SAOA 2019 ABSTRACTS

Unity in Diversity

Combined 65th SOUTH AFRICAN ORTHOPAEDIC CONGRESS 2019

DURBAN ICC 2 - 6 SEPT

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ARTHROPLASTY PAPERS:

A High Rate of Early and Late Complications Linked to Pre-Operative Viral Load and Obesity Exists in HIV-Infected Patients Undergoing TKA

Paper: P43
Category: Arthroplasty
Presenting Author: P Ntombela
Co-authors: JRT Pietrzak, J Courcol, LZ Muller, K Sikhauli, D van der Jagt, L Mokete

Background:

The use of active antiretroviral therapy (HAART) has changed the course and nature of patients infected by the human immunodeficiency virus (HIV). HIV-infected patients may be considered an independent risk factor for infection. A paucity still exists in the literature with regards the outcomes of TKA in HIV-infected patients.

Methods:

The aim of this paper was to assess the outcomes of TKA in HIV-infected patients in a sub-Saharan academic hospital. We retrospectively reviewed the outcomes of 29 HIV-infected patients who underwent 36 TKAs from January 2014−January 2018.

Results:

There were 22 females and 7 males with an average age of 59.6 years. The average BMI was 33.8 and 34.5% (n=10) had ≥2 co-morbidities. There were 28 knees with osteoarthritis (OA) (24 tricompartmental OA) and 8 knees with inflammatory arthritis. The average pre-operative CD4+ was 674 and 19 patients had an undetectable viral load (VL) at the time of TKA. The follow-up of all patients was 2 years and 4 months. The overall complication rate was 33.3% (n=12) which included 8 early complications (<6 weeks) and 4 late complications (>6 weeks). There were 2 DVTs and cardiac complications. There were 4 surgical site infections (SSIs) and 4 late deep infections. There were 4 DAIR (debridement, antibiotics, irrigation and retention of implants) procedures. Three patients underwent 2 stage revision TKA (1 failed DAIR, 2 chronic deep infections). Septic sequelae were not related to pre-operative CD4+ count but to high pre-operative VL and obesity (BMI >40). HAART was not initiated on 3 of 4 late deep infections. The culture profile was *Acinetobacter baumannii* and *Proteus mirabilis* in one patient that presented with deep infection. The remaining 3 patients cultured *Klebsiella pneumoniae*, *Pseudomonasaeruginosa* and methicillin-sensitive *Staphylococcus aureus*. The 30-, 60- and 90-day readmission rate was 13.9%, 2.8% and 2.8% respectively. There was an overall improvement in KSS in 88.9% (n=32 TKAs). The satisfaction rate was 75.8% (n=22 patients).

Conclusion:

A significantly high rate of complications exist in HIV-infected patients undergoing TKA. There is a high rate of both early and late infective complications linked to high pre-operative viral load but unrelated to CD4+ count.

A Prospective Randomised Trial Comparing Post-Operative Knee Alignment Following Total Knee Replacement Using Patient Specific Knee Instrumentation Based on either CT or MRI

Paper: P125
Category: Arthroplasty
Presenting Author: L Mokete
Co-authors: W Ndou, LP Selemela, N Sikhauli, JRT Pietrzak, D van der Jagt

Background:

Accurate knee alignment following total knee replacement surgery confers a better long-term outcome than the mal-aligned knee replacement. Patient Specific Instrumentation (PSI) is a technique that has been developed with the aim of achieving accurate knee alignment while improving theatre efficiency. The technique involves manufacture of bone cutting jigs using rapid prototype technology based on pre-operative CT or MRI of the lower limb. Reports of both CT and MRI based PSI systems have revealed promising results when compared to conventional jigs with respect to limb alignment. However, there is a concern that CT tends to underestimate the dimensions of the knee, as cartilage mapping is imprecise with this imaging modality.

Aim:

To compare the accuracy of CT based PSI (CTPSI) or MRI based PSI (MRIPSI) as determined by limb alignment following knee replacement surgery.

Methods:

Seventy patients with advanced degenerative arthritis of the knee were randomised to receive a cemented posterior stabilised knee replacement (Persona, Zimmerbiomet) using CTPSI or MRIPSI. Post-operative CT scans (Perth Protocol) were done within six weeks of surgery to determine leg alignment.

Results:

Forty-three females and ten males with a mean age of 66 years (range: 50-79 years) had a full data set. The groups were similar regarding age and gender distribution. There was no statistical difference (ANOVA) in coronal and sagittal alignment between the groups (CTPSI versus MRIPSI, 2.3° ± 0.9 (-1° to 3°) vs 3.5° ± 0.8 (-2° to 1°), p=0.29) and (CTPSI versus MRIPSI, 0.1° ± 2.3 (-6° to 7°) vs 0.4° ± 2 (-3° to 7°), p=0.35) respectively. Femoral rotation was more accurate with CTPSI (CTPSI versus MRIPSI, 0.1° ± 0.7 (1° to 4°) vs 0.4° ± 2 (1° to 8°), p=0.03).

Conclusion:

CT based PSI (CTPSI) is as accurate as MRI based PSI (MRIPSI) for coronal and sagittal alignment in knee replacement surgery. However, CTPSI is more accurate for femoral rotation. CTPSI is cheaper and is associated with less likelihood of failed pre-op scans.

An Assessment of the Accuracy of Measurement of Leg Length Discrepancy and Inter-Observer Reliability, Using a Digital PACS X-Ray System and Templating Software

Paper: P121
Category: Arthroplasty
Presenting Author: Z Moonda
Co-author: MB Nortje

Background:

Leg length discrepancy (LLD) is a major cause of morbidity and litigation following total hip replacement (THR) surgery. In order to achieve equal leg lengths during THR, pre-operative planning, including measuring LLD, is carried out, to achieve adequate leg length correction (LLC). This is often done using digital X-rays, however, the accuracy and reliability of these systems is sometimes questioned.

Aims:

To assess the accuracy of measuring LLD using a digital PACS X-ray system and templating software. Inter-observer reliability of measuring pre- and post-operative LLD of patients undergoing THR surgery was also assessed.

Methods:

Pre-operative X-rays of 50 patients undergoing THR were assessed by three different Orthopaedic Surgeons, to measure LLD using a PACS system and templating software. Post-operative X-rays were assessed to measure the LLC achieved by THR. The measurements were done separately by each surgeon, and no discussions were had between them. The measurements of the surgeons were then compared and analysed.

Results:

The average pre-operative LLD measured was: Surgeon A: 8.8 mm; Surgeon B: 5.2 mm; Surgeon C: 10.7 mm. The difference between observers was: A-B: 3.5 mm; A-C: 1.9 mm; B-C: 5.5 mm. The average inter-observer difference was 3.7 mm. The post-operative LLD measurements were: Surgeon A: 4.3 mm; Surgeon B: 3.8 mm; Surgeon C: 8.8 mm. The average difference between observers was 3.3 mm.

Conclusion:

The average difference between observers in measuring both the pre- and post-operative X-rays was 3.5 mm, however this is not considered to be clinically significant. The difference in the measurements was considered to be due to variance between surgeons in choosing the most medial point on the lesser trochanter. Good inter-observer reliability using this method was also demonstrated. We therefore conclude that the use of digital X-ray and templating systems is clinically acceptable, and is an important tool in correcting LLD in THR.

Complications Associated with the Direct Anterior Approach for Total Hip Arthroplasty in a South African Academic Hospital

Paper: P57
Category: Arthroplasty
Presenting Author: W Ndou
Co-authors: PN Ntombela, JRT Pietrzak, N Sikhauli, D van der Jagt, L Mokete

Background:

The total hip arthroplasty is one of the most successful procedures and has been dubbed the procedure of the century. With satisfaction rates between 80–90%, this has become one of the most commonly performed procedures in orthopaedic surgery with alleviating of pain and improved patients' quality of life. The direct anterior approach carries a steep learning curve and high complications during the learning curve. The aims were to report on the complications of the direct anterior approach using a modified fracture table and to highlight and report on risk factors for complications using the direct anterior approach.

Methods:

Study design - The study is a retrospective review. Inclusion criteria - All patients who underwent total hip replacement using the AMIS® approach on a modified fracture table using Medacta® implants from January 2015 to February 2019. Exclusion criteria - Revision total hip replacements and total hip replacements performed using the posterior or anterolateral approaches. Measurement tools - Complications including: intraoperative periprosthetic fractures, nerve palsies, dislocation, wound infections and periprosthetic joint infections. Demographic data was documented to identify potential risk factors to complications.

Results:

A total of 224 anterior total hip replacements were performed by seven surgeons who all underwent training through the Medacta® Academy. 20/224 complications were recorded. Seven femoral fractures (0.03%), six femoral nerve palsies (0.02), three acetabular fractures (0.01), two periprosthetic joint infections, one superficial surgical site infection and one dislocation. Patient factors identified as risk factors included neck of femur fractures, avascular necrosis of the femoral head and inflammatory arthritides. Larger acetabular cups and femoral stems were associated with acetabular and

femoral fractures. A clustering of medical co-morbidities such as rheumatoid arthritis and HIV were found to be risk factors for wound and periprosthetic joint infections.

Conclusion:

The direct anterior approach is a safe and reproducible approach for total hip arthroplasty, but has a steep learning curve. Careful patient selection, pre-operative templating and meticulous surgery aids in limiting complications. Patients with medical co-morbidities need to be optimised prior to planned surgery.

Is there a Change in Patient Weight and Body Mass Index Following Elective Primary Total Joint Arthroplasty?

Paper: P66
Category: Arthroplasty
Presenting Author: BS Khonye
Co-authors: JRT Pietrzak, W Ndou, K Sikhauli, L Mokete, DR van der Jagt

Background:

In total joint arthroplasty (TJA), obesity is associated with poor perioperative and postoperative outcomes. However, reports of changes in weight after total knee (TKA) and total hip (THA) arthroplasty are unreliable especially in a South African context. This study examined weight changes following TKA and THA for osteoarthritis (OA) in an urban South African academic institution.

Methods:

We assessed the change from pre-operative to post-operative weight and body mass index (BMI) in 101 patients that underwent elective TJA at a minimum of 1-year follow-up. A retrospective chart review assessed the impact of co-morbidities, pre-operative activity levels, type of surgery and reason for surgery on potential weight change.

Results:

There were 56 THAs and 45 TKAs, 15 males and 86 females in total who underwent surgery between January 2016 and December 2017. The mean follow-up time was 1.56 years (1.1 years to 2 years). The average pre-operative BMI for TJA was 32 kg/m2 (19 kg/m2 to 49 kg/m2). The average BMI for THA and TKA was 31.2 kg/m2 (19 kg/m2 to 49 kg/m2) and 38.63 kg/m2 (21 kg/m2 to 58 kg/m2) respectively. There were 64.3% (n=65) who gained weight post-operatively while 25.7% (n=26) lost weight and 10.8% (n=11) stayed the same weight. The average post-operative BMI for THA and TKA was 33.12 kg/m2 (19 kg/m2 to 49 kg/m2) and 42.6 kg/m2 (21 kg/m2 to 58 kg/m2) respectively. There were 12 patients (11.88%) who became morbidly obese after total joint arthroplasty. Patients who underwent THA were more likely to lose weight than those who underwent TKA. Females >70 years were most likely to gain weight. There were 75 patients (74.3%) who gained ≥2 BMI points. Patients with ≥2 medical comorbidities were 2.3 times more likely to gain weight post-operatively.

Conclusion:

The majority of patients gain weight 1 year after TJA. Careful consideration of morbidly obese patients undergoing TKA is necessary as they are three times more likely to gain ≥2 BMI points post-operatively. Better strategies than simple dietitian referral are necessary to ensure weight reduction.

Leg Length Correction in Computer Assisted Primary Total Hip Arthroplasty: A Collective Review of the Literature

Paper: P132
Category: Arthroplasty
Presenting Author: J Rajpaul
Co-author: MN Rasool

Aim:

The aim of this study was to determine whether computer assisted surgery (CAS) can provide a more accurate, reproducible technique to achieve equal leg lengths in total hip arthroplasty (THA) and to compare the clinical outcome with conventional on table judgement of leg lengths in unilateral total hip replacement.

Methods:

A collective review of the literature was undertaken utilising applicable databases. Research criteria were the following: (1) developing and developed country studies, (2) level II, III, IV and V studies, (3) human subjects only, (4) period of study from 1996 to 2017 - English text only. The identified publications were assessed for their relevance and methodology and 20 articles were selected.

Results:

The overall evaluation of the results demonstrates that CAS provides a more accurate reproduction of limb length in THA compared to conventional freehand THA. Short to medium-term studies have demonstrated no benefit in clinical outcome scores. There is a high degree of correlation between measurements provided by CAS intra-operatively and radiographic measurements postoperatively.

Conclusion:

CAS provides a more accurate, reproducible technique to achieve limb length equality in THA compared to conventional freehand THA, however more intensive long-term studies are required to establish the effect on implant longevity and revision surgery rates in the two groups.

Minimally Invasive Direct Anterior Approach Total Hip Arthroplasty Allows Good Functional Outcomes and Return to Sports at Medium- to Long-Term Follow-Up

Paper: P123
Category: Arthroplasty
Presenting Author: JRT Pietrzak
Co-authors: K Nortje, JN Cakic

Background:

Total hip arthroplasty (THA) is a well-established, cost effective treatment option for patients with hip osteoarthritis (OA). The optimal surgical approach for THA, however, is debatable. Minimally invasive direct anterior approach (DAA) is an inter-nervous, intermuscular approach that is growing in popularity, but long-term outcomes remain controversial. The aim of this paper was to determine the long-term outcomes of minimally invasive DAA by a single South African surgeon >5 years post-operatively.

Methods:

We conducted a retrospective chart review of all THA performed from January 2007 to December 2013. Demographic details, pre-operative radiological features and implant details were recorded. An anonymous, on-line electronic questionnaire was sent to all patients. Timeous reminders were sent 1 week apart for 3 weeks. Patients were then contacted telephonically and asked to complete

questionnaire. Patient reported outcome measures (PROMs) recorded included the modified Harris Hip Score (mHHS), Forgotten Joint Score, the Hip Disability Outcome Score (HOOS) and Patient Reported Perception score.

Results:

There were 259 patients who responded to the electronic questionnaire of 512 that were operated on during this period. The response rate was 50.58%. There were 185 females and 74 male patients, average age 57.34 ± 9.85 at a mean 7.64 year follow-up in this cohort. In this group there 145 OA (55.9%), 46 inflammatory OA (17.7%), 42 dysplastic hips (16.2%) and 26 AVN hips (10%). The overall satisfaction rate was 91.9% with 3.1% being neutral about their outcome. There were 65.6% of patients that reported a completely natural feeling joint. Rating the functionality of the joint: 40.9% indicated that they can do anything while 52.1% could do most things. The VAS score showed that 90.3% of all patients experienced a pain score of ≤3, while 56.3% had a score of 0. The median FJS was 42.0. The average mHSS was 80.5 with 87% having an excellent outcome. Three in four participants (73.7%) reported that they were able to return to sports activities following surgery.

Conclusion:

Minimally invasive DAA THA provides good long-term functional results and patient satisfaction rates. Return to sports participation is achieved in the majority of cases.

POPI-Compliant Smartphone-Based Data Form Inputting Platform to Manage an Arthroplasty Wait List in an Academic Hospital: A Pilot Project

Paper: P137
Category: Arthroplasty
Presenting Author: S Swartbooi
Co-authors: JRT Pietrzak, W Ndou, N Sikhauli, DR van der Jagt, L Mokete

Background:

The burden of primary hip and knee replacement in the public sector in South Africa continues to outstrip our ability to service patients in need of these procedures. This creates a queuing phenomenon and wait lists that require active management. Set criteria for prioritisation on the wait list are helpful but rigid enforcement can be at odds with maximising efficiency of theatre slot utilisation. This fluid environment requires ease of access to information and manipulation of data. Portable handheld communication devices including smartphones are convenient for inputting simple patient data. However, they do not lend themselves to handling spreadsheets as traditionally used for wait lists. Currently we collect information at outpatient clinics for inputting into the wait list database on handwritten paper forms. The information is later typed into a desktop, which serves as the repository for our database. We are piloting a new integrative communication platform that is able to handle POPI-compliant smartphone-based data and forms with storage on a desktop computer or the cloud to manage our wait list.

Aim:

To compare the ease of use and retention of data of our established wait list and the new platform.

Methods:

A retrospective study was done of the information collected for the Arthroplasty wait list with both the current and the new method over a period of two months. Fifteen random entries from the new platform and the established wait list were assessed for accuracy, quality and quantity of information. Ease of use was assessed by way of a questionnaire. Use of the State-Trait Anxiety Inventory (STAI) form revealed that anxiety over new technology decreased after the third patient's data was captured. This new technology additionally allowed eight (53.33%) to be identified as high anaesthetic risk and simultaneously referred to a pre-assessment clinic.

Conclusion:

Use of a smartphone-based forms inputting platform resulted in consistently accurate collection of relevant data that enabled more efficient management of the database. The doctors reported that the platform was more user friendly, with minimal additional anxiety, than traditional handwritten paper forms resulting in more accurate retention of data.

Prevalence of Pathological Fractures in Patients Undergoing Arthroplasty for Neck of Femur Fractures at a Single Tertiary Academic Hospital

Paper: P119
Category: Arthroplasty
Presenting Author: SA Khan
Co-authors: JD Jordaan, M Burger, N Ferreira

Background:

Femoral neck fractures continue to be a burden to the health system in developed and developing countries, with the annual incidence expected to increase. Pathological fractures in the elderly population are most commonly caused by metastatic bone tumours and multiple myeloma. Determining whether a fracture is pathological is generally based on clinical presentation and suspicious lesions on X-ray. Femoral heads are sent for histology at the time of surgery to determine histological proof of malignancy. No studies in the literature use routine histology on all femoral heads to exclude occult pathological fractures. Additionally, there is no South African data regarding prevalence of pathological femur neck fractures. At our institute, all femoral heads are sent for routine histology, hence definitively excluding pathological causes and giving a true prevalence of pathological fracture prevalence. The primary aim was to determine the prevalence of pathological neck of femur fractures at our institute between 2014 and 2016. A secondary aim was to determine whether sending all neck of femur specimens for histology would be justifiable in terms of the cost/benefit ratio.

Methods:

All clinical data and histology results of patients who underwent hip arthroplasty after femoral neck fractures between 2015 and 2017, were evaluated.

Results:

A total of 312 patients were evaluated of which 216 were female, 95 were male with a mean age of 73.4. 195 patients with complete data and histology were analysed. Of those with histology results 0.3% (n=10) were pathological, which were all expected based on their clinical history and X-ray features. No occult pathological fractures were observed. The most common metastases were breast adenocarcinoma, followed by small cell lung carcinoma.

Conclusion:

We report a 0.3% prevalence of pathological neck of femur fractures which is decreased compared to previous reports in the literature which reported 1.6% and 0.9%, respectively. No occult pathological fractures were identified.

Prevalence of *Staphylococcus Aureus* Colonisation in Patients Undergoing Total Joint Arthroplasty at a South African Academic Hospital

Paper: P55
Category: Arthroplasty
Presenting Author: C Hitge
Co-authors: J Pietrzak, D Dimitriou, R Rajkoomar, L Mokete

Background:

Staphylococcus aureus colonisation, whether methicillin-sensitive *Staphylococcus aureus* (MSSA) or methicillin-resistant *Staphylococcus aureus* (MRSA), is a risk factor for surgical site infections (SSI). SSIs are a major source of morbidity and mortality. Infections are nine times greater in *S. aureus* carriers than in non-carriers. The aim of this study was to determine the prevalence of MSSA- and MRSA-colonisation in patients awaiting total joint arthroplasty (TJA) in a South African academic institution.

Methods:

We prospectively assessed 119 consecutive patients awaiting TJA. We tested three separate anatomical areas including the anterior nares, axilla and groin in all patients for both MSSA and MRSA. Patients with positive cultures were treated with intranasal mupirocin ointment and daily chlorhexidine showers for five days and re-tested. Data was correlated with positive results and potential risk factors were evaluated. All patients were followed up for 30-, 60- and 90-day readmissions and subsequently for a minimum of two years for any evidence of deep infection.

Results:

There were 78 patients undergoing total knee arthroplasty (TKA) and 41 patients undergoing total hip arthroplasty (THA). The incidence of *S. aureus* colonisation was 31.9%. There were no patients colonised with MRSA. Nasal swabs, groin swabs and axilla swabs were positive in 81.6%, 39.5% and 28.9% respectively. Patients older than 70 years and of Indian extraction presented with lower prevalence rates. Eradication was successful in 92.1% after 1 week's treatment. Failed treatment was as a consequence of poor compliance and all were decolonised after repeat treatment. The overall complication rate was 7.56% with 3 minor and 6 major complications. The 30-day readmission rate in the MSSA-colonised group was 5.3%. There were no 60- and 90-day readmissions. No cases were revised at two-year follow-up.

Conclusion:

The rate of *S. aureus* colonisation was 31.9% and is equivalent to reported international rates. Testing to identify *S. aureus* colonisation of the anterior nares is most significantly successful. Intranasal mupirocin decolonisation is effective and results in a low rate of short- and mid-term infective complications.

Primary Total Hip Arthroplasty in the Very Young Patient (<55 years)

Paper: P110
Category: Arthroplasty
Presenting Author: JD Jordaan
Co-authors: J Charilaou, M Burger

Background:

The successes of total hip arthroplasty (THA) have internationally resulted in more arthroplasty being performed in younger patients. The quadruple disease profile in developing countries such as South Africa also contributes to a unique pathology profile that presents for THA. In particular, i) trauma, ii) the HIV pandemic and iii) alcohol abuse put the very young patient at risk for developing early hip arthritis which eventually results in the need for THA. The aim of this study was to provide an overview of population profile of young patients (<55 years) presenting at our institution for THA.

