ibra
Better Eye Surgery

# IBRA API technologies for 3rd party service providers (DHS)

Brochure

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| API Version | 2.1.4 |
| Release | 17. Jan. 2022 |

# About the IBRA® API

The IBRA® API from Zubisoft GmbH is the best way to integrate leading cataract and refractive surgery planning and analysis technology into your DHS or EMR system.

Simply by adding a couple of lines of code into your application you can provide the most comprehensive collection of tools needed by surgeons to assess, enhance, compare and forecast ophthalmic surgery.

As it is integrated into your own application the surgeons can get the benefits right from their familiar electronic record environment – treatment decision making made easy!

The technologies offered by the IBRA® API have shown to significantly improve the clinical outcomes and to reduce costs in laser eye surgery. There is no better way to get excellent patient results.

The reliable high-performance interface of the IBRA® API uses common REST standards and provides the highest level of web system security with ISO 27001 and ISO 13485 certification.

IBRA® API

# 7 Key benefits of an IBRA integration

## 1. Personalized eye care

IBRA enables a patient-individual approach with state-of-the-art treatment planning with unique reference and surgeon-specific laser nomograms, and IOL and toric calculators for EDOF, trifocal, toric and multifocal lens surgery.

## 2. Enhanced surgical decision making

Information provided by IBRA, such as laser-specific treatment refractions and paths, surgically induced astigmatism, the optimal toric IOL alignment axis or the optimized lens constant assist the surgeon in making informed treatment decisions quicker and more accurate.

## 3. Improved workflow & productivity

The IBRA API allows the integration of important treatment calculators right into the host environment, such as a DHS or EMR system, at the right position within the patient workflow. Double data entry is avoided, typing errors are reduced and the familiarity of the electronic record environment is preserved, increasing surgeon's and clinic's productivity and saving time.

## 4. Improved patient success

The personalized eye care approach in combination with the use of market leading calculation algorithm and large reference databases leads to improved clinical results, lower retreatment rates and cost savings.

## 5. Cloud analytics & benchmarking

IBRA's web-based infrastructure allows fast collection and analysis of big data with cutting-edge technologies. Results from different treatments and geographic locations can be used to benchmark surgeon-, center- and patient-individual outcomes. Collective data can be used for publications and MD manufacturer's R&D.

