Case Study

CLEAR Motion Cardiac: Redefining Diagnostic Precision in Motion-Affected Scans

powered by Altivity

"CLEAR Motion makes one beat cardiac CTA even more robust by minimizing coronary artery motion over a wide range of heart rates. I have more confidence in my diagnosis as I am no longer trying to read through motion artifacts."

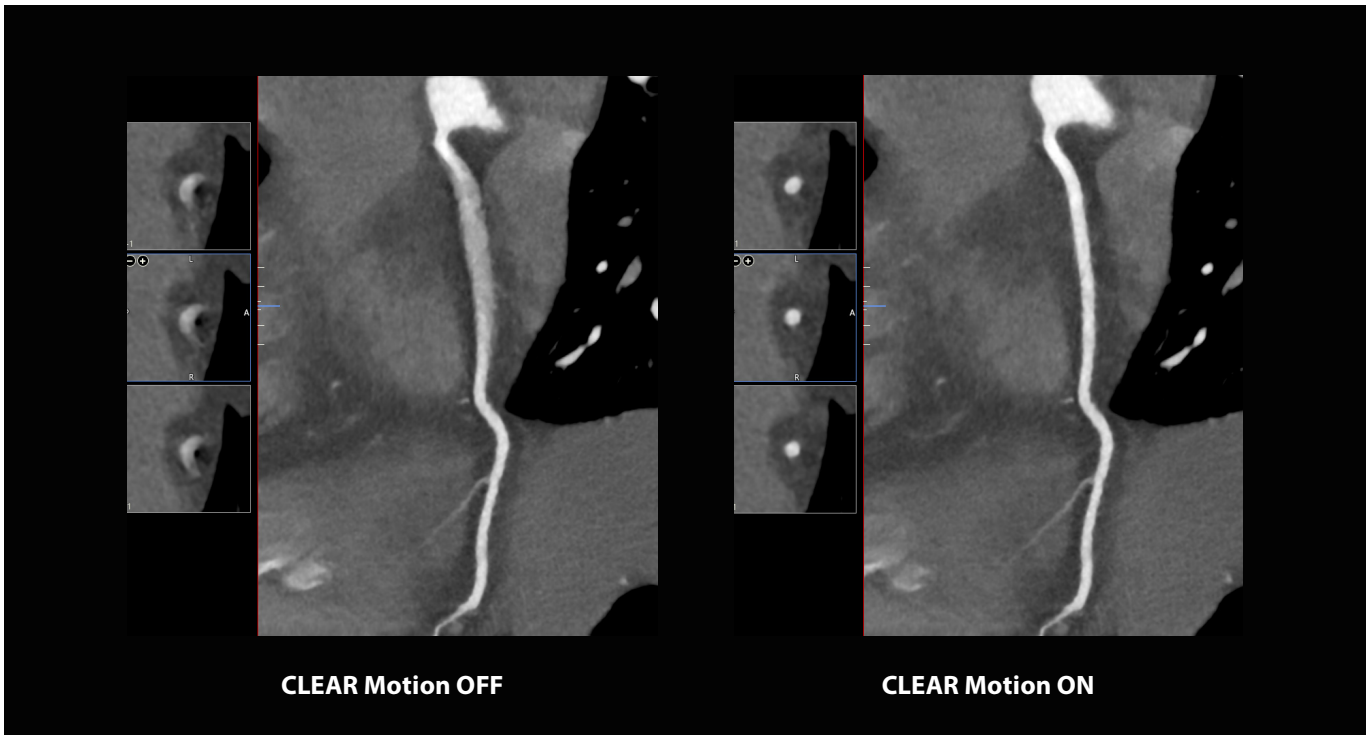


Dr. Marcus Chen, MD
NHLBI, National Institutes of Health, USA

Patient History

This 56-year-old female presented with chest pain and a cardiac CTA scan was requested to rule out coronary artery disease. A single beat scan was performed with an exposure window of 70-80%. Images with CLEAR Motion Cardiac and Precise IQ Engine (PIQE) 1024 matrix were reconstructed.