Methods:

A retrospective review of all primary THA being performed in patients <55 years old in a single tertiary academic hospital in South Africa, between May 2016 and April 2019, was conducted. Demographical data as well as clinical data, including diagnosis, surgical approach and bearing surface, fixation technique and surgical seniority, was collected.

Results:

A total of 186 THA were performed during the study period (7%, n=13 <25 years; 19%, n=35 <35 years; 22%, n=41 <45 years; 52%, n=97 <55 years), which included 58% (n=107) male and 42% (n=79) female participants. The primarily pathologies were avascular necrosis (31%, n=57) and post-traumatic osteoarthritis (30%, n=56) followed by primary osteoarthritis (19%, n=32), developmental dysplasia hip (8%, n=14) and inflammatory arthritis (7%, n=11). Surgical approached included the posterior approach (63%, n=118), direct anterior (34%, n=64) and antero-lateral (2%, n=4) approaches. Ceramic on crosslink polyethylene (51%, n=93) was the main bearing surface followed by ceramic on ceramic (24%, n=44). Most femoral components (95%, n=175) and all acetabular components were uncemented. The primary surgeon in most cases was an arthroplasty consultant (50%, n=93), followed by an arthroplasty fellow (31%, n=57) and an arthroplasty registrar (19%, n=36).

Conclusion:

We report a high volume of young patients, <55 years, requiring primary THA at a tertiary hospital in South Africa. The main pathologies included avascular necrosis and trauma which highlights the quadruple disease burden of developing countries to contributes to an increased burden of very young patients presenting for THA.

Proposal and Validation of a Novel, Descriptive Classification System for Hip Pathology in HIV-Infected Patients Awaiting Total Hip Arthroplasty

Paper: P65
Category: Arthroplasty
Presenting Author: T Pillay
Co-authors: N Sikhauli, W Ndou, DR van der Jagt, L Mokete, JRT Pietrzak

Background:

Improved life expectancy in patients with human immunodeficiency virus (HIV) results in an increased possibility of developing chronic degenerative and HIV-associated joint disease. No descriptive classification system exists to describe hip pathology in HIV positive patients awaiting total hip arthroplasty (THA). The aim of this paper was to evaluate the gross radiological hip pathology in patients awaiting THA. Secondarily, the authors aimed to propose and validate a descriptive hip-specific radiological classification system for HIV-associated hip pathology.

Methods:

We retrospectively reviewed pelvic radiographs of 75 consecutive HIV-infected patients and 119 hips with hip pathology necessitating THA consultation in a single at an Arthroplasty Unit between

January 2015 and July 2018. Each hip was classified as type 1 if avascular necrosis (AVN) of the femoral head was evident; type 2 if the pathology was unrelated to HIV (osteodegenerative or inflammatory arthritic changes) and type 3 if a neck of femur (NOF) fracture was present. Type 1 hips were subclassified according to the acetabular reaction and subsequent position of the centre of rotation (COR) of the necrotic femoral head. Subsequently, type 1A had normally contained femoral heads, type 1B had proximal erosion of the acetabulum, type 1C had proximo-lateral migration of the COR and type 1D had medial migration of the COR and acetabuli protrusio. Inter- and intra-observer reliability was evaluated by 6 independent reviewers with at least 2 years orthopaedic surgery experience.

Results:

Seventy-nine hips (67%) were type 1. The majority, 33 patients (44.6%), were type 1A (well contained) while 12 (16.2%) showed proximal migration and superior acetabular erosion (type 1B) and 19 (25.7%) had acetabuli protrusion (type 1D). There were 33 (27.7%) who were type 2 with 21 with Tonnis 2 OA and 6 with radiological inflammatory arthritis. There were 12 (10.1%) with NOF fracture (type 3) of which 5 (41.7%) had coxa vara. There was both excellent inter- and intra-observer reliability (kappa-value 0.95) for the proposed classification.

Conclusion:

We propose and validate a descriptive classification system for HIV-associated hip pathology in patients awaiting THA. AVN is present in the majority of cases.

Severe Windswept Deformity in Patients Undergoing Total Knee Arthroplasty: What Came First, the Valgus or Varus?

Paper: P89
Category: Arthroplasty
Presenting Author: W Ndou
Co-authors: L Mokete, PN Ntombela, N Sikhauli, JRT Pietrzak, D van der Jagt

Background:

Total knee arthroplasty is a successful operation, which provides pain relief, improves knee function and restores quality of life. Bilateral involvement of the knees with degenerative arthritis is common with either symmetrical varus or valgus deformity in both knees. The windswept deformity is a curious and uncommon presentation with unique challenges in restoring limb alignment. There is a paucity of information on the reasons behind this asymmetry.

Aim:

To determine which deformity became symptomatic first in patients with a windswept deformity presenting for total knee arthroplasty.

Methods:

Data was collected prospectively over a period of 3 years (July 2016–December 2018). Demographic data including age, sex, BMI as well as childhood history of skeletal dysplasias, inflammatory disease and metabolic bone disease were documented. Patients were questioned during history taking as to which knee became symptomatic first. All data was captured using Excel.

Results:

A total of 10 patients (8 females, 2 males) were identified. None of the patients had a history of childhood dysplasias or metabolic bone disease. One patient had rheumatoid arthritis on disease modifying agents. The varus deformity averaged 23 degrees (range 10–30) and valgus deformity averaged 30 degrees (range 10–30). Two patients with the severest valgus deformities required total knee arthroplasty using hinged prosthesis. Six out of ten patients reported that the valgus knee became symptomatic first.

Conclusion:

Total knee arthroplasty in patients with severe deformities remains a challenge and the patient's symptoms usually guide the side to be corrected first. Our small case series showed that 60% of our patients were more symptomatic in the valgus knee. A larger case series is required to conclusively answer the study question.

Short-Term Outcomes of Cementing a Dual Mobility Cup into a High Friction Uncemented Acetabular Cup in Revision Hip Arthroplasty Surgery

Paper: P76
Category: Arthroplasty
Presenting Author: D van der Jagt
Co-authors: A Sekeitto, AJL du Toit, KR van der Jagt, K Sikhauli, JRT Pietrzak, S Mdou, L Mokete

Background:

Revision hip replacement surgery has a high complication rate with acetabular bone loss and dislocations remaining a significant challenge. High friction metal acetabular shells and dual mobility bearings have offered attractive solutions but have only been used individually and not in combination.

Methods:

We review 19 cases of hip arthroplasty where Redapt high friction acetabular cups were implanted with best bone apposition, and with less regards for orientation. A Polar dual-mobility cup was then cemented into the Redapt cup, achieving optimal inclination and anteversion. The femoral component was implanted using established techniques.

Results:

At review all 19 constructs remained well sited with no loosening. There was one dislocation which was reduced closed and did not re-dislocate. One patient, which had had a previous septic clearance had a recurrence of his sepsis and needed a repeat two stage septic clearance. 17 patients required no further intervention.

Conclusion:

We conclude that the combination of dual mobility cups cemented into modern high friction acetabular cups where there is poor acetabular bone stock is a viable solution for this challenging problem. Short-term results are very encouraging.

The Utility of Alpha–Defensin Test in Guiding Second Stage Revision in Patients with Inflammatory Arthritis

Paper: P90
Category: Arthroplasty
Presenting Author: N Sikhauli
Co-authors: L Mokete, JRT Pietrzak, W Ndou, D van der Jagt

Background:

Periprosthetic joint infection continues to be a major complication of total joint arthroplasty with devastating consequences and can lead to limb loss or loss of life. Alpha-defensin test has a high accuracy in diagnosing periprosthetic joint infection however there are no studies that looks at the use of alpha-defensin test in guiding second stage revision/implantation in inflammatory arthritis patients. Our hypothesis is that alpha-defensin test can be used as the ultimate test in proving the absence or presence of PJI during 2nd stage implantation/revision.

Methods:

Retrospective review of 126 revision cases from 2015 to 2018 in a single academic centre. Patients with inflammatory arthritis who underwent 1st stage revision with the use of cement spacer or use of Lautenbach irrigation tubes and second stage revision where the alpha-defensin test was used were enrolled.

Results:

Total of 16 cases met the inclusion criteria, 13 knees and 3 hips. Rheumatoid arthritis 11, systemic lupus erthromatosus 3, psoriatic arthritis 1 and gouty arthritis 1. We noted a disparity in infective markers (ESR & CRP) in all the cases. Four cases underwent repeat first stage revision (exchange of spacers) due to high persistent of ESR and CRP. Positive cultures were identified in five cases during first stage revision. The average wait from 1st stage to 2nd stage revision was 19 weeks (8–36). Fifteen cases had a successful 2nd stage revision after negative alpha-defensin test with no readmission at 6 months, one case of gouty arthritis still has a cement spacer to date after undergoing two repeat 1st stage and a positive alpha-defensin test.

Conclusion:

We conclude that the alpha-defensin test can be used safely and reliable as a confirmation for infection eradication in patients with inflammatory arthritis and polarising infective blood results at an average of 19 weeks following 1st stage revision. There is a need to establish the threshold duration at which the test can be safely and reliably used to guide the second stage revision.

What They Say vs What They Do: Assessing Physical Recovery after Total Knee Arthroplasty Comparing Wearable Motion Sensors and Self-Reported PROMs

Paper: P63
Category: Arthroplasty
Presenting Author: M van Heukelum
Co-authors: S Bolink, B Grimm

Background:

Following primary total knee arthroplasty (TKA), patients experience pain relief and report improved physical function and activity. However, there is paucity of evidence that patients are truly more active following TKA. The primary aim of this study was to prospectively measure physical activity with a wearable motion sensor before and after TKA and compare the data to patient-reported levels of physical activity before and after TKA, gathered using previously validated PROMs. A second aim was to investigate whether differences in physical activity after TKA are related to levels of physical function.

Methods:

Twenty-two patients undergoing primary TKA were measured preoperatively and 1–3 years postoperatively. Patient-reported outcome measures (PROMs) included KOOS-PS (physical function) and SQUASH (activity). Physical activity was assessed during 4 consecutive days wearing an accelerometer-based activity monitor (AM) at the thigh. Data was analysed using algorithms in Matlab. AM-derived parameters included walking time (s), sitting time (s), standing time (s), sit-to-stand transfers, step count, walking bouts and walking cadence (steps/min). Objective physical function was assessed by motion analysis of gait, sit-to-stand (STS) transfers and block step-up (BS) transfers using a single inertial measurement unit (IMU) worn at the pelvis. IMU-based motion analysis was only performed post-operatively.

Results:

PROMs demonstrated significant improvement of perceived physical function (KOOS-PS=68±21 vs. 34±26; $p<0.001$) and physical activity (SQUASH=2584±1945 vs. 3038±2228; $p<0.001$) following TKA. AM-based parameters of physical activity demonstrated no significant differences between pre- and postoperative quantitative outcomes. Only walking cadence improved (81.41±10.86 (steps/min) vs. 94.24±7.20 resp.; $p<0.001$). There was moderate correlation between self-reported levels of physical activity and objectively assessed levels of physical activity after TKA (Pearson's $r=0.36–0.43$; $p<0.05$). Outcomes of physical activity after TKA were moderately correlated to IMU-based outcome measures of gait, STS-transfers and BS-transfers (Pearson's $r=0.31–0.48$; $p<0.05$).

Conclusion:

Post TKA, patient-reported and objective physical performance tests show improved function. However, the self-perceived higher activity level is not supported by objective measure. This may have implications for general health, rehabilitation and patient communication and expectations.

FOOT AND ANKLE PAPERS:

Medium- to Long-Term Results of the Hintegra Total Ankle Arthroplasty: A South African Perspective

Paper: P23
Category: Foot and Ankle
Presenting Author: M Khademi
Co-authors: NP Saragas, PNF Ferrao

Background:

Total ankle arthroplasty (TAA) is an accepted treatment option for ankle arthritis. This procedure is increasingly being performed of late, as the implant design has improved biomechanically with good outcomes. Most reports on survivorship and complications are published by the designers. To our knowledge, this is the first study reporting on the short- to medium-term results of the Hintegra mobile bearing TAA to come out of Africa.

Methods:

All patients between 2007 and 2014 who had a Hintegra TAA were retrospectively reviewed. A total of 93 TAA were performed using the Hintegra prosthesis by a single surgeon. Eight patients passed away prior to the review and 16 patients were untraceable. We included a total of 69 patients (69 ankles) in this study. All 69 patients were available for clinical and radiological examination as well as for completion of a visual analogue scale (VAS) for pain, the American Orthopaedic Foot and Ankle Society (AOFAS) score and the self-evaluation Foot and Ankle Score (SEFAS).

Results:

Mean follow-up was 60 months. Mean VAS score was 2, SEFAS was 47 and AOFAS was 87.28 at recent follow-up. Eight patients had periprosthetic osteolysis of which five patients had revision surgery with bone grafting of the cysts. We detected polyethylene particles and calcification particles in specimens taken from osteolytic cysts

by using various stain techniques. Eight patients were converted to ankle arthrodesis.

Conclusion:

The Hintegra mobile-bearing total ankle arthroplasty had an 85.5% implant survival in the short to midterm. The ankle range of motion however did not improve from the preoperative range. This study demonstrated that TAA is a valid option to maintain the hindfoot function. By using polarised microscopy, we have detected polyethylene particles in specimens taken from osteolytic cysts, which could be one of the causative factors. We also believe that the hydroxy apatite coating also plays a role in the pathogenesis of periprosthetic osteolysis of TAA.

Reliability of the Intra-Operative Radiographic Visual Assessment of the Hallux Interphalangeal Angle after Correction of Hallux Valgus Deformity

Paper: P25
Category: Foot and Ankle
Presenting Author: M Khademi
Co-authors: NP Saragas, PNF Ferrao

Background:

Hallux valgus interphalangeus (HVI) contributes significantly in the total hallux valgus (HV) and should be corrected surgically in conjunction with the HV correction. Akin osteotomy has been accepted as the standard osteotomy for correction of the HVI. The magnitude of the HVI dictates to the surgeon the size of the wedge to be resected when doing the Akin osteotomy. Visual estimate of the HVI angle intraoperatively is the most feasible and practical way to decide on the HVI correction. The purpose of this study was to evaluate the reliability and reproducibility of visual estimation of the HVI angle compared with direct measurement.

Methods:

A total of 50 cases of HV were included in the study. Two foot and ankle surgeons involved in the surgery estimated the HVI on the C-Arm intraoperatively after correcting the HV by various types of osteotomies. The foot and ankle fellow measured the pre-Akin HVI angle and once the Akin osteotomy was completed on the X-ray.

Results:

There was strong agreement between the two observers on the measurement ($p<0.001$) as well as between both observers and the exact measurement ($p<0.001$).

Conclusion:

The interobserver reliability of radiographic visual assessment of the HVI is 78%.

GENERAL PAPERS:

A Comparison of Hip Revision Arthroplasty Surgery in the Private and Public Sectors

Paper: P80
Category: General
Presenting Author: D van der Jagt
Co-authors: A Sekeitto, AJL du Toit, KR van der Jagt, K Sikhauli, JRT Pietrzak, S Mdou, L Mokete

Background:

Public and private sector patients are differentiated mainly on the basis of economic criteria. We initiated this study to determine if this influenced the revision profile in these patient groups.

Methods:

We reviewed the clinical records of the last 50 revision hip arthroplasties performed in a large private practice and those performed in an arthroplasty dedicated academic unit in the public sector. We compared our findings to determine differences as well as similarities in these two groups of patients. The patient demographics were similar in the two groups of patients in respect of age, time to revision and sex.

Results:

There was a similar rate of previous revisions in both groups of patients. The majority of patients revised in the public sector were for sepsis, periprosthetic fractures and occasional bearing wear sequelae with sepsis predominating. Those in the private sector were revised for sepsis and prosthetic wear sequelae with nearly equal proportions. Similar implants from the same cohort of suppliers were used in both groups of patients. Sepsis is an equal problem in the public and private sector patients.

Conclusion:

There was some shift in the revision load from the private to the public sector with some public sector patients having received their primary prosthesis in the private sector. Conclusions from this study may be important when NHI is implemented.

A Comparison of Knee Revision Arthroplasty Surgery in the Private and Public Sectors

Paper: P81
Category: General
Presenting Author: D van der Jagt
Co-authors: A Sekeitto, AJL du Toit, KR van der Jagt, K Sikhauli, JRT Pietrzak, S Mdou, L Mokete

Background:

Public and private sector patients are differentiated mainly on the basis of economic criteria. We initiated this study to determine if this influenced the revision profile in these patient groups.

Methods:

We reviewed the clinical records of the last 50 revision knee arthroplasties performed in a large private practice and those performed in an arthroplasty dedicated academic unit in the public sector. We compared our findings to determine differences as well as similarities in these two groups of patients. The patient demographics were similar in the two groups of patients in respect of age, time to revision and sex.

Results:

The majority of patients revised in the public sector were for sepsis and for periprosthetic fractures. Those in the private sector were revised for instability, sepsis, prosthetic wear and for disease progression of degenerative changes in knees with uni-compartment replacements. Similar implants from the same cohort of suppliers were used in both groups of patients. No patients in either group had their primary prosthesis done in the other sector.

Conclusion:

We conclude that patients in the private sector are less tolerant of instability issues, and this may be because they 'pay' for their procedure. Instability issues in public patients are relatively unimportant because of the patient load. Sepsis continues to be a revision burden in both groups of patients. There is no shift in the revision load from the private to the public sector. Conclusions from this study may be important when NHI is implemented.

Bioactive Glass as Dead-Space Management Following Debridement of Type 3 Chronic Osteomyelitis

Paper: P60
Category: General
Presenting Author: WT Oosthuysen
Co-authors: N Ferreira, R Venter, Y Tanwar

Background:

Chronic osteomyelitis is a challenging condition to treat and although no exact treatment guidelines exist, the surgical management strategy includes wide resection of necrotic and infected bone followed by dead space management. This study evaluates the use of bioactive glass as a single stage procedure for dead space management following surgical debridement.

Methods:

A consecutive series of 24 patients with Cierny Mader type 3 osteomyelitis, treated between March 2016 and June 2018, were identified and evaluated retrospectively. Patients were managed with bioactive glass as dead space management following surgical debridement.

Results:

Of the patients who completed more than 12 months follow-up, all fourteen (100%) showed complete resolution of symptoms. Of the remaining ten patients with less than 12 months follow-up, eight had complete resolution of symptoms resulting in a preliminary result of 22 out of 24 (91.65) having resolution of symptoms following debridement and dead space management with bioactive glass. One patient experienced a complication related to the use of bioactive glass. This manifested as prolonged serous wound drainage that resolved with local wound care.

Conclusion:

The use of bioactive glass appears to be effective for dead space management following debridement of anatomical type 3 chronic osteomyelitis of the appendicular skeleton.

Completing an SAOA Endorsed Hip and Knee Arthroplasty Fellowship: Review of the Journey

Paper: P143
Category: General
Presenting Author: J Charilaou
Co-authors: JD Jordaan, M Burger

Background:

Fellowships aim to equip an orthopaedic surgeon to excel in a subspecialty field. This encompasses surgical proficiency, patient management and decision making, exposure to a variety of pathologies and evaluation of implants, technology and innovation options. There is a strong academic component with research and teaching as cornerstones. This is all done in a supervised and structured environment in compliance with ethical and legal requirements. This report aims to highlight the processes and identify the outcomes achieved after completing a hip and knee arthroplasty fellowship of one year at a tertiary hospital in South Africa.

Methods:

Descriptive analysis of clinical and academic outputs from July 2018–June 2019. This fellowship entailed public-private sector collaboration. It is primarily based at an academic hospital with weekly observerships to three private practice surgeons.

Results:

Surgical outcomes achieved during the first 9 months: Involved in 295 arthroplasties with 92 primary procedures as the lead surgeon (hip=71, knee=21) as well as three revisions (hip=2, knee=1). A wide spectrum of complex hip and knee pathology was managed. Assisted in 200 arthroplasties (state=109, private=91).

Research: Presented at 2018 SAOA congress. Collaborating in multiple ongoing and long-term projects within the unit.

Mentorship: Continuous interaction and mentorship on a variety of personal and professional aspects complemented the time spent within the system.

Teaching: Involved in pre-graduate and registrar educational programmes and academic forums. Being taught, but also acquiring the skill of also teaching others.

Learning: Attendance of 12 local courses encompassing the whole spectrum of arthroplasty Attendance of two international courses and visitations in Switzerland and Ireland.

Conclusion:

The value of a well-structured and transparent fellowship programme is crucial to optimise time allocation and maximise skill development and maintain credibility. The public-private partnership and exposure further adds weight and broadens the scope of practice to achieve pre-set goals. Local fellowships can compete with international peers and provide a crucial platform to continually improve the fraternity.

Description of a New Open Surgical Technique for Repair of Chronic Full Thickness Abductor Muscle Tears and Evaluation of the Mid-Term Results

Paper: P124
Category: General
Presenting Author: JRT Pietrzak
Co-authors: K Nortje, JN Cakic

Background:

Tears of the abductor tendon complex, including the gluteus medius and gluteus minimus, are a distinct source of lateral hip pain and dysfunction. In general, these are recalcitrant to non-operative treatment measures. Optimal surgical technique and management remains controversial.

Methods:

We conducted a retrospective review of the mid-term outcomes of a single surgeon series of chronic full-thickness gluteus medius and gluteus minimus open surgical repair. All patients underwent MRI scans to confirm the presence and size of complete tears. All patients failed a minimum of 3 months non-operative treatment. We describe this novel surgical repair technique which includes excision of bursa, diamond-shaped release of the ilio-tibial band (ITB), microfracture of the greater trochanteric abductor footprint, quadrant-shaped suture anchor repair of gluteus minimus and speed bridge fixation and compression of gluteus medius over gluteus minimus. Platelet-rich plasma augmentation is injected post repair before closure of ITB. All patients were managed for 6 weeks in abductor-brace. Previous greater trochanter PRP and corticosteroid injections were noted. No patients had had previous ipsilateral total hip arthroplasty (THA).

