

GentleMax Pro Plus®

A Multitude of Treatment Possibilities in a Single Platform

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Introduction

The GentleMax Pro Plus (GMPP) is a platform from Candela that is the ultimate result of innovations and advances from the original platform produced years ago. It is a solid, stable dual wavelength platform of both the 755 nm Alexandrite as well as the 1064 nm Nd:YAG wavelengths. The platform is globally recognized as the gold standard for laser hair removal, offering not only optimal wavelengths but also versatility for various treatments. The unique features and reason for its status as the best epilation laser in the world will be explained in detail in separate sections.

Unique features of the GMPP

The GMPP is a dual wavelength platform having 2 solid state wavelengths of the 755 nm Alexandrite and the 1064 nm Nd:YAG. This means the platform can offer a variety of treatment sessions given the action of the wavelengths on melanin, haemoglobin and tissue water. It has high power and multiple spot sizes ranging from 1.5 mm to 26 mm. The smaller spot sizes (1.5, 3, 3x10, and 6 mm) are typically used for vascular lesions, whereas the larger spot sizes above 12 mm are suitable for laser epilation. This is because a larger spot size will penetrate deeper and will also have a larger coverage area for faster treatment time. Typically for pigmentation the spot sizes 8, 10, 12 and 15 mm are used.

The GMPP has multiple pulse durations from microsecond in the Nd:YAG to longer millisecond pulses which will enable us to treat small fine structures that require a short pulse duration as well as larger structures which will require a longer pulse duration. The frequency is 3 Hz which means that 3 shots can be fired in a second resulting in very fast treatments if the larger spot sizes are used. Importantly, for laser epilation on the large spot sizes the GMPP has a 2 ms pulse duration which is particularly useful in the treatment of fine hairs.

The GMPP has dynamic cooling device (DCD) which is efficient in cooling the surface of the skin to protect the epidermis and both the spraying and delay time can be adjusted. The GMPP is the latest version of a number of advances from the previous gentle series which has led to this advancement.

Laser epilation

Laser epilation or hair removal as its commonly known remains one of the most in demand aesthetic and laser treatments worldwide and as such despite the growth in all aspects of laser rejuvenation treatments this modality will continue to be one of the most popular applied treatments. As such, it is important to have a solid and stable laser epilation system that can treat all different skin types and hair thickness sizes. The GMPP has the advantage of large spot size enabling deep penetration, high frequency speed of 3 Hz as well as high power to enable high fluence levels in a large spot size. As the treatments progress and the hair shaft becomes thinner and finer it is important to use a very short pulse duration to effectively achieve longterm hair reduction and the GMPP is able to get down to 2 ms which will be particularly useful for the fine thin hairs. This is a major differentiating factor compared to many other systems in particular the diode lasers.

There are regional laser epilation guidelines and recommendations although worldwide there is a degree of variation in terms of interval and parameters. In general, treatment initially is suggested at intervals of 4 to 8 weeks, increasing this as the treatment progresses and the hair cycle slows down¹. It is recommended to start with a minimal spot size of 12 mm and keeping the handpiece in direct perpendicular contact with the treated area with around 20% overlap. The DCD should be adjusted based on skin type and fluence but is typically 30:20 or 40:20. Blonde, white or red hairs typically do not respond to laser epilation. The GMPP is the best platform to achieve stable, longterm hair reduction with little regrowth when measured at 6, 9 and 12 months post laser epilation treatment.

Hair follicle-related disorders

In addition to laser treatment of hirsutism or unwanted hair for aesthetic reasons the Nd:YAG laser has been used in a number of follicle-related disorders with or without combination treatment with favourable outcomes. These conditions include hidradenitis suppurativa, pilonidal sinus (particularly post surgery), dissecting cellulitis, keratosis pilaris, and pseudofolliculitis barbae².

Alexandrite for pigmentation

The 755 nm is a wavelength that is strongly absorbed by melanin and can therefore be used to treat benign epidermal pigmentation in the lighter skin types. Despite the fact that the nano and picosecond lasers are much better in targeting pigmentation with little collateral damage the GMPP can have a short pulse duration (2 ms in the large 10-15 mm spot sizes, and in the microsecond in 6 mm spot) which will get closer to the thermal relaxation time of melanocytes and melanosomes. Typically the cryogen cooling is turned off to allow for the use of lower fluences in achieving the clinical endpoint of darkening of the pigment. Therefore common parameters for diffuse lentiginos are a spot size between 8-12 mm, 7-10 Hz, and a fluence between 6-12 joules with the cooling off. Lighter pigment requires higher fluences whilst darker pigment needs lower fluences. Typically, a few pulses are performed until the clinical endpoint of pigment darkening and mild perilesional erythema is achieved³.

Vascular uses

The Nd:YAG wavelength is absorbed by haemoglobin which is why this laser can be used in a number of vascular conditions in dermatology. In particular venous lesions respond preferentially to the Nd:YAG compared to the shorter vascular wavelengths (such as the 595 and 532 nm) as they are located deeper in the skin and are rich in deoxyhaemoglobin which is well absorbed by the Nd:YAG wavelength. It is the combination of these two characteristics which makes this wavelength the first choice for venous lesions such as leg veins, venules on the face and thick or hypertrophic parts of haemangiomas and portwine stains³.