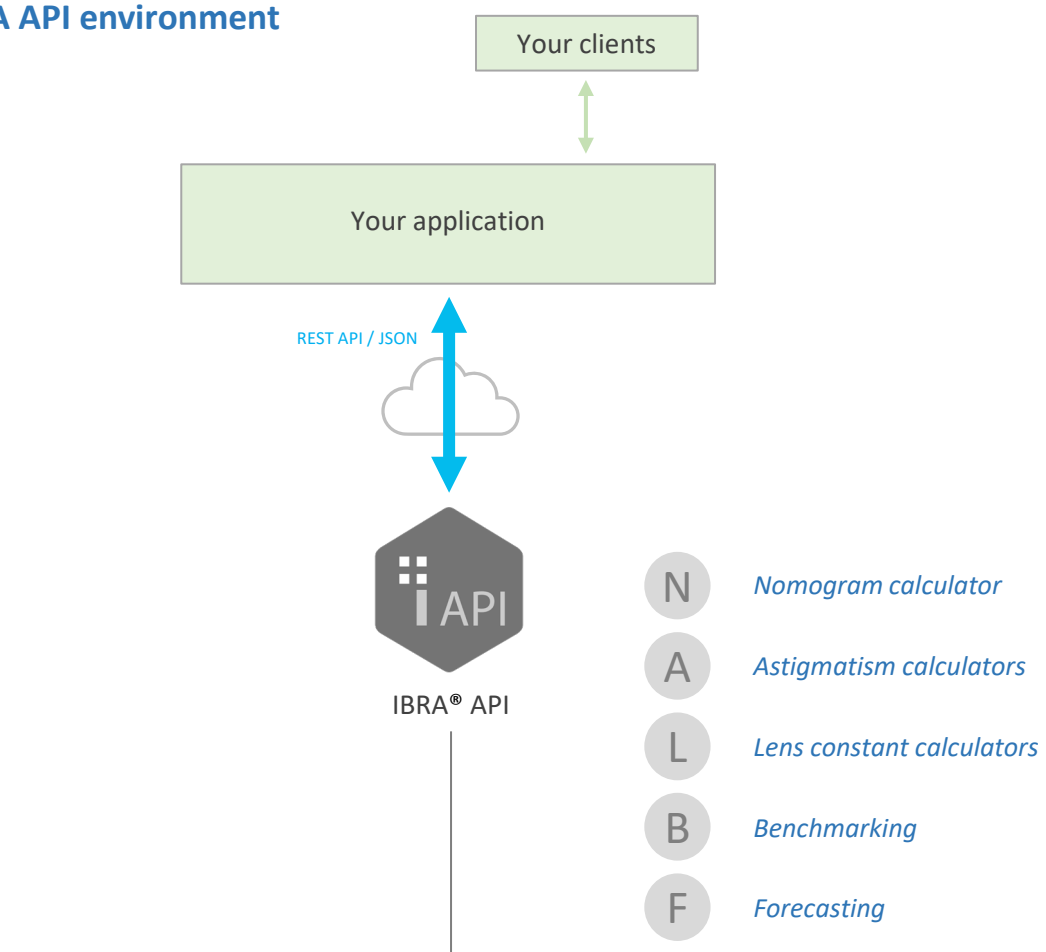
## 6. Outcome forecasting

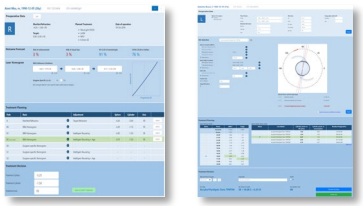
The use and analysis of the data enables outcome predictions on the most used treatment methods. This allows for informed consenting and the management of patient expectations.

## 7. Proven to lead to better eye surgery

IBRA is the market leader in cataract & refractive surgery analysis and outcome enhancement. The IBRA technology has statistically proven to improve the unaided visual acuity and to reduce the enhancement rate in LASIK.

# The IBRA API environment



IBRA® API

# Nomogram Calculator

*Background*

Nomograms are algorithm that can help adjusting refractive surgery plans with reference to the preoperative manifest refraction, the patient's age, the used method (LASIK, PRK), the laser model and laser mode, the optical zone and the refractive target.

Zubisoft's laser nomograms and technologies are unique and the best in their class. They use proprietary algorithm with up to nine different factors to calculate accurate laser performance profiles.

Nomogram calculations can base on the IBRA reference database (start-up nomogram) or on surgeon's own data (surgeon-specific nomogram).

## *Why is this important?*

*Small adjustments to the treatment refraction can increase the accuracy of the laser intervention leading to higher patient satisfaction.*

*Nearly every laser system on the market can benefit from nomogram adjustments and the surgeons are aware of the potential improvement it can bring.*

*It is highly recommended by refractive ophthalmic societies (e.g. ASCRS) to use nomograms where appropriate.*

Alcon WaveLight EX500 EXCIMER LASER

**Alcon WaveLight Allegretto**
**Alcon WaveLight Eye-Q**
**Alcon WaveLight EX500**

Modes: WFO, CONTOURA, T-CAT

Methods: LASIK, PRK, TRANS-PRK

SCHWIND eye-tech-solutions

**Schwind Amaris 500E**
**Schwind Amaris 750S**
**Schwind Amaris 1050RS**
**Schwind ATOS**

Modes: Aspheric aberration-free

Methods: LASIK, TRANS-PRK, Lenticular Extraction

ZEISS

**ZEISS MEL 80**
**ZEISS MEL 90**
**ZEISS VISUMAX**

Modes: Aspheric, SMILE

Methods: LASIK, PRK, Lenticular Extraction

Johnson & Johnson VISION

**Johnson & Johnson VISX S4 IR**

Modes: Conventional, WaveScan, iDesign

Methods: LASIK, PRK, LASEK

ziemer OPHTHALMOLOGY

**Ziemer LDV**

Methods: Lenticular Extraction (CLEAR)

BAUSCH + LOMB TECHNOLAS PERFECT VISION

**Technolas 217z**

Methods: Aspheric

NIDEK

**NIDEK EC5000**

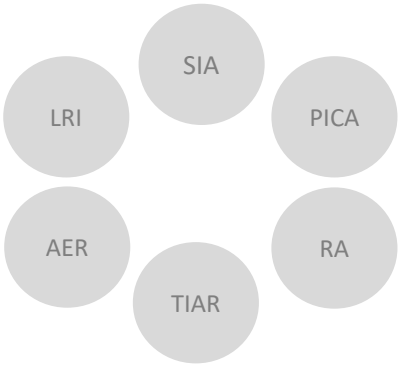
Methods: Aspheric

IBRA® API

# Astigmatism Calculators

*Background*

The main corneal incision causes a flattening effect along the orientation in which it is applied. These curvature changes result in significant alterations to the magnitude and orientation of the principal corneal meridians (astigmatic power and axis).




