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The official guide to scleral lens terminology

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ABSTRACT

Purpose: In absence of scleral lens standards, this article aims to provide an official definition of terms related to scleral lens fitting and manufacturing, in order to make more uniform the use of appropriate terms when describing, writing or lecturing about scelral lenses. Adoption of a common terminology may also favor more fruitful exchanges between eyecare practitioners and manufacturers.

Methods: A committee of 12 advances scleral lens clinicians met and develop a list of terms related to scleral lens fit and manufacturing. Litterature review was made using PubMed database with the keywords “scleral lenses” and “terminology”. Other related publications such as textbooks were also considered valid references. Validation of the terms selected and their suggested definition was made by consultation of other experts in the field, over 2 years. A final version was adopted by the Scleral Lens Education Society late in 2018.

Results: This article contains three main sections. Section I provides the definition of a scleral lens. Section II addresses the general terminology habitually applied to contact lens field but in the context of scleral lens usage. Finally, Section III suggests a decription of terms specifically used when fitting or manufacturing scleral lenses. At the end, recommendations are made to manufacturers about the essential elements to provide to eyecare practitioners in order to help them understanding the lens design and to customize their fit.

Conclusion: A common language is key to advancing the science and clinical practice of scleral lens fitting. The current terminology will help standardize this field, helping eyecare practitioners, educators, speakers and manufacturers to talk with the same language.

1. Introduction

The current terminology for contact lenses is voluminous and potentially confusing [1], and the absence of a standardized terminology for scleral lenses has led manufacturers, practitioners, and researchers to adapt a myriad of unique names to describe identical lens parameters. Hence, over the past 2 years, the Scleral Lens Education Society (SLS) had tasked authors to work with 12 experts from North America (see acknowledgments) to establish a standardized terminology for scleral lenses. This paper describes the recently adopted terminology [2] with an aim to expand the use of this scientific language to all aspects of scleral lens manufacturing, fitting and management. We report the most important aspects of this standardizing effort with the intention for the new terminology to be globally adopted by all parties in order to more effectively communicate about and develop the scleral lens specialty.

In this review, scleral lens terms associated with lens design, properties, fitting relationships and clinical outcomes will be described. The objective is to translate the evolution that occurred in the language used, to define the common jargon and acronyms to be used by scleral lens practitioners, researchers and manufacturers alike. Additionally, examples of inconsistent terminology in scientific publications and teaching sessions on scleral lenses will be identified, and terminology modifications will be suggested to provide consistency with the new SLS standard.

2. Methodology

The committee of 12 advanced scleral lens clinicians and researchers met during a scientific meeting in Las Vegas (Global Specialty Lens Symposium, 2017) and began to develop an official terminology for scleral lenses. A literature review was conducted using keyword “scleral lens” and “terminology,” yielding few peer-reviewed articles specifically regarding scleral lens terminology [3], although two textbooks [2,4] were considered valid references. Published a few years apart, the two publications exemplify the evolution of the terms over

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the last 10 years. Additionally, the committee referred to the International Standards Organization (ISO) [5], although there is lacking presence of scleral lens standards in this source as well.

The committee worked over 2 years to develop a consensus, monitoring industry, publication, and lecturing trends as well as engaging in conversations and debates with colleagues. The authors were responsible for the initial identification of terms and suggested definitions, which were validated and modified during exchanges with other committee members and external colleagues. Two in-person meetings were conducted (2017-18) to address specific issues. Once a final consensus was reached on all terminology, a final document was produced and presented to the SLS board of directors (2018). It was adopted by the SLS in 2019 and became the official terminology regarding scleral lenses endorsed by this organization.

