NIBRA-CS®: The New Standard in Autonomic Neurofunction Assessment

Advanced, point-of-care autonomic testing designed for diagnostic precision and clinical workflow efficiency. (Non-Invasive Baro-Reflex Assessment – Combined System).

CDSCO Approved

Patented Technology

Clinically Validated

NIBRA® CS

Cardiac Autonomic Neuropathy (CAN): The Silent Killer in Diabetes

Highly prevalent, massively underdiagnosed, and drastically increases mortality—yet standard screening fails to catch it early.

The Burden

89.8M

Adult Diabetics in India. An estimated 60% of people with diabetes suffer from some form of nerve damage.

The Prevalence

22%

in Type 2 Diabetes; 17% in Type 1 Diabetes. Prevalent across all age groups, not just the elderly.

The Clinical Threat

50%

Mortality Rate within 5–10 years for patients developing symptomatic autonomic neuropathy. Predisposes to sudden cardiac death.

Sources: IDF Diabetes Atlas 2021; Vinik et al., Circulation 2007; Spallone et al., DMRR 2011; ADA 2017 Position Statement; Maser et al., Diabetes Care 2003.

The Diagnostic Gap: Why Traditional Testing Fails

	Traditional Methods	NIBRA-CS® Advantage
Workflow Efficiency	Requires 45+ minutes per patient.	Complete in 19 min + prep time.
Human Capital	Requires continuous specialist physician presence.	100% automated; run by trained clinical assistants.
Data Acquisition	Manual paper ECG calculations and separate blood pressure tools.	Integrated 5-patch ECG and non-invasive BP with automated digital math.
Output & Diagnosis	Subjective interpretation with a high margin of error.	Objective, cloud-ready digital reporting with automatic scoring.

Introducing NIBRA-CS®: Comprehensive Autonomic Assessment

Hardware Architecture

- Touchscreen console
- Wearable 5-patch ECG system
- Non-invasive oscillometric BP
- Wireless sensors for Valsalva/Handgrip

Software Ecosystem

- Standalone clinical OS (no PC required)
- EMR/EHR sync capabilities
- Cloud-based reporting

Clinical Output

- Rapid, reproducible data
- Research-grade acquisition
- Point-of-care delivery

Engineered for the Entire Healthcare Ecosystem

The Physician

(Cardiologists / Diabetologists)

- Objective ADA gold-standard autonomic data.
- Early intervention capability for silent ischemia.
- Automated, error-free scoring.

The Operator

(Diagnostic Chain Managers)

- Guided 19-min test cycle + prep.
- Zero physician presence required during testing.
- Highly reproducible, zero-friction technical workflow.

The Administrator

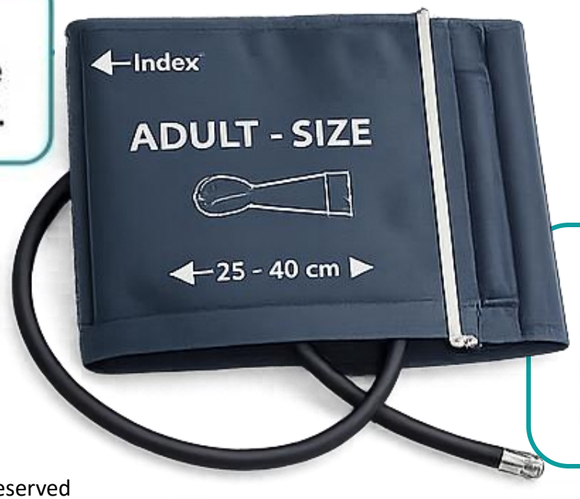
(Hospital Owners)

- Rapid ROI per test through high daily throughput.
- Replaces multiple disparate diagnostic tools.
- Taps into vast, unmonitored diabetic patient populations.

Clinical-Grade Hardware, Point-of-Care Simplicity

Component 1:
Wearable medical-grade 5-patch ECG system.

Component 2:
Wearable medical-grade non-invasive BP monitor.



Component 3:
Combined wireless pressure sensor tailored for Valsalva and Handgrip tests.

Component 4:
Disposable mouthpieces ensuring infection control.

Component 5:
Simple Touchscreen based GUI connected with dedicated Cloud.

