Radiation Therapy for Early-Stage Dupuytren's Disease

Patient-Specific Bolus for Accurate Superficial Dose Delivery

Clinical Background

Dupuytren's disease is a progressive fibroproliferative disorder of the palmar fascia, marked by nodule and cord formation that can lead to fixed flexion contracture. Radiation therapy is effective in early-stage disease, before significant contracture develops, with stabilization or improvement seen in approximately 80–90% of treated patients.[1]

The Dosimetry Challenge

The curved, irregular palmar surface makes consistent bolus contact difficult with conventional sheet bolus. Air gaps can compromise surface dose accuracy, and target depth may vary considerably across the field. In a fractionated course, these variables can compound, making patient-specific bolus a compelling option to improve reproducibility, dosimetric confidence, and patient comfort.

Patient Selection

RT may be used for early, progressive Dupuytren's disease before significant contracture develops, typically in patients with nodules or cords and ≤10° contracture. It may also be considered for selected patients who decline invasive procedures.

Truefit - Clear Bolus

TrueFit - Clear is a fully translucent, patient-specific 3D-printed bolus, digitally designed from DICOM data in Adaptiiv 3D Bolus software and manufactured through Adaptiiv On Demand. Its precise digital geometry eliminates air gaps and setup variability associated with manual bolus techniques, while its translucency allows direct visualization of anatomy, setup marks, and immobilization alignment throughout treatment, a particular advantage in anatomically complex regions like the hand.

[1]Yunes MJ. Radiation Therapy for Dupuytren Contracture. Practical Radiation Oncology. 2025;15:248–252.

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Clear Bolus in Action

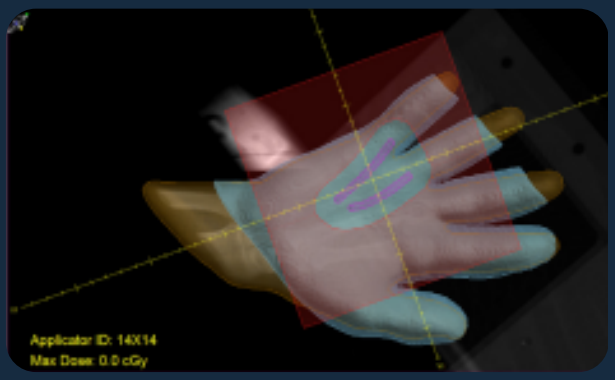
Case Study: RT for Dupuytren's Disease at UMass Chan Medical School – Baystate

The Challenge

Treating the hand with radiation requires precise surface dose delivery across an irregular, curved anatomy. Conventional sheet bolus fails to conform consistently, introducing air gaps and setup variability that compound over a fractionated course. For a disease where early intervention is the goal, dosimetric accuracy matters from fraction one.

The Workflow

At UMass Chan Medical School – Baystate, Adaptiiv software and clear 3D printed bolus is used routinely for Dupuytren's RT. Nodules and cords are palpated and marked on the skin at simulation. A custom bolus is then designed from the patient's DICOM data in Adaptiiv 3D Bolus software, precisely conforming to the palmar surface with modulated thickness accounting for variable target depth. At each fraction, the bolus fits the same way every time - and setup marks remain visible through the transparent material, streamlining daily alignment without repositioning delays.



The Results

- Air gaps eliminated across the full treatment field
- Surface dose accuracy within 1–2% (OSLD confirmed)
- Reproducible setup maintained across all fractions
- Setup marks visible through bolus at every session

Why It Matters

In benign RT, patients are healthy and functional - the bar for treatment precision and patient experience is high. Clear bolus removes the manual variability of conventional bolus techniques, giving clinicians confidence in setup accuracy from simulation through the final fraction.

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To learn more, visit our Adaptiiv Learning Center or click here to watch the RT for Dupuytren's Webinar