International Journal Dental and Medical Sciences Research
Volume 6, Issue 5, Sep - Oct 2024 pp 325-330 www.ijdmsrjournal.com ISSN: 2582-6018

"Effect of Carbon Dioxide Laser in Benign Skin Conditions over Face

Dr Laxmi, Dr Vishal V Wali

Junior resident, Department of Dermatology, Venereology and Leprology, Basaveshwara Teaching and General Hospital, MahadevappaRampure Medical College, Kalaburagi

Professor, Department of Dermatology, Venereology and Leprology, Basaveshwara Teaching and General Hospital, MahadevappaRampure Medical College, Kalaburagi

Submitted: 05-10-2024 Accepted: 15-10-2024

ABSTRACT

Introduction: As there are about 5-10% of all skin diseases amount to benign skin lesions and other cosmetically disabling conditions, amenable to laser therapy, it is decided to findout the effect of CO2 laser in the treatment from the patient's point of view regarding better look cosmetically and psychologically. Laser has become an essential tool for dermatologic surgeons. Conditions that until very recently could not be successfully treated with an acceptable risk-benefit ratio can now be easily treated in the office setting by using one of an ever-expanding array of lasers.

Methods: A single group of Prospective interventional study was conducted and 50 clinically diagnosed benign conditions patients were enrolled. By using Simple random sampling, the study subject will be selected after applying inclusion and exclusion criteria and information will be collected through prepared proforma from each patient. All patients will be examined in good light. A detailed dermatological assessment of the disease was carried out which includes total number and distribution of lesions, size of lesions, site of involvement noted over face.It depends on experience and skill as well as the type of ablative procedure performed.

Results: In the present study patients experienced significant improvement, with many achieving over 75% lesion reduction after a single session. The results highlighted the high efficacy of CO2 laser treatment, particularly for lesions on the face and cosmetically sensitive areas, where precision and minimal scarring are crucial. The study confirms the effectiveness of CO2 laser therapy in managing benign skin conditions, with a high safety profile when proper techniques and post-operative care are applied.

Conclusion: The present study demonstrates the effectiveness and safety of CO2 laser treatment for various benign skin conditions, with the majority of participants experiencing complete removal, low recurrence rates, and high levels of patient satisfaction.

Keywords: Co2 laser, ablative mode, benign conditions

I. INTRODUCTION

With minimal clinical proof, the aging process of the face is a slow, atrophic progression of soft and hard tissues that occurs over the course of three to four decades. Ultimately, it can be identified by the appearance of wrinkles and furrows together with a decrease in tonicity. Other indicators of aging on the skin also arise with age and are partly due to photoaging and benign lesion development. Patients frequently seek the aesthetic removal of skin tags (acrochordons), verrucae, including keratosis, syringoma, dermatosis papulosa nigra (DPN), nevi, and other benign lesions from an aesthetic surgery practice.[1]

As there are about 5-10% of all skin diseases amount to benign skin lesions and other cosmetically disabling conditions, amenable to laser therapy, it is decided to find out the effect of CO_2 laser in the treatment from the patient's point of view regarding better look cosmetically and psychologically.[8]

Laser has become an essential tool for dermatologic surgeons. Conditions that until very recently could not be successfully treated with an acceptable risk-benefit ratio can now be easily treated in the office setting by using one of an ever-expanding array of lasers.

Common skin conditions such as verruca vulgaris, verruca plantaris, soft fibromas, condyloma acuminata, syringomas, common warts, have also been found to respond well to laser treatment. In the field of aesthetic dermatology, laser treatment is also used to treat acne and alopecia. Additionally, a variety of devices have been developed for face cosmesis to repair wrinkles and drooping skin that has aged both chronologically and through photos.

International Journal Dental and Medical Sciences Research
Volume 6, Issue 5, Sep - Oct 2024 pp 325-330 www.ijdmsrjournal.com ISSN: 2582-6018

The intended uses of the lasers used to treat various illnesses differ depending on the wavelength of the light. While there are many different kinds of lasers, we will discuss the principles and medical uses of the carbon dioxide (CO_2) laser in this article since it is one of the most commonly used lasers in dermatology.

Not much literature is available in this part of the country about use of CO_2 laser in benign conditions of the face. Hence, this study was mainly undertaken in order to study the use of CO_2 laser in benign conditions of the face.

