

Clinical Data Compendium
Portrait® PSR³ Skin Regeneration
from Rhytec



Portrait® PSR³ Studies

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Comparison Between Fractionated and Plasmakinetic Skin Resurfacing for Periorcular Wrinkles

Weinstein C, Da Silva K, Attalla M, Chen P
Presented at ASLMS, Orlando 2008

Background and Objectives: To compare the efficacy of fractionated skin resurfacing (Fraxel-Reliant Technologies) with Plasmakinetic skin resurfacing (Plasma Portrait PSR-Rhytec) for improvement of periorcular wrinkles.

Materials and Methods: Two groups of 16 matched patients received either 1 treatment of Plasma Portrait PSR (Rhytec) or 4 treatments of the Fraxel (Reliant Technologies) for static periorcular wrinkles. Plasma Portrait PSR group received 1 treatment at 3.0 J/cm^2 2 passes. The Fraxel group received 4 treatment sessions, 4 weeks apart, at 125 MTZ/cm^2 , 12 m joules, 10 passes, total density of 1250 MTZ/cm^2 .

Results: Two independent observers assessed the degree of improvement after 6 months. The Plasma Portrait group improved on average 83.2% in periorcular wrinkles. The Fraxel group improved on average 36.8%. Healing time (return to work) for Plasma Portrait PSR was 5.6 days, while Fraxel was 1.4 days. Post Plasma PSR treatment erythema lasted 4.7 weeks, while Fraxel was 6.2 days. There were no cases of scarring or permanent hyperpigmentation in either group.

Conclusion: Plasmakinetic (Portrait PSR) appears to produce significantly more improvement in periorcular wrinkles compared to commonly used fractionated (Fraxel) laser parameters. There was however more "down time" and post treatment erythema with the Plasma Portrait PSR compared with Fraxel laser.

Plasmakinetic Resurfacing of the Eyelids

Biesman, B

Presented at ASLMS, Orlando 2008

Background: Plasma skin resurfacing (PSR) describes a process whereby RF-generated nitrogen plasma is delivered to the skin. The plasma pulses produce predictable tissue effects. The clinical correlate of these tissue changes include tissue shrinkage, reductions of rhytids, and generalized improvement in the appearance of photoaged skin. Eyelid rejuvenation is a commonly requested procedure. An initial treatment trial of PSR on the eyelids produced excellent clinical results but a long post-treatment recovery. The purpose of this study is to identify a treatment algorithm that permits safe and effective PSR eyelid rejuvenation with a shorter recovery time.

Methods: This is a single center, randomized prospective clinical study to evaluate the performance of PSR in patients with mild to moderate dermatochalasis. Sixteen patients underwent PSR on the upper and lower eyelids. Based on an experience from an earlier trial at which energy of 3 J was delivered in a single or double pass fashion, patients underwent either double pass or triple pass treatment at an energy of 1.5 J. All treatments were performed under topical anesthesia. Outcomes were assessed photographically, by the investigator, and by patient questionnaires.

Results: All subjects tolerated the procedure well. Post treatment recovery times were markedly shorter relative to higher energy treatment. Clinical efficacy remained high. In most cases eyelid tightening, rhytid reduction, and/or improvement of texture was apparent to both the investigator and subject.

Conclusion: Plasmakinetic resurfacing may be used to safely and effectively rejuvenate moderately photoaged eyelids.

Converging Procedures in Facial Rejuvenation: Portrait® Plasma Skin Regeneration and Aesthetic Facial Surgery

Holcomb J D

Presented at AACS, Orlando 2008

Objective: Evaluation of Portrait® Plasma Skin Regeneration and concurrent aesthetic facial surgery.

Methods: Portrait® Plasma Skin Regeneration was gradually introduced and performed over regionally involved facial skin concurrent with various aesthetic facial surgical procedures since October 2005.

Results: Portrait® Plasma Skin Regeneration has been successfully performed over regionally involved facial skin at low and high energy settings concurrent with browlift, upper and lower eyelid lift, lower eyelid lateral canthoplasty, endoscopic assisted midface lift, malar/submalar augmentation, chin augmentation, lip vermilion advancement, lip augmentation and multi-planar, multi-vector facelift.

Conclusion: Idiosyncratic signs of facial aging - including sagging, volume loss and rhytidosis - are commonly addressed with lifting procedures, augmentation with implants and/or injectable fillers and skin resurfacing.

While these varied procedures have the common goals of redistributing facial volume and smoothing and tightening facial skin they are often performed in a staged fashion, purportedly to avoid increased risk of wound healing complications (including infection and flap failure) and increased healing time.

Portrait® (nitrogen) Plasma Skin Regeneration is a novel, non-chromophore dependent, FDA-cleared treatment for benign skin lesions and facial and non-facial rhytids. Established protocols enable treatment of a variety of skin conditions across a wide range of skin types.

Improvement in skin quality following Portrait® Plasma Skin Regeneration treatment may include reversal of photodamage, improvement of dyschromia, surface smoothing and effacement of rhytids as well as significant skin tightening.

The dual zone of effect of nitrogen plasma with a limited zone of thermal damage and a significantly deeper zone of thermal modification enables dermal depth resurfacing of regionally involved facial skin concurrent with aesthetic facial surgery without extending healing time or increasing the risk of wound healing complications. Excluding peri-oral HSV reactivation, the absence of an open wound immediately following treatment and throughout the regenerative process likely circumvents any increased risk of peri-operative infection. With appropriate selection of patients (e.g. nonsmokers) and surgical techniques that avoid thin skin flaps, nitrogen plasma technology safely facilitates convergence of disparate procedures for enhancing facial volume and smoothing and tightening facial skin into a single operative session.

Unique Two-Step Neocollagenesis Response Using Plasma Energy for Wrinkle Reduction and Skin Rejuvenation

Fitzpatrick R, Holcomb JD, Sibbons P
Presented at ASLMS, Orlando 2008

Background and Objective: Pulsed nitrogen plasma energy reduces wrinkles, removes precancerous lesions, tightens and rejuvenates the skin. The study evaluated short-term healing responses of eight experimental nitrogen plasma outputs with extended pulse durations. Previous studies using standard pulse duration show stimulation of inflammatory remodeling of the reticular architecture of the upper dermis. The objective was to assess histologically whether experimental outputs enhance this healing response.

