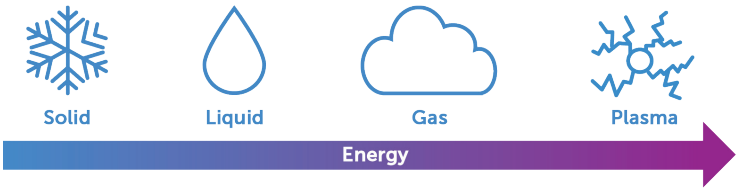
Cold plasma therapy in wound treatment, dermatology and podiatry

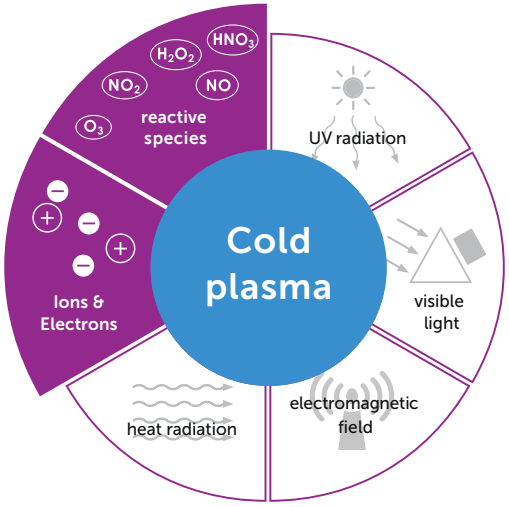
Mode of action | application |
case reports | research results

medical

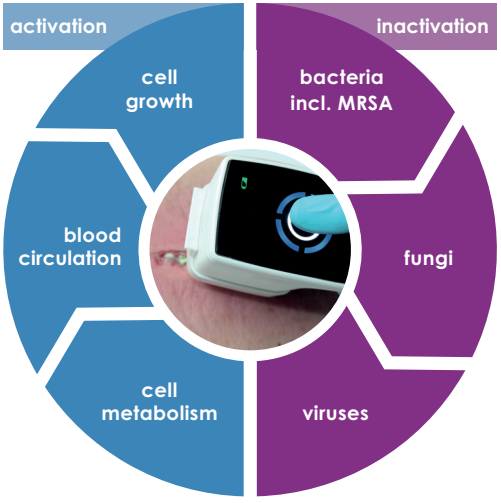
The principle of cold atmospheric plasma



Physical plasmas are ionized gases composed of ions, electrons, and neutral particles. Unlike thermal plasmas (e.g. in lightning), cold atmospheric plasma is generated in such a way that the entire gas remains at body temperature, while the free electrons are still highly energetic. This property allows for its targeted use in medicine.



Plasma cocktail
Biologically active species.
Reactive oxygen species (ROS) and reactive nitrogen species (RNS) with dual mode of action.



Dual mechanism of action
Two effects, one application.
1. Eliminates pathogens without resistance
2. Activates tissue regeneration

Key Facts

Significant healing progress: Proven in practice and studies

Randomised controlled trials (RCTs) prove the effectiveness of cold atmospheric plasma in the clinical applications of wound management and dermatology.

Wound management

Dermatology

Podiatry

Accelerated healing & improved quality of life

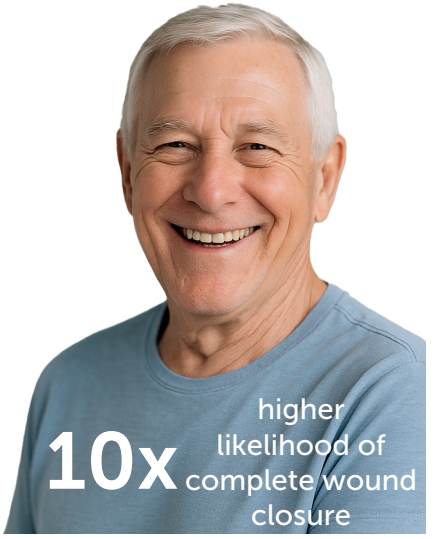
CAP-based treatment leads to a significant improvement in clinical results and patient well-being:

- 65% reduction in wound area after just 3 applications
- Near-complete pain relief (VAS 1) after the 3rd application
- 85% reduction in exudate within 6 weeks
- Markedly improved skin appearance after 6 weeks
- Significantly less itching, redness and swelling

Effective infection control

Plasma breaks through microbial barriers and eliminates pathogens without resistance developing[1,2,3]:

- 4-log reduction (99.99%) even of multi-resistant germs (e.g. MRSA)
- Biofilm penetration
- Fungicidal - effective against fungi[11,12,25]
- Virucidal - effective against viruses[27]



plasma care® - mobile, safe and effective

Cold plasma with plasma care®

Cold atmospheric pressure plasma (CAP) is generated at ambient temperature and pressure. The plasma care® device converts an air gas mixture into cold plasma by supplying energy. This plasma contains therapeutically relevant free electrons, radicals, ions, and reactive species.
The system uses an indirect plasma source with patented Surface Micro-Discharge (SMD) technology. No electrical current flows through the skin; contact is limited to the plasma components. The resulting electric field and UV radiation are minimal and remain below relevant safety limits.

This enables safe use on patients with cardioelectronic implants (including external systems) or metallic osteosynthesis materials and nail braces.

The handheld device

plasma care® is a battery-powered, mobile medical device for generating cold plasma from ambient air. It is portable and operates without carrier gas, cables, or hoses. The device features intuitive one-button operation. It must always be used in combination with an application-specific spacer. The treatment parameters, including the automatically controlled treatment time, are defined by the spacer used. The device is ment for use by medical professionals only.

The device is suitable for use on patients with pacemakers, defibrillators, exposed osteosynthesis material, fixators or metal nail braces.

plasma care® - mobile, safe and effective

The spacers

The plasma care® spacers determine both the user group and the indication. They ensure consistent, repeatable plasma quality by precisely adjusting the treatment distance, volume, and time.

wound spacer (sterile/disposable)
Application:
For chronic or acute wounds.
Properties:
Sterile disposable product to prevent cross-contamination.
Function:
Defines the exact treatment distance to the wound surface and limits contact with the affected skin or wound area.

derma spacer
Application:
On intact skin to improve the appearance of the skin and to treat bacterial, fungal or viral skin conditions (e.g. acne, neurodermatitis).
Properties:
Non-sterile disposable product for even application.
Function:
For the safe and controlled treatment of sensitive and uneven skin areas.

"The storm in the grid"

Plasma source with grid electrode and activated plasma source.

wound spacer | derma spacer | podo spacer

podo spacer
Application:
For the treatment of onychomycosis (nail fungus).
Properties:
Enables multiple therapeutic applications on the same patient.
Function:
Specially shaped for the simultaneous treatment of multiple toenails with precise spacing.

