

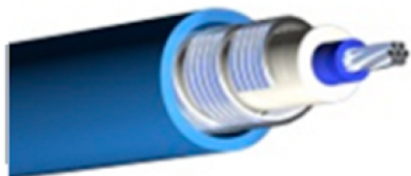
**MINICORSO SULLA CSP:
PARTE I – FONDAMENTI E BASI PRATICHE DELLA CSP**

**Tecniche d'impianto CSP:
stiletto si - stiletto no?
Pro e contro**

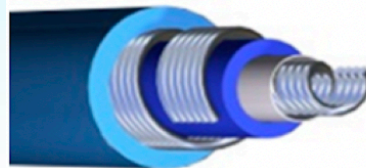
Matteo Casula

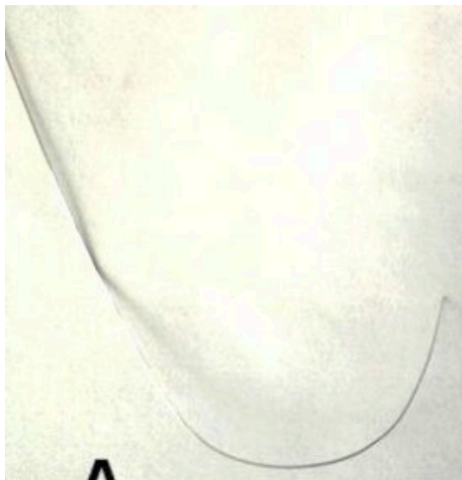


Lumenless lead

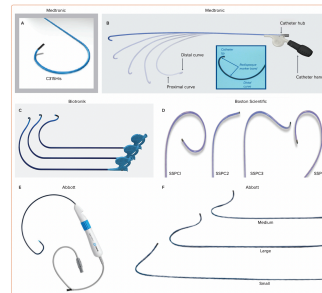


Lead with stylet lumen





SISTEMA



Stilettabile vs Lumenless

Diametro

Corpo del catetere - Elica

**Supporto per trasmissione
della spinta e della rotazione**

Lunghezza elettrocatetere

Materiale isolante

Esterno / interno

Possibilità di connessione dello stiletto al PSA

*Monitoraggio morfologia di stimolazione e
parametri durante avvitaamento*

Sistemi di delivery differenti

*Diametro, resistenza alla torsione,
supporto, curvatura, adattabilità*

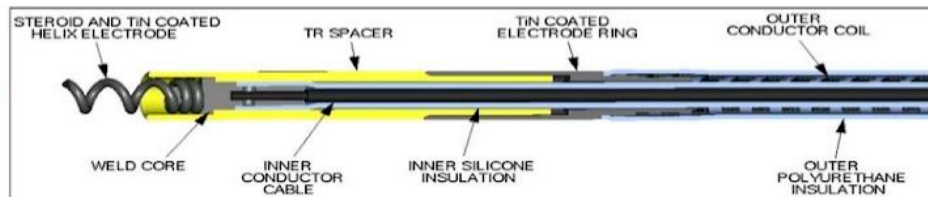
Vite

Esposta vs retrattile / lunghezza / forma



Lead Design	Lumenless Leads
Lead Name	SelectSecure 3830
Manufacturer	Medtronic
Lead design	Lumenless
Lead length (cm)	59/69/74
Lead body diameter (mm/Fr)	1.4 (4.1)
Helix design	Fixed, non-retractable
Cathode design (lead tip electrode)	Electrical active helix
Tip electrode length (mm)	1.8
Tip electrode surface area (mm ²)	3.6
Tip-to-ring electrode spacing (mm)	9
Anode ring electrode surface area (mm ²)	16.9
Anode ring electrode width (mm/Fr)	Not specified
Outer isolation	Polyurethane
Inner isolation	Silicone/ETFE
Steroid eluting	Yes
Type of steroid	Beclomethasone dipropionate

