 2010 and 2016. Total 2715 patients were included in this study, of these 64 (2.4%) were detected with postoperative surgical site infection. Diabetes mellitus, low preoperative serum calcium, low pre and post operative albumin levels, high preoperative serum glucose, multiple fusion segments, increased surgical time and estimated blood loss, decreased postoperative haemoglobin, prolonged drainage duration were found to be independent risk factors for surgical site infections.

Multilevel fusion and history of diabetes were the two strongest risk factors with an odds ratio of 2.3 and 2.2 respectively. This study confirmed previously recorded risk factors in this large population study and some new independent risk factors were also identified. These new independent risk factors were low preoperative serum calcium level, decreased pre and post operative albumin level and decreased post operative haemoglobin.

## **6. Surgical outcomes in elderly with degenerative spondylolisthesis:**

With improved healthcare facilities and treatment average lifespan has increased to around 70 yrs in India at present, and is challenging treating these elderly patient population with osteoporotic bones and various co morbidities like diabetes mellitus hypertension, ischemic heart disease. The most frequent question we face from patient and their relatives is spine surgery safe and possible at this age? Liao JC and Chen WJ conducted a retrospective study on patients above 80 yrs of age who had undergone instrumented lumbar fusion surgery for degenerative spondylolisthesis and compared it patients that were aged 65- 79 yrs.

On the basis of the data collected the authors concluded that patients over 80 yrs

have a higher osteoporotic status and co morbidities which may lead to longer operative time and increased blood loss with poorer radiographic outcome, but the clinical results were not affected, and with proper patient selection age over 80yrs is not a negative predictor factor for instrumented surgery for degenerative spondylolisthesis.

### 7. Risk factor analysis for predicting vertebral body re-collapse after posterior instrumented fusion in Thoracolumbar burst fractures

Early postoperative re-collapse after posterior instrumented TL burst fractures after a well restored vertebral body height during surgery could induce complications like post traumatic kyphosis, metal failure often leading to revision surgery for reconstructing the anterior column support. This re-collapse is quite difficult to predict and no accurate prediction system exists. Although load sharing classification helps us to guide for a need for an additional anterior column support, this radiographic scoring system has several critical limitations.

Hae- Dong Jang et al conducted a retrospective comparative study which included 208 consecutive patients who were operated with posterior instrumented fusion for thoracolumbar burst fracture to evaluate risk factors to predict vertebral body re-collapse predicting scoring system to prevent unnecessary additional anterior spinal surgery.

The authors concluded on the available data the two independent risk factors for predicting re-collapse after posterior instrumented fusion for TL burst fracture were age at operation more than 43yrs and preoperative body height loss of more than 54%, thus careful assessment with their decision making model can help predict re-

collapse and prevent unnecessary additional anterior reconstruction surgery.

### 8. Prospective Multicenter Study of a Multistep Screw Insertion Technique Using Patient-Specific Screw Guide Templates for the Cervical and Thoracic Spine

Patient-specific drill guide templates have been developed as a simple, inexpensive, and accurate alternative to guide PS insertion. Most studies using patient-specific drill guide templates use computer software to generate a plastic drill guide based on individual CT scans, but deviation can occur in as many as 17% of screw insertions. The inaccuracy of the template-assisted PS insertion may arise from the insecure fixation of the template to the lamina and the absence of confirmation steps for marking the entry points, for drilling the screw holes, and for placing the screws. To solve these technical issues, the authors developed a multistep screw guide technique using three types of fit-and-lock templates. In this report, they describe the design of the templates and surgical procedures and summarize the data regarding the placement of 813 screws in 103 patients. Thus with the available data in present study the authors concluded that their multistep screw insertion technique using 3D-fitting templates for SGTS resulted in higher accuracy insertion than did previous methods, with a lower incidence of perforation of the pedicles and a mean deviation of the screws from the center of the pedicle of less than 1 mm. This system does not require expensive equipment such as an intraoperative computer navigation system or intraoperative CT scanner and can reduce radiation exposure of both the patients and the operators.

This method is especially useful for

patients with small pedicles or severe spinal deformity. However, some drawbacks have been observed: the muscles must be cleaned from the bone surface to fix the templates on the lamina, and 1 to 2 days is required to design and print the templates. If the templates are produced outside of the hospital, the shipment time can add another 1 to 2 days. Consequently, this method cannot be used for emergency surgery. In the future, improved software and 3D printers may shorten the time required for template preparation.

