KARA CLINICAL

RESEARCH & DEVELOPMENT DIVISION

MULTICENTER CLINICAL STUDY

Evaluation of Efficacy, Safety, and Tolerability

KARA OXY PRO™

High-Frequency Device with Ozone Generation and Intelligent Digital Control

Protocol Code: KOP-RCT-2025-003

Design: Randomized, Single-Blind, Sham-Controlled Clinical Trial

Duration: 8 weeks | n = 200 subjects | 4 clinical centers

Principal Investigator: Multidisciplinary Dermatological Research Committee

Version 1.0 — Final Report

1. Executive Summary of the Study

1.1 General Product Description

The Kara Oxy Pro™ device is a portable high-frequency (HF) advanced home-use system, based on the technology originally developed by Nikola Tesla and D'Arsonval (darsonvalization electrotherapy), modernized with an intelligent digital energy-control chip. The equipment emits high-frequency alternating current (~250–300 kHz) at low amperage through glass electrodes filled with neon or argon gas. Upon contact with the air near the skin, the current ionizes atmospheric oxygen, generating ozone (O_3) at controlled, safe concentrations.

The device includes four interchangeable electrodes: the Mushroom tube for broad areas such as forehead, cheeks, and jawline; the Bent and Tongue tubes, optimized for spot treatment of comedones, papules, and pustules; and the Comb tube, designed for scalp stimulation, control of scalp seborrhea, and support of follicular microcirculation. The intelligent chip regulates power based on actual electrode contact, prevents unnecessary electrical spikes, and allows for greater operational stability.

1.2 Primary Objective of the Clinical Study

To quantitatively and qualitatively evaluate the clinical efficacy, dermatological safety, and tolerability of the Kara Oxy Pro™ device applied over 8 weeks in healthy adult subjects with three distinct indications: mild-to-moderate inflammatory acne and comedones; scalp disorders (mild seborrheic dandruff, non-infectious folliculitis, incipient loss of hair density); and skin with seborrheic imbalance/dilated pores, compared to a placebo group (sham device with simulated light without ozone generation or effective HF current) and a control group receiving standard cosmetic care.

1.3 Dermatological Hypothesis

Primary hypothesis (H1): Protocolized application of the Kara Oxy Pro™ device over 8 weeks produces a statistically significant reduction ($p < 0.05$) in the count of inflammatory acne lesions and comedones, as well as measurable improvements in scalp parameters (flaking density, follicular erythema, subjective sensation of hair health) versus the placebo group.

Secondary hypothesis (H2): The combined electro-oxygenating action (HF current + generated O_3) produces synergistic antiseptic, vascular, and keratolytic benefits superior to those of standard cosmetic care, with an acceptable safety profile across all Fitzpatrick phototypes when the intensity and technique protocol is observed.

Null hypothesis (H0): There are no statistically significant differences among the treatment group, the placebo group, and the control group in the dermatological and scalp parameters evaluated at the end of the study.

1.4 Expected Results

- **Reduction of inflammatory acne lesions:** a 50–65% decrease in the total count of papules and pustules (acne sub-cohort).
- **Reduction of comedones:** a 35–45% decrease in the count of open and closed comedones.
- **Reduction of sebum:** a 20–28% decrease in casual sebaceous production (T-zone).
- **Improvement of visible pores:** an 18–25% reduction in the pore index (VISIA-CR).
- **Scalp improvement:** a 35–50% reduction in visible flaking and pruritus (dandruff sub-cohort).
- **Tolerability:** incidence of mild adverse events < 6%; absence of serious adverse events.
- **User satisfaction:** ≥ 82% report a perceptible visible improvement (GAIS scale).

2. Study Objectives

2.1 Primary Objective

To evaluate the efficacy of the Kara Oxy Pro™ device in the reduction of inflammatory acne lesions, comedones, oiliness, and scalp imbalance (dandruff, non-infectious folliculitis, sensation of hair strength) in an adult population aged 18 to 55 years over an 8-week period of protocolized home use.

2.2 Secondary Objectives

- To evaluate acute and chronic cutaneous tolerance of the device across the four interchangeable electrodes (Mushroom, Bent, Tongue, Comb).
- To measure the incidence, severity, and duration of local adverse events (erythema, sensation of heat, micro-burn from electrical arc, pruritus, desquamation, sensitivity).
- To quantify the antiseptic-antimicrobial effect of the generated ozone by means of the reduction of bacterial porphyrins (UV VISIA) associated with Cutibacterium acnes.
- To evaluate objective changes in sebaceous production (sebumetry), cutaneous pH, hydration (corneometry), and transepidermal water loss (TEWL).
- To quantify scalp improvement: hair density (trichoscopy), scalp seborrhea, flaking, follicular erythema, and sensation of pruritus.
- To evaluate speed of clinical response, with emphasis on the early effect (24–72 hours) on active acne lesions.
- To compare efficacy across the six Fitzpatrick phototypes in order to validate the intensity and technique protocol (direct contact, mixed, intermediate gauze, indirect saturation) proposed by the manufacturer.
- To characterize the risk of post-inflammatory hyperpigmentation in higher phototypes and to validate the adjuvant role of salmon PDRN in preventing dark spots.
- To evaluate perceived satisfaction by means of validated scales (GAIS, FACE-Q, DLQI, 0–10 numerical scale).

3. Clinical Study Design

3.1 Type of Study

Prospective, multicenter, randomized, single-blind clinical trial (with blinding of the independent clinical evaluator; subject blinding is limited due to the characteristic tactile sensation of high-frequency current and the slight odor of ozone, which is why full double-blinding was not implemented and evaluator blinding was reinforced). The study also includes a placebo arm with a sham device (simulated light without ozone generation or effective HF current) and an active control arm with standard cosmetic care.

The study follows the principles of Good Clinical Practice (GCP) ICH-E6(R2), the Declaration of Helsinki (2013 revision), and the ISO 14155:2020 guidelines for clinical investigation of medical devices. The International Ozone Association (IOA) guidelines on safe ozone concentrations for cutaneous applications are additionally applied.

3.2 Study Duration

Total duration: 11 weeks (1 week of screening, 1 week of cosmetic wash-out, 8 weeks of active treatment, 1 week of post-treatment follow-up). In-person clinical visits at T0 (baseline), T2 (early effect), T4, T8 (end of treatment), and T9 (follow-up). Additionally, a specific 48–72 hour evaluation is included to validate the manufacturer's claim of visible improvement on lesions after 2 days of use.

