

Fig. E-1

Photographs showing a mechanical patient-safety syringe (Avanca RPD) fitted with a safety needle with a rotating sheath (Eclipse). *A*, The components of the mechanical syringe including an injection plunger, an aspiration plunger, a pulley system connecting the two plungers so that the plungers reciprocate (alternate), a functional barrel for the injection plunger, and an accessory barrel for the aspiration plunger. Fluid is only contained within the functional barrel with the needle fitting. *B*, To aspirate, the thumb depresses the aspiration plunger. *C*, To inject, the thumb depresses the injection plunger.

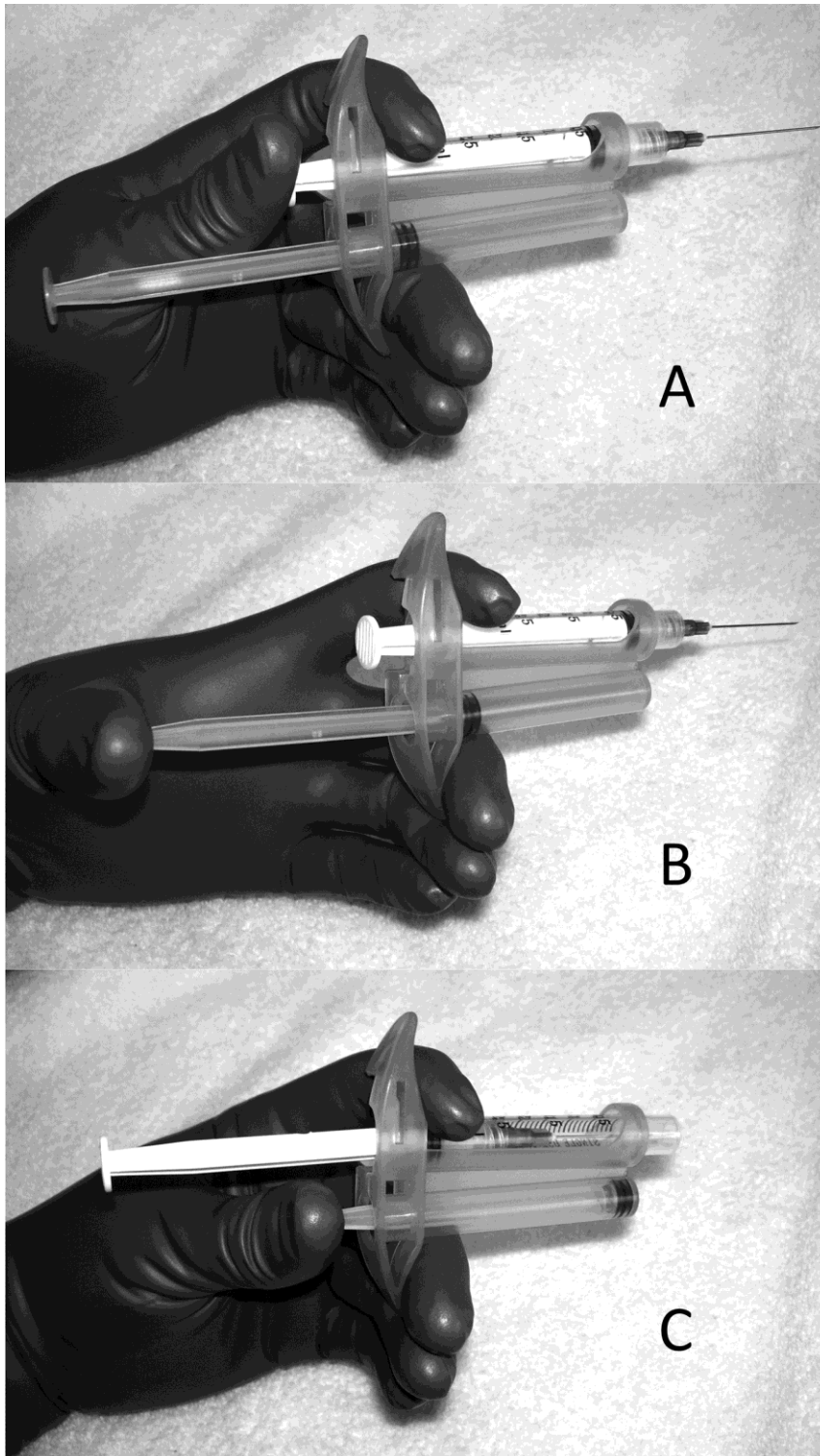


Fig. E-2

Photographs showing the Procedur-SF safety syringe, which is a digital retractable mechanical syringe that reciprocates with two plungers, one an aspiration plunger and the other an injection plunger. *A*, To inactivate the needle, the injection plunger is fully depressed, with the thumb locking the plunger into the needle fitting. *B* and *C*, The aspiration plunger then is depressed with the thumb (*B*), which retracts the needle within the syringe barrel, shielding the needle (*C*).

