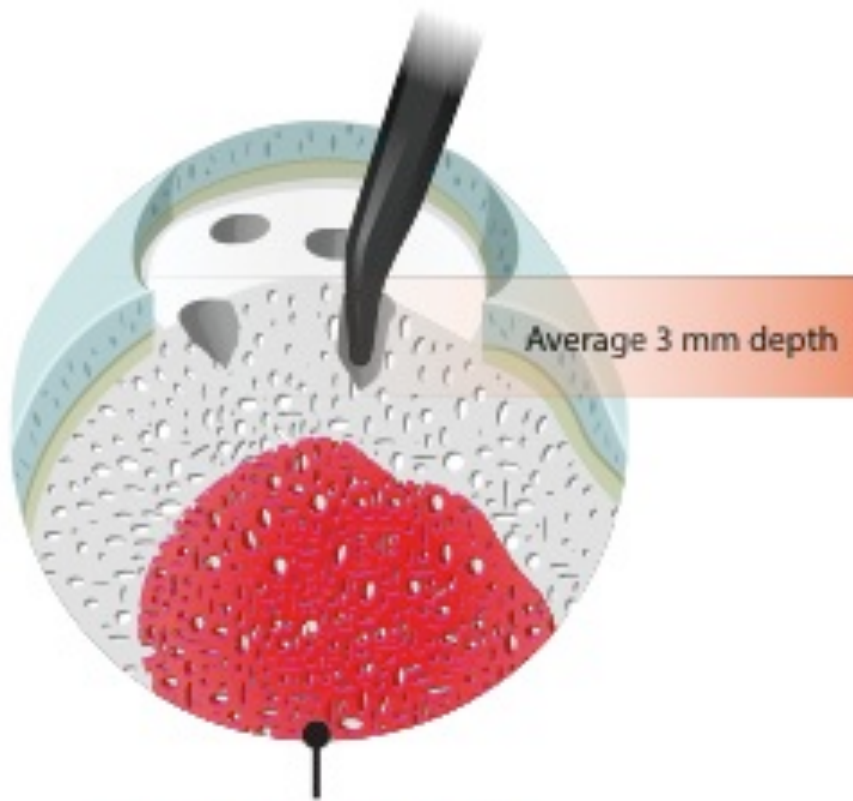




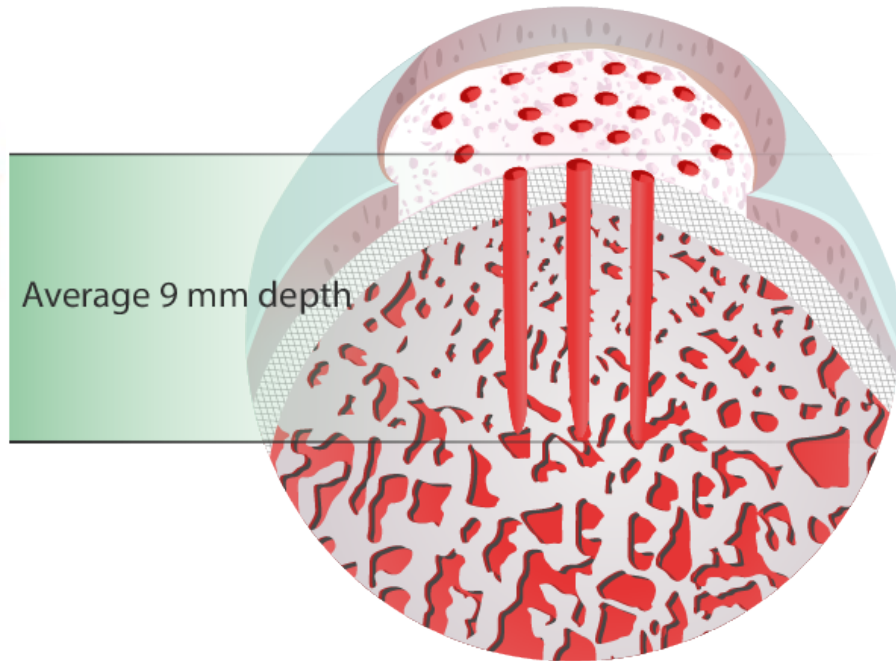
# NanoFx<sup>®</sup>

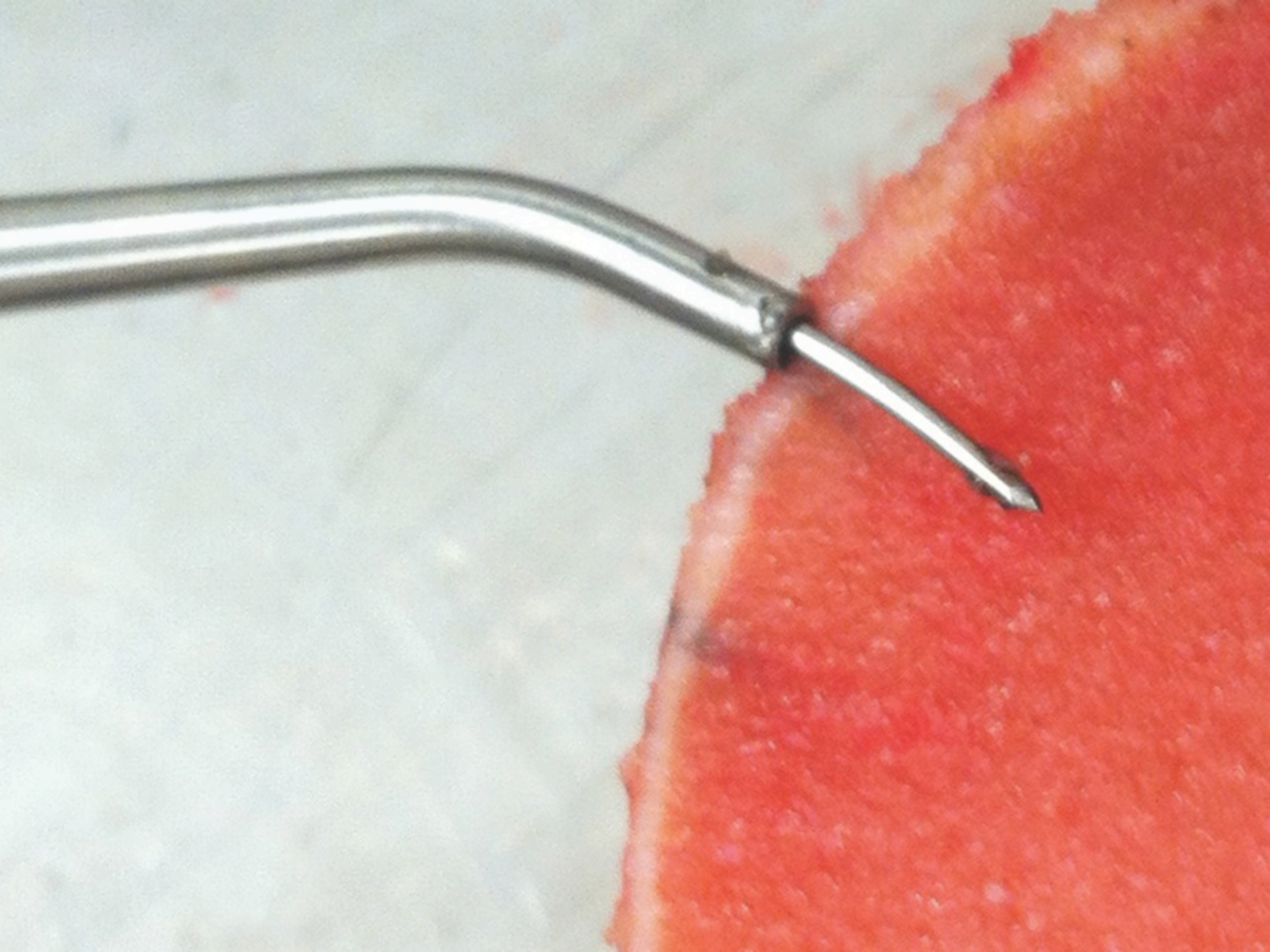
To get the healing response you want, you have to reach deeper. Bone marrow stimulation-based cartilage repairs rely on cells that reside deep in the bone. With **NanoFx** you can reach them.