The Gold Standard: Ewing's Battery Automated

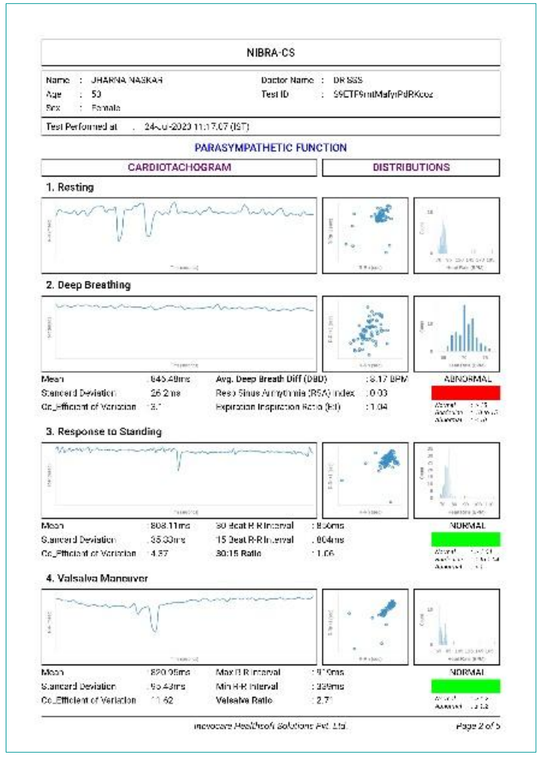
NIBRA-CS automatically executes and calculates all 5 vital cardiovascular reflex tests with zero manual math.

Parasympathetic Evaluation

Deep Breathing Test
Calculation:
Expiration:Inspiration ratio

Valsalva Maneuver
Calculation: Valsalva ratio

Response to Standing
Calculation: 30:15 ratio



NIBRA-CS

Name : JHARNA NASKAR
Age : 53
Sex : Female
Doctor Name : DR SSS
Test ID : 99CTF9mtMafymPdRKcoz
Test Performed at : 24-Jul-2023 11:17:07 (IST)

PARASYMPATHETIC FUNCTION

CARDIOTACHOGRAM | DISTRIBUTIONS

1. Resting

2. Deep Breathing

Mean 845.43ms
Standard Deviation 26.2 ms
Coefficient of Variation 3.1
Avg. Deep Breath Diff (DBD) : 8.17 BPM
Resp Sinus Arrhythmia (RSA) Index : 0.03
Expiration Inspiration Ratio (EI) : 1.04
ABNORMAL

3. Response to Standing

Mean 808.11ms
Standard Deviation 38.03ms
Coefficient of Variation 4.87
30 Beat R-R Interval : 806ms
15 Beat R-R Interval : 804ms
30:15 Ratio : 1.06
NORMAL

4. Valsalva Maneuver

Mean 890.96ms
Standard Deviation 95.43ms
Coefficient of Variation 11.62
Max R-R Interval : 1010ms
Min R-R Interval : 335ms
Valsalva Ratio : 2.71
NORMAL

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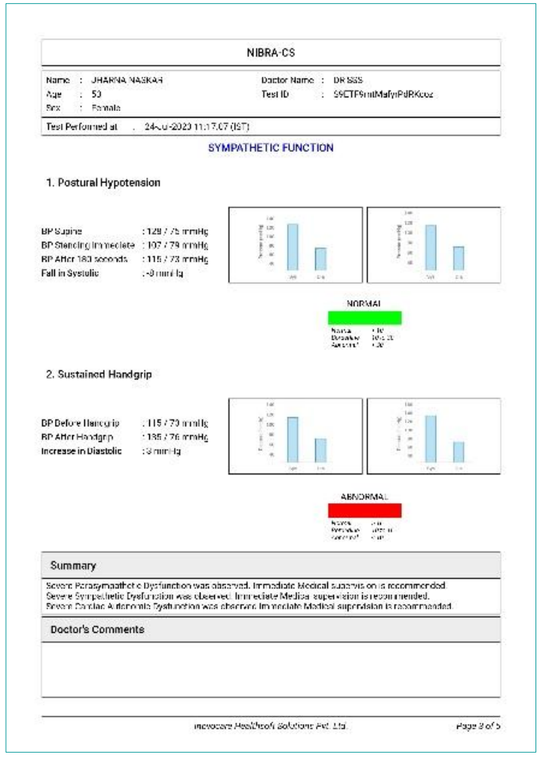

