Preliminary Results after Four Years of *MonaLisa Touch®* Treatments on Subjects with Genitourinary Syndrome of Menopause (GSM).

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Objectives: This preliminary review aims to draw conclusions about the efficacy of *MonaLisa Touch®* therapy in treating main symptoms of patients with Genitourinary Syndrome of menopause (GSM).

Materials and methods: From January 2013 to December 2016, a total of 1,135 *MonaLisa Touch®* laser treatments were performed at the *Republic of San Marino State Hospital's Department of Pathology of the Lower Genital Tract and Laser Therapy*, on 527 patients suffering from GUS symptoms.

Results: All patients were subjected to Visual Analogue Scale (VAS) as well as two specific questionnaires after each treatment to be able to monitor the improvement in each symptom. The data collected over the four years of the trial are being analysed in order to extract information on the efficacy of this treatment.

Conclusions: From the preliminary data, it is clear that *MonaLisa Touch®* treatment is extremely promising for treating the main symptoms of GSM.

Key words: Genitourinary syndrome of menopause, gynaecological cancers, lichen sclerosus, stress urinary incontinence, laser therapy.

INTRODUCTION

In October 2012, at the 20th FIGO (International Federation of Gynecology and Obstetrics) World Congress, held in Rome, there was a presentation detailing the results of a clinical and histological study on the effectiveness of the cutting-edge *MonaLisa Touch®* treatment[1-4] – the procedure that uses the special SmartXide[2] fractional CO_2 laser system (DEKA - Calenzano, Italy) to restore trophic conditions in the vulvovaginal region and thus treat the symptoms associated with Genitourinary Syndrome of Menopause (or GSM).

MATERIALS AND METHODS

From 23 January 2013 to 31 December 2016, a total of 1,135 *MonaLisa Touch®* laser treatments were performed on 527 patients with the aim of restoring vaginal function, at the Republic of San Marino State Hospital's Department of Pathology of the Lower Genital Tract and Laser Therapy. In June 2013, in addition to the vaginal channel, we also began systematic treatment of the vaginal entrance and the vestibular/vulvar region, thus improving patient outcomes. The protocol involves three treatments, performed about 30-40 days apart.

During the early stages of the trial, given that health care in the Republic of San Marino is provided free of charge, the protocol was carried out slightly differently. In order to give all patients access to the treatment without causing congestion and long waiting lists at the medical facility, we initially decided to offer at least one treatment to all women requesting it, then deciding at follow-up whether or not to go on to the second and third treatments. This procedure was used for the first year. With time we realized that the three treatments were absolutely the right standard to use, so we adapted the protocol accordingly. In my experience, despite the fact that most patients report an improvement in symptoms even shortly after the first treatment, the three standard protocol treatments have a cumulative effect, thus consolidating the improvements by further stimulating the tissues with the laser.

Women whose symptoms were struggling to improve, or beginning to show improvement only towards the end of the three classic treatments, were offered one further round of treatment. The fourth treatment was performed in 5% of cases, and arose from a request from patients whose symptoms were just beginning to improve after three treatments and who specifically asked to go ahead with the process. In

some cases (1% of subjects treated), a fifth treatment was also performed, but whereas the fourth treatment did improve subjective symptoms, no significant improvement in well-being was forthcoming from the fifth treatment. It was therefore decided not to recommend the fifth treatment to poor responders.

DISCUSSION

In order to reach these conclusions, all patients were subjected to PH and Visual Analogue Scale (VAS) as well as two specific questionnaires (on expectations and post-treatment satisfaction) after each treatment, so as not to lose any statistical data and, above all, to be able to monitor the improvement in each symptom.

The data collected over the four years of the trial are being analyzed in order to extract information on the efficacy and duration of the benefits of this treatment. Currently, we can come up with some initial considerations, as well as outline some trends of improvement in the various symptoms following the treatment sessions.

