

Potpourri - Recent and relevant literature in 2016

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

Orthopaedic Trauma - Relevant articles in 2016

Rohan Gala¹, Sanjay Dhar¹

Over the years, there has been a constant attempt of orthopaedic surgeons worldwide to come up with newer techniques & improve the standard techniques of fracture fixation, reduce the risk of postoperative infection & to help patients achieve a good functional outcome to lead a better life.

“Die-punch” fractures of the distal end of radius have always been difficult to classify due to their complex nature. Scheck et al defined it as a dorsal fracture fragment of the lunate fossa at the distal end of radius in 1962. As per the current concepts Zhang et al devised a new classification system in which they classified die punch fractures into 5 types which showed good inter-observer reliability and intra observer reproducibility, thus aiding the clinician to assess these injuries with relative ease [1]. Speaking of classifications, a recently devised **classification system for proximal tibial fractures** described by LUO et al [2], also known as the three column classification was applied and anatomical locking plates to treat complex three column fractures were invented. These plates proved to be far superior to the standard locking plates. This year seemed to have more emphasis on **tibial plateau fractures** as Reza Firoozabaadi et al [3] identified a subset of bicondylar plateau fractures with a hyperextension varus deformity known as HEVBTP and they found a higher incidence of

associated injuries like compartment syndrome and neurovascular injuries in this type. They laid down the radiographic hallmarks of this pattern, which were, loss of posterior slope of tibial articular surface, tension failure of posterior cortex, compression of the anterior cortex and varus deformity on the coronal plan

Open tibial fractures in adults have existing protocols outlining treatment strategies in detail. However, Ramsabhu et al [4] in their study on open tibial fracture management in paediatric age group concluded that more research is needed to determine an optimum treatment guideline as the existing literature of poorer quality.

Intra articular calcaneal fractures are one of the most difficult fractures to treat due to associated complications. One important complication is the peroneal tendon instability, which is clinically difficult to evaluate due to pain and swelling. Ketz et al [5] in their study concluded that intra operative evaluation of the superficial peroneal retinaculum as well as pre operative imaging (CT scan) is useful in the operative management of intra articular calcaneal fractures. SPR and its confluence with the peroneal tendon sheath represent the primary restraint against displacement of peroneal tendons. They also suggested a new technique of repairing the superficial peroneal retinaculum with intra-osseous suture anchor placement into the posterolateral fibula.

Sacral fractures with spinopelvic dissociation are highly unstable injuries which often require surgical intervention with Iliosacral screw fixation &/or lumbopelvic fixation from L4 to Pelvis which is often associated with life threatening complications and higher infection rate due to the prolonged surgery and increased blood loss. Seth K. Williams et al [6] developed a minimally invasive percutaneous lumbopelvic fixation technique to reduce and stabilize these fractures. They concluded that this technique is not only time saving but the intra operative blood loss is less. The ability to immediately weight bear without restriction made the author use this technique in cases where sacro iliac screw fixation alone would have sufficed.

Fracture spine is a subtype of fracture that relies heavily on radiological imaging (X-Ray MRI, CT- Scan) in assessment and planning. The treatment strategies of thoracolumbar fractures are largely dependant on the classification system, and recently most of them have stressed on the importance of assessing then integrity of posterior ligament complex due to the high instability of the fractures and the resultant functional deterioration. Rajasekaran et al [7] formulated an interesting radiological index based on plain radiographs and CT scan to detect PLC injury without the actual

need for MRI. The injury was assessed with parameters like Superior Inferior End plate Angle (SIEA), Vertebral body Height (VBH), Local Kyphosis (LK), Inter Spinous distance (ISD), and Interpedicular distance (IPD).