Lumenless



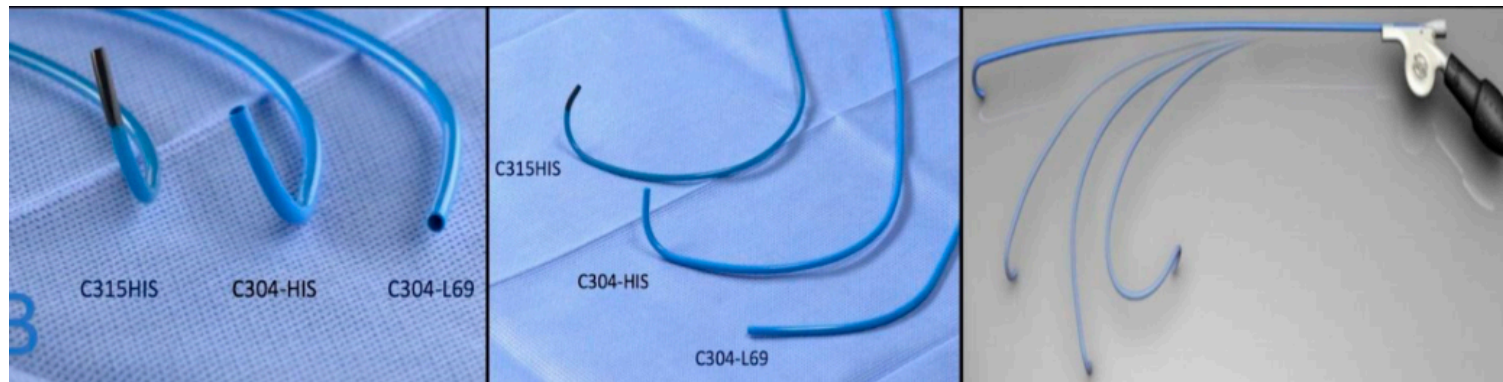
3830 Lead Specifications:

- 4.1 FR lead body diameter
- Bipolar
- Fixed screw helix
- Steroid eluting
- Polyurethane outer insulation
- Cable inner conductor



Cano O et al. Arrhythm Electrophysiol Rev. 2024
Taddeucci S et al. J Clin Med. 2024

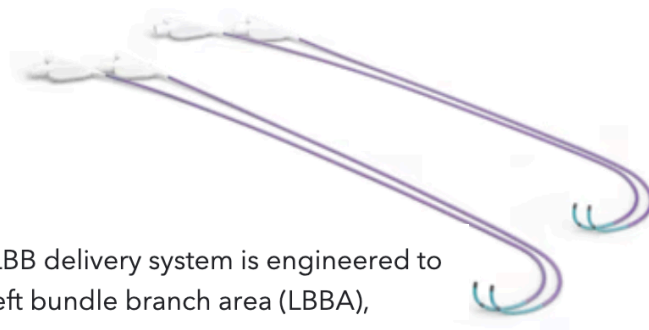




Taddeucci S et al. J Clin Med. 2024

C315H20	Short working length for access into small patients
C315J	For placement in RA appendage, high atrial septum, lateral free wall
C315S4	For placement in Bachmann's Bundle, high atrial septum, low atrial septum
C315S5	For placement in Bachmann's Bundle, high atrial septum, low atrial septum
C315S10	For placement in RVOT, mid ventricular septum
C315H40	For placement in the apex, triangle of Koch
C315HIS	For placement in bundle of His

The C320LBB delivery system is engineered to reach the left bundle branch area (LBBA),



Lumenless pacing leads

Potential advantages

Smaller lead body (4.1Fr) might result in less interference with septal kinetics and less risk for collateral damage to septal vessels or septal injury

Isodiametric lead design facilitates septal penetration

Fixed helix design: helix is robust and retraction will not occur

In case of LBBP failure, HBP as bail out might be easier than with SDL

Potential disadvantages

Absence of stylet results in less stiffness and torque ability of the lead

Smaller lead body can result in less grip on the lead when rotating the lead

Delivery sheaths with smaller diameters might be less supportive and more prone to kinking

Requirement for new venous access and use of delivery sheath for re-positioning (even for conventional position)