# Microfracture

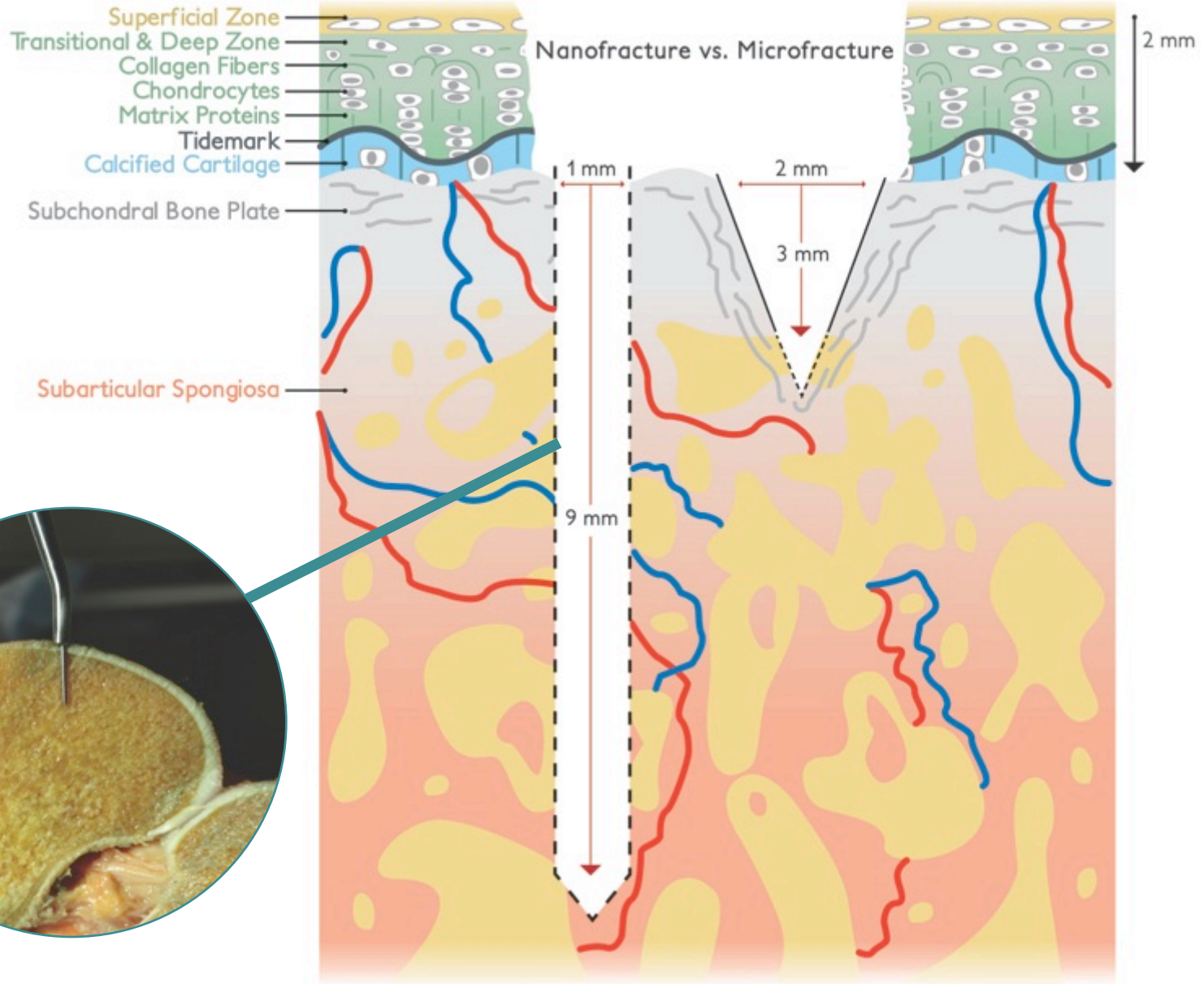


Pleuri-potential cells





# SMALLER. DEEPER. BETTER.





## The Effect of Different Bone Marrow Stimulation Techniques on Human Talar Subchondral Bone: A Micro-Computed Tomography Evaluation

Arianna L. Gianakos, D.O., Youichi Yasui, M.D., Ethan J. Fraser, M.D., Keir A. Ross, B.S.,  
Marcelo P. Prado, M.D., Lisa A. Fortier, D.V.M., and  
John G. Kennedy, M.D., F.R.C.S. (Orth.)