Results:

The study included 18 patients (14 females, 4 males) with a mean follow-up of 13.72 months (range 12.1–23.34 months). The average age of patients was 46.2 years (37–67 years) and

8 (44.4%) had lower back pathology. The overall patient satisfaction rate was 83.33% (n=15). VAS pain scores improved from 7.92 (6.2–10) to 3.54 (2.3–7.2). The patient reported outcomes were measured according to the mHHS, HOS-ADL and iHOT-33. The mean improvements from baseline to post-operative follow-up were 48.63 (range 32.80–82.70) – 78.57 (range 45.30–93.70) for mHHS, 63.93 (range 25.49–100.00) – 82.14 (range 48.53–100.00) for HOS-ADL and 38.85 (range 12.45–71.96) –78.23 (range 25.29–93.80) for iHOT-33. All four dissatisfied patients had received >1 PRP and corticosteroid injection within 6 months of surgical repair. There were two (11%) patients who complicated with small wound dehiscence.

Conclusion:

We present an open surgical technique for repair of chronic, recalcitrant full thickness abductor tears. At a minimum of 1-year follow-up this surgical approach yields both good functional results and satisfaction rates.

Direct Anterior Hip Approach: A Descriptive Analysis of Its Implementation at a Tertiary Academic Hospital

Paper: P142
Category: General
Presenting Author: J Charilaou
Co-authors: JD Jordaan, M Burger

Background:

The direct anterior approach (DAA) to hip arthroplasty has gained popularity in South Africa as a main and in some centres the preferred approach. However, few academic institutions teach and transfer this skill set to post graduate trainees. The steep learning curve of between 50 and 100 cases and the associated complications of this technique are well documented. The aim of this study was to analyse the introduction and routine use of the DAA in a tertiary academic institution.

Methods:

A retrospective review of all DAA arthroplasties performed during a 16-month period (January 2018 to April 2019) was performed. Primary surgeons were subdivided into consultant, fellow and registrar categories.

Results:

A total of 220 patients were included. A female predominance of 62.4% was observed. Eighty per cent (n=176) of surgical indications were due to neck of femur fractures. Cemented stems were utilised in 19.6% (n=43) of cases. Total hip arthroplasties were done in 63.2% (n=139) and hemiarthroplasties in 35.5% (n=78) of cases. Lead surgeon roles per category: Consultants 20.5% (n=45), fellows 40.9% (n=90) and registrars 38.6% (n=85).

Conclusion:

The DAA for hip arthroplasty can be implemented at a postgraduate level for trainees to sufficiently overcome the associated learning curve and limit complications. Consultants have a longer learning curve despite being experienced and high-volume surgeons. Fellows have a shorter learning curve due to the protected and supervised environment. Registrars can become proficient in DAA during a three-month arthroplasty rotation.

Epidemiological Data from a High-Volume Arthroplasty Unit in South Africa: A Five-Year Retrospective Review

Paper: P84
Category: General
Presenting Author: V Singh
Co-authors: C Frey, RDV Greeff

Background:

Limited data is available regarding the epidemiology of primary and revision hip and knee arthroplasty cases done in the state sector in South Africa. As a result, we rely on international data to guide us. We suspect that international data may underestimate the spectrum of joint disease related to communicable diseases such as HIV and tuberculosis in South Africa. Furthermore, we suspect that our population group tends to present with more advanced joint disease, due to contrasting referral systems and health-seeking behaviour. By analysing the epidemiology of cases at our institution, we aim to better define the local diseases spectrum with regard to diagnosis and severity of disease.

Methods:

A retrospective review of all patients operated in our arthroplasty unit between 1 January 2013 and 31 December 2018 were conducted. Epidemiological data pertaining to patient demographics, diagnosis, stage of disease, ASA grading and comorbidities were recorded and analysed.

Results:

Included in the review were 2 413 patients who were operated in our arthroplasty unit over the 5-year period. Primary total knee arthroplasties accounted for 55.6% of cases while revision total knee arthroplasties accounted for 2.2% of cases. Primary total hip arthroplasties accounted for 38.7% of cases while revision total hip arthroplasties accounted for 3.5% of cases. The majority of osteoarthritic knees presented with advanced degenerative disease (Kellgren & Lawrence Grade 4), while most arthritic hips were graded as Tonnis grade 3.

Conclusion:

Data from this review reflects that the majority of patients with degenerative disease present with advanced disease, while also having multiple comorbidities. This not only increases the difficulty of performing the joint replacement, but also carries a higher anaesthetic risk. We need to take cognisance of this fact when planning these patients for surgery. Furthermore, more complex surgeries result in longer operating times and a higher cost per patient.

Evaluating Knee Arthroscopy Skills in Orthopaedic Trainees

Paper: P68
Category: General
Presenting Author: K Berry
Co-authors: J Klopper, M Held

Background:

The emphasis on orthopaedic trauma in South Africa might overshadow arthroscopic training. Traditionally, the surgical competency of registrars has been assessed by an attending educator's observations in the operating room, subjective end-of-rotation evaluations, and case logs. We aimed to quantify the surgical competency of our registrars more specifically to their arthroscopy skills in a simulated setting.

Methods:

A prospective observational cohort study was performed to assess the basic knee arthroscopic skills of orthopaedic trainees. Participants were assessed using the modified Basic Arthroscopic Knee Skill Scoring System (mBAKSSS) while performing a diagnostic arthroscopy on an artificial simulation knee on two separate assessments. They were assessed before and one month after a cadaver workshop. The mBAKSSS scores was documented along with the time needed for the task.

Results:

Twelve registrars (four in each of their second, third and fourth years of training) were assessed using the mBAKASS. Participants with previous arthroscopy experience had higher mBAKASS (correlation coefficient 0.56). Although there was a trend of more senior registrars having higher scores, this was not significant. There was no improvement of scores after a cadaver workshop.

Conclusion:

Registrars with more arthroscopy experience scored higher. A cadaver workshop had no impact on the skills of registrars over the period of the study. Our registrar training might not lead to improved scores for senior registrars compared to their juniors.

Genicular Nerve Radiofrequency Ablation in Patients with End-Stage Knee Osteoarthritis Awaiting Total Knee Replacement

Paper: P93
Category: General
Presenting Author: A Minnis
Co-authors: S Magobotha, A Minnis

Background:

Chronic knee pain secondary to osteoarthritis (OA) is a common condition that is known to have a significant impact on both the quality of life and the degree of disability in any given population. Many of these patients with Kellgren-Lawrence grade IV OA and severe intractable pain opt for a total knee replacement (TKR) for pain relief and restoration of function. The increased prevalence of knee osteoarthritis has resulted in increases in the number of patients and the length of time patients wait prior to receive a TKR. As a result of the larger waiting list, there is also increased and or prolonged use of NSAIDs and opioid medication along with which is an increased risk of associated adverse drug events. Genicular nerve radiofrequency ablation (GNRFA) can be used in this patient population to reduce the pain levels, use of chronic medication and associated risk of adverse events. Hypothesis: RFGNA is an effective treatment alternative for reducing pain and improving function in patients waiting for TKR at a Level 3 hospital.

Methods:

A prospective study of series of consecutive patients awaiting total knee replacement from the Arthroplasty Clinic with radiological evidence of Kellgren-Lawrence grade III/IV osteoarthritis, moderate to severe pain measured on the visual analogue scale (VAS), and failed medical therapy will be eligible for GNRFA. Any patient not meeting the inclusion criteria or patients with a seronegative/positive arthropathy, cognitive, psychiatric, bleeding disorder or those with previous GNRFA therapy are not eligible for participation. Data collection will be conducted at various time periods pre- and postoperatively using a validated VAS, Western Ontario and McMaster University Osteoarthritis Index (WOMAC) scores. Appropriate statistical analysis of the differences will be undertaken.

Results:

This cohort of patients have responded positively to GNRFA treatment and have reported significantly statistically lower pain scores using the VAS.

Conclusion:

Genicular nerve radiofrequency ablation therapy is an effective treatment for patients with end-stage knee osteoarthritis awaiting TKR. RFGNA can be used as definitive therapy in pain management in patients with end-stage knee osteoarthritis.

Hemiarthroplasty vs Total Hip Arthroplasty in the Management of Neck of Femur Fractures: A Comparison

Paper: P112
Category: General
Presenting Author: W Mukiibi
Co-authors: J Pietrzak, R Netshamutsindo, W Ndou, D van der Jagt, K Sikhauli, S van Deventer, L Mokete

Background:

Neck of femur (NOF) fractures were once called 'the unsolved fracture' and optimal management remains controversial today. The outcomes of surgical treatment, hemiarthroplasty (HA) and total hip arthroplasty (THA), are still debatable and as the demand continues to grow, evaluation and quality improvement remains essential. In the absence of a standardised protocol we therefore sought to compare the outcomes of HA and THA for NOF fractures in a single urban academic institution.

Methods:

We conducted a retrospective chart review of all patients presenting with isolated intracapsular NOF fractures to our institution from January 2016 to April 2019. The decision regarding HA or THA was based upon the Sernbo score, age and pre-morbid level of activity. Hospital efficiency including time to theatre, cancellations, reasons for cancellations, postoperative high care area stay and time to discharge were evaluated. Peri-operative complications, short-term outcomes and mortality rates were determined for both HA and THA.

Results:

There were 92 consecutive patients with NOF fractures who underwent 48 THA and 44 HA between January 2016 and April 2019. The average Sernbo score for THA was 18.9 (11–20) and HA was 14.1 (8–20). The time taken from admission to theatre was 6.4 days (1–22) and 7.6 days (2–31) for HA and THA respectively. The average number of times a THA and HA was cancelled was 1.4 (0–3) and 1.2 (0–2) times respectively. The most common reason was lack of post-operative high-care bed availability (15%). The peri-operative complication rate for THA was 6% and HA was 25% respectively. The 30-day mortality rate for THA and HA was 2.17% (n=1) and 2.32% (n=1) respectively. The preoperative mortality rate for HA was 18% (8). The 30-day readmission rate for THA and HA was 2.08% (n=1) and 6.98% (n=3).

Conclusion:

A prolonged delay to surgery and significant cancellation rate of patients awaiting HA plays a role in the increased pre-operative mortality rate. Mortality rate and readmission rate in THA was not linked to delayed surgical intervention.

Local Bone Antibiotic Delivery Using Porous Alumina Ceramic: Clinical and Pharmacological Experience

Paper: P15
Category: General
Presenting Author: E Denes
Co-authors: F Fiorenza, E Toullec, F Bertin, S El Balkhi

Background:

Local concentration of antibiotic at the site of infection is a major parameter for its efficiency. However, bone diffusion is poor leading either to their non-use (ex: gentamicin) or the use of high concentration (ex: vancomycin). Local administration could optimise their local concentration combined with lower side effects. We report the clinical experience and pharmacological results of an antibiotic-loaded porous alumina used to replace infected bone in four patients.

Methods:

Two patients had a destroyed sternum following mediastinitis; one presented a femoral chronic osteomyelitis due to MRSA and one had an infected ankle arthroplasty. The ceramic was loaded with gentamicin in three cases and vancomycin for the ankle infection. Local dosages were performed thanks to Redon's drain. In parallel blood samples were done. Loading was performed to protect the device while implanted in an infected area and was combined with conventional antibiotic therapy.

Results:

In comparison to pharmacological parameters: Cmax/MIC>8 for gentamicin or AUC/MIC>400 for vancomycin, local concentrations were dramatically higher than the one needed (i.e. >50 folds) immediately after implantation and for at least 24 hours for the longer follow-up. Vancomycin concentration was still high after H48. Meanwhile, blood samples did not find the presence of gentamicin during the 48 hours following implantation. After more than one year of follow-up for all the patients, there is no relapse of infection or signs of device infection, whereas all samples perform during implantations grew with bacteria, meaning that loaded antibiotic played a major role avoiding device colonisation in combination with surgical debridement and cleaning.

Conclusion:

This mode of administration allows an optimisation of the antibiotic delivery, maximising local concentrations while reducing systemic toxicity. In addition, ceramic mechanical characteristics allow bone replacement (strength >3 times the one of the cancellous bone and osseointegration) and thus enables one-stage surgery instead of two-stage like for the patient with chronic osteomyelitis thanks to a good primary stability.

Orthopaedic Syllabus for Undergraduate Medical Students in Southern Africa: A Consensus from Local and International Experts

Paper: P45
Category: General
Presenting Author: M Held
Co-authors: M Laubscher, S Graham, N Kruger, P Njisane, V Njisane, R Dunn

Background:

Most patients with orthopaedic pathology in South Africa are treated by non-specialists. A curriculum to prepare undergraduate medical students for this should reflect the local pathology and offer feasible solutions. The aim of this study was to establish and prioritise an orthopaedic syllabus consisting of knowledge, clinical cases, and skills relevant to medical students in South Africa.

Methods:

A modified Delphi consensus study was conducted, in the form of three interactive iterative rounds of communication and the prioritisation of items by experts from Africa, Europe and North America. For this, preferred priorities were selected but were limited to 50% of possible items. Percentage agreement of more than 75% was defined as consensus on each of these items.

Results:

Most of the 43 experts who participated were orthopaedic surgeons from seven different countries in Southern Africa, but 30% were general practitioners from Southern Africa or international educational experts. Experts prioritised cases like a multiple injured patient, a limping child and orthopaedic emergencies. The manipulation and immobilisation of dislocations and fractures were prioritised skills. The most important knowledge topics included orthopaedic infections, the treatment of common fractures and dislocations, red flags alerting to specialist referral, as well as backpain. Surgical skills for the treatment of urgent care conditions were included by some experts who saw a specific need in their clinical practice but were ranked lower.

Conclusion:

A wide geographic, academic, and expertise-specific footprint of experts informed this international syllabus through their various clinical and academic circumstances. Knowledge, skills and cases in orthopaedic trauma and infections were prioritised with the highest percentage agreement. Acute primary care for fractures and dislocations ranked high. Furthermore, the diagnosis and treatment of conditions not requiring specialist referral were prioritised. This syllabus can inform national curricula, not just in Southern Africa, and assist in the allocation of student contact times.

Performing Hip Arthroplasty on the 'Forbidden' Patients

Paper: P138
Category: General
Presenting Author: JD Jordaan
Co-authors: J Charilaou, M Burger

Background:

Traditional contraindications for total hip arthroplasty (THA) included: acute and chronic infection, neuropathic joint, severe paralysis or spasticity of lower limb muscles and uncompliant and or psychotic patients. Significant heterogenicity exists between dislocation risk between traditional antero-lateral, posterior and direct anterior approaches to the hip joint. The reduction in dislocation rates after direct anterior hip surgery is well documented and this allowed us to offer THA in previous high-risk patients. The aim of this study was to describe the 'forbidden' patient population undergoing THA at a tertiary hospital in South Africa.

Methods:

A retrospective review of all primary direct anterior THA performed in traditionally high-risk patients that were performed from 2017 to 2018 in a single tertiary academic hospital in South Africa was conducted. Patients with proven lower limb spasticity, mental retardation and acute uncontrolled psychosis were included and basic demographic and clinical information was collected.

Results:

Six patients (eight THA) were included. Bilateral staged THA was done for a quadriplegic cerebral palsy patient while bilateral single stage THA was performed in an acutely psychotic patient with old neck of femur fractures. Single THA done for three severe mental retardation patients. Finally, a single THA was performed for an acute uncontrolled psychotic patient. All operations were performed without any major intra-operative complications. Time to discharge was at a mean of seven days post-surgery. One patient presented with a significant complication which resulted in excision arthroplasty.

Conclusion:

Successful THA could be performed via the direct anterior approach on patients that traditionally were excluded from hip replacement surgery. THA can potentially significantly improve the quality of life in these patients and future research should further investigate this vulnerable population.

Rating of Arthroplasty Implants: What Orthopaedic Surgeons Need to Know

Paper: P85
Category: General
Presenting Author: V Singh

Background:

Orthopaedic surgeons today are faced with a wide range of hip and knee prostheses to choose from. As these various brands flood the market, one needs to be aware that they differ in terms of design as well as material used. Even in cases where the design and alloy are a carbon copy of a proven implant, the track record of the individual implant is what ultimately dictates its rating. The Food and Drug Administration in the USA approves implants for use in patients but does not make any statement regarding the track record of the implant. For this, we rely on implant rating systems. The most widely used of these is the ODEP (Orthopaedic Data Evaluation Panel) rating.

Methods:

We looked at the details behind the ODEP rating, including how the system was developed and what the rating implies. We have compiled a simplified diagram of the rating as well as listed the current ratings of the most widely used hip and knee implants in South Africa.

Results:

We show that despite certain implants copying the design of well-known implants whose patent has expired, they require their own ODEP rating. The ODEP rating can only be escalated as the duration of use of the implant increases. Newer implants should ideally maintain an A-grade within their year group. The most widely used hip and knee prostheses in South Africa tend to have excellent ratings.

Conclusion:

Data from this investigation reflects that the ODEP rating of prostheses is increasing in importance as more and more implants are brought into the market. Surgeons should be familiar with the rating system and take note of the rating before implanting the prosthesis into a patient. Furthermore, companies marketing newer implants should strive to have their implant rated according to the ODEP system in order for us to have a common standard when choosing a prosthesis.

Short to Medium Results of Custom 3D-Printed Pelvic Implants

Paper: P28
Category: General
Presenting Author: A Olivier
Co-author: G Vicatos

Background:

The use of custom designed pelvic implants has increasingly gained popularity in recent years. Drawbacks of these implants include the time to design and manufacture. With major advances in additive manufacturing (AM), custom implants can therefore be anatomically designed to assist in complex surgery of the bony pelvis in both orthopaedic oncology and orthopaedic reconstruction surgery.

Methods:

This series includes three patients who had major pelvic bone loss after initially presenting with infection after previous total hip arthroplasty. The extent of the bone loss in the pelvis was severe and therefore impossible to be reconstructed by conventional 'off-the-shelf' implants. The patients' pelvis was scanned producing a 3D virtual model of the entire pelvic girdle. To ensure symmetry, the unaffected opposite hemi-pelvis was mirrored, and the level and size of the acetabulum was ascertained. The implant was designed considering the remaining bony structures of the hemi-pelvis, to provide an anatomical, secured support for the reconstructed hip joint. Reconstruction of the pelvis was performed together with a cemented (bipolar bearing) acetabular cup. In two of the three cases, a proximal femoral replacement was also necessary to compensate for bony defects.

Results:

Pre-operatively, two of the three patients had extremely poor function due to previous Girdlestone procedures and were limited to using walking aids or confined to a wheelchair. Post-reconstruction all patients were ambulant without walking aids, leg lengths were restored and had minimal pain. All three patients were infection-free.

Conclusion:

Custom implants offer reconstruction solutions to surgeons dealing with complex and challenging cases with massive and complex bone loss of the pelvis. The modern technology combining MRI and CT imaging with AM, enables the rapid design and manufacturing of custom patient specific implants. Average time for design and manufacturing is around two weeks. All patients in this study managed with this novel treatment option, proved to have a stable pelvic reconstruction with restoration of leg lengths, improvement of strength and independent ambulation at short- and medium-term follow-up.

South African Perspective of Collaborations for Global Surgery in Africa

Paper: P49
Category: General
Presenting Author: S de Villiers
Co-authors: K Sewchurran, R Dunn, G Fieggen, B Biccard, R Duys, K Chu, M Held

Background:

The academic field of global surgery has emerged from the drive to improve equitable access to high quality surgical care worldwide and while historically high income country (HIC) institutions and individuals have determined the global surgery agenda, most

beneficiaries live in low to middle income countries (LMICs). Recent voices however have demanded more equitable collaborative frameworks between HIC and African partners. The aim of this research was to understand the South African perspective of global surgery by interviewing key stakeholders, including orthopaedic surgeons.

Methods:

This was a qualitative study conducted through focus group interviews and informal discussion with key stakeholders in African global surgery. Data in the form of propositions, observations and statements were collected in the interviews and analysed through codes, themes and dimensions.

Results:

Given the immense variation across our continent, we advocate for an Africa-centred identity for African surgery. Surgery in South Africa must be intrinsically rooted within the country and continent to allow collaborations with international partners to be equitable and ultimately lead to transformation, empowerment, and local buy-in. Major funding is often controlled by HIC groups outside of Africa, overshadowing local priorities. Equitable collaborations which include a participatory and emancipatory strategy practice among African (and non-African) stakeholders will seek to define a local agenda to be evaluated locally and through national surgical, anaesthesia and obstetric plans. Besides surgeons, anaesthetists and obstetricians, non-specialists are core stakeholders. A shortfall in the number of specialists means that most surgical care in South Africa is provided by non-specialists at first and second-level hospitals. Therefore, the South African global surgery agenda setting must include the entire non-specialist workforce providing surgical care. These frontline providers can contribute to global surgery efforts by identifying the barriers to improved surgical access. Research must therefore aim to find solutions for adequate training, mentorship and retention leading to an effective and safe task-sharing surgical system.

Conclusion:

South African surgery should be driven by a local agenda involving all relevant stakeholders to foster research and build clinical capacity within the continent. International collaboration has great impact when it aligns with this agenda.

GT DU TOIT – REGISTRAR RESEARCH PAPERS:

Antegrade Flexible Intramedullary Nailing Through the Greater Trochanter in Paediatric Femur Shaft Fractures

Paper: GT P44/P129
Category: GT du Toit – Registrar Research (Paediatrics)
Presenting Author: RC Rosin
Co-authors: MN Rasool, W Sibanda, PD Rollinson, D Simmons

Aims:

To determine whether an antegrade approach, through the tip of the greater trochanter, in femoral shaft fractures in children, is safe, achieves adequate union and results in significant proximal femoral growth complications.

