Improvement in Facial Aging & Photo-damage Using a Sequential 1320nm and 1440nm Wavelength Multiplex Laser

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Introduction

The life expectancy of a 45 year old is 80.9 and as baby boomers enter middle age, the enthusiasm for slowing the aging process escalates. Among the medical and lay public there is a growing expectation that technology will be able to manipulate the physical manifestations of aging without the inconveniences of hospital admissions and long recovery times. This fact is demonstrated by the dramatic shift away from the gold standard for the treatment of facial aging - CO_2 resurfacing in favor of less invasive procedures with minimal downtime.

The latest microthermal and fractional laser techniques provide an exciting and effective means of improving the signs of facial aging while minimizing downtime for our patients. The signs of facial aging that make a patient appear older than their stated age are wrinkles, loss of tone and elasticity, increased skin fragility. Histopathologically, these changes are identified by the presence of amorphous elastin material or solar elastosis, the hallmark of photoaged skin. In addition to these deeper changes, superficial alterations linked directly to ultraviolet radiation also occur such as, pigmented lesions, keratoses, telangectasias. These changes correlate to melanocyte stimulation, disrupted immune surveillance and angiogenesis histopathologically.

The Affirm™ Multiplex™ (Cynosure, Inc., Westford, MA) is a non-ablative "combination" fractionated laser that offers sequential firing of a 1320nm wavelength laser pulse followed by a 1440nm wavelength laser pulse. The 1320nm wavelength penetrates further than 300um deep into the dermis and subcutis re-modelling collagen. This disruption leads to tissue repair and subsequent clinical skin tightening.

The 1440nm wavelength targets more superficial collagen (100-300um), particularly the band of solar elastosis found in the reticular dermis. Additionally, the Affirm utilizes a Combined Apex Pulse technology that utilizes both micro-rejuvenation and thermal mechanisms to achieve the desired effect. The microthermal zones created by the laser produce a pattern of coagulated tissue columns surrounded by uncoagulated tissue. High-fluence "apexes" produce the coagulated columns while the uncoagulated columns are produced by lower background fluences. The entire treated area is heated, but the coagulated columns are heated more and the uncoagulated columns are heated less. This unique combination of 1320nm and 1440nm wavelengths treats both the shallow and deep components of photo-aged skin.

Methods

The purpose of this study was to evaluate the efficacy of the Affirm Multiplex for the treatment of wrinkles, dyspigmentation, skin texture, tone, and laxity. Subjects who presented with mild to moderate full-face rhytides, enlarged pore size, and skin laxity were treated. After informed consent, patients were photographed and prepped with peroxide followed by 5% topical lidocaine for 15-20 minutes. The topical anesthetic was thoroughly removed including wipes with peroxide. Subjects were then pre-cooled with the SmartCool cool air system for 30-60 seconds.

Figure 1

39 year old female after a series of 4 treatments
14mm spot size, 1320nm: 7-8 J/cm²; 1440nm: 2.4 – 2.8 J/cm²; SmartCool 6
Improvement in skin tone and texture, pigmentation, erythema

Subjects were treated with the Affirm Multiplex laser. Treatment parameters were as follows: 14mm spot size, 3millisecond pulse delay between wavelengths and treatment fluences ranging between 7-9J/cm² for the 1320nm wavelength and 2J/cm² for the 1440nm wavelength. The repetition rate ranged between 0.5 and 1.0 Hz. One or two passes were administered depending on the severity of the photo-damaged areas. The SmartCool cool air system was attached to the laser handpiece and used for all patients with a fan speed setting of 6 or higher depending on patient comfort. After treatment, ice packs were used to cool the face.

Results

Skin texture, mild-moderate wrinkles, lentigines, pore size and skin laxity were all improved in the subjects treated with the Affirm Multiplex anti-aging system. All subjects experienced post-operative erythema, which resolved within 18-24 hours. Patients tolerated the procedure well and there were no long-term adverse sequelae.
Discussion

The Affirm Multiplex anti-aging system is an effective modality that addresses the photo-aging concerns of baby boomers as they enter middle age. Fine and moderate wrinkles, lentigines, pore size, skin laxity and texture are all improved with this new technology. The demand for improvement of the signs of aging with minimal downtime makes the Affirm Multiplex system an attractive addition to the tools available for aesthetic based practices.

Combining both the 1440nm and 1320nm wavelengths creates a unique opportunity to treat both the superficial as well as deep effects of photo-damaged skin. The 1440nm wavelength improves solar elastosis by creating microthermal zones of coagulation, prompting wound repair, new collagen and tightened skin. The 1320nm wavelength approaches the depth created by CO_2 resurfacing techniques without the downtime due to the micro-fractional distribution of energy.

Cooling with the SmartCool cool air system, before, during and after the procedure is important for diminishing the risk of superficial blisters or burns. The addition of ice packs after the treatment enhances patient comfort and adds to the safety protocol of this device. Inadequate cooling may lead to increased discomfort for the patient, prolonging treatment time. Insufficient cooling also increases the likelihood of skin blisters.

Patients should be advised that post-operative erythema is expected after the procedure. None of the cases performed at our center resulted in permanent erythema. In fact, there were no long-term sequelae in any of the treated patients.

Figure 2

62 year old female for the treatment of per ocular rhytids
14mm spot size, 1320nm: 7-8 J/cm²; 1440nm: 2.4 – 2.8 J/cm²; SmartCool 6
Noticeable improvement post 6 treatments