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¹Department of Orthopaedic Surgery, Dr D.Y. Patil Medical college, New Bombay, Maharashtra, India

Address of Correspondence: Dr Sanjay Dhar, Department of Orthopaedic Surgery, Dr D.Y. Patil Medical college, New Bombay, Maharashtra, India

E-mail: drsanjaydhar@gmail.com

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How to Tame the Flood of Literature? A Round-up of Knee Surgery Research in 2016

Miten Sheth¹

There have been several interesting publications pertaining to the knee this year. Promising new technologies were described, contemporary implants and approaches were evaluated and conflicting evidence was deciphered through well-designed reviews and meta-analysis. We aim to summarize innovations, trends and consensus in knee surgery with this article.

There has been increased interest in the **use of tranexamic acid (TXA) during total knee arthroplasty (TKA)**. The Michigan group [1] reported their experience of 23000 odd TKAs concluding that TXA use was associated with decreased blood loss and

transfusion risk, without increased risk of complications. Researchers from Louisville [2] found topical TXA to be a safe and efficacious alternative to intravenous TXA. Xing et al [3] reported a meta-analysis of ten studies, including one study conducted this year at Bombay hospital [4], noting that the combination of intravenous and topical TXA reduced post-operative blood loss without increasing the risk of thromboembolism.

There have been some high-profile papers concerning **unicompartmental arthroplasty (UKA)** recently. The Oxford UKA remains a slightly controversial intervention in the knee

world. The Netherlands group [5] supported the use of Phase III mobile-bearing Oxford Knee in medial compartment osteoarthritis with 90.6% survival at fifteen years. The Texas group [6] showed 88% survivorship at ten years and excellent function. The Oxford group [7] themselves reported the largest ever single series of around 1000 UKAs with a ten-year cumulative survival rate of 93.2%. Notably, they mentioned that good results of UKAs can be achieved even by trainee surgeons, if performed at a high-volume centre.

The anterior cruciate ligament

(ACL) has always been an enigma and we seem to discover new things every year. Japanese surgeons from Kobe [8] evaluated factors affecting quadriceps strength recovery after ACL reconstruction with a hamstring tendon autograft. Pre-operative quadriceps strength, age, sex, and knee pain are independently associated with post-operative quadriceps strength recovery. Fink et al [9] prospectively studied acute and delayed ACL surgery patients for two years and found no impact of surgical timing on the objective and subjective outcomes. Cadaver research at Pittsburgh [10,11] concluded that the ACL isthmus is located almost half of the distance between the insertion sites. The cross-sectional area of the ACL at the isthmus is largest with the knee unloaded and at 90° of flexion, and the area decreases with extension and applied loads. ACL reconstruction with graft fixation and tension for anteromedial bundle - 45°/ 30N and posterolateral -15°/ 10N, most closely matched intact knee kinematics. Clinical research at Pittsburgh [12] revealed that increased slope of the lateral tibial plateau might be an important anatomical variable predicting high-grade rotatory laxity in patients with ACL injury.

While there are raised expectations from newer approaches to ACL reconstruction like the “All-inside technique”, there is very little in the way of objective evidence to support it over the traditional methods. Surgeons from Vienna [13] and Hampshire [14] followed around 100 patients to a minimum of two years post-surgery. While both these studies reported improved functional outcomes and stability with a re-rupture rate of 12.7% and 6.5% respectively, French surgeons from Reims [15] found that a year after surgery, around 50% of patients had residual anterior tibial translation > 3 mm.

Meniscal ramp and root lesions are a subject of increasing interest. Ramp lesions constitute a common but often missed entity in ACL deficient knees. Laprade et al [16] summarized the anatomy, biomechanics, diagnostic strategies, recommended treatment options, and post-operative protocol. A controlled laboratory study by Amis et al [17] proved that anterior and external rotational laxities were significantly increased after sectioning of the posteromedial menisco-capsular junction in an ACL deficient knee. These were not restored after ACL reconstruction alone but were restored by ACL reconstruction combined with posterior menisco-capsular repair. Sonnery-Cottet et al [18] classified these lesions and reported improved outcomes of ramp repair at a minimum two-year follow-up with a 6.8% failure rate.