Burri H et al. Europace. 2023

Thin profile
Fixed helix
No lumen
High torque control
Lower shaft support



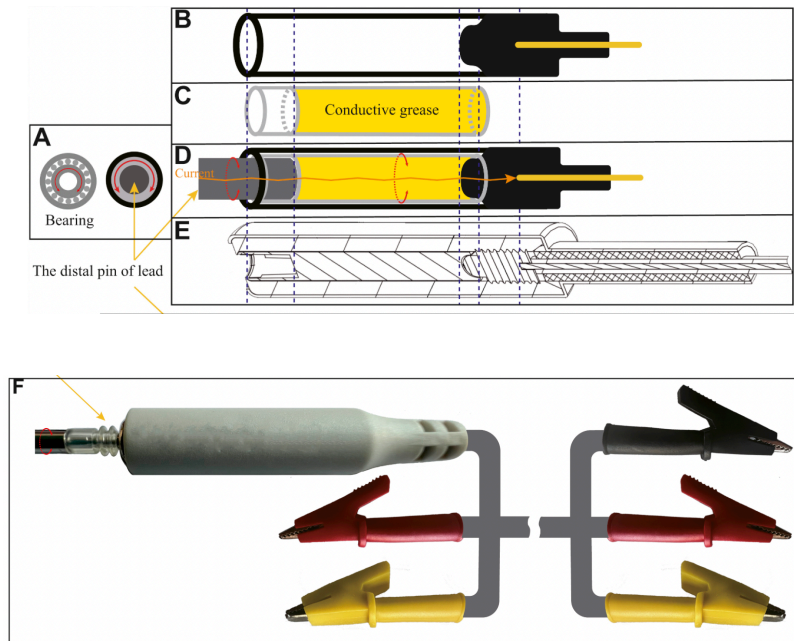
Abdin A. Arrhythm Electrophysiol Rev. 2026

No possibilità di connessione dello stiletto al PSA

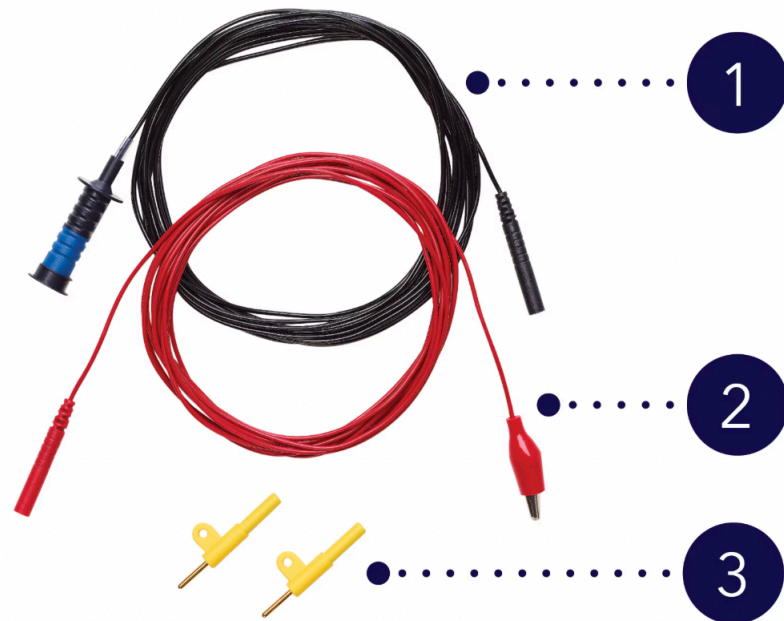
Monitoraggio morfologia di stimolazione e parametri durante avvitalamento

Rischio di interferenza/danneggiamento tra vite e apparato tricuspidale se si passa la tricuspidale con catetere esposto





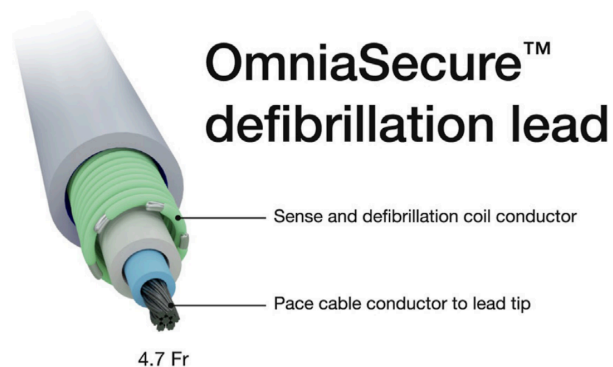
Shen J et al. Can J Cardiol. 2022



Medtronic™ rotatable connector 5944RL

Medtronic rotatable connector 5944RL provides continuous signal monitoring for SelectSecure™ MRI SureScan™ Model 3830 procedures.