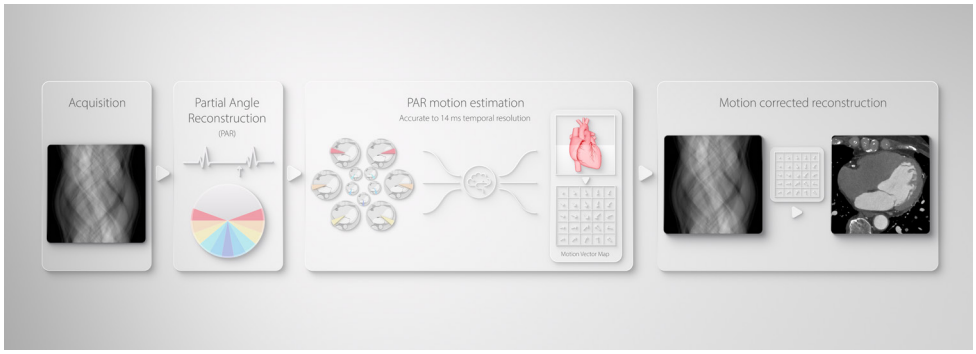
Results



The initial images (left) of the mid-right coronary artery (RCA) exhibited significant motion artifacts, rendering the scan non-diagnostic. Leveraging CLEAR Motion technology (right), motion artifacts were effectively minimized. The CLEAR Motion images allowed for a diagnostic-quality evaluation of the RCA, confirming the absence of coronary artery disease.

Technology

Reconstruction of a cardiac scan begins with a minimum of half-rotation data targeted to a specific phase of the cardiac cycle. This half-scan data is divided into segments, each with 14 millisecond temporal resolution. These segments undergo partial angle reconstruction (PAR) to create images which are subsequently analyzed to detect motion differences, resulting in the generation of a 4D motion vector map.
The 4D motion vector map is then applied during the reconstruction process resulting in motion-compensated cardiac images. By applying motion correction at the raw data level, CLEAR Motion Cardiac uniquely facilitates the combined use of Deep Learning Reconstruction (DLR) algorithms Advanced intelligent Clear-IQ Engine (AiCE) and PIQE, enabling effective motion correction, noise reduction, and Super Resolution concurrently and automatically from the scanner.



Conclusion

CLEAR Motion Cardiac calculates differential motion in projection space at a 14 ms temporal resolution to create a precise motion vector map that corrects motion during image reconstruction. As demonstrated in this case, CLEAR Motion Cardiac is particularly effective in ensuring diagnostic-quality scans. By eliminating the motion in the RCA, a rescan was avoided, saving contrast and radiation dose to the patient while ensuring efficient patient care.

Key Benefits

- Integrated into the scan protocol
- No additional exposure
- Compatible with PIQE and AiCE DLR

Acquisition

Scanner Model:
Aquilion ONE / INSIGHT Edition

Scan Mode:	ECG gated Volume
Collimation:	0.5 mm
Exposure:	100 kV, SURE Exposure
Rotation Time:	0.24 s
CTDI vol:	4.7 mGy
DLP:	56.0 mGy·cm
Effective Dose:	0.79 mSv
k-factor:	0.014 *
Heart Rate:	75 bpm

* American Association of Physicists in Medicine (AAPM) Report 96, 2008.

Altivity Altivity is a new approach to AI innovation. It is a multimodality, overarching brand for healthcare, which pulls together all the AI technology that Canon provides under one name.

CANON INC.

30-2, Shimomaruko 3-chome, Ohta-ku, Tokyo 146-8501, Japan
Telephone: (81)-3-3758-2111
©CANON INC. 2025-2026. All rights reserved.
Design and specifications are subject to change without notice.
Model number: TSX-308A
MCSCT0017EAA 2026-04 Published in Japan

Clinical results may vary due to clinical settings, patient preparation, and other factors. The views and opinions expressed in this brochure are those of the clinicians and do not necessarily reflect the views of Canon Inc.

CANON MEDICAL GROUP

Made For life