Study Design/Material and Methods: Porcine subjects were treated following general anesthesia and application of EMLA to the face. Experimental outputs consisted of 4 and 6 Joules, with two different pulse durations and delivered using single- and double-pass techniques. Historical controls consisted of 4 Joules at the standard pulse duration. Biopsies were taken at days 2, 5, 8 and 12. Two sets of samples were stained for histological analysis, one using hematoxylin and eosin, the other Miller's elastin with picosirius red. Measurements of neovascularization and neocollagenesis were made.

Results: The experimental test sites did not show a depth of effect exceeding that of the controls. All treatment sites healed uneventfully. The most notable observation was the previously unreported response seen with increasing pulse duration consisting of a well demarcated two-stage neocollagenesis: flattened neocollagenesis through day 4, with a second phase of strong Rete ridge formation re-establishing a papillary structure to the upper dermis. This feature was particularly apparent in biopsies taken from the 4 J double-pass extended pulse site where extended duration was achieved by a low energy pulse burst. Not only was the regeneration more profound but healing occurred earlier compared to the control and other experimental sites.

Conclusions: Extending the pulse duration of nitrogen plasma shown in this experiment produces decreased healing time with more profound regeneration of dermal architecture. Further studies are needed to assess whether this translates to improved clinical outcomes.

Skin Rejuvenation with Very Low Energy Plasma

Parlette E, Graber E, Daniels N, Bernstein E, Geronemus R, Dover J, Arndt K
Presented at ASLMS, Orlando 2008

Background and Objective: Evaluate the efficacy of very low energy nitrogen plasma as a minimal downtime procedure for improving skin tone, texture, dyschromia, fine lines, and wrinkles.

Study Design/Materials and Methods: Portrait PSR³ system generated nitrogen plasma through controlled radio frequency energy. Two treatment centers participated. Subjects underwent initial screening. Patients received 6 treatments at 3 week intervals. Day 1 following treatments, phone assessments was performed. 30 days following the final treatment, a biopsy, final assessments, and photos were taken. One hour prior to treatments, patients applied non-anesthetic moisturizer. 0.5J was applied to the full face with a single pass each treatment. After the procedure, investigators recorded procedural observations. Patients completed questionnaires at each treatment and follow-up.

Results: 17 patients were treated at two sites. All patients were female with an average age of 51 years. Average treatment time was 6 minutes with an average of 298 pulses. No adverse events were reported. One patient experienced flaking day 1 after treatment 2. Physician assessment of wrinkle severity was rated 0 (no wrinkles) to 9 (severely wrinkled). Pre-treatment physician rating was 4.12, and post-treatment 3.94. Patient textural assessment was 0 (very rough/uneven) to 4 (very smooth) with a 30% improvement rating. Patient skin quality assessment was 0 (poor) to 4 (excellent) with a 21% improvement rating. Patient satisfaction was rated 0 (not satisfied) to 4 (total satisfaction) with a post-treatment rating of 2.13 (moderately satisfied to satisfied) with a 38% overall improvement.

Conclusion: Very low energy plasma is a safe, quick procedure offering patient satisfaction with modest improvement and no downtime.

A Pilot Study Evaluating the Efficacy of Portrait® PSR³ for Hand Rejuvenation

Sadick N

Presented at ASLMS, Orlando 2008

Purpose: This study evaluated the effectiveness of Portrait® Plasma Skin Regeneration (PSR) treatments in improving skin tone, texture, dyschromia and reduction wrinkles on the hands in patients with Fitzpatrick Skin Type I - IV.

Materials and Methods: Ten subjects with visible wrinkles and dyschromia on hands (Rhytec Hand Photodamage Scale Grade 5-9) were enrolled and randomized into one of two groups. Group 1 received one PSR treatment utilizing a 25mm standoff for delivery of approximately 2.8 Joules (J) (generator set at 4.0J). Group 2 had 3 PSR treatments done 4 weeks apart utilizing a 25mm standoff for delivery of approximately 2.1 to 2.8 J (generator set at 3-4.0J). A 25mm standoff was utilized to ensure consistent and accurate energy delivery. Patients were followed to 90 days post-final treatment. Skin tone, texture, dyschromia, patient downtime and reduction in wrinkles were assessed.

Results: At month 1, the physician rated overall improvement for Group 1 was 30% while the patient-rated improvement was 31.7%. At baseline, Group 1 patients had an average Photodamage score of 7.7 which decreased to 6.3 at month 1 (17.4% improvement). For Group 2, month 1 physician rated improvement was 30% and the patient-rated improvement was 53.7%. At baseline, Group 2 patients had an average photodamage score of 6.7 which decreased to 4.7 at month 1 (30% improvement). Results continued to improve through day 90. No Adverse Events have occurred in the study.

Conclusion: Plasma Skin Regeneration off-face treatment has low downtime, a high safety profile and a high efficacy rate for the treatment of the hands. The Rhytec Photodamage Scale allows physicians to objectively assess baseline photodamage level of hands and allows them to show the improvement post-treatment.

Off-Face Photodamage Scales

Sadick N, Murphy L, Alster T
Presented at ASLMS, Orlando 2008

Background/Objective: One of the challenges in clinical research in the aesthetic industry is to identify objective measures for analysis of very subjective results. To meet this need, a 10-point photo scale to assess photo damage of the neck, chest and hands was developed/studied.

Study Design/Materials and Methods: Ten subjects whose level of photodamage represented the 10 levels (0 to 9) of photodamage for neck, chest and hands were recruited and photographed. The wrinkles and dyschromia from each of the 10 subjects were then transposed onto "source" photos. The validation study was conducted using six raters (board-certified dermatologists). Utilizing the photo scale, each rater evaluated 21 photographs for the chest, 23 photographs for the hand and 19 photographs for the neck at two different time points (photos were randomized) at least two weeks apart. Inter-rater and intra-rater reliability was assessed.

Results: The intra-rater reliability showed that the frequency with which the first and second rating of a rater differed by at most 1 ranged from 72% to 79%, and the mean difference in the two ratings ranged from 0.9 to 1.0. The Spearman Rank Correlation Coefficient ranged from 0.78 to 0.87. The inter-rater agreement showed that the frequency with which the ratings of two raters differed by at most 2 ranged from 81% to 91%, and the mean absolute difference between the two ratings ranged from 1.2 to 1.4. The Spearman Rank Correlation Coefficient ranged from 0.76 to 0.82.

Conclusion: For all scales there was good intra- and inter-rater reliability. The scales will allow physicians to objectively assess baseline photodamage level of the neck, chest and hands, and demonstrate post-treatment improvement to patients.

