

# CASE STUDY: Total Resolution of a Stage 4 Refractory Diabetic Ulcer

## A Unified Analysis of Bio-Physical Wound Resolution

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**Subject:** Patient Klaus D. (67)

- **Patient Profile:** 67-year-old male presenting with a "therapy-refractory" chronic leg ulcer.
- **Systemic Failures:** Co-diagnosed with **Diabetes Mellitus**, **Hypertension**, and **pAVK** (Peripheral Arterial Occlusive Disease).

### Clinical Summary

The patient underwent a high-intensity **Bio-Physical Transition** protocol consisting of **four CellSonic VIPP treatments**, spaced across a three-month period. Each session utilized a Stage 4 VIPP asset delivering **1,000 pulses** directly to the wound bed and the surrounding ischemic margins to stimulate local angiogenesis and bypass arterial occlusions.

Protocol	Ulcer Dimensions (mm)	Volume (mm3)	% Reduction	Clinical Result
<b>Start</b>	45 x 30 x 3	4050	0%	Baseline therapy-refractory ulcer
<b>1st Cellsonic Treatment</b>	45 x 30 x 2	2700	33%	Initial depth reduction
<b>2nd Cellsonic Treatment</b>	45 x 30 x 2	2700	33%	Stabilization phase
<b>3rd Cellsonic Treatment</b>	20 x 20 x 1	400	<b>90%</b>	Accelerated contraction (Mitotic trigger)
<b>4th (final) Cellsonic Treatment</b>	Closed	0	<b>100%</b>	<b>Complete Resolution</b>

Figure 1 Cellsonic Treatment protocol. Diabetic Ulcer 100% percent resolved in 4 sessions.

Despite systemic stalling caused by pAVK and Diabetes, the intervention achieved a **33% volume reduction** by the second treatment, followed by an accelerated contraction phase that resulted in a **90% reduction** by the fourth treatment. The protocol concluded with **100% total resolution (closure)** of the stage 4 ulcer, successfully overriding years of metabolic stasis and chemical treatment failure.

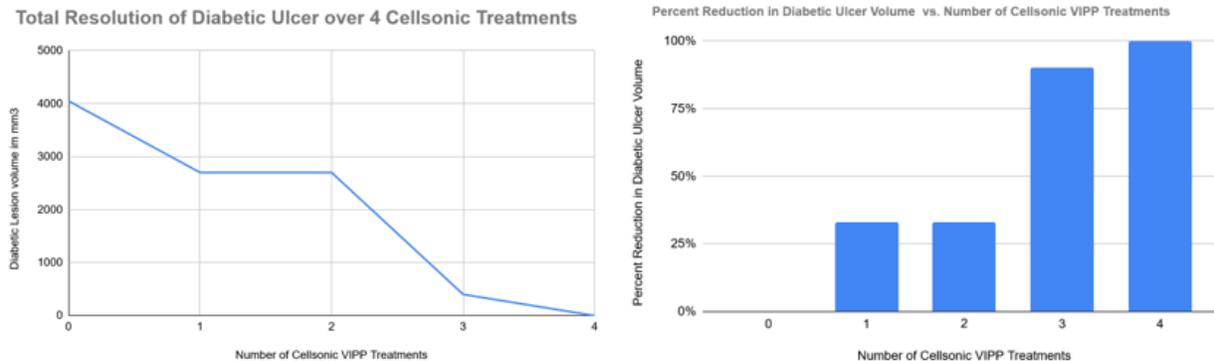


Figure 2 Cellsonic Diabetic Ulcer Treatment summary showing volume shrinkage towards total resolution in over 4 sessions.



Figure 3 Photographs showing the complete resolution of diabetic ulcer using Cellsonic VIPP bio-physics

## II. The Mechanism: Diabetic Wound Healing via CellSonic Bio-Physics

The resolution of the diabetic ulcer in this case study is not anomalous. Unlike traditional wound care—which relies on chemical topicals and systemic antibiotics—bio-physics identifies three distinct physical mechanisms that drive the resolution of chronic disease:

### 1. Restoration of the "Current of Injury" (The Bio-Electric Reset)

Central to wound healing using CellSonic bio-physics is the restoration of the **transmembrane potential**. Chronic wounds are characterized by a "stalled" electrical state (**0 mV**) which halts cellular communication and division. The VIPP pulse restores the regenerative voltage (**-50 mV** required for mitosis. This resets the "**Current of Injury**," creating a bio-electric beacon that initiates **Electrotaxis**—the directed migration of fibroblasts and stem cells to the site of tissue loss.

