Lenti oftalmiche e progressione miopica: dalla scelta della montatura al corretto approntamento

Alberto Bernardoni

Ottico Optometrista, SIOO-Firenze

Seminario di aggiornamento

Miopia management: è davvero possibile controllare la progressione miopica?

Firenze, 4 Marzo 2022

Nessun interesse personale economico o rapporti di proprietà sui prodotti e sui metodi trattati in questa relazione

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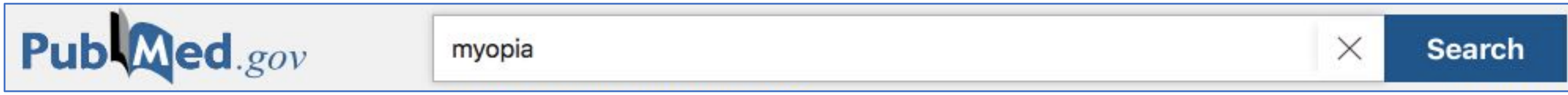
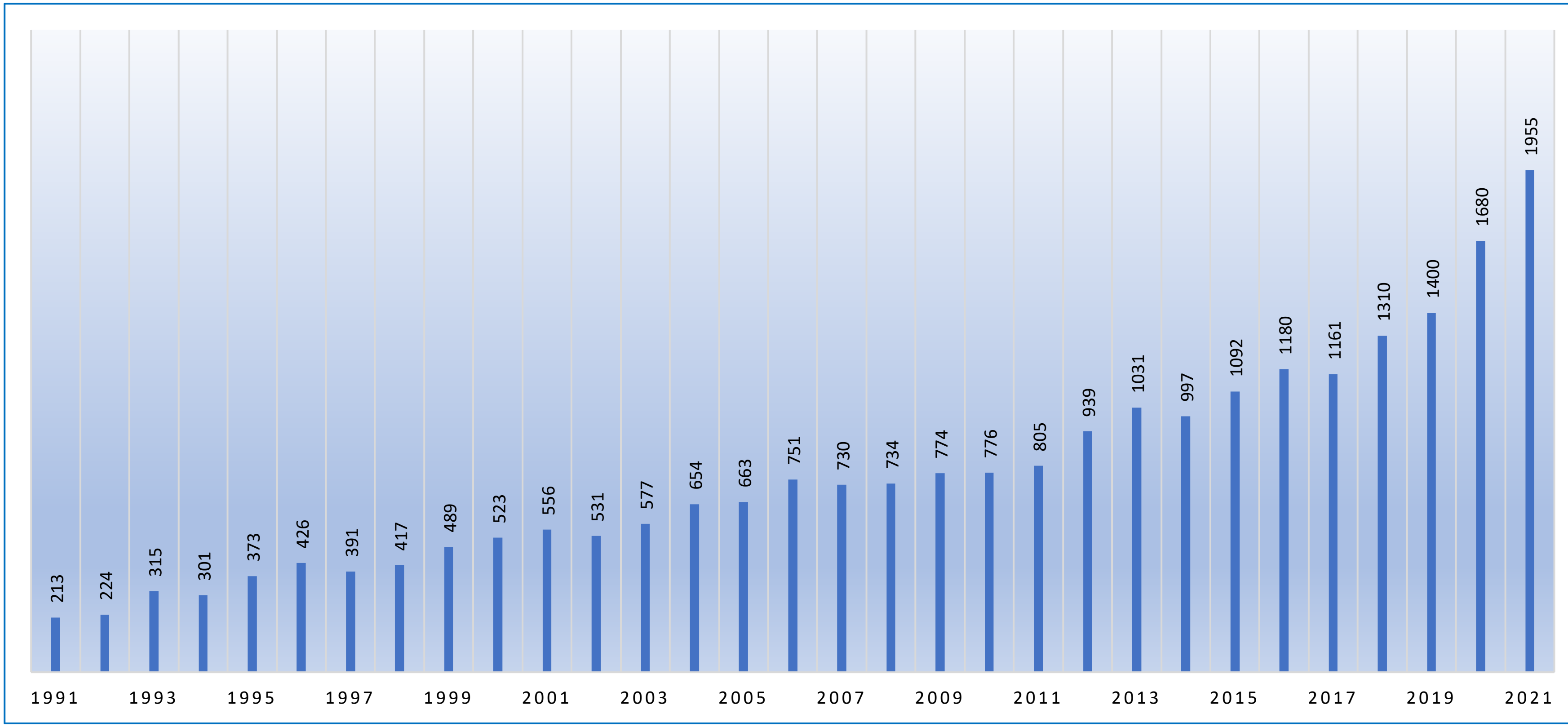
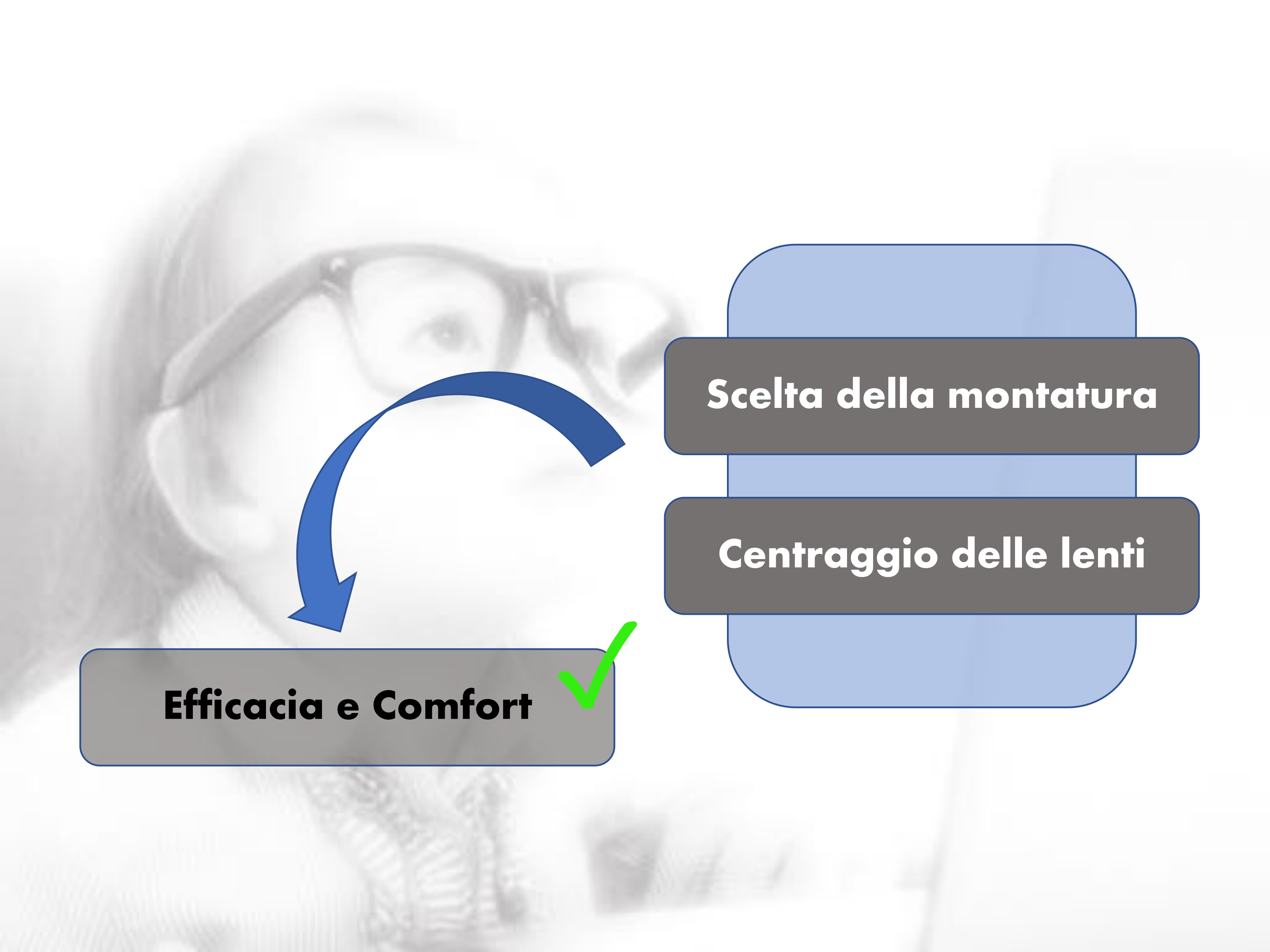
Articoli catalogati su Pubmed