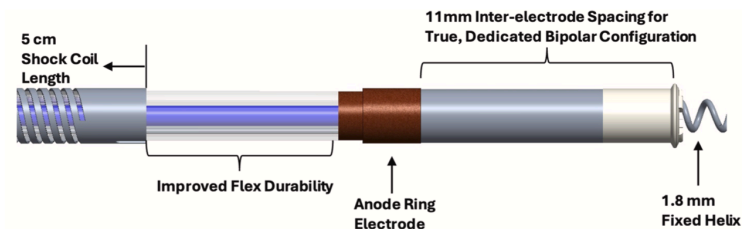


Crossley GH 3rd et al. Heart Rhythm. 2024

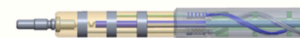
Sprint Quattro Secure™ 6947M
defibrillation lead



UltiSynq CSP ICD lead (Model LDA1122Q)



LDA1122Q (with DF4 Connector)



LDA1122 (with DF-1 and IS-1 connectors)

Shaller RD et al. Heart Rhythm. 2026

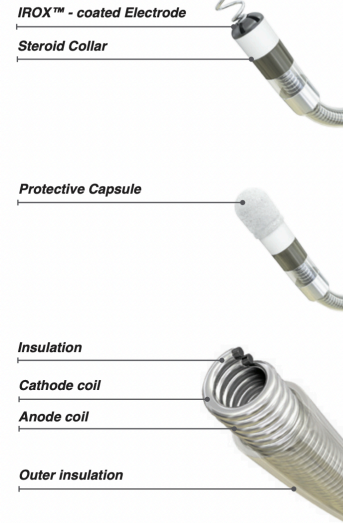


Stylet-driven Lead (SDL)

Thicker profile
Extendable helix
Stylet inside
Stylet guidance
Higher shaft support



Lead Design	Lumenless Leads	Stylet-driven Leads				
Lead Name	SelectSecure 3830	Solia S	Tendril 2088 TC	Vega	Ingevity/Ingevity+	FINELINE
Manufacturer	Medtronic	Biotronik	Abbott	MicroPort	Boston Scientific	Boston Scientific
Lead design	Lumenless	Stylet-driven	Stylet-driven	Stylet-driven	Stylet-driven	Stylet-driven
Lead length (cm)	59/69/74	45/53/60	46/52/58/65/85/100	45/52/58	45/52/59	45/52/58
Lead body diameter (mm/Fr)	1.4 (4.1)	1.8 (5.6)	1.9 (5.8)	2.0 (6.0)	1.9 (5.7)	1.7 (5.0)
Helix design	Fixed, non-retractable	Retractable	Retractable	Retractable	Retractable	Fixed, non-retractable
Cathode design (lead tip electrode)	Electrical active helix	Electrical active helix	Electrical active helix	Electrical active helix	Electrical active helix	Non-conductive helix (cylindrical anode at distal lead tip)
Tip electrode length (mm)	1.8	1.8	2.0	1.5	1.8	1.6
Tip electrode surface area (mm ²)	3.6	4.5	6.9	4	4.5	5
Tip-to-ring electrode spacing (mm)	9	10	10	1	10.7	16
Anode ring electrode surface area (mm ²)	16.9	17.4	16	44	20	31/33
Anode ring electrode width (mm/Fr)	Not specified	1.9 (5.9)	Not specified	Not specified	2.0 (6.0)	1.9 (5.9)
Outer isolation	Polyurethane	Polyurethane/silicone	Optim™	Silicone with Silglide® treatment	Polyurethane (55D)	Polyurethane (model 4456/4457), silicone (model 4458/4459)
Inner isolation	Silicone/ETFE	Silicone	Silicone	Not specified	Silicone	Polymer
Steroid eluting	Yes	Yes	Yes	Yes	Yes	Yes
Type of steroid	Beclomethasone dipropionate	Dexamethasone acetate	Dexamethasone sodium phosphate	Dexamethasone sodium phosphate	Dexamethasone acetate	Dexamethasone acetate