A Retrospective Analysis of the Safety Profiles of a New Plasma Skin Regeneration Device Compared to CO₂ Lasers

Fitzpatrick R, Rothaus K

Presented at AAD, San Antonio 2008

Purpose: Although the CO₂ laser is considered the industry gold standard for laser resurfacing, many plastic surgeons have abandoned the technology because of the complications and prolonged recovery. Plasma skin regeneration is a new nonablative technology which at high energy approaches CO₂ results, has a higher safety profile, faster recovery time, and can safely be used as an adjunct procedure for patients undergoing rhytidectomies and blepharoplasties to enhance aesthetic outcomes. In addition, plasma skin regeneration does not require a dedicated operating facility, sedation, or specialized safety equipment. This report analyzes the safety/efficacy profiles of the plasma devices in comparison to the CO₂ laser.

Materials and methods: A review of current literature regarding patient outcomes (~1100 patients) from CO₂ laser resurfacing was done. In addition, a retrospective analysis of high-energy plasma skin regeneration patients over the past 2 years (120 patients) at two sites was performed.

Results: The incidence rate of the following complications was assessed: hypopigmentation, hyperpigmentation, persistent erythema, scarring, and bacterial and viral infection. For CO₂ patients, the most common adverse effects noted were hyperpigmentation (transient and other 21-34%), bacterial and viral infection (7-8%) and prolonged erythema. Reports of late hypopigmentation range from 8% to 20% of CO₂ patients evaluated. Scarring was rare. Average initial recovery time for CO₂ patients is 2 weeks; however, erythema lasting 2 to 6 months was common. Of the 120 plasma patients evaluated, half of those patients were over a year post-treatment, and the others were at least 6 months. Patient and physicians rated improvements with plasma skin regeneration vary based on energy level used (3.0–4.0 J) and ranged from 30% to 70%. The average recovery time was less than 7 days. There were no cases of prolonged erythema and no cases of hypopigmentation in the plasma patients. Herpes simplex occurred in one patient who did not prophylax with antiviral medication. Other isolated events were post inflammatory hyperpigmentation (4%) which occurred in Fitzpatrick skin types III and IV only. Isolated spots of delayed healing were occasionally seen when patients prematurely removed re-epithelializing skin and were treated with topical or oral antibiotics as needed. This resulted in one iatrogenic minor scar being observed. Skin tightening and improvement in rhytides were noted in all patients and approached results seen with CO₂.

Conclusions: Because of the risk of complications and prolonged recovery, many plastic surgeons have sought alternatives to CO₂ laser resurfacing as an adjunct to surgery. Plasma skin regeneration is a new nonablative technology that, at high energy, approaches CO₂ results in terms of wrinkle reduction and skin tightening. The complication rate with plasma skin regeneration is extremely low, has a high safety profile, short recovery period and represents a technological advancement in resurfacing for the aesthetic surgical patients.

Randomized Control Trial Comparing Plasma Skin Resurfacing (PSR) with Carbon Dioxide Laser in the Treatment of Benign Skin Lesions

Potter M, Harrison R, Ramsden A, Penny K, Andrews P, Gault D
Lasers in Medical Science, Volume 18, Supplement 1, 2003

Introduction: The ideal mode of removing skin lesions would be accurate, involve minimal collateral damage, allow rapid healing and induce minimal scarring. A novel Plasma Skin Resurfacing (PSR) device has been developed which delivers energy to the skin by plasma pulses induced by passing RF into nitrogen gas. The plasma causes rapid heating of the skin lesion, with accurate and specific tissue ablation, but with minimal thermal damage. PSR does not require a dedicated operating facility or specialized safety equipment, and will have significant cost savings compared to lasers.

Materials and Methods: 21 patients with 41 benign skin lesions were randomized to receive either laser or PSR treatment. Patients were reviewed at 10 days, 3 months and 6 months post-surgery, with follow up measures recorded and observed at each time period.

Results: There was no significant difference in any follow up measure, including degree of re-epithelialization, hyper or hypopigmentation, scarring (area and raised height), pain, redness, lumpiness, itchiness and level of satisfaction at each follow-up appointment.

Conclusion: This randomized control trial has demonstrated that the novel technology of Plasma Resurfacing can be used to remove benign skin lesions with the same efficacy and low complication rate as CO₂ Laser treatment.

Plasma Skin Resurfacing (PSR) – a Preliminary Report of a New Technique for Skin Resurfacing

Harrison R, Ramsden A, Penny K, Wilson H, Andrews P, Gault D
Lasers in Surgery and Medicine, Supplement 15, 2003

Background and Objectives: A novel Plasma Skin Resurfacing (PSR) device has been developed which delivers energy to the skin by plasma pulses induced by passing RF into nitrogen gas. The plasma causes rapid heating of the skin lesion, with accurate and specific tissue ablation, but with minimal thermal damage as demonstrated in independent trials on porcine dermis. In this trial we sought to compare PSR with conventional laser treatment and determine potential disadvantages.

Study Design: With Medical Devices and local Ethics Committee approval and appropriate informed consent, 21 patients with 41 benign skin lesions were randomized to receive either laser or PSR treatment. Patients were reviewed at 10 days, 3 months and 6 months post-surgery, with follow up measures recorded and observed at each time period.

Results: There was no significant difference in any follow up measure, including degree of re-epithelialization, hyper or hypopigmentation, scarring, pain, redness, lumpiness, itchiness and level of satisfaction at each follow up appointment.

Conclusion: This randomized controlled trial has demonstrated that the novel technology of Plasma Resurfacing can be used to remove benign skin lesions with the same efficacy and low complication rate as Carbon Dioxide Laser treatment, and unlike laser treatment, does not require a dedicated operating facility or specialized safety equipment.

A Histopathologic Evaluation of the Gyrus Plasma Skin Resurfacing System (PSR) versus a Standard Carbon Dioxide Resurfacing Laser in an Animal Model

Fitzpatrick R, Bernstein E

Lasers in Surgery and Medicine, Supplement 15, 2003

Background: A variety of high energy, pulsed and scanned carbon dioxide (CO₂) lasers are available to perform cutaneous resurfacing. Gyrus Medical has developed a clinically versatile plasma device that is potentially as effective as a laser, at a lower cost, and without the need for the extensive safety precautions necessary when using lasers.

Objectives: To benchmark the energy outputs of the test device against an Ultrapulse CO₂ laser (the "control device"); to demonstrate that the test device is at least as good as the control device in terms of consistency of effect and post-procedural healing; and to enable detailed analysis of tissue response to the test device over time.

