



A Chance to Fight Non-Response. Energy Efficient

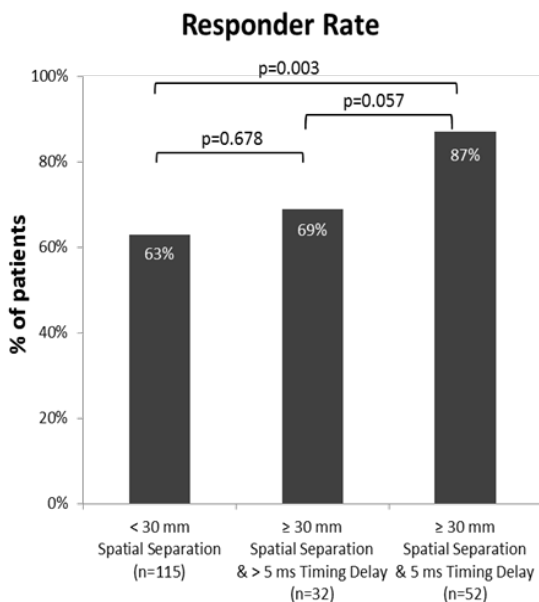
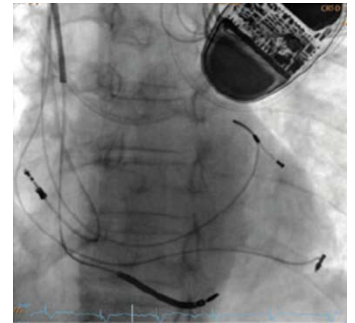
Our 360° CRT Newsletter this week focuses on **BIOTRONIK MultiPole Pacing (MPP)**

Providing additional programming options to increase CRT response<sup>1,2</sup>, **particularly helpful** for patients with **high-risk of non-response** and designed with **limited impact on battery longevity**.



### What's the concept behind MPP?

Early studies concluded "multisite pacing improved acute systolic function compared with BiV pacing"<sup>1</sup>; but do physicians want to implant an additional lead with complex Y-connector, bulky pocket & no independent pacing outputs? Not to mention battery drain! Technology evolved to provide multi-poles instead, but allowing similar programming options.

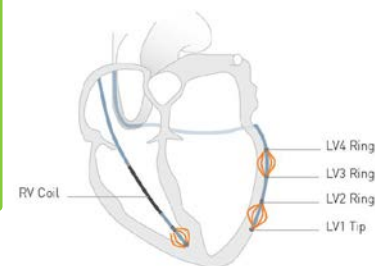


### What is the evidence?

Pappone et al<sup>3</sup> described programming strategies for optimising the CRT response with MPP:

- 1) Maximise the anatomical separation of pacing sites
- 2) Maximise the electrical delay between pacing sites

BIOTRONIK offers the **longest total pole spacing** on the market.



BIOTRONIK MPP IDE study showed best results (87%) in the trial arm with >30mm & 5ms LV-LV delay.

1 Thibault B, Dubuc M, Khairy P et al. Acute hemodynamic comparison of multisite and biventricular pacing with a quadripolar left ventricular lead. *Europace*. 2013; 15(7): 984-991. 2 Menardi E, Ballari GP, Goletto C, Rossetti G, Vado A. Characterization of ventricular activation pattern and acute hemodynamics during multipoint left ventricular pacing. *Heart Rhythm*. 2015; 12(8): 1762-1769. 3 Pappone C, Calović Z, Vicedomini G, Cuko A, McSpadden LC, Ryu K et al. Improving cardiac resynchronization therapy response with multipoint left ventricular pacing: Twelve-month follow-up study. *Heart Rhythm*. 2015; 12(6): 1250-1258.



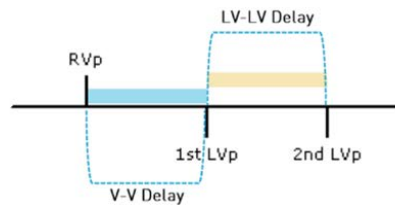
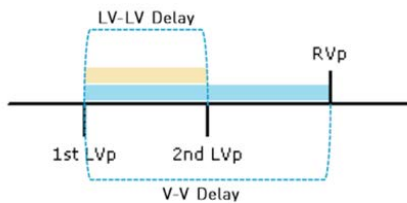
For Physicians.  
For Patients.

## Simple & intuitive programming with Renamic

	Permanent	ModeSw	Post shock
Ventricular pacing	BIV	BIV	RV
Triggering	RVs	RVs	
LV T-wave protection	ON	ON	
Maximum trigger rate [bpm]	UTR + 20		
Initially paced chamber	LV		
VV delay after Vp [ms]	5		
MultiPole pacing			
Pacing polarity 2nd LV	LV1 tip → LV4 ring		
LV-LV delay [ms]	0		
Pacing sequence	1st LV - 2nd LV - RV		

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Ventricular pacing	BIV	BIV	RV
Triggering	RVs	RVs	
LV T-wave protection	ON	ON	
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MultiPole pacing			
Pacing polarity 2nd LV	LV1 tip → LV4 ring		
LV-LV delay [ms]	0		
Pacing sequence	RV - 1st LV - 2nd LV		

Pacing Polarity	
LV1 tip	→ LV2 ring
LV1 tip	→ LV4 ring*
LV2 ring	→ LV1 tip
LV2 ring	→ LV4 ring*
LV3 ring	→ LV2 ring*
LV3 ring	→ LV4 ring*
LV4 ring	→ LV2 ring*
LV1 tip	→ RV coil
LV2 ring	→ RV coil
LV3 ring	→ RV coil*
LV4 ring	→ RV coil*
LV1 tip	→ ICD



1st and 2nd LV pacing polarities must have different configurations

## Concerns over battery?

No need to worry with BIOTRONIK MPP!

Product Lifetime of 7.5 Years in a Realistic Setting!

BIOTRONIK CRT-Ds  
**do not** have  
disproportionate  
battery drain when  
exceeding 3.0V  
pacing amplitudes.

	RA	RV	LV1→LV2	LV3→LV4	Longevity
<b>Intica 7 HF-T QP</b>	15% pacing, 1.7V @0.4ms, 550 Ohm	100% pacing, 1.7V 0.4ms, 550 Ohm	100% pacing, 2.0V @0.4ms, 830 Ohm	100% pacing, 3.2V @0.4ms, 660 Ohm	
<b>Conventional CRT pacing (BP)</b> Apical_Pacing	✓	✓	✓		8.9 years
<b>1st step Optimisation</b> Basal_Pacing	✓	✓		✓	7.8 years
<b>2nd step Optimisation with MPP</b> Apical+Basal_Pacing	✓	✓	✓	✓	7.5 years

} -4%

If you'd like to know more about our MPP, please contact us directly, through [our website](#) or take a look on [Twitter](#) for links to relevant clinical articles.