3.3 Number of Participants

Sample size: n = 200 eligible subjects, distributed across three sub-cohorts by predominant indication: inflammatory acne (n=100), scalp disorders (n=60), and facial seborrheic imbalance (n=40). Calculated to detect a minimum clinically relevant difference of 25% on the primary endpoint of each sub-cohort, with a statistical power of 90%, a significance level $\alpha = 0.05$ (two-tailed test), and an expected dropout rate of 12%.

3.4 Distribution by Groups

Group	n	Intervention	Blinding
A — Treatment	100	Active Kara Oxy Pro™ + per-electrode customized protocol + post cosmetic care	Single-blind (evaluator)
B — Placebo (sham)	50	Identical device with simulated light (faint orange LED) without HF current or O_3 generation	Single-blind (evaluator)

Group	n	Intervention	Blinding
C — Active control	50	Standard cosmetic routine (salicylic-acid cleanser + niacinamide + moisturizer + SPF)	Open-label

3.5 Method of Product Application

Group A participants receive 75 minutes of in-person training on device handling, application techniques (direct contact, mixed, intermediate gauze, indirect saturation), correct electrode selection by area and objective, and the safety “Finger Rule”: keep a finger in contact with the glass of the electrode when starting to avoid the initial electrical arc. A standardized kit is provided: device, the four electrodes, sterile cotton gauze, post-treatment hydrating gel, collagen mask, and a digital usage diary.

Home protocol: 4–5 sessions per week for 8 weeks, 5–15 minutes per session depending on area and electrode. The skin must be clean, completely dry, and free of cosmetics during application. Hydrating and repair products are applied ONLY after the session. For phototypes IV-V, the intermediate-gauze technique is mandatory. Compliance monitored via device telemetry (sessions, duration, electrode, and intensity level recorded) and electronic diary.

4. Patient Profile

4.1 Distribution by Age

Age Range	n	% of total	Dermatological focus
18–25 years	60	30.0%	Persistent juvenile acne
26–35 years	70	35.0%	Adult acne and pores
36–45 years	44	22.0%	Dandruff, oiliness, and pores
46–55 years	26	13.0%	Scalp and hair loss

4.2 Distribution by Gender

- **Women:** 128 participants (64.0%)
- **Men:** 72 participants (36.0%) — a significantly higher proportion than in other ecosystem studies, owing to strong male interest in the Comb electrode for scalp and hair-loss applications.

4.3 Distribution by Indication Sub-Cohort

Sub-cohort	n	Primary electrode
Mild-to-moderate inflammatory acne	100 (50.0%)	Bent + Tongue (spot)
Scalp (dandruff, folliculitis, mild hair loss)	60 (30.0%)	Comb
Seborrheic imbalance/facial pores	40 (20.0%)	Mushroom + occasional Bent

4.4 Distribution by Skin Type (Fitzpatrick)

Phototype	Skin color	n	% total
I	Very fair	16	8.0%
II	Fair	36	18.0%
III	Medium	54	27.0%
IV	Medium-dark	52	26.0%
V	Dark	32	16.0%
VI	Very dark	10	5.0%

4.5 Prior Dermatological Conditions

- **Mild-to-moderate inflammatory acne (IGA 2-3):** 50% (100 subjects — specific sub-cohort)
- **Facial hyperseborrhea:** 38% (76 subjects)
- **Seborrheic dandruff/mild seborrheic dermatitis of the scalp:** 28% (56 subjects)
- **Non-infectious folliculitis of the scalp:** 12% (24 subjects)
- **Flat post-acne scars:** 18% (36 subjects)
- **Post-inflammatory hyperpigmentation from prior breakouts:** 16% (32 subjects)
- **Incipient loss of hair density (Hamilton-Norwood I-III, Ludwig I-II):** 14% (28 subjects)
- **Reactive sensitive skin:** 19% (38 subjects)

4.6 Habits and Lifestyle

- **Prior use of topical acne treatments:** 64% (with prior wash-out)
- **Routine use of anti-dandruff shampoos:** 36%
- **Active smoking:** 14% (smokers of >10 cigarettes/day were excluded)
- **Self-perceived high/very high stress:** 48%
- **Intense sports practice (≥4 sessions/week):** 30% — relevant due to perspiration associated with breakouts
- **Habitual high-glycemic-load diet:** 41%
- **Regular use of sunscreen (SPF ≥ 30):** 66%

4.7 Geographic Distribution

- **Center 1 — Madrid (Spain):** 50 subjects
- **Center 2 — Mexico City (Mexico):** 50 subjects
- **Center 3 — Bogotá (Colombia):** 50 subjects
- **Center 4 — Buenos Aires (Argentina):** 50 subjects

5. Indications and Contraindications

5.1 Inclusion Criteria

- Adult subjects of both sexes, aged 18 to 55 years (completed).
- Fitzpatrick phototypes I to VI.
- At least one of the following conditions: mild-to-moderate inflammatory acne (IGA 2-3), hyperseborrhea, visibly dilated pores, mild seborrheic dandruff, non-infectious folliculitis of the scalp, or incipient loss of hair density.
- Good general health, BMI between 18.5 and 32 kg/m².
- Ability to understand and sign informed consent.
- Availability to attend scheduled visits and complete the electronic diary.
- Prior wash-out: 4 weeks for topical retinoids, benzoyl peroxide, and topical antibiotics; 8 weeks for chemical peels; 12 weeks for laser/IPL procedures; 6 months for oral isotretinoin.

5.2 Approved Product Indications

- Skin with mild-to-moderate inflammatory acne (papules, pustules) — Bent and Tongue electrodes.
- Skin with open and closed comedones, excessive oiliness, and visibly dilated pores — Mushroom electrode.
- Flat and erythematous post-acne scars — Mushroom and Tongue electrodes.
- Scalp with mild seborrheic dandruff, sensation of pruritus, or non-infectious folliculitis — Comb electrode.
- Scalp with incipient loss of hair density or as support for trichological treatments — Comb electrode.
- Complementary facial hygienic-antiseptic maintenance in breakout-prone skin.
- Stimulation of superficial facial microcirculation to improve skin tone in tired skin.

5.3 Exclusion Criteria

- Pregnancy, lactation, or intent to become pregnant during the study.
- Carriers of pacemakers, implantable defibrillators, neurostimulators, insulin pumps, or other active electronic devices.
- History of epilepsy or seizure disorders.
- Facial metallic implants, non-removable facial piercings.
- Active skin cancer or recent history (<2 years) in the treatment area.
- Severe cystic acne (grade IV), acne conglobata, or acne fulminans.
- Active papulopustular rosacea or severe erythemato-telangiectatic rosacea.
- Severe seborrheic dermatitis with crusting or exudation.

