# Applicator reconstruction

Determining the source path and the most distal dwell position are the catheter reconstruction objectives. The CT dummies design that allows reconstruction of brachytherapy source channels is easy, and all vendors include them in their product catalogs. By contrast, applicator reconstruction is more challenging when MRI is used and even more so in T2- weighted sequences. The materials visible in MRI are usually liquids, and this limits the construction diameter of the dummy. Some solutions are available for the intracavitary part14 and more recently for needles too2. The determination of the most distal dwell position involves an extra challenge due to the finite slice thickness. A possible solution is to add reconstructed images between two slice thicknesses, which reduces the uncertainty in the searched position.

An alternative to this modality of reconstruction is the use of applicator libraries. The applicator libraries contain accurate 3d models of the applicators. Once the implanted model has been selected, we find a transformation that matches it on the image. Once the applicator is in place, both the source path and the most distal dwell position are well determined. The method is only valid for rigid applicators and, therefore, excludes the interstitial part.

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## Reconstruction

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