Materials/Methods: Three Yucatan mini-pigs were the subject of this study. Following anesthesia, 5 experimental sites were marked along the psoas muscle on each side of the spine. Treatment was applied using either the test or control device, with one site remaining untreated as a control. Biopsies were taken from all treatment sites on Days 0,2,7,14,30 and 60 and processed to H&E staining. Blinded histopathological examination was performed.

Results: Skin treated with the PSR device showed a range of tissue effects across the energy settings used. All treatment sites had fully regenerated epidermis by Day 14, with visible amounts of fresh collagen noted at the highest energy setting (4J).

Conclusion: The Gyrus PSR system provides an attractive alternative to standard CO₂ laser with good remodeling of tissue architecture. Epidermis regenerated after PSR treatment shows a smoother surface profile than adjacent untreated tissue.

Plasmakinetic Skin Rejuvenation on Peri-Oral Rhytides

Fitzpatrick R, Geronemus R, Kim K, Brown D, Bernstein L
Presented at ASLMS, Dallas 2004

Background: High-energy pulsed and scanned lasers are available to perform cutaneous resurfacing. A new modality, Plasmakinetic Skin Rejuvenation (PSR), allows precise and rapid treatment with minimal thermal injury without the safety precautions necessary when using lasers.

Objectives: Evaluate PSR technology in treating peri-oral rhytides. Healing time, quality of regenerated epidermis, post-procedure discomfort, zone of thermal damage, collagen reformation, neocollagenesis, and amount of erythema were recorded.

Materials/Methods: Twenty-four patients at two sites comprised this study. Patients had their upper lip treated with the Gyrus PSR device. Patients were allocated into six groups treated at a specific energy setting, ranging from 1.5 – 4J. Two patients from each group were treated with single pass, and two with two passes. 2mm punch biopsies were taken for histopathology analysis immediately following treatment and at 30 days.

Results: Skin treated with the PSR device showed a range of tissue effects across the energy settings. All treatment sites had fully regenerated epidermis by day 10, with visible amounts of fresh collagen noted at the highest energy setting (4J). At higher fluences, patients noted 67.5% improvement by day 30.

Conclusion: The Gyrus PSR System provides an attractive alternative to standard lasers, with good remodeling of tissue architecture. Epidermis regenerated after treatment shows a smoother surface profile with minimal side effects.

Treatment of Periorbital Rhytides using a Novel Plasma Skin Resurfacing System

Tremblay J, Moy R
Presented at ASLMS, Dallas 2004

Background and Objective: Plasma skin resurfacing is a new energy delivery system that allows for precise and rapid tissue ablation with limited collateral thermal damage. This system has recently been approved for the treatment of superficial skin lesions. The purpose of this study was to assess the safety and efficacy of this plasma skin resurfacing system in treating patients with periorbital rhytides.

Study Design: Ten patients with skin types I-III and having periorbital rhytides were treated with one to two passes (1.5-3.5 J/cm²) of non-overlapping pulses using the plasma resurfacing system. Follow-up visits were scheduled at 10 days, 1 month and 3 months after treatment. Clinical assessment was performed at baseline and each subsequent visit using standardized digital photography analysis, blinded observer assessment and patient questionnaires.

Results: The procedure was well tolerated by all patients. Side-effects included erythema, edema and epidermal de-epithelialization. No scarring or dyspigmentation was observed. Periorbital skin was completely re-epithelialized within 5 to 7 days with minimal residual erythema at day 10. All patients showed at least 30-50% improvement in skin texture and severity of periorbital rhytides at day 10 and 30. Additional improvement was observed at 3 months. Patient self-assessment paralleled the clinical improvement measured. Patient satisfaction rates were found to be moderate (N=2) to high (N=8).

Conclusion: Plasma skin resurfacing produces substantial improvement of periorbital rhytides associated with good patient tolerability and satisfaction rate. Further study is needed to assess the longevity and efficacy of clinical results compared to other treatment modalities.

Treatment of Post-Auricular Skin Using a Novel Plasma Resurfacing System: An in-vivo clinical and Histologic study

Tremblay J, Moy R

Presented at ASLMS, Dallas 2004

Background and Objective: Plasma Skin Resurfacing is a new technology that has shown efficacy in treating superficial skin lesions. This study was designed to assess the clinical and Histologic effect of this new system in human skin.

Study Design: Twelve patients underwent plasma resurfacing on a 2 x 2 cm post-auricular skin site. Patients were treated with a single non-overlapping pass at energy settings of 1, 2, 3 or 4J/cm². Clinical evaluation and skin biopsies were performed on day 0, 10 and 30 after treatment. Skin biopsy specimens were examined blindly.

Results: Treatment resulted in immediate and energy-dependent erythema, edema and de-epithelialization with minimal charring. Measurable immediate linear skin contraction averaging 11.6% (n=6) was observed using 3 and 4J/cm². All treated areas were completely reepithelialized within 7 days. No scarring was observed. Thermal injury was limited to the epidermis and dermo-epidermal junction using 1 or 2J/cm². Thermal injury reached the papillary dermis averaging 8.2 µm and 11.8 µm in depth using 3 and 4J/cm² respectively. At day 10, the epidermis appeared mildly thickened. The dermis showed a moderate inflammatory infiltrate with increased vascular density. Evidence of collagen remodeling was observed in the papillary dermis at day 10 and 30.

Conclusion: This novel plasma skin resurfacing system was shown to be safe and effective at inducing precise and char-free skin de-epithelialization and neocollagenesis with minimal healing time and absence of scarring. Further studies are mandated to assess the therapeutic use of plasma resurfacing in photoaged skin.

A Pilot Study on the Use of a Plasma Skin Regeneration Device (PSR) in Full Facial Rejuvenation Procedures

Kilmer S, Semchyshyn N, Shah G, Fitzpatrick R, Lee S, Rokhsar C, Bernstein E
Presented at ASDS Meeting, San Diego, September 2004

Purpose: CO₂ laser resurfacing has decreased in popularity due to the high morbidity and downtime associated with its use. A new modality, the Plasma Skin Regeneration (PSR) System, allows precise and rapid treatment of tissue with minimal thermal injury. We evaluated the PSR technology in full facial rejuvenation procedures to assess recovery and outcome.

Methodology: Twenty-four patients were allocated into three groups treated with a single pass at 3J, 3.5J or 4J under topical anesthesia. 2mm punch biopsies were taken for histopathological analysis pre-treatment and at 90 days post-treatment. Healing time, peri-operative discomfort, duration and degree of erythema, quality of regenerated epidermis, and dermal remodeling including neocollagenesis were assessed.