Methods:

The case records and radiographs of 23 paediatric patients aged 7 to 12 years with femur shaft fractures managed with stainless steel antegrade flexible nailing were reviewed retrospectively. Preoperative radiographs were reviewed for fracture pattern, level and comminution. Post-operative radiographs were reviewed to assess for union, alignment, osteonecrosis of the femoral head and epiphysiodesis of the greater trochanter. Morphological changes of the proximal femur were assessed by comparing the neck shaft angle and articulo-trochanteric distance with the opposite hip. Case records were reviewed for post-operative complications, patient reported complaints and leg length discrepancy. Clinical outcomes were assessed with the criteria established by Flynn.

Results:

All patients achieved union, and none had evidence of osteonecrosis of the femoral head on follow-up. Three patients had malalignment and two patients had radiographic evidence of greater trochanteric epiphysiodesis. Two patients had morphological changes of the proximal femur, with one having an increased neck shaft angle and one an increased articulo-trochanteric distance. One patient had a leg length discrepancy of 2 cm. Fifteen patients had excellent clinical outcomes, five had satisfactory outcomes and three had poor outcomes according the criteria established by Flynn.

Conclusion:

Antegrade entry through the tip of the greater trochanter does not appear to compromise the blood supply to the femoral head or increase the risk of clinically significant morphological changes to the proximal femur. All patients achieved adequate union. Furthermore, antegrade insertion avoided skin problems and prominent nail complications around the knee seen with retrograde insertion.

Arthroscopic Arthrolysis after Total Knee Arthroplasty

Paper: GT P52
Category: GT du Toit – Registrar Research (Knee)
Presenting Author: Y Desai

Background:

Arthrofibrosis after total knee arthroplasty (TKR) is an uncommon reason for poor outcomes. Primarily, the patient will have decreased range of movement. There is paucity in good evidence for the management of this complication. The aim was to review the outcomes of the patients who had arthroscopic arthrolysis in our hospital for arthrofibrosis post TKR.

Methods:

A total of 16 patients were found to have had arthroscopic arthrolysis post TKR for arthrofibrosis. Three patients were found to have subsequent dual pathologies. Patients underwent a systematic arthrolysis, manipulation under anaesthesia and physical therapy thereafter. Range of movement (ROM) was recorded at intervals and patient overall satisfaction was noted.

Results:

There was a mean gain in ROM from pre-arthroscopic arthrolysis to final follow up of 32.1° at 20.1 months. This had a 75% satisfaction with three of the four dissatisfied patients found to have other pathologies/complications in addition to arthrofibrosis. The mean time to arthroscopy from arthroplasty was 30 months (3–132).

Conclusion:

Where other causes for knee loss of movement and pain have been ruled out, and arthrofibrosis is likely to be the sole cause, arthroscopic debridement is a beneficial procedure to improve ROM and patient satisfaction even if performed more than one year after the arthroplasty.

Biomechanical Comparison of Two Different Configurations of the Truelok Hex and Taylor Spatial Frame External Fixators

Paper: GT P29/P87
Category: GT du Toit – Registrar Research (Trauma)
Presenting Author: I Steyn
Co-authors: C Kat, F Birkholtz, A Barnard, E Hohmann

Aim:

Determine the percentage strain at a simulated fracture between two different configurations of the TrueLok Hex (TL-Hex) and Taylor Spatial Frame (TSF) external fixators.

Methods:

Two configurations each of TL-Hex and TSF were constructed using a bone substitute with a 20 mm fracture gap. They included an all-wire ring block construct and a half-pin and fine wire construct, tested under axial load in a Schenck universal testing machine. Constructs were loaded ten times at a rate of 5 mm/minute to a total load of 750 N. Fracture displacement was measured at six fixed points 120 apart with a Vernier calliper (accuracy 0.01 mm). Strain at the fracture was calculated in the medial–lateral, anterior–posterior, and axial planes using a mathematical model based on the Gough-Stewart platform.

Results:

At 750 N load the shear strain difference between the TL-Hex and TSF all-wire ring block constructs in the medial-lateral plane was 2.6% ± 1.1% vs 2.7% ± 0.9% (mean ± SD). In the anterior-posterior plane the difference was 0.2% ± 1.6% vs 1.9% ± 0.8%. Axial strain difference was 43.3% ± 1.3% vs 43.3% ± 0.6%. Differences did not reach significance ($p>0.9$; $p=0.5$; $p>0.9$ respectively). At 750 N load of the half-pin and fine wire constructs, TL-Hex allowed less strain in the anterior-posterior plane than the TSF - 2.1% ± 2.3% vs 5.9% ± 4.3% reaching significance ($p=0.014$). TSF showed lower strain rates of 52.8% ± 3.5% vs 58.3% ± 1.2% in anterior-posterior plane which was significant ($p<0.001$). In comparison with the all-wire constructs, the half-pin and fine wire constructs had significantly increased strain in all planes ($p\leq0.05$).

Conclusion:

In this experimental design, half-pin and fine wire external fixators confer significantly less stability with resultant increased strain at the fracture site. There was significantly more strain at the fracture site in all planes with the half-pin and fine wire construct in both brands. There was no statistically significant difference between the TL-Hex and TSF all-wire ring block construct.

Can Anatomical Contoured Plates Reduce Scapula Body, Neck and Glenoid Fractures?

Paper: GT P43/P128
Category: GT du Toit – Registrar Research (Shoulder and Elbow)
Presenting Author: JJ de Wet
Co-authors: S Roche, B Vrettos, JP du Plessis, R Dey

Background:

The aim is to ascertain the anatomical congruence and fit of an available pre-contoured scapula plating system and evaluate their fracture fixation capability. The investigators hypothesised that 3D-printed models are a valuable pre-operative tool, but the current available pre-contoured anatomical plates fail to achieve adequate fixation and reproducible results.

Methods:

The study is an observational basic science study. Twenty-two scapulae with closed fractures who underwent shoulder CT scans following blunt trauma from 2012 to 2016 were included in the study. Isolated acromion and coracoid fractures were excluded. The fracture patterns were evaluated and classified according to the anatomical location of the scapula and the glenoid. The investigators templated four plates: long lateral (LL), short lateral (SL), long medial (LM) and short medial (SM) plates. Nine investigators classified the fractures and templated the plates on two separate sittings, one month apart.

Results:

A plate score according to anatomical fit was calculated for each plate. Only 54.8% of the LL, 5.1% of SL, 33.8% of LM and 28.8% SM reduced the fractures. The average fixability of the fractures was found to be 49.4%.

Conclusion:

77% of fractures were scapula body fractures and 36% glenoid fractures. The anatomical pre-contoured plates are designed to fit the thicker, more robust medial and lateral borders in order to get adequate screw fixation across the fracture site. Higher incidents of body fractures and inadequate design of the plates reduced their ability to fix scapular (sub-acromion) fractures. Furthermore, the short lateral plate was unable to reduce the glenoid fractures. In order to improve the average fixability, redesigning of the plates are recommended. The investigators remain of the opinion that 3D printing is a valuable pre-operative tool.

Comparing Outcomes between Enhanced Recovery after Surgery and Traditional Protocol in Total Knee Arthroplasty

Paper: GT P11/P41
Category: GT du Toit – Registrar Research (Arthroplasty)
Presenting Author: JE Beukes
Co-authors: C Janse van Rensburg, JH Venter, RJ Immelman, MV Ngcelwane, JN de Vos

Background:

Knee replacement surgery was traditionally associated with prolonged recovery and rehabilitation programmes in hospital. Enhanced Recovery After Surgery protocols (ERAS) are cost effective and does not compromise patient safety. Despite this proven efficacy, ERAS has not been widely adopted in South African orthopaedic practices.

Methods:

119 patients undergoing elective total knee arthroplasty was included in the study. They were divided into two cohorts. The first were treated with the traditional protocol and included 59 patients. The ERAS protocol was implemented in March 2015; following this 60 consecutive patients were included in the ERAS group. Functional outcome was assessed using the Oxford knee score (OKS). The 30-day readmission rate was used to assess safety of early discharge. Length of stay and patient demographics were also collected to match the cohorts.

Results:

The length of stay was significantly decreased in the ERAS group; with a mean of 2.3 days and 5.0 in the traditional group ($p<0.001$). Two sample T test was used to compare OKS and 30 -day readmission rates. The mean OKS for the traditional group was 59.1 and for the ERAS group 58.7. The readmission rate was 5 in the traditional group and 6 in the ERAS group. No clinical significant difference was present with regard to OKS and readmission rate.

Conclusion:

With the implementation of ERAS protocols in elective total knee arthroplasty, the length of stay can be significantly reduced without compromising patient safety or functional outcome.

Open Tibial Shaft Fractures: The Effect of Management Delays on Infection Rates – a Retrospective Cohort

Paper: GT P7/P27
Category: GT du Toit – Registrar Research (Trauma)
Presenting Author: TR Basson
Co-authors: N Ferreira, JJ du Toit, MC Burger

Background:

Open tibial fractures, a multifaceted and challenging clinical scenario are still laden with controversies. The timing of the different treatment strategies plays an important role in the eventual outcome of these patients. First world guidelines have strict time standards that governs the treatment of these injuries. In the developing world, these time constraints cannot always be adhered to, causing uncertain secondary sequela, outcomes and complications. The aim of this study was to investigate the effects of time delays of basic surgical principles on the risk of infection in open tibia shaft fractures within a developing world setting.

Methods:

Records were reviewed for 82 open tibia fractures in 77 patients. The time interval from arrival to antibiotic administration (<3 hours vs >3 hours), first surgical debridement (<24 hours vs >24 hours), definitive skeletal fixation (<5 days vs >5 days) and soft tissue reconstruction (<7 days vs >7 days) was measured.

Results:

No association between infection and antibiotic administration was observed when patients were treated within or after three hours ($p=0.503$) or if surgical debridement was done before or after 24 hrs ($p=0.211$). A significant association between a skeletal fixation time of less than 5 days and reduced risk of infection was observed ($p=0.006$). Temporary fixation had a higher association with developing infection ($p<0.001$). Soft tissue closure within 7 days had a significantly lower risk ($p<0.001$) of infection compared to those who had soft tissue closure after 7 days.

Conclusion:

Time delays in the treatment of open tibial fractures has detrimental effects on rates of infection. Delaying definitive skeletal fixation and soft tissue reconstruction beyond the predefined times is associated with significant increased risk for developing infection. Delaying of antibiotic administration and surgical debridement beyond the prescribed times had minimal effect on infection rates.

Patient Satisfaction Following Wide Awake Local Anaesthetic No Tourniquet Hand Surgery in a South African Tertiary State Hospital

Paper: GT P24/P70
Category: GT du Toit – Registrar Research (Hands)
Presenting Author: M de Buys
Co-authors: A Aden, M Tsama

Background:

Wide awake local anaesthetic no tourniquet (WALANT) hand surgery is a rapidly growing technique of performing hand surgery whereby a lignocaine/adrenaline/bicarbonate mixture is injected into the hand or fingers of the patient where the procedure is to be carried out. No tourniquets or sedatives are used providing numerous benefits for the patient, hospital and surgeon.

Methods:

This is a retrospective study with prospective recall looking at the satisfaction of patients who underwent WALANT hand surgery at our institution in the first year of its inception. The questionnaire analysed basic demographics, compared WALANT to dental procedures, attempted to analyse the subjective and objective experience of the procedure, overall experience, expectations, pain felt at each stage of the procedure and finally surgical outcome.

Results:

Eighty procedures were included in the study which equated to 67 patients. Some 86.6% would prefer WALANT for themselves in the future and 86.5% would 'definitely' or 'probably' recommend WALANT to friends or family. When compared to their previous dental procedures, 79.3% of patients said the pain was less or the same. Some 70.1% of patients say the experience was better than expected and for 26.9% it was the same as expected. The pain assessment showed average pain scores of 3.89/10 during local anaesthetic injection, 1.25/10 during the procedure and 5.20/10 post-operatively, with post-operative pain starting an average of 9 hours following procedure completion. At time of follow-up, 85% of conditions were cured and there were no instances of digital ischaemia or infection noted.

Conclusion:

The results of this study suggest that WALANT hand surgery is a safe, effective and satisfactory method of performing hand surgery in the South African context with the results being similar to International published data. The misconception regarding the use of lignocaine injections into the digits has once again been refuted as not a single case of ischaemia was seen.

Prevalence of a Peri-Operative Troponin Leak in Patients Undergoing Hip Arthroplasty for a Neck of Femur (NOF) Fracture in a South African Population

Paper: GT P10/P31
Category: GT du Toit – Registrar Research (Arthroplasty)
Presenting Author: RD van Zyl
Co-authors: MC Burger, JD Jordaan

Background:

Patients undergoing arthroplasty surgery are mostly of advanced age with various co-morbidities. The additional physiologic stress associated with a neck of femur (NOF) fracture puts this population at higher risk for myocardial injury after non-cardiac surgery (MINS). MINS, diagnosed with the use of troponin testing, is underdiagnosed in arthroplasty patients and the South African population. Previous research reported a 42% post-operative troponin leak prevalence among different types of hip and knee

arthroplasty. Of these, patients with NOF fractures had the highest prevalence (67%). The aim of this study was to determine the prevalence of a peri-operative troponin leak in NOF fracture patients undergoing hip arthroplasty to compare the prevalence at the time of admission and after surgery.

Methods:

A prospective, longitudinal study of NOF fracture patients undergoing hip arthroplasty at a tertiary academic hospital in South Africa was conducted from April 2018 to July 2018. Troponin levels were recorded pre-operative on admission and on day one and day three post-surgery using a highly sensitive cardiac troponin T assay (hs-cTnT). A level of >15 ng/L was considered abnormal and termed positive troponin leak while >100 ng/l is suspected in acute coronary syndrome (ACS).

Results:

Thirty-nine patients (n=39) were included. Twenty-three (n=23) patients (59%) recorded a positive peri-operative troponin leak of which twenty (n=20) patients (87%) had a positive leak on admission already. Two (n=2) patients (5%) had a suspected ACS.

Conclusion:

Patients with NOF fractures are at risk for MINS with a high one-year mortality rate, many of which die during hospitalisation or within one month after surgery. Previous work from our unit reported a high post-operative troponin leak prevalence among NOF patients while in the current study we report most patients (87%) had raised levels on admission already and potentially at greater risk for cardiac events prior to surgery. The additional stress associated with a fracture is an important risk factor in NOF patients. Troponin surveillance is an inexpensive and essential measure to diagnose patients at risk for MINS. Early detection before surgery allows for improved patient optimisation. We recommend routine peri-operative testing for all NOF fracture patients in South Africa.

Relative Metatarsal Length Change following the Modified Lapidus Procedure

Paper:	GT P4/P21
Category:	GT du Toit – Registrar Research (Foot and Ankle)
Presenting Author:	W Greeff
Co-authors:	A Strydom, PNF Ferrao, NP Saragas

Background:

The modified Lapidus is a surgical treatment option for moderate to severe hallux valgus deformities, especially in the presence of the first tarsometatarsal joint arthritis or hypermobility. It has good long-term results, but reportedly can lead to transfer metatarsalgia due to shortening of the first metatarsal.

Methods:

A retrospective analysis of the clinical records of all adult patients who underwent a modified Lapidus procedure during a 3-year period. Clinical notes were evaluated to look for non-union or any other complications related to the surgery. Pre- and post-operative standard weight bearing radiographs were used to establish the relative metatarsal length (RML), intermetatarsal angle (IMA), hallux valgus angle (HVA) and distal metatarsal articular angle (DMAA). A total of 69 modified Lapidus procedures were performed, with 32 included in the study.

Results:

The mean RML was -0.77 mm and -4.86 mm pre- and post-operatively respectively. The average RML shortening due to the surgery was -4.09 ($p<0.0001$). The mean pre and post-operative IMA was 15 and 5 degrees respectively ($p<0.0001$). The mean pre and post-operative HVA was 33 and 9 degrees respectively ($p<0.0001$). No patients reported transfer metatarsalgia.

Conclusion:

In this series there was a statistically significant degree of shortening ($p<0.05$) of the relative length of the first metatarsal. The low rate of transfer metatarsalgia following the modified Lapidus procedure could be attributed to the sagittal plane correction and stability obtained by performing a first TMT fusion.

Reliability of the Radiographic Measurement of the Hallux Interphalangeal Angle

Paper:	GT P6/P24
Category:	GT du Toit – Registrar Research (Foot and Ankle)
Presenting Author:	M Khademi
Co-authors:	NP Saragas, PNF Ferrao, A Strydom, Z Mayet

Background:

The hallux valgus interphalangeus (HVI) deformity has a common association with hallux valgus and hallux rigidus. The hallux valgus interphalangeus angle is formed by the angle between the long axes of the proximal and distal phalanges. The normal value for this angular deformity in the coronal plane is less than 10 degrees. The aim of this study was to analyse the intra- and inter-observer reliability of measuring the interphalangeal angle by orthopaedic surgeons. This study is going to be the first study to evaluate the reliability and reproducibility of measuring the HVI angle.

Methods:

Twenty-one X-ray prints of weight bearing feet constituted a set. Sixteen qualified orthopaedic surgeons were asked to measure the HVI angle of all 21 X-ray images in the set. Three randomised sets were sent to each evaluator at 4-weekly intervals. After all three sets were measured, data was retrieved and statistically analysed to determine the inter- and intra-observer variability and reliability in the measurement of the HVI angle.

Results:

Reproducibility of the HVI measurement was assessed using three categories which included the ability to measure the same angle three times and achieve: three degrees or less, five degrees or less and more than five degrees variation. The intra-observer reliability was found to be 5 degrees and less in 75.2% of participants and the inter-observer reliability was 61.2%. The researcher didn't find significant correlation between the surgeons' level of experience with respect to the reliability of measuring the HVI angle.

Conclusion:

The inter- and intra-observer reliability of measuring the HVI angle is 61.2% and 75.2% respectively. The level of experience of the surgeon does not improve this reliability.

Results of Odontoid Peg Fracture Treatment at a Tertiary Hospital

Paper:	GT P33/P100
Category:	GT du Toit – Registrar Research (Spine)
Presenting Author:	FM Sukati
Co-author:	MV Ngcelwane

Background:

The axis most frequently fractures at the odontoid peg waist. Odontoid fractures account for up to 20% of all cervical spine fractures. Historic treatment with traction and then immobilisation

for 12 weeks has since evolved to include internal fixation of these fractures. We undertook the study to determine the prevalence of odontoid type II fractures in relation to cervical spine fractures and clinical outcomes in patients treated in our hospital.

Methods:

This is a retrospective review of patients admitted with axis fractures from January 2008 to December 2018. We excluded patients with pathological fractures. From the odontoid peg fractures patients' demographics, neurological deficit, method of treatment, fracture union and clinical outcomes were recorded.

Results:

Of 231 fractures of the cervical spine, 42 involved the odontoid peg. Of these, 36 were male and eight female. Age range was 16–86 years. There was one type I, 24 type II and 17 type III fractures. The type I fracture was treated with a hard collar. Cones callipers treatment was used in 17 of type II fractures, seven of which were later converted into halo frame. Three underwent primary surgical treatment. Type III fractures were treated with a collar in one patient, cones traction in 15, later converted to halo in two patients. One patient was treated surgically. Six patients were treated surgically, two for non-union, four patients were treated primarily surgically after a few days of cones callipers immobilisation. All the patients went on to union, including the two that later required surgery for non-union.

Conclusion:

Odontoid peg fractures heal well with non-operative management. Type II fractures have a higher non-union rate on non-operative treatment. The introduction of a halo frame reduces hospital stay and may be the answer to the prolonged bed occupancy of these fractures.

Sarcopenia in Patients Presenting with Fragility Fractures of the Hip at a Tertiary Facility in South Africa

Paper:	GT P28/P86
Category:	GT du Toit – Registrar Research (Trauma)
Presenting Author:	C Laubscher
Co-authors:	M Burger, J Charilou, MM Conradie, R Eagar, JD Jordaan

Background:

Changes in body composition, including a decrease in muscle and bone mass, accompany ageing. Sarcopenia is defined as the degenerative loss of skeletal muscle mass, quality, and strength associated with ageing. The aim of this study was to assess the prevalence of sarcopenia in patients that present with fragility fractures of the hip (FFH).

Methods:

In this cross-sectional study, all patients presenting with an FFH were invited to participate. Traumatic hip fractures, pathological hip fractures or patients with an acute concomitant disease were excluded. The European Working Group on Sarcopenia in Older People (EWGSOP) criteria of a) low muscle mass together with b) evidence of impaired muscle function was used to diagnose sarcopenia. Muscle mass was determined using a dual-energy X-ray absorptiometry (DEXA) scan and hand grip strength, measured with a Jamar hand dynamometer, was used to assess muscular function. Routine blood sampling for calcium, inorganic phosphate, ALP & 25-OH vitamin D was performed.

Results:

Over the 16 weeks study period, 65 of 100 patients that presented with an FFH were recruited. A total of 44 out of the 65 patients (68%) were sarcopenic.

Conclusion:

This study reports a high prevalence of sarcopenia in our local FFH population. Sarcopenia is associated with poor patient outcomes following surgical intervention and South African orthopaedic surgeons should therefore be cognisant of the presentation and associated risks of sarcopenia as our patient population ages.

The Burden of Tibial Diaphyseal Fractures at an Urban Academic Institution: Time Counts

Paper:	GT P38/P114
Category:	GT du Toit – Registrar Research (Trauma)
Presenting Author:	AS Whitehead
Co-authors:	J du Plessis, JRT Pietrzak, S van Deventer, A Robertson

Background:

Approximately 26 tibial diaphyseal fractures occur per 100 000 population per year worldwide. These fractures represent a significant burden on theatre resources. The aim of this study was to evaluate this burden in terms of time taken for intramedullary nailing of a tibia fracture by registrars and medical officers on a dedicated orthopaedic trauma list.