“Our data support that using an s.MFX awl (NanoFx) results in diminished areas of destruction, sclerosis, and thickening in regions adjacent to the defect, thereby limiting the amount of perimeter compaction.”



## Necrosis during Bone-Marrow Stimulation for Cartilage Repair

Hongmei Chen,<sup>1</sup> Jun Sun,<sup>2</sup> Caroline D. Hoemann,<sup>1</sup> Viorica Lascau-Coman,<sup>1</sup> Wei Ouyang,<sup>1</sup> Marc D. McKee,<sup>3</sup>  
Matthew S. Shive,<sup>2</sup> Michael D. Buschmann<sup>1</sup>

“On average, heavy bleeding was found from microdrilling 6mm holes, and no immediately visible bleeding in three out of four microfracture 2mm holes.”

“Acute subchondral hematoma was confined to the void volumes created by the holes from both microdrilling 2mm and microfracture 2mm defects, but occupied a greater volume for the microdrilling 6mm holes which broke through the epiphysial scar (growth plate) and reached the deep marrow cavity.”

“We also found that deeper holes, as expected, produced greater subchondral hematoma with increased access to marrow stroma.”



## Marrow Stimulation Cartilage Repair

Hongmei Chen,<sup>1</sup> Caroline D. Hoemann,<sup>1</sup> Jun Sun,<sup>2</sup> Anik Chevrier,<sup>1</sup> Marc D. McKee,<sup>3</sup> Matthew S. Shive,<sup>2</sup> Mark Hurtig,<sup>4</sup>  
Michael D. Buschmann<sup>1</sup>

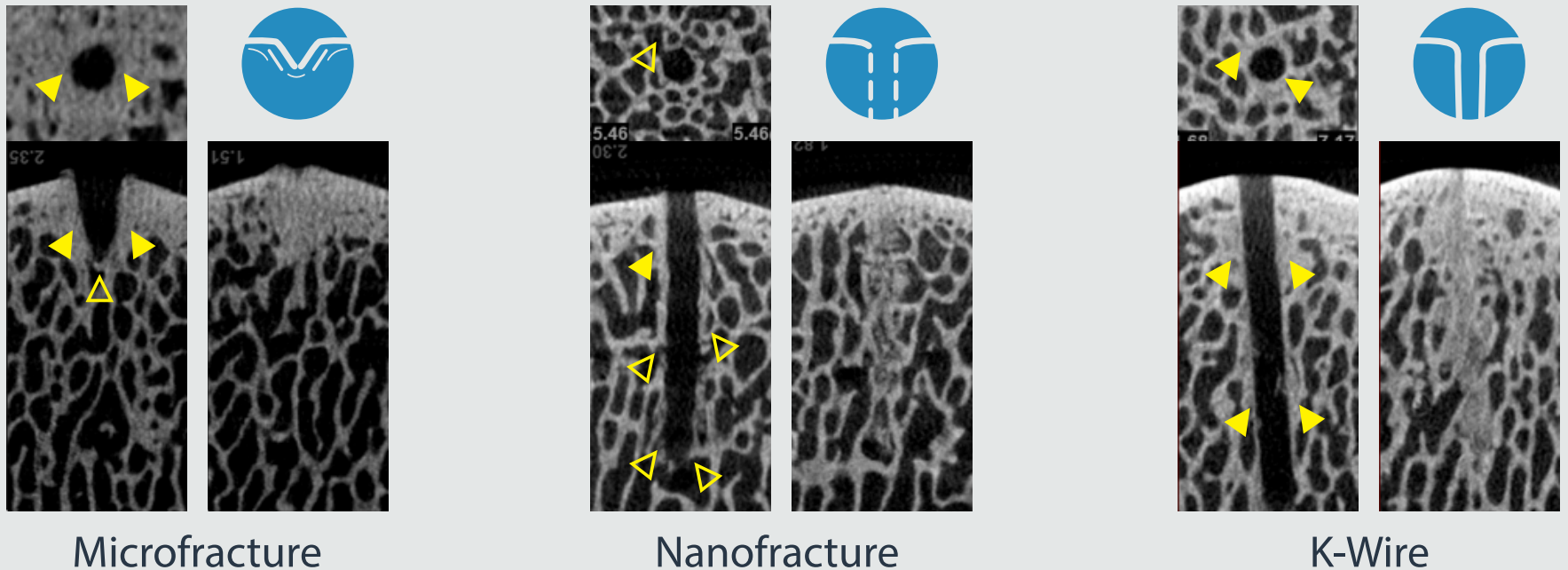
“In acute defects, holes drilled deeper to 6mm versus 2mm provided greater access to marrow compartments.”