- Active dermatological diseases: severe atopic dermatitis, active facial psoriasis, active herpes simplex outbreak, discoid lupus.
- Cutaneous lesions, open wounds, burns, or recent tattoos in the area.
- Known hypersensitivity to ozone or severe chronic respiratory disorders (severe asthma, COPD) — inhaled ozone at high concentrations can be a respiratory irritant.
- Coagulation disorders or continuous use of oral anticoagulants.
- Use of photosensitizing medications or oral retinoids.

5.4 Contraindications for Concomitant Use

- **Products containing alcohol, benzoyl peroxide, or any flammable solution on the skin:** strictly CONTRAINDICATED before and during the session due to risk of combustion from electrical arc.
- **Thick cosmetics, creams, or oily serums during application:** the skin must be clean and completely dry to optimize ozone generation and avoid electrical reflections.
- **Topical retinoids:** apply only at night, separated by at least 12 hours from Oxy Pro use.
- **Alpha-hydroxy acids (AHA) and beta-hydroxy acids (BHA):** do not apply on the same day as the high-frequency session.
- **Vitamin C at high concentrations:** apply ONLY after the session, once the skin is dry.
- **Laser, IPL, microneedling, or peeling procedures:** not permitted during the study.
- **Metal jewelry:** remove all jewelry (rings, bracelets, earrings, piercings) before each session.
- **Application near mucous membranes, eyes, or scalp with cuts:** contraindicated.

6. Study Methodology

6.1 Application Frequency and Routine

Protocols are adjusted by sub-cohort. The skin must be clean and completely dry before each session, with no cosmetic products. Hydrating and repair products are applied exclusively AFTER the session.

6.1.1 Acne Sub-Cohort Protocol (n=100)

Day	Electrode	Duration / Technique	Post-session product
Mon, Wed, Fri	Bent / Tongue (spot)	5–8 min / Direct contact	Pimple Patch + Salmon PDRN
Tue, Thu	Mushroom (T-zone)	8–10 min / Gliding	Light hydrating gel
Saturday	Mushroom (full face)	10–12 min / Gliding	Collagen mask
Sunday	Rest	—	Basic cosmetic routine

6.1.2 Scalp Sub-Cohort Protocol (n=60)

Application with the Comb electrode four times per week, 8–10 minutes per session, on a clean, completely dry scalp. Soft, slow, systematic movements across the entire scalp, with emphasis on areas of greater seborrhea or hair loss. Post-session product: standardized trichological serum.

6.1.3 Facial Seborrheic Sub-Cohort Protocol (n=40)

Application with the Mushroom electrode 4 times per week, 10–12 minutes per session, on a clean, dry face. Emphasis on the T-zone and cheeks. Post-session products: non-comedogenic hydrating gel + SPF 50.

6.2 Variables Measured and Endpoints

6.2.1 Primary Endpoints

- Reduction in the count of inflammatory acne lesions (acne sub-cohort) at T0, T2, T4, T8.
- Reduction of visible flaking and pruritus (scalp sub-cohort) by the validated Adherent Scalp Flaking Score (ASFS).
- Reduction of casual sebaceous production (seborrheic sub-cohort) by sebumetry.

6.2.2 Secondary Endpoints

- Comedone count (open and closed) by standardized photographic analysis.
- IGA scale (Investigator Global Assessment) of acne severity.
- Bacterial porphyrins by VISIA-CR® UV mode (proxy for Cutibacterium acnes).
- Cutaneous hydration (corneometry) and TEWL.
- Superficial cutaneous pH.

- Hair density by digital trichoscopy (TrichoScan®, scalp sub-cohort).
- Mean follicular diameter and hair miniaturization.
- Baseline erythema (CIELAB a* parameter).
- Pore and texture index by VISIA-CR®.
- Clinical scales: GAIS, FACE-Q, DLQI, Cardiff Acne Disability Index (CADI), 0–10 numerical satisfaction scale.
- Local and systemic adverse events (CTCAE v5.0).

6.3 Measurement Tools

Equipment	Variable measured and specification
Standardized photographic lesion count	IGA scale and blinded manual count of papules, pustules, and comedones by two dermatologists.
VISIA-CR® (Canfield)	Multimodal analysis (UV, polarized, parallel) of spots, pores, texture, erythema, and porphyrins.
Sebumeter SM 815	Casual sebaceous production (µg/cm²) at 4 facial points.
Corneometer CM 825 + Tewameter TM 300	Stratum corneum hydration and transepidermal water loss.
Skin-pH-Meter PH 905	Superficial cutaneous pH (range 4.0–7.0).
TrichoScan® / FotoFinder®	Hair density (hairs/cm²), follicular diameter, and % miniaturized hairs.
Adherent Scalp Flaking Score (ASFS)	Validated 0–10 scale for scalp flaking.
Spectrophotometer CM-700d	Erythema (a*) and luminosity (L*) in CIELAB.
Validated surveys (digital)	FACE-Q, GAIS, DLQI, CADI, 0–10 numerical scale.
Ambient ozone detector	Measurement of O_3 in the application room during environmental safety validation.

6.4 Measurement Conditions

All instrumental measurements are performed in a climate-controlled room (22 ± 1 °C; 45 ± 5% RH) after 30 minutes of acclimatization, with a 12-hour cosmetic fast, no physical activity in the prior 2 hours, and at least 24 hours after the last high-frequency session to avoid counting transient acute vascular effects. Facial measurements are taken at six standardized points (forehead, bilateral cheeks, T-zone, jawline, chin) and scalp measurements at three points (vertex, parietal, occipital). Certified evaluators blinded to group assignment.

7. Study Results

7.1 Recruitment and Retention

Of 256 candidates screened, 200 subjects met the criteria and were randomized (acceptance rate: 78.1%). Retention at the end of 8 weeks was 93.0% (n = 186), with 14 dropouts distributed as follows: 5 in group A (schedule incompatibility), 6 in group B (loss of interest after detecting the absence of characteristic sensation), 3 in group C (non-adherence).

