

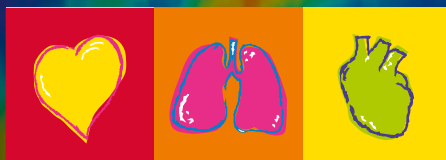


## HyperQ™

### Unlocking the hidden treasures of ECG

The groundbreaking HyperQ technology with superior accuracy provides a unique solution for the detection and evaluation of Coronary Artery Disease (CAD) and Acute Coronary Syndrome (ACS).

HyperQ: more accurate diagnosis, fewer false alarms.



# SCHILLER

The Art of Diagnostics

## Revolutionising the Detection of Coronary Artery Disease

Coronary Artery Disease (CAD) screening is largely based on stress ECG testing that has a limited diagnostic accuracy, especially in women. Additionally, there are growing concerns over exposure to radiation and cutbacks on payment for costly cardiac imaging.

HyperQ stress ECG testing provides a low-cost, non-invasive, radiation-free and highly reliable first line CAD diagnostic solution for private cardiology practices as well as cardiology departments in hospitals. HyperQ is based on solid scientific and clinical research and is FDA-cleared and CE-marked.

## Unbeatable Benefits

Significant increase in diagnostic accuracy

- Higher sensitivity in diagnosing ischaemia
- Fewer false alarms in non-ischaemic patients
- Performs equally well in women and men
- Provides clear results in patients with equivocal standard stress ECG test results

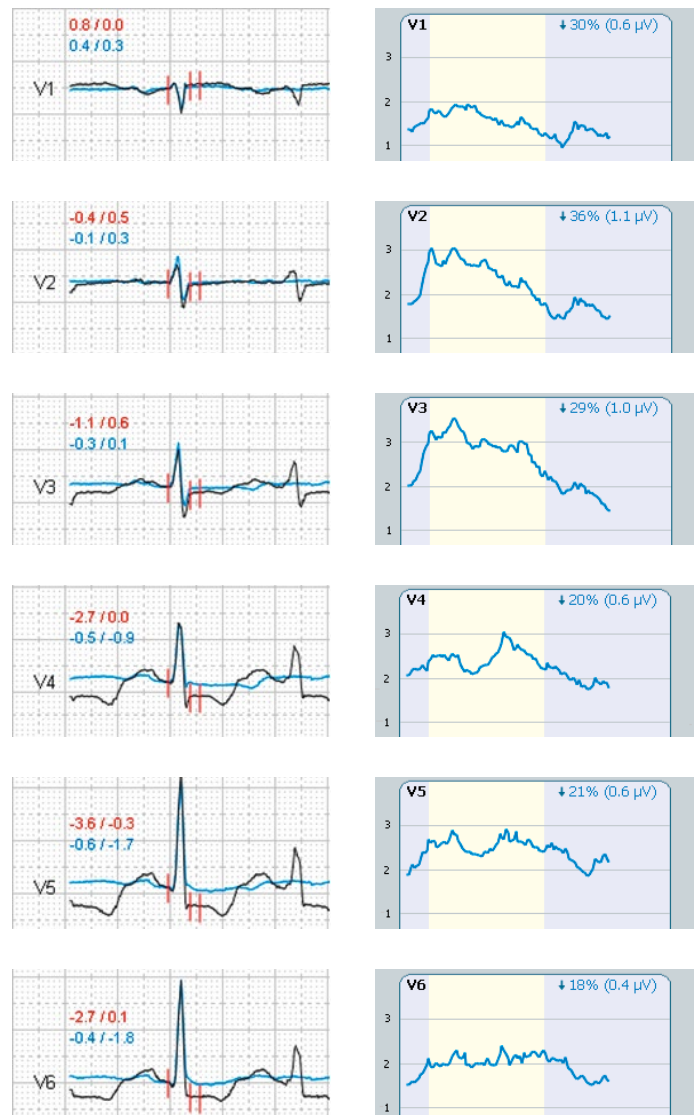
Fits into existing workflows

- Same procedure as traditional stress ECG tests
- 12-lead configuration
- User-friendly and interactive interface
- Straightforward interpretation of results

HyperQ Stress is integrated into the following SCHILLER devices: CARDIOVIT CS-200 Excellence and CS-200 Touch.