With regard to vaginal atrophy, the symptoms considered were: dyspareunia (Fig.1), pain in the vaginal entrance / introitus (Fig.2), dryness (Fig.3), itching (Fig.4), burning (Fig.5) and heat (Fig.6). Patients

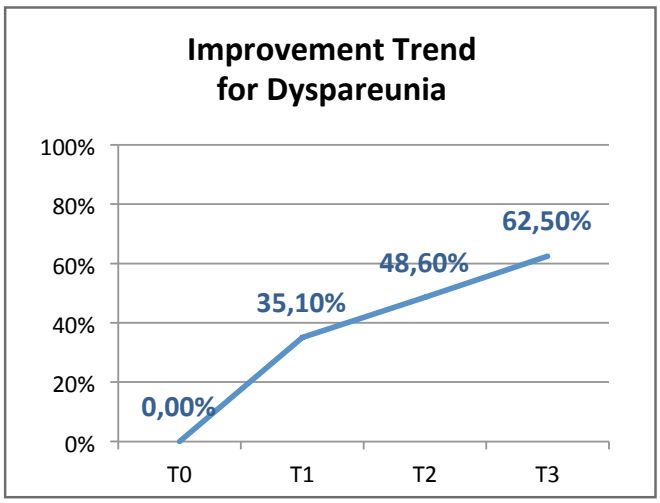

Fig. 1: The *dyspareunia* symptom severity was rated for every patient in the pre-treatment condition (T0; n = 437), after 1 laser treatment (T1; n = 386), after 2 laser treatments (T2; n=243) and post laser treatment assessment (T3; n = 97). The percentage of improvement trend is shown in the graphic above.

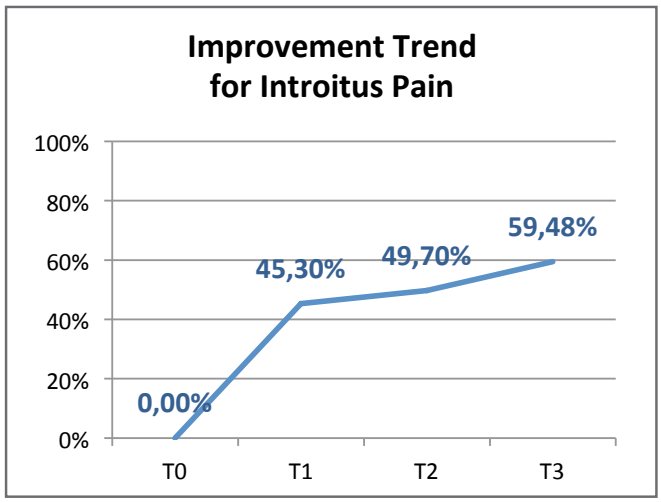

Fig. 2: The *introitus pain* symptom severity was rated for every patient in the pre-treatment condition (T0; n = 330), after 1 laser treatment (T1; n = 288), after 2 laser treatments (T2; n=215) and post laser treatment assessment (T3; n = 159).The percentage of improvement trend is shown in the graphic above.

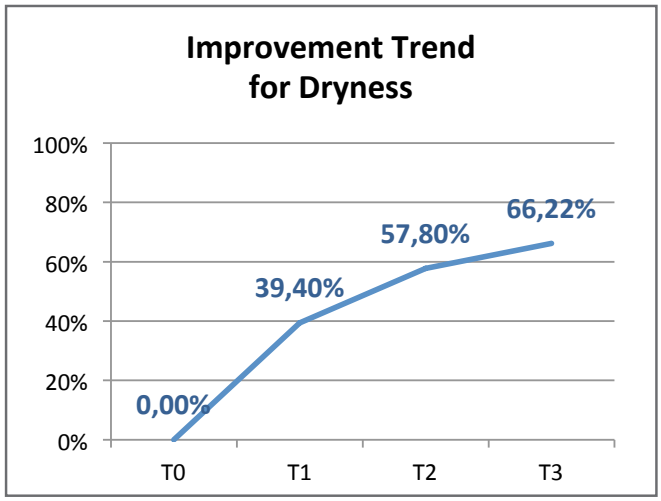

Fig. 3: The *dryness* symptom severity was rated for every patient in the pre-treatment condition (T0; n = 450), after 1 laser treatment (T1; n = 398), after 2 laser treatments (T2; n=245) and post laser treatment assessment (T3; n = 183).The percentage of improvement trend is shown in the graphic above.

were asked whether they were suffering from any of these symptoms and, if so, to evaluate their severity on a scale of 1 to 10 (1: slight symptom; 10: severe symptom). This was repeated for each symptom following each *MonaLisa Touch®* laser treatment session (T0: initial reference time before each treatment; T1: follow-up 30-40 days after 1 treatment; T2: follow-up 30-40 days after 2 treatments; T3: follow-up 2 months after 3 treatments). In the event of total

