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## **Association of serum biomarkers with radiographic knee osteoarthritis, knee pain and function in a young, male, trauma-exposed population – findings from the ADVANCE study**

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### **What is the ADVANCE Study?**

The ADVANCE Study investigates the physical and psycho-social outcomes of battlefield casualties in the long-term. The study includes 1,145 male participants who served in the armed forces and were deployed to the conflict in Afghanistan (2002-2014). Half of the cohort have sustained serious battlefield injuries, and the other half are the comparison group of non-injured servicemen.

### **What does this piece of ADVANCE research look at?**

Osteoarthritis is a very common, long-term joint problem that causes pain and symptoms, reduces joint use and activity, and can lead to early medical retirement. It is more common as we age but can also occur in younger people after an injury. This study wanted to see if we could use new blood tests ("biomarkers") to identify those with osteoarthritis (on X-rays), knee pain (on questionnaires), or reduced physical activity (on six-minute walk-test). In the future, these blood tests could recognise early osteoarthritis before it becomes a problem so we can intervene to slow or even stop it

### **What were the findings?**

There were several interesting findings. One biomarker ('COMP') was higher in those with a combat-injury, but lower in those with an amputation, decreasing in line with the number of amputated limbs. COMP can be considered similar to cement, which holds different parts of knee tissue together. We think this shows two things; one, we are seeing some of the healing process (including when it goes wrong), and two, that COMP is made in joints, so there will be less cement when they are missing or damaged.

We also saw there were two biomarkers ('leptin' and 'adiponectin') which were higher in those with knee pain and painful osteoarthritis. Potentially, these could be used to pick out individuals who might be at risk of worse pain or symptoms; therefore, we can focus on them. Finally, we have always thought that osteoarthritis happening after injury is different from age-related osteoarthritis and, therefore, would need different treatment. However, we actually saw no difference in blood tests in those who had osteoarthritis in the exposed and unexposed groups, suggesting a common process. This is exciting because, potentially, we can use the same treatments for everyone.



### **What do the findings mean?**

We now have a better idea of what is happening 'under the bonnet' of knees with osteoarthritis and have several new avenues to explore. We plan to use the data collected at follow-up one to understand how helpful they would be to predict changes in osteoarthritis and pain and to translate them into the clinical environment for doctors and nurses.