### *Why is this important?*

*Pre-surgical consideration of the main astigmatic clinical variables will allow the surgeon to plan a more accurate correction of the pre-existing corneal astigmatism with the implantation of a toric intraocular lens.*

*If the final astigmatism is reduced to its minimum, the unaided visual acuity can significantly increase.*

*Today, no toric and multifocal surgery is performed without considerations of the astigmatic changes.*

## Surgically induced astigmatism (SIA)

The induced astigmatism is calculated based on the change of keratometric (or topographic) astigmatism but can also be calculated from the change of (manifest) refractive astigmatism. This allows the calculation of a keratometric SIA (using pre- and postoperative K-values) and a refractive SIA (using pre- and postoperative cylinders).

## Post-incision corneal astigmatism (PICA)

The corneal astigmatism changes because of the corneal main incision needed for the cataract or refractive lens operation. The change is affecting the power and axis of the corneal astigmatism. The astigmatism after the incision is called the post-incision corneal astigmatism (PICA), it can be calculated and is needed for the toric lens power determination and the alignment.

## Residual astigmatism (RA)

Residual astigmatism (RA) is the unwanted remaining astigmatism after lens surgery, usually reducing postoperative uncorrected visual acuity and causing unsatisfied patients.

## Astigmatic effect ratio (AER)

The calculations return the astigmatic effect ratio (AER) and the loss of astigmatic correction in percentage for a toric IOL that is misaligned (in off-axis position) by a certain degree.

## Toric IOL axis re-alignment (TIAR)

The TIAR components consist of the axis position of toric IOL with minimal residual astigmatism (RA), it provide information about the amount of rotation required (re-alignment) to get the IOL to the ideal position

## Limbal relaxing incisions (LRI)

Limbal relaxing incisions flatten the steep meridian of the corneal astigmatism and allow the eye to heal into a more spherical shape (with lower amounts of astigmatism).

IBRA® API

# Lens Constant Calculators

*Background*
The selection of the most appropriate IOL power formula including the use of an accurate lens constant are recognized being critical for delivering optimized refractive outcomes and best possible postoperative uncorrected visual acuity.

Lens constants are specific adjustment elements that improve the precision of the IOL power calculation by including the effective lens position (ELP) prediction. The material and design of the intraocular lens, the used diagnostic instrument and surgical factors may lead to variation of the lens constant.

The manufacturer recommended lens constants, and constants provided by independent groups, e.g. ULIB, are the starting point for a surgeon-specific lens constant.

Multiple studies have shown a significant improvement of the refractive accuracy and visual outcomes due to lens constant optimization (general and surgeon-specific).

Surgeons are encouraged to develop and optimize their own lens constants for a given IOL to account for practice-specific variables.

## *Why is this important?*

*Several studies have demonstrated the beneficial effect of lens constant optimization on the refractive predictability and the postoperative visual outcome.*

*It's common practice to use optimized lens constants provided by the lens manufacturer or other sources (e.g., ULIB database). However, these are unspecific general adjustments of the constants.*

*Surgeon-specific A-constants have shown to further enhance the spherical accuracy of the used intraocular lenses.*

## A-constant optimization (SRK/T)

The calculator returns an optimized a-constant (SRK/T) for a particular lens model. The a-constant remains one of the most important lens constant for IOLs. Simple conversion equations are available to convert one lens constant to another for a particular IOL model and biometry formula.

## A-constant personalization (SRK/T)

The **IBRA P1 biometry formula** accounts for biological variations. It returns a patient-individual a-constant for a particular IOL model (3 models available), axial length and age.

## Haigis constants optimization

To further improve accuracy for a broader range of eye conditions, the Haigis formula takes anterior chamber depth measurements into account to predict the most accurate spherical lens power. The IBRA calculator returns the optimized Haigis constants a0, a1 and a2 for a given lens model.

IBRA® API

# Benchmarking

*Background*
Zubisoft's unique benchmarking algorithm can compare the visual and refractive outcomes of an individual laser eye treatment with the outcome of cases from the reference database that share the same preoperative and operational characteristics (laser, method, refraction, age, optical zone).