3. Section I : Definition

3.1. Scleral lenses (SL)

In the past, the SLS defined lenses based on their diameter and where they rest on the ocular surface.While “scleral lenses” were globally defined as lenses resting entirely on the sclera, lenses up to 6 mm larger than HVID being further described as “mini-scleral” lenses; those extending beyond the 6 mm zone were labelled “large scleral”. Lenses resting partly on the cornea and partly on the sclera were known as corneo-scleral and finally, lenses resting entirely on the cornea were referred to as corneal lenses. The new terminology to define scleral lenses removes the distinction between mini and large lenses. All scleral lenses, regardless of size, are fitted to completely vault over the cornea and land on the conjunctiva, thus there is no need for distinction and the terminology can be simplified to “scleral lens” for all sizes of lenses. To this point, knowing that the SL is resting on the ocular surface, and that the conjunctiva conforms to the shape of the underlying sclera, the term scleral is kept on the basis of naming the lens by where it distributes its weight or bears on the ocular surface [4].

According to the official document adopted by the SLS [2], scleral lenses should now be defined as follows: *a lens fitted to vault over the entire cornea, including the limbus, and to land on conjunctiva overlying the sclera.* The word “corneal”, still present in the actual ISO definition [5], is no longer used because there is a strong consensus to reserve this term to describe any device that contacts, totally or in part, the cornea. Furthermore, the term “contact lens” generally refers to a cosmetic alternative to spectacles rather than medically necessary device for specific ocular conditions. The suggestion that scleral lenses are cosmetic in nature can undermine the severity of a patient’s ocular condition and create confusion for patients and insurance carriers. Therefore, the acronym for scleral lens is “SL” rather than ScCl or SCL (generally used for soft contact lenses).

Lastly, a scleral lens is sometimes referred to as a prosthetic device. A prosthesis is used to replace an organ or part of the body whereas a prosthetic device helps, replaces, corrects or supports an organ or body part. In the case of a scleral lens, it replaces the function of an eye by providing visual rehabilitation, ocular surface lubrication or other functions and therefore these terms should be used for their specific purpose [2,4].

4. Section II: General Terminology

4.1. Corneal diameter- visible Iris diameter

The fitting of scleral lenses requires measurement and description of anatomical parameters of the patient’s eye. Among them, one of the most important is the visible iris diameter, the distance from one limbus to the opposite limbus located along the same meridian. The visible iris diameter should be specified in millimeters (mm) in the meridian of orientation, most commonly expressed as HVID if measured horizontally (horizontal visible iris diameter). Due to the highly customized nature of scleral lens fitting, a practitioner may find it useful to measure or indicate corneal diameter (CD) in other meridians (ex: CD-V (vertical) or at oblique angles CD-XXX deg).

4.2. Sagitta (SAG), sagittal height of the cornea (SHC), overall sagittal height of the ocular surface (OSHO)

Fitting is based on a principle of sagitta (SAG) that is the maximum distance (in micrometers) from a chord, which is perpendicular to the axis of rotation of a surface, to the curved surface. Specifically, the practitioner often considers the sagittal height of the cornea (SHC), defined as the distance from a chord at the level of the corneo-scleral junction to the apex of the cornea. The SHC is described as the height distance (μm) followed by the chord value (ex: 2800 μm @ 12 mm). Furthermore, the overall sagittal height of the ocular surface (OSHO), which is more important to consider during scleral lens fitting, is the maximum distance from a defined chord perpendicular to the axis of rotation of the ocular surface. It is also designated by microns (μm) followed by the chord value. (Ex: 3800 um @ 15 mm, Fig. 1).

4.3. Fluid reservoir (FR)

The vault of the scleral lens over the ocular surface generates a fluid-filled space known as the fluid reservoir (FR). This is the space between the anterior cornea and the back surface of a scleral lens, filled with non-preserved solution (saline, artificial tears, autologous serum or any other compatible and similar products, or a mixture of them) to support the scleral lens, prevent corneal desiccation, and provide optical neutralization of aberrations from corneal surface irregularities. In the past, it has been referred to as lens clearance, clearance, fluid chamber, fluid reservoir, tear fluid reservoir, among others. These terms should not longer be used. To be most descriptive, this space should be referred to as the FR and be described by depth and location (example: FR of 300 μm in the central zone; FR of 50 μm at the limbus).