### 2. Mechanical Bactericide (The End of Antibiotic Dependency)

CellSonic establishes a new standard in infection control through **Mechanical Sterilization**. The intense pressure pulses physically rupture the cell walls of pathogens and shatter protective **Biofilms**. This mechanical action is effective against Gram-positive and Gram-negative bacteria (including MRSA and Pseudomonas) without the risk of Antimicrobial Resistance (AMR). By clearing the field of infection through physics rather than chemistry, the wound environment is instantly optimized for the CDK1 activated healing phase.

### 3. Neovascularization and Stem Cell Recruitment

Treatment with CellSonic Very Intense Pulsed Pressure (VIPP) technology acts as a catalyst for **Angiogenesis**, the formation of new capillary networks. In ischemic patients (like Klaus D.), the VIPP pulses trigger the release of vascular growth factors that physically rebuild the blood supply to "dead" zones. Furthermore, the protocol signals the body to release **systemic stem cells** into the blood, which are then electrically "called" (via the restored Vm gradient) to the treatment site to begin structural re-engineering of the dermis.

Wound Healing Principle	The Problem (Chronic Stasis)	The Bio-Physics Solution (VIPP)	Clinical Outcome
1. Bio-Electric Reset	Flat gradient (0 mV); stalled communication.	<b>Voltage Restoration:</b> Re-establishes <b>-50 mV</b> and the <b>Current of Injury</b> .	Directed Electrotaxis of stem cells/fibroblasts to the wound center.
2. Mechanical Bactericide	Antibiotic-resistant biofilms; chemical toxicity.	<b>Sonic Rupture:</b> Physical destruction of bacterial cell walls.	<b>Physical destruction of bacterial cell walls. Sterile wound bed optimized for CDK1 genetic ignition.</b>
3. Structural Recruitment	Ischemia; "dead" vascular zones.	<b>Angiogenesis Catalyst:</b> Triggers <b>VEGF</b> and <b>systemic stem cell</b> release.	New capillary networks and structural re-engineering of the dermis.

Figure 4 Diabetic Wound Healing Mechanisms demonstrated by Cellsonic VIPP biophysics

### III. The Evidence: The Busch Report Cohort Study

The success of individual cases like Klaus D. is validated by the large-scale cohort data from **Christian Busch and the University of Tuebingen (2017)**. The evidence-based conclusions of the study leave zero doubt as to the efficacy of CellSonic Bio-physics as the best modality for the healing of chronic open wounds like diabetic ulcers.

- **The 92% Success Benchmark:** In a study of 75 therapy-refractory ulcers, **92%** showed significant positive response. This proves efficacy is independent of patient age (ranging 12–93 years) or the underlying cause of the lesion.
- **The 50-Year Threshold:** The study successfully resolved wounds that had remained open for up to **50 years**, proving that the VIPP protocol can override decades of chronic biological stalling where standard care failed.
- **400% Genetic Ignition:** Molecular analysis confirmed a **4-fold increase in CDK1** and Cyclin A2 within 24 hours of treatment. These are the master switches that restart the stalled genetic machinery of cell division (Mitosis).
- **Multi-Front Regeneration:** The study documented the transformation of dormant cells into active "wound fibroblasts" and the induction of **capillary network formation** (angiogenesis), physically rebuilding the blood supply to the wound site.