### Woman with abnormal ST and Negative HyperQ

65 years, Female: ST segment analysis shows significant abnormalities. However, the HyperQ analysis correctly detected normal coronary arteries.

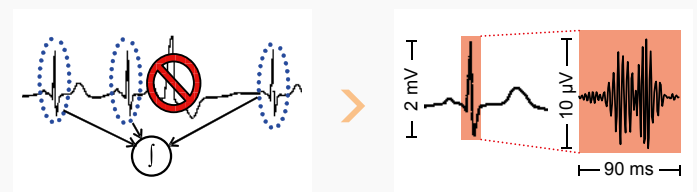


### HyperQ: Selected publications

- The Use of ECG Depolarization Abnormalities for Detection of Stress-Induced Ischemia as Defined by Myocardial Perfusion Imaging, Tali Sharir et al., American Journal of Cardiology (2012); 109(5) 642-650.
- High-Frequency QRS Analysis Improves the Specificity of Exercise ECG Testing in Women Referred for Angiography, David Rosenmann et al., Journal of Electrocardiology, Vol. 46(1) pp. 19-26, January 2013
- The cost-effectiveness of stress testing using high-frequency QRS analysis, Guy Amit et al., Int. J. Medical Engineering and Informatics 2013, Vol. 5, No. 1, pp. 68-80.
- High-Frequency QRS Analysis in Patients with Acute Myocardial Infarction - A Preliminary Study. Amit G et al, Annals of Noninvasive Electrocardiology, Volume 18, Issue 2, pages 149-156, March 2013
- Feasibility of high-frequency QRS analysis in patients with acute myocardial infarction. Amit G et al, J. of Electrocardiology 44 (2011) 742-747
- Analysis of Depolarization Abnormalities in the Evaluation of Patients with Chest Pain. Galante O et al, Euro. Heart J. (2011) 729, P4184

### Principles of Rest and Stress HyperQ analysis

For each test, the HyperQ Rest Analyzer performs the following steps:



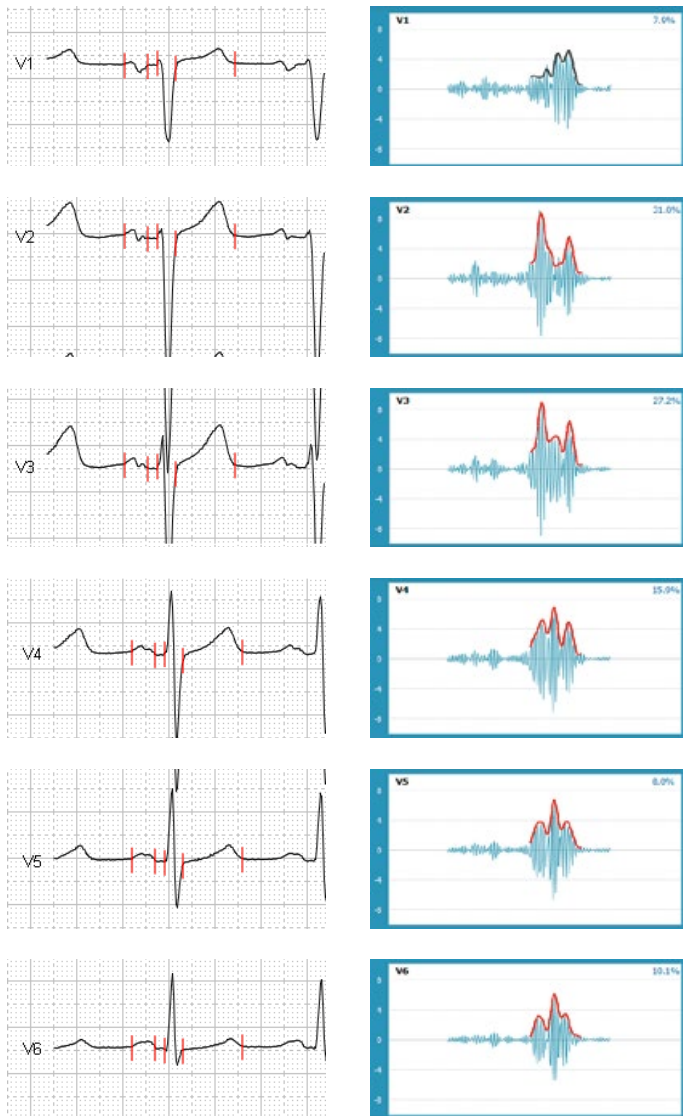
High resolution ECG is recorded. QRS complexes are detected while rejecting arrhythmias and noisy complexes.