Scelta della montatura
Centraggio delle lenti
Efficacia e Comfort

La “calzata” dell’occhiale

La calzata dell’occhiale è un elemento ampiamente sottovalutato, ma determinante per il successo di uno specifico trattamento

Se l’occhiale cala sul naso e il bambino ha la possibilità di guardare fuori dalla montatura, questo vanificherà l’efficacia della correzione.

La "calzata" dell'occhiale

...prima delle lenti specifiche per il controllo della progressione miopica...

Ophthal. Physiol. Opt. 2005 25: 310–314

Downward deviation of progressive addition lenses in a myopia control trial

Satoshi Hasebe, Chiaki Nakatsuka, Ichiro Hamasaki and Hiroshi Ohtsuki

Department of Ophthalmology, Okayama University Medical School, 2-5-1 Shikata-cho, Okayama 700-8558, Japan

Abstract

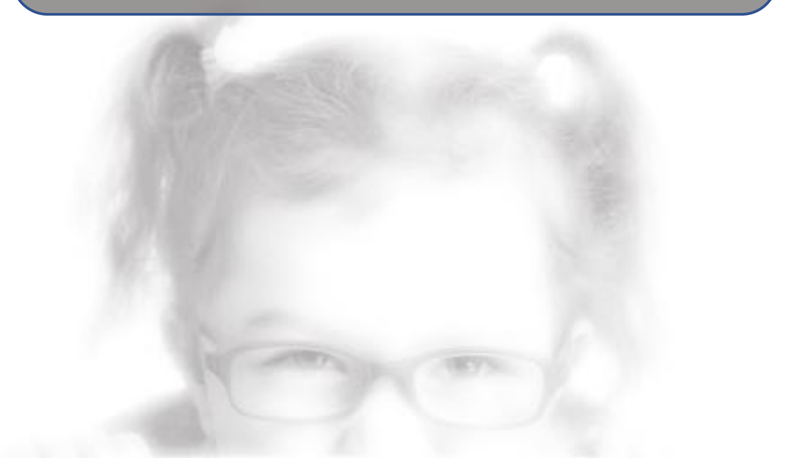
Purpose: To clarify how the downward deviation of progressive addition lenses (PALs) reduces their near-addition effect in schoolchildren participating in a myopia control trial.

Methods: Among 95 schoolchildren wearing PALs for 6 months (age range: 6–12 years; refractive error range: −6.00 to −1.25 D), facial images were captured with a digital still camera placed 60 cm in front of the eyes while he or she was looking ahead with natural head posture. The vertical deviations of PALs from their ideal position (mm) were evaluated by analysing these images.

Results: The mean (±SD) downward deviations of PALs for the right and left eyes were 3.7 ± 2.3 and 3.7 ± 2.0 mm, respectively, and the largest downward deviation was 10.2 mm. For simulations using the average downward deviation, the near-addition effect of PALs was reduced to 30 and 60% of the expected value at the 10° and 20° downward eye positions, respectively.