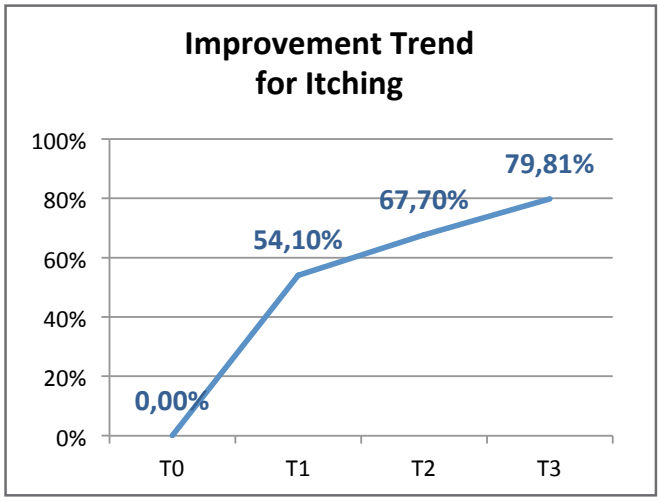

Fig. 4: The *Itching* symptom severity was rated for every patient in the pre-treatment condition (T0; n = 172), after 1 laser treatment (T1; n = 151), after 2 laser treatments (T2; n=95) and post laser treatment assessment (T3; n = 77).The percentage of improvement trend is shown in the graphic above.

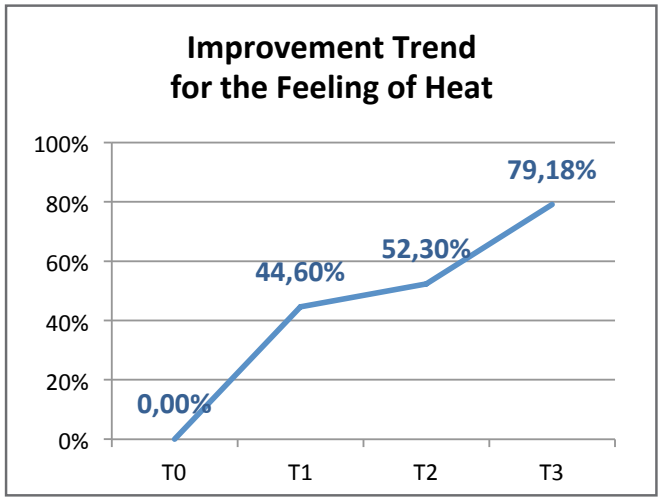

Fig. 6: The *feeling of heat* symptom severity was rated for every patient in the pre-treatment condition (T0; n = 72), after 1 laser treatment (T1; n = 63), after 2 laser treatments (T2; n=41) and post laser treatment assessment (T3; n = 34).The percentage of improvement trend is shown in the graphic above.

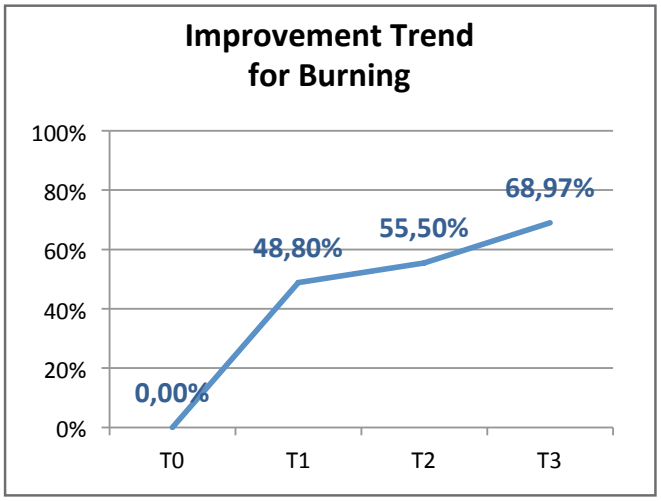

Fig. 5: The *Burning* symptom severity was rated for every patient in the pre-treatment condition (T0; n = 260), after 1 laser treatment (T1; n = 227), after 2 laser treatments (T2; n=147) and post laser treatment assessment (T3; n = 111).The percentage of improvement trend is shown in the graphic above.