The dual mechanism of action of cold plasma

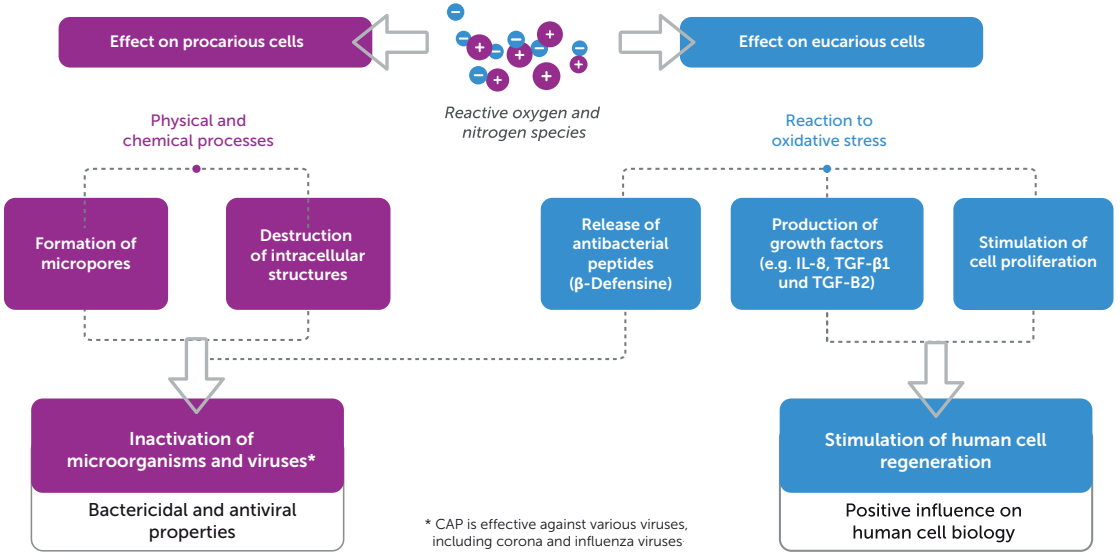
The use of cold atmospheric plasma (CAP) has been an established medical application for over a decade. Its particular value lies in its dual mechanism of action, which combines two complementary effects: the reliable inactivation of pathogens and the targeted stimulation of human cellular processes.[1–6]

This effect is mediated by reactive oxygen and nitrogen species (ROS/RNS) generated within the plasma. In bacteria—including antibiotic-resistant pathogens—these reactive compounds destroy the cell membrane and intracellular structures such as DNA, leading to their inactivation. This physico-chemical mechanism is equally effective against viruses, including coronaviruses and influenza viruses, as well as fungi.[7–16]

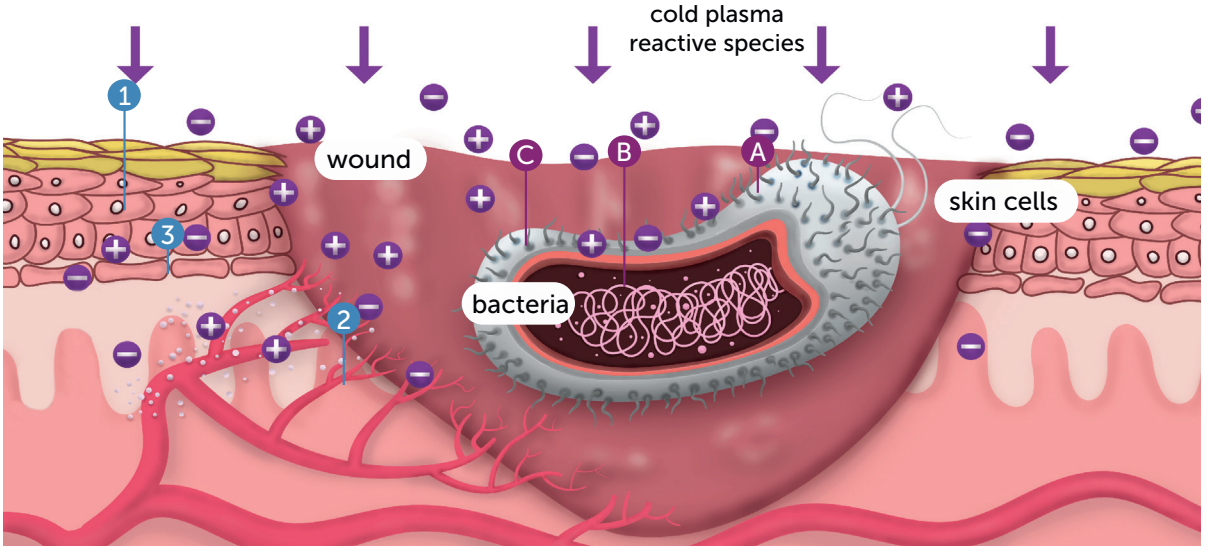
Simultaneously, the plasma elicits a positive cellular response to mild oxidative stress in human cells. This triggers intracellular signaling cascades that stimulate the production of growth factors such as IL-8 and TGF-ß. The result is increased cell proliferation, accelerated wound healing, and a general promotion of tissue regeneration.[4–8,17]

Thus, plasma care® combines two therapeutic actions in a single application: broad antimicrobial inactivation without the risk of resistance development, and direct stimulation of the body's innate regenerative processes.[7,18,19]

Human cells are protected from inactivation by cold plasma due to their cell nucleus and robust cellular repair mechanisms. In vitro studies have further shown that the oxidative stress induced by cold plasma can stimulate cellular survival mechanisms. A recent study also demonstrates that cold plasma treatment helps regulate wound pH, thereby creating a more favorable environment for wound healing.[20–22]



Effect of cold plasma on bacterial cells



cell wall/cell membrane

The breakdown of chemical compounds and the opening of signalling pathways, as well as interaction with cells, lead to the destruction of cellular components.

nucleic acids

Destruction of DNA and RNA reduces the replication rate

proteins and enzymes

Denaturation of proteins, inactivation of enzymes within the cell and oxidation of amino acids

Intracellular processes

cell metabolism

Cell metabolism is stimulated, which activates the overall wound healing process.

stimulation of angiogenesis*

leads to improved blood circulation in and around the wound.

*Vascularisation from existing blood vessels.

release of cytokines*

promotes cell growth.

*Proteins that regulate cell growth and differentiation.

Effect of cold plasma on fungi and viruses

Effect on fungi

Due to its broad mechanism of action, cold plasma is effective against various fungi. This includes yeasts such as Candida albicans, as well as dermatophytes—particularly trichophytes, which are the most common causative agents of onychomycosis (nail fungus).

Cold atmospheric plasma (CAP) exhibits strong fungicidal efficacy through the release of reactive oxygen species (ROS). These reactive components lead to deformation, rupture, and shrinkage of fungal spores, damage cell membranes and proteins, and can even destroy fungal DNA.