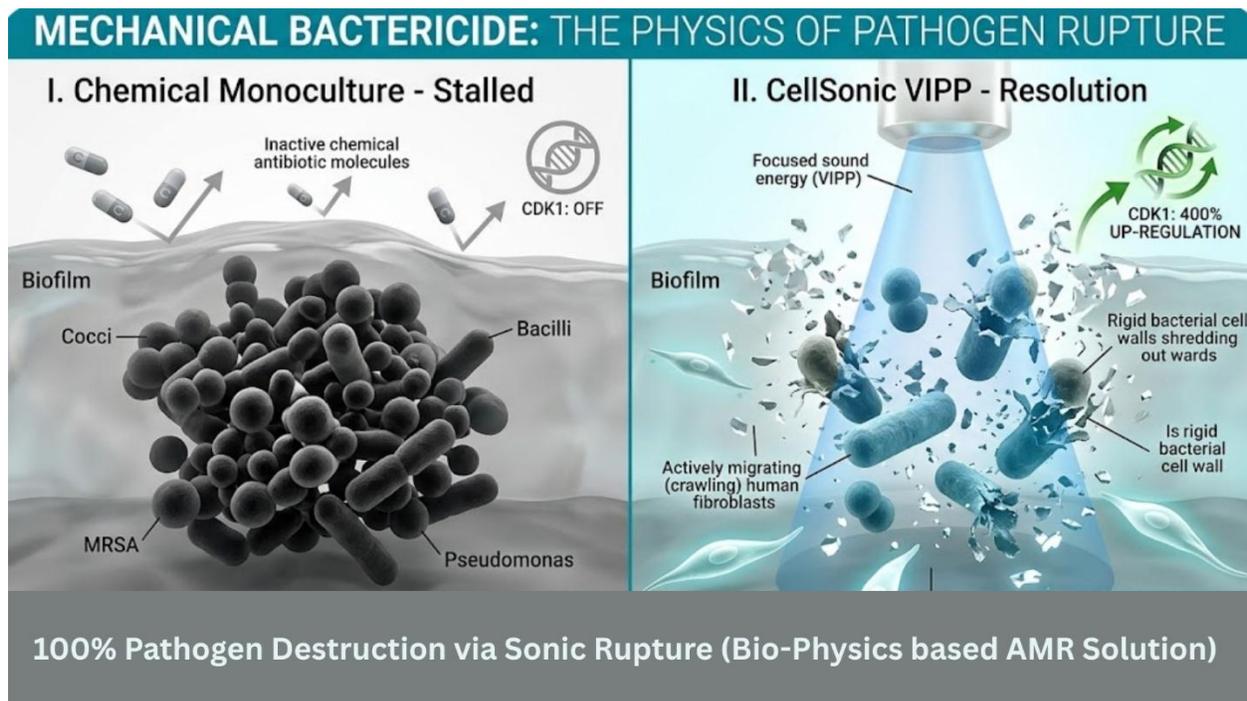


Figure 5 An Illustration of the mechanical bactericide effects of CellSonic VIPP. Completely negates the issue of antibiotic resistance.

### Summary and Conclusions

The resolution of Klaus D.'s stage 4 ulcer serves as a definitive validation of the Bio-Physics Transition. By bypassing the systemic failures of the chemical monopoly—specifically the "metabolic stasis" caused by diabetes and arterial occlusion—the **CellSonic VIPP** establishes a new clinical standard for high-throughput wound resolution. This technology does not merely manage symptoms; it physically re-starts the body's stalled genetic and bio-electric machinery, which represents a high-margin strategic shift away from labor-intensive, antibiotic-dependent "management" toward a bio-physics-led model of rapid, total tissue regeneration.

## Supportive References

### 1. The Bio-Electric Pillar: Transmembrane Potential (Voltage)

- **Tennant, J. (2010).** *Healing is Voltage*.
  - **Voltage Reset:** Cells need **-50mV** to heal; VIPP "recharges" the cellular battery.
- **Haltiwanger, S. (2003).** *Electrical Properties of Cells*.
  - **Liquid Crystal Reset:** Uses mechano-transduction to restore **Transmembrane Potential (Voltage)** and metabolism.
- **Sagi, J., et al. (2020).** *Regenerative Medicine*.
  - **Current of Injury:** Re-establishes the bio-electric beacon (Vm gradient) for cell migration.
- **Zhao, M. (2009).** *Seminars in Cell & Dev Bio*.
  - **Electrotaxis:** Proves that human cells physically follow electrical gradients to close gaps.

### 2. Modern Neovascularization & Homing

- **Contaldo, C., et al. (2020).** *Journal of Clinical Medicine*.
  - **Angiogenesis:** Triggers **VEGF** to build new vessels where chemical drugs cannot reach.
- **Asari, R., et al. (2021).** *J. Orthopaedic Surgery & Research*.
  - **Stem Cell Recruitment:** Increases **SDF-1** signaling to pull endogenous stem cells to the site of injury.

### 3. The Busch Report: Molecular & Cohort Validation

- **Busch, C., et al. (2017).** *Cell Physiol Biochem*.
  - **400% Genetic Ignition:** Documented 4-fold increase in **CDK1** (Mitotic Machinery).
- **Busch, C., et al. (2017).** *Journal of Wound Care*.
  - **92% Success:** Evidence that VIPP overrides decades of metabolic stalling.