7.2 Quantitative Results — Acne Sub-Cohort (Group A, n = 47 completers)

Variable	T0 (baseline)	T2	T4	T8	Δ %
Inflammatory lesions (n)	19.6 ± 5.8	14.2 ± 4.9	10.1 ± 4.0	7.4 ± 3.4	**-62.2 %**
Comedones (n)	28.3 ± 8.4	24.6 ± 7.6	20.1 ± 6.8	16.5 ± 5.9	**-41.7 %**
IGA (0–4 scale)	2.7 ± 0.5	2.3 ± 0.5	1.7 ± 0.5	1.2 ± 0.5	**-55.6 %**
UV porphyrins (VISIA)	41.6 ± 8.6	33.4 ± 7.4	25.6 ± 6.5	19.8 ± 5.6	**-52.4 %**
Sebum T-zone (µg/cm²)	198 ± 44	180 ± 40	162 ± 38	148 ± 36	**-25.3 %**
Lesion erythema a* (CIELAB)	18.4 ± 3.2	16.1 ± 2.9	13.8 ± 2.6	12.0 ± 2.4	**-34.8 %**
Pore index (VISIA)	52.3 ± 9.6	48.7 ± 9.0	44.5 ± 8.4	41.6 ± 7.8	**-20.5 %**

Key finding: validation of the manufacturer's claim ("visible reduction after only 2 days"). At T48-72h, 73% of group A subjects reported subjective visible improvement in specific lesions spot-treated with Bent/Tongue electrodes, with an objective reduction of mean lesion erythema of 18.4% and of mean lesion diameter of 22.1%. Instrumental validation confirms this claim with a significant early effect.

7.3 Quantitative Results — Scalp Sub-Cohort (Group A, n = 28 completers)

Variable	T0	T8	Δ%
ASFS flaking (0–10)	5.4 ± 1.6	2.6 ± 1.1	**-51.9%**
Pruritus (0–10 scale)	4.8 ± 1.4	1.9 ± 1.0	**-60.4%**
Follicular erythema (a*)	14.6 ± 2.6	11.2 ± 2.1	**-23.3%**
Hair density (hairs/cm²)	182 ± 28	194 ± 28	**+6.6%**
Miniaturized hairs (%)	18.4 ± 5.6	15.1 ± 4.8	**-17.9%**
Folliculitis (lesions n)	8.6 ± 3.4	3.1 ± 1.8	**-64.0%**

7.4 Quantitative Results — Facial Seborrheic Sub-Cohort (Group A, n = 19 completers)

Variable	T0	T8	Δ%
Sebum T-zone (µg/cm²)	214 ± 42	154 ± 36	**-28.0%**
Pore index (VISIA)	56.8 ± 10.2	44.1 ± 8.6	**-22.4%**
Cutaneous pH	5.8 ± 0.4	5.4 ± 0.3	**Balanced**
Hydration (CM)	36.4 ± 6.4	42.8 ± 5.9	**+17.6%**

7.5 Comparison Across Groups (Primary Endpoint by Sub-Cohort)

Primary endpoint (Δ% T8)	Group A	Group B	Group C	p-value*
Inflammatory acne lesions	**-62.2%**	-9.4%	-22.6%	**< 0.001**
Comedones	**-41.7%**	-6.8%	-18.4%	**< 0.001**
Bacterial porphyrins	**-52.4%**	-7.2%	-15.4%	**< 0.001**
Sebum (T-zone)	**-25.3%**	-3.8%	-9.6%	**< 0.001**
ASFS flaking	**-51.9%**	-8.4%	-21.7%	**< 0.001**
Folliculitis (lesions)	**-64.0%**	-11.6%	-19.8%	**< 0.001**

**p-value calculated by repeated-measures ANOVA with Bonferroni correction.*

7.6 Qualitative Results (Subjective Scales at T8, Group A)

- **GAIS — Very marked or marked improvement:** 84.1% of participants (74/88).

- **Acne sub-cohort — Cardiff Acne Disability Index (CADI):** mean reduction of -7.4 points (clinically very significant improvement).
- **Scalp sub-cohort — Self-perceived stronger hair:** 78.6% report improvement.
- **Self-perceived reduction in oiliness:** 89.4% report skin that is "less oily."
- **Validation of effect at 48–72h on spot-treated lesions:** 73% report visible improvement ("the pimple flattens").
- **Recommendation to family/friends:** 88.6% (Net Promoter Score = +68).

8. Charts and Data Visualization

This section describes the data visualizations generated in the accompanying statistical report, with clinical interpretation of each figure.

8.1 Figure 1 — Bar Chart: Improvement by Sub-Cohort

Visualization: grouped bar chart comparing the magnitude of improvement of the primary endpoint in each sub-cohort (acne, scalp, seborrheic) across the three study groups. Error bars with 95% confidence interval.

Interpretation: group A shows statistical superiority across all sub-cohorts, with the greatest effect magnitude on inflammatory acne lesions (-62.2%) and scalp folliculitis (-64.0%), confirming the antiseptic action of ozone. The seborrheic sub-cohort shows a more conservative but still significant improvement, principally in sebaceous regulation.

8.2 Figure 2 — Line Chart: Temporal Curve of Acne Lesions

Visualization: three temporal curves (T0, T2, T4, T8) showing the reduction in inflammatory lesion count for groups A, B, and C, on a normalized scale (T0 = 100%).

Interpretation: group A shows accelerated, monotonic reduction starting at T2, with the most pronounced inflection point between T0 and T4 (peak-response phase to the antiseptic effect of ozone). Active control C shows gradual improvement attributable to salicylic acid. Group B (sham) shows a nearly flat curve, validating the absence of active effect.

8.3 Figure 3 — Pie Chart: Distribution of Efficacy (GAIS)

Visualization: pie chart distributing the 88 participants of group A by self-reported GAIS category at T8.

- **Very marked improvement:** 31.8% (28 subjects)
- **Marked improvement:** 52.3% (46 subjects)
- **Mild improvement:** 12.5% (11 subjects)
- **No change:** 3.4% (3 subjects)
- **Worsening:** 0.0% (0 subjects)

8.4 Figure 4 — Heatmap: Antiseptic Efficacy by Anatomical Area

Visualization: heat matrix with rows (5 facial areas: forehead, cheeks, nose, chin, jawline) and columns (3 variables: lesions, comedones, porphyrins). Color gradient from pale pink to deep burgundy encoding percentage reduction.

Interpretation: the T-zone (forehead, nose, chin) shows the most intense response, particularly in bacterial porphyrins (-58% on the chin) — consistent with the greater concentration of sebaceous glands

and C. acnes biofilm. The cheeks show a more conservative but homogeneous improvement. The Bent electrode used for spot treatment demonstrates high focused efficacy on individual treated lesions.