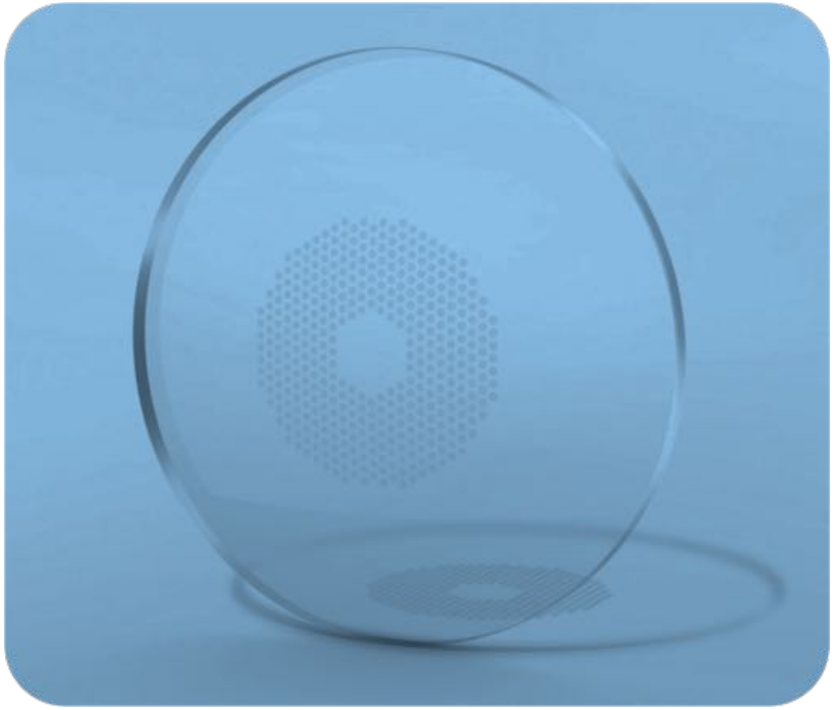
Conclusions: The downward deviation of PALs is a significant factor in reducing their therapeutic effect for near-addition. To ensure the proper alignment of PALs in children, the conventional spectacle-frame-fitting procedure is not sufficient, and repeated confirmation using a testing method similar to that used in this study is required.

Molti occhiali venivano calzati troppo bassi!



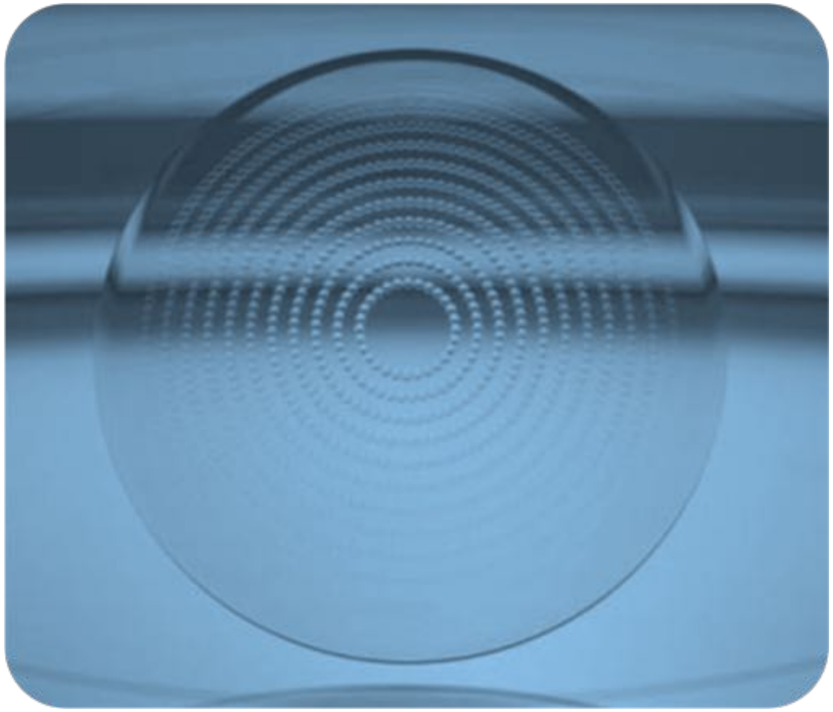
D.I.M.S

Defocus Incorporated Multiple Segments



H.A.L.T

Highly Aspherical Lenslet Target



Correggere

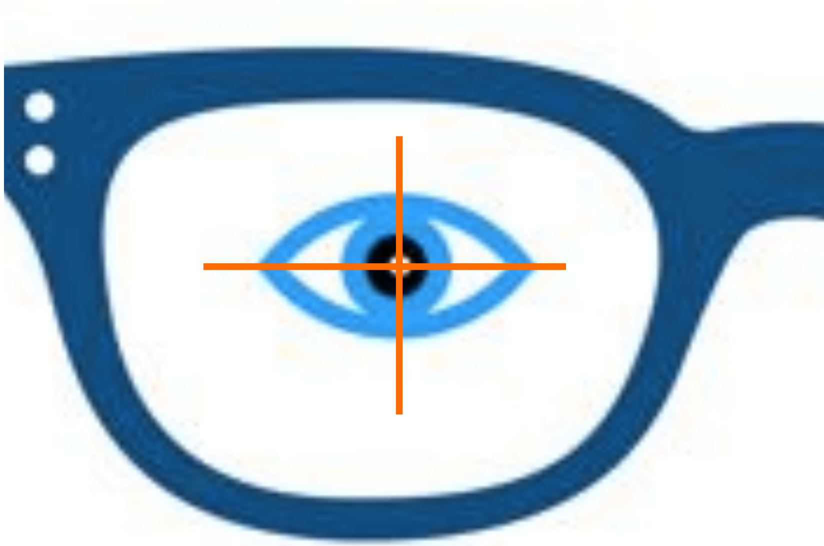
Rellentare la progressione

La centratura delle lenti

Centrare le lenti come se fossero delle lenti progressive

In direzione primaria di sguardo, rilevare:
- **altezze monoculari**
- **(Semi) DAV**