Venules on the face respond well to the Nd:YAG but are safe to treat using a small spot and starting with low fluences given the risk of atrophic scarring when a large spot size and high fluences are used. In one study comparing both the Nd:YAG laser against the pulsed dye laser (PDL) for nasal vessels it was found that the small red telangiectasia respond better to the PDL whereas the blue venules responded better to the Nd:YAG laser; an observation agreed with by all laser experts⁴.

A study on the comparison between the Nd:YAG long-pulsed against the 532 nm vascular laser in leg vessels showed that the longer penetration of the Nd:YAG wavelength was superior to the 532 nm laser given the deeper uniform heating which will address the lower

parts of the vessels since only the upper part of some vessels were in interaction with the shorter wavelength of 532 nm⁵. The parameters of the Nd:YAG in leg vessels depend on the size and depth of the leg vessels with typically smaller vessels requiring a smaller spot size and a shorter pulse duration and larger vessels requiring a slightly larger spot size and a longer pulse duration. The clinical endpoint is important which is colour change, spasm or disappearance of the vessel. In the GMPP the linear elliptical 3x10 mm is particularly suited for such linear vessels on the legs (on the face too but with a degree of caution).



Figure 1: Reduction in the vascularity of the acne lesions with the Nd:YAG laser



Figure 2 : Venous lake on the lower lip treated with the Nd :YAG laser

The gold standard treatment for portwine stains remains the PDL although there are reports of intense pulsed light (IPL) and 532 nm treatment in this condition. The hypertrophic component of portwine stains respond less well to the shorter wavelengths and is preferentially treated with the Nd:YAG wavelength. The hypertrophic blebs and the purple colour of the vessels imply larger calibre vessels located deep in the skin hence their response to the Nd:YAG laser. Indeed in a study among Chinese patients it was demonstrated that for the purple component of the portwine stain the Nd:YAG was efficient albeit should be used with care and expertise.

The treatment of haemangiomas has been transformed over the last decade since the discovery of the efficacy of systemic beta blockers in this condition. Nevertheless, the Nd:YAG laser has been used in combination with the PDL in the treatment of the deeper component of the haemangiomas with success.

The 755 nm Alexandrite laser is a wavelength absorbed well by deoxygenated haemoglobin and can therefore be used as an advanced mode in a number of vascular conditions. In hypertrophic resistant portwine stains it has been used with 8 or 10 mm spot size, 3 ms pulse duration and fluences starting from 5- to 60 joules depending on skin thickness and the clinical endpoint of pupura⁶. Facial and leg telangiectasia have also been treated with the Alexandrite on a 6 mm spot, 40 ms pulse duration (the longer pulse durations were safer on the epidermis than the shorter ones) and fluences starting from 60-70 joules. It is particularly effective in vessels of a diameter greater than 0.5 mm given these will be venules and hence rich in deoxyhaemoglobin.

Reduction in vascularity

Vascular rosacea and reduction in vascularity have been successfully treated with the Nd:YAG laser in both the millisecond pulsed mode as well as the painting mode with the microsecond pulse. The Nd:YAG wavelength is absorbed by haemoglobin hence its efficacy in reducing vascularity due to the photothermal effects leading to vessel coagulation. Particularly the short pulse duration would be more suitable for this reduction since the small vessel size would have a short thermal relaxation time. In one study among patients with unsightly leg veins the use of long-pulsed Nd:YAG led to good clearance of the majority of patients with no complications. In practice the Nd:YAG laser can be combined with other topical or systemic therapies for reducing vascular abnormalities for a synergistic effect. Typical parameters will include 10 mm spot, 0.3 ms, 7-10 Hz and a fluence between 8-12 Joules in a painting fashion until the clinical endpoint is reached⁷.

Onychomycosis

Fungal nail infection is a common problem worldwide and while there is systemic treatment for this condition, the use of lasers might be an alternative to patients who are unable to or unwilling to take systemic treatment in the form of tablets. The Nd:YAG has been reported in numerous studies to be effective in onychomycosis with typically several treatments needed at around monthly intervals. There is some variation in terms of parameters – in particular the pulse duration – but it is generally the short pulse durations in the nano and microsecond range that tend to be effective. The author prefers to use the microsecond pulse duration with high repetition rate with heat generation being the suggested mechanism behind its efficacy⁸.

Wrinkles

The Nd:YAG laser, operating within a wavelength that effectively targets all three primary skin chromophores—haemoglobin, melanin, and water—demonstrates enhanced absorption by water in the shorter microsecond wavelength range, where melanin and haemoglobin absorption is minimal. With a high repetition rate, this results in an accumulation of heat in the skin, contributing to the treatment of wrinkles through repeated sessions. This treatment can be seamlessly integrated with other procedures focused on wrinkle treatment, such as injectables or alternative energy-based devices. Common parameters for this treatment include an 8 mm spot size, a frequency of 7-10 Hz, energy levels of 10-12 joules, a pulse duration of 0.3 ms, and multiple passes until achieving uniform pinkness and a perceptible heat sensation, confirmed by an external thermometer reading of 40 degrees Celsius.

Conclusion

The GMPP is a dual wavelength multipurpose platform with 2 wavelengths and multiple applications. It has a large spot size of 26 mm and a short pulse of 2 ms with a speed of 3 Hz which will make laser hair reduction particularly effective in all skin types and hair thicknesses. Furthermore it has multiple applications in rejuvenation*, vascular and benign epidermal pigmentation.

* Rejuvenation defined as the treatment of pigmentation, vascularity, and wrinkles.

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