II. METHODOLOGY

All patients were examined in good light. A detailed dermatological assessment of the disease was carried out which includes total number and distribution of lesions, size of lesions, site of involvement noted over face. Treatment areas were cleaned with povidone iodine and normal saline. Topical EMLA(1: 1 eutectic mixture of 2.5% lidocaine and 2.5% prilocaine) applied to the site of the lesions 1 hour before the procedure. For a few patients local infiltration with 2% lignocaine was given after the test dose. Appropriate safety goggles and eyeshields were provided for staff and patients respectively. Fractional CO2 laser ablation was done in Normal mode (Pulse/ Continuous) of laser settings.

It depends on experience and skill as well as the type of ablative procedure was performed. With the laser set at a power of 10W and with an impact spot of 3 – 4 mm, begun with a short impact in the centre of the lesion. Repeat this with a continuous burst and move to the peripheral margin of the lesion. The procedure was stopped when the surface has been totally treated. the resulting char was cleaned. Repeat the vaporize cleanse cycle until the bleeding is stable and the wound created appeared reasonably uniform. Patient were followed up.

The data was analysed statistically using IBM SPSS 20.0 Version software. For qualitative data analysis Chi square analysis was applied for significance, for quantitative data analysis t test and ANOVA test was applied for significance. P value <0.05 was considered as significant.

III. RESULTS

Table:1 Laser mode distribution among the study participants (N=50)

Laser Mode	Frequency (n)	Percentage (%)
Continuous wave	44	88.0
Pulse mode	6	12.0
Total	**50**	**100.0**

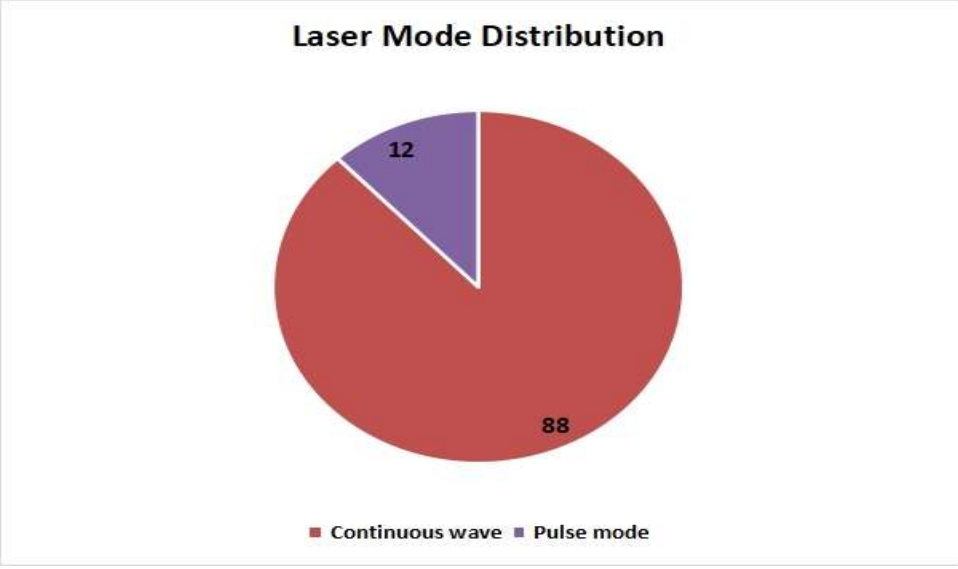


Figure 1. Laser mode distribution among the study participants

Table 1 depicts laser mode distribution among the study participants. Of total, 88% (n=44) of the study participants were treated with continuous wave and 12% (n=6) were treated with pulse mode.

International Journal Dental and Medical Sciences Research
Volume 6, Issue 5, Sep - Oct 2024 pp 325-330 www.ijdmsrjournal.com ISSN: 2582-6018

Table 2:Response distribution among the study participants (N=50)

Response	Frequency (n)	Percentage (%)
Complete removal	46	92.0
Incomplete removal	4	8.0
Total	**50**	**100.0**