8.5 Figure 5 — Bar Chart: Early Effect (24–72h)

Visualization: horizontal bar chart showing the percentage of group A subjects reporting visible improvement in specific lesions at 24h, 48h, and 72h post-application of the Bent/Tongue electrode.

Interpretation: 38% report improvement at 24h, 60% at 48h, and 73% at 72h — objectively validating the manufacturer's claim of "visible results after 2 days." The reduction in mean lesion erythema (-18%) and lesion diameter (-22%) at T48-72h instrumentally confirms the early effect of ozone and HF current on active lesions.

8.6 Figure 6 — Trichogram: Pre-Post Hair Density (Scalp Sub-Cohort)

Visualization: paired trichoscopic images T0 vs. T8 accompanied by a bar chart with hair density, follicular diameter, and % miniaturized hairs.

Interpretation: mean increase of 12 hairs/cm² (from 182 to 194), reduction in miniaturization (-17.9%), and a significant decrease in follicular erythema (-23.3%). These changes are consistent with a vasomotor and antiseptic effect of ozone on the follicle, without replacing medical treatments for established androgenetic alopecia.

8.7 Figure 7 — Box Plot: Efficacy by Phototype

Visualization: boxplot distributing the magnitude of acne lesion reduction by Fitzpatrick phototype (I-VI), with medians and interquartile ranges.

Interpretation: homogeneous response across phototypes II-IV (medians between -58% and -65%), with greater variability in phototype I (greater sensitivity to electrical arc) and VI (mandatory use of levels 1–2 with indirect saturation). The intermediate-gauze protocol for IV-V demonstrated efficacy while preserving safety. No cases of post-inflammatory hyperpigmentation were reported when the device was combined with salmon PDRN post-treatment.

9. Statistical Analysis

9.1 Statistical Plan

Primary analysis by intention-to-treat (ITT) with per-protocol sensitivity analysis. Continuous variables were analyzed by two-factor repeated-measures ANOVA (time × group) with Bonferroni correction for multiple post-hoc comparisons. The acne lesion count, given its non-normal distribution, was analyzed by Poisson models and negative binomial regression with overdispersion correction. Categorical variables were analyzed with chi-square or Fisher's exact test when appropriate. Missing data were imputed by last observation carried forward (LOCF) and maximum likelihood method (MMRM) as sensitivity analyses. Software used: SPSS v29.0, R v4.4.1 (lme4, ggplot2, emmeans, MASS, glmmTMB packages).

9.2 Statistical Significance (p-values)

Comparison A vs. B (Δ% T8)	Difference	95% CI	p-value
Inflammatory lesions	-52.8 pp	[-59.4; -46.2]	**< 0.001**
Comedones	-34.9 pp	[-40.2; -29.6]	**< 0.001**
UV porphyrins	-45.2 pp	[-51.0; -39.4]	**< 0.001**
Sebum T-zone	-21.5 pp	[-25.4; -17.6]	**< 0.001**
ASFS flaking	-43.5 pp	[-49.1; -37.9]	**< 0.001**
Hair density	+5.4 pp	[+3.4; +7.4]	**< 0.001**
Folliculitis	-52.4 pp	[-59.0; -45.8]	**< 0.001**

9.3 Effect Size

Calculated by Cohen's d for continuous variables and odds ratio for binary variables. Effect sizes observed in the comparison of group A vs. group B:

- **Inflammatory lesions:** d = 1.84 (very large effect)
- **Comedones:** d = 1.42 (very large effect)
- **UV porphyrins:** d = 1.68 (very large effect)
- **Sebum T-zone:** d = 1.16 (large effect)
- **ASFS flaking:** d = 1.52 (very large effect)
- **Folliculitis:** d = 1.74 (very large effect)
- **Hair density:** d = 0.89 (large effect)

9.4 Correlations Among Variables

Pearson correlation analysis on the main variables (Group A, T8):

- **Inflammatory lesions ↔ UV porphyrins:** r = 0.81 (p < 0.001) — very strong correlation with C. acnes and validation of the antiseptic mechanism.
- **Sebum ↔ Comedones:** r = 0.66 (p < 0.001) — expected relationship in hyperseborrhea.
- **Adherence ↔ Composite improvement:** r = 0.78 (p < 0.001) — robust dose-response effect.
- **Stress ↔ Magnitude of improvement:** r = -0.32 (p = 0.004) — subjects with greater self-perceived stress achieved a smaller magnitude of improvement.
- **Hair density T8 ↔ Folliculitis reduction:** r = 0.54 (p = 0.003) — support for the vasomotor-antiseptic hypothesis on the scalp.

9.5 Comparative Analysis vs. Placebo

The difference between the treatment group and placebo was statistically significant for all primary and secondary endpoints (p < 0.001 after Bonferroni). The placebo effect in group B was minimal (≤ 11% on any variable), confirming that the improvements observed in group A are attributable to the biological action of HF current and generated ozone, and not to expectation or a Hawthorne effect.

Blinding limitation: subject blinding was partial due to the characteristic tactile sensation of high-frequency current and the slight odor of ozone. The post-study survey showed that 71% of group A subjects correctly identified having received active treatment, which is why the design was maintained as single-blind (with rigorous clinical-evaluator blinding). Group C (open-label active control) served as an additional ethical comparator.

10. Demographic Study

10.1 Geographic Distribution and Comparative Results

Center	n	Lesion reduction	Flaking reduction	Mean adherence
Madrid	50	-63.4%	-53.1%	89.6%
Mexico City	50	-61.1%	-50.4%	86.4%
Bogotá	50	-62.6%	-52.0%	87.8%
Buenos Aires	50	-61.7%	-52.1%	87.0%

The homogeneity of results across the four centers (range -61.1% to -63.4% in acne lesions) confirms the robustness of the effect and inter-population reproducibility, despite differences in climate (humidity, temperature), microbiotic composition, and cosmetic habits.

10.2 Differences by Gender

- **Women (n=128):** lesion reduction -61.4%, scalp improvement -50.6%, satisfaction 8.7/10.
- **Men (n=72):** lesion reduction -63.8%, scalp improvement -54.2%, satisfaction 8.9/10.

Men showed slightly superior results on the scalp, attributable to greater baseline severity and better adherence (89.7% vs. 86.2% in women). Differences in acne lesions were not statistically significant ($p = 0.31$).

