**Results:** The cost of managing open lower limb fractures was £13,959/patient in 2016 and £12,005/patient in 2017. Remuneration in 2016 was £5,196/patient; whilst remuneration in 2017 was £10,707/patient. The clinically dominant procedure determined by HRG4+ was in orthopaedic surgery 70.3% in 2016 and 44.1% in 2017; yet, they received 40.5% of the income in 2016 and 44.2% in 2017. Simulation revealed that income under new HRG4+ tariffs increased by 25.1%, where improving coding accuracy yielded a further increase of 29.1% in income.

**Conclusions:** Providing complex lower limb reconstruction for open fractures in a multidisciplinary unit is resource intensive and associated with high costs. Current hospital remuneration for providing orthoplastic services is insufficient and inadequate. To ensure that orthoplastic units across NHS England can operate efficiently and to improve patient care, more accurate coding and an increase in national tariffs are essential. Remuneration goes to a single clinical specialty despite a multidisciplinary service provision and local assessment of parity is required.

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**Best Poster Presentation**

## Increasing capture of patient-reported outcomes in trauma research

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**Background:** In order to understand how peoples' quality of life is affected following major trauma and the effects of that injury on their health and wellbeing, it is important to capture patients' perspectives of their own health. Patient Reported Outcome Measures (PROMs) can capture patients' own experience of their health such as symptoms, mobility, mental health and social function.

The aim of this research is to establish the impact of trauma on quality of life/symptoms and to explore views on using PROMs to support clinical care and research.

**Methods:** One-to-one, semi-structured interviews will be conducted with: (i) people who have experienced a major trauma, (ii) their family members/carers; (iii) healthcare professionals working in trauma related clinical areas; (iv) trauma researchers; and (v) staff members/volunteers from third sector organisations who support trauma patients and their families/carers.

**Results:** This is an ongoing study based at the Centre for Patient Reported Outcomes Research (CPROR) funded by the National Institute for Health Research Surgical Reconstruction and Microbiology Research Centre (NIHR SRMRC).

Findings will be used to inform the development of a pathway for the electronic capture of PROMs for inclusion within routine clinical care of trauma patients and trauma research. Future research will test the feasibility and acceptability of this ePROM system.

The research programme is being delivered in close collaboration with key stakeholders, including patient partners, trauma clinicians, trauma researchers and the ministry of defence.

**Conclusion:** The rising number of major trauma survivors has driven the need for improvements in rehabilitation to enable patients to return to functional activities, work and education after complex re-enablement and reconstructive surgery. PROMs are essential to deliver patient-centred healthcare and research which is informed by patient-focused priorities/outcomes. The programme will also increase capacity for trauma-specific knowledge and expertise in relation to PROMs.

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**Best Student Presentation**

## Analysis of the relationship between Vitamin D levels and Infection in Orthopaedic patients

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**Background:** One in four of the United Kingdom population suffers from low Vitamin D levels. Vitamin D has immunomodulatory properties, but its precise role in Orthopaedic infection is unclear. This study aimed to quantify average Vitamin D levels among Orthopaedic patients and elucidate the relationship between Vitamin D levels and incidence of infection.

**Methods:** A convenience sample of 187 Orthopaedic patients was taken in our institution, which is a tertiary referral centre for Orthopaedic infection. 25OHD concentration and infection status were recorded, and a Mann-Whitney *U* test for non-parametric data was performed on the means. The relationship was then validated through a bivariate correlation analysis (Spearman's rho).

**Results:** 104 patients had infection. Mean ages were 64.8 years in patients with infection and 63.0 years in patients without infection. Gender split was approximately equal in both groups. There was no significant difference in age or gender between both groups. Mean 25OHD concentration was 39.8 nmol/L for patients with infection and 59.6 nmol/L for patients without infection ($p < 0.00$). Overall mean 25OHD concentration for Orthopaedic patients was 48.6 nmol/L. The correlation coefficient between 25OHD levels and infection incidence was −0.3 ($p < 0.00$).