This allows accounting for the case complexity (case complexity-based scoring), providing a true image of the quality of surgery.

### *Why is this important?*

*Surgeons who compare their clinic outcomes with the results from other surgeons gain a better understanding of their treatment quality.*

*Knowing if a surgeon performs above or below the average, is the starting point for further assessments and treatment adjustments – with the goal to improve the treatment success and catch up with the others.*

## Scoring of UDVA

Case complexity-based scoring is performed in relation to the postoperative unaided distance visual acuity (UDVA), one of the key performance indices in refractive eye surgery. This can also be called the 'quality of vision' scoring.

## Scoring of SE predictability

This case complexity-based scoring is based on the analysis how well the postoperative spherical equivalent (SE) target was achieved. This can also be called the 'accuracy of treatment' scoring.

## Peer group comparison

Returns the p-value to indicate the statistical difference between the personal outcomes for UDVA, CDVA and SE predictability for a given treatment method and refractive range and the outcomes of the peer group (refence database).

IBRA® API

# Forecasting

*Background*
Forecasting key outcomes, such es residual stromal bed, the risk for an enhancement, the risk for visual loss, or the chance to achieve 20/20 unaided visual acuity can support the surgeon in treatment decision making, patient education and informed consenting.

### *Why is this important?*

*Estimation of the most likely outcome and the possible side effect of an intervention is important for the surgeon AND patient and supports the decision whether to go ahead with the operation or not.*

*Estimation is usually done by the surgeon based on experience. However, we now can add data and hard facts to the decision-making process, enhancing the expectations and reducing the risk for postoperative ectasia.*

## Clinical outcomes

The prediction of post-refractive laser surgery visual acuity and refractive outcomes is useful to assess the risks of the surgery and to prepare the patient for any undesired outcome and its consequences, e.g., the need for glasses after surgery.

The clinical forecasting algorithm assess the results from 400'000 recent laser eye treatments and provides accurate outcome figures.

## Tissue ablation

Preoperative assessment of the tissue ablation (tissue calculator) for several laser platforms and laser modes helps identifying patients at high risks for postoperative ectasia.

IBRA® iframe

# Laser treatment planner with graphical user interface

*Background*

With the help of the iframe technology a laser treatment planner page can be embedded into the host software. This page has its own graphical user interface (‘mini website’) and offers a sequence of calculations that are very close to the eye surgeon’s normal workflow and thinking process, and that are needed for state-of-the-art laser treatment planning.

Access to the iframe planner requires a specific token generated via the IBRA API. Existing treatment data can be submitted in advance to prepopulate the preoperative and treatment fields.

Depending on the laser equipment in use specific treatment paths are shown, supporting the surgeon with the nomogram adjustment (e.g. rounding or age-related changes) and providing treatment approaches that are simple and repeatable.

