

Supplementary materials

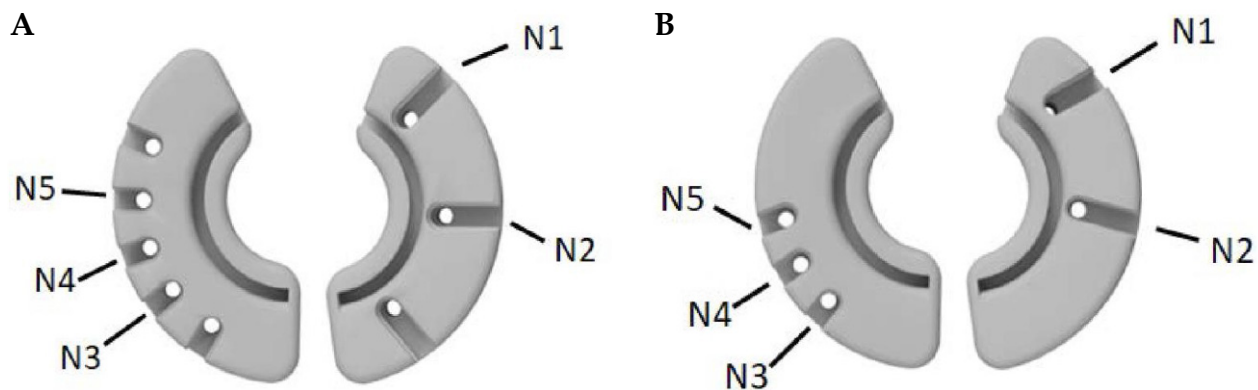


Fig. S1. Configuration of five IS needle trajectories selected for end-to-end validation of the design workflow. The left cap's trajectories (N1, N2) were initially produced with 3D Brachy, and the right cap's trajectories (N3, N4, N5) were designed *de novo* using Fusion 360™. Ground truth caps and their replica are shown on the left and right, respectively. **A)** Ground truth caps; **B)** Replicated caps

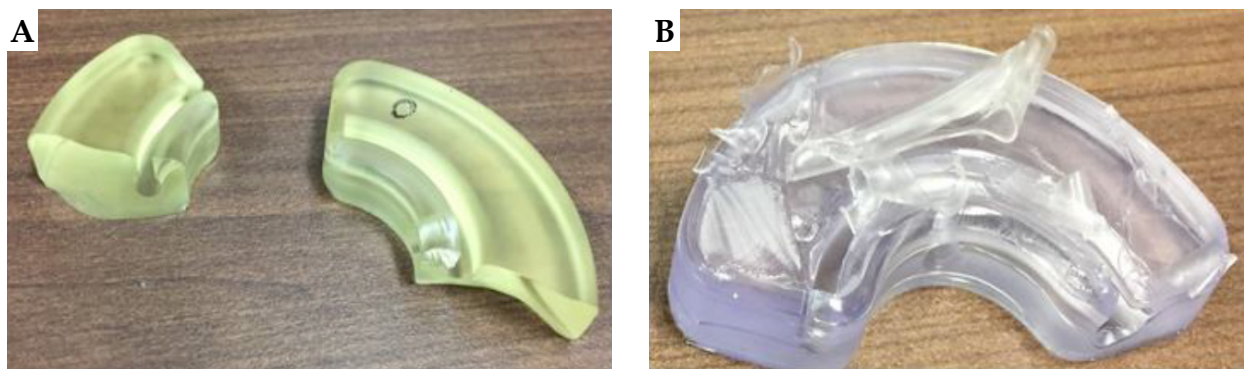


Fig. S2. Adaptiv caps printed at 0° showing chipping of the material (BioMed Amber) after removal from the built platform or delamination of the bottom layer (Biomed Clear) following sterilization. **A)** BioMed Amber; **B)** BioMed Clear