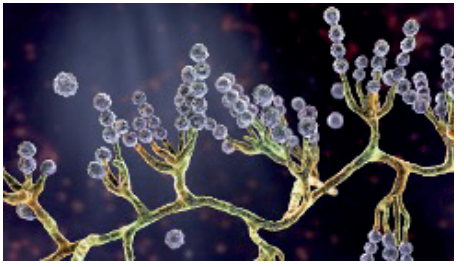
Evidence for efficacy against Onychomycosis:
Studies have demonstrated that cold plasma effectively eliminates dermatophytes, such as Trichophyton rubrum, confirming its suitability for the treatment of onychomycosis.[11,23–25]

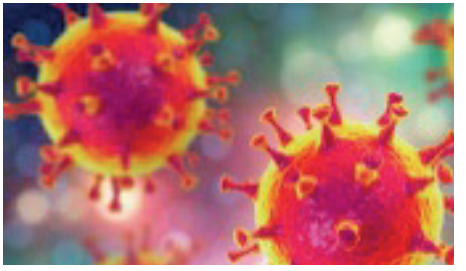
Effect on viruses

CAP exhibits broad-spectrum antiviral properties.

The reactive oxygen and nitrogen species (ROS/RNS) generated in the plasma target both enveloped and non-enveloped viruses: they disrupt the envelope of viruses such as herpes viruses and denature the capsid proteins of non-enveloped viruses. This inhibits receptor binding and prevents viral entry into host cells. Furthermore, oxidative damage can fragment the viral genome (DNA or RNA), thereby blocking replication.

Evidence against Herpes Viruses:
Studies have confirmed the effective inactivation of herpes viruses by cold plasma, validating its potential for treating viral infections.[14,26–31]





plasma care® has a broad spectrum of activity against bacteria, fungi and viruses without resistance, interactions or known side effects.

All content, information and studies are also available online.

On our website or simply scan here

plasma care® in wound treatment

The challenge: Chronic and infected wounds pose a complex therapeutic challenge due to biofilms, antibiotic resistance and impaired healing processes. Conventional antiseptics can exhibit cytotoxic effects on healing tissues and may disrupt granulation.

The solution with plasma care®: The dual mechanism of action addresses both problems simultaneously. CAP disrupts resistant biofilms and physically inactivates pathogenic germs (including MRE) - without inducing resistance. Concurrently, it stimulates cell migration and proliferation to reactivate stalled healing processes. Well tolerated: no known side effects or pain during application. The sterile wound spacer ensures hygienically safe and standardised application directly onto the wound.

Practical advantage:
"CAP combines causal antiseptics – resistance-free inactivation of germs, including biofilm – with biostimulation for accelerated cell regeneration, granulation and epithelialisation."

Backed by science - what the research says...

The use of cold atmospheric plasma (CAP) in wound treatment has been the subject of scientific research for many years.[2,10,19]
Clinical studies on plasma care® demonstrate its significant efficacy across key parameters, including reduction of wound area, control of exudate, pH stabilisation, pain relief, and microbial load, alongside a consistently safe profile with no documented side effects.[2,19,20,22,32]
This body of evidence underscores its therapeutic potential as a well-established adjunct therapy, supported by positive initial experiences regarding its safety - even in paediatric applications.[33]

"CAP reduces the bacterial load (including MRSA), activates wound healing and complies with guidelines (S2k guideline AWMF)."

"I have been using plasma care® in our diabetes practice for years to treat diabetic foot syndrome (DFS) and other problem wounds. I am convinced that cold plasma should definitely be part of standard care for DFS in the future."

Dr Nikolaus Scheper, Diabetologist, Germany

Wound care

sterile disposable spacer for hygienic and user-friendly wound treatment.

10x higher wound healing | 83% reduced wound exudate | 2x faster wound reduction

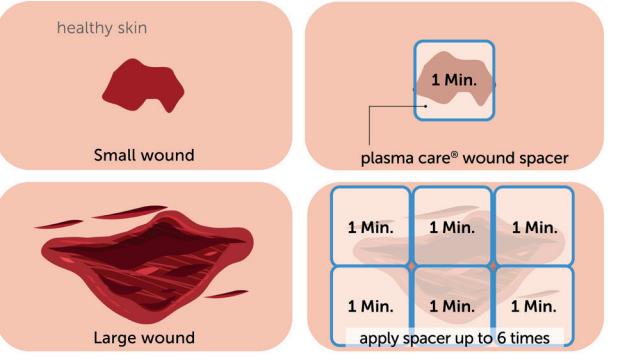
plasma care® - easy integration into wound treatment

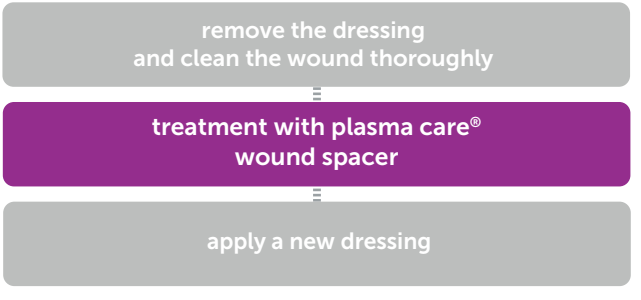
Preparation:
The foundation for successful treatment

A clean wound bed is essential prior to cold plasma application. We recommend initial mechanical debridement to prepare the wound surface.

Guideline-Compliant Care: Treatment of the underlying disease remains an integral part of the therapy.

Integration: The plasma care® application should be integrated into the standard care process following wound cleansing.





Implementation:
Simple and safe application

Application: Place the spacer lightly on the wound, ensuring contact without applying pressure to avoid causing discomfort.

Treatment Duration: Each therapy unit runs automatically for 1 minute. For larger areas, the spacer can be repositioned up to 6 times per session, allowing a maximum treatment time of 6 minutes within a 10-minute window

Optional Adjunct: For heavily contaminated wounds, an antiseptic may be used after CAP therapy to enhance efficacy or provide a prolonged antibacterial effect.

Treatment with plasma care®

Therapy with plasma care® perfectly complements conventional wound care. Proper procedure ensures safe and effective application.

"Thanks to plasma care® I can enjoy life again!"

Recommended treatment times

plasma care® is suitable for use in every phase of wound healing and for prophylaxis in high-risk wounds.
The following guidelines have been established:

Exudation phase – with high bacterial load
2-3x weekly 1-3 minutes/site

granulation phase
2x weekly 1-2 minutes/site

epithelialisation phase
1x weekly 1 minute/site

For prophylaxis and intraoperative use, the treatment duration is highly dependent on the specific indication and the resulting tissue stress.

Case reports - complex, chronic wounds of various origins

Pressure ulcer

Patient (61) with sacral pressure ulcer following bilateral stroke with spastic hemiparesis on the left side. Type II diabetes, s/p alcohol abuse.