4.4. Asymmetry

Practitioners must also determine how the scleral lens lands on the complex and often asymmetric shape of the ocular surface. Asymmetry of the ocular surface is evident when there are sagittal height differences (in microns) of various points on the eye compared to adjacent areas. On the average eye, peripherally from the cornea, the ocular surface is not rotationally symmetric in nature, or simply put, it is asymmetric [3]. It can be applicable both to corneal (corneal asymmetry) and scleral (scleral asymmetry) shape.

4.5. Diagnostic scleral lens

Fitting scleral lenses requires the use of a diagnostic scleral lens, which is a scleral lens of known front and back surface specifications. A diagnostic scleral lens may also be a lens created with a specified shape to customize its fitting. The term diagnostic scleral lens is specifically recommended to be used rather than trial lens, due to the nature of the evaluation process involved.

4.6. Impression scleral lens

If ideal fitting characteristics can not be achieved through this

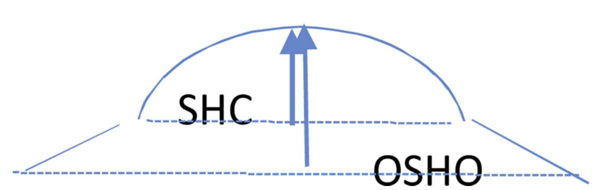

Fig. 1. Overall sagittal height of the ocular surface (OSHO) vs sagittal height of the cornea (SHC).

diagnostic process, an alternative method of scleral lens fitting and design can involve the use of an impression mold. An "impression scleral lens" is a scleral lens designed from an imprint (mold) of the patient's eye.

4.7. Application- removal

Finally, application is known as the process of applying a scleral lens to the ocular surface. This term should replace the word "insertion", which is technically incorrect because the lens is applied on the ocular surface, not inserted into the eye. The process of removing a scleral lens from the ocular surface will be defined as removal, which is already the widely adopted term used for scleral lens removal.

5. Section III: Specific Terminology Related to Lens Parameters

One of the challenges in designing scleral lenses is the potential for discrepancy between diagnostic lenses and the final product delivered to the patient. This issue may occur when practitioners and manufacturers use conflicting terminology regarding scleral lens zones that can lead to misunderstanding. Another issue stems from the fact that novice scleral lens practitioners may lack the understanding that if a single element of the lens needs to be modified, others will be affected. This challenging situation may occur during the practitioner's consultation with a lab. The use of inconsistent terminology at this point can lead to incorrect scleral lens parameter alterations. For practitioners with limited experience with scleral fitting, even if proper modifications are made by the consultant, misunderstandings about lens parameters can create confusion between consultants and practitioners. The following section lists basic parameters and their definition to improve the mutual understanding between prescribers and manufacturers.

5.1. Scleral lens anatomy

The anatomy of a scleral lens is described in three separate zones: the optical zone (A) transition zone (B) and landing zone (C). (Fig. 2)

5.2. Optical zone

The nomenclature of the central scleral lens zone that houses the optics has historically been manufacturer-dependent and has included terms such as optic zone, clearance zone, clearance curve, central clearance zone, anterior clearance zone, apical clearance zone, corneal vault zone, cornea zone, base curve, base curve radius zone, and other variations [3]. The optical zone is described by its radius (OZR) of curvature (mm) and its width (ex: 7.9 mm BC x 8 mm).

5.3. Back optic zone radius (BOZR), Power (PWR)

Back optic zone radius (BOZR, BOZR-AS if made aspheric) is the distance from a center line or point to an axis of rotation defining the back optic zone of a contact lens, or the radius of curvature of the central portion of the posterior surface of the lens. BOZR may also be manipulated to influence the fluid reservoir (FR) depth, steeper curves increasing the fluid reservoir depth and flatter curves reducing it. The radius of a scleral lens influences the overall lens power (PWR). The power is the back vertex optical power of a scleral lens, written in standard optometric convention

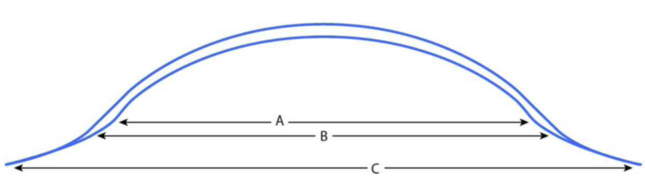

Fig. 2. Anatomy of a scleral lens comprising 3 zones.

as spherical power and negative cylindrical power (the difference in back vertex power between the two primary meridians, 90 degrees apart) (ie. PWR = -2.00 D; or PWR =-2.00–1.00 × 090).