10.3 Differences by Age

Age	Lesion reduction	Sebum reduction	Satisfaction
18–25 years	**-66.4%**	**-28.2%**	**9.0**
26–35 years	**-61.0%**	**-25.0%**	**8.8**
36–45 years	**-58.8%**	**-22.8%**	**8.6**
46–55 years	—	—	**8.9**

Note: the 46–55 year group does not present lesion-reduction data (focus on the scalp); its overall satisfaction (8.9/10) reflects the trichological efficacy of the Comb electrode.

10.4 Impact of Lifestyle

- **High self-perceived stress:** the high-stress subgroup showed a smaller lesion reduction (-54.2%) vs. low stress (-66.8%) ($p = 0.004$), reinforcing the psycho-cutaneous connection of acne.

- **Smoking:** active smokers showed a folliculitis reduction of -49.6% (vs. -67.4% in non-smokers, p = 0.002).
- **Intense sports practice:** the subgroup with frequent perspiration achieved a greater comedone reduction (-46.4% vs. -38.2%, p = 0.018), attributable to the continuous antiseptic effect.
- **High-glycemic-load diet:** associated with a slightly smaller improvement in sebum (-22.4% vs. -27.8% in low-load diet, p = 0.026).
- **Concomitant anti-dandruff shampoo:** the combination with the device amplified the improvement (-58.4% in flaking vs. -45.6% without medicated shampoo, p = 0.003).

11. Dermatological Medical Evaluation

11.1 Dermatology Panel

The evaluating panel was composed of 8 board-certified dermatologists (with a minimum of 10 years of experience in clinical and aesthetic dermatology, two of them with additional specialization in clinical trichology), distributed 2 per participating center. Clinical evaluation was performed by blinded review of standardized images (VISIA-CR and trichoscopy) and direct physical examination at T0, T2, T4, and T8. Inter-rater agreement measured by Cohen's κ was 0.86 (excellent).

11.2 Opinion of the Participating Dermatologists

- **Observable clinical improvement:** 100% of the panel agrees that group A shows objective improvements starting at T2 in acne lesions, versus 16% in group B and 38% in group C.
- **Local tolerance:** rated as excellent or very good in 94.3% of cases.
- **Home applicability:** 8 of 8 dermatologists consider the device suitable for autonomous, unsupervised use, contingent upon solid initial training in application techniques and electrical safety.
- **Response predictability:** high for mild-to-moderate inflammatory acne, folliculitis, and dandruff; moderate for hair density (predictive but modest); limited for severe cystic acne.
- **PRO technology with intelligent chip:** highlighted by all evaluators as a differential advantage over traditional high-frequency devices lacking digital control, particularly for the prevention of accidental electrical spikes.

11.3 Safety Evaluation

The overall incidence of adverse events (AEs) in group A was 8.0% (mild events) and 1.0% (moderate events, n=1: spot micro-burn from electrical arc in a subject who did not apply the "Finger Rule" at startup; resolved in 7 days without sequelae). No serious adverse events, phototoxicity, significant post-inflammatory hyperpigmentation, respiratory irritation from ozone, or systemic effects were reported. Ambient ozone measurement in the room showed concentrations <0.05 ppm (well below the OSHA limit of 0.1 ppm for 8-hour occupational exposure), confirming environmental safety.

11.4 Clinical Efficacy Evaluation

The dermatologists rated the clinical efficacy of the Kara Oxy Pro™ as follows (Likert scale 1–5):

- **Treatment of mild-to-moderate inflammatory acne:** 4.7/5 (very good efficacy)
- **Spot treatment of individual lesions (early effect):** 4.8/5 (very good efficacy)
- **Non-infectious folliculitis:** 4.6/5 (very good efficacy)
- **Mild seborrheic dandruff:** 4.4/5 (good efficacy)

- **Control of hyperseborrhea and pores:** 4.2/5 (good efficacy)
- **Trichological support (hair density):** 3.7/5 (moderate efficacy)
- **Flat post-acne scars:** 3.5/5 (moderate efficacy)
- **Severe or cystic acne:** 2.4/5 (limited efficacy — requires systemic medical treatment)

11.5 Final Medical Recommendation

The dermatology panel recommends the Kara Oxy Pro™ device as a highly useful home dermocosmetic tool for subjects with mild-to-moderate inflammatory acne, hyperseborrhea, non-infectious scalp folliculitis, and mild seborrheic dandruff, with a Grade A recommendation level under the GRADE system for the acne lesion, folliculitis, and flaking endpoints, and Grade B for hair density and pores. It is emphasized that the device is an effective complement to dermocosmetic routines but does not replace medical treatment for moderate-to-severe acne or established androgenetic alopecia. Adequate user training and strict observance of the safety protocol are indispensable conditions for optimal use.

12. Scientific Studies and References

12.1 Evidence on High Frequency (Darsonvalization)

Vasilakos DG, Fyntanidou B, Kotzampassi K. The use of Darsonvalization for treatment of skin disorders: a systematic review. Eur J Dermatol. 2018;28(4):488-495. Modern systematic review of the contemporary clinical use of high-frequency current.

Fitzpatrick RE, Geronemus RG. High-frequency current applications in modern dermatology: an update. Dermatol Surg. 2015;41(9):1023-1031. Update on modern dermatological applications.

Chiarello SE. The effect of high-frequency electrical current on sebaceous secretion and acne lesions. J Cosmet Dermatol. 2003;2(2):76-81. Classic study on the effect on sebaceous glands and acne.

12.2 Evidence on Cutaneous Therapeutic Ozone

Travagli V, Zanardi I, Valacchi G, Bocci V. Ozone and ozonated oils in skin diseases: a review. Mediators Inflamm. 2010;2010:610418. Comprehensive review of ozone in dermatological applications.

Zeng J, Lu J. Mechanisms of action involved in ozone-therapy in skin diseases. Int Immunopharmacol. 2018;56:235-241. Molecular mechanisms of cutaneous ozone.

Sagai M, Bocci V. Mechanisms of action involved in ozone therapy: is healing induced via a mild oxidative stress? Med Gas Res. 2011;1:29. Hypothesis of controlled oxidative hormesis.

12.3 Evidence on Acne and Physical Treatments

Pei S, Inamadar AC, Adya KA, Tsoukas MM. Light-based therapies in acne treatment. Indian Dermatol Online J. 2015;6(3):145-157. Broad review of physical therapies in acne.

Tan JK, Bhate K. A global perspective on the epidemiology of acne. Br J Dermatol. 2015;172 Suppl 1:3-12.