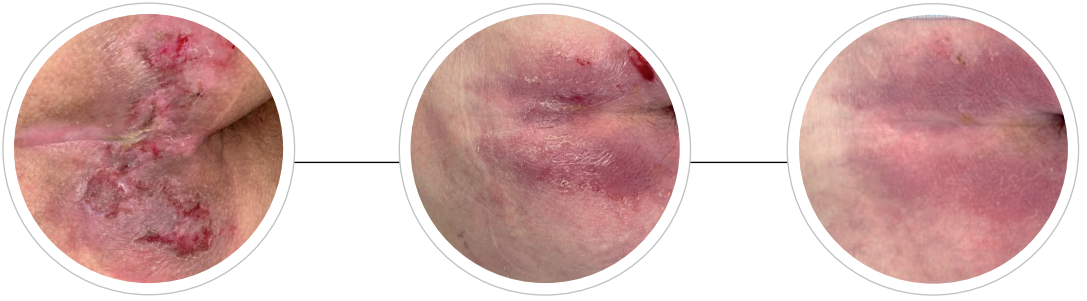
Patient with pressure ulcer measuring 5.5 x 6.8 cm. Ulcerations of varying depths (cat. II-III). No clinical signs of infection. Anticoagulant medication with clopidogrel.

Treatment process:

2 CAP treatments per week (5x1min grid) in the first 4 weeks.

From the 5th week onwards:
1 CAP treatment per week.

Standard wound care:
cleaning with NaCl,
covering with siliconised PU foam.



Day 0
initial situation

Day 28
8 x CAP

Day 42
10 x CAP

Practical advice:
"The targeted use of CAP offers decisive advantages in palliative care: it stabilises wound conditions and reduces pain, relieves the nursing team by simplifying wound care and minimises the risk of infection – even preventing sepsis in particularly vulnerable patients."

image source: Sebastian Kruschwitz, Berlin

Ulcus cruris venosom

Patient (73) with diagnostically confirmed venous ulcer on left leg.

2.3 x 2.6 cm fibrin coating.
Wound swab positive for multiple bacteria.
Ulcer >2 years.

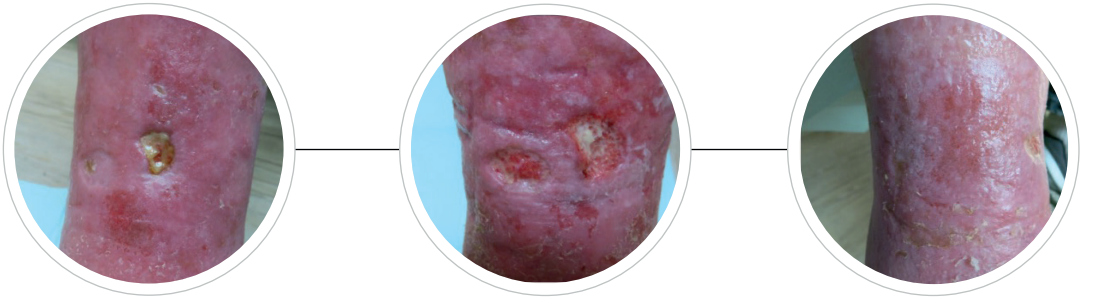
Compression therapy with stockings.
Intermittent topical and oral antibiotics during treatment.

Treatment process:

2 CAP treatments per week

Initial sharp debridement.
Standard wound therapy with compression.

Significant epithelialisation in 4 weeks.
Complete wound closure after 7 weeks



Day 0
initial situation

Day 28
8 x CAP

Day 49
14 x CAP

Practical advice:
"CAP is effective on chronic wounds – in the area around the wound, it interrupts the cycle of irritation caused by redness, maceration and superinfection and protects intact skin areas at the first signs of inflammation. At the same time, it takes effect at the base of the wound by reliably eliminating biofilms, including resistant problem germs such as MRSA."

image source: Peter Friedman, New York

Postoperative wound healing disorder

Patient (17) following osteosynthesis surgery M1 after fracture.

Scar dehiscence of 2 cm over the entire length of the scar of 7 cm.

- Osteomyelitis
- MRSA

Systemic antibiotic treatment discontinued prior to CAP therapy.

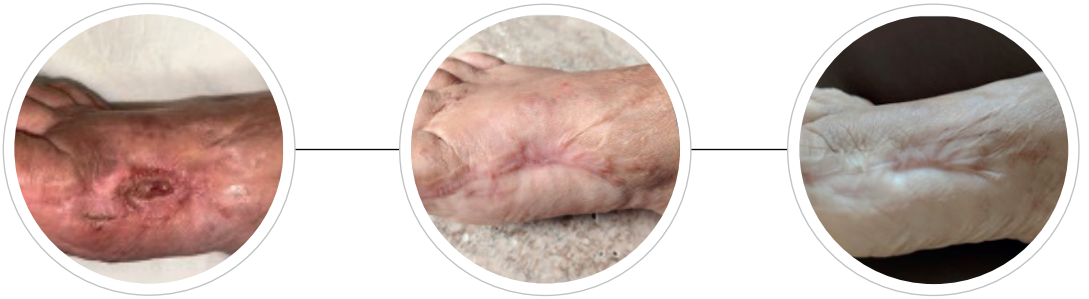
Treatment process:

2 CAP treatments per week over a period of 3 weeks.

Initial sharp debridement and standard wound therapy.

Wound healed in 3 weeks.
No evidence of MRSA.

Follow-up after 6 months:
No recurrence and stable scarring.



Day 0
initial situation

Day 13
4 x CAP

Day 21
6 x CAP

Practical advice:
"CAP continues to be effective even after wound closure: it actively modulates scars by softening contractures and improving mobility, reduces the tendency to form keloids by regulating collagen metabolism, and even intervenes specifically in pathological remodelling processes in old scars that are resistant to therapy..“

image source: Guido Ciprandi, Padua

Postoperative scar infection

Patient (17) with trauma suture following a traffic accident.

Oedema and superficial inflammation following suture removal. Risk of aesthetically problematic scar formation.

Topical antibiotics discontinued prior to CAP therapy.

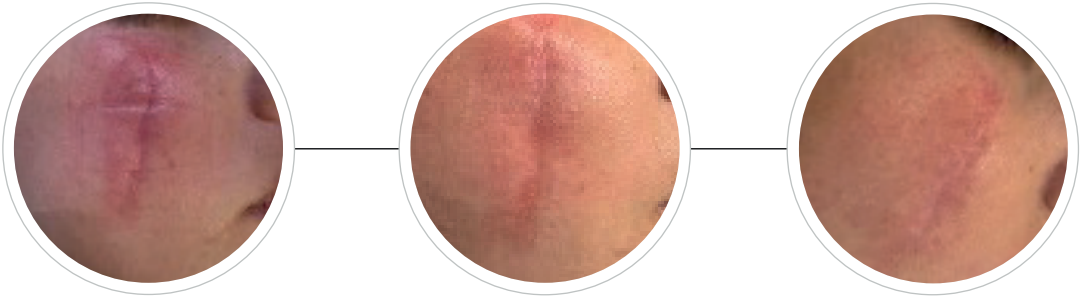
Treatment process:

8 CAP treatments in 9 weeks.

Initial sharp debridement and standard wound therapy.

Significant reduction in redness and swelling after 9 weeks. Aesthetically pleasing and stable scar.