## *Why is this important?*

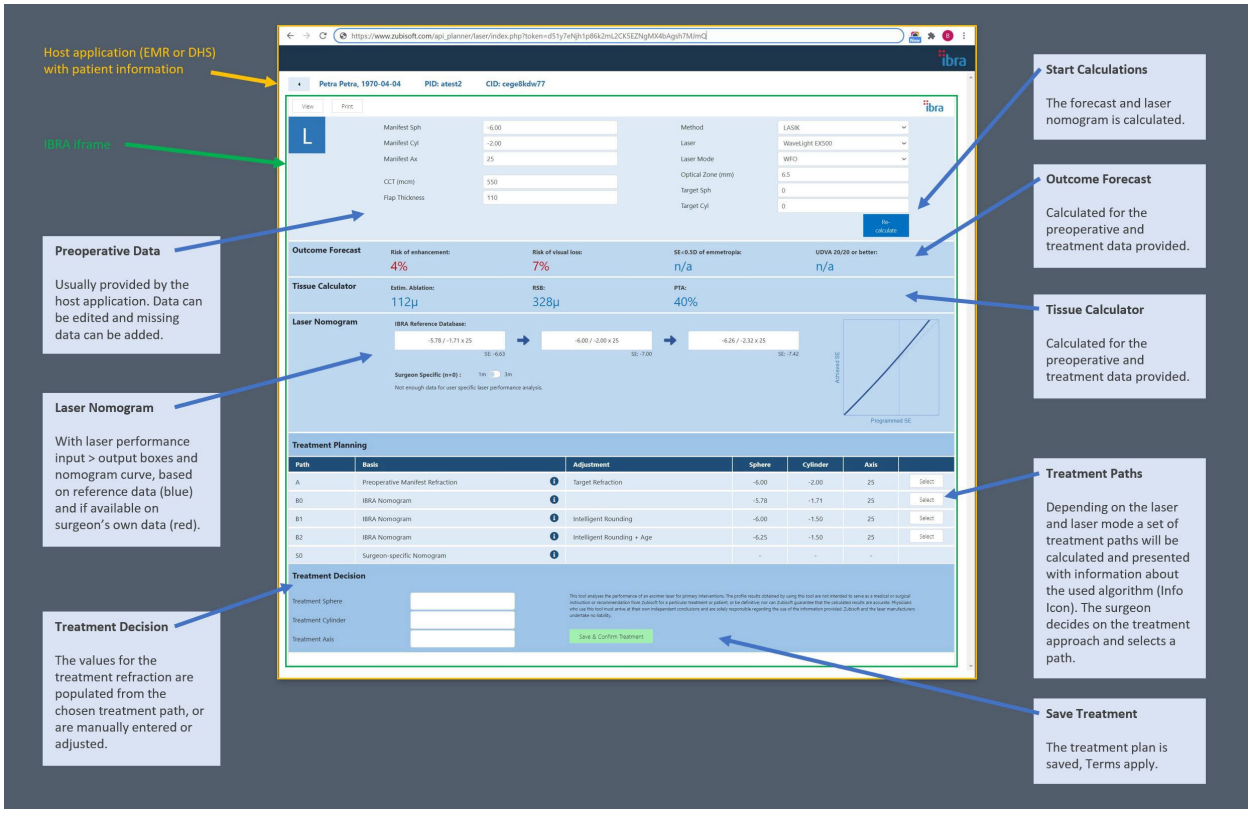
*Using treatment nomograms means working according to best medical practice.*

*The iframe laser treatment planner provides a wide range of resources and calculation algorithms required in modern treatment planning.*

*The technologies included are:*

- *Clinical outcome forecast*
- *Tissue ablation forecast*
- *Nomogram calculation (reference)*
- *Surgeon-specific nomogram*
- *Comparison of nomogram figures*
- *Treatment paths*
- *Summary and decision section*
- *Printout page*

Screenshot of the iframe laser treatment planner:



IBRA® iframe

# IOL treatment planner with graphical user interface

*Background*

With the help of the iframe technology an IOL treatment planner page can be embedded into the host software. This page has its own graphical user interface (‘mini website’) and offers a sequence of calculations that are very close to the cataract surgeon’s normal workflow and thinking process, and that are needed for the planning of toric and multifocal IOL surgery.

Access to the iframe planner requires a specific token generated via the IBRA API. Existing biometry and preoperative data can be submitted in advance to prepopulate the treatment fields.

The planner calculates the optimized lens and cylinder powers using the SRK/T and Haigis formula, provides a table with information about the available toric IOLs with residual astigmatism calculation, and creates a graphical output of the toric lens alignment.