5.4. Back optic zone diameter (BOZD)

Back optic zone diameter (BOZD) represents the diameter of the BOZR of a scleral lens measured to the surrounding junction (expressed in mm). If the zone is oval in shape, it should be described with its horizontal and vertical diameters.

5.5. Front optic zone radius (FOZR)

Similar to the BOZR, front optic zone radius (FOZR) is known as the distance (mm) from a center line or point to an axis of rotation defining the front optic zone of a contact lens, also known as the radius of curvature of the front surface of the lens.

5.6. Front optic zone diameter (FOZD)

Like the BOZD, the front optic zone diameter (FOZD) is defined as the diameter (mm) of the front optic zone of a contact lens, measured to the surrounding junction. If the zone is oval, it should be described with its horizontal and vertical diameters.

5.7. Central lens thickness (CT), Maximum lens thickness (MLT)

Description of the distance (mm) between the front and back surfaces of a scleral lens, measured at its geometric center is known as the central lens thickness (CT). However, depending on the lens design and the lens power, this thickness may vary. Maximal lens thickness (MLT) describes the thickest portion of a scleral lens, with a notation about its precise location (ex: 425 µm @ 80 deg mid-periphery or 4.5 mm from geometric center (GC) of lens). This is an important element to know in order to evaluate the potential impact of the lens on the corneal physiological response over time (i.e. to estimate the oxygen transmissibility of the lens and of the system), knowing that most "minus" power lenses are thickest at 3 to 4 mm ring from the geometric center of the lens and most "plus" power lenses are thickest at the geometric center of the lens

5.8. Oxygen transmissibility of the lens (Dk/t) and of the system (DK/t-SYS)

The oxygen transmissibility of the lens is estimated by dividing the oxygen permeability of the material (Dk) by the lens thickness (t), in centimeters (cm), of the measured sample under specified conditions. The Dk/t value is expressed in Fatt Units. This is the same for the oxygen transmissibility of the system (Dk/t-SYS) which takes in account the permeability of both the scleral lens and the fluid reservoir, as recommended by the manufacturer's fitting guide, divided by the maximum central thickness.

5.9. Prolate (PRL), oblate (OBL)

The optical zone radius not only provides optical correction (since it is aligned with the visual axis) but can also be manipulated to change the FR or to optimize lens power. Scleral lenses can be designed as prolate (PRL), which describes a lens that has a back optic zone radius steeper than its peripheral radius. On the contrary, a scleral lens can be of oblate (OBL) design and have a back optic zone radius flatter than the peripheral radius. An oblate lens is described by its value in diopters and/or microns (ex: Oblate 4 D/ 80 µm).

5.10. Sagittal value of the lens

Each manufacturer has a different way of labeling the zones of scleral lenses. One of the confusing parts is that the terms sagittal height and sagittal depth are always used similarly, but there are differences. Sagittal height (SAG) describes the ocular surface while sagittal depth describes the sagittal value of the SL. To this point, most often, manufacturers label the lens sag based on the chord defined by the overall lens diameter (OAD), defined as the full diameter(edge-to-edge) of a scleral lens, along the same meridian. However, a true sag value must be established from the chord value of where the lens lands theoretically (see PFDL below) on the ocular surface. These specifications are not currently supplied. Consequently, the SLS suggests adopting the following terms to alleviate any further confusion.

