

Microneedle Patch Applicator



Client

Confidential

Practice Areas

Combination Products
TechBio & Life Sciences

Core Disciplines

Mechanical Engineering
Systems Engineering
Transfer to Manufacture
Industrial Design
Quality System Management

Challenge

The client's novel microneedle patch required significantly greater application pressure uniformity than traditional adhesive patches – in a reusable device designed for patient self-administration at home. The applicator needed to perform consistently across a wide range of skin types, including variations in thickness, age, moisture content, and anatomical placement, while meeting durability expectations for repeated use and strict low-cost manufacturing targets.

Solution

Triple Ring applied interdisciplinary expertise across materials science, mechanical engineering, and life sciences to design a precision applicator capable of delivering controlled, uniform mechanical force during patch placement. Materials selection strategies supported durability and repeat use, while design optimization ensured reliable adhesion and consistent drug delivery performance across diverse user conditions. User-focused design features supported intuitive, safe home-based application throughout.

Client Impact

- Delivered a reusable combination product integrating applicator and microneedle array patch for intracutaneous drug delivery
- Enabled rapid drug absorption with consistent dosing performance across diverse patient populations
- Supported successful advancement into clinical trials and demonstration of technology effectiveness to healthcare stakeholders
- Underlying technology acquired by a global vaccine manufacturer, validating the platform's commercial and clinical potential

Find more case studies on our website:

