

Introduction

Meibomian gland dysfunction (MGD) is considered as the main cause for dry eyes [1]. Viso et al. found a prevalence of MGD in subjects aged 40 years and older of 21.9% [2]. Thus every fifth person in this age group is affected by MGD.

There are various forms of therapy for MGD. For most therapies, the affected persons invest time in MGD therapy at home every day. This is often a time and compliance challenge for MGD patients in their everyday life.

A novel form of MGD therapy is the Intense Pulsed Light application (IPL). The complete IPL treatment takes place at an optometric practice as it can't be performed at home by the patient. The efficiency of the IPL application can possibly be supported in combination with Low Level Light Therapy (LLLT), according to the manufacturer's recommendations.

Currently only few literature sources are available that describe the effectiveness of IPL application in combination with LLLT technology in MGD patients [3]. For this reason, this study should make a valuable contribution to science.

Purpose

The study aimed to evaluate and compare subjective sensation by Ocular Surface Disease Index (OSDI), Non Invasive Keratograph Break Up Time (NIK BUT) and osmolarity in the presence of conjunctivitis sicca before and after IPL / LLLT application.

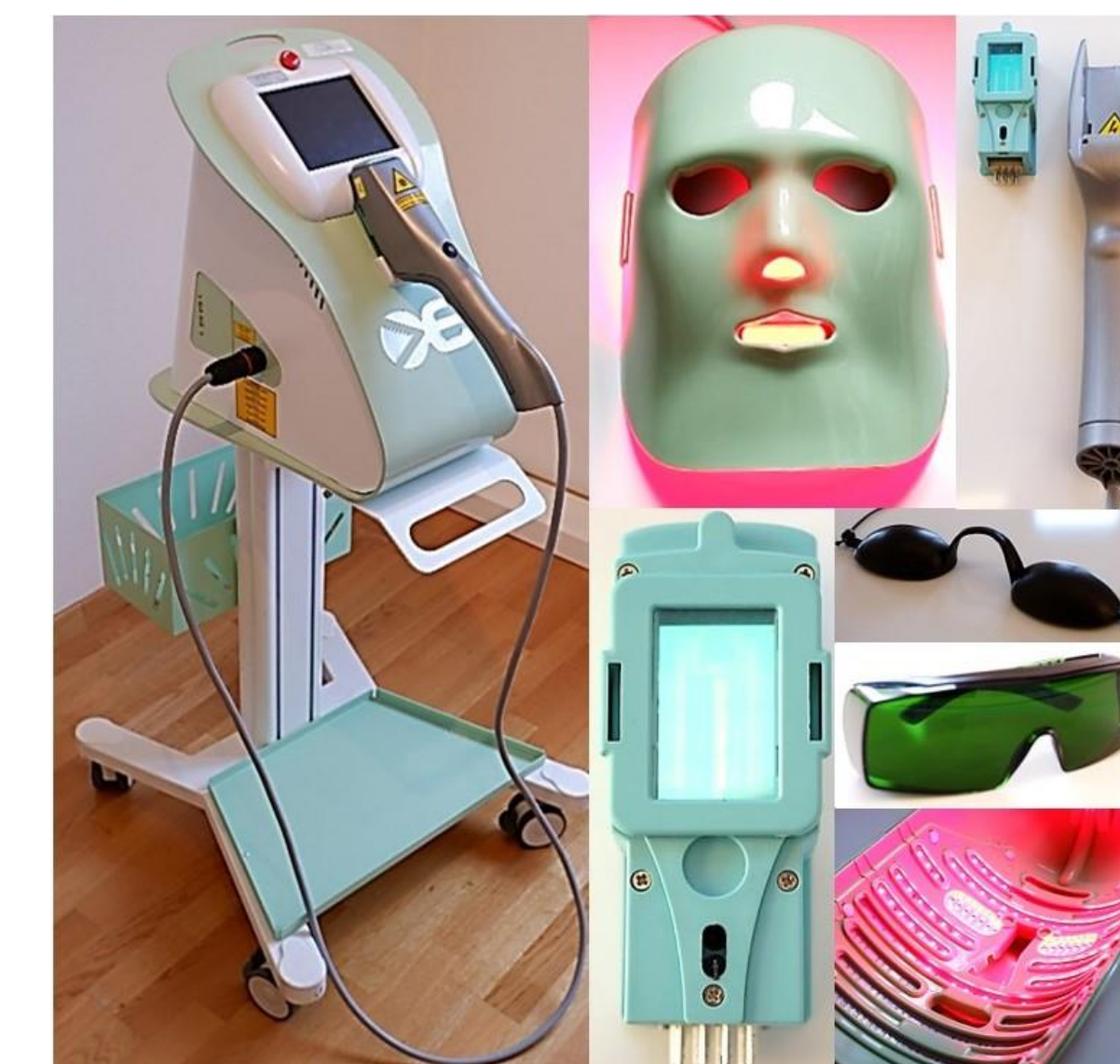
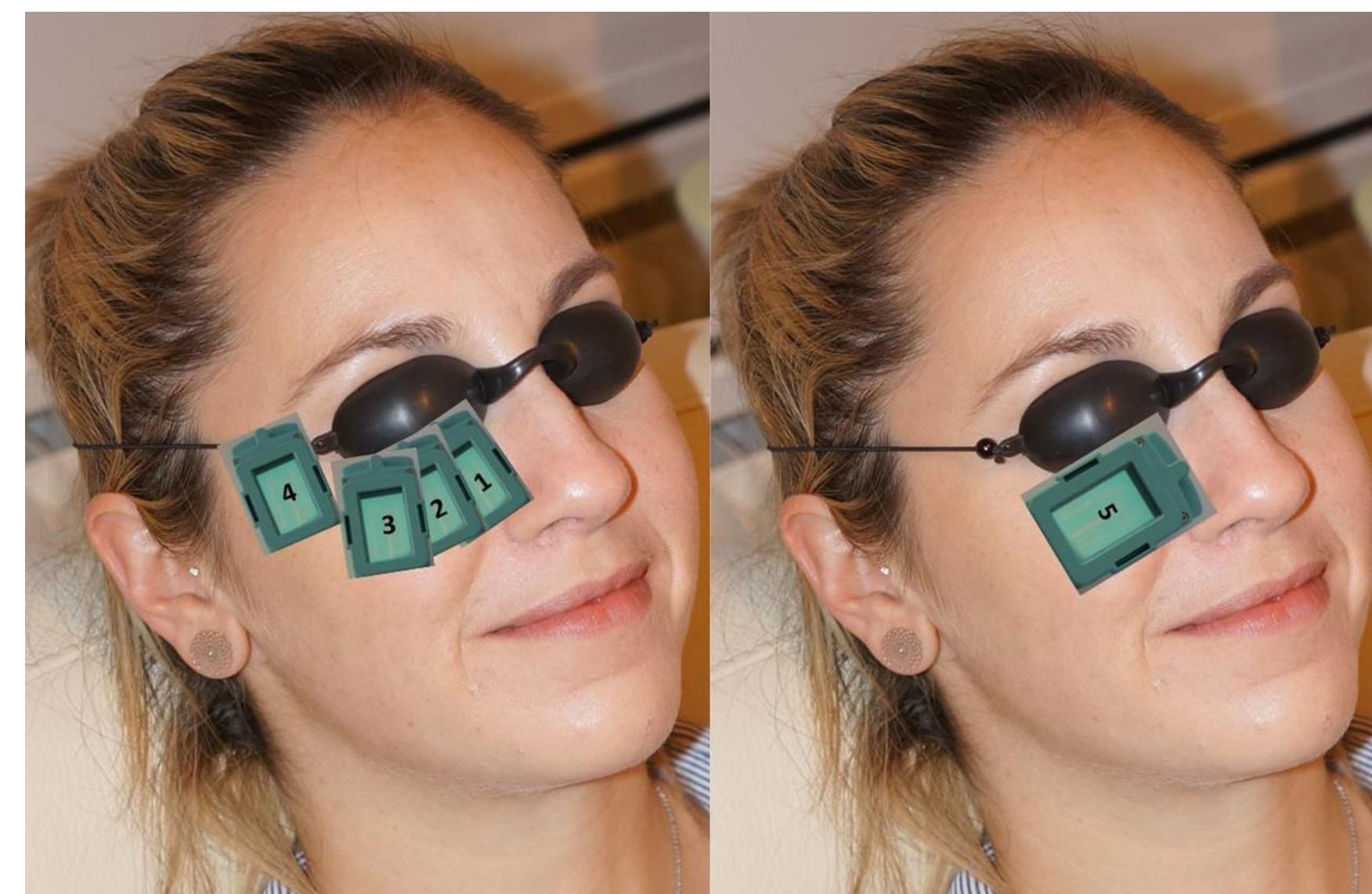
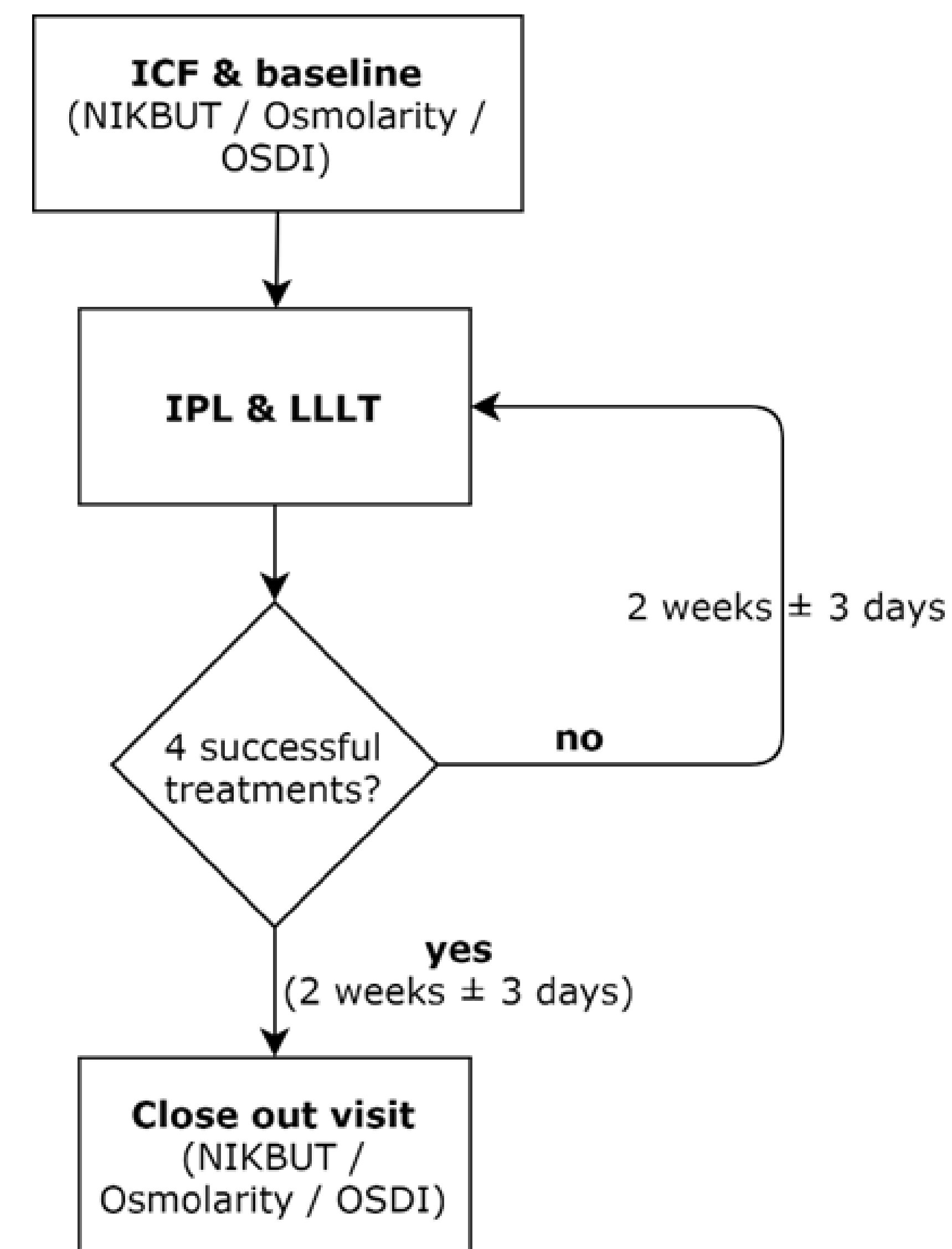
Material and Methods

