

# PULSED DYE LASER VERSUS INTENSE PULSED LIGHT THERAPY IN TREATMENT OF NAIL PSORIASIS : RANDOMIZED CONTROLLED CLINICAL STUDY

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## Introduction

Nail psoriasis is recognized as a common manifestation of psoriasis, occurring from 15% to 79% of patients of psoriasis, with an estimated lifetime incidence of 80–90%. Nail involvement can cause significant physical impairment, pain, and psychological stress and may impair patients in social settings and within the workplace causing a negative impact on quality of life. Treatment options for nail psoriasis are different including topical treatment, intralesional corticosteroids, biological treatment. Laser treatment includes photodynamic therapy, pulsed dye laser (PDL), intense pulsed light therapy (IPL), Excimer laser and Nd: YAG laser. The PDL has been widely used in treating nail psoriasis due to the highly vascular nature of psoriatic lesions. The most commonly used wavelengths for PDL therapeutic use are 585 and 595 nm, which can effectively reach the nail bed through the nail plate. The intense pulsed light works on the principle of selective photothermolysis to cause coagulation of the enlarged blood vessels that supply the psoriatic nail. The wavelengths for IPL vascular therapeutic use are 550- to 1,200-nm.

## Aim of the work

The aim of this study was to assess and compare the efficacy of Pulsed Dye Laser versus Intense Pulsed Light therapy in treatment of patients with nail psoriasis.

## Patients

Twenty patients with bilateral clinically diagnosed and dermoscopically confirmed fingernail psoriasis were recruited. Patients were randomized into three groups; Group A; psoriatic nails of one hand treated with PDL; Group B; psoriatic nails of the opposite hand treated with IPL; and Group C; the remaining 2 or 3 fingers with nail psoriasis left without treatment as a control group.

## Methods

**Group A:** Psoriatic nails of one hand were treated with PDL (595 nm) with 2 passes of the following parameters (6ms pulse duration, 10mm spot size, 6 J/cm2 laser energy) with Moral DCD cooling system. Treatment was done once per month for 6 months. **Group B:** Included the psoriatic nails of the opposite hand that were treated with IPL with 2 passes of the following parameters (560 Handpiece, 5 ms pulse duration, 4×1 cm spot size, 5-10 ms pulse delay, 25 J/cm2 fluence). Treatment was done once per month for 6 months. **Group C:** Included the remaining 2 or 3 fingers with nail psoriasis in both hands that were left without treatment to serve as a control group.

## Results

The results of the present study revealed that a significant reduction in the mean total, nail bed, and nail matrix NAPS I score from the baseline to the end of the study were observed in the PDL group as well as in the IPL group with no significant difference between the treated groups. In contrast, a significant difference was observed in the PDL and the IPL group from the control group. (Table 1 & 2) (Figure 1 & 2).

Table (1) : Comparison between the three studied groups according to percent of decrease in NAPS I score from before sessions (n = 20)

| % of decrease in NAPSI from before sessions | PDL (A)   | IPL (B)             | Control         | H       | p       |
|---|---|---------------------|-----------------|---------|---------|
| Before 3 <sup>rd</sup> session              |   |                     |                 |         |         |
| Min. – Max.                                 | -12.50 –85.71   | -35.71 –66.67       | -20.0 –20.0     | 9.311*  | 0.010*  |
| Mean ± SD.                                  | 15.77 ±21.71  | 13.17 ±20.77        | 1.65 ±9.02      |         |         |
| Median (IQR)                                | 12.50 (0.0 –20.63)  | 8.33 (2.38 –20.41)  | 0.0 (0.0 –4.94) |         |         |
| Sig. bet. grps.                             | p <sub>1</sub> =0.840,p <sub>2</sub> =0.006*,p <sub>3</sub> =0.011* |                     |                 |         |         |
| Before 5 <sup>th</sup> session              |   |                     |                 |         |         |
| Min. – Max.                                 | 0.0 –85.71  | -10.0 –100.0        | -142.9 –20.0    | 22.551* | <0.001* |
| Mean ± SD.                                  | 21.99 ±20.51  | 28.27 ±23.86        | -5.60 ±34.19    |         |         |
| Median (IQR)                                | 17.26(11.36 –25.90)   | 21.58(15.48 –41.25) | 0.0 (0.0 –2.0)  |         |         |
| Sig. bet. grps.                             | p <sub>1</sub> =0.428,p <sub>2</sub> <0.001*,p <sub>3</sub> <0.001* |                     |                 |         |         |
| 3 months after sessions                     |   |                     |                 |         |         |
| Min. – Max.                                 | 0.0 –57.14  | -7.14 –60.0         | -75.0 –20.0     | 29.111* | <0.001* |
| Mean ± SD.                                  | 27.75 ±14.0   | 32.02 ±19.23        | -8.50 ±27.71    |         |         |
| Median (IQR)                                | 27.27(20.17 –36.73)   | 31.78(22.22 –48.08) | 0.0 (0.0 –0.0)  |         |         |
| Sig. bet. grps.                             | p <sub>1</sub> =0.522,p <sub>2</sub> <0.001*,p <sub>3</sub> <0.001* |                     |                 |         |         |