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## Whats New in Orthopaedic Trauma in 2018

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### Hip Fractures: Big data Bigger problems ?

Evolution of large national databases has precipitated an explosion of big data papers. Using the various national database such as Scottish hip registry, American college of Surgeons National Surgical quality improvement Program NSQIP authors have aimed to draw conclusions between patient variables and surgical outcomes [1]. This practice has been in the particularly common with hip fractures with various studies producing conclusions and treatment protocols using large sample sizes. However recently a study of NSQIP found that a large number of patient with missing data. In the patients who underwent Hip fracture surgery between 2005-2013 they had more than 27245 percutaneous fixations, 27125 hemiarthroplasties, 27245 Intramedullary mailings, 27244 Plate screw fixations. The participating hospitals has gone up from 121 to more than 600, however the amount of missing data is astonishing. The least missing was the patient demographics, 0.1% however when we turn our attention to the medical comorbidities the rate is 70 % for diseases and co morbidities like GI, CNS, Hematological, Pulmonary problems. Lab studies and Length of stay missing data varied from 10 to 70 %. These were due to various reasons over time. The purpose of the publication was to sensitive the reader and the surgeon to exercise caution while interpreting this data to make an informed decision for his patient. Weight bearing restrictions after a hip fracture fixation though prescribed may not be followed rigorously was the hypothesis in a study from Germany. An insole force sensor was used to compare the compliance and ability of patients with hip ( trochanteric ) fractures to perform restricted or non weight bearing [2]. A group of patients >75 years of age with trochanteric fractures was treated surgically with Proximal femoral Nail and another group of patients between 18 to 40 years of age with ankle fractures were analyzed. The findings were that none of the patients ion the elderly group could comply with weight bearing restrictions and

100 percent of the younger patients could comply. The elder patients exceeded the specified load by almost two fold. Though partial weight bearing restrictions have been associated with significant increase in mortality, reduced quality of life as compared to unrestricted weight bearing they are still a frequent recommendation in the post operative after care. In light of the findings of the study the relic of post operative partial weight bearing should be abandoned. The other options of augmenting the fixation with cement or a total hip replacement may be considered as they gain a wider acceptance. The problem of Long term Bisphosphonates being very effective in treating osteoporosis and preventing typical osteoporosis on one hand and causing atypical femoral fractures on the other hand persists [3]. Over suppression of the Bone repair may impair the bone remodeling resulting in a accumulation of trabecular micro fractures compromising strength. Intramedullary nailing is the standard form of treatment but delayed and failed fracture healing remains the major concern. This is the first large case series that has reported outcomes in these challenging situation. The outcomes have been compared to those from failed osteosynthesis in subtrochanteric fractures not associated with Bisphosphonates. Long term Bisphosphonate therapy was defined as one in which patient is on the medications for more than 3 years the patients were on Bisphosphonates for a mean of 4.5 yrs and the bisphosphonate group fulfilled the criteria for a bisphosphonate associated fracture of on being transverse fracture line with a medial beak and being within 5 cm son the lesser trochanter There were 14 patients in the atypical group ( bisphosphonate) and 21 in the typical group between 2008 and 2016 . Both the Groups were fixed with the 95 degree angled blade plate. the time to Union in the typical group was 7 months and in the atypical on was 8.4 months , 12 of 14 and 18 of 21 patients (85.7%) patients had union. While atrophic non union was common in the atypical group hypertrophic was common in the typical group, The

Typical group was older in comparison to the typical group. all the patients in the atypical group had teriparatide (rPTH) for a period of 3-6 months. all the patients had a freshening and opening up of the non union site and bone grafting. the 95 degree plate provided a rigid fixation , allowed for correction of deformity, bone grafting and allowed compression across the fracture site. The 95 degree plate is an effective modality of fixation of non union of atypical subtrochanteric fractures providing high rates of union and function.

### Pelvis and the Acetabulum:

Pelvic ring injury continue to be a leading cause of mortality. A study from the Japanese Trauma Database reviewed the practices and studied if the application of an external fixator decreased mortality in pelvic ring injuries [4]. 386 patients with a unstable pelvic ring fracture with various fracture patterns including vertical shear and lateral compression. The retrospective analysis revealed that application of an external fixator was associated with lower risk of death at 24 hours, 7 days and 28 days. also there is a decreased requirement of blood transfusion in the patients in the first 24 hours and also at 7 days. The hemostatic effect of the external fixator in pelvic fractures is useful in decreasing mortality. Fixation of anterior ring of the pelvis in pelvic ring injuries via the Anterior pelvic Internal Fixator, InFix is fast becoming popular , mid term follow up of 83 patients revealed that the surgeons could achieve a good reduction percentage, very minimal loss of reduction, good compliance and decreasing complications as the surgeons negotiated the learning curve [5]. Disadvantage of an Infix is the necessity of an implant removal but the authors describe at least 4 patients in whom implants were retained for a longer than 5 month duration and a female who had 2 vaginal deliveries with the transverse bar in situ . All the patients had a external fixator in situ for a week before converting to an infix. Examination under anesthesia has always been used to assess pelvic stability. In a multi centric study lateral compression