Abdin A. Arrhythm Electrophysiol Rev. 2026

Cano O et al. Arrhythm Electrophysiol Rev. 2024



Stylet-driven pacing leads (SDLs)

Potential advantages

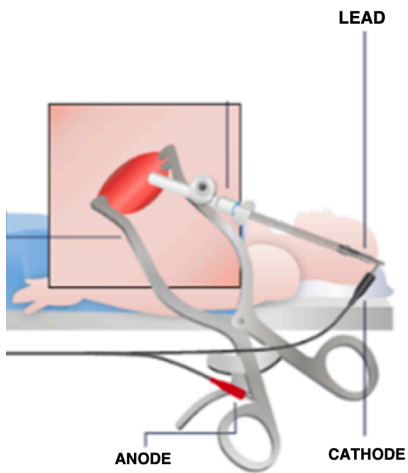
Stylet-supported lead body resulting in enhanced stiffness and torquability, facilitating deep septal lead deployment
Delivery sheaths with larger diameters offer better support with less risk of kinking
Wider lead body diameters (>5,5Fr) might offer more grip when rotating the outer lead body
In case of lead dislodgment, standard right ventricular pacing may be performed without having to regain vascular access
Extendible helix may be kept retracted during mapping and crossing the annulus, to avoid snagging tissue

Potential disadvantages

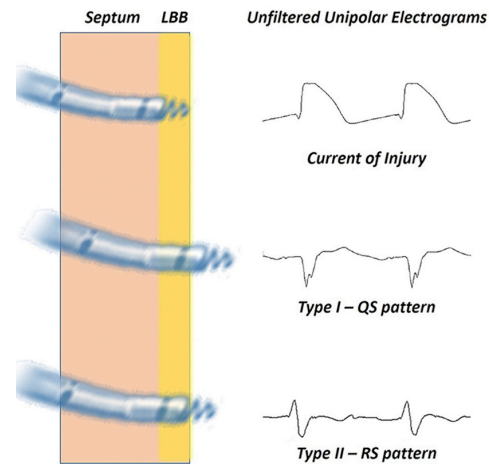
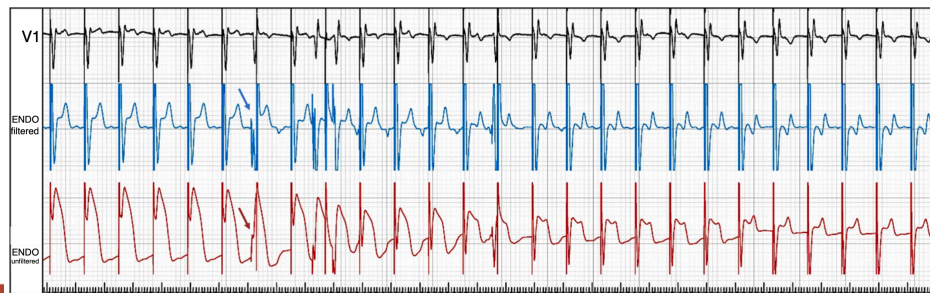
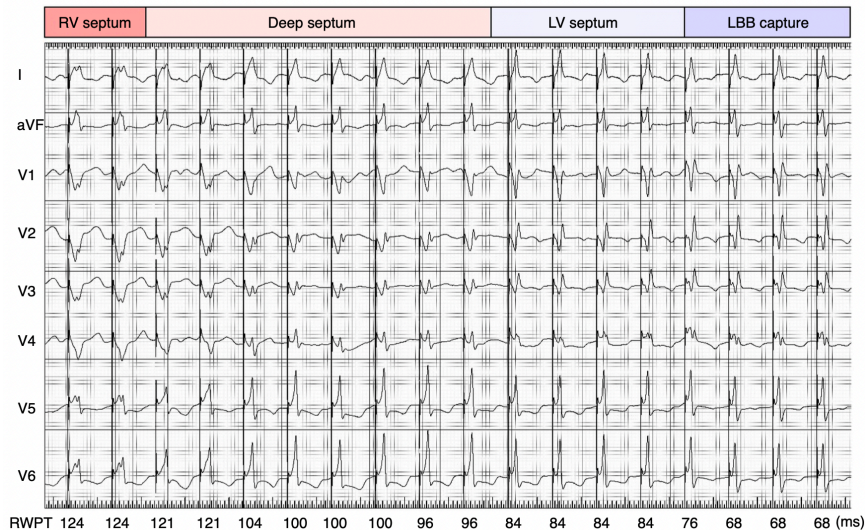
Extendable helix design might result in helix retraction during screwing
Higher risk of screw damage with re-positioning with current SDLs (especially for HBP)
Larger lead diameter might increase the risk of collateral damage to septal vessel, septal injury, or interference with the tricuspid valve