Our understanding of the meniscal root has evolved in the last five years. A critical analysis review of the evaluation, treatment and outcomes of meniscal root tears was done this year by the team from New York [19]. Mayo Clinic, Rochester [20] provided the natural history benchmark for clinical outcomes in patients undergoing non-operative treatment. Untreated root tears are associated with poor clinical outcome, worsening arthritis, and a relatively high rate of arthroplasty at five year follow-up. Surgeons from Korea [21,22,23] reported favorable mid-term outcomes after pull-out fixation especially in patients with decreased meniscus extrusion at post-operative one year follow-up. Grade ≥ III chondral lesions, varus alignment, and older age were found to predict a poor prognosis after root fixation. A meta-analysis of case series showed that root repair resulted in significant improvements in the post-operative subjective scores. However, meniscus extrusion was not reduced and progression of arthrosis was not

prevented completely.

World literature is full of reports on **osteoarthritis of the knee**. However, there is little data to support decision making. A 3-year, double-blind, randomised, placebo-controlled trial of 500 odd patients studied the effect of vitamin D supplementation on knee osteoarthritis (VIDEO study) [24]. The authors concluded that vitamin D supplementation has no role in the management of knee OA. A Cochrane review by the team from Sao Paulo [25] could not draw definite conclusions to help us decide between micro fracture, drilling, mosaicplasty, and allograft transplantation for cartilage defects. Of note though, treatment failure, with recurrence of symptoms, occurred with both microfracture and mozaicplasty.

Multi center trials threw light on some interesting facts this year. The **Research in OsteoChondritis of the Knee (ROCK)** study group [26] developed a classification system for arthroscopic evaluation of osteochondritis dissecans (OCD) of the knee that demonstrated excellent intra- and inter-observer reliability. The **Multicenter Orthopaedic Outcomes Network (MOON) group** [27,28] reported 32% incidence of high-grade pre-operative knee laxity in a cohort of around 2300 patients who underwent primary isolated ACL reconstruction. The presence of this laxity was associated with significantly increased odds of revision surgery but had no association with outcome scores at two years. Chronic ACL tears, generalized ligamentous laxity, and meniscus tears are associated with high-grade Lachman, pivot shift, and anterior drawer tests. Female patients and age younger than 20 years are associated with increased odds of a high-grade pivot-shift test. The **Delaware-Oslo ACL cohort study** [29] advised return to sports 9 months or later after ACL

reconstruction, and more symmetrical quadriceps strength prior to return, to reduce the re-injury rate. The **Multicenter ACL Revision (MARS) study** [30] identified prior lateral meniscectomy and grade 3 to 4 changes of the trochlea as factors associated with worse outcomes after revision ACL reconstruction.

Articles debating the existence of anterolateral ligament, efficacy of hyaluronic acid or platelet rich plasma, and nature of cartilage healing filled up world literature this year. Navigation, robotics and patient-specific instrumentation in total knee arthroplasty were discussed with caution, concern and confidence. In spite of the plethora of new information, a lot of questions remain unanswered yet. Original research, multi-centric collaboration and systematic analysis of published evidence are the key to better understanding of the knee.

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¹The Knee Clinic, First floor, Panchsheel Building, Paanch Rasta, Mulund West, Mumbai, India

Address of Correspondence: Dr Miten Sheth, The Knee Clinic, First floor, Panchsheel Building, Paanch Rasta, Mulund West, Mumbai, India

E-mail: imiten@gmail.com

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Shoulder Surgery - Relevant articles in 2016

Dipit Sahu¹

1. Conservative treatment of atraumatic cuff tears

An important question about atraumatic rotator cuff tears is that which ones will need surgical repair and which of them could be successfully managed by physiotherapy. The MOON group [1] in their prospective study of 433 patients found that 20% of patients failed conservative therapy and the most important indicative factors were low expectations from physiotherapy, high activity level and non-smoking status. The factors, which were non-predictive of failure of physical therapy, were the size of the tear, VAS pain score status. The ones who eventually decided to opt for surgical treatment did so in the first 12 weeks of the therapy. Moreover it does reaffirm the belief that majority of the atraumatic cuff tears can be managed conservatively. However it is hard to put it in clinical practice perspective. The main result of the paper is that low patient expectation is the most important determinant of failure of conservative therapy in the management of atraumatic cuff tears.

