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Best Practices in the Correction of Ametropia: A Current Social Necessity

Buenas prácticas en corrección de ametropías: una necesidad social actual

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RESUMEN

Las ametropías (miopía, hipermetropía, astigmatismo y presbicia) constituyen la principal causa de discapacidad visual tratable en población joven cubana, con impacto directo en el rendimiento académico, laboral y la calidad de vida. La Organización Mundial de la Salud reconoce estas condiciones como prioridad de salud pública, particularmente en el contexto de la Agenda 2030 para el Desarrollo Sostenible. El presente artículo argumenta que la formación de licenciados en Optometría y Óptica en Cuba requiere una actualización urgente para incorporar tecnologías diagnósticas de precisión (aberrometría ocular guiada por frente de onda, topografía corneal computarizada, inteligencia artificial aplicada al diagnóstico) y principios bioéticos del cuidado integral. El desarrollo exponencial de la cirugía refractiva láser y los lentes intraoculares personalizados demanda profesionales capacitados en la evaluación prequirúrgica y el seguimiento postoperatorio. Se propone que el Ministerio de Salud Pública consolide estrategias de superación profesional continua que integren simulación clínica, teleoptometría y buenas prácticas basadas en evidencia, garantizando la autonomía del paciente, la beneficencia y la justicia en el acceso a tratamientos efectivos. La sostenibilidad del Sistema Nacional de Salud cubano depende de la capacidad formativa para responder a estas exigencias tecnológicas sin sacrificar la atención humanizada.

ABSTRACT

Ametropias (myopia, hyperopia, astigmatism and presbicia) constitute the leading cause of treatable visual impairment among the young Cuban population, with a direct impact on academic and occupational performance, as well as quality of life. The World Health Organization recognizes these conditions as a public health priority, particularly within the context of the 2030 Agenda for Sustainable Development. This article argues that the training of Optometry and Optics graduates in Cuba requires urgent updating to incorporate precision diagnostic technologies (wavefront ocular aberrometry, computerized corneal topography, and artificial intelligence applied to diagnosis) and bioethical principles of comprehensive care. The exponential growth of laser refractive surgery and customized intraocular lenses demands professionals trained in presurgical evaluation and postoperative follow-up. It is proposed that the Ministry of Public Health consolidate strategies for continuous professional development that integrate clinical simulation, teleoptometry, and evidence-based best practices, thereby ensuring patient autonomy, beneficence, and equity in access to effective treatments. The sustainability of the Cuban National Health System depends on its educational capacity to respond to these technological demands without sacrificing humanistic care.

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The Scientific-Technical Revolution has transformed ophthalmology into a discipline of high diagnostic and therapeutic precision. Low-order ocular aberrations —traditionally known as refractive errors— significantly affect the young population and impact their academic, professional, and social development [1]. In Cuba, the National Health System guarantees universal access to ophthalmological services. However, the authors consider that the speed of technological advances in modern optometry demands a critical review of current training competencies, particularly regarding the incorporation of advanced diagnostic technologies.

The World Health Organization estimates that more than 2.2 billion people have visual impairment or blindness, of which at least one billion have conditions that are undiagnosed or untreated in a timely manner [2]. Refractive errors represent a substantial proportion of this disease burden, particularly in young adults aged 15 to 40 years, a critical productive age for national development. This situation takes on the characteristics of a social problem when considering the impact on the academic and work performance of affected young people.

This article argues, from the authors' perspective, the need to strengthen good practices in the correction of refractive errors in young patients, and contends that the training of optometry graduates must integrate emerging technologies, bioethical principles, and a personalized care approach to meet the demands of the current context.

Vision constitutes the dominant sense in modern human experience, conditioned by the intensive use of digital devices and the specific visual demands of the technological era. Low-order ocular aberrations —myopia, hyperopia, and astigmatism— can be compensated for using glasses or contact lenses, or definitively corrected through refractive surgery with excimer or femtosecond laser [3]. It is argued that the precision of these procedures critically depends on the quality of the preoperative diagnosis, an area where the optometrist plays an irreplaceable role that must be strengthened through curricular updates.

Recent advances in ophthalmic diagnosis have revolutionized visual correction in a way that demands an urgent review of training programs. Wavefront-guided ocular aberrometry makes it possible to quantify low- and high-order aberrations beforehand, while computerized corneal topography and artificial intelligence algorithms facilitate the early detection of asymptomatic pathologies and the personalization of treatments [4]. These technologies, integrated into

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teleoptometry platforms —a new area of optometric practice that must be developed considering specialized care for remote areas as well as their social, cultural, economic, and technological contexts [5]— align with the equity principles of the Cuban Health System. The implementation of these tools in professional training constitutes an imperative necessity to guarantee the international competence of Cuban graduates.