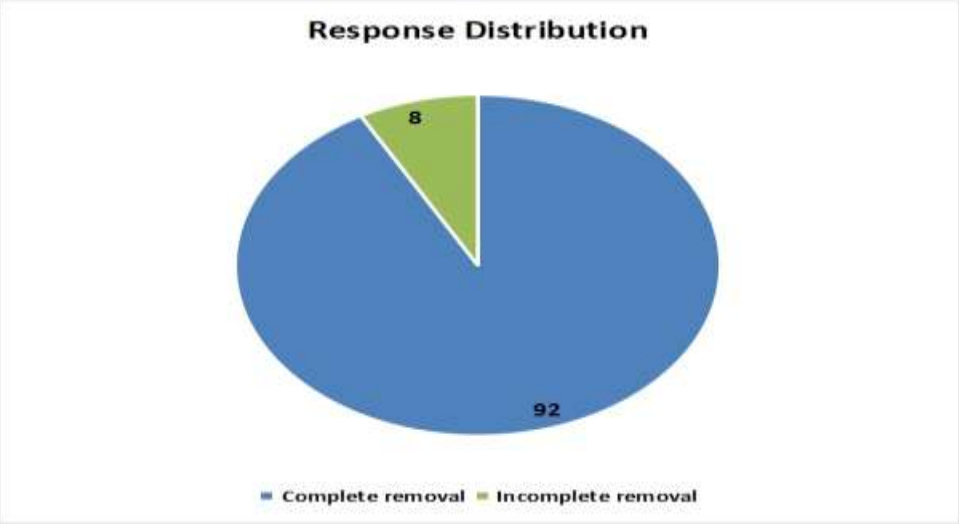


Figure 2. Response distribution among the study participants

Table 2 depicts response distribution among the study participants. Of total, 92% (n=46) of the study participants had complete removal and 8% (n=4) had incomplete removal.

Table 3. Recurrence distribution among the study participants (N=50)

Recurrence	Frequency (n)	Percentage (%)
Absent	43	86.0
Incomplete removal and recurrence cannot be assessed	4	8.0
Present	3	6.0
Total	**50**	**100.0**

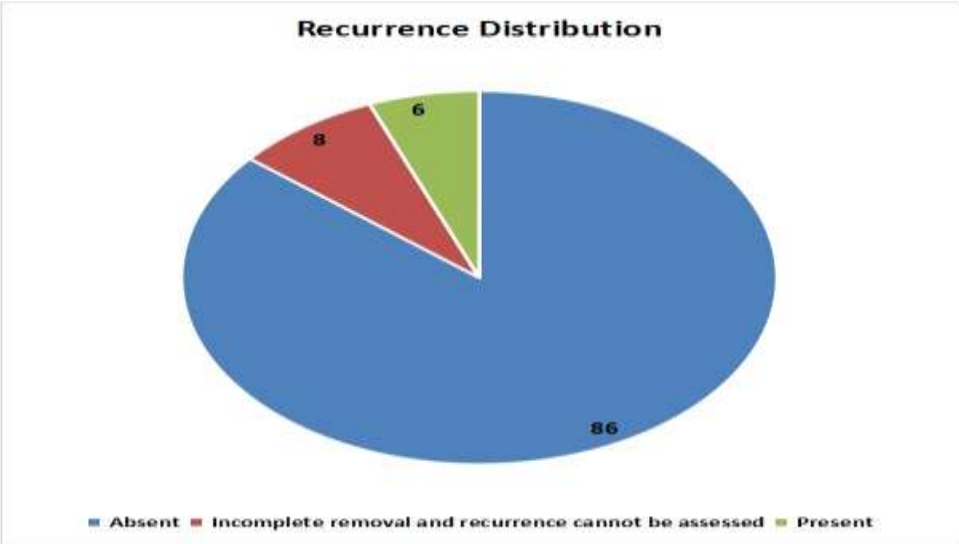


Figure 3. Recurrence distribution among the study participants

Table 3 describes recurrence distribution among the study participants. Of total, 86% (n=43) of the study participants had no recurrence, 6% (n=3) had recurrence and 8% (n=4) had incomplete removal and recurrence cannot be assessed. 86% (n=43) of the study participants had no recurrence.

IV. DISCUSSION

The research study seeks to comprehensively assess both the effectiveness and safety profile of CO2 laser therapy when utilized in the treatment of various benign skin conditions. CO2 lasers have emerged as prominent tools in the realm of dermatology, largely due to their exceptional precision and the capacity to precisely target tissue while causing minimal collateral damage to surrounding areas. It is this particular quality that renders CO2 lasers a particularly appealing option for addressing benign skin irregularities

Age and Gender Distribution

The age distribution of the study participants showed that the majority (48%, n=24) belonged to the 21-30 years age group, followed by 41-50 years (26%, n=13), 11-20 years (16%, n=8), and 31-40 years (10%, n=5) age groups. This age distribution is consistent with the typical onset and presentation of many benign skin conditions, which often develop during adolescence and young adulthood. The gender distribution revealed a higher representation of females (68%, n=34) compared to males (32%, n=16).