Thirty-eight subjects with diagnosed MGD were enrolled in a prospective single center study in an optometric practice based in Wil (Switzerland). The average age of all subjects was 54.2 ±12.2 years (median 53 years with a range of 30 to 90 years). Twenty-seven subjects were female, eleven male. All subjects met the inclusion criteria.

All patients were treated with the IPL device EyeLight™ (company Espansione, Italy) and underwent combined IPL / LLLT therapies every 14 days from baseline until four treatments were conducted. OSDI, BCVA, IOP, NIKBUT, osmolarity, lower lid margin appearance and meibography data were captured at baseline before the first IPL/ LLLT treatment and 14 days after the last treatment.

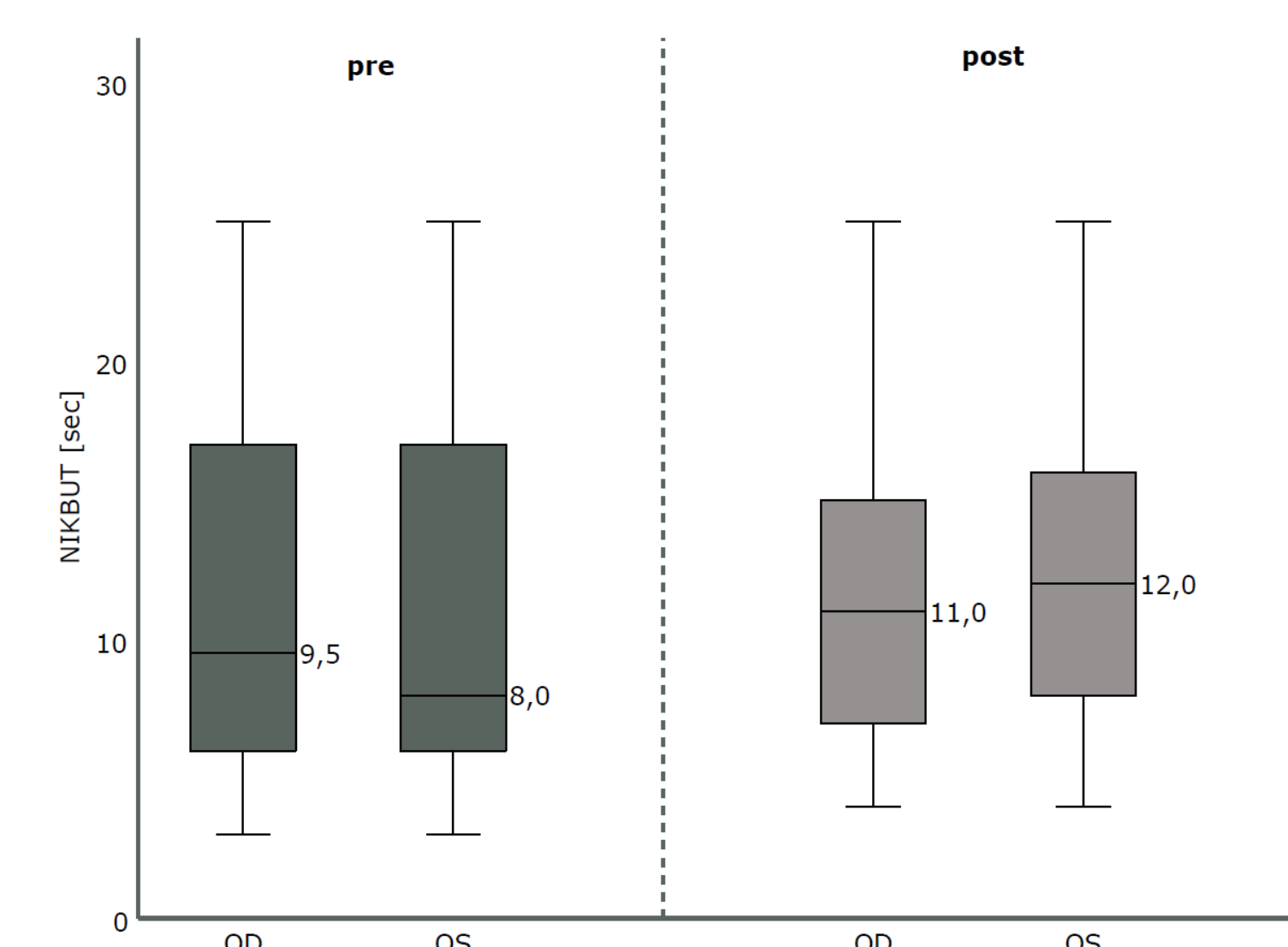
Pre and post NIKBUT, osmolarity and OSDI data of the right (OD) and left eye (OS) were statistically analyzed using Wilcoxon signed-rank test.