“6mm holes have three times the surface area in contact with marrow compared to the 2mm deep holes.”

“Deep DRL created more access channels to the marrow and may potentially recruit a greater number of cells and a variety of cell types from the deep marrow stroma, resulting in improved cartilage repair.”

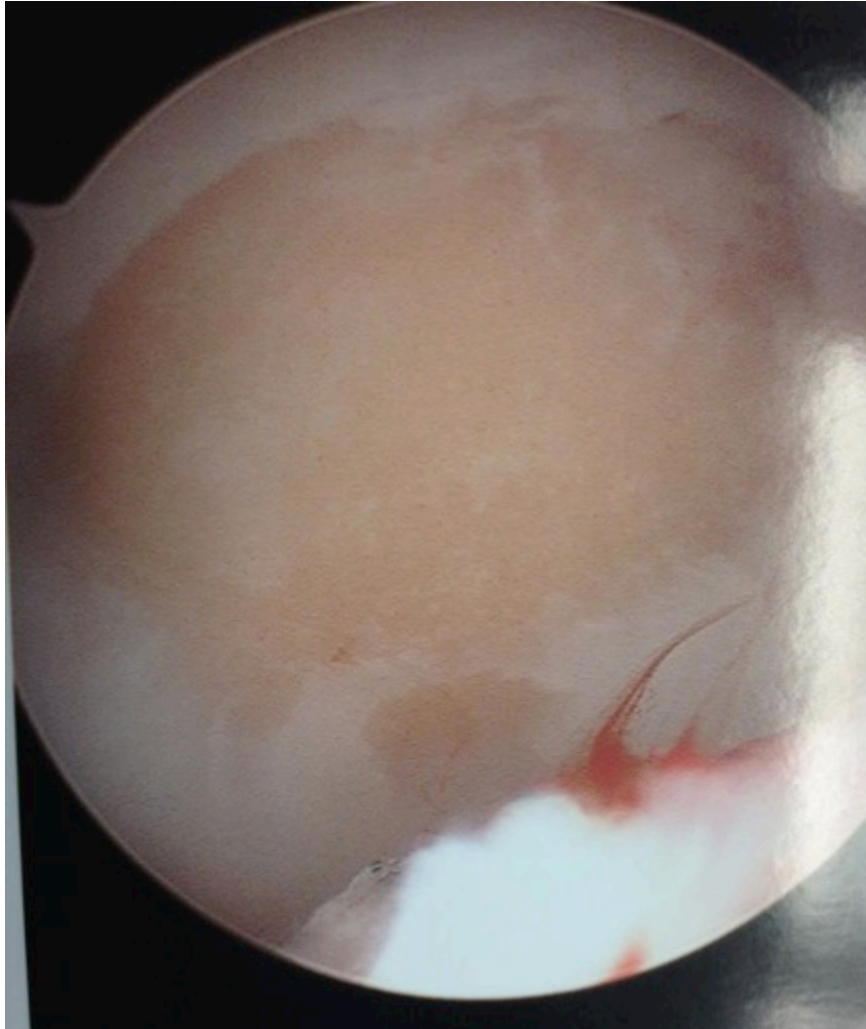
When tested against Microfracture and K-Wire, **NanoFx** resulted in thin, vented cancellous bone channels with open trabecular channels and no rotational heat generation. It also demonstrated consistent deep cancellous bone perforations with minimal effects on the subchondral bone plate.