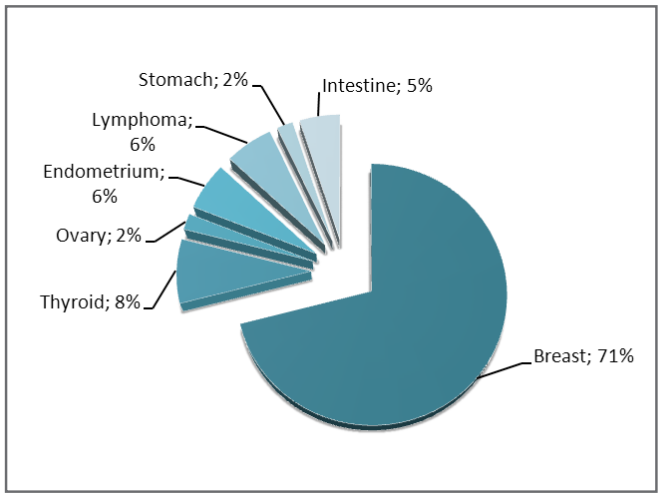

Fig. 7: Percentage of different kinds of cancers in oncologic patients treated with *MonaLisa Touch®* procedure from March 6th, 2013 to December 31st, 2016.

remission from a symptom, its VAS value would be equal to 0. The improvement trend was calculated by determining the percentage decrease in the mean VAS value for each symptom at T1, T2 and T3 compared to the initial value at T0.

About 13% of patients treated were oncology patients[5-7] (Fig. 7), who had been strongly advised not to use hormone therapy to treat the symptoms of GSM. The results obtained in terms of improvement in symptoms were very much the same as those in non-cancer patients (Fig.8)

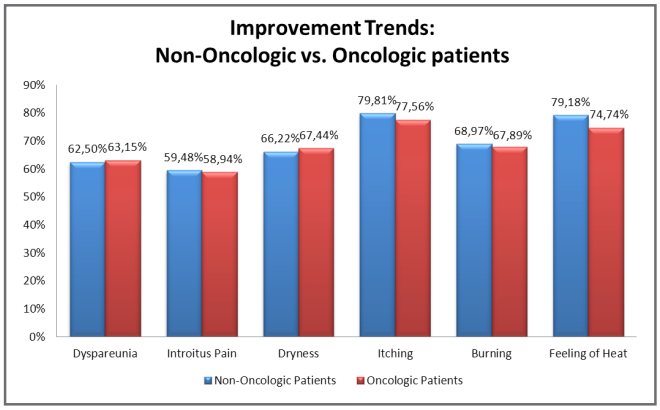

Fig. 8: Improvement trends comparison of main GSM symptoms, 2 months after the 3rd laser session, between non-oncologic and oncologic patients. Non-significant differences can be observed.

The symptoms helped most by the effectiveness of the treatment definitely include burning and itching, especially around the vulva, clitoris and anus (Figs. 9-10). One of the greatest satisfactions in terms of symptomatic improvement regards the treatment of anal and clitoral symptoms. Lichen sclerosus symptoms are also very much affected[8,9]. Of course, given that this is a disorder of autoimmune origin, the laser cannot affect the causes of the disease, but the treatment greatly alleviates the symptoms and, above all, reduces the need for cortisone creams which, by reducing the thickness of the epithelium, could paradoxically lead to a deterioration in the underlying condition.

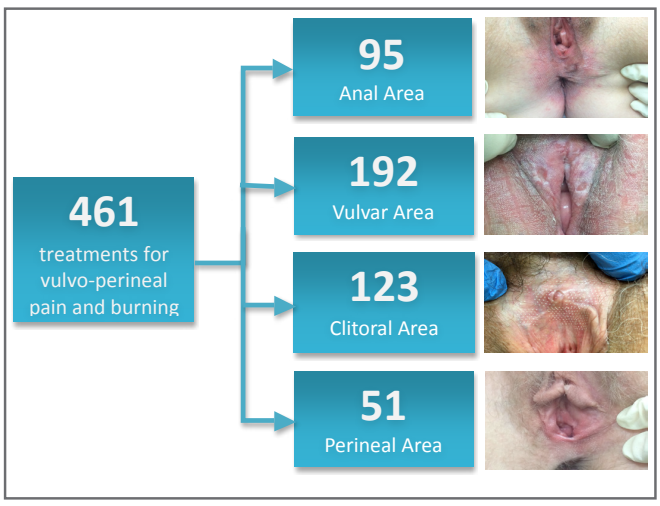

Fig. 9: Number of vulvo-perineal *MonaLisa Touch®* treatments, divided by anatomical areas, performed from March 6th, 2013 to December 31st, 2016 in patients with vulvo-perineal pain and burning symptoms.

