# ROUNDUP360

## Research

### Tranexamic acid: just give it – it's not important how!

There is a wealth of data published in the indexed literature demonstrating that the use of tranexamic acid (TXA) is beneficial in reducing bleeding in total knee arthroplasty (TKA). Studies (including randomised controlled trials) have demonstrated the safety, efficacy and cost effectiveness of the treatment in reducing blood loss following TKA. Despite all the research, however, there is still no overwhelming consensus on the best administration method or amount to give to patients, with studies supporting both parenteral and topical use in varying dosages. Although a retrospective cohort, researchers in **Pennsylvania (USA)** have reported this trial of 373 intravenous TXA *versus* 198 topical TXA which set out to add further evidence to the slightly obscure issue of method of delivery of tranexamic acid in the peri-operative period following knee arthroplasty. The study team undertook a chart review of their mixed cohort of 1g intravenous TXA *versus* 3g topical infiltration (with suction drains clamped for one hour). Outcomes were assessed via chart review and included haemoglobin drop and transfusion requirement in the post-operative period. The research team established that there was a difference in transfusion requirement, with none of the topical TXA group requiring transfusion, while 2.4% in the intravenous group received transfusion. While there was a significant difference in mean post-operative haemoglobin (11.4 vs 11.1), the clinical significance of this drop is questionable.[1] It may be a bridge too far to suggest the small differences seen in this paper represent true clinical significance, as transfusion of course is a clinician decision and there were different teams caring for these cohorts of patients. However, what this paper does add is evidence to suggest that it does not seem to matter how TXA is given; it continues to appear to be an effective treatment in the prevention of bleeding after TKA.

### The anterolateral ligament re-examined

Although on the surface seemingly simple, the biomechanics of the knee continue to throw up new and previously unappreciated nuances to knee motion and restraint thereof. In many joints the biomechanics can be said to be of intellectual interest only, and not directly relevant to surgeons. However, given the volume of knee ligament reconstruction undertaken it is essential that surgical teams understand the nuances of knee ligament structure and function. After all, without understanding normality how can pathoanatomy be understood? There has been recent interest in the newly identified anterolateral ligament (ALL) of the knee and in some quarters it has been proposed that this structure contributes to the stability of the knee after anterior cruciate ligament (ACL) injury. Surgeons have proposed that reconstruction of this ligament can improve knee stability when performed at the same time as ACL reconstruction. Researchers from **Washington (USA)** set out to explore the biomechanical basis for this supposition with their cadaveric study. They designed a study using 11 cadaveric knees set up on a biomechanical testing rig able to measure resistance to abnormal movements in different degrees of flexion. The investigators sequentially divided the ACL, the lateral collateral ligament (LCL), then the ALL, and the percentages of contribution to force and movement were measured at different degrees of flexion. The ALL was found to be a contributor to the resistance of internal rotation at angles greater than 35°, and this increased with increasing flexion. The interaction between the ACL and ALL changes throughout the range of motion, with the ACL forming the primary restraint to internal rotation at angles less than 35° and primary restraint to anterior drawer at all angles.[2] While the ACL, unsurprisingly, was found to be the key restraint to both anterior translation and internal rotation, this study highlights the potential importance of the ALL in resisting post-traumatic knee instability, especially in unwanted pivot shifts. Further clinical research is required now to identify the optimal ways of reconstructing this ligament and then assessing the clinical outcome.

### Warfarin a poor post-operative agent

Warfarin is a tricky drug to manage. With interactions with many other agents and the varying effects of diet, maintaining a therapeutic range is always a tricky task – and it is particularly a problem in the post-operative window. There are still many surgeons worldwide who use warfarin as an agent in venous thromboembolism (VTE) prophylaxis, and it is frequently used for patients who have suffered a previous VTE during the post-operative period. Researchers from **Missouri (USA)** completed this simple study with the laudable aim of establishing just how many patients managed in this way actually end up with an international normalised ratio INR in the therapeutic range. The study team reviewed the coagulation screens of 184 patients treated with warfarin for VTE prophylaxis following a total knee replacement. The patients were treated with two different targeted INRs of 1.7 to 2.7 and 2.0 to 3.0.[3] The results are a real eye-opener. Given that patients were only within the therapeutic range for 54% (INR 1.7-2.7 target) and 46% (INR 2.0-3.0 target) of the time, this cannot be an effective method for managing VTE prophylaxis in high risk patients. Perhaps even more worryingly, patients were overcoagulated 13% and 15% of the time, putting them at risk of post-operative haematoma, wound infection and other complications of anticoagulation. This very simple study highlights the complexities associated with decision-making surrounding DVT prophylaxis. Based on the results of this series, questions should be asked about the likely efficacy of warfarin, given the small proportion of patients who are actually in the therapeutic window at any one time.