2. Intra articular lesions in first time dislocators and recurrent dislocators

The researchers from Korea [2] tried to answer very pertinent questions regarding the differences in the observed intra articular lesion between first time dislocators and recurrent dislocators. They compared two groups of patients who underwent arthroscopic bankart repair, one who had only one dislocation episode and other group who had recurrent dislocation episodes. They found that there was a higher incidence of anterior glenoid erosion and ALPSA

lesions in the group with recurrent dislocators. This also resulted in a higher failure rate with a higher incidence of recurrent subluxation and apprehension in the group with patients with recurrent dislocation as compared to the first time dislocation group.

3. Intramedullary nails in proximal humerus fractures have a higher complication rate

Intramedullary nails have recently gained popularity in the management of 2 and 3 part proximal humerus fracture because of the improved biomechanics and minimal exposure required to treat these fractures. However locked plates have been the gold standards in the management of such fractures. Can the intramedullary nails have better outcomes than locked plating? This prospective randomized study hypothesized that the outcomes will be no different in the two groups. And indeed they did find that final constant scores were not different at the end of one year [3]. However an important finding was that there was a higher complication rate (28 adverse events versus 10 in plating group) in the intra medullary nail group, with a higher incidence of re-operation and a higher incidence of rotator cuff tears.

4. North American experience with Arthroscopic Latarjet

Arthroscopic Latarjet was first introduced in France by Laurent Lafosse and since then has become increasingly popular in North America and rest of the world. However the steep learning curve limits its use in the hands of highly experienced arthroscopy surgeons. Athwal et al [4] analyzed their results in a series of 83 patients who underwent Arthroscopic

Latarjet by 5 senior experienced arthroscopy surgeons. They found that there was a 25% incidence of complication rate. However the most significant of all was a graft fracture and inability to fix the graft with 2 screws in 6 patients. Nerve related complications were observed in 1 patient. Their complications rate is not much different from those in open Latarjet, but the complications are unique to arthroscopic procedure like inability to fix the graft with two screws in 6 patients since an open procedure could have avoided this problem.

5. Association of rotator cuff tears with progression of shoulder arthritis

The association between rotator cuff tears and progression of arthritis in the shoulder has always been of great interest. However the exact relationship has not been deeply studied. The study from Washington University St Louis, attempts to investigate the relation between the presence of asymptomatic cuff tears and progression of osteoarthritis and cuff tear arthropathy [5]. In their study of 138 patients with median follow up of 8 years, they found minimal progression of arthropathy and arthritis as compared to the control group but no significant effect of the size of the tear, the enlargement of the tear size or the symptomatic status of the patient on the progression of arthropathy. However they evaluated their patients using ultrasound to assess the size and retraction of the tear, and the follow-up was also minimal (median 8 years)

6. Atraumatic shoulder instability has unsatisfactory outcome after

labral repair

Posterior shoulder instability is rare but poses a challenge for the treating physician. A standard approach to treat posterior instability has not been yet defined. This retrospective study in 41 shoulders compared the clinical outcomes after arthroscopic capsulolabral repair in traumatic and atraumatic posterior shoulder instability and its relation with the glenoid retroversion [6]. They found less favorable clinical outcomes after repair following atraumatic instability as compared to traumatic one. They also found that atraumatic shoulder instability was associated with a higher glenoid retroversion angle as measured by the vault method. This suggests that the treatment of atraumatic posterior shoulder instability is challenging and needs to be investigated further.