Methods:

We conducted a retrospective chart review of all tibial diaphyseal fractures operated on at a single level one trauma centre in a major metropolitan area from April 2016 to April 2018. All cases underwent intramedullary fixation. The operating time was deducted from the total theatre time to determine the amount of time used for anaesthetic and set-up purposes.

Results:

Tibial fractures accounted for 18% of all orthopaedic admissions during this time period. There were 2 289 total orthopaedic trauma surgical procedures performed and intramedullary nailing of tibial fractures was the most common long bone trauma procedure done (n=238, 10.4%). A total of 169 tibial fractures in 165 patients were included (122 isolated, 43 polytrauma; 35 females, 130 males). There were 57% closed injuries (98) and 43% open fractures (71). The most common mechanism of injury was motor vehicle accidents (n=108, 65%), falls from height (n=17, 10%) and assaults (n=16, 9%). The mean operating time was 88 minutes (45–210). The mean theatre time 149 minutes (80–260). The anaesthetic and setup time represented 41% of theatre time (mean 61 minutes, 15–140 minutes). On average, the longest operating times were by medical officers (100 minutes, 60–160). Operating times improved with each year of orthopaedic surgical training and peaked in the second year. Registrars in the fourth year of training took an average of 10 minutes longer to complete the procedure than second year registrars (80). Tibial nails done as isolated procedures were on average 17 minutes faster than those done as part of a polytrauma case (105, 60–135).

Conclusion:

Intramedullary tibial nailing is a significant burden on trauma services. Non-operative tasks including set-up consume 41% of the time in the theatre. More judicious use of theatre time may expedite lists, save money and improve waiting lists.

The Incidence of Low Energy Hip Fractures in the Western Region of the Eastern Cape Province, South Africa

Paper: GT P5/P22
Category: GT du Toit – Registrar Research (Trauma)
Presenting Author: ML Grundill
Co-author: D Thomas

Background:

The incidence of fragility hip fractures is increasing worldwide and the same can be expected in developing countries like South Africa. South Africa has traditionally been represented as having one of the lowest incidences of fragility hip fractures worldwide. Recent work has shown a ten-fold increase in incidence as compared to previous data. This suggests that we may be underestimating our local fragility hip fracture burden.

Aim:

Determine the age, gender and race specific incidence rates of low energy fragility hip fractures within the western region of the Eastern Cape. This information will be compared to local and international data sets, with the aim of developing a more accurate understanding of fragility hip fractures in South Africa.

Methods:

A one-year retrospective record review of all fragility hip fracture cases was undertaken. Data pertaining to age, gender, race and mechanism of injury were collected. Age, gender and race specific incidences were calculated for the region. Local data was compared to a number of regions across the world.

Results:

A total of 305 hip fracture cases were reviewed. Of these cases 253 were fragility hip fractures. Some 70% of the cases occurred above the age of 65 years (214.77 per 100 000). 27% of the cases were between 45 and 64 years (27.85 per 100 000). 3% of the cases were younger than 45 years (0.82 per 100 000). The crude incidence in males and females is 14.58 per 100 000 and 23.41 per 100 000 respectively. Overall crude incidence is 19.3 per 100 000. The highest incidence rate was found in the white population (46.64 per 100 000).

Conclusion:

Local incidences appear to be much higher than previously thought and mirror an upward trend as shown by another local sub-population. Despite this our crude incidences still appear to be on the lower end of the spectrum worldwide. Our patients appear to be sustaining fractures at a younger age than Western populations. Of interest is that a subset of our young male population has one of the highest incidence rates worldwide. This work serves to contribute to a countrywide study, and highlights opportunities for further investigation.

The Microbiology of Chronic Osteomyelitis in a Developing World Setting

Paper: GT P3
Category: GT du Toit – Registrar Research (General)
Presenting Author: PG Mthethwa
Co-author: LC Marais

Aims:

The primary aim of this study was to identify the microorganisms that cause chronic osteomyelitis in a developing world clinical setting and to characterise the antibiotic sensitivity profile of these pathogens. Furthermore, we aimed to determine whether the causative organisms vary in relation to physiological status of the host, the HIV status of the patient or cause.

Methods:

We performed a retrospective review of consecutive adult patients treated curatively for chronic osteomyelitis of long bones, over a two-year period. Patient charts were reviewed, and data extracted in respect of patient demographics, the cause of infection, physiological status of the host in accordance with the Cierny and Mader classification, HIV status, surgical treatment strategy and causative organism.

Results:

A total of 108 organisms were identified in the 60 patients included in the study. Multiple organism were cultures in 45% of patients, a single Gram-positive organism in 22% and a single Gram-negative organism in 26% of patients. In four cases (7%) no causative organism was cultured. The most prevalent organisms were Enterobacteriaceae (34%), *Staphylococcus spp*. (29%), *Pseudomonas aeruginosa* (11%), and *Enterococcus spp*. (9%). Many isolates were found to be resistant to commonly used empirical anti-microbial agents. Seventy per cent of *Enterobacteriaceae spp*. were resistant to either cefuroxime and/or ampicillin-clavulanic acid. Seventy-seven per cent of *Staphylococcus aureus* isolates were susceptible to cloxacillin. More than 50% of *Pseudomonas aeruginosa* strains were resistant to meropenem, imipenem, piperacillin-tazobactam or cefepime. There was a significant association between the aetiology of the infection and the microorganisms involved ($p<0.01$). The bacterial pathogen profile was, however, not associated with the physiological status of the host ($p=0.22$) or the HIV status of the patient.

Conclusion:

While the majority of haematogenous chronic osteomyelitis still involved a solitary Gram-positive organism, the incidence of Gram-negative infections was found to be higher than previously reported. Contiguous chronic osteomyelitis was mostly polymicrobial in nature and solitary infections involving a Gram-negative organism was most common in the post-traumatic group. The bacterial pathogen did not vary in relation to the HIV status of the patient or the physiological status of the host.

The Short-Term Outcomes of Hip Arthrodesis in Paediatric Patients with End-Stage Hip Disease

Paper: GT P50/P144
Category: GT du Toit – Registrar Research (Paediatrics)
Presenting Author: T Mniki
Co-authors: LC Marais, P Maré

Background:

Management of end-stage hip disease has changed over time. Total joint replacement has gained popularity due to retained mobility and stability. However, in the high demand paediatric and adolescent population, its use has been limited due to risk of repeated revisions. We believe that hip arthrodesis remains a good option to confer a stable painless hip with good functional outcome in this population group.

Methods:

A single centre retrospective analysis was conducted, assessing paediatric patients with end-stage hip disease that underwent hip arthrodesis between 2010 and 2014. Clinical records were reviewed to identify the underlying disease process, the obtained fusion position and fusion rate, functional outcome, complications and reoperation rate.

Results:

Fifteen patients (nine female) of the 22 patients on the database were eligible for inclusion. The average age at hip fusion was 11 years (6–18). The etiological spectrum included TB hip (nine cases), septic arthritis (three), neglected slipped femoral capital epiphysis (one), idiopathic chondrolysis (one) and chronic synovitis (one). Uncomplicated functional fusion was achieved at a rate of 66% (10/15). All patients in whom fusion was achieved had relief of pain and returned to their normal activities.

Conclusion:

We believe hip arthrodesis performed in the correct patient is a good procedure to preserve function and relieve pain. The procedure is technically demanding and careful follow-up to ensure optimal positioning

Tumour Volume as a Predictor of Metastases in Patients Presenting with High-Grade Conventional Osteosarcoma

Paper: GT P25/P73
Category: GT du Toit – Registrar Research (Oncology)
Presenting Author: SC Phillias
Co-authors: LC Marais, MV Ngcelwane

Background:

Survival rates in osteosarcoma have been found to be in the region of 60% in patients with localised disease, 20–40% in metastatic disease, with current multimodality treatment protocols. Tumour volume is one of the factors known to be poor a prognostic indicator. Majority of patients present late with large tumours for treatment.

Aim:

To investigate the association between tumour volume and the presence of skeletal or pulmonary metastases at time of presentation in patients with osteosarcoma.

Methods:

A retrospective review was performed on the records of all patients with osteosarcoma referred to our tertiary level orthopaedic oncology unit, from 2010 to 2014. Diagnosis of osteosarcoma was confirmed on histology. Age at presentation, gender and anatomical site of the tumour were recorded. Tumour size was measured on MRI, pulmonary metastases on CT and skeletal metastases on technetium bone scan. Strata statistical software was used to analyse the results.

Results:

There were 61 patients. Mean age was 21 years ([SD] 11.9 years) with an equal distribution between male and female (50.8 vs. 49.2%). Evidence of metastasis at time of presentation (pulmonary n=44 (72%); skeletal n=16 (28%)). Mean tumour volume at presentation was 1 114 cm^3 (SD 1 285 cm^3). There was no difference in the tumour volume at presentation between patients with and without pulmonary metastases at time of diagnosis (p=0.85). Tumour volume, however, did appear to predict the presence of skeletal metastases (p=0.02). Receiver operating characteristic (ROC) analysis identified the optimal break point for tumour volume as a predictor of the presence of skeletal metastases as 1 383 cm^3 (sensitivity 60%, specificity 87%). Univariate analysis of tumour volume greater than 1 380 cm^3 revealed an OR of 13.6 (95% CI 2.5–72.5; p<0.01) for the presence skeletal metastases at time of presentation. Multivariate analysis of a tumour volume greater than 1 380 cm^3 yielded an OR of 8.6 (95% CI 1.1–67.1; p=0.039) for presence of skeletal metastases.

Conclusion:

There are greater chances of skeletal metastases in patients with tumour volumes greater than 1 380 cm^3.

HAND PAPERS:

Diagnostic Accuracy of Pre-Operative Clinical Examination in Zone V Flexor Injuries

Paper: P78
Category: Hands
Presenting Author: ED Osei
Co-author: MC Sathekga

Background:

Zone V flexor region is densely packed with 12 tendons, three nerves and two major arteries. Zone V flexor injuries can be very devastating to the patient and impair proper functioning of the hand. Most often, the intra-operative findings differ significantly from the pre-operative clinical findings. This research was done to analyse the demographic data of patients who present with zone V flexor injuries and also assess the diagnostic accuracy of pre-operative clinical examination in predicting injuries to anatomical structures in zone V flexor injuries.

Methods:

Ethics clearance was obtained for the study. Fifty-six patients who sustained zone V flexor injuries and fulfilled the inclusion criteria were enrolled in the study after they signed a consent form. Demographic data of the patients were documented. Patients were examined pre-operatively by orthopaedic doctors at the casualty and findings were documented. Orthopaedic doctors in theatre documented their intra-operative findings. The frequency and proportions were reported for the demographic data. The pre-operative and intra-operative findings were analysed by cross-tabulation to assess the accuracy of the pre-operative clinical examination.

Results:

The male to female ratio was 4.1:1. More than half of the patients were employed. Two-thirds of the injury occurred on the dominant hand of the patient. Assault or homicide was the leading cause of zone V flexor injury. 39% of the patients were drunk when the injury occurred. More than two-thirds of the injury occurred on weekends. There were 25 cases of spaghetti wrist and 16 cases of ulna triad injuries. Flexor digitorium superficialis injuries were missed more than flexor digitorium profundus injuries. 100% and 50% of superficial radial nerve and median nerve respectively were missed on clinical examinations. 75% and 48% of radial artery and ulnar artery injuries respectively were missed clinically. Only five out of 42 partially torn anatomical structures were accurately diagnosed pre-operatively.

Conclusion:

The study demonstrated a significant difference between pre-operative finding and intra-operative findings of zone V flexor injuries. Clinical examination skills, knowledge of functional anatomy of anatomical structures, lack of thorough examination, observer error and patient factors accounted for the high level of missed diagnosis.

The Evaluation of the Efficacy and Complication Rates of Peripheral Regional Anaesthesia Performed at our Institution's Hand Unit

Paper: P135
Category: Hands
Presenting Author: KB Mogami
Co-author: MC Sathekga

Background:

Regional anaesthesia is the administration of local anaesthetic agents and adjuvants to specific anatomic areas, resulting in a combination of motor and sensory blockade. As medical technology improves, more understanding and better techniques for both mechanism and administration of available local anaesthetic agents has led to an increase in the use of these techniques. The need for perioperative pain control in orthopaedic procedures is of vital importance. With improvement in techniques, the use of regional anaesthesia has been associated with better post-operative pain control, decreased narcotic use and thus narcotic-related side effects such as nausea and vomiting. In addition, brachial plexus blockade alleviates complications associated with administration of general anaesthesia such as hemodynamic instability, airway instrumentation, longer recovery times and slower discharge times post-operatively.

Aims:

Our study aims to evaluate the efficacy of peripheral regional anaesthesia: coracoid and axillary blocks, performed at our institution's Hand unit for upper extremity surgery as well as the associated complication rates.

Methods/Results:

This was a prospective study of all patients undergoing surgery in our unit under regional blockade. A total of 109 patients were reviewed for the study. There were 38 females and 71 males. The average age was 34, and the right hand was more commonly involved than the left. The majority of patients (80.7%) reported no pain during the operation, while 10.6% had mild pain, 7.7% severe pain and 2.9% had intolerable pain. Complications were reported in only 1.8% of patients. The majority of patients said they would have a repeat procedure under regional blockade. Furthermore, at 24-hour review, most patients reported satisfactory sleep with minimal discomfort, even though most required rescue medication.

Conclusion:

Based on our findings, we concluded that the majority of regional blocks performed in our unit are effective with low complication rates. There is great patient satisfaction likely due to longer analgesic effect of the blocks.

HIP ARTHROSCOPY AND PRESERVATION PAPERS:

Age, Gender and a Decline in Functional Outcome Scores at Three Months May Predict Revision Hip Arthroscopy: A Single Surgeon Series of 1 363 Consecutive Hip Arthroscopies

Paper: P64
Category: Hip Arthroscopy and Preservation
Presenting Author: JRT Pietrzak
Co-authors: K Nortje, JN Cakic

Background:

Hip arthroscopy is a rapidly growing, evolving area within arthroscopic orthopaedic surgery. Despite improvements in equipment and training, it remains a challenging procedure. The primary objective was to determine the success of joint preservation after hip arthroscopy and to determine whether patient characteristics or PROM functional score trends could predict revision hip arthroscopy or total hip arthroplasty (THA).

Methods:

We reviewed 1 363 hip arthroscopies performed from January 2010 to December 2016 by a single high-volume surgeon at a single institution. Data was prospectively collected and retrospectively reviewed with a minimum two-year follow-up. Hip arthroscopy failures were defined as THA or revision hip arthroscopy after index hip arthroscopy.

Results:

There were 751 females and 612 males with an average age of 34.63 years (19–58 years). There were 199 cases (14.6%) of labrum repairs only, 286 (20.9%) cam and labrum repairs, 319 (23.4%) cam and pincer surgeries and 193 (14.1%) cam only surgeries. Pre-operative IHOT-33 patient-reported outcomes scores (27.42 ± 6.2) improved significantly at the 6 week-, 3 month- and 6-month follow-up visits ($p<0.05$). The best improvements were seen in symptoms and functional improvements (IHOT-SFL) ($p<0.05$). There were 223 failures, 131 patients (9.61%) underwent revision hip arthroscopy and 92 required THA (6.75%) at 18.45 months ± 7.34 months. The THA conversion rate was 8.4% for patients >50 years old and 3.72% for patients <50 years old. Age (>50 years) and female sex were associated with increased risk of conversion to THA ($p<0.05$) while young (<25 years old) and female patients were most likely to undergo hip revision arthroscopy. Surgery involving repair of the labrum only were more likely to result in revision arthroscopy surgery and THA (70.7% at 10.6 years).

Conclusion:

Joint preservation and no subsequent surgery at 10.6 years is 83.64%. This study showed that predictors of revision hip arthroscopy or THA included poor pre-morbid functional score, female gender, age >45 years, sudden functional score decrease at 3-months follow-up and cases in which only the labrum is surgically repaired.

An Anatomical Study of the Prevalence and Morphology of the Corona Mortis in a South African Cadaver Sample

Paper: P109
Category: Hip Arthroscopy and Preservation
Presenting Author: J Naicker
Co-authors: N Mogale, S Matshidza

Background:

Orthopaedic surgeons are hurrying to perform the widespread anterior approach to the pelvis using the Modified Stoppa approach, a minimally invasive technique which may lead to iatrogenic haemorrhage and fatality in patients. Such mortality is due to the accidental severing of the corona mortis (CM) vessels, the anastomosis between the obturator artery and the external iliac artery normally via an accessory obturator artery, which can also be consistent of the vessels venous counterparts. This study investigated the variations and incidence of the CM and the constituent vessels in a South African sample using 31 adult cadavers.

Methods:

After careful dissection of the blood supply of the pelvis, the location of the CM in relation to bony landmarks encountered during anterior approaches to the pelvis was documented. These landmarks included the pubic tubercle, pubic symphysis and the anterior inferior iliac spine in order to map out 'safe zones' adjacent to these landmarks for surgeons to use when exposing the pelvis. Any correlation between sex, side, age and body mass index (BMI) with the presence of the CM were recorded. The point of bifurcation of the abdominal aorta and the length of the common iliac vessels were documented. The position of these common iliac vessels along the quadrilateral plate of the pelvis, were also observed.

Results:

The incidence of the CM was observed as 64.52%, with 61.29% being venous and 3. 23% being of arterial vessels. An incidence of 55% of CM occurred on the left with 45% occurring on the right-hand side and a total of ten bilateral CM incidents were observed. Venous CM resulted in an anastomosis between an accessory obturator veins which presented with a 75.81% incidence or a second accessory obturator vein with an incidence of 22.58%. Arterial CM consisted of an anastomosis between the accessory obturator arteries which resulted in an incidence of 3.28%.

Conclusions:

The results of this study will assist physicians in administering a more minimally invasive procedure where the risk of haemorrhage and mortality is greatly decreased by better understanding of the variations and precedence of the CM and its possible locations.

Post-Operative Rivaroxaban in Patients at Risk for Deep Vein Thrombosis Undergoing Hip Arthroscopy: A Single Surgeon Series in a Developing Country

Paper: P67
Category: Hip Arthroscopy and Preservation
Presenting Author: W Verhoogt
Co-authors: J Pietrzak, K Nortje, J Cakic

Background:

Globally, the demand for hip arthroscopy (HA) has increased 25-fold in the United States. Problematically, complication rates of HA have been underestimated in the literature. Particularly, a recent systematic review finds that the risk of venous thromboembolic events (VTE) is approximately 2%. This is likely also underestimated and therefore protocols to mediate VTE may be more necessary than previously thought. A single high-volume surgeon specialising in HA in Johannesburg South Africa implemented a protocol between 2012 and 2018 to reduce the risk of VTE. This protocol included the use of rivaroxaban in patients undergoing HA who were deemed to be at risk of VTE. The aim of this paper was to retrospectively review this surgeon's protocol and outcomes in order to determine the incidence of VTE complications and to interrogate rivaroxaban's use in VTE prevention.

Methods:

A retrospective chart review of 646 consecutive patients who underwent HA was conducted. All patients were treated according to a predetermined protocol in order to prevent VTE post-operatively which classified patients as being high or low risk for VTE. For high-risk patients (≥1 risk factor) this specifically included oral thromboprophylaxis for 2 weeks post-operatively. The incidence of VTE and subsequent correlation with these risk factors were recorded and analysed in this study.

Results:

There were 880 HA in 258 males and 388 females at an average age of 35.4 years. The overall complication rate was 4.3% (n=38) with 28% (n=6) of these being major complications and 72% (n=32) being minor complications. The total incidence of VTE was 0.45% (3 DVT, 1 PE). Within the high- and low-risk groups for VTE, the incidence of VTE was 1.2% and 0.16% respectively. Oral thromboprophylaxis was not associated with any post-operative bleeds, 30- or 60-day readmissions.

Conclusion:

This study demonstrated a lower rate of VTE in both low risk and high-risk individuals than in the reported literature. It highlights the value of identifying patients with risk factors for VTE, having a predetermined protocol for VTE prophylaxis and initiating post-operative oral thromboprophylaxis in patients at risk. Oral thromboprophylaxis for 2 weeks is safe and efficacious with a low side-effect profile.

Proximal Femur Geometry in the Adult Kenyan Femur and Its Implication in Orthopaedic Surgery

Paper: P52
Category: Hip Arthroscopy and Preservation
Presenting Authors: M N Mouti, J Kibet
Co-authors: C K Lakati, B N Ndeleva

Background:

Numerous orthopaedic procedures are carried out on the proximal femur. For optimal hip function, these procedures must restore the anatomy of the proximal femur to near normal. There are currently no local studies that have described in detail the normal anatomy of the proximal femur and its implications in operations on the proximal femur. The aim of this study was to determine the neck-shaft angle, femoral neck anteversion angle, femoral neck width and femoral head diameter in adult femora, compare the results with other studied populations and examine the implications of the same in operations on the proximal femur.

Methods:

Femoral neck anteversion angle and the neck-shaft angle were determined from digital photographs of 70 cadaveric femora using an open-source image analysis software, ImageJ®. Femoral neck width and femoral head diameter were determined by measurement using a digital Vernier calliper. The dimensions of available implants were searched from local suppliers of the implants.

Results:

Mean femoral neck-shaft angle was found to be 129.21°, while the mean femoral neck anteversion angle was found to be 23.06°. Mean neck-shaft angle was found to be 128.67° on the left while on

the right side, it was 129.03°. Mean femoral neck anteversion angle was found to be 23.97° on the left side, and 23.03° on the right side. Mean femoral neck width was found to be 29.36 mm, with mean width of the left side being 28.67 mm and that of the right being 29.36 mm. Mean femoral head diameter was 42.6 mm ,with mean diameter of the left side being 41.2 mm and that of the right side being 42.6 mm. The differences were not statistically significant.

