LIST DO REDAKCJI LETTER TO EDITOR
DOI: 10.24292/01.OT.111124

SMILE (*small incision lenticule extraction*): New horizons in laser vision correction procedures–limited invasiveness in light of recent research

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KEY WORDS
SMILE, small excision lenticule extraction, corneal refractive surgery, laser vision correction.

DEAR EDITOR

While reviewing the scientific literature from recent years focusing on articles on recent research related to the SMILE (*small incision lenticule extraction*) laser vision correction procedure, we came across an intriguing article written by Wolniewinska et al. [1]. The article was published in your journal and delves into the characteristics of this procedure and its impact on patients' quality of life after the procedure. We believe that this topic is of great importance due to the growing popularity of laser vision correction procedures, especially minimally invasive methods that limit complications and allow the patient to quickly return to daily functioning [1].

The minimally invasive nature of the SMILE procedure, compared to the gold standard of LASIK (*Laser-Assisted In Situ Keratomileusis*) refractive surgery, translates into reduced damage to the cornea's biomechanics and innervation, plus less postoperative inflammation [1]. A meta-analysis by Guo et al. [2], which included 22 studies (randomized, cohort and cross-sectional), confirmed that in terms of corneal biomechanical strength, the SMILE procedure outperforms LASIK and PRK/LASEK procedures.

The SMILE procedure, as mentioned above, reduces the amount of damage to corneal innervation, which in turn helps reduce the incidence of one of the major complications of laser vision correction, Dry Eye Syndrome. Liu et al. [3] conducted a randomized controlled study with paired eyes of 70 patients who were randomized to receive SMILE in one eye and LASIK in the other. After the procedure, the eyes were compared mainly for dry eye syndrome. This was done by comparing TBUT (*tear break-up time*). Eyes after the SMILE procedure had significantly better TBUT scores than eyes after the LASIK procedure, after 1 and 3 months, respectively. In addition, the study used measurements of

the levels of numerous proteins in tears, which showed that the LASIK procedure was associated with richer and more numerous immune processes occurring in the cornea compared to SMILE. There were more intense changes in cell cycle, apoptosis, homeostasis and protein metabolism. This may indicate the greater interference of the LASIK procedure, relative to SMILE. Tear proteomics, however, is a new and innovative field that requires further development to formulate accurate conclusions [3].

Another very important issue when writing about complications in laser vision correction procedures is the occurrence of higher-order aberrations, which translate to patients' post-operative quality of life assessment, as they determine night vision disturbances and a reduced sense of contrast. Both studies by Ganesh et al. [4] and Lin et al. [5] agree in their conclusions and showed that higher-order aberrations such as coma, trefoil and spherical aberrations after SMILE surgery occur less frequently than after LASIK surgery.

Nevertheless, important for patients and surgeons is the question of safety and efficacy of laser vision correction methods – SMILE and LASIK procedures show no significant differences. A multicenter study conducted by Kamiya et al. [6], which included 130 patients (252 eyes were operated on), aimed to examine early results after surgery and showed that the SMILE procedure showed good efficacy in terms of all criteria such as safety, effectiveness and predictability in the correction of myopia and myopic astigmatism. In addition, none of the operated cases experienced serious complications. The SMILE procedure is proving over time as it was thought to be an effective and safe way to correct corneal refractive defects, providing predictable and stable correction of myopia and myopic astigmatism [6].

The results of the SMILE technique in terms of keratometric, cylindrical and spherical measurements are very good. Observations after the procedure confirmed that it is a very effective procedure, with few complications and good visual results [7].

A very important issue and one that directly demonstrates the effectiveness of the SMILE procedure is the subjective increase in patients' quality of life after the procedure, assessed mainly by questionnaires. Studies conducted in this way unequivocally show that the average total increase in quality of life of patients after the SMILE procedure, compared to spectacle wearers, is higher and, depending on the study conducted, better or with statistically insignificant differences in this issue of results relative to the LASIK procedure [8, 9]. Moreover, a study conducted 4 years after the procedure confirms in patients the maintenance of positive effects on quality of life [10].

All of the above features of the SMILE procedure make it an attractive choice for patients as well as refractive surgeons. With the passage of time since its introduction, recent scientific reports only confirm its benefits. This procedure is an alternative to traditional LASIK offering high efficacy, safety and comfort for patients.

Sincerely,

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Authors' contributions:
All authors have equal contribution to the paper.

Conflict of interest:
The authors declare no conflict of interest.

Financial support:
None.

Ethics:
The content presented in the article complies with the principles of the Helsinki Declaration, EU directives and harmonized requirements for biomedical journals.