★ **Figure 4 A,B,C:** △ open trabecular channels;  
▲ closed trabecular channels, microCT comparison:  
Axial (top), Sagittal (bottom).





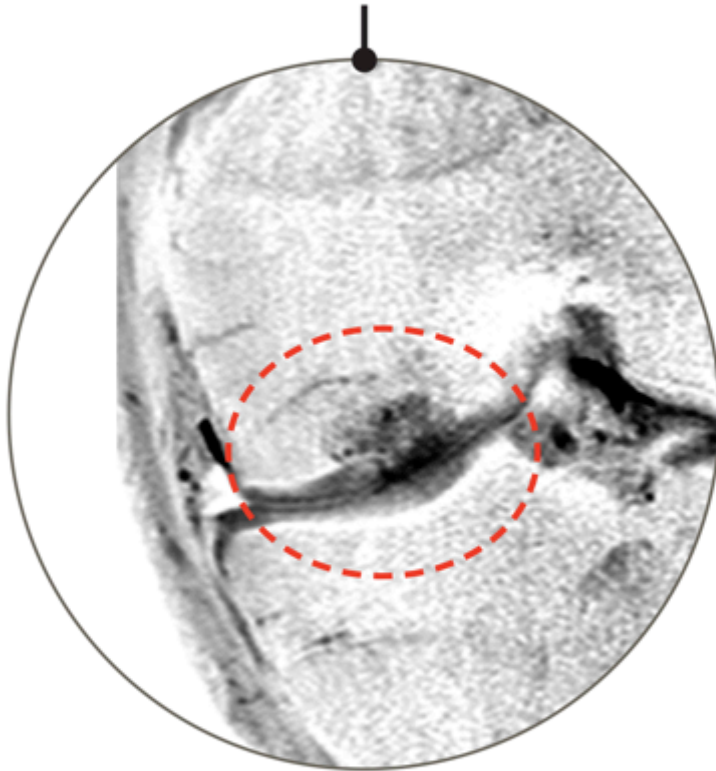
Before



After

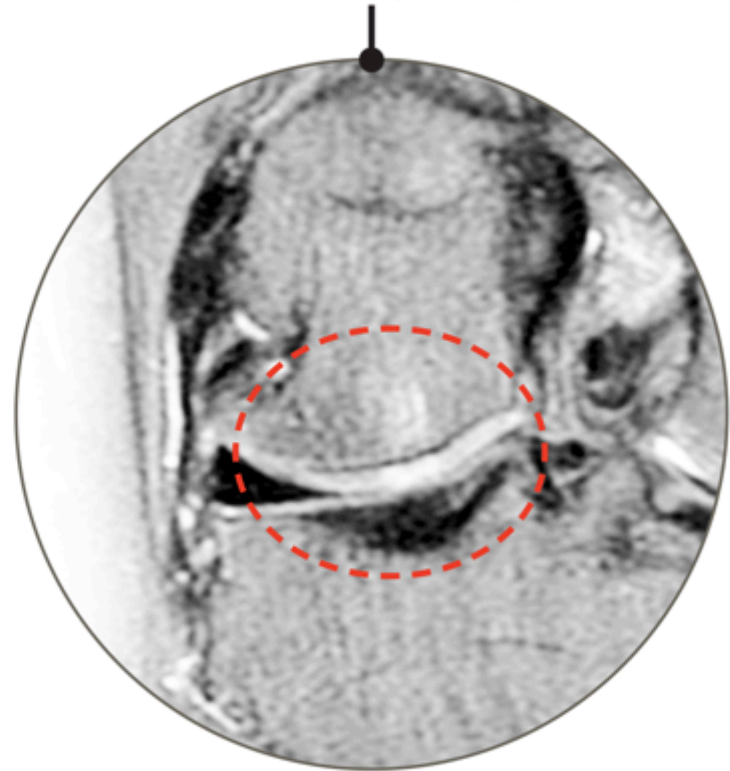


Microfracture  
3 months post-op



*Uneven fill with significant  
bone surface disruption*

nano fx  
3 months post-op



*Smooth, continuous fill without  
bone surface disruption*