Conclusion:

The current study has shown that the femoral neck-shaft and anteversion angles in the Kenyan femora vary from those of other populations. The available implants have angles which may not be suitable for a significant proportion of the local population. It would be prudent to avail a range of implants with different angles to improve the choices available to the surgeon when faced with a patient who requires an operation on the proximal femur.

There is a Low Rate of Infections and Subsequent 30- and 60-Day Admission Rates in Primary Hip Arthroscopy, Revision Hip Arthroscopy and Cases Converted to Total Hip Arthroplasty

Paper: P53
Category: Hip Arthroscopy and Preservation
Presenting Author: W Verhoogt
Co-authors: J Pietrzak, K Nortje, J Cakic

Background:

The incidence of hip arthroscopy (HA) has increased 25-fold worldwide. Superficial infection complicates 0.3% cases and deep infections less than 0.1% of cases. However, complication rates may be underestimated in the literature. The aim of this paper was to determine the incidence of infective complications in primary HA, revision HA, and in cases converted to total hip arthroplasty (THA) after HA.

Methods:

We conducted a retrospective chart review of all patients who underwent HA by a single high-volume surgeon in Johannesburg from 2012 to 2018. The incidence of all complications, as well as the 30- and 60-day readmission rates were noted. All revision HA and conversion THA had aspirate fluid sent for microscopy, culture, and sensitivity (MC&S) at surgical portal insertion and exposure capsulotomy respectively. The results of these investigations were subsequently reviewed. Appropriate pre-operative antibiotics were given in all cases.

Results:

There were 880 HA performed in 646 patients (258 males and 388 females) at an average age of 35.4 years. There was a total of 100 (11.3%) revision HA within the sample. There were 25 (2.8%) conversions to THA done following HA within the sample. The overall complication rate after index HA was 4.3% (n=38). Primary HA, revision HA and conversion THA were complicated by superficial infections in 0,2% (n=2), 0.1% (n=1), and 0% respectively. There was no growth on MC&S from specimens taken at any revision HA or THA. There were no readmissions or complications in any conversion THA. No deep infections were reported in any case at a minimum 1-year follow-up. All three superficial infections were treated successfully with oral antibiotics.

Conclusion:

Primary HA has a low superficial infection rate. Revision HA and conversion THA does not predispose to infective complications or increased 30- or 60-day readmission rates provided prophylactic antibiotics are prescribed and appropriate precautions are followed.

KNEE PAPERS:

Not Strong Enough? Insignificant Movements Generated During Clinical Examination of Sagittal and Rotational Laxity in an ACL-Deficient Cadaver Knee

Paper: P47
Category: Knees
Presenting Author: J le Roux
Co-authors: CW Bezuidenhout, J Klopper, H Hobbs, R von Bormann, M Held

Background:

The decision to further investigate anterior cruciate ligament (ACL) injuries is influenced by the initial clinical assessment of sagittal and rotational laxity. Perceived laxity is often estimated in millimetres and degrees. We aimed to measure and compare this motion generated by clinicians in a cadaver model after ACL and anterolateral ligament (ALL) were transected.

Methods:

A group of orthopaedic surgeons and trainees examined a cadaver knee for sagittal and rotational instability at 30° and 90° with intact ligaments, after the ACL was transected and after the ACL and ALL were transected. Rotational and sagittal movements during these examinations were recorded by Pi Galileo computer assisted surgery (CAS) system (Smith & Nephew, Memphis, Tennessee) and compared.

Results:

Twenty-four participants with a wide range of clinical experience took part in this study. The median sagittal plane laxity captured by CAS at 30° flexion was 7 mm (IQR 2) in the intact knee, 9 mm (IQR 1) after the ACL was cut and 9 mm (IQR 3) after ACL and ALL were cut. The median arc of rotational laxity measurements as captured by CAS at 30° was 19° (IQR 7) in the intact knee, 24° (IQR 5) after the ACL was cut and 22° (IQR 6) after the ACL and ALL were cut. None of the differences in these movements was significant.

Conclusion:

We could not generate enough force in a cadaver model, which could be measured objectively by CAS as significant differences in sagittal or rotational motion when examining the intact knee, ACL deficient (only), or combined ACL and ALL deficient knee. We need to get stronger to accurately diagnose knees with ACL injuries.

The Management of Acute Knee Dislocations: A Global Survey of Orthopaedic Surgeons' Strategies

Paper: P106
Category: Knees
Presenting Author: S Venter
Co-authors: V Khanduja, RPB von Bormann, H Hobbs, M Held

Background:

Acute knee dislocations are uncommon injuries which can have devastating consequences. Prompt diagnosis, followed by reduction of the dislocation, immobilisation of the knee and neurovascular monitoring form the basis of treatment in the acute setting. High volume centres in the developed world recommend early single stage arthroscopic ligament reconstruction with auto- or allografts. Yet, for resource constrained settings in low-income countries, there are no evidence-based guidelines which are adapted to local challenges. The objective is to assess the management approach of acute knee dislocations by orthopaedic surgeons in South Africa and world-wide. The aim was to develop evidence-based guidelines for the treatment of acute knee dislocations in resource-constrained settings.

Methods:

This is a descriptive cross-sectional survey analysis using the website REDCap. Participants are orthopaedic surgeons registered with the South African Orthopaedic Association and/or SICOT, both in independent and/or state practice. The survey will be sent out to approximately 1 000 orthopaedic surgeons, with an expected reply from 200 (an estimated response rate of 20% is expected).

Results:

Computed tomography angiography (CTA) is selectively performed in patients with clinically abnormal vascular examinations. Surgical management of multi-ligament knee injuries is favoured over conservative management in all socio-economic settings. The choice of autograft vs allograft varies among surgeons. Collateral ligaments are most often acutely repaired, followed by staged cruciate ligament repair. Most public and private centres have access to a dedicated physiotherapy unit.

Conclusion:

Although early, single stage arthroscopic ligament reconstruction is recommended for knee dislocations. The management varies, especially in resource-limited practices. Ligament surgery is often delayed, staged and done via open cruciate surgery. Dedicated post-operative rehabilitation plays a crucial role in functional outcome.

ONCOLOGY PAPER:

The Outcome of the Lateral Approach to Distal Femoral Tumour Resections – A Retrospective Clinical Audit at a Private Practice in Pretoria

Paper: P101
Category: Oncology
Presenting Author: N van der Watt
Co-author: O Koch, T le Roux

Background:

In most European countries distal femoral tumour resections are traditionally performed through a medial or anteromedial approach. The medial approach identifies and protects the femoral artery in Hunter's canal and therefore limits intra-operative vascular complications. An alternative procedure that has been described in the literature involves the use of a lateral approach to the distal femur. Currently, there is limited research available with regard to this approach and the safety thereof. This study aimed to assess the intra-operative and immediate post-operative vascular complications when using the lateral approach during the resection of distal femoral tumours.

Methods:

We performed a retrospective clinical audit at a private practice in Pretoria. We identified all distal femoral tumour resections followed by prosthetic replacements between 2006 and 2019. These surgeries were performed via the lateral approach by a single surgeon. We assessed the files of the patients to determine if there were any intra-operative or immediate post-operative vascular complications.

Results:

We identified 35 patients who underwent resection of their distal femoral tumours via the lateral approach. Two vascular complications were recorded during this period. Both complications occurred intra-operatively and were immediately repaired. There were no subsequent post-operative complications secondary to these injuries. In our study group we found a low intra-operative risk of vascular injury when performing distal femur tumour resections using the lateral approach.

Conclusion:

The findings of this retrospective study suggest that an overall positive outcome with a low risk of vascular complications can be expected when resecting distal femoral tumours through a lateral approach.

PAEDIATRICS PAPERS:

A Replacement for the Kirschner Wire: Micro-CT and Histological Assessment of a Bioabsorbable Pin for Paediatric Fracture Management

Paper: P19
Category: Paediatrics
Presenting Author: SP Mackenzie
Co-authors: RJ Wallace, AHRW Simpson, AW Murray, TO White

Backgroud:

Kirschner wires are commonly used in paediatric fractures, however, the requirement for removal and the possibility of pin site infection provides opportunity for the development of new techniques that eliminate these drawbacks. The Acumed Biotrak Helical Nail is a bioabsorbable pin that could remain in situ to allow definitive closure of skin at the time of insertion minimising the risk of infection. However, their effect on the growth plate is not completely understood.

Methods:

Two Helical Nails were inserted across the distal femur physis in 12 immature sheep, and 1.6 mm Kirschner wires in the contralateral limb acted as a control. The amount of femoral growth at six months was assessed. Micro-CT was used to assess the Helical Nails and their effect on the growth plate in terms of percentage disruption, physeal thickness, and physeal bony infiltration. Traditional histopathological techniques were used to assess for foreign body reactions.

Results:

There was no difference in the length of the femora in each group. The nails disrupted 3.4% of the physeal volume. Micro-CT demonstrated that the Helical Nails lost their integrity due to intervening growth. Two cases of physeal tethering adjacent to a Helical Nail were identified. Physeal thickness and bony infiltration of the physis were not adversely affected. Histopathology did not reveal any significant inflammatory or foreign body reaction adjacent to the nails.

Conclusion:

The Helical Nail had a negligible effect on the growth plate and did not adversely affect femoral growth. There was clear Micro-CT evidence that the Helical Nail was overcome by the hydrostatic forces of growth. This suggests that the Helical Nail could provide initial fracture stability, before allowing subsequent unhindered growth.

An Overview of the Patient Population Presenting with Congenital Talipes Equinovarus (CTEV) at a Tertiary Hospital in the Western Cape

Paper: P88
Category: Paediatrics
Presenting Author: M Thiart
Co-authors: C Fenn, J du Toit, MC Burger

Background:

Clubfoot (or congenital talipes equinovarus) is as a common paediatric orthopaedic condition. Globally, clubfoot is more prevalent in males and has a prevalence of 1/1 000 live births . Treatment with the Ponseti method occurs as soon as possible after birth in a developed world setting. The aim of this study was to provide an overview of the demographic profile and treatment regimen of the population treated for clubfoot at a high volume, tertiary level hospital in a developing world setting.

Methods:

A retrospective cohort study, including all patients presenting with clubfoot between November 2013 and December 2018 was conducted. General demographic information as well as treatment information was collected.

Results:

A total of 221 patients (62.8% male and 36.2% female) were included over the 62 months study period at a median age of presentation of 5.0 weeks (IQR 2.0–12.0 weeks). Of these, 78.2% (n=173) of patients were diagnosed as having idiopathic clubfoot, 6.3% (n=14) with postural clubfoot and 12.2% (n=27) with syndromic clubfoot. The majority of patients (52.4%) had bilateral clubfoot with 20.4% having unilateral left and 26.7% unilateral right clubfoot. Only 11.3% reported having a positive family history. Patients had to travel a median distance of 20.9 km (IQR 10.2–23.0) to attend the clinic (range 2.1–325) and required a median of six casts (IQR 4.0–9.0), (range 1.0–35.0), before the next phase of treatment. A total of 47.5% (n=105) of 221 participants did not require a tenotomy, 39.4% required a tenotomy (n=87) and 13.1% (n=29) was not reported, before commencing maintenance treatment. A total of 20.3% (n=45/221) of patients had relapsed clubfoot, with 19% (n=42/221) undergoing repeat Ponseti treatment and 9.1% (n=20/221) required a repeat tenotomy.

Conclusion:

Our demographic profile of mostly male patients suffering from bilateral and idiopathic clubfoot is in agreement with the global literature. However, we report a delayed age of presentation and a greater travel distance than would generally be expected. Of interest is a reported family history of only 11.3% compared to the literature. Future research should interrogate these findings further.

Appropriate Age to Transition Paediatric Patients to Adult Orthopaedics at an Academic Hospital

Paper: P72
Category: Paediatrics
Presenting Author: M janse van Vuuren
Co-authors: F Ahmed, A Robertson

Background:

Changing admission policies in our hospital motivated an inquiry into the demographics of adolescent orthopaedic admissions. The age cut off needs to ensure optimal management for the unique physiological, skeletal and psychosocial requirements of adolescent patients. We aimed to compare our policy to the national and international practices to deduce whether it is appropriate to reduce the age for transition to adult orthopaedics from 16 to 14 years at our institution.

Methods:

A retrospective audit over 30 months (June 2016 to December 2018) of patients aged 14 years and older admitted to our paediatric orthopaedic ward was conducted to determine the spectrum of disease and treatment required for this age group. A survey of national and international paediatric orthopaedic admission practices was conducted and a literature review on appropriate age of transition for adolescent orthopaedic patients was performed.

Results:

No national standardised admission age exists for paediatric orthopaedic patients in the public sector in South Africa. Admission cut-offs vary from 12–16 years with concessions made to admit older patients with congenital orthopaedic conditions as well as disabilities such as cerebral palsy. Our audit revealed total paediatric orthopaedic admissions of 2 215 of which 158 fell between the 14 and 16 year age groups. The admission distribution profile for this age group indicated 77 (49%) trauma related admissions, with 45 (58%) of trauma related admissions requiring paediatric specific management. Of the non-trauma admissions 36 (45%) were general paediatric orthopaedic admissions. The remaining non trauma admissions fell under subspecialties: spine 17, tumour and sepsis 19, and sports injuries 8. In total 117 (74%) of admissions required specific paediatric orthopaedic management.

Conclusion:

Decreasing the admission age to paediatric orthopaedic wards from 16 to 14 years of age, and treating adolescents as adult patients, may negatively affect the management of these patients who have not yet reached skeletal maturity. They constitute a very small group when compared to the overall admission numbers and thus pose little burden in the paediatric ward. An individualised approach may be required to admission protocols, rather than strict cut-offs purely based on age.

Common Causes of Atraumatic Swollen Painful Joints in South African Children

Paper: P46
Category: Paediatrics
Presenting Author: S Wever
Co-authors: M Bruins, A Upfill, S Dix-Peek, M Held

Background:

Delayed or incorrect diagnosis of joint infections in children can lead to poor clinical outcome and lifelong impairment. Thus, early recognition and accurate diagnosis is crucial to avoid these sequalae. The aim of this study was to evaluate the frequency of infections among children with swollen, painful joints in South Africa. A secondary aim was to evaluate differences in laboratory parameters comparing pyogenic infections, tuberculosis (TB) infections and non-infectious conditions.

Methods:

This was a retrospective review of consecutive patients, 12 years of age or younger, who presented with swollen, painful joints to a large urban South African children's hospital from April 2013 to April 2015. A surgical database was used to search for patients and all children were included who underwent a biopsy to test for TB as part of the routine clinical workup. Patients with injuries were excluded. These tests included histology, microbiology, culture, or Xpert MTB Rif. Clinical notes, laboratory results, and histopathological findings of the patients were analysed.

Results:

104 children with a mean age of 5 years (59% male) were included. In 7 children, more than one joint was affected. Most were diagnosed with a pyogenic infection (n=40; 38.5%), followed by TB (n=15, 14.4%), acute synovitis (n=15, 14.4%), or chronic synovitis (n=11, 10.6%). Pyogenic infections were most commonly caused by *Staphylococcus aureus* (n=23, 57.5%), followed by *Streptococcus pyogenes* (n=4; 10%) and *Streptococcus pneumoniae* (n=3; 7.5%). The knee was most commonly affected, followed by the hip and ankle. Children with pyogenic infections presented more often with pyrexia ($p<0.05$), and had a higher white cell count (WCC) (mean 17 vs 10.9; $p\leq0.05$) and erythrocyte sedimentation rate (ESR) (mean of 176.8 vs 47.9; $p\leq0.05$). There was a trend for a higher platelet count in patients with TB compared with pyogenic infections. (539.6 vs 433.23, p=0.074).

Conclusion:

A high proportion of children with swollen, painful joints had infections and a large portion of these had TB. Children with TB had a higher platelet count, whereas patients with pyogenic joint infections had a significantly higher temperature, ESR and WCC.

Effect of Seasonal Variation on the Peak Presentation of Slipped Capital Femoral Epiphysis: A Comparison of Children in Johannesburg, South Africa and London, United Kingdom

Paper: P26
Category: Paediatrics
Presenting Author: M Foster
Co-authors: G Firth, C Pieterse, Y Ramguthy, A Izu, J Bacarese-Hamilton, M Ramachandran

Background:

The variation in peak presentation of slipped capital femoral epiphysis increases as the latitude increases over 40 degrees north of the equator. Few studies have compared populations living on either side of the equator. The objective of this study was to compare two cohorts of children (one in South Africa and the other in the United Kingdom) and explore similarities and differences regarding demographic and epidemiological features, incidence and seasonal variation in peak presentation.

Methods:

Patients presenting with slipped capital femoral epiphysis at one of two hospitals in either South Africa or the United Kingdom between January 2011 and December 2017 were included in the study. A retrospective cohort was collected from hospital records and data was recorded using an Excel spreadsheet. The following factors were recorded: duration of symptoms, chronicity, stability, seasonality, tri-radiate cartilage closure, severity and prophylactic pinning. Statistical methods used included calculating incidence and confidence intervals, means and standard deviations for demographic and clinical data.

Results:

A total of 137 patients were included in the study: 70 patients (80 hips) from South Africa and 67 patients (73 hips) from the United Kingdom. Sixty per cent of children from South Africa presented with a chronic slip compared to 53% in the United Kingdom. There was higher delay to presentation in the United Kingdom compared to South Africa (90 days vs 60 days, p=0.0262). The UK population were more skeletally mature (32.8% had an open triradiate cartilage) compared with the South African population (64.9% had an open triradiate cartilage). In the South African population, the most common season of symptom onset and presentation was in summer. In the United Kingdom, the most common season of symptom onset was summer, but the most common season of presentation was in autumn.

Conclusion:

This study has compared two populations from either side of the equator and found significant differences including a more skeletally mature population in the United Kingdom. Both cohorts showed seasonal variation in peak incidence but there was more seasonal variation in peak incidence in the UK – in summer for onset of symptoms and autumn months for time of presentation.

Epidemiology of Paediatric and Adolescent Fractures Admitted to a South African Provincial Hospital

Paper: P30
Category: Paediatrics
Presenting Author: S Strydom
Co-authors: C Hattingh, M Ngcelwane, N Ngcoya

Background:

There are few studies available that examine the epidemiology of children and adolescents admitted with orthopaedic injuries in developing countries. South Africa possesses several elements that make our population unique, which may influence fracture patterns and their management. These statistics can help to identify areas that can benefit from preventative measures. Information regarding admission duration and type of management can also help hospital management to adequately plan and budget for these patients.

Methods:

We did a cross sectional record review for the period from 1 January 2016 to 31 December 2017. Convenience sampling was done, and demographic and clinical data collected from patient records. All patients younger than 18 years at the time of injury that

were admitted with fractures of the appendicular skeleton, spine or pelvis were included. Patients with incomplete clinical records and isolated tuft fractures were excluded.

Results:

A total of 731 patients were admitted, with 526 (72%) remaining after incomplete records were excluded. From these records we found a higher percentage of males admitted (73%) compared to previous publications and the average age was 7.7 years (SD=4.5). A fall on level ground was the most common mechanism of injury (70.0%), followed second by pedestrian vehicle accidents (12.2%). The most frequently fractured regions that required admission were the forearm (36.4%), humerus (26.5%), femur (18.9%) and the tibia/fibula (12.5%). The average duration of admission was 8.6 days (SD=9.0). Out of the 307 (58.3%) patients taken to theatre, hardware was used in 148 (28.1%). Additional non-skeletal injuries were sustained by 15 patients and 13 patients sustained fractures to multiple regions. There was one death in a patient with gunshot trauma.

Conclusion:

The need to provide safer environments for children has already been recognised in South Africa. By providing a current descriptive picture of traumatic orthopaedic injuries and exploring current treatment practice patterns, we hope to guide policies that promote paediatric trauma prevention, improve treatment and reduce the associated morbidity and mortality.

Femoral Lengthening in Children: Complications and Outcomes

Paper: P61
Category: Paediatrics
Presenting Author: A Horn
Co-author: M Sipilia

Background:

We evaluated the outcomes following femoral lengthening by distraction osteogenesis in children. Additionally, we determined the incidence and nature of complications, the management thereof and factors associated with the development of complications.

Methods:

A retrospective review was performed of all patients who underwent femoral lengthening as an isolated procedure at our institution. Data regarding presenting details and clinical course were collected and X-rays analysed. The healing index (HI) and the percentage lengthened were calculated. Complications were defined as deep sepsis, joint contracture, fracture and neurological injury.

Results:

Fifteen patients underwent 16 femoral lengthenings from 2008–2018. Nine patients had congenital short femur or proximal focal femoral deficiency, three patients had sequelae of meningococcaemia and four had various other pathologies. The median age at time of surgery was nine years (6–13). Median follow-up was 1.6 years (0.5–6.6). The median HI was 32 days/cm (20–60). Leg lengths were equalised to ≤2.5 cm in 11 patients, length achieved was as planned in all but three patients. Eight patients sustained fractures on average six days (2–57) after frame removal, five were through the regenerate. Four required surgery. Thirteen patients developed joint contractures and six required additional procedures to address this. Two deep infections required surgery. Two patients developed neurological symptoms of which one recovered fully. Higher percentage length gained (>20%) was associated with increased fracture and joint contracture rate. Diaphyseal osteotomy, as opposed to metaphyseal, was associated with increased risk of fracture (71% vs 25%). A diagnosis of congenital short femur was associated with increased fracture rate. Spanning the knee did not prevent joint stiffness in 4/5 patients but did prevent subluxation.

Conclusion:

Femoral lengthening using external fixation can be successful in achieving leg length equality, but complications are common and often require additional surgery. Limiting lengthening to less than 20% of the original bone length and performing the osteotomy through the metaphysis decreases the risk of fracture and joint contracture.