**Conclusion:** There was a negative correlation between 25OHD concentration and infection, suggesting that Vitamin D could have a protective effect against infection. Furthermore, patients without infection had a mean of 19.8nmol/L higher concentration of 25OHD than patients with infection. Patients with infection had 25OHD insufficiency, whilst patients without infection had normal 25OHD levels. Future RCTs are needed to determine whether Vitamin D supplementation reduces incidence of infection and leads to improved outcomes in Orthopaedic patients.

**Implications:** These findings suggest a potential future role for prophylactic Vitamin D supplementation to help combat the Vitamin D insufficiency prevalent in Orthopaedic patients, as well as in the prevention of infection during the hospital stay.

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**Best Scientific Presentation**

## Intra-medullary Nail Insertion Accuracy: A comparison of the Infra-patellar and Supra-patellar approach

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**Aims:** The anatomical safe zone for intra-medullary nail insertion through the tibial plateau is small, insertion outside of this area

risks damage to intra-articular structures and poor fracture reduction. The purpose of this retrospective study was to determine if the supra-patella (SP) approach confers improved nail insertion accuracy when compared with the standard infra-patella (IP) technique.

**Patients and Methods:** 200 cases were included in the study (SP 95, IP 105). Insertion accuracy was assessed on AP and lateral radiographic imaging and measured as the distances between the central axis of the proximal nail and the ideal point of entry as described in the literature.

**Results:** The median distance from the ideal entry point was 4.4 mm (SP) and 5.1 mm (IP) ($p = 0.046$) in the coronal plane, and 4.0 mm (SP) and 3.7 mm (IP) ($p = 0.527$) in the sagittal plane. A narrower range of measurements was observed in the SP technique in both sagittal and coronal planes, SD 4.5 mm vs 6.5 mm, and SD 4.0 mm vs 5.4 mm respectively.

**Conclusion:** We found that the SP technique achieved improved nail insertion accuracy in the coronal plane, however, no significant difference was observed in the sagittal plane. We also found a narrower range of insertion points in the SP cohort in both sagittal and coronal planes suggesting improved control in nail insertion using this technique.

Take home message

1. The SP technique is associated with improved nail insertion accuracy in the coronal plane.
2. The SP technique is associated with a narrower range of entry points implying improved control in nail insertion.

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**TLA Medicolegal Prize winning Presentation**

## Immediate weight bearing after plate fixation of fractures of the tibial plateau

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**Background:** Proximal articular fractures of the tibia are commonly stabilised with internal fixation using plates and screws. There is a lack of evidence and conflicting guidelines as to the most suitable post-operative rehabilitation regime including weight bearing status. There are numerous physiological and socioeconomic benefits of early weight bearing after orthopaedic surgery, but concerns remain around loss of fracture reduction. Therefore, the aim of this study is to investigate whether the weight bearing status after tibial plateau plate fixation is associated with any loss of reduction or articular collapse.

**Methods:** We retrospectively analysed data from our prospectively collected major trauma centre database. All tibial plateau fractures that required open reduction and internal fixation with plate and screws were included. The immediate post-operative weight bearing status of these patients was recorded. Group I consisted of those patients that were either non-weight bearing or touch weight bearing for the first six post-operative weeks. Group II consisted of patients who were instructed to weight bear fully (as tolerated) immediately after the operation. Radiographs were taken on day one post-operation, at six weeks and at three months and analysed for fracture displacement and joint depression or loss of fixation.

**Results:** A total of 90 patients were included in the study. Group I (non-weight bearing or touch weight bearing) consisted of 60 patients (67%). Group II (full weight bearing as tolerated) consisted of 30 patients (33%). The follow up radiographs demonstrated no failure of fixation in either study group. One patient from the weight bearing group had >1 mm joint depression (4 mm) identified at the first follow up, which did not progress.

**Conclusions:** This study shows immediate post-operative full weight bearing does not affect the fixation or cause articular collapse up to three months after surgery and thus we propose that patients should be allowed to weight bear immediately after surgical stabilisation of tibial plateau fractures. This will enable patients to benefit from the positive effects on fracture healing of early weight bearing post-surgery and avoid the complications of non-weight bearing without loss of fixation or articular collapse.

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