Dermabrasion with Non-Ablative Electrosurgery and Peeling with Mandelic Acid and Lactoferrin In the Treatment of Perioral Wrinkles

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ABSTRACT

Lips and perioral area are fundamental in youthful appearance. The perioral region is the most dynamic anatomic area of the face and is subject to complex and dramatic changes during aging. The ideal and effective treatment for perioral rejuvenation and, above all, smoker’s lines, has yet to be identified. All proposed techniques and previous studies reported only subjective results.

The propose of this study is to evaluate the treatment of the upper lips and the smoker’s lines with a superficial disepithelization with a non-ablative multifrequency electrosurgery and a peeling based on mandelic acid.

Patients with upper lip wrinkles were inserted into the protocol. After a light scrub, we proceeded to make a superficial dermabrasion using a multifrequency electrosurgery able to create a voltaic arc. Once the superficial corneal layer of the skin was removed, we made a peeling consisting of mandelic acid combined with lactoferrin until a white Frost was obtained.

We treated 25 women with an average age of 60 (Range 52/73). A marked improvement, from 70% to 90%, was observed in 18 patients with class I - II wrinkles. Instead a moderate improvement was observed in 7 cases with class II - III wrinkles, with percentages ranging from 40% to 60%.

Dermabrasion controlled by a voltaic arc, combined with peeling with MA and LF, has proved effective for the marked reduction of perioral wrinkles. The arc acts without coming into contact with the tissues, creating a delicate coagulation. To reduce any side effects related to the use of the voltaic arc and to have a homogeneous skin regeneration without dyschromia or scars, we used a mandelic acid which was able to act without inducing erythema, to accelerate the reparring of the skin, to moisturize the skin and give it a tensor effect.

Keywords
Perioral wrinkles, Lips, Peeling, Dermabrasion, Electrosurgery, Voltaic Arc Dermabrasion, Perioral Rhytides.

Introduction
The etiology of facial aging is complex and remains incompletely understood. Age-related changes in all anatomical layers of the face, including the underlying skeleton, soft tissues such as fat compartments and muscles, as well as the skin, interdependently contribute to the phenotype of the aging face [1-8]. The perioral area (defined superiority by the columella, laterally by the nasolabial folds and marionette lines and inferiorly by the inferior aspect of the mental symphysis), is a region at particularly high risk for volume-loss and dynamic rhytid formation, especially in women [9-12].

Perioral rhytids affect more than 90% of women and the impact of these problems on the patient’s self-esteem can become important enough to affect quality of life in psychological and sociocultural terms. Basic science shows that skin rhytids are related to loss in quantity and function of dermal collagen fibers. Smooth facial skin is correlated with perceived attractiveness, health, and
and acne. Mandelic acid (alpha-hydroxybenzeneacetic acid) is an
common skin changes such as photoaging, uneven pigmentation
been extensively studied for its possible uses in the treatment of
from the hydrolysis of an extract of bitter almonds [37], has
called by the German word "mandel" ("almond") and derived
In the last 25 years mandelic acid, an alpha-hydroxy acid (AHA)
transmission of live virus [30-36].
mechanical properties of skin and skin surface contours reflect the
process of the face is a gradual progression toward atrophy [2].
Biochemically, the ratio of type I to type III collagen is reduced
and the elastic fibers spread in a laminar shape between the
collagen bundles become tiny and fragmented [6]. These changes
result in an overall reduction of the total amount of collagen [7].
in addition to ageing, environmental damaging agents such as actinic
radiations may accelerate this decline [8].

Aesthetic treatment of this area is a procedure commonly
requested by patients who are typically over 50 years and smoke, or
are former smokers [9]. Various methods, including dermabrasion
[10-12], carbon dioxide laser [10,11,13], fillers [14], chemical peels
[11,15-17], and botulinum toxin [18] are used for treatment perioral
rhytids. Dermabrasion can be considered safe to the level of the
superficial or mid-reticular dermis [19]; moreover, although small
observational studies have proposed fractionated carbon dioxide
(CO$_2$) laser as a technique with a potential to induce less erythema
and edema than dermabrasion, the final outcomes have been
demonstrated to be equivalent [10,20-22]. Ablative resurfacing
is typically used to treat rhytids, dyschromia, and scarring [23].
Dermabrasion has a long history of success in the treatment of
wrinkles and scars [24]. It has recently fallen out of favor because
many surgeons have found CO$_2$ lasers to be more predictable as
to the depth of tissue injury [25]. Advantages of dermabrasion
include the relatively low cost of equipment [26]. Disadvantages
include the potential exposure of health care personnel to blood-
borne pathogens aerosolized by the dermabrasion [26]. Mechanical
facial resurfacing traces its origins from the early 20th century
with the advent of dermabrasion, first described by Kromayer in
1905 [27]. Contemporary techniques include the use of a wire
brush or diamond fraise, with erythema variably persisting for 7
to 10 days [28,29]. Dermabrasion produces aerosolized particles
that remain airborne for hours after the procedure and may lead to
transmission of live virus [30-36].