Outcomes of Distal Radius Metaphyseal Fractures in Children

Paper: P54
Category: Paediatrics
Presenting Author: P Ntombela
Co-authors: W Mukiibi, M Ramokgopa, Y Ramguthy

Background:

Distal radius fractures are one of the commonest fractures in children. Fractures in the distal third of the forearm account for 75% to 84% of all forearm fractures. Management of these fractures is met with many controversies. These range from manipulation under anaesthesia (MUA) and casting alone versus the use of percutaneous pinning, the use of above-elbow cast versus a forearm cast. The aim of this study is to determine the outcomes of management in children treated for distal radius fractures.

Methods:

This is retrospective review of patients who presented and were treated between January 2018 and December 2018 with a distal radius fracture in a South African hospital. Short-term outcomes were reviewed.

Results:

There were 20 girls and 76 boys with an average age of 9.1 years. Fifty-eight per cent of the injuries involved the right side and 42% on the left. The majority (53%) of the fractures were as a result of falling on an outstretched hand (FOOSH) followed by soccer injuries (17%). Thirty-nine per cent of patients were treated with an above-elbow cast, 40% in a below-elbow and 21% with K-wires plus forearm cast. Of the K-wire group, two needed open reduction. There was a 100% union rate recorded, with fractures uniting at an average of 25.1 (14–46) days. The overall complication rate was 8.3%. Two per cent (n=2) of patients needed re-operation, both requiring a re-manipulation and K-wire insertion one week after the initial manipulation. Of note, both had been initially treated in a below-elbow cast. Overall, 3% (n=3) required the cast to be bivalved because of swelling but none progressed to a compartment syndrome. No one from this lost reduction, two were initially in a forearm cast and one in an above-elbow cast. From the 21 patients treated with K-wires, 14% (n=3) developed low-grade pin tract sepsis. This resolved with a short course of antibiotics with no chronic complications. These made up 3% of the 8.3% complication rate.

Conclusion:

The overall complication rate associated with distal radius metaphyseal fractures is relatively low. The use of K-wires is not a benign undertaking and should be reserved for specific cases that demand it.

Patient-Based Outcome After In Situ Percutaneous Pinning for Slipped Upper Femoral Epiphysis (SUFE)

Paper: P69
Category: Paediatrics
Presenting Author: T Phiri
Co-authors: A Robertson, D Simmons

Background:

Percutaneous in situ fixation with a single screw is regarded as safe and remains the gold standard of treatment of SUFE. However, reliance is placed on subsequent remodelling of the femoral neck. Healing in a non-anatomic position with insufficient remodelling predisposes the patient to femoro-acetabular impingement and degenerative arthritis the hip. Consequently, some surgeons advocate surgical hip dislocation and reduction of a severe acute SUFE. The aim of this study was to assess patient-based outcomes after in situ pinning. The hypothesis is that our patients remodel adequately and are pain-free and function well after at least two years' remodelling after in situ pinning.

Methods:

This was a study of a cohort of patients treated by in situ pinning of a SUFE. Patients were identified from the surgical registers from 2011–2016 and asked to return for follow up. They were all at least two years post-op. Outcome measures were a modified Harris Hip Score (HHS) and a Visual Analogue Score (VAS).

Results:

Seventy-six SUFE patients were identified, but only 28 patients were available for follow-up. Two were excluded as no pre-operative x-rays were available. Of the twenty-six patients included, 16 were male and ten female, and ten had bilateral SUFE. The mean age at surgery was 12.9 years. The average BMI was 28.5 kg/m2. The mean follow-up was 3.3 years (2–7 years). Hips were classified radiologically into three groups; mild SUFE (13), moderate SUFE (12) and severe SUFE (11). There was a significant deference (P=0.003) between the three groups in terms of functional outcome. Mild and moderate slips had excellent outcome and severe slips had good results but with two complications (18%). The mean modified HHS for severe slips was 87.9 and mean VAS pain score was 2.36. The overall complication rate for the three groups is 5.6%.

Conclusion:

Our results suggest that in our population in situ percutaneous pinning is safe with low complication rates. High patient satisfaction in terms of pain and function suggests that remodelling is effective, even for severe slips.

Perthes Valgising Osteotomy

Paper: P126
Category: Paediatrics
Presenting Author: A Naidoo
Co-author: MN Rasool

Background:

The main aim of operative treatment in Perthes disease is containment of the femoral head and preventing further deformation. For advanced Perthes, or a non-containable head, salvage procedures involving osteotomies of the pelvis or proximal femur have been described. Within this non-containable group is a subset of patients who present with hinge abduction, and a large flattened head which is laterally subluxed. In this group of 18 patients we evaluate the use of a valgising osteotomy stabilised with an intermediate pin and plate, and the radiological and clinical outcomes.

Methods:

Eighteen patients with Perthes disease were included in this study. They all presented with a painful short limb gait, a fixed flexion deformity of the hip and hinge abduction. They were treated between 2007 and 2017 by adductor tenotomy, a closing wedge valgising osteotomy, derotation to neutral was performed to correct any external rotation deformity, and extension to correct flexion deformity - a pin and plate was applied. Strict non weightbearing post op was enforced by a u-slab spica, or in an older child by a period of skin traction followed by non-weight bearing with crutches.

Results:

There were 13 boys and five girls. Hinge abduction was not present post osteotomy on the table. The leg length discrepancy improved by 1.5–2 cm in all patients, with a gradual improvement of hip range of movement. Two patients also had a shelf osteotomy to improve containment of the head. Radiographs show improved remodelling of the femoral head with an increase in the neck shaft angle. The pin and plate were removed at one year.

Conclusion:

The valgising osteotomy is a useful salvage procedure to improve outcomes in Perthes disease.

Primary Total Hip Arthroplasty in Paediatric Patients (<20 years)

Paper: P113
Category: Paediatrics
Presenting Author: JD Jordaan
Co-authors: J Charilaou, M Burger

Background:

The success of total hip arthroplasty (THA) in younger patients has expanded the age groups traditionally set out for hip replacement surgery. Performing arthroplasty in the paediatric population group (<20 years) remains controversial, yet the primary aim of this procedure remains to relieve pain, restore function and allow physical and social development in this unique population. The main risk associated with THA in paediatric patients is projected longevity of modern generation hip arthroplasty materials, which has not been establish to date. The aim of this study was to provide an overview of paediatric patients requiring THA at a tertiary hospital within South Africa.

Methods:

A retrospective review of all primary THA in patients (<20 years), performed in single tertiary academic hospital in South Africa between January 2015 and March 2019, was conducted. Patient demographics, pathology and previous surgery, surgical approach, implants fixation and bearing surfaces, primary surgeon seniority and surgical complications were recorded.

Results:

Primary THA were performed in 11 patients (n=6 male and n=5 female) in the study period. Mean age at surgery was 16 ± 1 year (range 14–19 years). Four patients had no formal surgery prior to THA while seven patients had an average of four surgical events prior to THA. Primary pathology included avascular necrosis (AVN) (n=4), slipped femoral epiphysis surgery (n=4), idiopathic chondrolysis (n=3) and juvenile rheumatoid arthritis (n=1). Painful hip ankyloses (n=7) and post-traumatic surgical failure (n=2) contributed to surgical difficulty. Surgical approaches included posterior (n=9), direct anterior (n=1) and antero-lateral (n=1) approached. Uncemented ceramic on ceramic implant were

used in ten cases and uncemented ceramic on high cross-linked polyethylene in a single case. All surgery were performed by arthroplasty consultant. No follow-up surgery to the hip joint has been required to date for any patient, following the initial THA.

Conclusion:

Successful THA could be performed in 11 cases of paediatric patients at a tertiary hospital in South Africa. The primary pathology in paediatric patients requiring THA in our population was AVN followed by slipped femoral epiphysis and chondrolysis. No patient required follow-up surgery.

Train Surfing and Train-Related Accidents, a Growing Scourge

Paper: P71
Category: Paediatrics
Presenting Author: B Steyn
Co-authors: F Ahmed, A Robertson, D Simmons

Background:

In developing countries train travel is economical and popular for adults and children alike. Train surfing is a high-risk phenomenon that has become a trend in various parts of South Africa. Lack of safety precautions on trains and stations also results in injury. We are presenting a case series of paediatric and adolescent patients presenting after train related trauma. We aimed to establish types of injuries and common trends in the mechanisms with the purpose of implementing preventive strategies.

Methods:

A retrospective review of inpatient records of patients aged under 20 years presenting with train related injuries over 9 months (July 2018–March 2019). The family answered a detailed questionnaire relating to the circumstances resulting in trauma and also precise locations of the incidents. We established patient demographics, injury patterns, injury severity, outcomes of injuries and complications.

Results:

Six patients were identified. The patients ranged in age from 9 to 15 years (mean 13.2) at the time of injury. The mean length of stay was 26.4 days (range 2–42). Of the six, five were male and one female. Three were confirmed train surfers while three were train-related accidents. Five of the six presented with very severe limb injuries. Four required some form of amputation. Three patients had an Injury severity score (ISS) of more than 32 and the average ISS was 27.

Conclusion:

Train surfing has become popular among many youths in South Africa. As an orthopaedic department we are seeing increasing numbers. The resultant injuries are severe and often result in disability. Half of this series were injuries resulting from accidents related to train transport. These highlight a lack of safety precautions where children are using trains for transport. These cases indicate the need for preventive strategies that may include raising awareness around the danger that trains can pose, identifying train stations at which these injuries commonly occur for possible intervention and public education about train safety. We would also like to use mainstream media to highlight the danger of train surfing and poor compliance with train safety.

Tuberculosis of the Extra-axial Skeleton in Children

Paper: P74
Category: Paediatrics
Presenting Author: A Horn
Co-author: S Vajapey

Background:

Musculoskeletal tuberculosis (TB) is a disease entity that often mimics other orthopaedic conditions in its radiographic and clinical presentation, which can delay diagnosis and treatment. If left untreated, TB of the joints and bone can lead to severe disability. The purpose of this study is to examine the initial clinical and radiographic presentation of patients with musculoskeletal TB who were treated at our institution over the past ten years and determine the characteristic features that lead to the correct diagnosis.

Methods:

This was a retrospective study consisting of 77 patients with extra-axial TB treated at our institution in Cape Town, South Africa over the last ten years. We collected data on initial clinical presentation, laboratory values, radiographic findings, treatment, and outcomes. We performed quantitative and qualitative analysis to look for patterns in presentation that can help with diagnosis and factors affecting the clinical outcomes.

Results:

The most common presenting complaint was pain or limping. Our patients presented with thrombocytosis and anaemia but normal white blood cell count. ESR and CRP were raised with means of 42.1 mm/hr and 29.2 mg/L respectively. The HIV co-infection rate was 6.5%. Among the diagnostic tests specific for TB, Mantoux test had the highest sensitivity (70.1%), followed by tissue culture (51.9%), tissue PCR (50.6%) and sputum/gastric washings (14.2%). Five patients had INH resistant TB, treatment was not altered for these patients. The most common joint involved was the hip followed by the knee. Only three patients developed joint ankylosis. Compliance to medical treatment was 97%.

Conclusion:

Musculoskeletal TB can be difficult to diagnose and treat. There are several patterns of laboratory values and radiographic findings that can be suggestive of TB as demonstrated in our study and may aid in diagnosing the disease timeously and correctly. No single test is 100% sensitive therefore a combination of clinical, radiological and laboratory investigations should be performed. Biopsy is considered mandatory even in the face of clinical certainty, as single and multidrug resistance is becoming more common. Medical treatment is typically all that is required; however, compliance is of utmost importance.

SHOULDER AND ELBOW PAPERS:

JuggerKnot Soft Anchors in Arthroscopic Shoulder Stabilisation

Paper: P20
Category: Shoulder and Elbow
Presenting Author: M Sarsam
Co-authors: DLJ Morris, A Dekker, M Espag, A Tambe, D Clark

Background:

The JuggerKnot Soft Anchor system was launched in 2009 with novel all suture anchors. The JuggerKnot Soft Anchor 1.5 mm has been utilised in arthroscopic shoulder stabilisation in our unit since 2011. Theorised benefits include reduced removal of bone and fewer hardware complications. However, despite promising

biomechanical studies, little evidence is available for their success in vivo. Consequently, we performed a service evaluation of implant outcomes in our unit.

Methods:

Retrospective cohort analysis of all patients in our unit that underwent arthroscopic shoulder stabilisation in which JuggerKnot Soft Anchors were utilised. Exclusion criteria include revision procedure, engaging Hill-Sachs lesion and glenoid bone loss >20%. Outcome measure was failure (dislocation and revision surgery). All patients were asked to complete a current Oxford Instability Score (OIS) via a postal questionnaire.

Results:

Sixty-seven patients underwent arthroscopic shoulder stabilisation utilising a JuggerKnot Soft Anchor met our inclusion criteria. Mean age at time of surgery was 32.6 years (range 15–55 years). Mean follow up is 34.5 months (minimum 13 months). No patient experienced a post-operative dislocation. However, one patient experienced subluxation episodes successfully treated with a Latarjet procedure. Two patients underwent revision stabilisation due to pain. Consequently, failure rate was 4.5%. Mean current OIS result is 39 (n=49).

Conclusion:

This series supports ongoing use of JuggerKnot Soft Anchors in arthroscopic shoulder stabilisation. The failure rate compares favourably with that previously reported in literature. Patient reported outcome measure suggests favourable results in the majority of patients.

Retrospective Audit of Serum Vitamin D Levels in Patients who Underwent Latarjet Procedure for Shoulder Instability

Paper:	P133
Category:	Shoulder and Elbow
Presenting Author:	PA Rachuene
Co-authors:	SJL Roche, S de Villiers, K Berry, B Vrettos, M Mulder, JP du Plessis

Background:

Vitamin D is important for bone development, growth and healing with well-studied physiological effects. Hypovitaminosis D has been shown to interfere with bone healing and graft incorporation in laboratory experimental studies and clinical studies. Shoulder instability is very common among young active adults with majority of the cases being post traumatic anterior shoulder instability. The method of stabilisation in many of these cases is the modified-Latarjet procedure. We have previously documented complications in patient having this surgery, notably graft fracture and osteolysis/resorption of the bone graft. In July 2017 we noted a patient's coracoid graft at time of surgery appeared to be abnormally soft and on investigation the patient was found to be Vitamin D deficient. We have therefore been offering patients vitamin D levels when the bone appeared soft at time of surgery since this index patient.

Methods:

Retrospective review of all patients who had a Latarjet Procedure from July 2017 until March 2019. Patients who were deemed to have suspected soft bone at time of surgery and underwent a Vitamin D level. These levels were documented. Routine 6 week or 3 monthly post-operative X-rays were assessed for non-union or osteolysis.

Results:

Fifty-three patients underwent a Latarjet procedure. Three were females. The average age 27 years. Eleven patients had vitamin D levels done. Sixty-three per cent of those patients tested had abnormal vitamin D levels; two patients were deficient, and five were insufficient. There were no graft non-unions, and one graft fracture at 3 months. There was evidence of osteolysis in 35% of the grafts.

Conclusion:

This study highlights a 63% vitamin D deficiency in young patients who undergo a coracoid graft and whom the surgeon perceives there is soft bone. This is a concern as it may lead to osteolysis and non-unions. Unfortunately, the whole cohort was not tested and therefore we do not know their vitamin D status. This is the first study on vitamin D and instability patients and highlights the need for further studies including routine testing in this group of patients.

The Management of Proximal Humerus Fractures by South African Shoulder Surgeons

Paper:	P98
Category:	Shoulder and Elbow
Presenting Author:	C Anley
Co-authors:	JP du Plessis, N Ferreira, B Vrettos, S Roche

Background:

Proximal humerus fractures (PHFs) account for 5–6% of all fractures, increasing to 10% in patients over the age of 65 years. The recent high profile PROFHER trial (PROximal Fracture of the Humerus Evaluation by Randomisation) has highlighted the role of conservative treatment in these patients. The results of this study have however not been universally accepted and the treatment of PHFs remains debated at both congresses and within the literature. The purpose of this study is to establish what treatment options are currently preferred by South African orthopaedic shoulder surgeons for PHFs. In addition, we would like to establish if the recently published PROFHER trial has influenced this treatment. We hypothesise that there remain significant discrepancies in the treatment options employed.

Methods:

This study was undertaken in person at the recent SASES congress. The members were asked to complete a basic questionnaire to detail their background after which they were shown a PowerPoint presentation containing the radiology of 6, randomly selected patients with PHFs. Each member completed a questionnaire classifying the fracture (Neer classification) and indicating their preferred treatment option.

Results:

A total of 36 members completed the questionnaire (70.5% of the active SASES members). Only 58% (21/36) of the members had heard of the PROFHER trial and of these members only 38% (8/21) had read the trial. With regard to the six cases presented, there was poor interobserver agreement with regard to the classification of all six fractures and in four of the six fractures with regard to the treatment of the fractures. There was however excellent agreement on the remaining two fractures with regard to treatment.

Conclusion:

The main findings of this study show that there is poor consensus among South African shoulder surgeons on the classification and management of patients with Proximal Humerus fractures. In addition, only 17% of the members acknowledged the PROFHER trial had altered their management strategies in these patients.

The Management of Rotator Cuff Tears by South African Shoulder Surgeons

Paper: P99
Category: Shoulder and Elbow
Presenting Author: C Anley
Co-authors: A Wang, G Bain, S Kirsten, S Roche

Background:

Tears of the rotator cuff muscles become more common with increasing age and can range from small partial tears to large full thickness tears that are repairable but may progress to full thickness tears that are irreparable. In addition, these tears can either be traumatic or degenerative. The natural progression of tears remains largely unknown making the recommend treatment options more complex. Despite being a common pathology, the preferred management of rotator cuff tears remains widely debated. Specific entities commonly debated are if surgery is required, the timing of surgery if it is undertaken and what surgery should be performed (i.e. debridement versus repair.) At present there is no data available on the preferred treatment options among shoulder surgeons in South Africa. The purpose of this study is to establish what treatment options are currently preferred by South African orthopaedic surgeons for rotator cuff tears. We hypothesise that surgical treatment is still the preferred treatment option.

Methods:

This study was undertaken in person at the recent SASES congress. The members were asked to complete a questionnaire containing six clinical scenarios of patients with rotator cuff pathology followed by a basic questionnaire to detail their backgrounds. Finally, they were asked to rank 10 patient variables which may influence their decision to offer a rotator cuff repair from the most important to the least important contraindication.

Results:

A total of 34 (67%) current SASES members completed the questionnaire. The average number of years in practise is 16 years, with the average number of cuff repairs performed being 113/year. With regard to the six cases presented, there was poor interobserver agreement with regard to the management of all six scenarios. Surgical intervention was more commonly suggested in the presented scenarios. Finally, there was poor agreement with regard to the ranking of contraindications for rotator cuff repairs

Conclusion:

The main findings of this study show that there is poor consensus among South African shoulder surgeons on the management of patients with rotator cuff tears. Surgical intervention appears to be more commonly suggested than conservative treatment.

Triceps off Fascial Sleeve (TOFS) Approach to the Distal Humerus

Paper: P17
Category: Shoulder and Elbow
Presenting Author: W Nkomo
Co-authors: M Solomons, S Roche, S Maqungo

Aims:

Primarily, to prospectively describe the functional outcome of intra-articular distal humerus fractures that have already been addressed using this approach. Secondary aims include an ultra-sonographic study to assess if the triceps is intact.

Methods:

Tools to measure functional outcomes:

1. Disability of the Arm, Shoulder and Hand (DASH) questionnaire
2. Active range of motion of the effected elbow
3. Triceps strength, calculated with the aid of a measuring scale
4. Sonographic assessment of the effected triceps tendon

Results:

The patients were assessed twice, at a mean of 12 months and again at a mean of 18 months. The mean arc of motion was 104.7 degrees (100 degrees is what is acceptable). There was a decrease in mean triceps muscle strength compared with that of the normal side, at 45 degrees of elbow flexion the mean triceps strength was 65% of normal, at 90 degrees it was 82%, at 120 degrees triceps it was 89%. The mean DASH score was 18.4 indicating mild residual impairment. The sonographic assessment showed the triceps tendon to be intact in all the participants.

Conclusion:

An intra-articular distal humerus fracture is a devastating injury. The TOFS approach is extensile enough to treat these injuries. Our study has shown that these patients can recover to the level of a mild residual physical impairment and attain an acceptable arc of motion with an intact triceps tendon post operatively. The TOFS approach is an option when addressing complex distal humerus fractures.

SPINE PAPERS:

Influence of the Newly Introduced Standard Operating Procedure on Outcomes of Acute Cervical Spine Dislocated Injuries at Groote Schuur Hospital

Paper: P75
Category: Spine
Presenting Author: G Ayik
Co-authors: T Mukabata, C Osborn, N Kruger

Background:

A retrospective analysis was performed on the impact that Groote Schuur Hospital (GSH)'s standard operating procedure (SOP) for cervical spine dislocations had on the timing of closed reduction.

Methods:

The study was a retrospective review of patients who presented to GSH with cervical dislocation injuries and were managed with closed reduction. The patient records spanned from 2015 to 2018, data from the acute spinal cord injury database along with patients' demographic information were gathered and compared. Participants within the study time frame were diagnosed with a cervical facet dislocation based on clinical examination findings and radiological confirmation. Patients who had reduction performed at other referring hospitals were excluded from the study.

Results:

Although it is now regarded as common practice within all Western Cape hospitals to perform closed reduction of cervical fracture

dislocations as soon as possible after injury, in this study the time between injury and closed reduction before introducing SOP was 13.13 hours on average, after introduction of SOP, the time increased to an average of 14.28 hours. The main cause for delay was transfer time from site of injury to ER. Other reasons for delay include missed diagnosis, orthopaedic registrar unavailability, and reduction bed incomplete.

