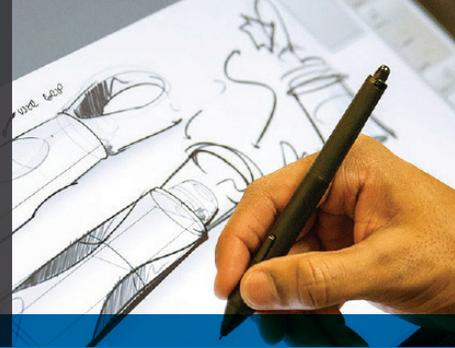


CONTROLLABLE FORCE AUTOINJECTOR



FASTER AND MORE COMFORTABLE DRUG DELIVERY

New drug formulations demand new answers in drug delivery. Battelle has designed a controllable-force autoinjector (CFAI) technology that eliminates key drawbacks of conventional autoinjector models and provides faster, better delivery of viscous drugs.

Benefits

The CFAI's unique soft needle insertion mechanism allows us to:

- Reduce insertion impact force.
- Decrease delivery times or double the viscosity of fluids delivered.
- Improve reliability and consistency near the end of the stroke, where most conventional springs are weak.

HOW IT WORKS

The CFAI uses a single-drive spring that combines compression and torsion to tailor the output force. The needle is inserted gently, and the spring mechanism delivers constant force during drug delivery. Energy used during insertion is stored for use during fluid delivery, which maximizes the spring's energy and minimizes the storage space required.

A convoluted track molded into the housing allows the spring to unwind in a manner that provides a programmed force profile over the stroke of the plunger. The shape of this track can be modified easily to change the force profile characteristics and to optimize the utilization of the combined compression/torsion spring.

A sleeve-style autoinjector was designed around the CFAI delivery mechanism.

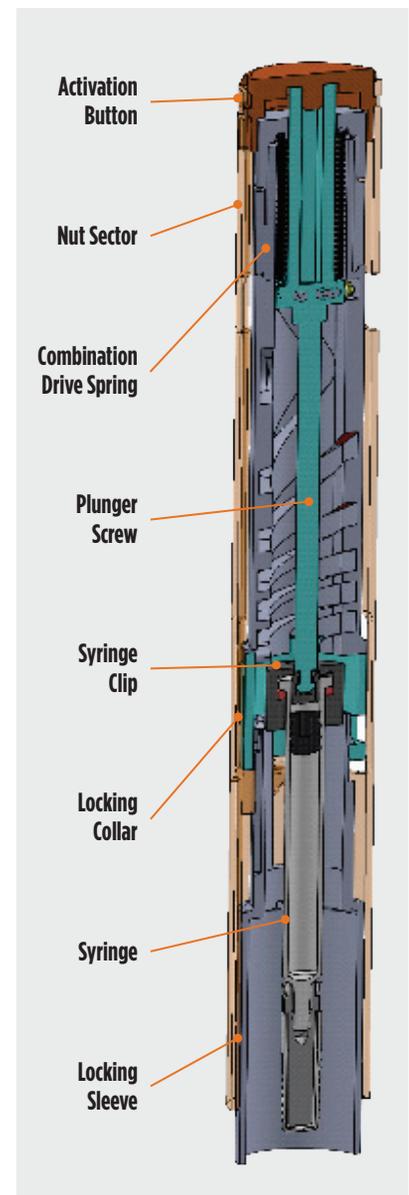
The autoinjector remains in a locked state until the sleeve is displaced. This actuates the delivery mechanism, inserting the needle and delivering the medication.

After the fluid has been delivered, as the patient removes the device from their skin, the sleeve extends and enters into a locked state. The sleeve shrouds the needle and prevents potential needle sticks.

EASIER, MORE COMFORTABLE DRUG DELIVERY FOR PATIENTS

The Battelle CFAI delivers substantial benefits for patients and manufacturers. As the use of biologics and other highly viscous drugs increases, the CFAI will make delivery faster and more comfortable for patients. Potential benefits include:

- Fast delivery of highly viscous drugs.
- Reduced delivery time for lower-viscosity drugs.
- Soft, controlled insertion for a more comfortable injection experience.
- Reduced risk of breaking the syringe during use.
- A quieter and more discrete delivery mechanism.
- Smaller device package size.



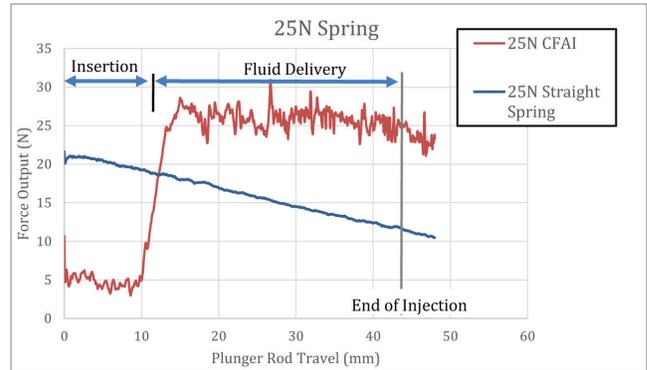
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RESULTS

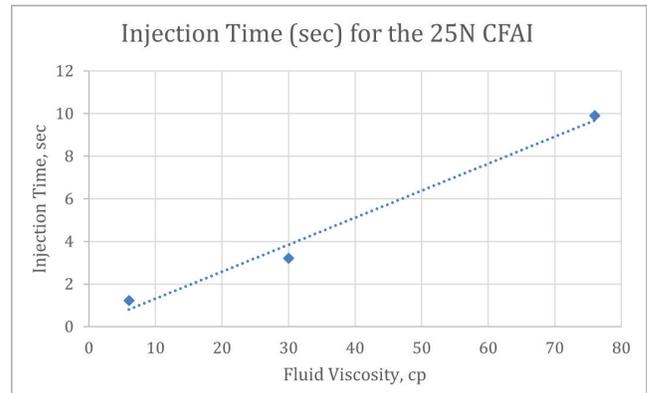
The Battelle CFAI has undergone testing to demonstrate the efficacy of the delivery mechanism. Tests of the feasibility prototype demonstrate that the CFAI delivers faster and more consistent fluid delivery when compared to traditional spring mechanisms.

Battelle has applied for a patent on the technology: patent application #WO2017007850 (A1), "Process and Autoinjector Device for Injections with Increased Patient Comfort."

25N CONTROLLABLE FORCE AUTOINJECTOR TEST RESULTS



CFAI provides soft needle insertion and constant drug delivery force, a significant improvement over existing springs.



CFAI delivers viscous drugs rapidly: 1 mL of 30 cP fluid in less than 4 seconds.

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