- Hypotheses:** H1: The IPL / LLLT application reduces the OSDI
 H2: The IPL / LLLT application improves the NIKBUT
 H3: The IPL / LLLT application reduces hyperosmolarity of the tear film

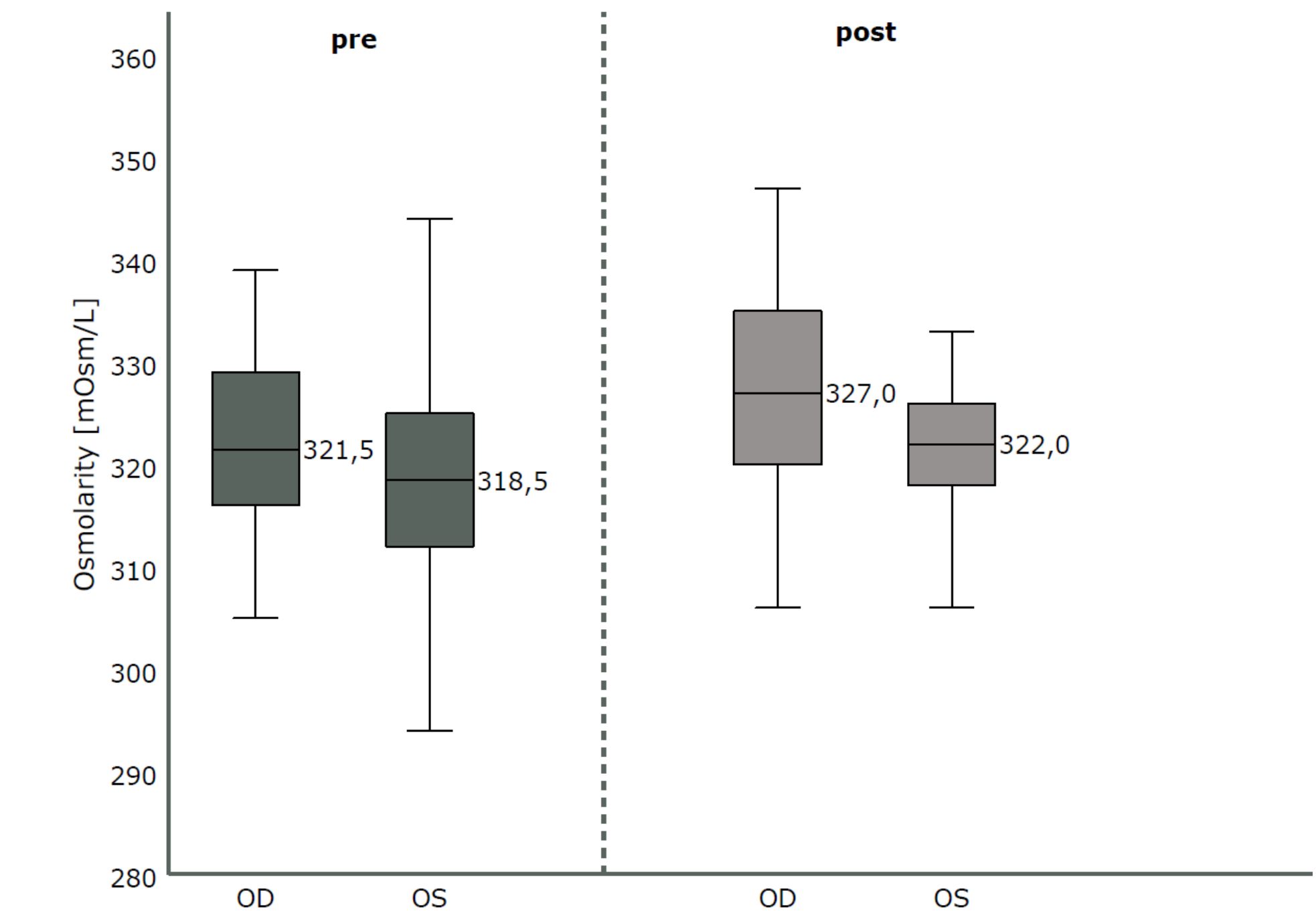


Results

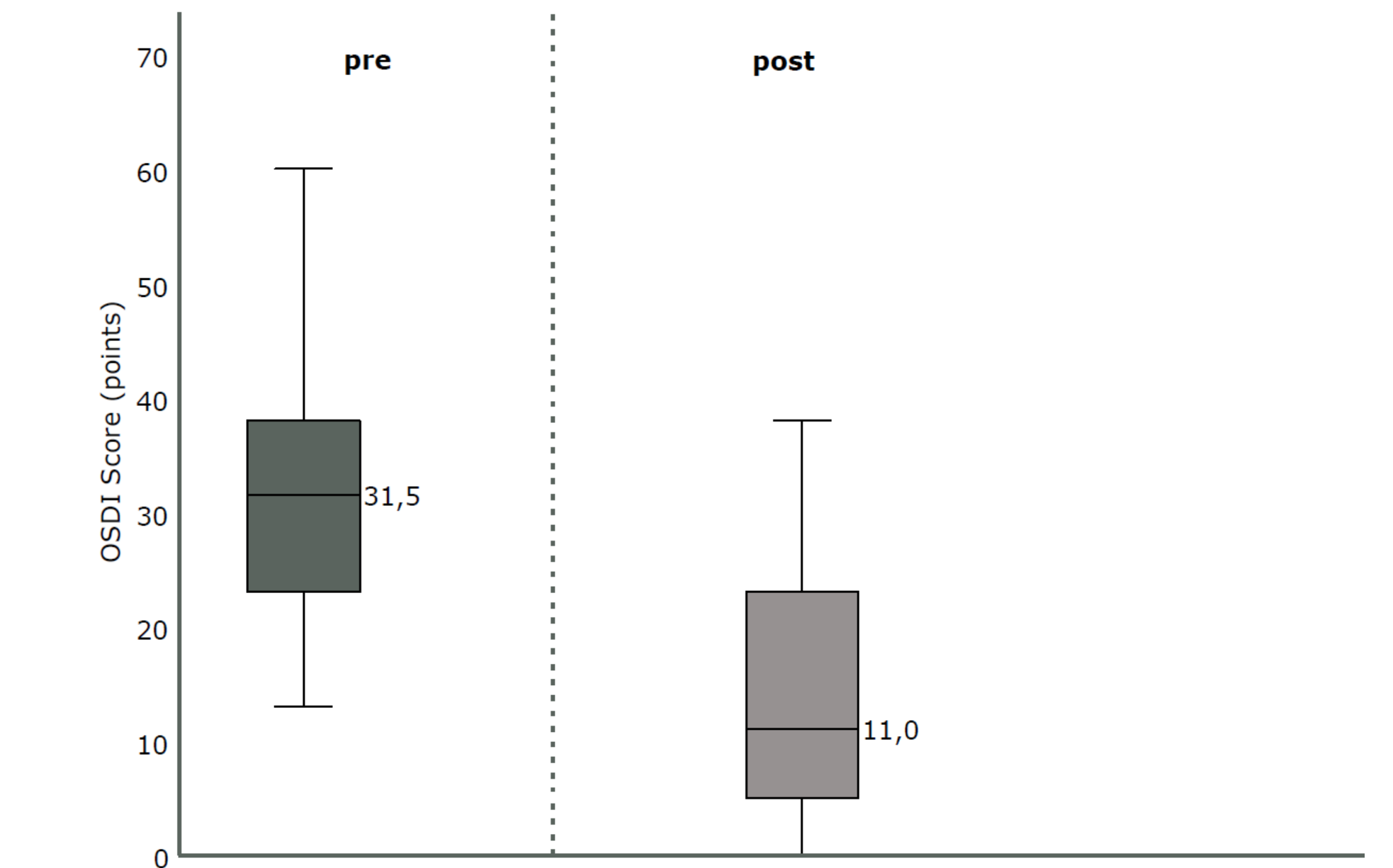
NIKBUT values increased not significantly OD from 9.5 sec to 11 sec ($p = 0.498$) and OS from 8 sec to 12 sec ($p = 0.056$).



Osmolarity increased significantly OD from 322.21mOsm/L to 327.92mOsm/L ($p = 0.006$). No significant difference was found OS pre 319.24mOsm/L post 323.24mOsm/L ($p = 0.097$).



OSDI score decreased significantly from 31.5 to 11 ($p = <0.001$). 26 of 38 subjects (68.4%) were satisfied or very satisfied by this new form of therapy whereas 12 subjects (31.6%) didn't report a subjective change.



