

# Monte Carlo Simulation of the Dose from Radiosynoviorthesis Using Sn-117m, Er-169, and Re-186 Including Stochastic Macrophage Motion

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Session Title: Monte Carlo Simulation and High-Performance Computing

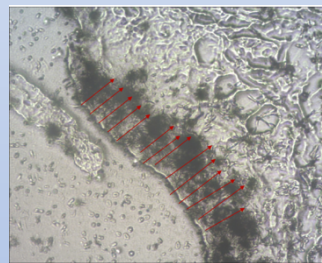
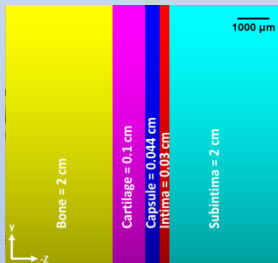
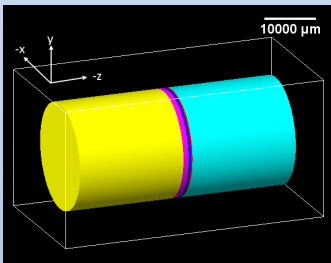
**Radiosynoviorthesis** is the treatment of arthritic joints using radionuclides. Currently, Er-169 and Re-186 are used for small- and medium-sized human joints, respectively. These simulations suggest that Sn-117m could replace both Er-169 and Re-186 in these joints.

## Methods at a glance

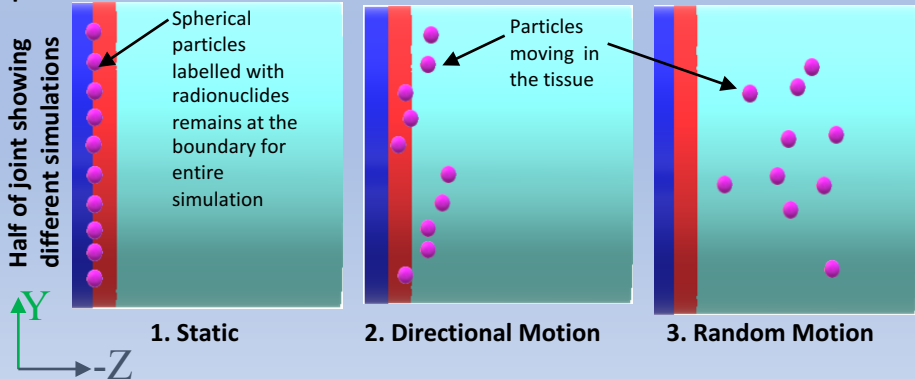
1. The geometry of the model of an arthritic joint

Thicknesses and composition of the layers of the model

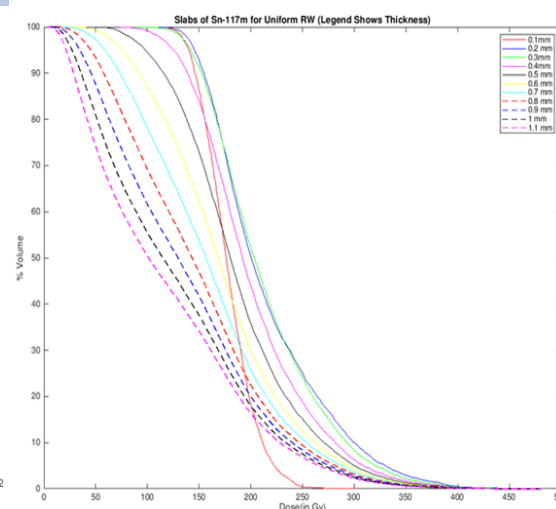
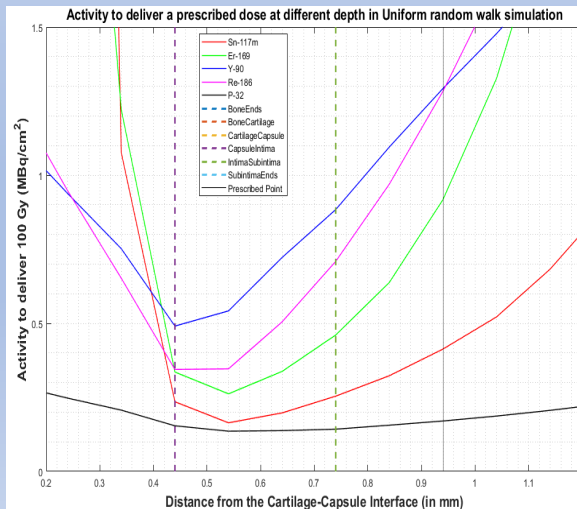
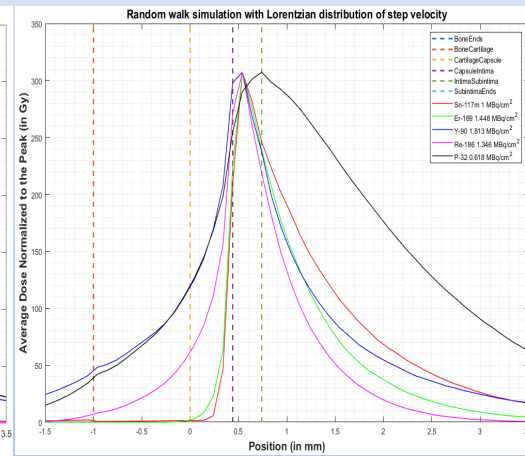
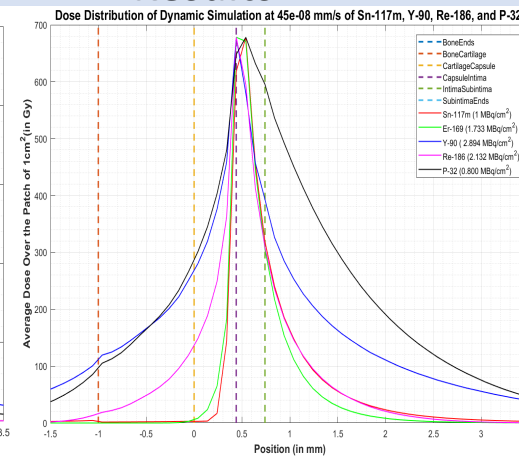
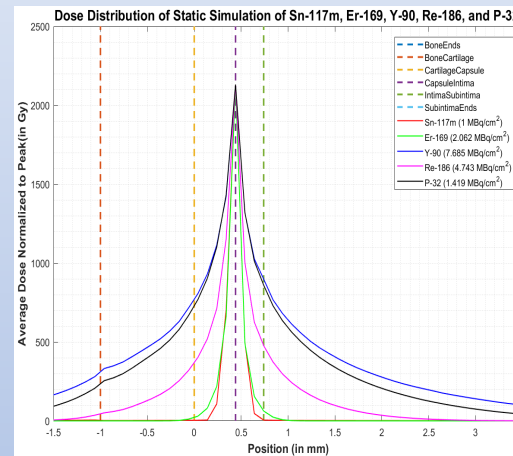
2. Estimation of the velocity of Sn-117m-labeled particles from the autoradiographs



3. Performance of Monte Carlo simulation of Sn-117m, Er-169, Re-186, Y-90 and P-32 separately for different cases: Static, Directional motion and Random motion of particles.



## Results



**Major Conclusion:**  
The data suggest that Sn-117m can replace Er-169 and Re-186 in small- and medium-sized joints, respectively. Further, the dose volume histogram supports the hypothesis that the longer half-life of Sn-117m results in a more homogenous dose distribution.