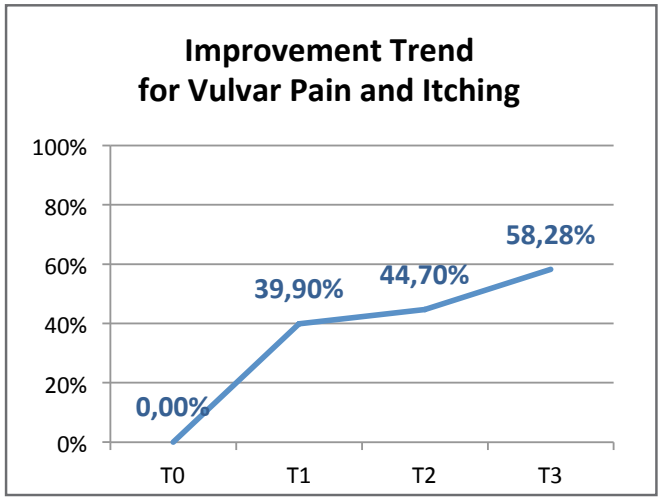

Fig. 10: The vulvar *pain and itching* symptom severity was rated for every patient in the pre-treatment condition (T0; n = 256), after 1 laser treatment (T1; n = 187), after 2 laser treatments (T2; n=105) and post laser treatment assessment (T3; n = 76).The percentage of improvement trend is shown in the graphic above.

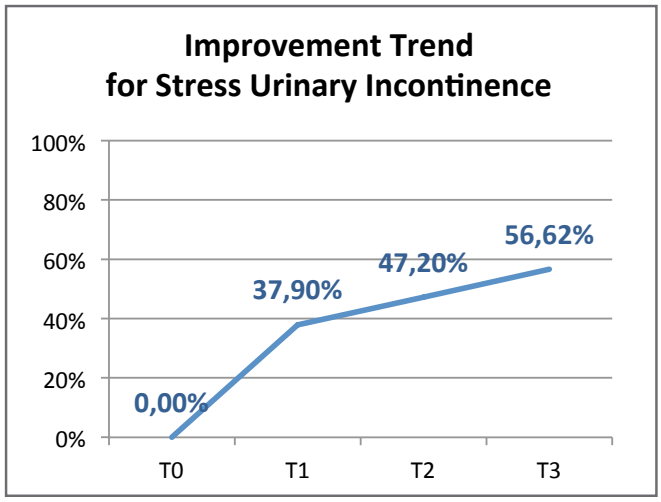

Fig. 11: The *stress urinary Incontinence* symptom severity was rated for every patient in the pre-treatment condition (T0; n = 166), after 1 laser treatment (T1; n = 110), after 2 laser treatments (T2; n=82) and post laser treatment assessment (T3; n = 58).The percentage of improvement trend is shown in the graphic above.

As for the treatment of mild incontinence, we initially focussed on creating a sort of "suburethral plate" which would restore the turgor pressure and oedema of the underlying connective tissue through collagen shrinkage (the concept on which the suburethral sling is based). However, a sling inherently involves creating a "hammock", which of course cannot be achieved with the use of the laser alone. Therefore, the true cause of improved

continence[10] (Fig. 11), which in women with atrophy reaches over 60% for both stress and urge incontinence, is the biostimulatory effect of laser treatment on the urethral epithelial cells (embryologically very similar to those of the vagina) which coapts the internal urethral orifice, a crucial point for continence purposes.

CONCLUSION

A complete analysis of the data collected over this four-year will enable the improvement in the various symptoms on which the *MonaLisa Touch®* treatment acts to be quantified more precisely, as well as to determine more accurately how long the benefits caused by this therapy actually last. In any case, even from the preliminary data, it is clear that MonaLisa Touch® treatment is extremely promising for treating the main symptoms of GSM[11].

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