## *Why is this important?*

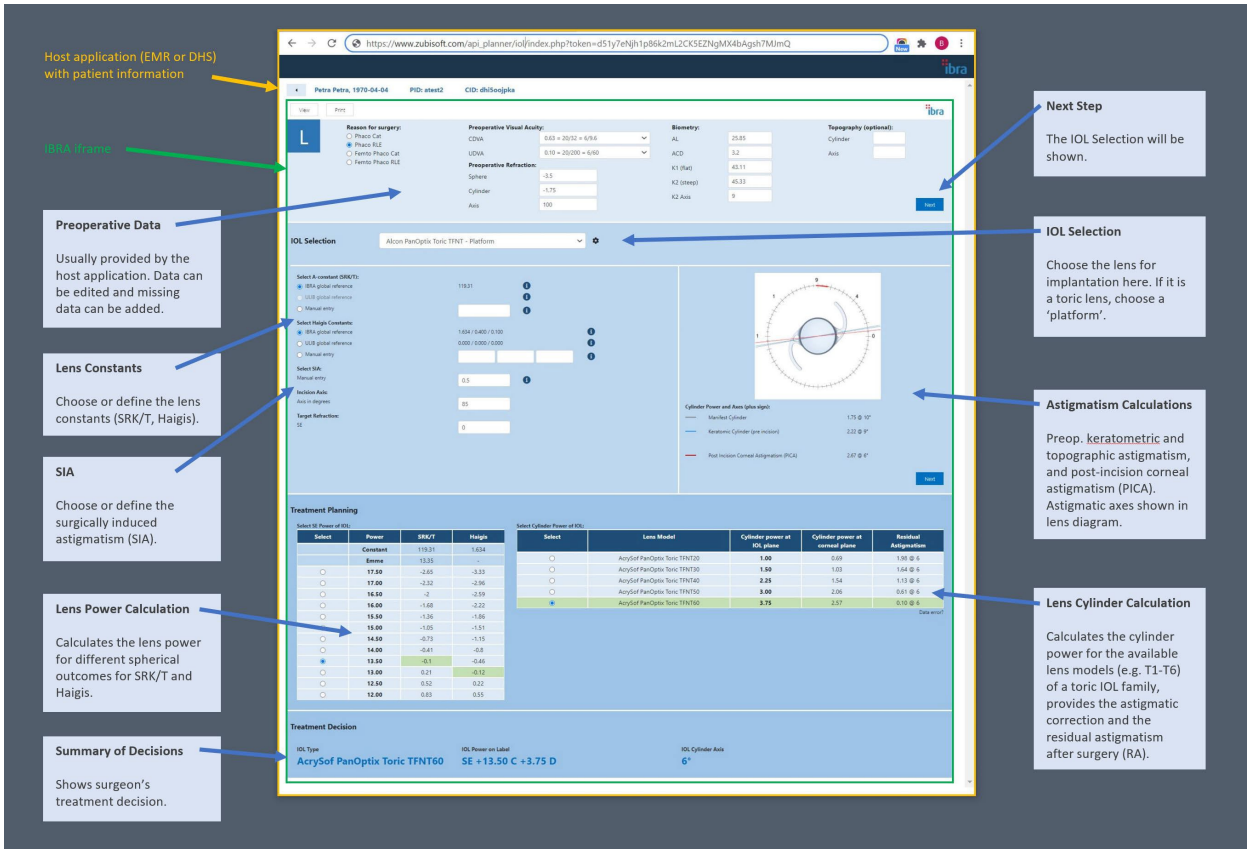
*Multiple studies have demonstrated the beneficial effect of using optimized lens constants and toric calculators in cataract and refractive lens surgery.*

*The iframe IOL treatment planner provides several important tools for best medical practice in this field.*

*The technologies included are:*

- *Optimized lens constants (IBRA)*
- *PICA calculation*
- *RA calculation (toric IOL family)*
- *Alignment of toric IOL*
- *SRK/T SE power calculation*
- *Haigis SE power calculation*
- *Summary and decision section*
- *Printout page*

Screenshot of the iframe IOL treatment planner:



IBRA® EyeChart

# Dashboard charting with liquid analytics

*Background*

EyeChart is a software application with its own graphical user interface that uses the IBRA API to communicate with the data sources, for example with 3rd party service providers (DHS).

It's a drag & drop dashboarding tool with many templates, charts and filters specifically designed for the analysis and presentation of ophthalmic data after cataract and refractive surgery.

The liquid analytics allow interactive dynamic adjustments, e.g., the change of a filter parameter, to take place immediately without reloading the page.