### Passive exoskeleton the orthosis of the future?

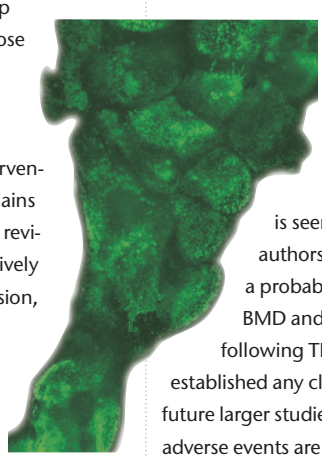
Few musculoskeletal articles manage to be published in Nature journal. This recent article from researchers in **Pennsylvania (USA)** perhaps received the editor's nod for the elegance of the concept rather than the importance of the manuscript. The research team evaluated the energy cost of a new spring-powered ankle orthosis.[4] Through use of a passive clutch and spring mechanism, the authors were able to design an orthosis aimed at passively improving the efficiency of human gait. The authors established that the use of this ankle 'exoskeleton' reduced the metabolic cost of walking by 7.2 ± 2.6%. The paper suggested that while natural selection has already shaped human locomotion, improvements in efficiency are still possible! Perhaps this is the shape of things to come in the orthoses of the future.

### Musculoskeletal medicine: a dark art to UK medical students?

Despite the ubiquitous nature of musculoskeletal diagnoses with common presentations in general practice, medicine, paediatrics and even when considering trauma, surgery, thoracics, urology and obstetrics, there has historically been a gap between the time devoted on undergraduate curricula to musculoskeletal medicine and relevance to practice as a doctor. This simple study from researchers in **London (UK)** highlights this as an ongoing problem and has demonstrated the inadequacy of MSK teaching in United Kingdom medical schools.[5] The most common specialty for United Kingdom medical graduates is that of primary care. Up to 40% of all primary care visits are related to the musculoskeletal system, so how can we expect our patients in primary care to receive a high standard of care if medical students are not taught the basics in medical school? With more and more emphasis on subspecialty training, doctors are relying ever more heavily on their medical school education to provide the fundamentals of medical education.

### Alendronic acid and bone density post arthroplasty

Total knee arthroplasty (TKA) remains one of the most reliable and successful operations with high patient satisfaction levels and excellent longevity. The almost universally better results of total hip replacement eclipse those of TKA but it is important to remember that TKR still outperforms almost every other intervention. One area that remains to be resolved is that of revision surgery. With relatively higher rates of TKR revision, and the associated decrease in periprosthetic bone mineral density (BMD), many health planners feel this to be a ticking time bomb. Bisphosphonates have a profound effect on bone turnover and mineral density. There is some evidence that bisphosponates can be used to restore BMD, but their use following TKA has not been widely accepted. Researchers in **Kuopio (Finland)** have reported a pilot randomised controlled trial evaluating the effects of bisphosphonates on periprosthetic bone following TKA. Their prospective randomised controlled trial recruited 26 patients who were randomised to either bisphosphonate therapy (alendronate and calcium, n=14) or a control group of calcium only (n=12). Therapy was continued for a year following surgery and the vast majority of patients received a cruciate-retaining prosthesis with a patellar resurfacing. The study reported out to seven years with outcomes of BMD and Knee Society Scores (KSS). Although there was an appreciable loss to follow-up in the early interval reporting of the study, the research team made considerable efforts to improve their follow-up and were able to report the results of all 26 patients at the seven-year final follow-up.[6] The reported KSS was significantly lower in the control group, but there were no subscale differences reported. Despite the small size of this study the authors report that treatment of calcium and bisphosphonates for one year post-operatively decreases the reduction of BMD seen in the femoral metaphysis following TKA. The most marked decline in BMD was seen in the first year and is probably where the most beneficial effect of the bisphosphonate is seen. Although the authors have established a probable link between BMD and bisphosphonates following TKR, they have not established any clinical benefit – future larger studies powered for adverse events are needed to assess whether or not an increase in BMD decreases incidence of loosening or risk of periprosthetic fracture.



### Apples with oranges? Knee functional scores revisited

One of the difficulties of not only performing musculoskeletal research, but in comparison of outcomes, systematic review and meta-analysis, is the plethora of different outcome measures, some validated, and some not. A prime example of this problem lies in total knee arthroplasty (TKA) where the intervention is considered successful and effective; however, there remains controversy over the best method to measure outcomes. There is a vast array of published and utilised outcome scores – two of the best accepted are the American Knee Society (AKS) clinical rating system, and the Oxford Knee Score (OKS), but rarely are these two scores used together – making comparison of study outcomes difficult. Researchers in **Kirkcaldy (UK)** set out to determine the equivalence and correlation between the AKS and OKS at intermediate five-year follow-up interval for total knee arthroplasty. The research team measured the outcomes of a total of 1022 patients using both the AKS and OKS scores at five years post-operatively from a TKA. The research team used a multivariate regression analysis to explore relationships between OKS and AKS, with a stronger correlation using the sum of the AKS knee and function scores.[7] Although these regression models are adjusted for confounding variables, BMI and age did not significantly increase the predictive value. The authors went on to create a regression model with a predictive tool for intra-class correlation with excellent reliability. Based on these results, the authors suggest that a score conversion can be undertaken using the AKS scores and the results of this study should help compare outcome data from studies and registries using the OKS or AKS score which can facilitate easier meta-analyses and systemic reviews in the future.

### REFERENCES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