Rispettare eventuali differenze di altezze e/o distanze



The Adaptation and Acceptance of Defocus Incorporated Multiple Segment Lens for Chinese Children

YIQIU LU, ZHENGHUA LIN, LONGBO WEN, WENYU GAO, LUN PAN, XIAONING LI, ZHIKUAN YANG, AND WEIZHONG LAN

• PURPOSE: We investigated the adaptability and acceptance of a novel spectacle lens design that was recently reported to achieve a significant antimyopia effect.
• DESIGN: A prospective, cross-over study.
• METHODS: Twenty children were recruited to wear both Defocus Incorporated Multiple Segments (DIMS) and single vision (SV) lens, with a random assignment of which type of lens was experienced first. For each type of lens, high and low contrast central distant visual acuity (VA) and high contrast mid-peripheral near VA were measured at both 500 lux and 50 lux ambient illuminance after 30 minutes' and a week's wearing of the lens. A self-developed questionnaire was applied to evaluate the visual discomfort at the 1-week visit. All quantitative data were analyzed by paired *t* test, while qualitative data were analyzed with the χ^2 or Wilcoxon signed-rank tests.
• RESULTS: Central VA was not affected by DIMS lens compared with SV lens in all circumstances (all $P > .05$). However, the mid-peripheral near VA was found to reduce by approximately 0.06 logarithm of minimal angle of resolution unit in 2 of 4 quadrants (500 lux; $P < .05$) and in 3 quadrants (50 lux; $P < .05$) for DIMS lenses. No improvement was detected in the 1-week visit. Mid-peripheral blurred vision was the main visual complaint, which was noticed only once or twice a day. Being aware of the average antimyopic efficacy, 90% of children subjects preferred DIMS lenses.
• CONCLUSION: Mid-peripheral vision through DIMS lenses was slightly affected compared with SV lenses. Otherwise, DIMS lenses received good tolerance and acceptance by Chinese children. (Am J Ophthalmol 2020;211: 207–216. © 2019 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).)

AJO.com Supplemental Material available at AJO.com.

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As one of the main causes of blindness, myopia has become a global public health problem. It is estimated that approximately 2 billion people in the globe currently suffer from myopia, and that number is predicted to increase to nearly 50% of the world's population by 2050.[1] From a global perspective, the prevalence of myopia is especially high in East and Southeast Asia–for instance, in China.[2] Myopia, if left untreated, will progress into high myopia (ie, >6 diopters [D]) and will significantly increase the risk of developing cases of irreversible visual impairment, such as glaucoma,[3,4] retinal degeneration, and retinal detachment.[2,5,6] Therefore, it is urgent to find a safe, effective approach to slow down myopia progression to reduce the incidence of these complications. Progressive myopia also primarily occurs in children, and because treatment usually needs to last for many years, an ideal approach should also be convenient and easily tolerated to ensure compliance.

It is well documented that ocular growth is principally visually guided.[7,8] For instance, when the image plane is artificially shifted behind the retina by a negative lens (ie, hyperopic defocus), ocular growth is stimulated and relative myopia develops. By contrast, when the image plane is shifted in front of the retina by a positive lens (ie, myopic defocus), ocular growth is inhibited and relative hyperopia develops.[9–15] Based on this principle, many optical approaches aiming to slow myopic progression have been introduced in recent years.[16–18] Lam and associates[19] recently introduced a novel lens design: the Defocus Incorporated Multiple Segment (DIMS) lens. Unlike previous lens designs, the myopic defocus area in the peripheral portion of the DIMS lens is a new honeycomb multizone design that includes a +3.50 D myopic defocus zone and a clear zone with central power (Figure 1). In the results of these researchers' randomized controlled clinical trial, the DIMS lens slowed myopia progression by 59% and inhibited axial growth by 60% compared with the traditional single vision (SV) lens; this was one of the top rankings of efficacy in the published literature.[16–18,20–26] Given its nature as a spectacle lens, the DIMS lens seems to be a more ideal solution for myopia control compared with contact lenses and drugs with regard to safety, tolerance, and convenience. To provide more guidance with these lenses with respect to clinical dispensing in practice, the

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OPO THE COLLEGE OF OPTOMETRISTS

ORIGINAL ARTICLE

The impact of spectacle lenses for myopia control on visual functions

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Essilor International

Abstract

Purpose: Spectacle lenses containing multiple small peripheral elements have been developed for myopia control in children. It is important that their effect on vision be quantified by (i) fixation through the peripheral portion, thereby using foveal vision and (ii) by fixation through the central portion and presentation of peripheral targets.

