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Supplementary Material for Interpretable Counterfactual Simulation of Knee Osteoarthritis Progression from qMRI Biomarkers

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S1. The interactive interface

The paper's perturbation simulator is exposed through a browser-based research interface. A user selects a biomarker component or the BMI lever, sets a perturbation magnitude in standard deviations, and the twin re-rolls to show the model-implied change in cumulative risk alongside the affected region on the bone surface. The interface is an inspection and communication tool for the trained simulator; it is not a source of the results reported in the paper, and its outputs are model-based perturbation responses rather than estimates of intervention effects in patients. Figure S1 shows a representative inspection of femur cartilage T2 (PC 7) at three doses.

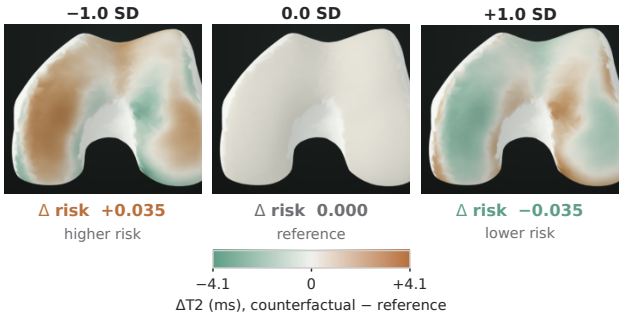


Fig. S1. Interface view of a femur cartilage T2 (PC 7) perturbation at −1.0, 0.0, and +1.0 SD, with the twin re-rolled at each dose. The surface map shows the per-step difference between the perturbed and reference trajectories, and the change in final cumulative risk is reported above each panel. The figure is an illustrative output from one fitted model, not a cohort-level estimate.

S2. Video and project page

A screen-capture video demonstrating the interface, together with project updates, is available at https://gabbiehoyer.github.io/kneetwin/.
This supplement contains no results beyond those reported in the paper.