fractures were first treated with posterior only percutaneous fixation [6]. Once this was done the stability of the pelvic ring was assessed using a distraction test if there was > 1 cm opening at the ramus fracture or in case of a bilateral fracture more unstable fracture was assessed first a percutaneous antegrade or a retrograde ramus screw was used. In case of a bilateral ramus fractures the EUA was done again and the second ramus was fixed or an external fixator was applied. In the anterior and posterior fixation group there were 36 patients none of whom had a displacement of the fracture at union. In the posterior only group 36 patients had only a posterior ring stabilization as per the protocol, displacement was seen only in patients with a bilateral superior and inferior pubic ramus fracture and the average displacement was 7.5 mm. So though the Protocol of MUA was predictably reliable in most of the patients, however in patients with bilateral rami fractures the anterior ring stabilization should be considered irrespective of the MUA findings. Achieving accurate reduction is critical to improving the results of acetabular fractures and the concept and importance of gaps and steps popularized by Matta are still used as a reference. The displacement of acetabular fractures can occur along the fracture plane and manifest as a Gap and if the displacement is perpendicular to it it manifests as a step. Investigators from the Hospital for special surgery and David Helfet group studied 227 acetabular fractures operated over a 12 year period with a minimum follow up of 2 years, out of this 55 patients underwent a Total hip arthroplasty [7]. Importantly pre and post op CT Scans were assessed and the results graded. The mean follow up was 8.7 +/- 5.6 yrs. No step or gap displacement was found online 7.9 % of the patients 90% of the patients had a gap displacement of 5.2 +/- 5.6mm and 49 % of the patients had a 1.3mm +/- 1.8 mm step. The patients 56 of whom underwent a THR had a significantly higher gap and step than the rest the younger patients had a significantly smaller Gap as compared to the older patients but a similar Step as compared to the older patients the 12 younger patients who underwent the THR had a significantly larger step as compared to the non THR

group and a similar gap. The Hip Survivorship was 82 percent at 10 years for patients with a < 5mm gap as compared to 56 % in patients with a > 5 mm gap. The authors concluded that though both hegap and the step displacement are associated with hip survivorship the gap displacement was independently associated with conversion to a total hip arthroplasty. In the younger lot however only a residual step of >1 mm was associated with a conversion to a THR. This is a very sobering message to the acetabular surgeons, especially in the elderly subset of patients where there is a impaction or a femoral head damage, the popularly held belief amongst surgeons that they could achieve anatomic reduction in all acute acetabular fractures is probably unrealistic.

#### **Tibial fractures:**

Debridement of open fractures through a defined surgical approach rather than an extension in the direction of the wound was compared in a prospective randomized trial to see if the requirement of a soft tissue flap cover or transfer is reduced [8]. A total of 66 patients with 68 open diaphyseal tibia fractures were included. Debridement of the open fracture through direct extension of the traumatic wound or through a defined surgical interval was done. It was found the defined surgical approach was a good approach and did not result in increased requirement of any flap cover A multicentre RCT in patients with acute displaced extraarticular fractures of the distal part of tibia compared Intramedullary nail with 161 patients with an open reduction and internal fixation with a locking plate 160 patients [9]. There were improved outcomes and functional outcomes at 3 months in the intramedullary group however there were no differences noted at 12 months. Interestingly there were also no difference in the complications. Another infographic from the same cohort and trial published in another journal on the economics of the fixation modalities and the outcomes stated there was no statistically significant difference in the quality of life indicators in the either group or the ankle scores [10]. The costs were significantly lower for patients treated with nail fixation over those treated with locking plates ( the costs was