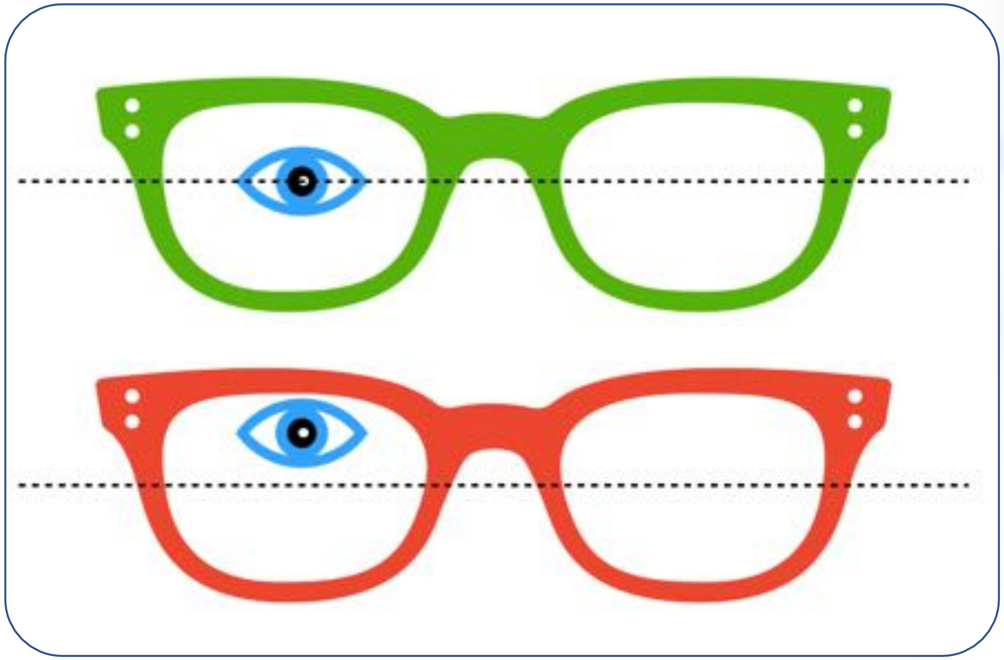
Methods: The above approaches were used in five studies to evaluate two novel spectacle lens designs: spectacle lenses with Highly Aspherical Lenslets (HAL) and Slightly Aspherical Lenslets (SAL). A single vision lens served as a control. Visually normal adults participated in each study. The first two studies had subjects fixate through the periphery of the lenses. High and low (10%) contrast visual acuity was measured with the Freiburg Vision Test and reading speed for high and low contrast words measured with a sentence generator. The other three studies assessed peripheral vision while subjects fixated through the central portion of the lens. Peripheral contrast sensitivity was measured using two cycles per degree drifting Gabor stimuli. Peripheral motion perception was further evaluated using random dot stimuli. Finally, attention was measured using an established test of useful field of view with three levels of complexity.

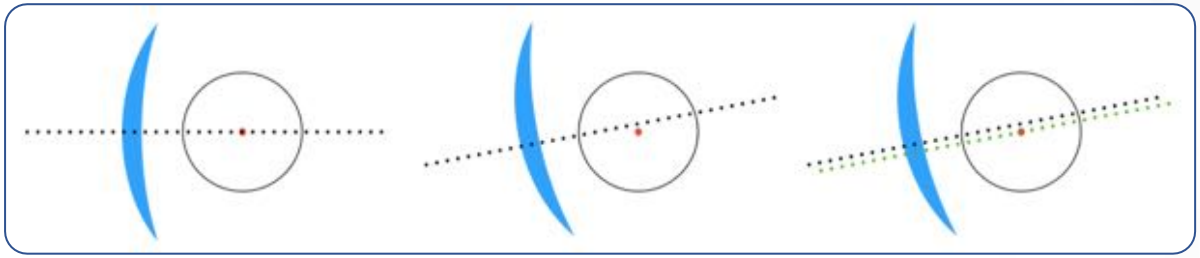
Results: The periphery of the HAL lens significantly reduced low contrast visual acuity, but not high contrast visual acuity, while the effect of the SAL lens was not significant for either. Neither test lens affected reading speed for high contrast words, but the HAL lens significantly affected performance for low contrast words. Neither test lens affected peripheral motion perception or useful field of view.

Conclusions: Low contrast visual acuity and reading was slightly reduced while high contrast visual acuity was unaffected when fixating through the periphery of the novel lens designs. None of the peripheral measures of vision was affected by the novel lens designs.

KEYWORDS
children, contrast sensitivity, motion perception, myopia, myopia control, visual acuity

Scelta della montatura





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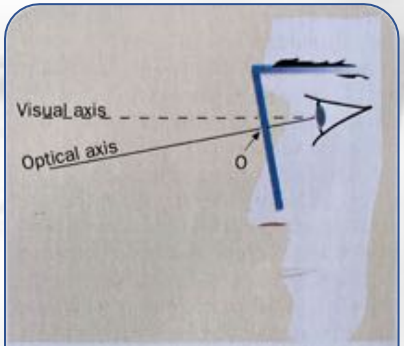


Figure 3.13
Vertical centration of spectacle lenses, the pantoscopic angle. O = optimum position for the optical centre

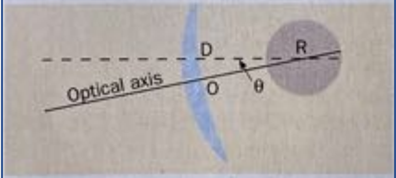


Figure 3.14
Vertical centration of spectacle lenses, the centre of rotation condition. R = eye's centre of rotation; D = distance visual point; O = optical centre of the lens; θ = pantoscopic angle; OR = *s*, the centre of rotation distance. From the geometry of the figure, AO = *s* tan θ

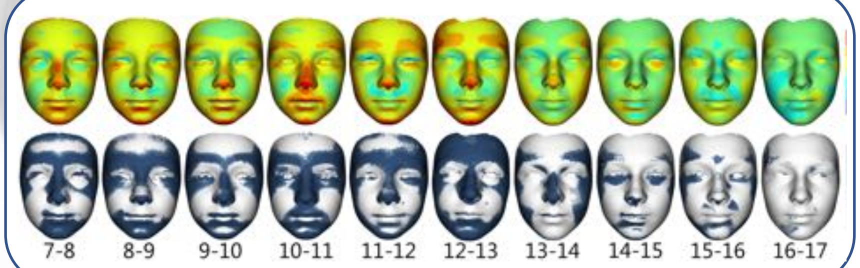
§ Mo Jalie – Ophthalmic lenses & Dispensing

Scelta della montatura

Fascia di età 6/16-18 anni

Differenti necessità:

Diverse morfologie facciali



Diverse abitudini visive

Necessità di scegliere prodotti sicuri

Design

J. Koudelová, et al. - Simulation of facial growth based on longitudinal data: Age progression and age regression between 7 and 17 years of age using 3D surface data – Feb 2019