Results: All patients tolerated the procedure well and fully re-epithelialized by Day 7, with a shorter than anticipated recovery period. Erythema was mild-moderate by 1 week and nearly clear by 2 weeks. Mild hyperpigmentation was noted and responded to topical treatment. Patients were pleased with improvement at Day 30. Early biopsies showed collagen remodeling. Day 90 clinical and histological results will be presented.

Conclusions: The Gyrus PSR system provides an attractive alternative to standard lasers that is well-tolerated by patients, stimulates collagen remodeling and provides excellent clinical outcome.

Full-Face Photorejuvenation Using Non-Ablative Plasma Skin Resurfacing (PSR)

Tremblay J, So J, Moy R

Presented at ASDS, San Diego, September 2004

Background and Objective: Our previous research data has shown that the novel Plasma Skin Resurfacing (PSR) system can induce superficial thermal ablation of the skin with resulting skin tightening and textural improvement. This study was designed to assess the clinical and Histologic rejuvenating properties of repeated PSR treatment using non-ablative energy parameters.

Study Design: Eight patients underwent a series of 4 full-face PSR treatments over a period of 3 months. Topical anesthesia was used exclusively. Patients were treated with energy settings of 1.5-2J (3Hz) using a sweeping non-overlapping motion. Assessment of changes in dyspigmentation, wrinkles, skin roughness/tightness were assessed serially by direct clinical evaluation, standardized pictures and patients questionnaires.

Results: The procedure was well tolerated by all patients. Mild erythema and fine desquamation was experienced for an average of 2-4 days after each treatment. Significant improvement in dyspigmentation was observed in 6/8 patients after 2 treatments. All patients reported improved skin smoothness (30-60%), skin tightening (20-30%) and wrinkle reduction (10-50%) progressively over 4 treatments. Patient satisfaction rate was found to be unanimously excellent.

Conclusion: The use of repeated non-ablative PSR treatments appears to be more effective than currently available non-ablative rejuvenating devices in improving dyspigmentation, textural changes and skin laxity associated with aging.

An Evaluation of Multiple Passes of Plasma Skin Regeneration (PSR) Energy on Human Skin

Geronemus R, Kim K, Brown D, Bernstein E

Lasers and Surgery and Medicine, Supplement 17, March 2005

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Background: Plasma Skin Regeneration (PSR), allows precise and rapid treatment with minimal thermal injury without the safety precautions necessary when using lasers. We studied the effect of pulse stacking PSR energy on human skin.

Materials/Methods: Fourteen patients requiring full thickness skin grafts following Mohs micrographic surgery participated in the study. Prior to excision of the donor skin, the dog ears of the elliptically excised tissue were treated with one to four passes using the PSR device. Energy setting ranged from 1 – 4J/cm². Two patients comprised a treatment group. One patient in each pair had skin debris removed between subsequent pulses of energy. Treated skin was evaluated histologically recording the depth of tissue vaporization and zone of thermal damage.

Results: Skin treated with the PSR device showed a zone of thermal damage equivalent to low and medium fluence CO₂ laser. Treatment sites not wiped between passes demonstrated progressive ablation of the epidermis across the range of energy settings.

Conclusion: Multiple passes with the PSR System produces a minimal zone of thermal damage probably due to the insulating properties of the damaged tissue. Removal of skin debris between passes produced a progressive ablative effect according to the energy delivered.

A Histopathologic Evaluation of the Effects of Hydration on the Absorption of Plasma Skin Regeneration (PSR) Energy in an Animal Model

Penny K, Andrews P, Southgate A, Sibbons P
Lasers in Surgery and Medicine, Supplement 17, March 2005

Background: Pre-clinical comparison of PSR energy to a CO₂ laser showed a faster rate of healing with the PSR device. A further Pre-clinical study was performed to assess the impact of skin hydration on the absorption of energy.

Objectives: To identify the impact of treatment variables on outcome, with focus on the use of topical anesthesia (EMLA) pre-treatment.

Materials/Methods: Five White Landrace pigs were treated. Following anesthesia, the faces of four pigs had EMLA applied, with one pig as the control. Each half-face was treated as a zone. EMLA was removed after 2 hours using either dry or alcohol-soaked gauze. After two or three minutes either 1.5 or 3.5J/cm² of energy was applied. 3mm punch biopsies taken pre- and post-treatment and on Days 2, 4, 7 and 10. Blinded histopathologic examination was performed.

Results: Treated skin showed a range of effects across both settings. At 3.5J/cm², the control site sustained the deepest ZTD (317µm), while the site cleared with alcohol-soaked gauze and treated after 2 minutes sustained the narrowest ZTD (37.5µm) at Day 2. A dry wipe with 30 minute delay at 3.5J/cm² produced a ZTD of 83% of the control (262µm) at the same time point.

Conclusion: Hydration of the epidermis defines the amount of energy that is absorbed. The use of dry or alcohol-soaked gauze to remove the topical anesthetic and the delay in applying energy in the intervening period all provide variables that contribute to the depth of therapeutic effect achieved.

Long Term Follow-Up on the Use of Plasma Skin Regeneration (PSR) in Full Facial Rejuvenation Procedures

Kilmer S, Fitzpatrick R, Bernstein E, Brown D
Lasers in Surgery and Medicine, Supplement 17, March 2005

Formatted: German (Germany)

Background: A pilot study on the use of the Plasma Skin Regeneration (PSR) System in full face rejuvenation procedures demonstrated positive improvement in photodamage at early follow-up. We report the results of long-term follow-up in this study.

Objectives: The performance of the PSR technology in full facial rejuvenation procedures was evaluated in patients who had their whole face treated with the PSR device. Skin biopsies were taken pre-treatment, and at 90 and 180 days post-procedure. Healing time, quality of regenerated epidermis, post-operative discomfort, collagen reformation, neocollagenesis and erythema were recorded.

Materials/Methods: Twenty four patients were included in the study. Patients were allocated into three groups; each group was treated with a single pass at either: 3, 2.5 or 4J/cm². Patients were treated with topical anesthesia applied one hour before treatment. 2mm punch biopsies were taken for histopathological analysis pre-treatment and at 90 and 180 days post-treatment.

Results: Skin treated with the PSR device showed a consistency of tissue effects across the energy settings used. All patients had fully regenerate epidermis by Day 7, with visible amounts of fresh collagen noted on the 90 day follow-up biopsy. Patients noted a mean improvement of 50% by Day 30 (range 5 – 85%). Skin quality scored 8/10 at Day 90, with progressive improvement noted in all endpoints at Day 180 follow-up.