IQR: Inter quartile range SD: Standard deviation H: H for Kruskal Wallis test, Pairwise comparison bet. each 2 groups was done using Post Hoc Test (Dunn's for multiple comparisons test)  
p: p value for comparing between the three studied groups p<sub>1</sub>: p value for comparing between PDL and IPL  
p<sub>2</sub>: p value for comparing between PDL and Control p<sub>3</sub>: p value for comparing between IPL and Control  
\*: Statistically significant at p ≤ 0.05

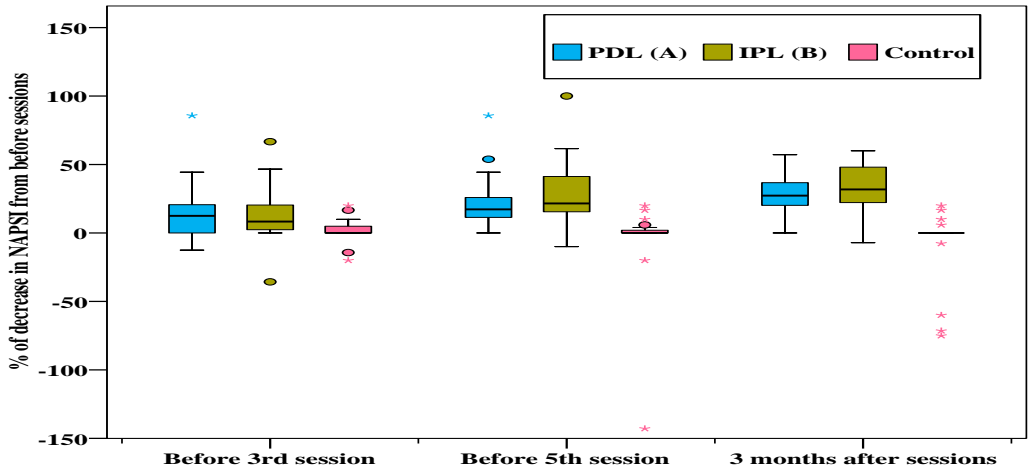


Figure (1): Comparison between the three studied groups according to percent of decrease in NAPS I score from before sessions (n = 20)

Table (2) : Comparison between the four studied periods according to nail matrix score (n = 20)