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¹Sir H.N. Reliance hospital, Saifee Hospital, Dr R N Cooper Hospital and HBT Medical College, Mumbai, India

Address of Correspondence: Dr Dipit Sahu, Consultant Shoulder Surgeon, Sir H.N. Reliance hospital, Saifee Hospital, Dr R N Cooper Hospital and HBT Medical College, Mumbai, India

E-mail: orthotripod@gmail.com

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Foot and Ankle in 2016 – The Big Questions!

Abhishek Kini¹

Some of the major questions in surgery have never been answered. While the push for evidence-based medicine is clearly a strong and well reasoned one for some interventions, perhaps the answer is self-evident – in the same way that parachutes will never be subjected to a randomized controlled trial, neither will chest drains for tension

pneumothoraces. Somewhere beneath these self-evident truisms, however, lie accepted interventions (such as TKA and ACL reconstruction) that don't always stand up to evaluation in a randomized control trial setting. In an era where nanotechnology is touching our lives and the Tata nano is hitting our roads, the “nano” or minimally invasive

surgery (MIS) is coming in vogue.

Does MIS have a role in ankle fixation?

Minimally invasive surgery (MIS) has a number of potential clinical, cosmetic (and even financial) advantages - on paper at least! The majority of readers will remember the fashion for mini-hip,

followed by 'mini-knee', so given the lack of advantage these passing surgical fads have shown (and some have even been discredited due to higher complication rates), it is with some trepidation that we should approach this paper from Taipei, a retrospective comparative series of mini versus open reduction and internal fixation for unstable ankle fractures [1]. The authors make a reasonable comment that in the face of higher infection rates and compromised soft tissues, there is perhaps an argument for minimally invasive surgery. The surgical teams undertook a retrospective study of 71 patients, all with 44-B type fractures. Whilst there is no argument that MIS is more complicated than the open approach, there is still very much debate about the relative benefits of each approach. MIS is not as easy to perform as open surgery - there is a learning curve, and special equipment is needed. The authors report essentially no differences in any of the outcome measures other than lower wound complication rates in the MIS group. This paper certainly supports the concept of MIS surgery in ankle fractures to reduce complication rates, however, in the face of other, better studies (such as the randomised controlled trials from Edinburgh reporting the fibular nail), a prospective randomised controlled trial would really be needed here to prove any kind of superiority. One of the most common procedures done in adult foot and ankle reconstruction in our setting is a subtalar fusion, the gold standard procedure for varying reasons from primary inflammatory arthritis to secondary post traumatic arthrosis. The pendulum has significantly shifted towards MIS by arthroscopic assisted subtalar fusion, especially in minimally deformed hindfoot, but the debate persists on.

One screw a screw too few..?

Achieving a stable fixation during arthrodesis is the key to reducing complications including metal-work fatigue and nonunion. The compression screw has long been the most reliable fixation in arthrodesis, although there are a variety of screw configurations around, all of which have their potential advantages in either surgical access, achieving compression or stability. Researchers from Western Michigan University undertook a biomechanical study using a surrogate bone model of the subtalar joint [2]. They tested three potential constructs – a single posterior screw, two minimally divergent posterior screws, and a highly divergent screw construct. The stability of the constructs was tested using a servo-hydraulic testing apparatus. As perhaps could be predicted, the two divergent screws offered significantly higher torsional stability over either of the other constructs. While this in itself is not surprising, it is important to add a slight note of caution: divergent screws by their nature do not increase the compression with the addition of the second screw and, as such, care should be taken in placement of the initial screw specifically to ensure that as much compression as possible is achieved prior to placement of the second screw, to ensure effective fusion. The Achilles tendon has brought the downfall of mighty warriors in battlefield as well as it brings agony and downfall of mighty surgeons (warriors) in their operation theatres (battlefield). This Trojan war on Achilles tendon is fought on.

Cast versus early weight bearing following Achilles tendon repair ..