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SYMPATHETIC FUNCTION

1. Postural Hypotension

BP Supine : 128 / 75 mmHg
BP Standing Immediate : 107 / 79 mmHg
BP After 180 seconds : 115 / 73 mmHg
Fall in Systolic : 9 mmHg
NORMAL

2. Sustained Handgrip

BP Before Handgrip : 115 / 73 mmHg
BP After Handgrip : 135 / 76 mmHg
Increase in Diastolic : 3 mmHg
ABNORMAL

Summary

Severe Parasympathetic Dysfunction was observed. Immediate Medical supervision is recommended.
Severe Sympathetic Dysfunction was observed. Immediate Medical supervision is recommended.
Severe Cardiac Autonomic Dysfunction was observed. Immediate Medical supervision is recommended.

Doctor's Comments

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Sympathetic Evaluation

Postural Hypotension
Calculation: Systolic BP drop

Sustained Handgrip
Calculation: Diastolic BP rise

Advanced Autonomic Modulation via HRV

Deep time-domain and frequency-domain **Heart Rate Variability** analysis to detect early, subclinical autonomic dysfunction.

Time Domain Analysis

- SDNN, RMSSD, NN50, pNN50.

(Maps global autonomic modulation and vagal tone).

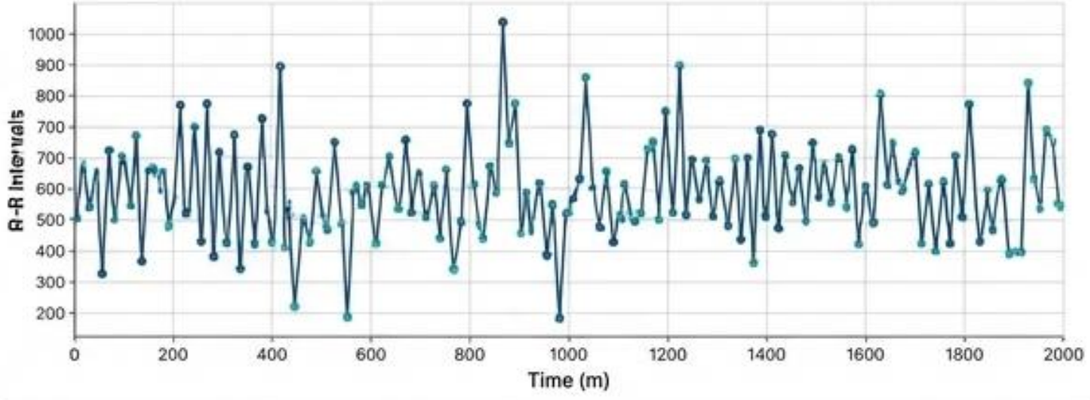
Frequency Domain Analysis

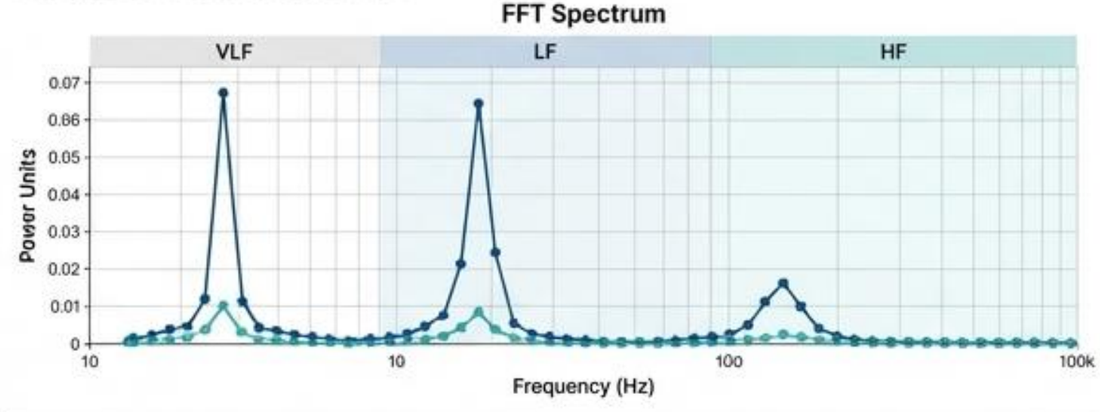
- Total Power, VLF, LF, HF, LF/HF Ratio.