Follow-up after 6 months:
No recurrence, stable and barely visible scars.



Day 0
initial situation

Day 28
4 x CAP

Day 59
9 x CAP

Practical advice:
"Aesthetic scar modulation with CAP: CAP significantly optimises the healing process, especially for visible scars. It shapes the scar early on and controls fibrin alignment for a more homogeneous collagen structure. In addition, it prevents excessive processes through targeted regulation, minimises redness and swelling in the critical healing phase, and reduces relief formation ('ridge effect') in linear wounds.."

image source: Guido Ciprandi, Padua

plasma care® in dermatology

The challenge: Many dermatological conditions, such as acne or eczema, have a microbial component. topical antibiotics carry a risk of resistance development, while cortisone-based preparations often only address symptoms and can compromise the skin barrier.

The solution with plasma care®:
CAP provides an antimicrobial effect without the risk of resistance and while simultaneously supporting the regeneration of the compromised skin barrier. It therefore combats the root cause - pathogenic germs - and actively promotes the restoration of both the stratum corneum and the natural microbiome.

The derma spacer® enables easy-to-control, large-area application on intact skin.

Practical advantage:
"CAP offers a causal treatment for bacterial, fungal and viral skin conditions, promotes skin-friendly regeneration and provides rapid symptom relief at the same time.."

Backed by science - what the research says...

The use of cold plasma in dermatology is becoming increasingly important: an initial randomised controlled trial (RCT) confirms the effectiveness of plasma care® in treating acne.[34]
Applying CAP to the skin reduces bacterial load, alleviates inflammation and promotes healing.[3,16,35–39]
There is also promising evidence for the prevention of radiodermatitis: CAP treatment reduced skin damage caused by radiation.[40–42]
Overall, the data suggest that CAP may be effective in treating various skin conditions, such as acne, actinic keratosis and other dermatological problems.[34, 43–50] These results underscore the versatile potential of CAP in dermatology.

"CAP complements conservative therapy for inflammatory and autoimmune diseases. plasma care® can be used after aesthetic procedures such as dermabrasion, microneedling or laser treatment. The therapy supports wound healing in dermatological surgery, prevents infections after procedures and serves as a postoperative adjunctive therapy."

Dermatology

Hygienically packaged disposable spacer with soft edges - ideal for treating anatomically difficult areas such as chin or ears.

70% fewer side-effects

85% less pain

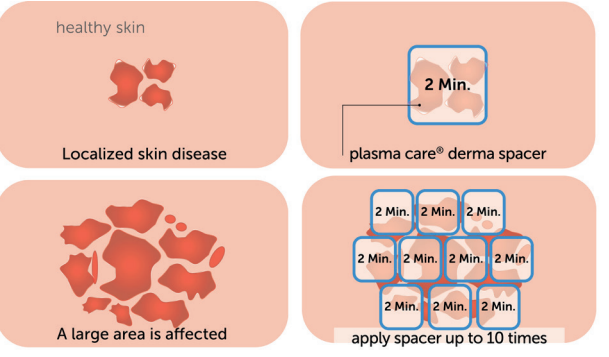
64% reduction in inflam. lesions

plasma care® - for the treatment of skin conditions

Preparation:
The basis for successful treatment

Before treating inflammatory skin conditions with plasma care®, it is recommended to thoroughly cleanse the areas of skin to be treated.

Application: active ingredient ointments (e.g., cortisone-based preparations) should be applied only after plasma treatment.



cleansing of the skin area, if necessary enzymatically or by dermabrasion

treatment with plasma derma care®

application of ointments or lotions containing active ingredients

Implementation:
Pleasant and effective application

The softly padded plasma derma spacer® is used for skin treatment. The spacer fits comfortably on curved areas of skin (such as the cheeks and chin) and ensures optimal closure of the plasma chamber.

Treatment duration: For larger areas, the spacer can be repositioned up to 10 times during a single therapy session. A therapy unit runs automatically for 2 minutes. A therapy session therefore lasts a maximum of 20 minutes within a time window of 45 minutes.

Treatment with plasma care®

According to the S2k guideline of the AWMF, cold plasma therapy is a guideline-compliant option in wound treatment and has a firm place in specialist training in dermatology - a clear signal of its scientifically recognised and clinically relevant significance.

"Finally, I enjoy looking at myself in the mirror again!"

Recommended treatment times

plasma care® is suitable for use in acute inflammation as well as for long-term therapy and prophylaxis.
The following guidelines have been established:

In case of high bacterial load
2-3x weekly 2-4 minutes/site

For adjunctive therapy (initial)
2x weekly 2-4 minutes/site

long-term therapy
1x weekly/fortnightly 2 minute/site

For prophylaxis, treatment times depend on the indication and stress level and therefore vary greatly.

Case reports - Dermatology

Akne vulgaris

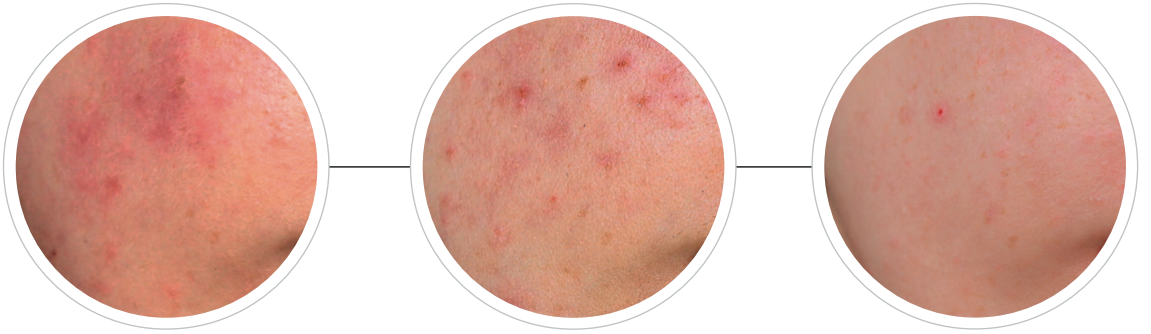
Female patient (17 years old),
no underlying conditions.

Severe acne, especially on the cheeks and forehead. Papules cause an unpleasant feeling of tightness.

Treatment process:

6 CAP treatments in three weeks.

exfoliation, professional cleansing, plasma treatment and tonic.



Day 0
initial situation

Day 28
4 x CAP

Day 63
9 x CAP

Practical advice:
"CAP for acne vulgaris - reduces germs and inflammation, alleviates redness and pain, and promotes gentle skin regeneration for visibly improved skin appearance."

image source: Yalda Burke, Munich

Psoriasis
with a treatment-resistant course

14-year-old patient with Down syndrome Suboptimal eating habits (despite counselling) – limited adherence to treatment.