TABLE E-1 Safety-Engineered Syringes and Needles

Safety Device	Manufacturer	Type of Anti-Needlestick Device	FDA Cleared	Health-care Worker Safety	Patient Safety	Changeable Needle	Type of Changeable Needle	Can Use Specialty Needles	Can Use 2-in (5.1-cm) Needles
Integra	Becton Dickinson (BD)	Retractable syringe, spring driven	Yes	Yes	No	Yes	Proprietary	No	No
Procedur-SF	Avanca Medical Devices.	Retractable syringe, digitally driven	Yes	Yes	Yes	Yes	Conventional needles	Yes	Yes
RPD Safety Syringe	Avanca Medical Devices	Safety syringe with shielded needle, digitally driven	Yes	Yes	Yes	Yes	Any Luer Fitting Safety Needle	Yes	Yes
Baksnap	Duopross Meditech	Retractable syringe, manually driven	Yes	Yes	No	Yes	Conventional needles	Yes	Yes
Safepro Invirosnap	Inviro	Retractable syringe, manually driven	Yes	Yes	No	Yes	Conventional needles	Yes	Yes
VanishPoint	Retractable Technologies	Retractable syringe, spring driven	Yes	Yes	No	No	Fixed needle only	No	No
Eclipse Safety Needle	Becton Dickinson	Retractable syringe, spring driven	Yes	Yes	No	Yes	Proprietary	No	No
SafetyGlide Safety Needle	Becton Dickinson	Shielded needle, digitally driven	Yes	Yes	No	Yes	Proprietary	No	No
SurGuard Safety Needle	Terumo	Shielded needle, digitally driven	Yes	Yes	No	Yes	Proprietary	No	No
Monoject Magellan Safety Needle	Kendall (Covidien)	Shielded needle, digitally driven	Yes	Yes	No	Yes	Proprietary	No	No
Safety-Lok Safety Syringe	Becton Dickinson	Syringe with safety shield, manually driven	Yes	Yes	No	Yes	Conventional needles	Yes	Yes
Monoject Safety Syringe	Kendall (Covidien)	Syringe with safety shield, manually driven	Yes	Yes	No	Yes	Conventional needles	Yes	Yes
Digitally Activated Shielded (DAS) Syringe	Science & Technology Corporation @ UNM	Syringe with safety shield, digitally driven	In process	Yes	No	Yes	Conventional needles	Yes	Yes

TABLE E-2 Clinical Characteristics of Safety-Injection Devices

Safety Device	Requires Two Hands to Inactivate	Must Change Holding Finger Position to Inactivate	Can Be Prematurely Activated While Needle in Patient	Can Use the One-Needle Two-Syringe Technique	Splatter of Contaminant When Activated in Tissues	Splatter of Contaminant When Activated Outside Body	Safety Feature Can Be Reliably Activated with Needle in Joint Capsule	Cost per 100 Devices (<i>US dollars</i>)
Integra	No	No	Yes	Yes	Minimal	Minimal	No (spring too weak)	\$130
Procedur-SF	No	No	Yes	Yes	Minimal	Moderate	Yes	\$150
RPD Safety Syringe	No	Yes	No	Yes	Minimal	Minimal	No	\$150
Baksnap	Yes	Yes	Yes	Yes	Minimal	Moderate	Yes	\$34
Safepro Invirosnap	Yes	Yes	Yes	Yes	Minimal	Moderate	Yes	\$50
VanishPoint	No	No	Yes	No	Minimal	Moderate	No (spring too weak)	\$135
Eclipse Safety Needle	No	Yes	No	Yes	Cannot activate in tissue	Minimal	No	\$40
SafetyGlide Safety Needle	No	Yes	No	Yes	Minimal	Minimal	Yes (but difficult)	\$40
SurGuard Safety Needle	No	Yes	No	Yes	Cannot activate in tissue	Minimal	No	\$30
Monoject Magellan Safety Needle	No	Yes	No	Yes	Minimal	Minimal	Yes (but difficult)	\$40
Safety-Lok Safety Syringe	Yes	Yes	No	Yes	Minimal	Minimal	Yes	\$40
Monoject Safety Syringe	Yes	Yes	No	Yes	Minimal	Minimal	Yes	\$40
Digitally Activated Shielded (DAS) Syringe	No	No	No	Yes	Minimal	Minimal	Yes	\$40