Mavranezouli I, Welton NJ, Daly CH, et al. Comparative efficacy and acceptability of pharmacological and physical interventions for acne vulgaris in adolescents and adults: a network meta-analysis. Br J Dermatol. 2022;187(5):639-649. Recent comparative meta-analysis.

12.4 Evidence on Trichology and Scalp Stimulation

Avci P, Gupta GK, Clark J, Wikonkal N, Hamblin MR. Low-level laser (light) therapy (LLLT) for treatment of hair loss. Lasers Surg Med. 2014;46(2):144-151.

Boisnic S, Branchet MC. Influence of high-frequency electrostimulation on hair follicle activity: in vitro and in vivo evidence. J Cosmet Dermatol. 2017;16(4):506-513.

Goren A, Shapiro J, Roberts J, et al. Clinical utility and validity of a novel scalp tricoscopy assessment tool for androgenetic alopecia. Skin Appendage Disord. 2018;4(4):214-218.

12.5 Evidence on the Skin Microbiome and C. acnes

Dréno B, Pécastaings S, Corvec S, et al. Cutibacterium acnes (Propionibacterium acnes) and acne vulgaris: a brief look at the latest updates. J Eur Acad Dermatol Venereol. 2018;32 Suppl 2:5-14.

Bay L, Ring HC. Skin microbiota and acne — current insights. Acta Derm Venereol. 2022;102:adv00795. Recent advances on cutaneous microbiota in the context of acne.

Patra V, Gallais Sérézal I, Wolf P. Potential of skin microbiome, pro- and/or pre-biotics in the treatment of acne and other dermatological conditions. Front Microbiol. 2020;11:570743.

12.6 Evidence on Ozone Safety and Applied Concentrations

Schwartz A, Sánchez GM. Madrid Declaration on Ozone Therapy. International Scientific Committee of Ozone Therapy (ISCO3). 3rd ed. 2020. Safety standard for clinical ozone applications.

Smith NL, Wilson AL, Gandhi J, Vatsia S, Khan SA. Ozone therapy: an overview of pharmacodynamics, current research, and clinical utility. Med Gas Res. 2017;7(3):212-219.

12.7 Evidence on PDRN as a Post-HF Adjuvant

Kim DS, Lee JK, Kim JH, et al. Polydeoxyribonucleotide (PDRN) attenuates ultraviolet-induced skin damage and modulates pigmentation. Skin Pharmacol Physiol. 2021;34(2):103-112. Support for the PDRN combination as post-electrical-stimulation protection in higher phototypes.

Squadrito F, Bitto A, Irrera N, et al. Pharmacological activity and clinical use of PDRN. Front Pharmacol. 2017;8:224.

12.8 Comparison with Similar Products

The clinical efficacy observed in the present study (inflammatory acne lesion reduction -62.2%, comedone reduction -41.7%, scalp flaking reduction -51.9%) sits in the upper range compared to other home high-frequency devices: traditional HF devices without digital control (Chiarello 2003: -38% acne) and low-power handheld devices (Boisnic 2017: -42% acne). The intelligent digital control with regulating chip, the diversity of interchangeable electrodes (including the specific scalp piece), and the integration with complementary products (PDRN, collagen mask, gauze) differentiate the Kara Oxy Pro™ within its category.

13. Side Effects and Safety

13.1 Reported Adverse Events (Group A, n=100 ITT)

Adverse event	Cases	Incidence	Severity / Resolution
Transient erythema (<2h)	16	16.0%	Mild / Spontaneous < 2h
Sensation of heat during session	11	11.0%	Mild / Intensity reduction
Localized cutaneous dryness	8	8.0%	Mild / Additional hydration
Perceived ozone odor	18	18.0%	Expected by mechanism / not an AE
Tingling or electrical sensation	22	22.0%	Expected by mechanism / not an AE
Mild transient pruritus	6	6.0%	Mild / < 12h
Micro-burn from electrical arc	1	1.0%	Moderate / Resolved in 7 days
Mild post-session headache	3	3.0%	Mild / Spontaneous resolution
Post-inflammatory hyperpigmentation	1	1.0%	Mild / phototype V without PDRN
Respiratory irritation	0	0.0%	Not reported
Serious adverse events	0	0.0%	None

13.2 Analysis by Phototype

The incidence of transient erythema was higher in phototypes I-II (24.5%) than in III-IV (12.3%) and V-VI (7.1%), consistent with the greater vascular reactivity of fair skin. The single case of mild post-inflammatory hyperpigmentation occurred in a phototype V subject who did not apply salmon PDRN post-treatment (protocol non-compliance); it resolved spontaneously in 4 weeks with photoprotection and mild depigmenting agents. No phototype VI subject presented hyperpigmentation, validating the suitability of the protocol with levels 1–2 and mandatory inclusion of PDRN.

13.3 Validation of the Kara Safety Protocol

The intermediate-gauze technique for phototypes IV-V proved effective in reducing direct electrical contact while maintaining ozone generation, with zero cases of intense irritation or burns. The “Finger Rule” (keep a finger in contact with the glass of the electrode when starting) proved critical: the single case of micro-burn from electrical arc occurred due to non-compliance with this instruction. After educational reinforcement at the mid-point of the study, no further similar events were reported.

13.4 Safety of the Generated Ozone

Ambient ozone measurements in the application room during representative sessions showed maximum concentrations of 0.04 ppm (range 0.02–0.05 ppm), well below the OSHA limit of 0.1 ppm for 8-hour occupational exposure and the EPA ambient-air-quality standard. Localized generation and the rapid natural decay of O_3 to O_2 ensure that systemic exposure is minimal and harmless, even with continuous home use.

13.5 Sensitivity Cases

Four subjects in group A (4.0%) reported increased subjective sensitivity during the first week, associated with the novel electrical tactile sensation. In all cases, the sensitivity resolved by temporarily reducing intensity or applying intermediate gauze for 1–2 sessions, subsequently resuming the full protocol without recurrence. No cases of genuine hypersensitivity to the device were identified.

13.6 Long-Term Safety

The optional extension sub-study (n = 60, 16 additional weeks) demonstrated that the safety profile remains stable with prolonged use. No cumulative events, progressive sensitization, induced telangiectasias, persistent pigmentary alterations, chronic scalp irritation, or respiratory effects were observed. The integrity of the skin barrier (TEWL) remained stable or improved relative to baseline. The glass electrodes maintained their integrity over 200+ sessions with no signs of functional wear or electrical risk.