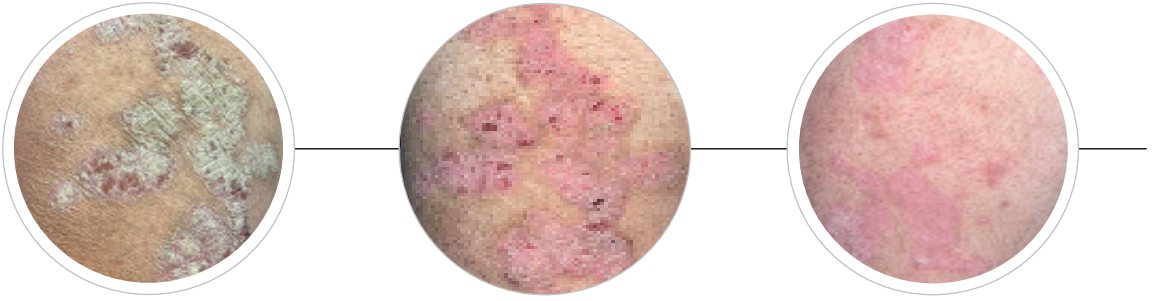
Basic treatment:
Daily application: Daivobet ointment and clopitazol propionate shampoo.

Consistent sun protection during treatment.

Treatment process:

Phase 1 (weeks 1–2):
Local basic therapy: combination therapy.
plasma care® twice a week for 2 minutes.
Application of phytotherapeutic skin gel after each CAP treatment.

Phase 2 (weeks 3-4):
Modification: Discontinuation of phytotherapy.
Continuation of plasma care® twice a week in isolation. Basic therapy unchanged.



Day 0
initial situation

Day 5
2 x CAP

Day 16
5 x CAP

Practical advice:
"CAP offers a complementary approach to skin conditions, providing a physical alternative that normalises keratinocyte proliferation, reduces inflammatory mediators and alleviates symptoms such as itching, redness and skin tightness – particularly valuable in cases where cortisone is contraindicated and also effective on hairy skin."

image source: BSM Medical, Jeddah

plasma care® in podiatry

plasma care® in podiatry addresses the targeted application for onychomycosis of the nails.

The challenge: Topical antifungal agents frequently demonstrate insufficient penetration through the nail plate, while systemic treatments may lead to adverse effects and drug interactions.

The solution with plasma care®:
he reactive species generated by cold plasma effectively penetrate the nail structure, inactivating both fungal spores and hyphae without systemic burden. This approach provides a causal, topical treatment that avoids resistance development.

Easy to use: The application is straightforward, involving a pain-free procedure within the practice setting. The pleasant treatment experience combined with visible clinical results significantly enhances patient compliance. The podo spacer is specifically designed for targeted and economical application to toenails.

Practical advantage:
"In combination with the patient-specific podo spacer, plasma care® enables targeted and hygienic nail therapy for onychomycosis - with deep action through effective penetration of the nail plate to combat the direct cause."

Backed by science - what the research says...

In podiatry, particularly in the treatment of nail fungus (onychomycosis), there are initial very positive reports on the use of cold plasma (CAP).[25,51]
Clinical and preclinical studies have shown that CAP is effective against the relevant fungal species by inactivating the fungal cells or inhibiting their growth.[11,12,25,51–55] Although no randomised clinical trials on onychomycosis have been conducted to date, these sound scientific findings underscore the potential of CAP as an innovative treatment option for nail fungus and other fungal diseases in podiatry.
These results indicate that CAP has the potential to become an innovative treatment method, particularly in the area of nail fungus (onychomycosis).

"In podiatry, CAP shows promising results in the treatment of nail fungus (onychomycosis):
studies have demonstrated its growth-inhibiting and fungicidal effects,
meaning that despite the lack of randomised studies, CAP is already considered an innovative and potentially effective treatment option."

Podiatry

Hygienic
patient spacer for a course
of 6 sessions.

Non-
systematic
stress

Safe
for
patients

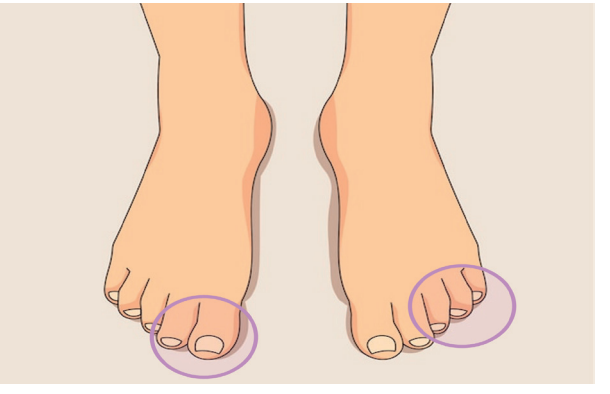
Combinable
with all
antimycotics

plasma care® - for treatment in podiatry

Preparation:
The basis for successful treatment

Before treating nail fungus with plasma care®, it is recommended to file or roughen the nail plate. Alternatively, the nail can also be pre-treated with urea-containing creams to enhance penetration the penetration of the reactive species.

Application: Ointments containing active ingredients (e.g. antimycotics) or tinctures should applied only after plasma treatment.



Implementation:
Pleasant and tailored application

The podo spacer® with toe cuff is used for nail treatment. The spacer fits over 2-3 toes simultaneously, it ensures even distribution of cold plasma across the treated areas.

One therapy session lasts 5 minutes. A maximum of 4 sessions per spacer are possible within a 60-minute time window. One spacer can be used for up to 6 therapy sessions.

nail cleaning and mechanical debridement of the nail surface

treatment with plasma care® podo spacer

application of ointments or lotions containing active ingredients

Treatment with plasma care®

Extended indications in podiatry: ingrown, inflamed nails and nail correction with braces.

"In summer, open shoes are no longer a no-no for me!"

Recommended treatment times

For long-term successful nail fungus treatment, we recommend an acute phase and a maintenance phase.

Acute phase (number of sessions)

1. Week 2x weekly
2. Week 2x weekly
3. Week 1x weekly
4. Week 1x weekly

Maintenance phase (number of sessions)

1x a month for at least 6 months
which corresponds to:
6 therapy sessions/1 podo spacer
(if necessary, 6 additional therapy sessions with a new spacer)

The therapy is complete once the healthy nail has grown back.

Case report - Podiatry

Onychomycosis

Female patient (84) with severe onychomycosis (nail fungus) on all 10 toes. Self-treatment unsuccessful for years.

Accompanying tinea pedis was treated with clotrimazole cream.