5.11. Primary functional sagittal depth of the lens (PFSD), primary functional diameter of the lens (PFDL)

PFDL (Fig. 3) is the diameter of a scleral lens defined by a chord of where the lens first contacts or “lands” on the ocular surface along the same meridian. PFDL is one of the most important attributes to know when fitting scleral lenses but unfortunately that data is not included in the labelling or information sheets provided by manufacturers. It is described in microns (µm) followed by the exact chord value. PFSD refers to the distance from the apex of the back surface of a scleral lens perpendicular at a chord defined by the primary functional diameter of the lens (PFDL). (ex: for a 18 mm diameter lens: PFSD = 4100 µm @ 15.5 mm). Obviously, PFSD is a theoretical value of where the lens would land on the conjunctiva, but, practically, practitioners will take this into account knowing that it may vary from patient to patient according to their unique ocular surface shape. However, PFSD designates to the prescriber an essential element necessary to understand where the lens first bears on the ocular surface and helps the practitioner make appropriate decisions about the selection and customization of lenses.

5.12. Transition zone radius (TZR)

The transition zone radius (TZR) is located just peripheral to the optical zone and continues to the start of the landing zone, deriving its name from its nature of transitioning between the optic and landing zones. Its nomenclature has varied amongst various manufacturers and even design. It has been described with terms such as limbal curve, limbal clearance curve, limbal zone, limbal clearance zone, limbal vault zone, peripheral curve 2, limbal lift zone or intermediate zone, to name a few. TZR is a more universal term to be used for this mid-peripheral lens area and is described by its radius of curvature and width (ex: TZR1 10.5 mm x 0.4 mm). If more than one TZR exists, as is sometimes the case with multi-curve scleral lens designs, they can be numbered TZR1, TZR2, TZR3… TZW (width)- width of the TZR). The transition zone can be manipulated to vary the FR depth over the mid-peripheral corneal surface, and such changes are customarily designated by how many microns of depth is lost or gained in the modification. When creating modifications in the TZR, the recommended way of describing the change is as microns of lowering or raising this zone, closer to or farther away from the ocular surface (i.e., -50 microns, +100 microns/(-) = closer to the ocular surface, (+) = farther from the ocular surface). As the junction between OZR and LZR, the TZR often passes over the limbus and can be manipulated to control vaulting in this specific area.

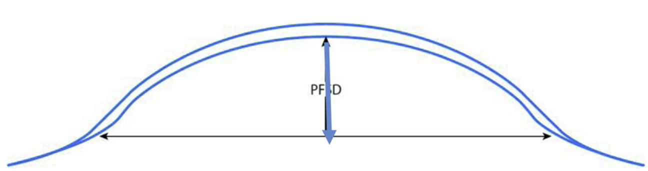

Fig. 3. Primary functional sagittal depth of the lens.

5.13. Landing zone radius (LZR)

The landing zone radius (LZR) is located peripheral to the transition zone radius (B). It begins at the primary functional diameter and ends at the lens edge. It can be a curved contour or a planar (flat) surface placed at various angles from the transitional zone to the edge of the lens. The LZR is described by its radius of curvature and width (if more than one LZR1, LZR2, LZR3… LZW (width)- width of the LZR). The landing zone radius has previously referred to as scleral landing zone, scleral zone, peripheral curve 4, advanced peripheral system, peripheral zone, peripheral clearance zone, peripheral haptic or haptic. All quadrant specific designs should include a description of LZR for each quadrant. For lenses with a planar surface, the landing zone is described in terms of a landing angle, the angle subtended from the point on the lens where it starts (higher numbers bring the lens closer to the eye, lower numbers create a higher edge lift).

Lastly, the landing zone radius is the portion of the scleral lens that aligns to the ocular surface and the scleral conjunctiva; this zone bears part of the weight of the entire lens, the remaining being supported by the fluid reservoir. Owing to the unique properties of the shape of the ocular surface, the landing zone radius of a scleral lens can be designed to be rotationally asymmetric or symmetric to properly align to the surface on which it lands.

