



CASE STUDY

PPI™



reddot design award
winner 2009

AN ERGONMIC & INTUITIVE INJECTOR WITH AWARD WINNING INDUSTRIAL AND MECHANICAL DESIGN

The Precision Pen Injector (PPI™) is an injector originally designed to deliver small yet highly precise doses of Restylane® Skinbooster™, a treatment produced by Swedish biomedical firm Q-Med AB (now Galderma) for revitalizing the skin. This innovative device received praises from doctors and clinicians alike for its ease-of-use and compact design at the 2009 IMCAS (International Master Course on Aging Skin), where the product was first officially launched. Furthermore, the PPI™ was recognized with the prestigious red dot design award for product design.

The idea behind developing the PPI™ arose from the need to introduce a breakthrough device that the filler market did not have at the time, one that could also address some of the challenges traditional syringes had. By working closely with doctors and nurses and integrating their feedback into the design of the device, several prototypes of the PPI™ were produced, studied, tested and verified to ensure that the final product addressed key user needs. The result was an ergonomic, compact and intuitive device that is still one-of-a-kind today.



GALDERMA
Q-MED

Region
Europe

Industry
Dermatology Solutions

Solution
Ergonomic Industrial Design
&
Rotaject™ Pressure
Release Technology

Website
www.q-med.com

“ SHL has been an exceptionally committed and reliable partner in the PPI™ project, from the very first prototyping all the way through to changes in the specifications, final design and at last, when the injectors went on the market.

- Jonas Törnsten
Manager,
Packaging &
Device Development Dept,
Galderma A&C

THE CUSTOMER

Q-Med AB, which was acquired by Galderma in 2011, develops, manufactures and markets solutions for aesthetic and corrective treatments and offers a complete worldwide portfolio in the aesthetic field including the brands Restylane, Emervel and Macrolane.

THE CHALLENGE

When Q-Med first introduced the Restylane® Skinbooster™ product administered with a 1mL traditional syringe in 2004, the company already had its sight set on becoming a pioneer in the filler industry by working on another breakthrough injector simultaneously. This injector would eliminate drooling and overdosing while enabling physicians to inject the highly viscous formulation easily and accurately. The final device would also have to be lighter in weight, aesthetically attractive and ultimately innovative enough to extend the product's life cycle.

However, with the viscosity of the hyaluronic acid formulation in the several hundred cPs and the need to inject highly precise yet small dosages repeatedly, Q-med needed to find a device partner that was experienced not only in mechanical and industrial design, but possessed key in-house manufacturing capabilities to address the product's manufacturability during design stages.

THE SOLUTION

After some evaluation, Q-Med decided to choose SHL as the device partner for this project since SHL was one of the market leaders in designing and manufacturing advanced drug delivery devices, or more specifically, injection systems such as auto injectors and pen injectors. Aside from well-established mechanical and industrial design teams, SHL also housed all key manufacturing capabilities internally, making it the one-stop-shop Q-Med was looking for.

To address the issue of high viscosity and to prevent drooling, SHL design engineers implemented the Rotaject™ Pressure Release technology, a special patented spring technology developed by SHL that allowed a device to deliver small yet consistent dosages of highly viscous formulations. In the application of PPI™, Rotaject™ enabled the device to repeatedly inject a 10µL dose for up to 200 times from a 2.25mL pre-filled glass syringe with the ideal injection speed. Normally, the more advanced the mechanical mechanism, the more it will weigh. However, maintaining a balance between the device's exterior shape and weight versus its mechanical properties was one of the vital requirements as the final product needed to be

compact and light for ease-of-use.

SHL mechanical and industrial designers eventually came up with a unique shape that offered a balance between a sleek non-medical exterior with a robust grip while balancing the weight of the advanced driving mechanism. To enhance the usability of the final product, various focus groups, studies and interviews were conducted with doctors and nurses to ensure end-user feedback were reflected in key design decisions. For example, four different activation button types (scroll, slide, tilt and push) were produced and test results showed preference of the push button, which was incorporated into the final design.

Other unique considerations include the design of a huge aperture around the syringe body to allow for a sufficient grip area and optimal visibility for volume control, and a long and narrow dose activator that provides several grip variations to meet the variable injection positions. The shape of the load knob invites the user to wind and load the device with little effort. Careful selection of device material also successfully presented the final device with a non-medical high-end product look with feminine characteristics, while ensuring optimal sound feedback.

Keeping in mind the requirements for manufacturability, the PPI™ was designed to be easily assembled, yet cannot be disassembled



PRECISELY DELIVERS SMALL DOSES OF HIGH VISCOSITY FORMULATIONS



“ The design & development of the PPI™ is a prime example of successful collaboration between customer and supplier. Very satisfying.

- Jochen Ratjen
Chief Industrial Designer,
SHL Group

afterwards. With core manufacturing abilities all in-house and close involvement throughout each development stage, SHL had all the required knowledge to customize the most optimized testing and assembly equipment for Q-Med for the highest quality production.

THE RESULTS

Preloaded with Q-MED's Restylane® Skinbooster™, the PPI™ Pen Injector quickly became a widely praised product for physicians and doctors in the industry. The aesthetically pleasing pen-image of the PPI™ lessened the fear of syringes for many patients and as a result helped attract new patients for many clinics. Usability related responses also indicated that the device was easy to learn and use and allowed the administrator optimum placement of every volume increment. Even more importantly, the unique grip and activation led to less hand fatigue after each treatment session.

Overall, this ergonomic, compact and intuitive device successfully replaced traditional syringes where desired accuracy may be difficult to achieve and can be seen today in various clinics world-wide.

KEY PRODUCT FEATURES:

- › Audible, visual and tactile feedback
- › One-handed operation
- › Accommodates high viscosity (>100cP)
- › Delivers small dosages
- › Ergonomic & Innovative
- › High Precision - No Risk of Overdosing
- › Even Distribution of Volume
- › Non-Medical Aesthetics
- › Patented SHL Rotaject™ Pressure Release technology
- › High Performance Delrin® materials