Scelta della montatura

- **Misura**
- **Forma**
- **Naselli**
- **Lunghezza aste**

An Interview Study on Children's Spectacle Frame Fit

Jiaxin Zhang and Yan Luximon[(✉)]

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Abstract. Although studies have examined problems with spectacle frame fit, little is known about appropriate frame design for children. To identify practical problems in this area, semi-structured interviews were conducted in Hong Kong with dispensing opticians, children who wear glasses, and the children's parents. The data analysis showed that frame width, nose pads, and leg shape were related to fit problems. However, there is no fit standard between faces and frames, and the temple width was the main reference used by dispensing opticians to help children choose spectacle frames. In conclusion, dispensing opticians are important actors in the selection of more appropriate spectacle frames for children, but they might be unable to solve fit problems in the nose area and ears due to deficiencies in frame design. As little research has been conducted on problems in children's spectacle design and fit, further studies on spectacle frame design should investigate children's facial features and special needs.

Keywords: Semi-structured interview · Spectacle fit · Children

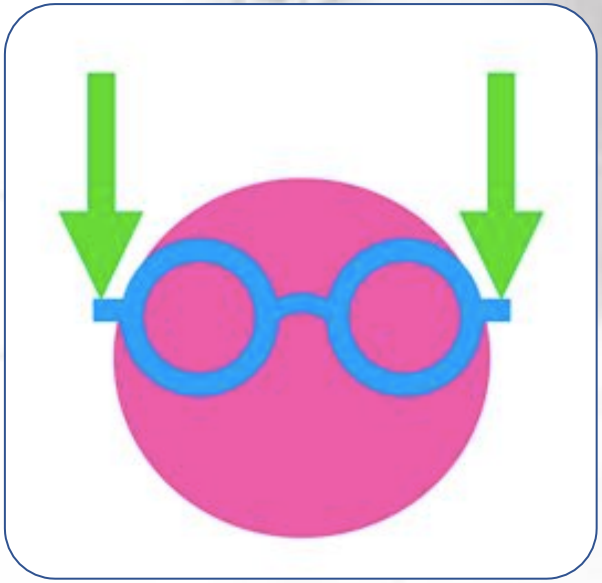
Quanto le problematiche di adattamento della montatura sono prevedibili e valutabili in fase di scelta della montatura?