Lens flattening/steepening represents another way to optimize lens alignment with the ocular surface. The peripheral curves can be modified by flattening or steepening each curve relative to the standard design. However, it is highly recommended to define the curve changes in microns (+ or –) the + meaning that the lens is going away from the surface and, conversely, - means that the lens profile is designed closer to the ocular surface (ex: LZR3 + 150 um Horizontally/-25 Vertically). Using flat 1-2-3 or steep 1-2-3 to describe modifications from standard design is not recommended since flat 1 does not represent the same value from one design to another design, and is potentially confusing terminology.

5.14. Localized vaulting (LV)

Localized vaulting (LV) is known as a variation in one of the scleral lens zones to vault a specific area with different values in microns. LV should be described by its location, its length, width and distance from the edge (ex: LV of 1 × 2 mm @ 45 deg, XX mm from the edge). It should be differentiated from notching because it is a local variation of the vaulting of one area under the lens versus a modification of the lens shape (see NT below).

5.15. Toric peripheral curves

Designs containing at least 2 different peripheral curve radii (TZR or LZR) should be described as having toric peripheral curves (TPC). This term describes a system of peripheral curves which differ in radii from quadrant to quadrant. This concept was expressed in the past using the wording such as toric haptics, scleral haptics, which should no longer be used.

5.16. Front surface toricity (FST)

Front-surface toricity (FST) is an optical correction that incorporates the sphero-cylindrical optical properties of the lens. In a scleral lens, it is incorporated into the optical correction by means of a sphero-cylindrical created on the anterior surface of the lens to correct residual astigmatism. Residual astigmatism most commonly comes from high order aberrations, mostly vertical or horizontal coma but also can result sometimes from the natural internal optics of the eyes, significant posterior corneal astigmatism as in keratoconus, lenticular astigmatism, crystalline lens dislocation, or can manifest from other corneal toricity that has not been neutralized with the scleral lens alone. If coming from

Table 1
The following items should be made available on the label or on the documents (shipping slip) provided by the manufacturer.

LENS PARAMETERS	ACRONYM	UNITS
Power	PWR	diopters
Primary functional lens diameter	PFLD	Mm
Primary functional sagittal depth of the lens	PFSD	µm @ XX mm
Back Optic Zone Radius	BOZR or BOZR-AS	mm
Back Optic Zone Diameter	BOZD	mm
Optical Zone Diameter	OZD	mm
Transition Zone Radius and width	TZR and TZW	mm X mm
Landing Zone Radius and width	LZR and LZW	mm X mm
Toric Peripheral Curve	TPC (curve x width)	mm x mm
	TPC- specifications (+ or -)	+ or - µm Horizontally, vertically, or @ XX deg
Maximal lens thickness	MLT	µm @ XX deg or mm/zone
Oxygen transmissibility of the system	Dk/t- SYS	Fatt Units
Edge Profile	EP	+ or – XX ; N. T. I. S.
Maximal Edge thickness	MET	µm @ XX deg/zone
Wetting angle of the material	WA- method	DEG
	Special features	
Oblateness	OBL	DD / µm diff generated
Localized vaulting	LV	LV of X x X mm @ XX deg, zone
Venting channels	VC	Venting channels of X mm @ XX and XX Deg
Notching	NT	Semi-circular notch of Y x Y mm @ XX DEG
Stabilization Process	SP	Specify PB, DSO, APCS or TR

aberrations, toric power may slightly reduce their perception without totally eliminating them and visual acuity can be sub-optimal.

Lens flexure was considered another element to be considered as a cause of residual astigmatism, but scleral lenses are relatively thick and when properly aligned with the ocular surface, flexure is limited. Although flexure may occur in some cases, it is not the main cause of residual astigmatism.

When both front- and back-surface toricity may be incorporated into a scleral lens, some refer to the lens as “bitoric.” This term is incorrect, however; the back optic zone radius is not toric, as the term suggests. A true bitoric lens would have optical front-surface toricity and optical back optical zone surface toricity as well. No scleral lens yet exists in that format [1–3]. It is then preferable to describe both surfaces separately.

5.17. Stabilization process (SP)

Similar to soft lenses, front surface toric scleral lenses must be stabilized. Stabilization Process (SP) describes the design variation used to stabilize a front-toric scleral lens. Stabilization is achieved with various design features and should be identified by its technology: prism ballast (PB), double slab-off (DSO), asymmetric peripheral curve system (APCS) or truncated (TR).