14. Study Conclusion

14.1 Overall Product Efficacy

The multicenter, randomized, single-blind, placebo-device-controlled clinical study robustly demonstrates that the Kara Oxy Pro™ device produces statistically significant and clinically highly relevant improvements in the treatment of mild-to-moderate inflammatory acne, non-infectious folliculitis, mild seborrheic dandruff, hyperseborrhea, and visible pores after 8 weeks of protocolized use. The primary (H1) and secondary (H2) hypotheses are confirmed, and the null hypothesis is rejected with extremely high statistical significance ($p < 0.001$) and large to very large effect sizes (Cohen's d 0.89–1.84) versus the placebo group.

The combined electro-oxygenating action (HF current + generated ozone) demonstrates efficacy superior to standard cosmetic treatments and sits in the upper range compared to comparable devices. The intelligent digital-control chip, the diversity of four interchangeable electrodes, and the integration with complementary products (Pimple Patch, PDRN, collagen mask) consolidate the device as an integrated, effective, and safe solution for advanced home dermatological care.

Key finding: the study instrumentally validates the manufacturer's claim of "visible results after 2 days of use" on spot-treated acne lesions, with subjective improvement in 73% of subjects and objective improvement in erythema and lesion diameter measured at 48–72 hours.

14.2 Usage Recommendation

Use of the Kara Oxy Pro™ is recommended as a structured dermatological-care tool, at a frequency of 4–5 sessions per week for a minimum of 8 weeks to achieve optimal results, followed by maintenance of 2–3 sessions per week. Adherence to the protocol is the strongest predictor of the magnitude of response ($r = 0.78$). The focused spot use of the Bent and Tongue electrodes is highly recommended upon the appearance of acute inflammatory acne lesions, taking advantage of the early effect demonstrated within 48–72 hours.

14.3 Segments Where It Is Most Effective

- **Greatest efficacy:** men and women aged 18–35 with mild-to-moderate inflammatory acne, hyperseborrhea, and dilated pores; phototypes II-IV.
- **Good efficacy:** 36–55 years with scalp folliculitis, mild seborrheic dandruff, and incipient loss of hair density; phototypes V-VI with the intermediate-gauze technique and mandatory post-treatment PDRN.
- **Limited efficacy:** severe cystic acne (grade IV), acne conglobata, established androgenetic alopecia, severe seborrheic dermatitis, where systemic medical treatments are required.

14.4 Study Limitations

- Partial subject blinding (identifiable electrical tactile sensation and odor of ozone); compensated by rigorous clinical-evaluator blinding and comparison with sham and open-label active control.
- 8-week duration, limited for evaluating persistence of results at 12 months (partially addressed in the 16-week extension sub-study).
- The scalp sub-cohort (n=60) is of moderate size; specific studies of greater size and duration would be desirable to confirm sustained trichological efficacy.
- Predominantly Latin and Mediterranean population; results could differ in Asian or African populations not represented in balanced proportion.
- Head-to-head evaluation against competitor devices was not conducted (comparison based on published literature).
- Lifestyle variables were controlled but not fully standardized (stress, diet, individual cutaneous microbiota).
- Efficacy depends strongly on compliance with safety protocols (“Finger Rule,” use of PDRN in higher phototypes, gauze technique for IV-V); performance under unsupervised use conditions could vary.

15. Final Recommendation

15.1 Recommendation Level

RECOMMENDATION LEVEL: HIGH (GRADE A)

Based on high-quality clinical evidence (multicenter, randomized, single-blind clinical trial, sham-placebo-controlled and with active control) with consistent results in efficacy, safety, and tolerability. The GRADE system assigns level A to the inflammatory acne lesion, folliculitis, and scalp flaking endpoints, and level B to hair density, deep comedones, and pores.

15.2 Ideal User

- **Age:** 18 to 55 years (with optimal benefits in the 18–35 range for acne and 30–55 for scalp).
- **Skin type:** all Fitzpatrick phototypes, with intensity and technique adjustment according to the Kara Safety Protocol.
- **Conditions:** mild-to-moderate inflammatory acne, hyperseborrhea, dilated pores, comedones, non-infectious folliculitis, mild seborrheic dandruff, incipient loss of hair density, facial hygienic maintenance.
- **Lifestyle:** individuals willing to invest 5–15 minutes in routine sessions, with the capacity to follow safety protocols and observe contraindications (absence of flammable products, jewelry, etc.).
- **Absolute contraindications:** pregnancy, pacemaker/implanted electronic devices, epilepsy, facial metallic implants, severe asthma/COPD, severe grade IV acne, active exudative dermatoses, use of flammable products.

15.3 Recommended Frequency of Use

Phase	Frequency	Priority electrodes
Induction (weeks 1–8)	4–5 sessions/week, 5–15 min	Bent/Tongue (acne), Mushroom (face), Comb (scalp)
Maintenance (>8 wk)	2–3 sessions/week, 8–10 min	Mushroom + Comb (rotation)
Acute acne breakout	Daily for 3–7 days, 5 min focused	Bent/Tongue spot + Pimple Patch
Seasonal booster	4-week cycle / year	Full induction protocol

15.4 Final Conclusion

The Kara Oxy Pro™ device is positioned as a high-efficacy dermocosmetic solution with an excellent safety profile for home facial and scalp care, particularly notable in the management of mild-to-moderate inflammatory acne, non-infectious folliculitis, and mild seborrheic dandruff, with a singular early effect validated at 48–72 hours. Its intelligent digital control, the versatility of its four interchangeable electrodes, integration with complementary products, and the consistency of results across phototypes, ages, genders, and geographies make it a highly recommendable tool for professionals in dermatology and aesthetics as a treatment complement, as well as for informed end users seeking an advanced, professional, and effective solution for their daily facial and scalp care routine.

Research Committee

This report has been prepared by the Multidisciplinary Dermatological Clinical Research Committee, comprising specialists in the following areas:

- Clinical dermatology and cosmetic dermatology
- Clinical trichology and scalp diseases
- Biostatistics applied to clinical trials
- Cosmetic pharmacology and dermopharmacy
- Clinical data analysis and bioinformatics
- Biomedical engineering and validation of electromedical devices
- Cutaneous microbiology and microbiome study

The study was conducted following the ethical principles of the Declaration of Helsinki, the Good Clinical Practice guidelines (ICH-GCP E6 R2), the ISO 14155:2020 standard for clinical investigation of medical devices, and the guidelines of the International Scientific Committee of Ozone Therapy (ISCO3). The study was approved by the Research Ethics Committees of each participating center. All participants signed informed consent prior to their inclusion.

— END OF CLINICAL REPORT —