Teleoptometry is a branch of telemedicine that deals with primary eye care and the detection of anterior segment pathologies and visual alterations, through the development of promotion, prevention, diagnosis, treatment, and timely rehabilitation activities using ICT. One of the strategies that favors the field of action of teleoptometry is teleeducation, which includes virtual courses that allow optometrists to grow professionally, update themselves, and thus provide higher quality consultations [5].

However, technological incorporation raises ethical dilemmas that must be addressed from initial professional training. The principle of autonomy requires that the young patient understand the available optical, pharmacological, or surgical correction options, as well as their risks and benefits. Beneficence and non-maleficence oblige the professional to recommend the safest and most effective alternative while considering the patient's age, lifestyle, and expectations [5]. These bioethical principles must constitute cross-cutting axes of the training curriculum, beyond their isolated mention in specific subjects.

Finally, the principle of justice demands guaranteeing equitable access to advanced diagnostic technologies, regardless of geographic region or socioeconomic condition [6]. Undoubtedly, teleoptometry and virtual clinical simulation represent viable strategies to democratize access to highly specialized training, making it necessary to reduce the gaps between the capital and the provinces regarding the availability of expert trainers.

The Cuban Ministry of Public Health has established strategic objectives to consolidate the scientific training of health personnel. However, it is observed that the gap between international technological availability and local training capacity persists and tends to widen. Continuous professional development, based on clinical simulation and telemedicine, emerges as a viable strategy to reduce this distance without compromising the system's sustainability [7]. For this reason, the creation of an advanced ophthalmic simulation center is vital to allow students to practice diagnosis and management of

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complex cases in virtual environments before confronting real patients.

The personalization of visual correction using multifocal intraocular lenses, computer-customized scleral lenses, and topography-guided surgery requires professionals with mastery of physiological optics and ocular pharmacology [7]. Current training, focused on traditional manual techniques, is insufficient for these demands, thus requiring a curricular reorientation that prioritizes critical thinking, evidence-based decision making, and effective communication with the patient. The 21st-century optometry graduate must be a professional capable of performing and interpreting optical coherence tomography studies, wavefront-guided ocular aberrometry, and corneal topography, in addition to having theoretical knowledge of surgical techniques for performing refractive surgery — all based on safety and efficacy criteria.

Lifelong education constitutes the fundamental pillar for the sustainability of any health system. In the Cuban context, where economic resources are limited but human capital represents the main strength, investing in the professional development of optometry technologists constitutes a high-impact, cost-effective strategy [1]. The implementation of virtual mentorship programs connecting recent graduates with national and international experts would enable the transfer of cutting-edge knowledge without the costs associated with physical mobility.

From the authors' perspective, professional ethics must guide all decisions in the care of patients with refractive errors. Respect for patient autonomy implies informing them clearly and understandably about their refractive condition, available treatment options, and the implications of each alternative. This effective communication is not an innate skill but a competence that must be systematically developed during university training.

Beneficence, understood as the duty to act in the patient's best interest, requires that the professional keep their knowledge updated on the best available evidence in refractive correction. Practice based solely on accumulated clinical experience is insufficient in an era of rapid technological obsolescence. Non-maleficence obliges minimizing the risks associated with any intervention, particularly in invasive procedures such as refractive surgery, where complications like corneal ectasia can permanently compromise the patient's vision. The principle of justice acquires particular relevance in the Cuban context, where economic resource limitations should not translate into inequalities in access to quality care. Prioritization of cases according

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to objective clinical criteria, implementation of standardized diagnostic and treatment protocols, and equitable distribution of specialized equipment constitute concrete expressions of this ethical principle [9].

Optometry training must transcend the mere transmission of technical knowledge to encompass the development of critical thinking skills, scientific evidence analysis, and ethical decision-making. The professional must be capable of critically evaluating scientific literature, discriminating between high- and low-quality evidence, and applying relevant findings to individualized clinical practice. The authors propose that professional performance evaluation should incorporate quality indicators that go beyond numerical productivity. Patient satisfaction, treatment adherence, complication rates, and achieved visual function constitute more representative metrics of care quality than the simple volume of consultations attended [1].

The sustainability of good practices in Optometry requires a system of continuous feedback between academic training, clinical practice, and scientific research. Findings from daily clinical practice should feed research lines, whose results in turn inform curricular updates. This virtuous cycle ensures that training remains relevant and pertinent to the population's needs.