(Maps sympathovagal balance and integration).

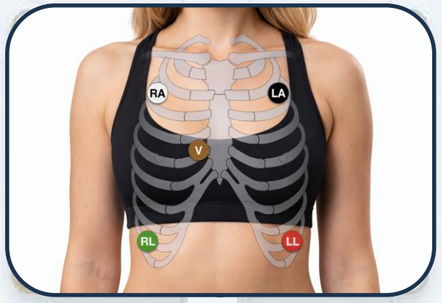
The Clinical Edge

Reduced HRV is an **independent predictor of sudden cardiac death**; NIBRA-CS quantifies this risk before outward symptoms appear.





4 Steps. 19 Minutes + Prep.
Zero Physician Supervision.



01
Attach
Place ECG patches and non-invasive BP cuff on the patient.

02
Setup
Position the patient and establish stable baseline readings via the touchscreen.

03
Perform
Follow on-screen, guided clinical prompts to execute reflex tests.

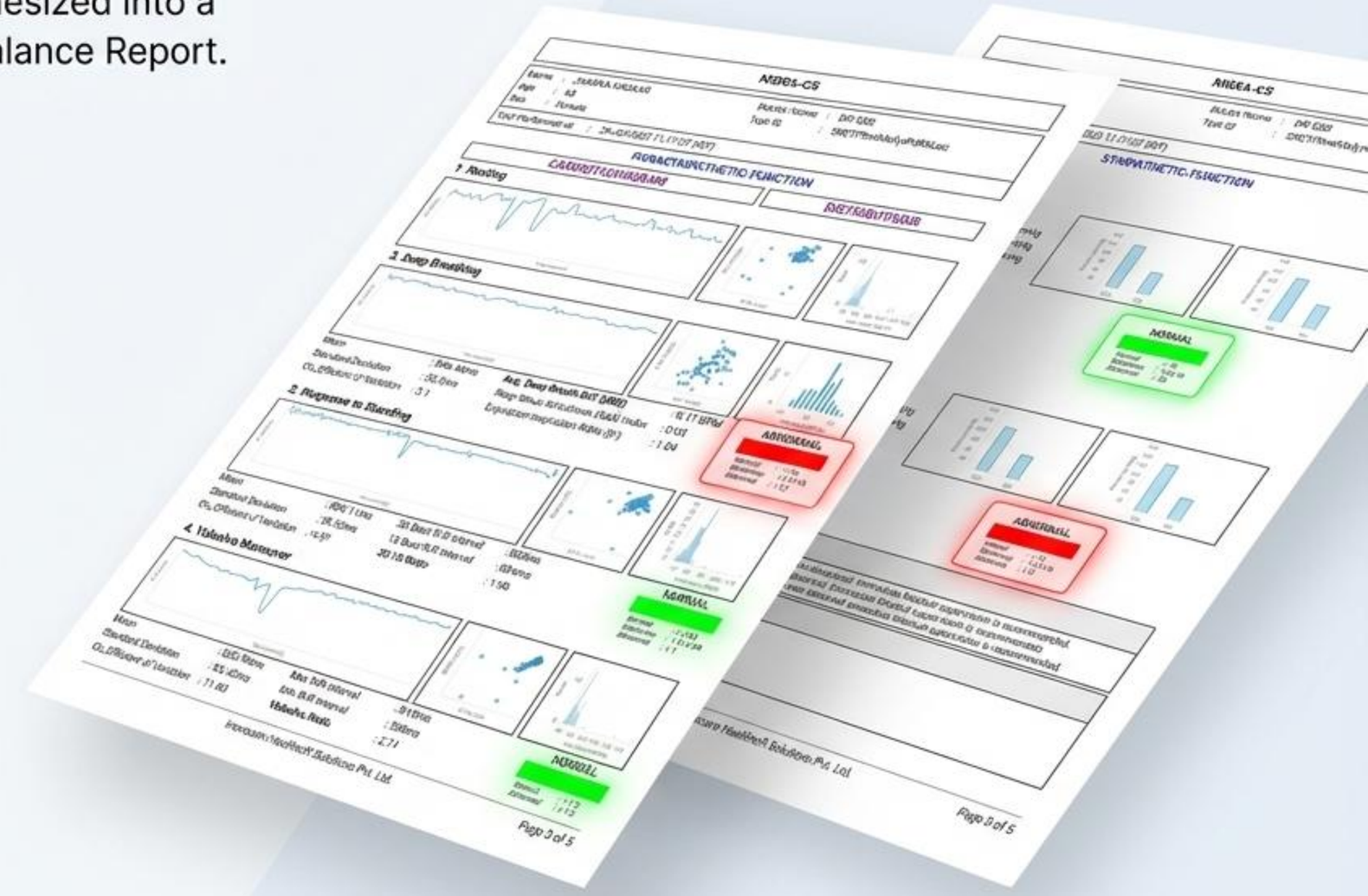
04
Report
Instant, cloud-ready digital report generation with scored results.