| Nail Matrix Score | Before Sessions   | Before 3 <sup>rd</sup> session | Before 5 <sup>th</sup> session | 3 months after sessions | Fr      | p       |
|-------------------|---|--------------------------------|--------------------------------|-------------------------|---------|---------|
| PDL (A)           |   |                                |                                |                         |         |         |
| Min. – Max.       | 1.25 –4.0   | 0.0 –4.0                       | 0.0 –4.0                       | 0.0 –4.0                | 30.096* | <0.001* |
| Mean ± SD.        | 3.25 ±0.91  | 2.87 ±1.27                     | 2.60 ±1.26                     | 2.42 ±1.09              |         |         |
| Median (IQR)      | 3.60 (2.28 –4.0)  | 3.15 (2.0 –4.0)                | 2.80 (1.75 –3.68)              | 2.55 (1.68 –3.38)       |         |         |
| p <sub>0</sub>    |   | 0.027*                         | <0.001*                        | <0.001*                 |         |         |
| Sig. bet. periods | p <sub>1</sub> =0.058,p <sub>2</sub> =0.043*,p <sub>3</sub> =0.903  |                                |                                |                         |         |         |
| IPL (B)           |   |                                |                                |                         |         |         |
| Min. – Max.       | 1.25 –4.0   | 0.0 –4.0                       | 0.0 –4.0                       | 0.0 –4.0                | 30.530* | <0.001* |
| Mean ± SD.        | 3.23 ±0.92  | 2.92 ±1.22                     | 2.42 ±1.30                     | 2.28 ±0.99              |         |         |
| Median (IQR)      | 3.63 (2.43 –4.0)  | 3.50 (2.0 –4.0)                | 2.80 (1.25 –3.50)              | 2.0 (1.75 –3.25)        |         |         |
| p <sub>0</sub>    |   | 0.221                          | <0.001*                        | <0.001*                 |         |         |
| Sig. bet. periods | p <sub>1</sub> =0.006*,p <sub>2</sub> =0.004*,p <sub>3</sub> =0.903 |                                |                                |                         |         |         |
| Control           |   |                                |                                |                         |         |         |
| Min. – Max.       | 0.0 –4.0  | 0.0 –4.0                       | 0.0 –4.0                       | 0.0 –4.0                | 2.867   | 0.413   |
| Mean ± SD.        | 2.81 ±1.34  | 2.82 ±1.38                     | 2.90 ±1.34                     | 3.03 ±1.12              |         |         |
| Median (IQR)      | 3.38 (2.0 –4.0)   | 3.38 (1.80 –4.0)               | 3.50 (2.0 –4.0)                | 3.38 (2.0 –4.0)         |         |         |

IQR: Inter quartile range SD: Standard deviation Fr: Friedman test, Sig. bet. Periods was done using Post Hoc Test (Dunn's)  
p: p value for comparing between the four studied periods p<sub>0</sub>: p value for comparing between before sessions and each other periods  
p<sub>1</sub>: p value for comparing between before 3<sup>rd</sup> session and before 5<sup>th</sup> session  
p<sub>2</sub>: p value for comparing between before 3<sup>rd</sup> session and 3 months after sessions  
p<sub>3</sub>: p value for comparing between before 5<sup>th</sup> session and 3 months after sessions  
\*: Statistically significant at p ≤ 0.05

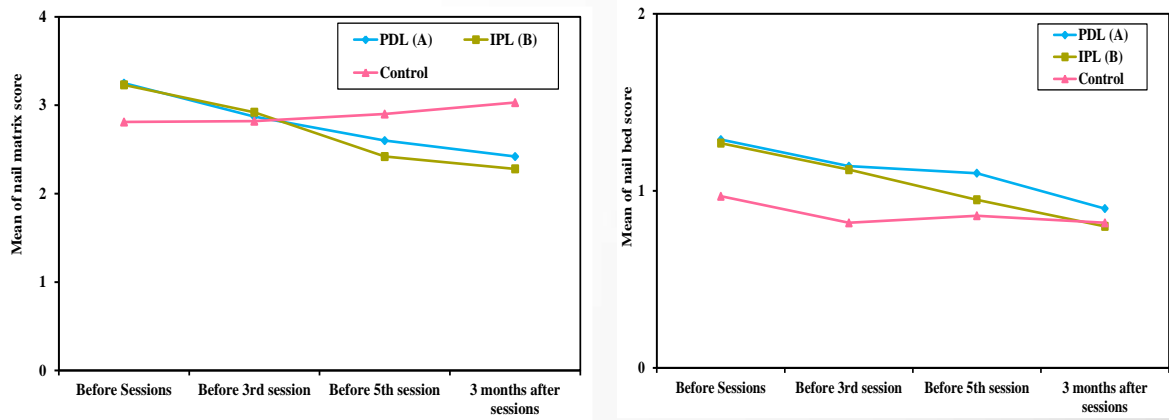


Figure (2): Comparison between the four studied periods according to nail matrix and nail bed scores (n = 20)

## Conclusion

Findings of the study revealed that receiving treatment with Pulsed Dye Laser (PDL) and Intense Pulsed Light therapy (IPL), in patients with bilateral fingernail psoriasis are safe and effective.