Burri H et al. Europace. 2023





Burri H et al. Europace. 2023



Ponnusamy SS e al.
Heart Rhythm. 2022



Retrazione della vite durante l'avvitamento



Difficoltà alla progressione



Deficit di fissaggio



Possibili microsposizionamenti

Come riconoscerla?



Marker fluoroscopici



Incremento dell'impedenza unipolare

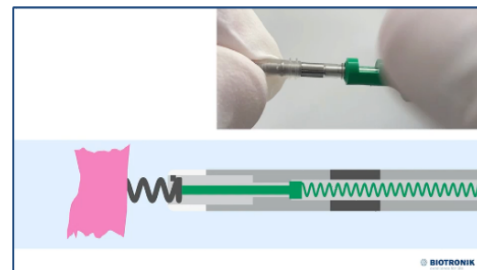


Come evitarla?



Sistemi di fissaggio

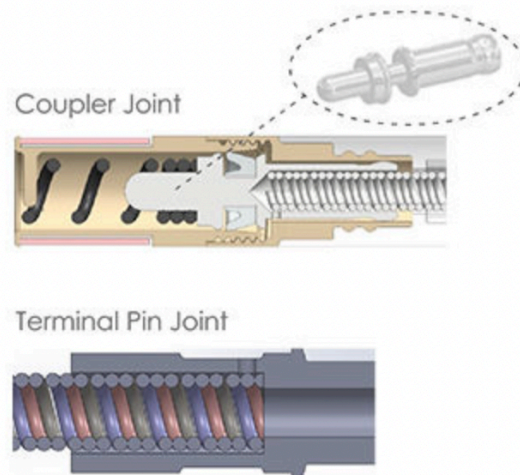
Pretensionamento



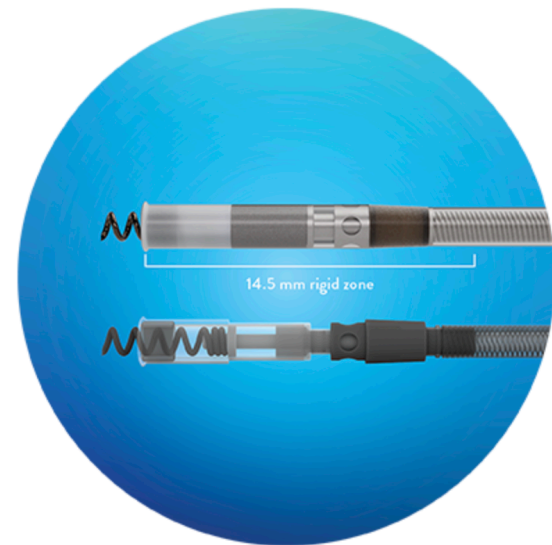
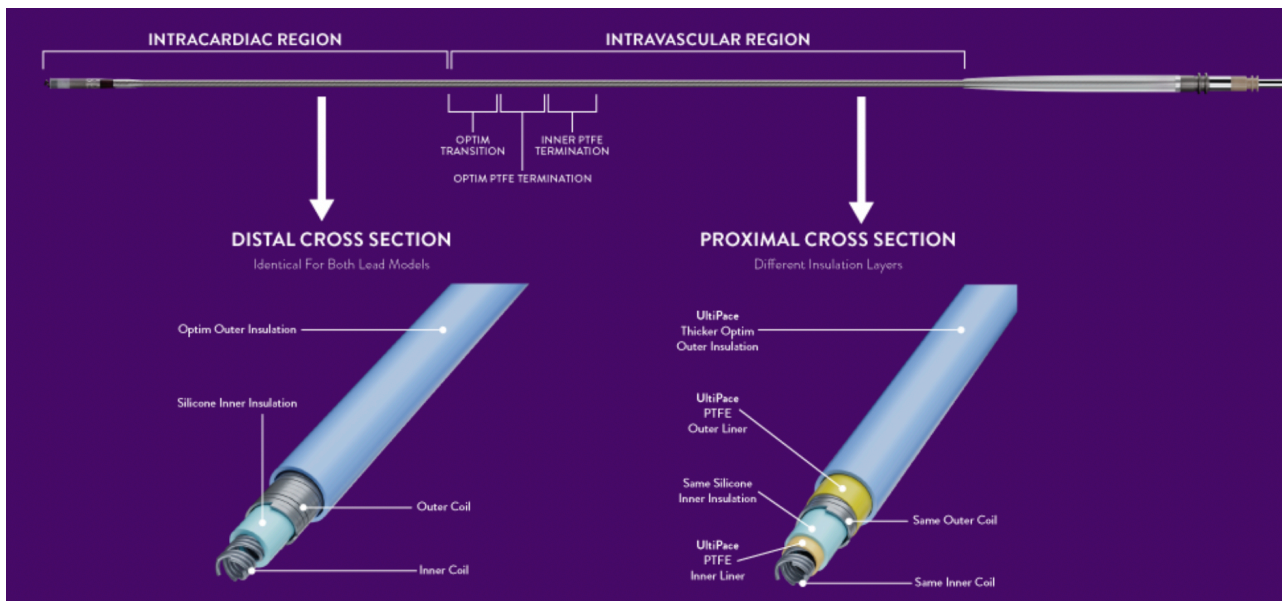
Ingevity +