The detected QRS complexes are aligned and averaged to suppress noise. Filtering the high frequency band produces the high frequency QRS signal.



## Patient with positive HyperQ and ACS (Acute Coronary Syndrome)

62 years, female, ACS: as displayed on the side, ST segment analysis shows no abnormalities. However, the HyperQ analysis correctly detects significant ischaemia.



## HyperQ

### Rest

## Early Detection of Acute Coronary Syndrome

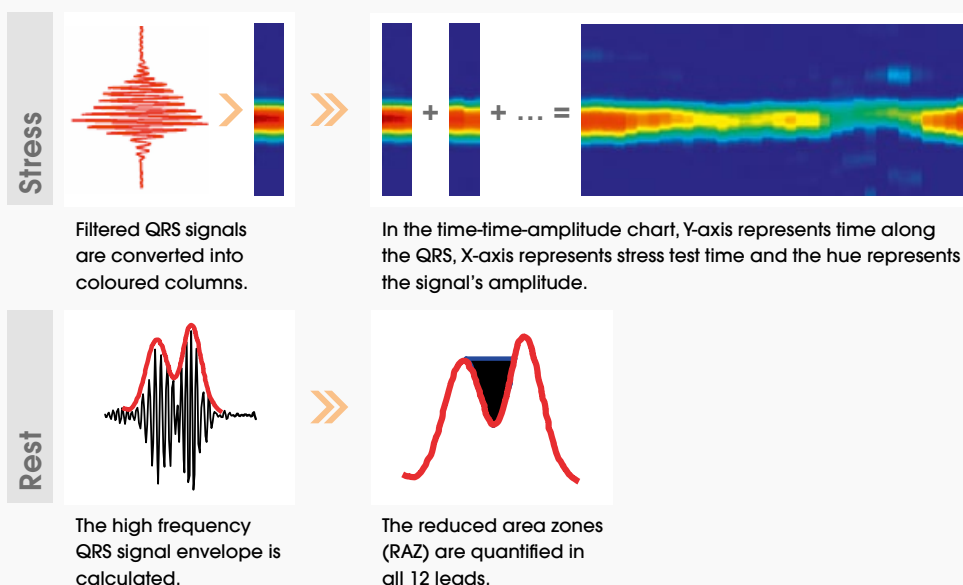
Chest pain is one of the main reasons for hospital emergency department visits worldwide. Early risk stratification of patients presenting with chest pain and suspected acute myocardial ischaemia or infarction is a major clinical challenge. Resting 12-lead ECGs, a mainstay in the management of acute myocardial ischaemia, is limited by low sensitivity, especially in cases of non ST elevation myocardial infarction and unstable angina.

Studies have shown that only 25% of patients who were suspected of having ACS on the basis of specific symptoms were eventually diagnosed as such. Adding an additional criterion may revolutionise one of the most commonly used routines in emergency departments.

## Unbeatable Benefits

- HyperQ Rest provides high accuracy, early detection and superior diagnostic value.
- No need for oversized expensive devices – extracts additional, previously unseen data from the standard 12-lead ECG.
- Suitable for emergency departments, emergency medical services, primary care clinics and telemedicine services.

HyperQ Rest is integrated in the following SCHILLER devices: CARDIOVIT CS-200 Excellence and CS-200 Touch.



## BSP and HyperQ

HyperQ was invented and developed by BSP. BSP is a medical device company providing novel, non-invasive and highly reliable products for the diagnosis and monitoring of Coronary Artery Disease. BSP's team combines years of experience and an interdisciplinary approach, with in-depth knowledge in the fields of signal processing, biomedical engineering and cardiology.



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