Conclusion:

This study found that the time taken for orthopaedic management of cervical dislocations was decreased by an hour after introduction of SOP, but the overall time to reduction did not decrease. This was due to delays in transfer to the ER and referral to Orthopaedics. We recommend that in our setting, reduction could be initiated within an hour of patient arrival, if emergency room doctors rapidly identified the problem and commenced cervical traction when the orthopaedic team was not immediately available. Our impression was that there was poor adherence to new SOP guidelines on time management by trauma team, and possibly transport delays prior to hospital admission. A further study to investigate the bottlenecks of the referral system is advisable.

Lower Lumbar Burst (L3–L5) Fractures: Incidence and Management

Paper: P32
Category: Spine
Presenting Author: SJ Mabusha

Background:

Biomechanical and anatomic characteristics of the lower lumbar spine differ from the thoracolumbar region and may account for the inherent stability of these injuries. The objective was to assess the incidence and outcome of management of lower lumbar burst fractures in an adult population.

Methods:

Twenty lower lumbar burst fractures were treated at our hospital, from January 2010 to December 2018, with an average follow up of 36 months for both the conservatively and surgically treated groups respectively. Eight patients were treated surgically, and 12 patients were treated non-operatively. Patients were evaluated for activities of daily living (ADLs), work status, lower back pain, visual analogue scale (VAS), sexual and neurological symptoms. Imaging modalities were reviewed for severity of initial injury, transverse process fractures and maintenance of initial correction.

Results:

In general, neurologically intact patients in both groups returned to similar post-injury employment levels. Persistent lower back pain was found to be more disabling in the surgically treated group, in which a fusion incorporating four or five lumbar segments was performed. There was no evidence of loss of initial reduction, and no patients experienced late neurological compromise in the surgical group. No patient presented with cauda equina syndrome. One patient reported sexual dysfunction in the form of poor erections. He was duly referred to the urologists.

Conclusion:

Conservative treatment of lower lumbar burst fracture is a viable option in the neurologically intact patients, but severe intractable pain, loss of lordosis and vertebral height may persist, leading to evolution of a kyphotic deformity. If surgery is chosen, a short rigid fixation with pedicular instrumentation may be of greater benefit. A long fusion with distraction instrumentation should be avoided in the lumbar spine, as long instrumented fusion can lead to persistent lower back pain.

Management Strategies of Lateral Mass Fractures of the Cervical Spine

Paper: P91
Category: Spine
Presenting Author: LN Bomela
Co-author: SN Motsitsi

Background:

Cervical lateral mass injuries are rare and most literature about cervical lateral mass fractures is very limited and controversial. This study provides an essential tool in the study of our own population dynamics and confounding factors with regard to the management of lateral mass fractures. The objective was to review the management of the lateral mass fractures of the cervical spine. The study design was a retrospective review of prospectively maintained database.

Methods:

A review was done of all the patients who sustained cervical spine lateral mass fractures over a 12-year period. The lateral mass fractures were classified according to Kotani lateral mass classification. For the classification of different lateral mass fractures, a review of the medical records, pre-operative and post-operative X-rays, computed tomography and MRI images (where indicated) were performed.

Results:

There was a total of 46 patients. The male to female ratio was 2:1 and the average age was 36 years. The majority (89%) of the injuries were due to high velocity motor vehicle accidents, falls were 8.7% and assault were 2.2%. A third of the patients had varying neurological deficits. Radiologically, the majority (37%) of the injuries were type C lateral mass fractures, followed by type A lateral mass fractures (30%). Of the operated patients 76% were single level, 13% were two level and 4% were more than three level surgeries.

Conclusion:

The lateral mass fracture represents a spectrum of cervical spine pathology. A third of patients with these injuries present with neurology and two thirds were treated with single level surgery.

Pre-Operative Use of Traction Views in Adolescent Idiopathic Scoliosis

Paper: P118
Category: Spine
Presenting Author: SM Tlhabane
Co-authors: A Rahman, IAR Elnour, SA Khan

Background:

The aim was to review the pre-operative use of traction X-rays views in the surgical management of adolescent idiopathic scoliosis, with the objective of documenting traction views under general anaesthesia as prediction method in surgical adolescent idiopathic scoliosis (AIS) compared with bending views. The hypothesis question was: is pre-operative traction view under general anaesthesia adequate to predict posterior instrumented surgery correctability of the spine curves determined by Lenke classification in AIS?

Methods:

A retrospective study was done at a single institution. Inclusion criteria: all patients, both males and females between the ages of 2 and 20 years, with idiopathic scoliosis; angle more than 40 degrees, measured using Cobb method. Exclusion criteria: individuals with pathology other than idiopathic scoliosis. Pre-operative bending

views were obtained for all the patients and the Cobb angle measured using Cobb's method. Traction views were obtained once the patients were under general anaesthesia and similarly the Cobb angles were measured using the Cobb's method.

Results:

The study showed that traction views were able to predict final post-operative correction to as close as 80% compared to 60% predictability when using bending views.

Conclusion:

Traction views under general anaesthesia were found to be a good predictor of post-operative correction in the patients with AIS.

The Clinical Outcome and Surgical Management of Cervical Spine Tuberculosis

Paper: P33
Category: Spine
Presenting Author: SJ Mabusha

Background:

Normal cervical spine has certain physiological lordosis in standard sagittal position. If sagittal plane changes, the normal physiologic lordosis will be lost, and the cervical kyphosis will develop at different degrees. Kyphosis in tuberculosis of the cervical spine tends to be severe and can lead to neurological fallout.

Methods:

Twenty-one patients with 23 lesions of cervical spine tuberculosis are reported. Angular kyphotic deformity was present in eight patients and neurological complications were present in six patients. The goals of management of tuberculosis of the cervical spine are to eradicate the infection, to prevent or relieve neural compression, to prevent or correct cervical kyphosis and to achieve unrestricted mobilisation and normalisation of patient's activities of daily living. The aim of the study was to evaluate the clinical and surgical management of the of cervical spinal tuberculosis. Between January 2010 and 2018, we performed a retrospective chart review of clinical and radiological data from 100 consecutive spinal tuberculosis patients, including 21 patients who were diagnosed and treated for cervical spine tuberculosis. The patients were evaluated pre-operatively and post-operatively on the basis of haematologic, radiographic and neurological function. An anterior cervical corpectomy and fusion was performed via Smith Robison approach for all the patients. This case series involves 14 lumbar tuberculosis patients treated with the above given surgical procedure. The following parameters were evaluated: visual analogue scale (VAS) score, erythrocyte sedimentation rate (ESR) and C-reactive protein value, vertebral body loss, deformity angle, kyphotic angle, cervical lordotic angle and fusion status of affected segment. The mean time of follow-up was 38.2 months (30–46).

Results:

Significant improvement was found in all radiologic parameters, and significant decrease in VAS and ESR were noted after surgery. Bony fusion was seen in all cases within a mean time of 4.3 months (range 3–7 months). No post-operative instrumental complication and recurrence were noted.

Conclusion:

All the patients received standard therapy with rifampicin, isoniazid, ethambutol, and pyrazinamide for 18/12. The result of this study showed that anterior surgical approach is a viable option for the management of cervical tuberculosis. TB is a medical condition.

The Efficacy of Radical Debridement and Spinal Instrumentation in Adult Patients with Pott's Paraplegia

Paper: P115
Category: Spine
Presenting Author: MN Mnisi
Co-author: NS Motsisi

Background:

To review the efficacy of radical debridement and spinal instrumentation in adult patients with Pott's paraplegia. The incidence of spinal tuberculosis has increased in developing countries. There is also an increase in HIV infection and anti-tuberculosis drug resistance in these countries. Antituberculosis chemotherapy is still the mainstay treatment of spinal tuberculosis. Surgical intervention is indicated in patients with neurological deficit, failed chemotherapy, unstable spine and kyphotic deformity correction.

Methods:

A retrospective study design, review of adult patients admitted in our spinal unit with Pott's paraplegia over a ten-year period. Patients included were above the age of 18 years, patients that had surgical intervention combined with chemotherapy and those that only had chemotherapy. Patients excluded did not conform to the inclusion criteria. A total of 84 patients files were reviewed. The female to male ratio was 1.05:1 and a mean age of 40 years. All the patients had antituberculosis chemotherapy for 8 weeks then reviewed. Twenty-four (28.6%) of the patients had surgical intervention and were followed up for a minimum of 12 months. Surgical intervention was anterior radical debridement and fusion plus instrumentation, posterior lateral debridement and fusion plus posterior instrumentation and anterior radical debridement with fusion.

Results:

Two-thirds of the patients improved on antituberculosis chemotherapy only. The remainder required surgical intervention. A total of the 24 patients had surgery, 15 of these had significant neurological improvement. From the 15 patients, eight patients improved from ASIA A to C, four patients from ASIA B to D and three patients from ASIA C to E. Four of the patients then remained as ASIA A after 12 months of follow-up.

Conclusion:

Shows that two-thirds of the patients improve on antituberculosis chemotherapy in the short-term follow-up. Antituberculosis chemotherapy is still mainstay treatment for TB spine. Radical debridement and spinal instrumentation combined with antituberculosis chemotherapy is still indicated in patients with neurological deficit ASIA C and less, failed chemotherapy, progressive neurology, instability and kyphotic deformity.

TRAUMA PAPERS:

Analysis of the Complications of Volar Plate Fixation for the Treatment of Distal Radius Fractures Frykman Type 3–6

Paper: P146
Category: Trauma
Presenting Author: S Xaso
Co-authors: MM Ramokgopa, SK Magobotha

Background:

The aim of the study was to analyse complications after open reduction and internal fixation using a volar plate in distal radius fractures. The hypothesis was that complications after open reduction and internal fixation using a volar plate for distal radius fractures occur less at our institution compared to incidences in the literature.

Methods:

The study design was a retrospective study with prospective recall, with a sample of size of 63 patients. These were patients who were managed operatively between July 2015 and June 2017. Inclusion criteria included: patients from 18 years of age and older, active male and female patients and patients with Frykman type 3-6 distal radius fractures. Exclusion criteria included patients with carpal bone involvement. Data collection was done during orthopaedic trauma upper limb clinics by the principal investigator. Data analysis was done with a biostatistician, and STATA 14 and frequency tables were used.

Results:

The results showed that some specific complications were more and some less than complication rates in literature. In terms of relationship between complications and surgical and patient factors, senior surgeons had less complications and better functional scores. Patients with increased number of complications had poor functional scores.

Conclusion:

The incidence of complications of distal radius fractures post open reduction and internal fixation is underestimated as shown by our study and the literature available. However, the complications have been shown to be much less for operations performed by senior colleagues. Further research needs to be done as this study had limited number of patients.

Neck of Femur Fractures at a Tertiary Academic Hospital: A Three-Year Descriptive Analysis

Paper: P141
Presenting Author: M Manjra
Co-authors: J Charilaou, JD Jordaan, M Burger, N Mullajie

Background:

With improved healthcare and an ageing population, developing countries face a significant increase in managing fragility hip fractures. This involves multifactorial considerations with monetary and social burdens increasing exponentially. Many first world guidelines are formulated and despite our best attempts to adhere we are not making adequate advances in preventing and adequately managing this pandemic in developing countries. The aim of this study was to do an in-depth descriptive analysis of patients with neck of femur fractures (NOFF) at a tertiary South African hospital.

Methods:

Patient records of all patients who presented with a displaced NOFF who underwent hip arthroplasty between 2015 and 2017 were included in this study. General demographic and clinical information was collected and the in-hospital mortality rate was calculated.

Results:

A total of 303 patients (mean age 73.8 ± SD 12.4) comprising 69% females and a left hip predominance (57%) were included. Low energy mechanism falls from a standing height, implying severe osteoporosis, accounted for 90.8% (n=275) of fractures. An international comparable in-hospital mortality rate of 3% (n=9) occurred. Only 5.3% (n=16) of patients complied to the one-year post-operative follow up visit.

Conclusion:

The results of this study suggest comparable demographic and epidemiological profiles to international literature. Unfortunately, NOFF are not well researched in the context of the South African health care system. Future research should first interrogate the true burden of disease to make a concerted effort to formulate more appropriate local guidelines.

Open Approaches for Cruciate Ligament Reconstruction in Knee Dislocations

Paper: P48
Presenting Author: M Held
Co-authors: B Schenck, B Wäscher, D Richter, H Hobbs, M Laubscher, R von Bormann

Background:

Open approaches for cruciate ligament surgery play a vital role in a referral setting with limited resources. It further avoids extravasation of arthroscopy fluid and the concomitant risk of compartment syndrome, and is mandatory in large traumatic arthrotomies. There are limited guidelines and reports for open surgery of knee dislocations. We aimed to evaluate patients who had undergone open cruciate surgery for multiple knee ligament injuries.

Methods:

A prospective surgical database of a knee unit in a large urban tertiary care referral centre in South Africa was interrogated between July 2016 and November 2018 and patients with a knee dislocation were selected who had undergone open cruciate ligament reconstruction or repair. A review of clinical notes and imaging was performed. Demographic information, injury mechanism and type, associated injuries, operating time, complications, as well as patient reported outcomes and radiographic outcomes were described.

Results:

Twelve patients (two females, median age 35 years, IQR 21.5) were identified from a pool of 103 patients with multiple knee ligament injuries. All underwent open cruciate surgery. In three patients, extravasation into the posterior compartments during diagnostic arthroscopy triggered the open approach. In 9 patients a large traumatic arthrotomy enabled sufficient access to a medial (in seven patients) or lateral (in two patients) approach to address collateral ligament injuries. All injuries, except one were high-energy injuries caused by road traffic accidents. Most patients had damage to three or more of the four main knee ligaments, and most had various associated injuries. The median operating time was

137.5 minutes (IQR 47.5). Patients regained a median Lysholm score of 80 (IQR 15) after a median of 12months (IQR 6). Although 40% reported stiffness, all but one could flex beyond 90°. None required further ligament surgery. One patient had a surgical site infection and one patient had delayed wound healing.

Conclusion:

Open cruciate surgery is valuable in a select group of patients with knee dislocations and can achieve acceptable outcomes even in patients with severe injuries. Stiffness, infection and wound healing is a concern.

Outcomes of Primary Fusion in High Energy Lisfranc Injuries Operated at Groote Schuur Hospital: a Retrospective Study from 2013 to 2018

Paper: P95
Presenting Author: V Boskovic
Co-authors: JI Wiegerinck, M Laubscher, S Maqungo, G McCollum

Background:

High energy Lisfranc injuries are relatively uncommon but can lead to severe disability and morbidity. Primary fusion is a treatment option that can improve outcomes and reduce the re-operation rate. The purpose of this study was to evaluate our series of primary fusions for high energy Lisfranc injuries, looking specifically at type of fusion, time to union, non-union rates, reoperation rates and quality of reduction.

Methods:

Folder numbers of patients who underwent surgery for Lisfranc injuries were identified from the REDCap surgical database and then retrieved from records. Only cases of primary fusion in adults were included. We excluded low energy twists and athletic injuries, ipsilateral lower limb injuries and cases where reduction and fixation were done without fusion. Radiographs were analysed from the I Site Enterprise PACS system (Phillips™).

Results:

Between 2013 and 2018, 14 cases of high energy Lisfranc injuries were identified where primary fusion was done. 7 patients (50%) underwent fusion of first, second and third tarso-metatarsal (TMT) joint, first and second TMT joint were fused in only one case (7.1%), second and third TMT joint fused in four cases (28.6%). Only two patients (14.3%) had removal of implants. Plate and screws were the technique of choice used for fusion. There was 100% union rate and average time to union was 84 days. Acceptable reduction was observed in ten cases (71.4%), four cases (28.6%) of malreduction were found among which one patient had pre-existing hallux valgus. Average reduction parameters in the well reduced group were as follows: intermetatarsal angle of 8.04°, medial cuneiform first metatarsal angle of 16.9°, Meary's angle 6.1°, sagittal shift 0.26 mm and coronal shift 0.64 mm.

Conclusion:

The majority of patient who underwent primary fusion of at least one TMT joint had good radiological outcome. No revision surgery was done. We concluded that our series of tarso-metatarsal fracture dislocation did well with primary fusion with a low re-operation rate for mid foot instability or arthritis.

Radial Shortening Following Low Velocity Gunshot Injuries Treated with an Intramedullary Device

Paper: P104
Presenting Author: M Abramson
Co-authors: M Laubsher, S Maqungo

Background:

Long bone fractures resulting from gunshot injuries contribute significantly to the burden of disease in orthopaedic fracture management in South Africa. These injuries are often characterised by significant zones of comminution, precluding some of the traditional fixation methods. The intramedullary radial nail provides an additional option to treat these fractures. Following its introduction in 2012 , we have performed a number of radial nails following low velocity, gunshot wound (GSW) fractures. Routine radiological follow-up revealed shortening in a significant portion of cases. Anecdotally it appears that certain areas of the radius are more at risk of shortening when treated with an intramedullary device. This retrospective radiological review aimed to substantiate the incidence of post-operative radial shortening and whether certain anatomical areas are more prone to this sequela.

Methods:

We retrospectively reviewed all cases of radial nails performed for GSW fractures of the radius from 2012 to 2018. Cases were divided according to the region involved. Initial X-rays were compared to those immediately post-operatively and at fracture union and assessed for shortening using the ipsilateral ulnar as a guide.

Results:

We performed 71 cases within the study period. 18 were excluded due to an ipsilateral ulnar fracture, and a further seven due to insufficient radiological follow up, leaving 46 cases for analysis. Ten cases were performed for distal radial shaft fractures, 21 for middle third and 15 for proximal third. There was a total of ten cases assessed as being shortened at time of union. Of these, four were seen in distal third fractures, five in middle third and one in proximal third. Further analysis showed that seven cases were the result of surgical error in failing to restore fracture length, and three shortened after the index procedure before achieving union.

Conclusion:

Radial nails resulted in a significant proportion (22%) of post-operative shortening in our series. Further scrutiny is needed to assess whether certain anatomical areas are at higher risk of shortening as it originally seems, or whether careful attention to detail intra-operatively and a sound understanding of the implants design can prevent this from occurring.

Three Months in Tygerberg Orthopaedic Trauma – What is a Registrar Worth?

Paper: P94
Presenting Author: H van Zyl
Co-author: N Ferreira

Background:

Tygerberg hospital is a tertiary hospital with a drainage area population of about 3.6 million people. The orthopaedic department manage about 6 000 trauma patients per year. The registrar training programme consist of three-month rotations through the different subspecialties of orthopaedics. There is a large discrepancy in the number of surgeons/training surgeons per population between public and private sectors. Due to budget and theatre time constraints, the trauma waiting list often exceeds 50–60 patients needing urgent and emergent surgery. This is worsened by other surgical disciplines using orthopaedic theatre time for life threatening injuries due to lack of theatre availability. One of the

proposed solutions to this problem is outsourcing of some of the cases to private medical facilities.

Methods:

A retrospective review, of surgical records kept during the three-month rotation (14 January 2019 to 14 April 2019) of all the surgeries in which the registrar was involved either as leading surgeon or assistant, was done. The surgeon fees were then calculated according to current medical aid rates at 100%. The implant cost was calculated at the average cost to state of the type of implant. No suture or dressing materials were included.

Results:

During the three-month period 154 procedures were done ranging from total hip arthroplasty to septic hand debridements. Eleven procedures were done per week. Sixty cases were done after 19:00. Surgeon fees amounted to R172 101.40 per month, three times that of the net salary of a registrar. Implant costs amounted to over R1 250 000. These numbers become significant when taking into account that there are six registrars in the trauma rotation.

Conclusion:

Although a very small-scale study this shows the significant amount of trauma work done at a tertiary institution. With increasing budget constraints, pressure on theatre time and growing population, expansion of resources is needed but in a cost-effective way. It seems that increasing capacity in the state sector could be a cheaper option compared to private outsourcing although more in-depth analysis needs to be done.

What is the Preferred Method of Management of Intertrochanteric Femur Fractures in South Africa? A Survey of Orthopaedic Surgeons

Paper: P120
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Background:

Intertrochanteric femur fractures are a growing concern in society due to the incidence of these fractures in the elderly and our progressively ageing population. Despite being a common pathology there is still no clear consensus on the management of these fractures. The aim of this study was to determine the level of agreement among orthopaedic surgeons from academic institutions working in South Africa with regard to the treatment choices of intertrochanteric femur fractures.

Methods:

An anonymous questionnaire was used to assess opinions of management of intertrochanteric femur fractures of orthopaedic surgeons who attended the 2018 South African Orthopaedic Association (SAOA) registrar congress. The various orthopaedic surgeons represented eight South African academic institutions. The questionnaire evaluated the surgeon demographics, current training level, and operative considerations in the treatment of intertrochanteric fractures with regard to two case scenarios attached to a picture of an A-P pelvis X-ray showing an unstable type intertrochanteric femur fracture (OTA 31–A2). Scenario 1 involved an 80-year-old patient and scenario 2 involved a 50-year-old patient.

Results:

Forty-seven questionnaires were received back. With regard to scenario 1: 14.9% indicated that a dynamic hip screw (DHS) would be the treatment of choice and 85.1% indicated that a cephalomedullary nail (CMN) would be used, and fixed angle blade plate was not chosen as an option. Out of the 40 respondents indicating the use of a CMN, 27.5% preferred a short CMN and 72.5% chose a long CMN. 12.8% respondents indicated they would consider total hip arthroplasty. With regard to scenario 2: 23.4% chose a DHS, 44.7% chose short CMN, 31.9% (n=15) chose long CMN and the option of total hip arthroplasty was not considered by any of the respondents.

Conclusion:

The use of a CMN was preferred in both scenarios, with a long CMN preferred over a short CMN in scenario 1 and a short CMN preferred over a long CMN in scenario 2. This matches the global trend that despite the lack of evidence indicating the best fixation, CMNs have become the preferred choice for managing intertrochanteric femur fractures, but nail length remains controversial.

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