Conclusion

The NIKBUT for the right and left eye and the OSDI are improved by the IPL / LLLT application. However, the osmolarity deteriorates. The entire group of subjects did not undergo any accompanying MGD therapy during the IPL / LLLT application. If the volunteers had already used eye drops before the study, they continued to use them identically during the study. Thus, the change in the sicca situation caused by IPL / LLLT can be determined in the best possible way. Due to the high reduction of sicca symptoms and the high satisfaction with the IPL / LLLT application, it can be concluded that an IPL / LLLT application is effective in MGD patients. This result points to the recommendation that the investigated IPL / LLLT therapy can be considered as an additional treatment option in the dry eye area.

References

- Nichols KK, Foulks GN, Bron JA, Glasgow BJ, Dogru M, Tsubota K, Lemp MA, Sullivan DA. Report of the International Workshop on Meibomian Gland Dysfunction. s.l.: Théa Pharma, 2011
- Viso E, Rodriguez-Ares MT, Abelenda D, Oubina B, Gude F. Prevalence of asymptomatic and symptomatic meibomian gland dysfunction in the general population of Spain. s.l.: Invest Ophthalmol Vis Sci, 2012
- Stonecipher, K., Abell, T. G., Chotiner, B., Chotiner, E., & Potvin, R. (2019). Combined low level light therapy and intense pulsed light therapy for the treatment of meibomian gland dysfunction. Clinical Ophthalmology (Auckland, NZ), 13, 993.