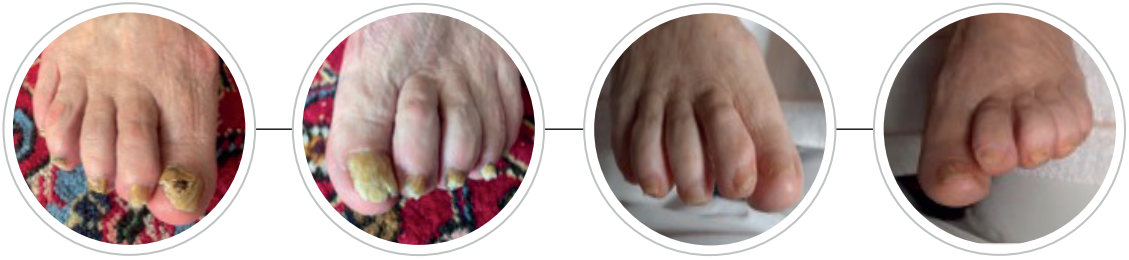
Treatment process:

Phase 1: Intensive therapy
6 treatments within 3 weeks

Phase 2: Consolidation
3 treatments at weekly intervals

Phase 3: Maintenance
3 treatments every 14 days

Phase 4: Recurrence prevention
6 treatments spread over 6 months
(once a month for half a year)



Day 0
initial situation

Day 0
initial situation

Week 26
12 x CAP

Week 26
12 x CAP

Practical advice:
"Long-term treatment success can only be achieved through a combination of several measures: careful nail preparation (thin grinding or filing of the nail plate) improves the effectiveness of CAP application. In addition, daily antifungal or disinfectant care should be provided. Consistent hygiene is equally important - patients must know and follow the relevant rules. Only the combination of nail treatment, accompanying therapy and hygiene leads to lasting success."

image source: Martin Bernhardt, Salem

plasma care®

Studies | Case reports | Research findings

Treatment of chronic wounds with cold plasma

A randomised, single-blind, placebo-controlled clinical trial (Strohal et al. 2025)

Background and study design

A prospective, multicentre, randomised, single-blind study investigated the efficacy and safety of plasma care® for the application of cold atmospheric plasma (CAP) to chronic wounds.

The background to this was the growing evidence of the antimicrobial, pH-lowering and wound-healing effects of CAP.

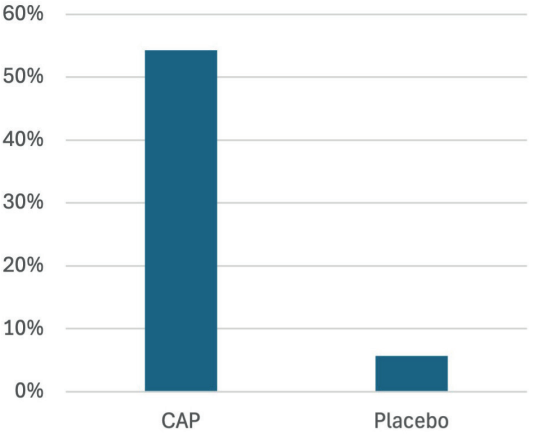
The study was conducted from April to October 2023 at two Austrian institutions.
The CAP or placebo application was performed in a standardised manner as part of the dressing change for one minute per wound area.

Primary and secondary endpoints

Primary endpoint:
Change in wound area up to day 42

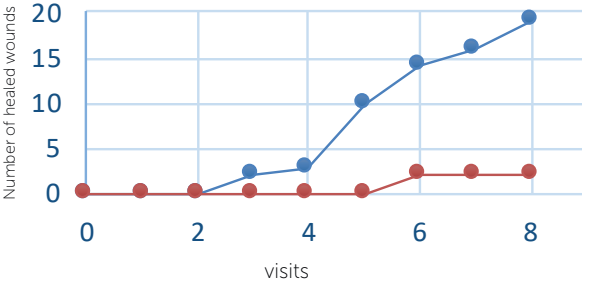
Secondary endpoints:
pH value of the wound, pain reduction (VAS scale), amount of exudate, tolerability of treatment and subjective perception.

Rate of healing (%)



With **54,3%** of wounds fully healed within just 6 weeks and 10 treatments, the CAP group achieved a tenfold higher healing rate compared to the placebo group, which reached only **5,7%**.

Complete wound healing

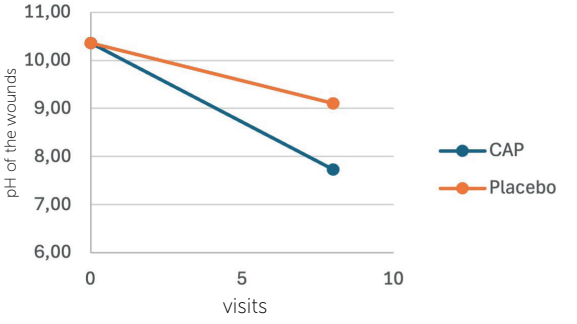


Results

At the end of the study (Day 42)

Wound area: Markedly greater reduction in the CAP group to 0.012 cm^2 compared to 0.805 cm^2 in the placebo group.

pH value: Significantly lower pH value in the CAP group (7.73 vs. 9.11), which promotes the healing process.



Exudate:
In 82.9% of CAP-treated patients, exudate levels were rated as "healed or mild", compared with only 17.1% in the placebo group.

During the course of treatment

Faster wound healing:
Under CAP treatment, wound area decreased almost twice as fast over the course of the study — with an average reduction rate of 10.9% between follow-up visits, compared to 6.4% in the placebo group.

Pain reduction:
By day 7, patients had already achieved near-complete pain relief (VAS 1).
In the placebo group, this pain level was not observed at any point during the study.

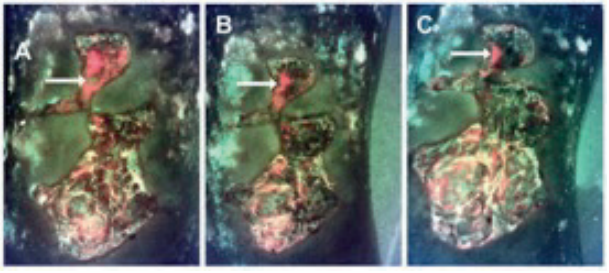
CAP treatment is a promising option for faster and successful wound healing.
For doctors, this means an effective treatment option,
and for patients, it means the chance of a faster recovery
(or even healing in the case of some chronic wounds).

Treatment of infected wounds with cold plasma

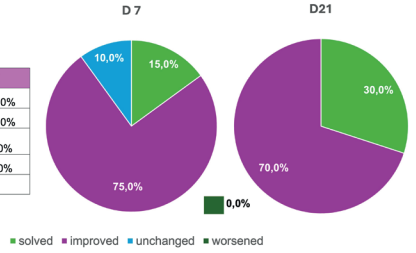
An application study - Ricci et al. 2025)

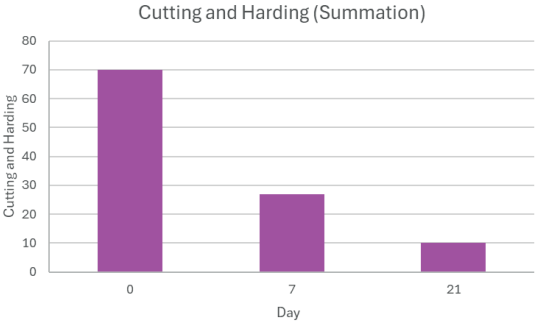
Background and study design

In this case series, 15 patients with a total of 20 chronic or infected wounds were treated with CAP. At the same time, the bacterial load was visualised using a MolecuLight i:X fluorescence camera.