Occupation and Comorbidities

The occupational distribution of the study participants showed that the largest proportion were students (40%, n=20), followed by homemakers (32%, n=16), employees (18%, n=9), actors (8%, n=4), and businessmen (2%, n=1). This distribution reflects the sociodemographic characteristics of the study setting and may provide insights into the healthcare-seeking behavior and access to specialized dermatological services. Regarding comorbidities, the majority of participants (90%, n=45) did not have any, suggesting that the benign skin conditions were the primary concern for seeking treatment in this cohort.

Duration and Site of Benign Skin Conditions

The duration of the benign skin conditions varied, with the majority (52%, n=26) having a duration of 13-18 months, followed by 7-12 months (18%, n=9), 1-6 months (14%, n=7), 19-24 months (10%, n=5), since birth (4%, n=2), and 25-28 months (2%, n=1). This suggests that the study participants sought treatment after a considerable period of disease onset, which could be attributed to various factors, such as the benign nature of the conditions, lack of significant functional or cosmetic concern

Diagnosis and Laser Treatment

The study participants presented with a wide spectrum of benign skin conditions, with the most prevalent diagnoses being verruca plana (18%, n=9), tricho epithelioma (14%, n=7), seborrheic keratosis (12%, n=6), syringoma (10%, n=5), and melanocytic nevus (8%, n=4). The majority of the lesions were treated using the continuous wave mode of the CO2 laser (88%, n=44), which is a commonly employed technique for the management of various benign skin growths. The observed high rates of complete removal (92%, n=46) and low recurrence (6%, n=3) suggest the effectiveness of CO2 laser therapy in this cohort. The continuous wave mode offers the advantages of precise control, efficient vaporization of the target tissue, and minimal thermal damage to the surrounding healthy skin. In contrast, a smaller proportion of the participants (12%, n=6) were treated using the pulse mode, which may be preferred for specific lesions or patient characteristics, such as thin or delicate skin.

Treatment Efficacy and Outcomes

The CO2 laser demonstrated high efficacy across various benign skin conditions, with 92% of participants achieving complete removal of their lesions. This high success rate underscores the precision and effectiveness of CO2 laser therapy in targeting and ablating abnormal skin tissue while preserving surrounding healthy skin.

The study employed two primary laser modes: continuous wave (88% of cases) and pulse mode (12%). The choice of mode was likely tailored to the specific characteristics of each lesion and patient, highlighting the adaptability of CO2 laser therapy. The high rate of complete removal suggests that both modes can be effective when appropriately applied.

V. CONCLUSION

In conclusion, the present study demonstrates the effectiveness and safety of CO2 laser treatment for various benign skin conditions, with the majority of participants experiencing complete removal, low recurrence rates, and high levels of patient satisfaction. However, the management of immediate and late complications

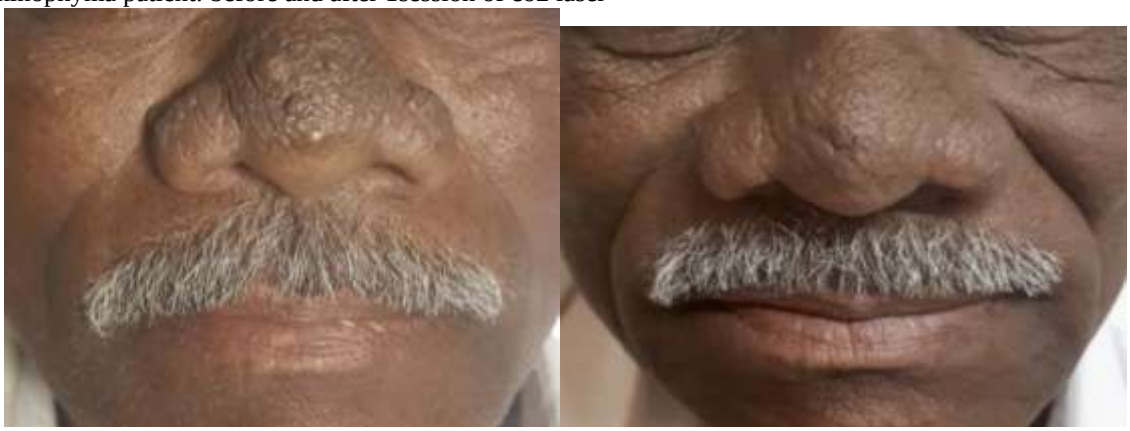
International Journal Dental and Medical Sciences Research
Volume 6, Issue 5, Sep - Oct 2024 pp 325-330 www.ijdmsrjournal.com ISSN: 2582-6018