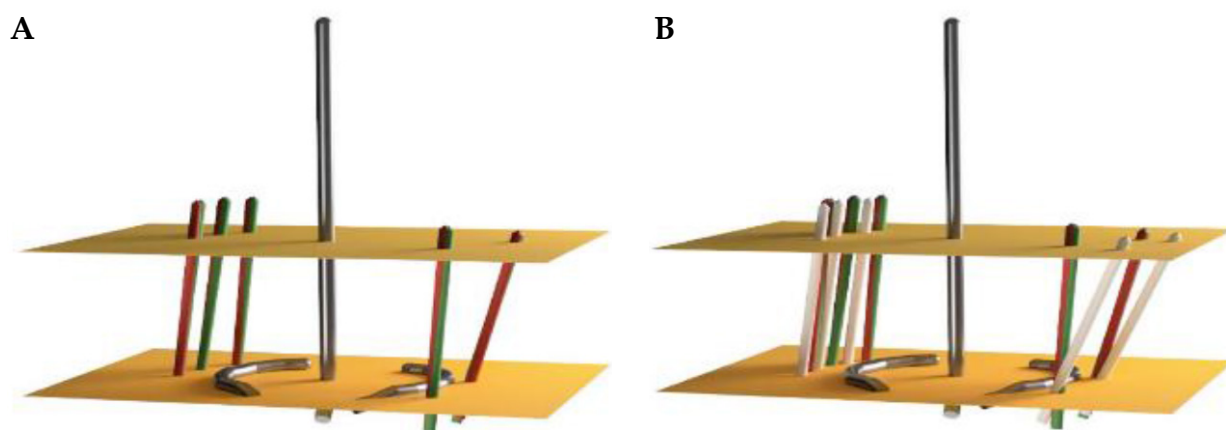


Fig. S3. Geometry for the end-to-end analysis of IS needle trajectory accuracy. IS needle trajectories of replicated caps, TPS pre-plan, and ground truth caps are shown in red, green, and white, respectively. **A)** 3D Brachy validation; **B)** E2E validation

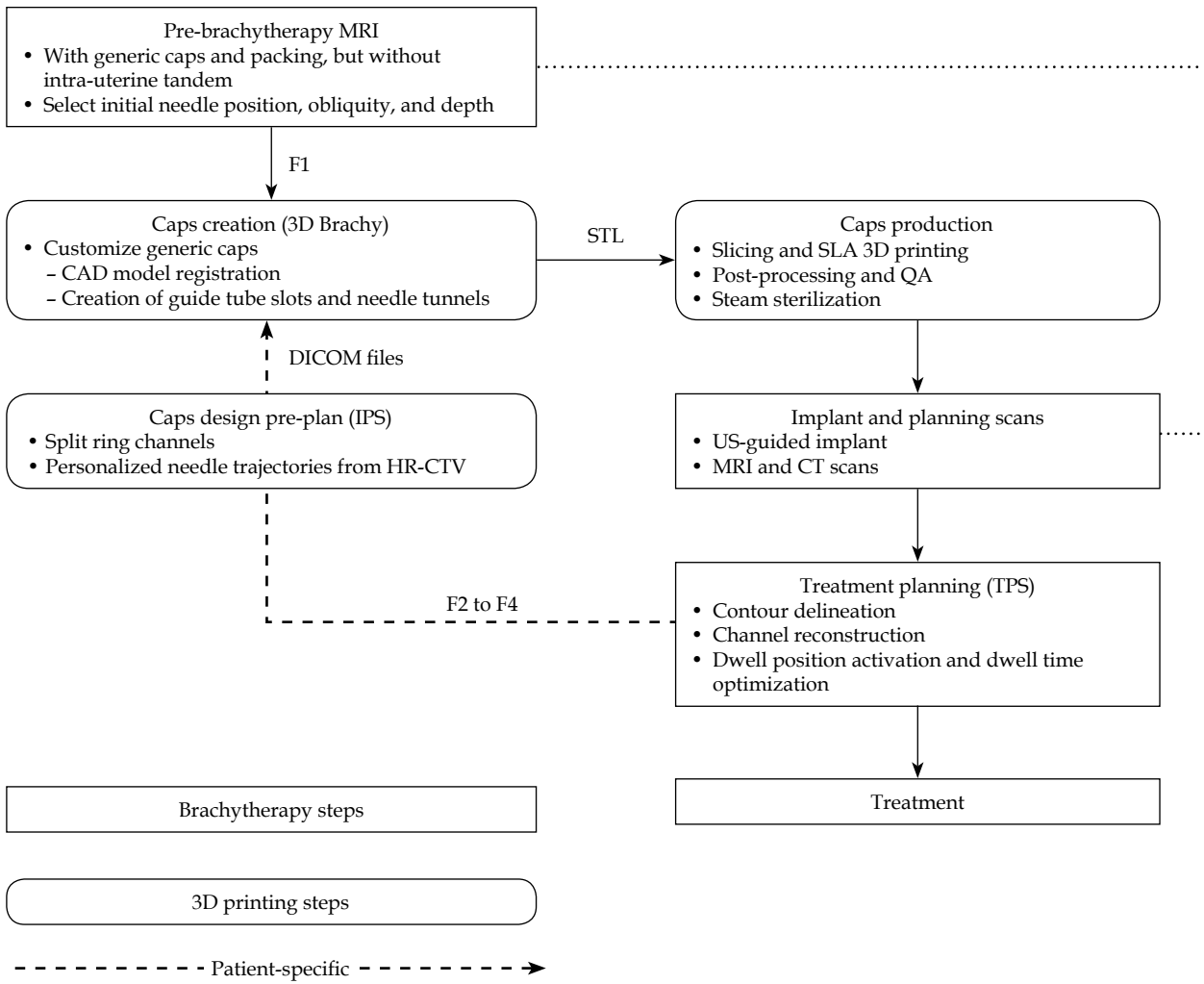


Fig. S4. Proposed clinical workflow for the Montreal split ring applicator that integrates in-house 3D printing to a conventional brachytherapy planning workflow