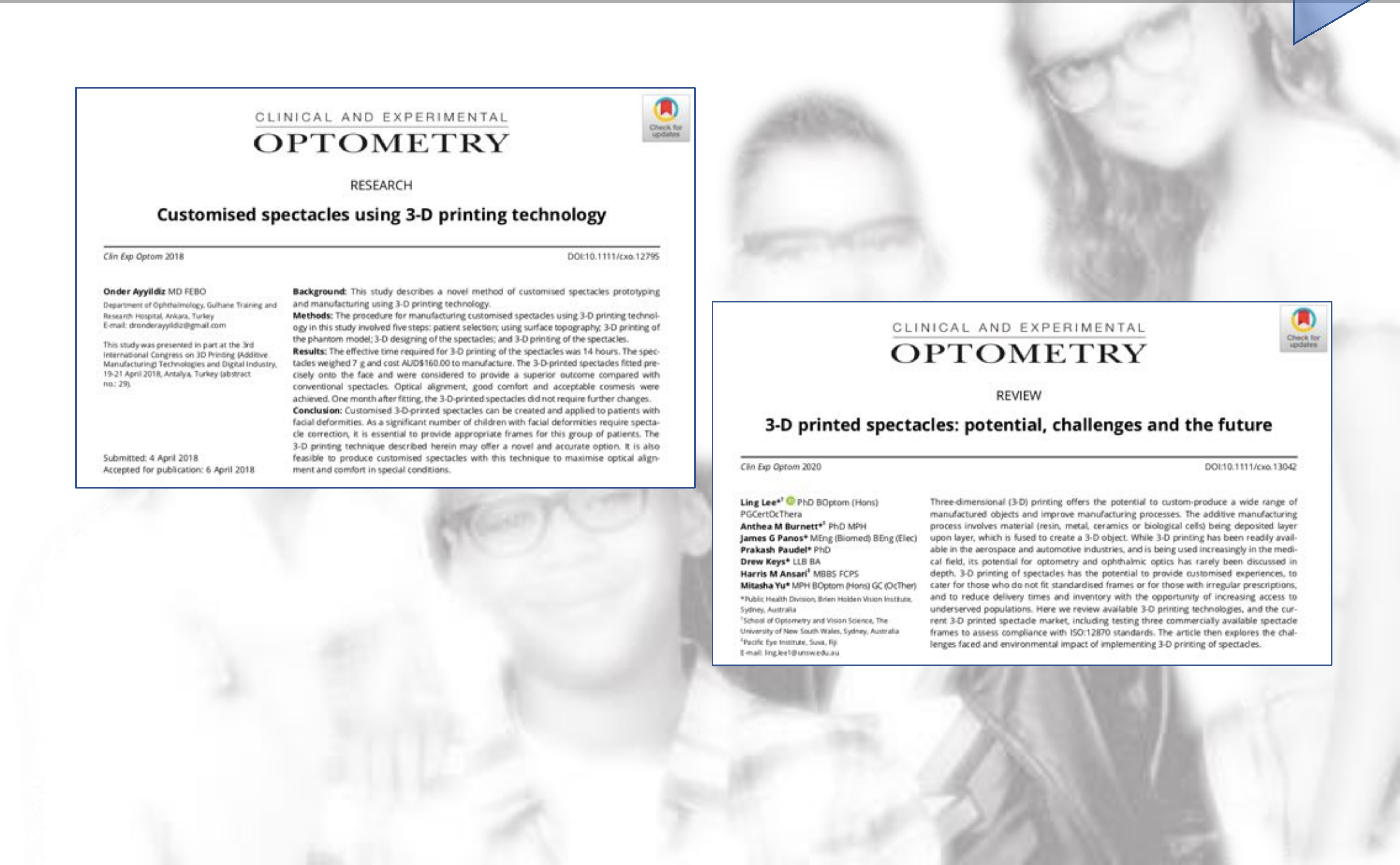
Scelta della montatura

Gli ottici sono degli attori molto importanti nella scelta della montatura

Verificare la montatura in fase di scelta

Non rimandare le regolazioni al momento della consegna dell'occhiale





CLINICAL AND EXPERIMENTAL
OPTOMETRY

RESEARCH

Customised spectacles using 3-D printing technology

Clin Exp Optom 2018 DOI:10.1111/cxo.12795

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This study was presented in part at the 3rd International Congress on 3D Printing (Additive Manufacturing) Technologies and Digital Industry, 19-21 April 2018, Antalya, Turkey (abstract no.: 29).

Submitted: 4 April 2018
Accepted for publication: 6 April 2018

Background: This study describes a novel method of customised spectacles prototyping and manufacturing using 3-D printing technology.
Methods: The procedure for manufacturing customised spectacles using 3-D printing technology in this study involved five steps: patient selection; using surface topography; 3-D printing of the phantom model; 3-D designing of the spectacles; and 3-D printing of the spectacles.
Results: The effective time required for 3-D printing of the spectacles was 14 hours. The spectacles weighed 7 g and cost AUD$160.00 to manufacture. The 3-D-printed spectacles fitted precisely onto the face and were considered to provide a superior outcome compared with conventional spectacles. Optical alignment, good comfort and acceptable cosmesis were achieved. One month after fitting, the 3-D-printed spectacles did not require further changes.
Conclusion: Customised 3-D-printed spectacles can be created and applied to patients with facial deformities. As a significant number of children with facial deformities require spectacle correction, it is essential to provide appropriate frames for this group of patients. The 3-D printing technique described herein may offer a novel and accurate option. It is also feasible to produce customised spectacles with this technique to maximise optical alignment and comfort in special conditions.

CLINICAL AND EXPERIMENTAL
OPTOMETRY

REVIEW

3-D printed spectacles: potential, challenges and the future

Clin Exp Optom 2020 DOI:10.1111/cxo.13042

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Three-dimensional (3-D) printing offers the potential to custom-produce a wide range of manufactured objects and improve manufacturing processes. The additive manufacturing process involves material (resin, metal, ceramics or biological cells) being deposited layer upon layer, which is fused to create a 3-D object. While 3-D printing has been readily available in the aerospace and automotive industries, and is being used increasingly in the medical field, its potential for optometry and ophthalmic optics has rarely been discussed in depth. 3-D printing of spectacles has the potential to provide customised experiences, to cater for those who do not fit standardised frames or for those with irregular prescriptions, and to reduce delivery times and inventory with the opportunity of increasing access to underserved populations. Here we review available 3-D printing technologies, and the current 3-D printed spectacle market, including testing three commercially available spectacle frames to assess compliance with ISO:12870 standards. The article then explores the challenges faced and environmental impact of implementing 3-D printing of spectacles.

Riepilogando

Il successo del trattamento intrapreso dipende anche dalla scelta della montatura

La verifica della calzata dell'occhiale e la regolazione delle aste devono essere svolte in fase di scelta della montatura

Verificare la necessità di utilizzare optional per migliorare la stabilità della montatura sul volto

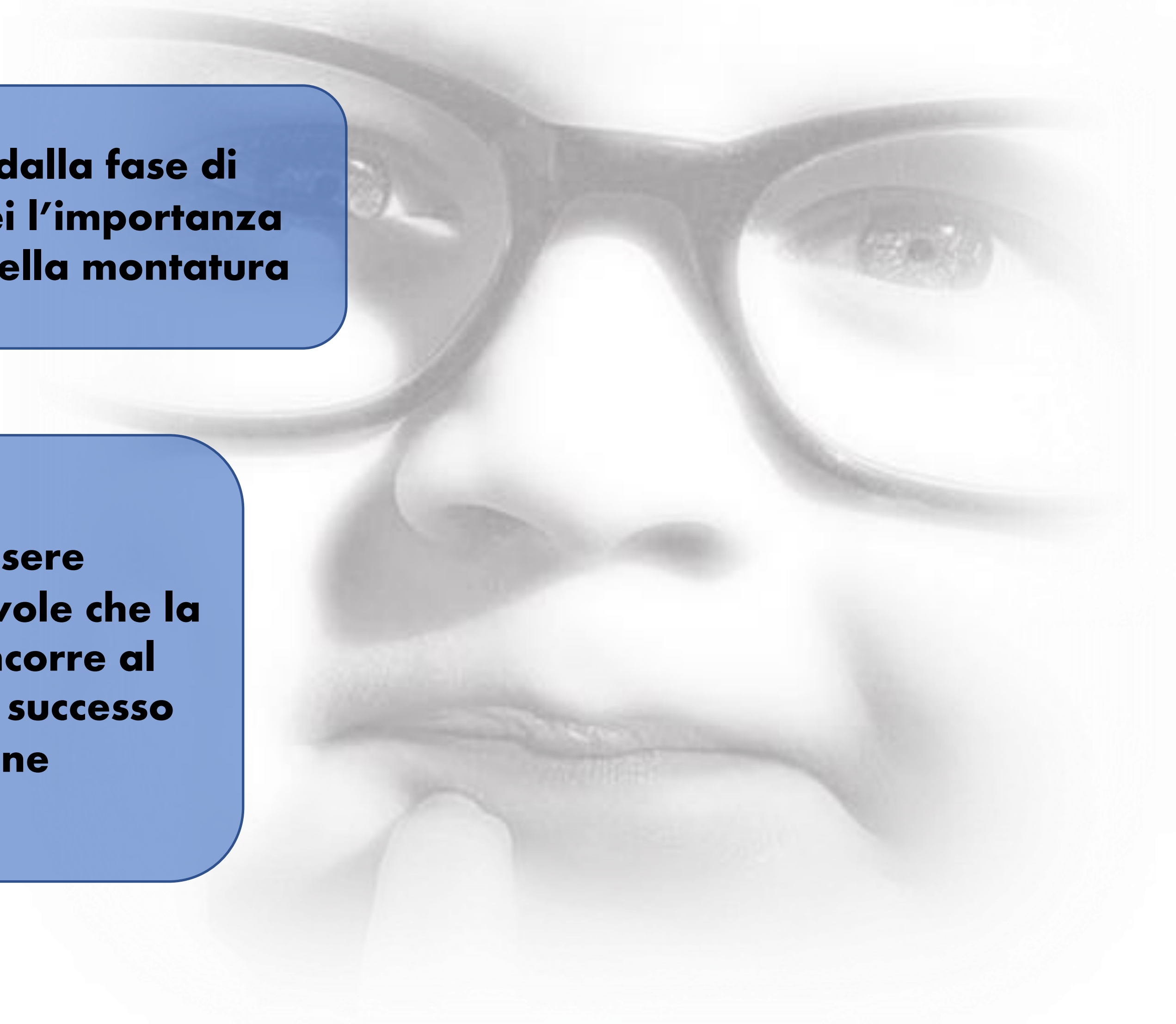
Suggerire dei controlli periodici per verificare l'assetto dell'occhiale