almost a 1000 pounds lesser) and this was across all sensitivity studies. IM Nailing for the distal tibial fractures in whom the fracture line is within 5 cms of the ankle mortise, though challenging is preferred to a MIPO as per the recent trends. Triantafillou et al hypothesized placement of the Nail in the anatomic centre of the tibia in the anteroposterior and lateral plane will decrease the risk of malalignment [11]. the placement of the nail in anatomic centre in the coronal plane which was lateral to the centre of the taller dome correlated with a good coronal plane alignment however the nail placement in the anterior quadrant in sagittal plane ( anatomic centre) was associated with more incidence of malalignment as compared with the nail in the posterior quadrant. A study conducted by J Evers et al at the TheAoresearch Institute Davos to investigate The role of and requirement of fixation of the posterior malleolus in a trim malleolar fracture was carried out in a cadaver biomechanics and a radiological study [12]. where in they created a trimalleolar fracture and the size of posterior malleolus was less than 25 % of the articular surface, Non fixation of this small fragment did not affect the stability however the contact pressures in the ankle joint and the articular surface increased significantly.

#### **Upper Limb Trauma:**

A retrospective study of 62 Patients with terrible triad injuries treated in the same protocol, Patients were divided in early within 24 hrs, intermediate 4 to 14 days and delayed more than 14 days. the patients in the early and intermediate group had a much faster recovery, better range of movement and good return to function than the delayed group. A retrospective study with interesting observation from the University hospital Tehran, Iran [14]. Due to the economic sanctions against Iran there were no modular radial heads available for replacement, hence the radial heads of the patients presenting with terrible triad injuries were excised in the period after the sanctions. In their retrospective cohort (though unequal) 29 patients in the replaced and 15 in the excision group were reviewed. In all the patients the coronoid was fixed either with a pull out stitch or a

screw or a plate, the LCL was repaired after the radial head was replaced in the replacement group and MCL was repaired in patients with residual laxity only. The LCL and MCL were repaired in all the patients of the excision group after fixation of the coronoid. A longitudinal pull of 90 nm was applied to check for the presence of an Essex Lopresti Lesion in the patients with an excision group. At the final Follow up there was no difference in the in the flexion extension supination pronation VAS, MEPSA, DASH scores, At the final follow up all patients had a stable elbow and returned to the pre injury jobs except 3. The authors concluded that in terrible triad injuries if the MCL, LCL, coronoid are all repaired and in absence of a Essex Lopresti lesion a radial head resection could also result in a favorable outcome in the short term. Though this study doesn't recommend against radial head replacement it certainly suggests for a complementary controlled investigation with a larger sample size, long term followup to confirm reproducibility of these results.

### Infection:

Fracture related infections and non unions are still one of the most challenging complications to handle [15]. In contrast to Periprosthetic Joint infections, there are a few standardized diagnostic protocols for infection after trauma. These are further hampered by a lack of consensus over the definition of a Fracture related infection (FRI) till recently. An expert panel drafted a confirmatory criteria and a suggestive criteria for diagnosing a Fracture related infection, the criteria included a sinus tract, wound breakdown, intra operative purulence and positive cultures from the deeper tissues. The most recent definition of PJI include the presence of significant acute

inflammatory cell infiltrate in the peri prosthetic tissues this is demonstrated by presence of 5 Neutrophils (NP) /High power (x 400) field (HPF)

The group from the Oxford Bone infecting unit investigated the value of Histopathology using the FRI Consensus definition as a standard they studied 156 Non unions in 150 patients and divided them into Confirmed infected, possibly infected and aseptic non unions. Intra operative deep tissue samples were taken at Surgery and after fixing, sectioning the tissues and staining them at least 10 HPF were examined from the areas with maximum inflammatory infiltrates. The NP infiltrates were scored into one of the four categories, absent NP, less than one NP, 1 TO 5 NP, and more than 5 NP /HPF Within the confirmed infections the growth was staphylococcal species and the possibly infected was low virulence species of bacterias, In all the 66 aseptic non unions NP were completely absent in 85 % 56 cases, small number were detected in 10 cases (15%), no cases of aseptic non unions had NP S more than 5 In the infected group and there were more than 5 NP s in 51 its (85%), less than 1 in 5 cases and between 1 and 5 in 7 cases Applying the histological analysis with a cutoff of 5 NP/HPF the false negative (13 cases) and no false positive cases resulted in a sensitivity of 80 % and a specificity of 100 % overall accuracy of 94% The positive predictive value of the test was 100% for infected non union and negative predictive value was 84% The authors have proposed the criteria of using five Neutrophils per high power field to be added to the definition of Fracture related infections. The complete absence of neutrophils confirms aseptic nonunion. Use

of quantitative Histopathology can improve diagnostic accuracy in upto 96% of the cases.

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