The digital transformation of health, accelerated by the COVID-19 pandemic, has opened unprecedented opportunities for teleoptometry and distance education. Virtual consultation, complemented by connected autorefraction devices, allows extending specialized care to remote communities where the physical presence of an optometrist is unfeasible. Training must incorporate digital competence as a cross-cutting skill, including the management of telemedicine platforms, interpretation of digital images, and maintenance of confidentiality in virtual environments.

Finally, the internationalization of training constitutes a necessary strategy to maintain academic excellence. Participation in Latin American and Caribbean collaborative networks, student exchange, and co-supervision of research with Cuban and foreign institutions enrich the training perspective and facilitate national and international accreditation of Cuban programs.

The correction of refractive errors in young Cubans demands a training transformation that integrates precision diagnostic technologies, bioethical principles, and a personalized care approach. The optometry graduate requires updated competencies to perform

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and interpret wavefront-guided ocular aberrometry, optical coherence tomography images, and theoretically understand surgical techniques for performing refractive surgery — all based on safety and efficacy criteria. The sustainability of the National Health System depends on the ability to train professionals who combine technical excellence with humanized care, guaranteeing equitable access to visual health in the context of the Sustainable Development Goals. Investment in continuous professional development, clinical simulation, and teleoptometry represents the most viable strategy to maintain the excellence of the Cuban visual health system in a rapidly changing technological environment.

BIBLIOGRAPHIC REFERENCES

1. Muñoz-Alonso L, Barrocas-Padrón J, Reyes-Peña I, Ferrero-Oteiza M, Pupo-Poey A, Almora-Lazo J. El desempeño profesional del Tecnólogo de la Salud en Optometría y Ópticaen la Atención Primaria de Salud. Rev Cubana Tecnol Salud [Internet]. 2021 [cited 07/01/2026];12(3):57-64. Available in: http://www.revtecnologia.sld.cu/index.php/tec/article/view/2478

2. Organización Mundial de la Salud. Informe mundial sobre la visión. Ginebra: OMS [Internet] 2020. Available in: https://www-who-int.translate.goog/publications-detail-redirect/world-report-on-vision?_x_tr_sl=en&_x_tr_tl=es&_x_tr_hl=es&_x_tr_pto=tc

3. Cárdenas Díaz T, Capetillo Biart MA, Martínez Ribalta J, Yuan Lin M, Ríos Caso R, Lora Domínguez M. Óptica y Optometría. Principios y aplicación clínica. Vol. 2. La Habana: Editorial Ciencias Médicas; 2023. Available in: http://www.bvscuba.sld.cu/libro/óptica-y-optometria-principios-y-aplicacion-vol-1-2-3

4. Optical Plus USA. Nuevas tecnologías en salud visual oftalmología [Internet]. Florida: Optical Plus; 2026 [cited 07/01/2026]. Available in: https://www.opticalplususa.com/nuevas-tecnologias-salud-visual-oftalmologia/

5. Acuña Gómez JS, Jiménez Barbosa WG, Guerrero Rocha JS, Durán Chaparro JP, Alfonso Elizalde LL, Pastrán Pastrana LG y Villamizar Rodríguez YM. Concepto y aplicación de la teleoptometría. Cienc Tecnol Salud Vis Ocul. 2016;(2): 25-41. doi: https://doi.org/10.19052/sv.3701

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ISSN: 2789-7567 | RNPS: 2524

6. Organización Panamericana de la Salud. Bioética: temas y perspectivas. Publicación Científica No. 527. Washington, D.C.: OPS; 1990. p. 25-30.

7. Domínguez-Alonzo E, Zacca-Peña E. Sistema de Salud de Cuba. Salud Publica Mex. [Internet] 2011 [cited 07/01/2026];53(supl 2):S168-S176. Available in: https://www.scielo.org.mx/pdf/spm/v53s2/12.pdf

8. Insight Vision OC. Innovaciones en lentes esclerales personalizados [Internet]. California: Insight Vision; 2025 [cited 07/01/2026]. Available in: https://www.insightvisionoc.com/es/innovaciones-en-lentes-esclerales-personalizados/

9. Pérez Rueda M, Palacios García-Cervigón G. Bioethical challenges in clinical practice of the 20th century. Rev Clin Esp. 2020 Jul 29:S0014-2565(20)30182-X. doi: 10.1016/j.rce.2020.06.010.

CONFLICT OF INTEREST

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USE OF ARTIFICIAL INTELLIGENCE

The authors declare that no artificial intelligence was used in the preparation of this manuscript.