	D 7		D 21	
solved	3	15,0%	6	30,0%
improved	15	75,0%	14	70,0%
unchanged	2	10,0%	0	0,0%
worsened	0	0,0%	0	0,0%
Sum	20		20	





Results

Bacterial load: In 60% of cases, bacterial colonization was significantly reduced or completely eliminated after only two CAP applications.

Reduction of pathogens: Colonization with Pseudomonas aeruginosa (detectable via cyan fluorescence) decreased in score from 30 to 6, while colonization with porphyrin-producing bacteria (e.g., Staphylococcus aureus - red fluorescence) decreased from 28 to 8.

Clinical signs of infection: The infection score according to Cutting & Harding decreased by an average of 82%. After 21 days, 6 wounds were free of infection, and 14 showed marked improvement.

Wound bed condition: The Wound Bed Preparation Score improved by 126% (higher = better).

Wound area: Fifteen wounds decreased in size. Across these 15 wounds, a 22% reduction in area was achieved within 21 days. In 5 cases, wound size increased despite CAP treatment.

Conclusion

The combination of mobile CAP therapy and fluorescence imaging allows targeted, visually controlled treatment of chronic, therapy-resistant wounds with proven effectiveness in infection control and wound bed preparation.

Treatment of infected wounds with cold plasma

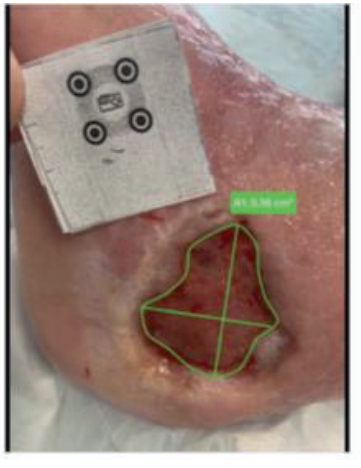
An application study - (Ligresti et al. 2024)

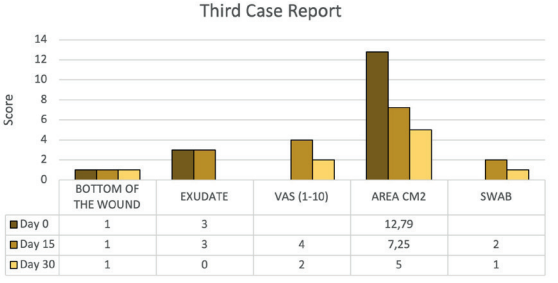
Background and study design

A multicentre, retrospective observational study in Italy (Turin, Asti, Bari, Reggio Emilia) investigated the use of CAP in chronic, infected and difficult-to-heal wounds.

Forty patients with a total of 41 wounds (> 60 days old) were treated weekly with plasma care for 30 days in addition to standard therapy
(1 minute/wound area).

The wound progression was documented using a digital wound app. Bacterial load, wound area, exudate, pain (VAS) and wound bed quality were recorded on days 0, 15 and 30.





	BOTTOM OF THE WOUND	EXUDATE	VAS (1-10)	AREA CM2	SWAB
Day 0	1	3		12,79	
Day 15	1	3	4	7,25	2
Day 30	1	0	2	5	1

Results

Reduction in wound area:
On average, wound area decreased by 28% within 30 days. For large wounds (>18 cm^2), the reduction was 31%.
43% of smaller wounds (<18 cm^2) showed a reduction of more than 40%.
Wound area progression:
85% of wounds decreased in size, and 2 wounds achieved complete closure.
Bacterial load:
A reduction was observed in 55% of wounds.
Exudate: Improved in 60% of cases.
Pain: Decreased in 50% of patients.

Conclusion

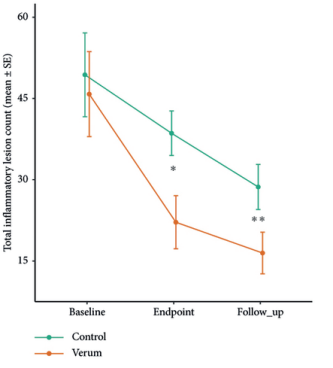
In this study, CAP therapy proved to be safe, easy to integrate, and effective as an adjunctive treatment option.
It significantly supports wound healing, reduces bacterial burden, and improves key clinical parameters — even in complex, long-standing wounds.

Treatment of mild papulopustular acne

A randomised, controlled double-blind study (Baé et al. 2025)

Cold plasma as a promising adjunct therapy for mild acne

In a first randomised, double-blind controlled study, cold atmospheric plasma (CAP) was investigated for the first time as an additive therapy for mild acne papulopustulosa. The background to this is the growing need for non-antibiotic treatments.



Study design

Forty patients received adapalene (0.1%) daily for six weeks and, in addition, either CAP treatment (verum) or placebo treatment weekly.

Results (after 6 weeks)

Efficacy: The CAP group showed a greater reduction in inflammatory lesions and a significantly greater improvement in severity (IGA score) than the control group.

Additional benefits: In addition, sebum production, porphyrin count and quality of life improved in the CAP group.

Safety: Fewer side effects occurred under CAP; there were no serious adverse events in either group.

64%
reduction in total inflammatory lesions

84%
fewer adverse events

85%
reduction of symptoms

Studies and observational studies with plasma care®

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Spacer guide

The right spacer for the right indication

Important definitions

therapy unit: The uninterrupted treatment duration per application is measured in minutes.
therapy session: A treatment block consisting of several therapy units.
The session has a maximum **total duration** during which all units must take place.

wound spacer - sterile disposable spacer
Status: sterile, for single use
Duration of a therapy unit: 1 minute
Structure of a therapy session: Maximum of 6 therapy units
(6 x 1 minute)
Total duration of the session: max. 10 minutes

derma spacer - non-sterile disposable spacer
Status: non-sterile, for single use
Duration of a therapy unit: 2 minutes
Structure of a therapy session: Maximum of 10 therapy units
(10 x 2 minutes = 20 minutes)
Total duration of the session: max. 45 minutes

podo spacer - patient-specific multiple spacer
Status: non-sterile, patient-specific, for multiple use
Duration of a therapy unit: 5 minutes
Structure of a therapy session: Maximum of 4 therapy units
(4 x 5 minutes = 20 minutes)
Total duration of the session: max. 60 minutes
Total use of the spacer: A spacer can be used for 6 therapy sessions.

Manufacturer:

terraplasma MEDICAL

terraplasma medical GmbH
Parkring 32
85748 Garching near Munich

+ 49 89 588 055 30
info@terraplasma-medical.com
www.terraplasma-medical.com

Jens Kirsch | Managing Director

Exclusive distributor BeNeLux:

GD medical

GD Medical Pharma B.V.
Park Forum 1057
5657 HJ Eindhoven

+31(0)40 3031090
info@gdmedical.nl
www.gdmedical.nl