Il centraggio delle lenti è piuttosto semplice ed è paragonabile a quello a cui siamo abituati con le lenti progressive

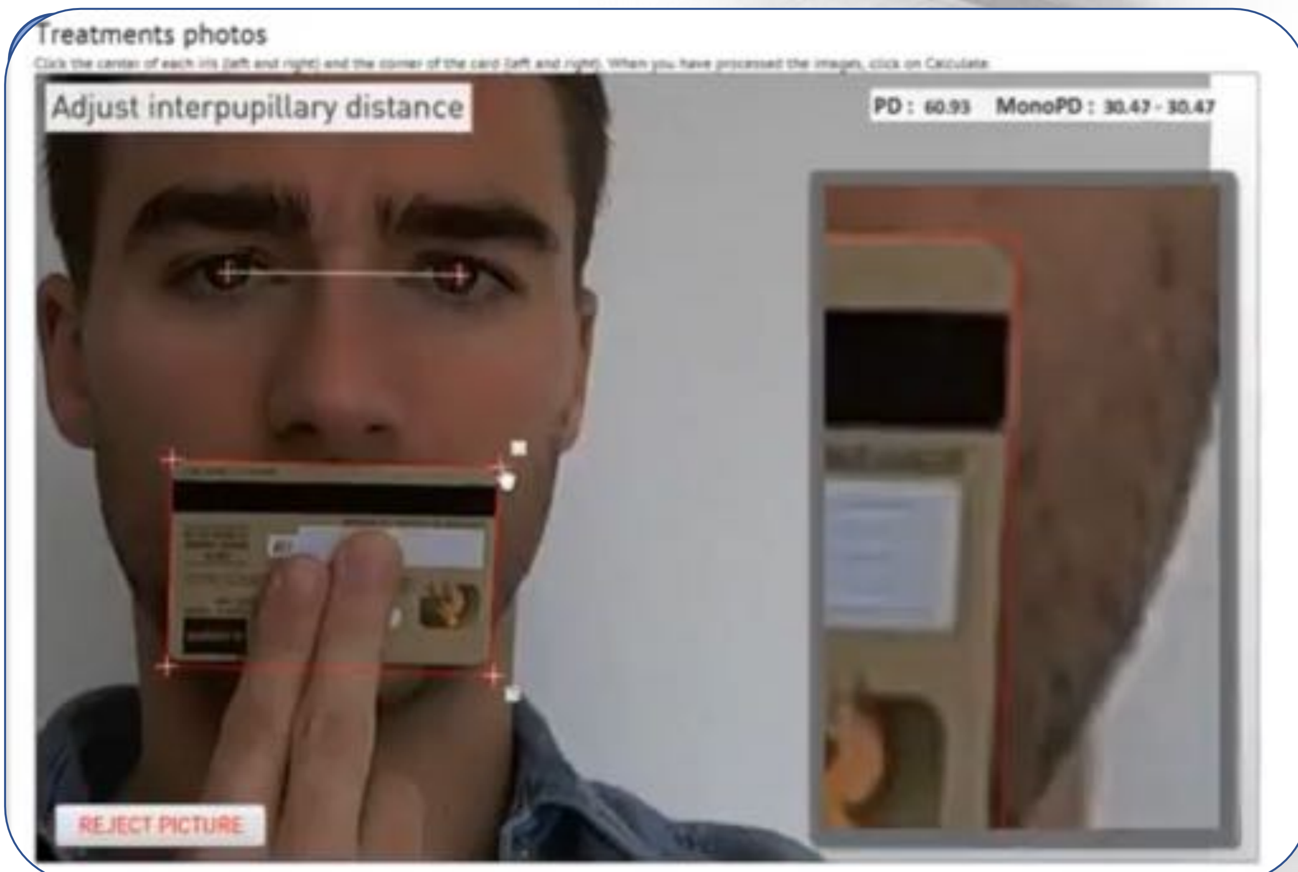
Concludendo…

È auspicabile che fin dalla fase di prescrizione si sottolinei l'importanza della scelta adeguata della montatura

L'ottico deve essere pienamente consapevole che la sua consulenza concorre al raggiungimento del successo della correzione



Concludendo...



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