The treatment of the Achilles tendon continues to vex many trauma and foot and ankle surgeons. Not only is the decision to operate fraught with difficulty, but the choice of

rehabilitation regime is far from clear. To make matters worse, although there are some short-term studies, there are no longer-term randomized controlled trials on which to base these decisions. Researchers in Finland report the ten-year outcomes of their randomized controlled trial comparing cast immobilization with a restricted motion brace allowing neutral plantar flexion and early weight bearing [3]. At a mean of 11 years following treatment, there were no differences in their primary outcome measure of the Leppilahti score at final follow-up (92.2 vs 93.6) and no differences in secondary outcomes including plantar flexion peak torques, or angular velocity measurements. Interestingly, there were differences in peak torque and isokinetic strength which were maintained between one and 11 years compared with the contralateral side, however, it is arguable whether or not these differences are clinically significant, given the impressively normal functional scores. The same research team reports their study of 60 patients, all presenting with an acute Achilles tendon rupture managed over a three-year period [4]. At 14 years of follow-up, 55 patients were available for review. All patients were managed with a similar splinting protocol as their rehabilitation, with the only difference being that 28 patients received a simple end-to-end suture repair while 27 patients received a fascial flap-augmented repair. The research team reported myriad outcomes including the Leppilahti Achilles tendon score, isokinetic plantar flexion strength (peak torque and the work-displacement deficit at 10° intervals over the ankle range of motion), tendon elongation, and the RAND 36-item health survey. The bottom line is that the end-to-end repair group performed better at final follow-up. There were no differences in re-

rupture rates and the augmented group had poorer calf muscle deficit that persisted right through to final follow-up. Hence giving us clear indications for not augmenting our Achilles tendon repairs.

Another major controversy in foot is management is the naïve looking but grossly disabling Lisfranc's injury. The question is whether to **Primarily fuse or ORIF the second tarsometatarsal joint in the context of severe trauma?**

The Lisfranc joint has been the cause of some head scratching over the past few years. Ever since the publication of a randomized controlled trial suggesting fusion was superior to fixation, this has become an ongoing debate. The anxiety for the operating surgeon, especially in treating younger, higher demand patients, is whether a primary fusion or ORIF. By definition, fusion limits the functional capability of the foot in the future, due to either loss of the joint or the inherent shortening that always occurs. Hence there is general hesitance to fuse joints in the younger population and a tendency to try and preserve motion by joint reconstruction in the index surgery. A paper from Hospital for Special Surgery, New York, has some significant value in this perspective [5]. It does present the return to function data for a mixed group of purely ligamentous and mixed osseoligamentous injuries after primary fusion at index surgery. The study has a retrospective design and utilized patient reported activity level questionnaires, and concludes participation in sports as equivalent to pre-injury in 64% and

reduced in 25% of patients. This was a mixed group of partial fusions, including single column or all three. The activities referred to included impact sports, and relied on patient declaration to record the premorbid activity levels. It is reasonable to advise patients contemplating a primary fusion that on average just over half of patients make a full return to sporting activity following this kind of surgery. There was a higher risk of metalwork removal in the ORIF group, although this is not surprising as many surgeons routinely remove metal-work inserted for ORIF but do not for a fusion. Clearly there is still some way to go to narrow the evidence gap in Lisfranc injuries, and we are still waiting for the 'definitive study' to inform practice. However, for the time being these functional data do reassure all involved in their care that these patients may be successfully treated with a fusion, and that the long-term results are not as bad as one might think. It appears that in spite of a single study favoring fusion, there is little in the way of evidence to support the suggestion that fusion outdoes ORIF and that for the moment at least, the two methods appear to be equivocal and 'dealers choice'.

Questions, are a linguistic expressions used to make a request for information. As we look forward to the dawn of 2017, the horizon will come up with newer questions which will paint / reflect on our sea of knowledge a better picture for better understanding and betterment of services of foot and ankle reconstruction.

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Foot and ankle reconstructive surgeon, Sportsmed Mumbai, India

Address of Correspondence: Dr. Abhishek Kini, Foot and ankle reconstructive surgeon, Sportsmed Mumbai, India

E-mail: kiniabhishek@gmail.com

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