remains an important consideration in the successful implementation of this therapeutic approach. Further research, including larger sample sizes and long-term follow-up, would help to consolidate the findings and guide the optimization of CO2 laser treatment protocols for benign dermatological conditions.

Acknowledgement:
We sincerely thank the faculty of the institute for helping us in each aspect of the study.
Declarations
Funding: None
Conflict of interest: None
declared Ethical approval: The study was approved by the Institutional Ethics Committee

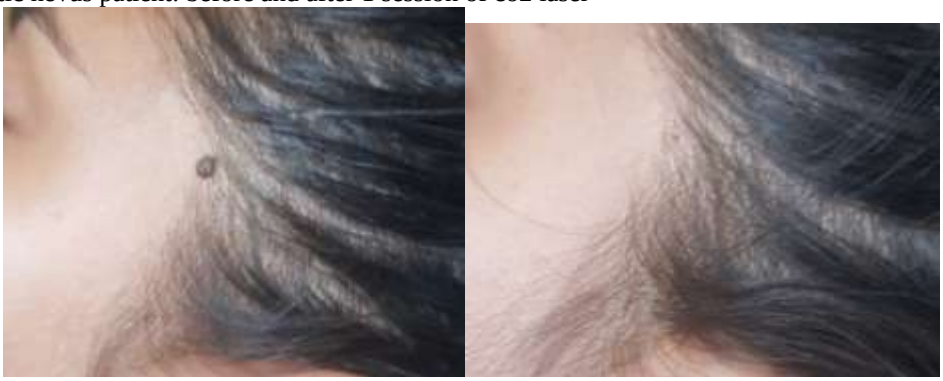
PICTURES

In rhinophyma patient: before and after 1session of co2 laser



In melanocytic nevus patient: before and after one session of co2 laser

In melanocytic nevus patient: before and after 1 session of co2 laser



REFERENCES

[1]. Sjerobabski-Masnec I, Situm M. Skin aging. Acta Clin Croat. 2010;49(4):515–518.
[2]. Higgins JC, Maher MH, Douglas MS. Diagnosing common benign skin tumors. Am Fam Physician. 2015;92(7):601–607.
[3]. Marinescu SA, Tatu AL, Mihai IR, Giuglea C. Correlations between clinics, dermoscopy and histopathology in a female with two dermatofibromas—a case report. Rom J MorpholEmbryol. 2016;57(1):323–326.
[4]. Niamtu J. Esthetic removal of head and neck nevi and lesions with 4.0-MHz radio-wave surgery: a 30-year experience. J Oral Maxillofac Surg. 2014;72(6):1139–1150.
[5]. Read-Fuller AM, Yates DM, Vu DD, Hoopman JE, Finn RA. Problems and complications of full-face carbon dioxide laser resurfacing for pathological lesions of the skin. Oral Surg Oral Med Oral Pathol Oral Radiol. 2017;123(1):e10–e15.
[6]. Preissig J, Hamilton K, Markus R. Current Laser Resurfacing Technologies: A Review that Delves Beneath the Surface. Semin Plast Surg. 2012;26(3):109-116.
[7]. Gianfaldoni S, Tchernev G, Wollina U, et al. An Overview of Laser in Dermatology: The Past, the Present and … the Future (?). Open Access Maced J Med Sci. 2017;5(4):526-530.
[8]. Goldberg DJ, Laser treatment of pigmented lesions, Dermatologic clinics: 1997: 25: 3: 397 – 407.
[9]. Polla LL, Margolis RJ, Dover JS, et al. Melanosomes are a primary target of Q-switched ruby laser irradiation in guinea pig skin. J Invest Dermatol. 1987 Sep. 89(3):281-6.
[10]. Dover JS, Margolis RJ, Polla LL, et al. Pigmented guinea pig skin irradiated with Q-switched ruby laser pulses. Morphologic and histologic findings. Arch Dermatol. 1989 Jan. 125(1):43-9.