Conclusion: The PSR system provides an attractive alternative to standard lasers with good remodeling of tissue architecture. Epidermis regenerated after PSR treatment shows a smooth surface with reduced photodamage at long term follow-up.

Repeated Non-Ablative Plasma Skin Resurfacing (PSR) for Full-Face Photorejuvenation: A Double-Center Open-Label Study

Tremblay JF, Fitzpatrick R, Lee S, Rokshar CP, Moy R
Lasers in Surgery and Medicine, Supplement 17, March 2005

Background and Objective: Previous research data has shown that Plasma Skin Resurfacing (PSR) system using ablative energy parameters can induce significant skin tightening and textural improvement with little associated recovery time. This study was designed to assess the clinical and histologic rejuvenating properties of repeated PSR treatment using non-ablative energy parameters.

Study Design: Fourteen patients recruited in 2 clinical centers underwent a series of four full-face PSR treatments over a period of 3 months. Topical anesthesia was used exclusively. Patients were treated with energy settings of 1.5 – 2J (3Hz) using a sweeping non-overlapping motion. Assessment of changes in dyspigmentation, wrinkles, skin roughness and tightness were assessed serially by direct clinical evaluation, standardized pictures and patient questionnaires. Skin biopsies were performed at baseline and 4 weeks after last treatment.

Results: The procedure was well tolerated by all patients. Mild to moderate erythema and fine desquamation was experienced for an average of 3-6 days after each treatment. Significant improvement in dyspigmentation was observed in 60% of patients after 2 treatments. All patients reported improved skin smoothness graded between 30-50%. Some patients reported skin tightening (10-20%) as well as fine wrinkle reduction (20-50%) progressively over 4 treatments. Patient satisfaction rate was found to be high. Skin biopsies showed evidence of epidermal thickening, new collagen production and decreased elastotic material in the papillary dermis.

Conclusion: The use of repeated non-ablative PSR treatments appears to be more effective than currently available non-ablative rejuvenating devices in improving dyspigmentation, textural changes and skin laxity associated with aging.

Facial Acne and Fine Lines: Transforming Patient Outcomes with Plasma Skin Resurfacing

Potter M, Harrison R, Ramsden A, Andrews p, Gault D
Lasers in Surgery and Medicine, Supplement 17, March 2005

Background and Objective: Laser has proved effective in the aesthetic treatment of facial irregularities. Despite established success its problems include: scarring, altered pigmentation and prolonged downtime. Plasma Skin Resurfacing (PSR) was developed as an alternative for facial rejuvenation to reduce such complications. This paper evaluated PSR both quantitatively and qualitatively.

Study Design/Material and Methods: Twelve patients underwent PSR treatment by a single surgeon. Nine were treated for acne and five for fine lines. Photography and silicone moulding allowed objective measurement of wrinkle depth. These measures, along with patient and doctor observed outcomes were recorded at 10 days, 3 months and 6 months. Analysis of pre and post-operative moulds was performed using a published microscope technique.

Results: Maximum erythema occurred at day 4. This dissipated by day 6. There was no weeping or exudates. No hyper/hypo-pigmentation or scarring occurred. Downtime ranged from 0 to 5 days. Skin defect analysis showed a 39% decrease in fine line depth ($P = 0.004$, Mann-Whitney Rank Sum Test) and 35% decrease in acne scar depth ($P = 0.001$, Mann-Whitney Rank Sum Test).

Conclusion: This trial demonstrates that Plasma Skin Resurfacing produces significant improvement in facial acne and fine lines. It avoids altered pigmentation and prolonged downtime associated with laser treatment. We believe PSR is a useful adjunct for the aesthetic clinician providing less aggressive treatment with effective results.

Plasma Skin Resurfacing for Rejuvenation of the Neck, Chest and Hands: Investigation of a Novel Device

Alster T, Tanzi E

Presented at ASDS, Atlanta 2005

Background: Ablative and nonablative lasers have been used successfully over the past decade for skin resurfacing, but have been limited by significant postoperative morbidity and inability to adequately treat non-facial sites (for the former) and minimal clinical effect (for the latter). Plasma skin rejuvenation involves the use of ultra-high frequency radio frequency (RF) to convert nitrogen gas into plasma, which releases energy into the skin with subsequent tissue heating. The objective of this study was to evaluate the efficacy and safety of this novel plasma device in the treatment of neck, chest and hands.

Study Design: Fifteen moderately photodamaged areas equally divided between neck, chest and dorsal hands were treated by a single operator with a PSR system. Areas were randomly assigned to receive treatment with one of 3 discrete energy settings (1.0, 1.5, 1.8 Joules). Clinical evaluations of the treatment areas for degree of re-epithelialization, erythema, hyperpigmentation, hypopigmentation, textural irregularities, rhytides and scarring were conducted and at each follow-up visit (postoperative day 0, 4, 7, 14, 30, 90). In addition, patients completed a satisfaction questionnaire prior to each examination. Histologic examination of skin punch biopsies obtained in each of the fifteen areas before and 90 days post treatment was performed by a dermatopathologist masked to the study protocol.

Results: Significant improvement in each of the three different anatomic regions was observed. Greater reduction in skin dyspigmentation and wrinkle severity was observed in neck and chest skin than in the skin of the dorsal hands. Higher energy settings resulted in greater clinical benefit, but also prolonged tissue healing. Side effects of erythema and edema were common, with denuded skin observed at the highest energy settings. Histopathologic tissue changes mirrored the clinical effects observed.

Conclusion: Plasma skin resurfacing can be safely applied to non-facial areas to achieve rejuvenative effects. Further studies will elucidate the effect of multiple treatments, optimal treatment parameters and intervals for each site and longevity of clinical results.

Effectiveness of Multiple Treatment, Low Fluence Technique with Plasma Skin Resurfacing for Facial Rejuvenation

Bogle M, Arndt K, Dover J

Presented at ASLMS Meeting, Boston, April 2006

Background and Objective: Plasma skin resurfacing delivers energy onto the skin through plasma pulses induced by passing radiofrequency into nitrogen gas. The purpose of this study was to evaluate improvement in photoaging following a series of low-fluence treatments for facial rejuvenation.

Study Design/Material and Methods: Eight participants had full-face treatments every 3 weeks for a total of 3 times using energy settings of 1.5-1.8 Joules. Skin biopsies were performed pre- and 90 days post-treatment.