Tri-filar inner coil:
improves the torque transmission
allows for removal of the ETFE covering



UtiPace



Solia CSP S

Fixed-screw

Dual-cut screw surface

Optimized distal end

2,2 mm



Novel approach to left bundle branch area pacing lead implantation using a 3-dimensional stylet

Bartosz Ludwik, MD, PhD,¹ Michał Labus, MD,¹ Tomasz Roleder, MD, PhD,^{1,2} Paweł Moskal, MD, PhD,³ Grzegorz Kietbasa, MD, PhD,³ Jerzy Śpikowski, MD, PhD,¹ Marek Jastrzębski, MD, PhD³

ABSTRACT

BACKGROUND Left bundle branch area pacing (LBBAP) requires implantation of the lead deep in the interventricular septum. We developed a novel implantation method that does not require dedicated delivery catheters but only a manually shaped 3-dimensional (3D) stiff stylet.

OBJECTIVE The aim of the study was to characterize procedural outcomes of this technique when used as a routine approach for LBBAP.

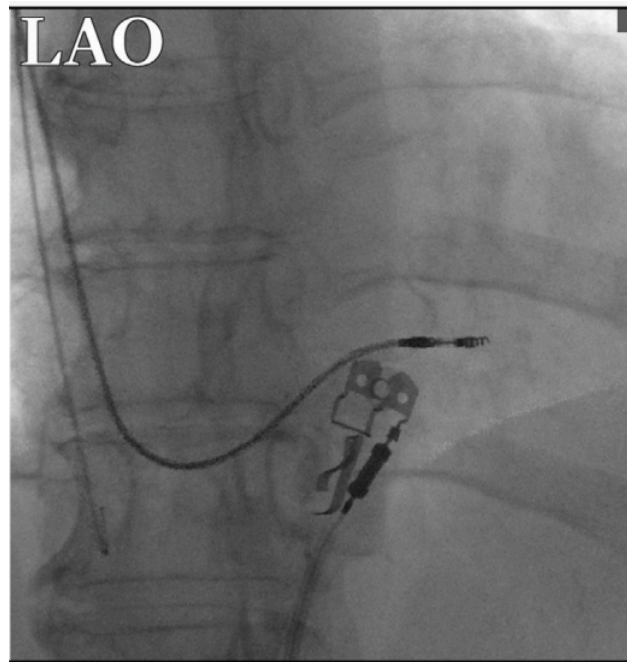
METHODS A case-control study compared procedural outcomes of consecutive patients who underwent pacemaker implantation at 2 centers: one using only the 3D stylet-based LBBAP technique and the other using the conventional catheter-based LBBAP lead implantation.

