Recordis™ Cardiac Timing Intervals

RECORDIS
Cardiac Sensor System

Standardized Measurement of MPI, Ejection Time, Diastolic Intervals, and Isovolumic Timing

The Measurement Gap

Cardiac timing intervals — how long the heart takes to contract, eject, relax, and refill — provide direct insight into cardiovascular performance. Decreases in left ventricular ejection time are associated with increased heart failure risk [1]. Reduced diastolic filling time reflects progressive depression of heart function [2]. Timing intervals have also shown associations with mental health symptoms [3] and training-related cardiac adaptations in athletes [4].

Measuring cardiac timing intervals currently requires specialized equipment, trained operators, and dedicated analysis time. Results vary by operator, by scan, and by vendor [5]. These barriers limit timing interval use to specialized centres and make them impractical for routine monitoring, longitudinal follow-up, or broad population use.

Key Timing Markers

Recordis captures the following timing intervals in under 60 seconds, without a sonographer, through a non-invasive sensor placed on the base of the sternum. Each recording is processed by an independent algorithm that removes traditional operator variability.

- **Myocardial Performance Index (MPI):** A composite measure of systolic and diastolic function derived from precise valve event timing. Most clinics do not routinely calculate MPI because echo-derived measurement is operator-dependent, variable between sonographers, and requires dedicated imaging time. Recordis produces a standardized MPI in every recording — one of the strongest single indicators of global cardiac function.

- **Isovolumic Contraction Time (IVCT):** Reflects the interval between mitral valve closure and aortic valve opening. Clinically valuable for assessing systolic performance and atrial fibrillation risk [8], but requires high levels of technical expertise and consistency to measure reproducibly in standard echo practice. Recordis provides direct, reproducible IVCT from the SCG waveform.

- **Left Ventricular Ejection Time (LVET):** The duration of blood ejection from the left ventricle. Echo-derived measurement is subject to heart rate correction variability and inter-observer differences. Our published SCAI oral presentation reports correlation between SCG-derived and echocardiography-derived ejection time ($\rho=0.71$; $p<0.0001$).

- **Diastolic Filling Time (DFT):** Clinical assessment of diastolic function typically relies on multiple complex echo parameters. Diastolic dysfunction is often one of the earliest manifestations of cardiac pathology [2]. Recordis provides direct diastolic timing from the SCG signal — rapid, reproducible, and available in every recording.

- **Isovolumic Relaxation Time (IVRT):** The interval between aortic valve closure and mitral valve opening. An early indicator of impaired ventricular relaxation [7]. Captured reproducibly with each Recordis recording alongside all other timing markers.

When timing measurements fall within normal ranges, clinicians can be confident that heart function is not significantly altered. When intervals become shortened or abnormal, this provides quantitative data to support further clinical evaluation.

LLA TECHNOLOGIES INC.

Contact Information

Dr. Payam Dehghani
payam.dehghani@llatechnologies.ca

Andy Parkins, COO
andy.parkins@llatechnologies.ca

Investigational Use Only Under FDA Review

Commercial validation being planned in rural Canada. Studies exploring cardiac data applications in chronic disease prevention, triage optimization, and resource allocation efficiency.

Recordis™ Cardiac Timing Intervals

RECORDIS
Cardiac Sensor System

Standardized Measurement of MPI, Ejection Time, Diastolic Intervals, and Isovolumic Timing

Study	Population	Key Finding	Status
Post-TAVI Timing Correlation	Patients undergoing transcatheter aortic valve implantation	Recordis captured timing changes consistent with established echocardiographic findings, without additional staff, time, or equipment	Published — JACC Advances 2025 [6]
Ejection Time & Diastolic Filling Time Correlation	Healthy adults	Recordis detected strong correlations for ejection time (ρ=0.71; $p<0.0001$) and diastolic filling time (ρ=0.93; $p<0.0001$)	SCAI 2026 Oral Presentation
Cardiac Timing in Athletes	University varsity athletes	Unique cardiac cycle timing adaptations measurable by SCG	Published — Eur J Sport Sci 2023 [4]
Mental Health & Cardiac Function	RCMP cadets during training	Timing intervals showed associations with mental health disorder symptoms	Published — J Psychiatr Res 2026 [3]

Clinical Significance

Cardiac timing intervals function as a window into mechanical heart performance that is otherwise difficult to attain outside of dedicated imaging studies. When captured reproducibly and at scale, they enable patterns that isolated measurements cannot:

Longitudinal monitoring. Serial timing measurements track cardiac function trajectory across visits, treatments, or training cycles — providing trend data that a single echocardiographic study cannot practically deliver at scale.

Early functional change. Alterations in IVCT, IVRT, ejection and diastolic timing may appear before structural changes become visible on imaging. Standardized timing data provides clinicians with an additional quantitative layer for ongoing patient evaluation.

Cross-population applicability. Published Recordis studies span post-intervention cardiac patients [6], varsity athletes [4], and RCMP cadets under occupational stress [3] — demonstrating that SCG-derived timing intervals capture clinically meaningful variation across diverse populations and contexts.

Ongoing Validation

Our SCAI 2026 oral presentation reports correlation data between SCG-derived and echocardiography-derived ejection and diastolic time measurements. Broader timing validation is included in the ongoing 500+ patient multi-site study across New York and San Francisco, with core lab echocardiographic analysis in Quebec.

We are actively seeking research collaborators. If your research requires standardized, reproducible cardiac timing data — whether for longitudinal monitoring, intervention tracking, or trial endpoints — contact us at the booth or through the QR code below.

References

1. Alhakak AS, et al. The significance of left ventricular ejection time in heart failure with reduced ejection fraction. Eur J Heart Fail. 2021;23:541–551.

2. Atwater BD, et al. Predicting the Development of Reduced Left Ventricular Ejection Fraction. Am J Cardiol. 2020;137:39–44.

3. Carleton RN, et al. Associations between mental health disorder symptoms and cardiac function among RCMP cadets. J Psychiatr Res. 2026;192:100–108.

4. Singh J, et al. Cardiac cycle timing intervals in university varsity athletes. Eur J Sport Sci. 2023;23:1457–1462.

5. Cantinotti M, et al. Standardization in paediatric echocardiographic reporting. Eur Heart J Cardiovasc Imaging. 2024;25:1029–1050.

6. Singh J, et al. Monitoring Cardiac Function Using Seismocardiography Post-Transcatheter Aortic Valve Implantation. JACC Adv. 2025;4:101664.

7. Nagueh S, et al. Recommendations for the Evaluation of Left Ventricular Diastolic Function by Echocardiography and for Heart Failure With Preserved Ejection Fraction Diagnosis: An Update From the American Society of Echocardiography. JASE. 2025; 38; 537-569.

8. Alhakak A, et al. The cardiac isovolumetric contraction time is an independent predictor of incident atrial fibrillation and adverse outcomes following first atrial fibrillation event in the general population. EHJ - Cardiovascular Imaging. 2020; 21; 49–57.

LLA TECHNOLOGIES INC.

Contact Information

Dr. Payam Dehghani
payam.dehghani@llatechnologies.ca

Andy Parkins, COO
andy.parkins@llatechnologies.ca

Investigational Use Only Under FDA Review

Commercial validation being planned in rural Canada. Studies exploring cardiac data applications in chronic disease prevention, triage optimization, and resource allocation efficiency.