Results: At day 90 follow-up, investigators rated a 37% reduction in facial rhytids, and study participants rated a 68% overall improvement. Re-epithelialization and erythema lasted an average of 6 days for all treatments, with downtime from the first treatment being longer than the following treatments (9 days versus 4 and 5, respectively). One patient developed localized areas of hyperpigmentation after the first treatment which had resolved by day 30. No scarring or hypopigmentation occurred. Post-treatment histological analysis revealed increased collagen at the dermal/epidermal junction and consistently more neocollagenesis with less dense elastin in the upper dermis in post-treatment skin. The mean depth of thermal change was 72.3 μm .

Conclusion: Plasma skin resurfacing using the multiple treatment, low fluence technique allows significant, successful treatment of photodamaged facial skin with minimal downtime.

Use of the PSR Technology at Low Fluence for Full Facial Rejuvenation

Kim K, Bernstein L, Chapas A, Geronemus R
Presented at ASLMS Meeting, Boston, April 2006

Objective: To evaluate the performance of the PSR technology on photodamaged skin at low fluence settings.

Materials and Methods: Twelve subjects with photodamage underwent three full face treatments at three week intervals. Treatment energy settings ranged from 1.2 – 1.8 Joules. Prior to each treatment, the quality of regenerated epidermis, post-operative discomfort, amount of downtime, and amount of erythema were recorded. Patients were also seen at one month and three months after their last treatments. Digital photography was performed prior to each treatment and at each follow-up visit. Patient self-assessments and investigator assessments were also recorded at each visit.

Results: Skin smoothness rating post-treatment was 8.15 (on a scale of 1 – 10). Average patient rated improvement was 55% and average satisfaction was 6.35 (out of 10). This correlated with investigator assessments.

Conclusion: Multiple, low energy treatments with the PSR technology provide improvement in skin smoothness and fine lines with a high degree of self-rated improvement.

Plasma Skin Resurfacing for Rejuvenation of the Neck, Chest and Hands: Investigation of a Novel Device

Alster T, Tanzi E

Presented at ASLMS Meeting, Boston, April 2006

Purpose: The objective of this study was to evaluate the efficacy and safety of a novel plasma device in the treatment of skin on the neck, chest and hands.

Methods and Materials: Fifteen moderately photodamaged areas equally divided between neck, chest, and dorsal hands were treated by a single operator with a Gyrus PSR system. Areas were randomly assigned to receive treatment with one of 3 discrete energy settings (1.0, 1.5m 1/8 Joules). Clinical evaluations of the treatment areas for degree of re-epithelialization, erythema, hyperpigmentation, hypopigmentation, textural irregularities, rhytides, and scarring were conducted before treatment and at each follow-up visit (postoperative day 0, 4, 7, 14, 30, 90,180). Histologic examination of skin biopsies obtained from each of the fifteen areas before and 90 days post treatment was performed by a dermatopathologist masked to the study protocol.

Results: Significant improvement in each of the three different anatomic regions was observed. Greater clinical improvement was observed in neck and chest skin than in the skin of the dorsal hands. Higher energy settings resulted in greater clinical benefit, but also prolonged tissue healing.

Conclusion: Plasma skin resurfacing can be safely applied to non-facial areas to produce rejuvenative tissue changes. Further study will elucidate the effect of multiple treatments, optimal treatment parameters, and longevity of clinical results.

A Pilot Study Using Low Fluence Plasma Skin Regeneration (PSR) System

Zelickson B, Coles C, Counters J

Presented at ASLMS Meeting, Boston, April 2006

Background and Objectives: PSR is a new electrosurgical modality using Radio Frequency energy converts nitrogen gas into plasma within the hand piece. The purpose of this study was to compare results of treating facial dyschromia and wrinkles using low energy treatments with the plasma RF.

Study Design/Materials and Methods: Twelve patients with mild to moderate facial elastosis and photodamaged skin received three full-face treatments every 7 days. Pre and post-op photos were taken. Patients followed up at 30 and 90 days after final treatment for photos and assessment of side effects. A patient questionnaire was completed at each visit. Treatment parameters remained constant at 1 Joule, 3 – 3.5 Hertz and 6 mm spot. Punch biopsies were obtained from the treated area prior to treatment and at 90 days post treatment.

Results: Average wrinkle reduction at Day 90 was 38.41% for the 6 patients who reached that point. The reduction was less at 30 days. Patient rated Improvement was 45.71% at Day 30 and 42% at Day 90. On a ten point scale, at Day 90 the average patient rated smoothness was 6.58 and satisfaction was 5.42.

Conclusions: This study shows that the PSR treatment at low energy is an effective treatment for fine facial rhytides and mild dyschromia with no side effects.

A Pilot Study on the Use of Very Low Energy Plasma Skin Regeneration to Improve Photodamage

Bernstein E

Presented at AAD, Washington DC 2007

Background and Objective: Chronic sun-exposure results in 5 main changes to exposed skin: telangiectasia, hyperpigmentation, rhytides, enlarged pores, and sagging skin. Plasma skin regeneration (PSR) is a new technology which has been proven to improve the effects of photodamage. The purpose of this study was to investigate the effect of very low energy (0.5J) PSR treatments to determine if the photodamage improvement seen at higher energies (1 – 1.5J) will also be seen at 0.5J but afford less recovery time.

Materials and Methods: A total of 12 female subjects with cutaneous photodamage were enrolled at a single site under IRB approval. Age range was 44 to 68 (mean 55) years. Subjects were pretreated with topical anesthesia (LM-X) for one hour prior to treatment. Subjects were treated with the PSR using 0.5J per pulse, over the entire face. Subjects received three treatments at three week intervals. Follow-up visits occurred on Day 4 following each treatment, as well as 1 and 3 months following the third treatment. During follow-up visits, Physician and subjects rated improvement and digital images were taken and evaluated using the Canfield VISIA CR photographic system.

Results: The procedure was well tolerated by all subjects (subject rated discomfort ranged from 0 to 2.5 – average 0.65 – on a 5 point scale). Most subjects reported being able to apply make-up or shave within 1 day of treatment. Average time to flake/peel was 1 day. Physician evaluated wrinkle severity score improved by 32.54% by Day 90 (post-final treatment). Subjects rated satisfaction to be 2.38 (moderately satisfied to satisfied) and 48% improved by Day 90. Eleven out of twelve subjects would recommend the procedure to a friend at Day 90.

Conclusion: Very low energy PSR treatments improve photodamage with no downtime. The greatest improvement was noted in skin texture, rhytides and pigmentary alterations.

