

## Minimally invasive implantation of bioactive materials

### Our aim

**Our aim** is to develop the materials and surgical techniques for the production of novel complex implants in vitro.

The **academic partners** in this project are Newcastle University (Dalgarno, German, Bretcanu, Fulton) in collaboration with University of Bradford (Coates), University of Nottingham (Grant, Ahmed) and University of Sheffield (Hatton). **Collaborators** are JRI Orthopaedics Ltd, Surgical Innovations Ltd, Glass Technology Services Ltd, Ceramisys Ltd and Materialise NV.

This project has two **research challenges**: (1) Development of micro-scale extrusion and droplet deposition equipment which can be operated through an arthroscope. (2) Creation of mechanically robust and biologically enhanced structures in vivo.

### Our approach

We will **characterise** the potential processing windows for material deposition within the context of having an available maximum diameter of 5mm within the arthroscope to deliver the material, and of needing to deliver the implant within clinically useful timescales. This WP will measure, model and extend the useful combinations of viscosity, surface tension and deposition rate which are achievable.

We will **develop** bioactive cements and composites which can be processed in situ to provide robust mechanical support to the musculoskeletal system, together with biopolymer membranes which may be used in kyphoplasty-type approaches.

We will **integrate** the instrumentation, processing and property knowledge to create a functionally gradient osteochondral plug in a simulated in-vivo environment.

### What we want to achieve

1. Definition of achievable combinations of viscosity, surface tension and deposition rate;
2. Characterisation of the mechanical and biological properties which can be achieved;
3. Demonstrated surgical technique for the production of novel complex implants in vivo.



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## Join our community

The MeDe Innovation Network exists to provide support to the medical device sector, including academic, industry and clinical members. As a member of the Network, you will benefit from:

- > access to information about manufacturing research, from our Centre's research outputs, international partnerships, and clinical centres in medical device innovation throughout the UK
- > access to Technology Roadmapping techniques to help shape and inform future research needs
- > updates on sector news and events, through e-newsletters, network events and an annual conference
- > access to commercial opportunities arising from our work with the Medical Technologies Innovation and Knowledge Centre
- > being part of an influential contributor to the UK medical device landscape
- > marketing opportunities to highlight your organisation's news and events on the MeDe Innovation website

Dissemination of research and moving it along to adoption and commercialisation is central to our mission and we value input from those working across the medical device sector in the UK. The network aims to not only inform, but also to connect, enabling businesses, policy makers, academics and clinicians to share information, knowledge and ideas and debate the challenges and issues facing the community.

Membership is free and it's easy to join – contact us now.

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## Contact us

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