RESULTS A total of 400 patients (age, 75.3 ± 9.8 years; 48.5% female) were analyzed and 230 were matched and included in a 1:1 ratio in each arm of the implantation techniques. No differences were observed in the success rate (95.0% vs 94.8%), fluoroscopy time (9.9 minutes vs 9.6 minutes), paced QRS duration (151 ms vs 148 ms), and sensitivity values (8.2 mV vs 8.5 mV) between the 3D stylet-based and catheter-based techniques, respectively. Small differences were observed in V_6 R-wave peak time (73.2 ms vs 76.5 ms) and capture threshold (0.63 V vs 0.83 V), with a higher percentage of confirmed left bundle branch captures (98.3% vs 77.4%) and a numerically higher occurrence of delayed perforations (2/115 vs 0/115) in the 3D stylet group.

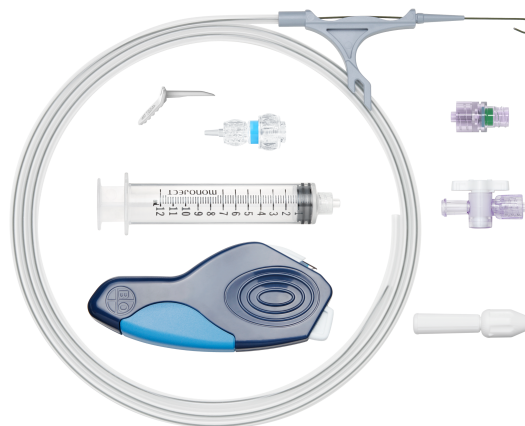
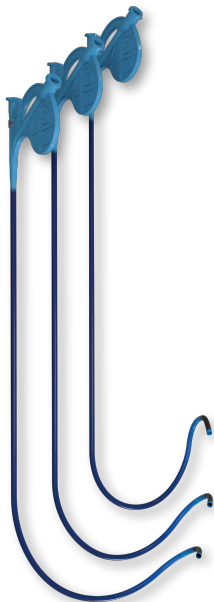
CONCLUSION LBBAP lead implantation with the use of a manually shaped stiff 3D stylet is feasible and results in comparable outcomes to those achieved with leads implanted by dedicated preshaped delivery catheters.

KEYWORDS Left bundle branch area pacing; Lead stylet; Implantation technique; Delivery catheter; Conduction system pacing

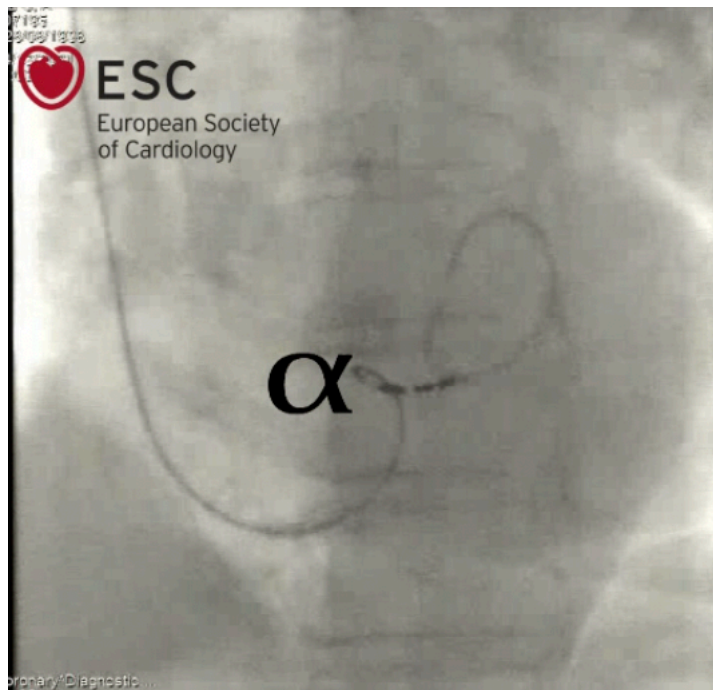
(Heart Rhythm 2025;22:2603–2612) © 2024 Heart Rhythm Society. All rights are reserved, including those for text and data mining, AI training, and similar technologies.



Guida? Dilatore? Catetere premontato?



...prima del taglio?



Burri H et al. Europace. 2023





GRAZIE

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