Evaluation of Plasma Skin Regeneration Technology Low-Energy Full-Facial Rejuvenation

Bogle M, Arndt K, Dover J

Archive of Dermatology, 2007; 143:168-174

Objective: To evaluate the use of multiple, low-energy, full-face plasma skin regeneration treatments.

Design: Plasma skin regeneration delivers energy to the skin through plasma pulses induced by passing radio-frequency into nitrogen gas. Single-treatment, high-energy, 1-pass treatments have been demonstrated to achieve good results with an excellent safety profile. Eight volunteers underwent full-face treatments every 3 weeks, for a total of 3 treatments, using energy setting 1.2 to 1.8 J. Before each subsequent treatment, the quality of regenerated epidermis, the degree of downtime, and erythema were recorded. Full-thickness skin biopsy specimens were obtained from 6 patients before treatment and 90 days following the last treatment. Patients were seen for follow-up 4 days after each treatment and 30 and 90 days after the third treatment.

Results: Three months after treatment, investigators found a 37% reduction in facial rhytids and study participants noted a 68% improvement in overall facial appearance. Re-epithelialization was complete in 4 days. Patients assessed erythema to persist an average of 6 days after treatment. Epidermal regeneration from the first treatment was longer than from the following treatments (9 vs 4 and 5 days, respectively). One patient developed localized hyperpigmentation after the first treatment, which resolved by follow-up at day 30. No scarring or hypopigmentation occurred. A Histologic evaluation 3 months after treatment revealed a band of new collagen at the dermoepidermal junction with less dense elastin in the upper dermis. The mean depth of new collagen was 72.3 μm .

Conclusion: Plasma skin regeneration using the multiple low-energy treatment technique allows significant successful treatment of photodamaged facial skin with minimal downtime. Results are comparable to a single high-energy treatment, but with less healing time.

Plasma Skin Resurfacing for Regeneration of Neck, Chest, and Hands: Investigation of a Novel Device

Alster T, Konda S

Dermatologic Surgery 2007; 33:1-7

Background: Although a wide array of noninvasive treatments are available to rejuvenate photodamaged skin, many are characterized by an unattainable balance between effectiveness and morbidity. The continued demand for safe and effective procedures has fueled the emergence of plasma skin regeneration (PSR), which utilizes ionized energy to stimulate dermal collagen remodeling under a biological dressing of retained epidermis. Preliminary clinical studies have elaborated on the safety and efficacy of PSR for facial skin; however, no evaluation of the device in nonfacial areas has been made.

Objective: This study was conducted to evaluate the efficacy and safety of PSR in the treatment of moderately photodamaged skin on the neck, chest, and dorsal hands.

Materials and Methods: Thirty moderately photodamaged skin areas, evenly divided between neck, chest and dorsal hand sites in 10 patients, were selected for study entry. Each area was randomly selected to receive one of three discrete energy settings (1.0, 1.5, or 18.J) using a commercially available PSR system (Portrait, Rhytec, Waltham, MA). Clinical evaluation of skin texture, pigmentation, wrinkle severity, and incidence of side effects were conducted by two independent medical assessors immediately after treatment and at 4, 6, 14, 30, and 90 days after treatment. Histologic examinations of skin biopsies obtained from each of the 30 areas before and 90 days after treatment were also performed by a board-certified dermatopathologist blinded to study specifics.

Results: Mean clinical improvements of 57, 48, and 41% were observed in chest, hands, and neck sites, respectively. Significant reductions in wrinkle severity and hyperpigmentation, as well as increased skin smoothness measurements, were achieved in all areas. Higher-energy setting yielded greater clinical benefit, but also prolonged tissue healing (14 days vs. 7 days). Histologic tissue changes mirrored the clinical effects observed.

Conclusions: PSR offers clinical and Histologic improvement of moderately photodamaged skin of the neck, chest, and dorsal hands with limited side effects. The use of the PSR system is a good treatment alternative to ablative and nonablative laser skin resurfacing procedures due to the combined efficacy of the former and minimal morbidity of the latter. Further studies are needed to determine the effect of multiple treatment sessions, optimal treatment parameters, and intervals for each site and longevity of clinical results.

A Single Center Evaluation of the Efficacy of Double-Pass, High Energy, Full-Face Portrait

Fitzpatrick R

Presented at ASLMS 2007, Dallas, TX

Background and Objective: Experience, both from the field and clinical studies, has shown that high energy, double-pass Portrait® treatments are safe and effective. This investigation will evaluate the Portrait®'s efficacy in high-energy, double-pass treatments and determine if there is a difference in healing time/response when using either petrolatum or Biafine® after a single treatment.

Study Design/Materials and Methods: Sixteen subjects (age ranging from 42-70) seeking a resurfacing procedure for resolution of moderate to severe rhytides and improvement in tone, texture and quality of skin were recruited. Subjects were treated once at high energy (304J), double-pass. Investigator and Subjects rated improvement and digital images were taken and evaluated 1 and 3 months following treatment.

Results: Patients' skin peeled by day 7 (mean: 5.6 days) regardless of treatment group. Preliminary evaluation of data demonstrated a minimum of 28% reduction in physician wrinkle score at 1 month (with increased improvement at 3 months), significant improvement in textural irregularity, mild to significant tightening and a mean of 57% patient rated overall improvement. Patients randomized to Petrolatum indicated higher satisfaction and improvement (70% vs 40%) scores than did the Biafine group.

Conclusions: This study shows safety and efficacy rates that are equal or above those of comparable procedures. The greatest improvement was noted in rhytides, skin texture and tightening. Patients appear to have a higher rate of satisfaction when using Petrolatum.

Facial Acne and Fine Lines – *Transforming Patient Outcomes with Plasma Skin Regeneration*

Potter M, Harrison R, Ramsden A, Bryan B, Andrews P, Gault D

Background: A novel device for skin rejuvenation has been developed and tested. The device converts a stream of nitrogen into a plasma of ionized gas, which ablates surface tissue in a controlled manner.

Methods: Eleven patients were followed up for 6 months. The results were assessed objectively using skin molds to measure skin irregularity, as well subjectively using patient – and doctor – assessed parameters.

Results: Plasma skin regeneration was shown to reduce fine line wrinkles by an average of 24% at 6 months ($P = 0.005$, Mann-Whitney rank sum test) and to improve acne scarring by 23% at 6 months ($P = 0.001$, Mann-Whitney rank sum test).

Conclusions: The main benefit of this system was that the patients had minimal erythema lasting only 1-6 days and no pigmentary changes. This is therefore a device with proven efficacy and limited morbidity.

Notes

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