From Raw Data to Clinical Decision in Seconds

Complex physiological data is instantly synthesized into a color-coded, easy-to-interpret Autonomic Balance Report.

Report Architecture:

- Patient baseline & clinical context tracking.
- Beat-to-beat cardiotachogram analysis.
- Clear Normal / Borderline / Abnormal scoring using traffic-light (Red/Yellow/Green) indicators.
- Composite interpretation generating an immediate diagnostic conclusion.



Clinical Case Evidence: Detecting Severe CAN

Patient Profile

53-year-old female, suspected autonomic involvement.

Baseline resting ECG appeared stable (QT 337ms).

CASE STUDY

Hidden Findings

Impaired Deep Breathing

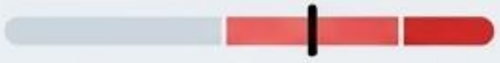
8.17 BPM diff

Abnormal
< 10

Hidden Findings

Reduced Vagal Reserve

30:15 ratio: 1.08



Borderline

Hidden Findings

Severe Sympathetic Dysfunction

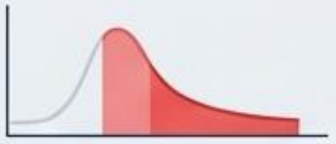
Handgrip Diastolic Rise: 3 mmHg

Abnormal
< 10

Hidden Findings

Altered Sympathovagal Balance

SDNN: 19.02 ms



Severely
low HRV

Diagnostic Outcome: Severe Cardiac Autonomic Dysfunction diagnosed, warranting immediate medical supervision.

Supported by DBT & DST Govt. of India

Transform Preventative Care into a Profit Center

Revenue per Hour

Vast Addressable Market

- Immediate, scalable application for existing diabetic, hypertensive, and autoimmune patient panels already inside your institution.

High Throughput & Optimized Labor

- 19-minute cycle (plus prep time) allows 25+ comprehensive tests per machine, per day.
- Delegated workflow conducted entirely by existing assistant-level staff, freeing up physician billing hours.

Ultra-Low OPEX

- Cost of operation is limited to standard, inexpensive ECG patches and disposable mouthpieces.

Validated by the Best. Trusted by Clinicians.

Regulatory Clearance

CDSCO MD5 Manufacturing License Granted.

CENTRAL DRUGS STANDARD CONTROL ORGANISATION
CDSCO CDSCO
MINISTRY OF HEALTH GOVERNMENT OF INDIA

Approved

Intellectual Property

Officially Patented Technology.

Patented

Clinical Validation

Extensively validated at AIIMS Kalyani; supported by a 800+ patient validation dataset and 4+ Ethics Committee approvals.

Institutional Backing

Recognized by BIRAC BIG, supported by the Govt. of India (DST & DBT), and incubated at **IIM Calcutta Innovation Park.**

birac
Govt. of India
IIM Calcutta Innovation Park

Beyond Diabetes: Multi-Territorial Diagnostic Utility

Diabetology

- Routine CAN screening
- Neuropathy progression tracking

Cardiology

- Unexplained syncope
- Arrhythmia risk assessment
- Resting tachycardia evaluation

NIBRA-CS®

Neurology & Internal Medicine

- Orthostatic hypotension differential diagnosis
- Autoimmune conditions
- Chronic liver disease monitoring

Research & Preventive Care

- Long-COVID dysautonomia
- Sports medicine physiology
- Longitudinal health tracking

Upgrade Your Diagnostic Capabilities Today

Schedule a clinical demonstration to see how NIBRA-CS can transform your practice, workflow, and patient outcomes.

Inovocare Healthsoft Solutions Pvt. Ltd.
(Incubated at IIM Calcutta Innovation Park)

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