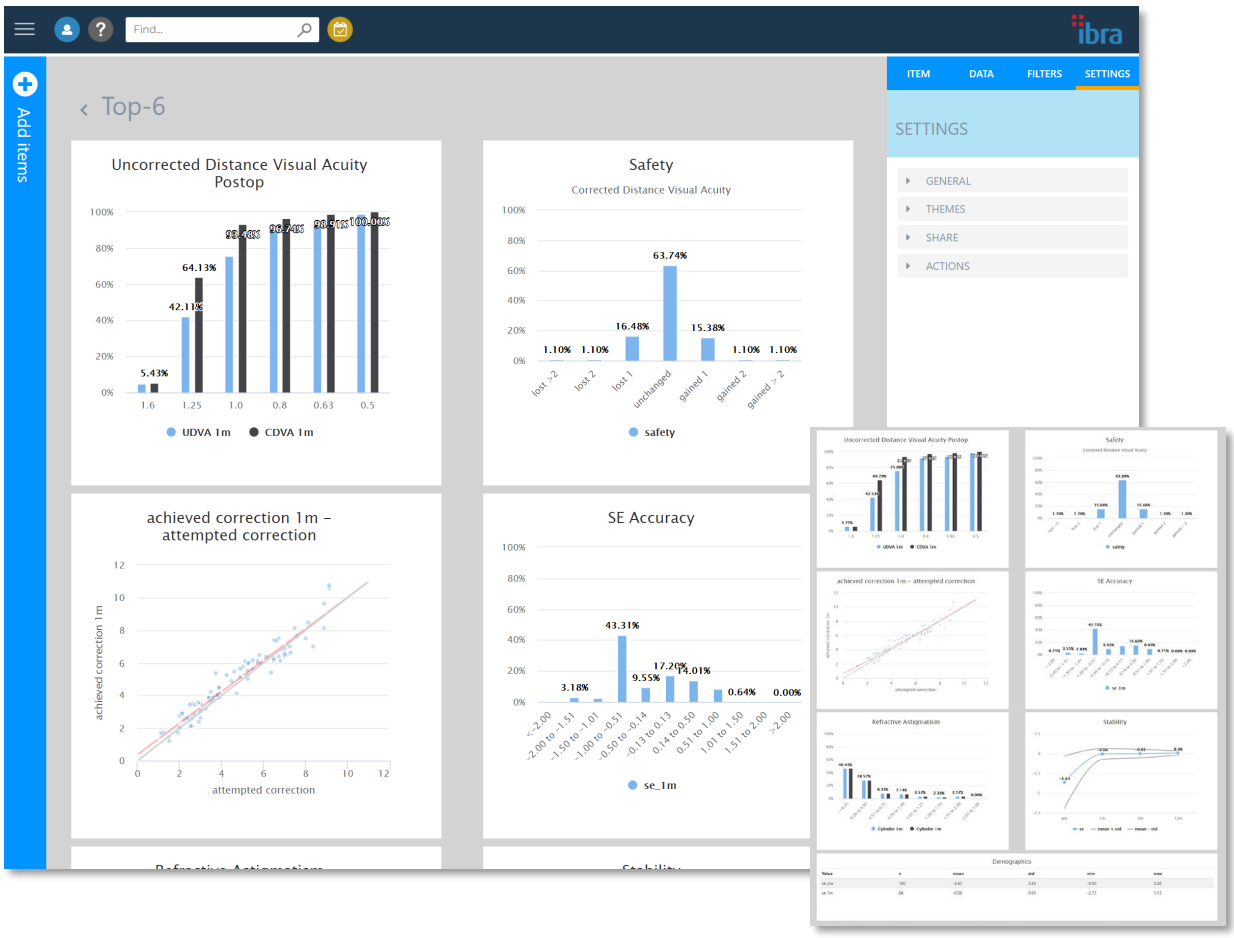
The customizable dashboards can be shared with the users or with the public.

## *Why is this important?*

*Visualization of large amount of treatment data from different sources enables a better understanding and overview of treatment outcomes of individuals, centers or the whole corporate.*

*The well-known and proven charts show quickly the quality of treatment, but also outliers that might have occurred.*

Screenshots of IBRA EyeChart:



IBRA® API

# Advantages of working with Zubisoft

## 1. Training and support

For Zubisoft software and support services have equal priorities! We provide first class onboarding with videos and surgeon-individual live trainings. After completing the initial steps successfully users can enhance their training with the IBRA Academy.

Our customer support has been praised for quick response times and competent replies. Our support goes beyond explaining the functionality of the software, it includes advice on treatment planning an individual quality reporting.

Product & Service

ACADEMY

## 2. IBRA Academy

IBRA Academy's mission is to transform the way surgeons achieve great treatment results by offering online eduction. From quick, practical webinars and onboarding videos to comprehensive 1-to-1 training sessions with the CEO of Zubisoft, users will learn everything they need to increase productivity and treatment success.

## 3. Security & Safety

- We use bank-grade WAF
- Data stored encrypted
- Data stored in Switzerland
- Data center ISO 27001 certified
- Live replication and offsite backup

## 4. Performance

- We use latest hardware (SSD)
- We use load balancer
- Interoute access points
- Clever coding
- Server are wired in-house

## 5. Accessibility and reliability

- Server managed 24 x 7
- Redundant systems

IBRA® – Outcome Innovation by Zubisoft GmbH

Zubisoft GmbH
Mandachstrasse 56
CH-8155 Niederhasli
+41 44 388 54 51
info@zubisoft.com

zubisoft