In the last 25 years mandelic acid, an alpha-hydroxy acid (AHA)
called by the German word "mandel" ("almond") and derived
from the hydrolysis of an extract of bitter almonds [37], has
been extensively studied for its possible uses in the treatment of
common skin changes such as photaging, uneven pigmentation
and acne. Mandelic acid (alpha-hydroxybenzeneacetic acid) is an
8-carbon alpha-hydroxy acid with the chemical formula HOCH

Figure 1: Mandelic Acid Formula.
The mandelic acid molecule is larger than the glycolic acid
molecule, a widely used AHA. In addition, mandelic acid, which
has a pK of 3.41, is stronger than glycolic acid, which has a pK
of 3.83 at 25°C. The acidity of AHAs may vary considerably with
changes in temperature. Mandelic acid has a high melting point,
is partially soluble in water, and is freely soluble in isopropyl and
ethyl alcohol [39]. It has been used in medicine for many years
as a urinary antiseptic. Methenamine mandelate (Mandelamine®,
Parke-Davis, Morris Plains, NJ) has the urinary antiseptic action
of both methenamine and mandelic acid. In concentrations of 35g
to 50g/100L of urine, it inhibits Staphylococcus aureus, bacillus
proteus, Escherichia coli, and aerobacter aerogenes. Chemically,
mandelic acid has a structure similar to that of other well-known
antibiotics [40]. It is a nontoxic substance that, after being ingested
orally, is excreted in the urine.

In 1999, Taylor [41] was interested in mandelic acid stems for its
dual nature as an AHA with both potential cosmeceutical activity
and well-established antibacterial activity. The earliest trials
with mandelic acid had two aims: to determine whether it can
produce antiaging effects on the skin similar to those produced
by glycolic acid, and to assess the antibacterial action in treating
acne and preventing gram-negative bacterial infections after laser
resurfacing.

In the last 30 years different authors proposed and demonstrated
the safety of 30/50% mandelic acid in active and chronic scars,
dyschromia and photoaging with high percentage of success [42-
44].

Lactoferrin (LF) is a non-heme iron-binding glycoprotein that is
part of the transferrin family of proteins (Figure 2). While one of
its main functions is to transport iron in blood, LF possesses
a range of protective effects [45] specifically, LF is produced by
mucosal epithelial cells and is present in most biological fluids,
including tears, saliva, vaginal fluids, semen, nasal and bronchial
secretions, bile, gastrointestinal fluids, urine, and most abundantly
in milk and colostrum [45,46]. Additionally, LF is present in
significant amounts in polymorphonuclear granules, and its
net positive charge and distribution in various tissues allow it
to play a role in several physiological processes. These include
regulation of iron absorption in the bowel, immune response, as
well as antimicrobial, antioxidant, anticarcinogenic, and anti-
inflammatory properties [46,47]. Moreover LF have a direct effect
of on wound re-epithelialization including the enhancement of
keratinocyte proliferation and migration as well as the protection
of cells from apoptosis [48].
Material and Methods
Patients with class II and III wrinkle scores were inserted into the protocol. Patients of any age and in good health were candidates for this treatment. The optimal candidate was a patient with Fitzpatrick skin types I to III with photodamage and moderate postoperative expectations.

Contraindications to the procedure included connective tissue diseases or a history of keloids. We excluded a patient with a recent herpes simplex infection history. Dermatologic conditions, as well as an history of radiation therapy or scleroderma, should also serve as a contraindication because of the absence of stem cells in the appendageal bulge, which reduce re-epithelialization postoperatively.

After having read the brochure and discussed risks, benefits and alternative kind of treatment, each patient signed the informed consent form, describing the possible complications and untoward effects such as bruising, swelling, erythema, dyschromia.

All the Patients were taken pre-treatment and subsequent photographs with weekly check the first month and once a month for the following six months.

The protocol consisted of two times:
TIME I: after cleansing and making a light scrub based on mandelic acid, we made a local block anesthesia with 2% lidocaine and we proceeded to a superficial dermabrasion using a multifrequency electrosurgery (Zeus, Speco) able to create a voltaic arc, with removal of the corneal layer. For our protocol we chose this kind of device for the possibility to use a double control of the treatment, the frequency and the duty cycle. At the same time, we had the control of the voltaic arc power and the possibility to decide to use the cutting or coagulation effect; the result of this combination gave us the advantage to use a very low power with a very superficial and safety disepithelization. For a less aggressive and superficial disepithelization, we used a thin loop tip.

TIME II: once the superficial corneal layer of the skin was removed, we performed a 50% mandelic acid peel combined with LF, in several states, using pads, until a white Frost was obtained. Once the objective was achieved, the peel was tamponed with a post-peeling cream carried out were with the patient going to his home.

Patients were given a home care treatment based on, hyaluronic acid, mandelic acid and LF. For all the follow-up period the patient used a total sunscreen.

For the first month, every week, patients were subjected to one check visit to evaluate the results and to prevent or follow any eventual side effects. Every month was made a photo evaluation. A subjective satisfaction test was given to the patients at the end of the protocol.

Results
In the period from September 2017 to September 2018 we treated 25 women with an average age of 60 aa (Range 52/73. 18 patients were with class I-II and 7 patients with class II-III wrinkles.

In the first postoperative week, patients presented mild spontaneous edema. In 8 (32%) cases, the appearance of light hyperemia was observed, which resolved spontaneously in 7 (28%) cases within the first thirty days of treatment (Figures 3-5). We observed a persistent hyperchromia in 1 patient who had a breast cancer 5 year before, treated with chemotherapy and radiotherapy (Figures 6 and 7).
In 18 cases was observed a marked improvement, from 70% to 90% of class I - II wrinkles (thin lines and generalized deep lines with moderate structural changes). A moderate improvement was observed in 7, in class II - III wrinkles with percentages ranging from 40% to 60% (Figures 8-9). No cases of hyperpigmentation, hypopigmentation, erythema, ecchymosis, pain, pruritus, herpes outbreaks, infectious processes or scars have been reported.

In conclusion, perioral wrinkles can be treated, with a high success rate through the combined use of superficial dermabrasion by means of a voltaic arc and a peeling with mandelic acid and LF.

References