There are recent advances preventing care in orthopaedic disease. Biomechanics research has significantly increased the lifespan of replacements. Research is needed to stop or slow cartilage loss, prevent joint infection, and develop new implant materials.

**Recent advances in imaging technology** – including CT scans, MRI’s and PET scans – have revolutionized the diagnosis and treatment of orthopaedic disease by providing high resolution 3D imaging of tissues.

Current imaging research is directed at providing physicians with better tools to diagnose and quantify disease, which will lead to earlier and more accurate diagnosis and, ultimately, more successful treatment.

**Tissue resident stem cells** have been discovered in many skeletal tissues, including the bone marrow, outer surface of the bone, the joint lining, muscle, fat, and possibly cartilage tissues.

NIH funding has enabled the discovery of these cells along with a study of their normal tissue repair and potential regenerative applications.

Cross-disciplinary research lead by ORS teams continues to pioneer new therapeutic applications for stem cells that will revolutionize orthopaedic care.

**Osteoporosis is the brittle bone disease, predominantly affecting women.**

1 in 3 women and 1 in 4 men will suffer an osteoporotic fracture of one kind or another.

Orthopaedic research has led to validated and validated stem cell therapies for osteoporosis.

Continued research aims to understand the underlying biology of this disease and develop new treatment options.

**~80% of Americans will suffer from back pain during their lifetime, with 31 million at any point in time.**

Advancements in instrumentation and bioactive substrates have enabled the fusion between injured vertebrae and bioactive substrates to enable improved repair and healing of degenerative spine disease.

Ongoing orthopaedic research continues to transform the approach to both spine fusion and degenerative spine disease.

Stem cell therapies, along with the engineering strategies being investigated, hold promise for future ways to eliminate back pain.

**Nicholls is the leading cause for joint replacements.**

Biomaterials and biomechanics research has significantly increased the lifespan of replacements. Research is needed to stop or slow cartilage loss, prevent joint infection, and develop new implant materials.