5.18. Venting channels

Other modifications can be made in the design of the LZR. In cases where scleral lenses seal off and apply suction to the eye, venting channels (VC) can be incorporated into the lens design to alleviate discomfort and improve tear exchange. [2] Channels can be milled or grooved into the back surface of the lens (LZR) to promote tear exchange under the lens [2,3]. Any channel should be described by its location and its width. (Ex: VC x 2 mm @ 45 Deg).

5.19. Edge profile

Tear exchange is limited under a scleral lens [6] but can be enhanced by modifications of the edge profile, defined as the shape of the edge in a plane containing the scleral lens axis. It is described as standard if not modified from the manufacturer’s original design. Modification should be indicated in microns, as for the peripheral curves, with a positive value (+) if moving away from the ocular surface (also known as flat) or with a negative value (-) if moving toward the ocular surface (also known as steep). It should also be described by its precise location if customized. (ex: edge + 50 microns ; edge -75 microns from 60 to 110 deg).

5.20. Notching, notches (NT)

Another alteration to the original design can involve the use of a notching. This involves sculpting and removal of a segment of lens edge to eliminate bearing on an ocular surface irregularity, such as pingueculae, pterygia, glaucoma drainage devices or cysts or to avoid bearing on a bleb.

Notches (NT) represent a variation in the scleral landing zone to create asymmetrical profiles to accommodate the contour of a surface irregularity. A notch should be described by its location, its length its width and its shape [2,3] (ex: NT of 1 × 2 mm @ 155 DEG).

5.21. Edge thickness (ET), maximal edge thickness (MET)

Edge thickness (ET) is an important lens parameter to know because it may impact the fit and the comfort of the scleral lens. It is defined as the thickness (mm) at the extremity of the peripheral zone (edge) of a contact lens measured parallel to the contact lens axis. More importantly, the maximal edge thickness represents the evaluation of the thickness of a scleral lens measured normal to the front surface, measured at its edge. When reported it should include its location (Ex: 65 µm @ 115 deg).

5.22. Fenestrations

Finally, a scleral lens can be fenestrated. Fenestrations are generated when one or many holes are created within a scleral lens to reduce subatmospheric pressure[1] under the lens and/or to provide increased oxygenation to the cornea [3]. They are not commonly used in modern scleral lens practice, but some designs and practitioners use them exclusively. Fenestrated lenses are also called “air-ventilated” lenses. Fenestrations may create bubbles underneath the lens, depending on how they are manufactured and where they are positioned [2,3]. Whenever used, fenestration should be described by their diameter (mm) and location.

[1] This term is more accurate than the often misused phrase “negative pressure”. The pressure beneath a scleral lens is presumed to be lower than the atmospheric pressure (sub-atmospheric), which generates the suction effect in the FR, but certainly not below zero (negative).

5.23. Final recommendations: information to be provided by manufacturers

With this new terminology, the SLS suggests consistent labeling information to be provided by manufacturers to eye care practitioners. The use of the suggested specifications will enable the practitioners to modify or customize their fitting and to compare different designs (Table 1). Speaking the same language will improve transparency and comprehension among practitioners, manufacturers and researchers. Understanding the basic “anatomy” of a lens and all possible modifications to each zone should improve scleral lens fitting success. The primary goal of the SLS is to disperse this new, standardized terminology and thereby promote its adoption among clinicians, manufacturers, researchers, lecturers, and reviewers and editors of scientific and clinical journals. Beyond this, we will encourage manufacturers to adopt new labeling standards and evolve in light of upcoming updates to ISO standards (2021).

6. Conclusion

With increasing interest of clinicians and manufacturers, scleral lenses have become “mainstream” in specialty contact lens practice to benefit patients. A common language is key to advancing the science and clinical practice of scleral lens fitting. The current SLS terminology and future ISO requirements will help standardize this field, and help ensure a clearer and brighter future for scleral lenses.

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