Aladdin Biometer

Myopia Module

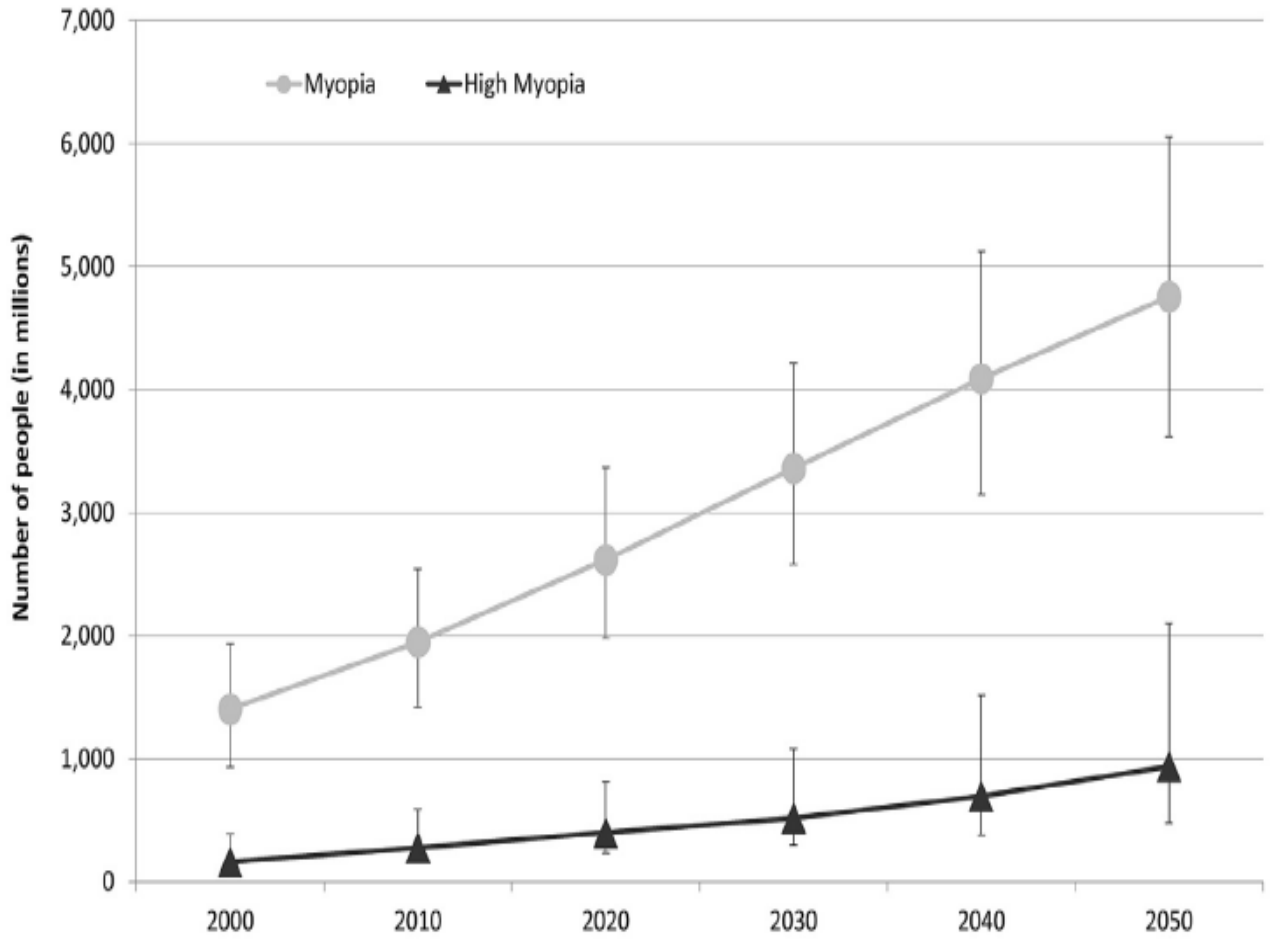
TOPCON
Healthcare Solutions

Myopia Global Trends

The prevalence of myopia has approximately doubled in the past three decades, arguably **reaching epidemic levels**.

Onset of myopia in the last two generations has been reported to occur earlier leading to an increased prevalence of high myopia.

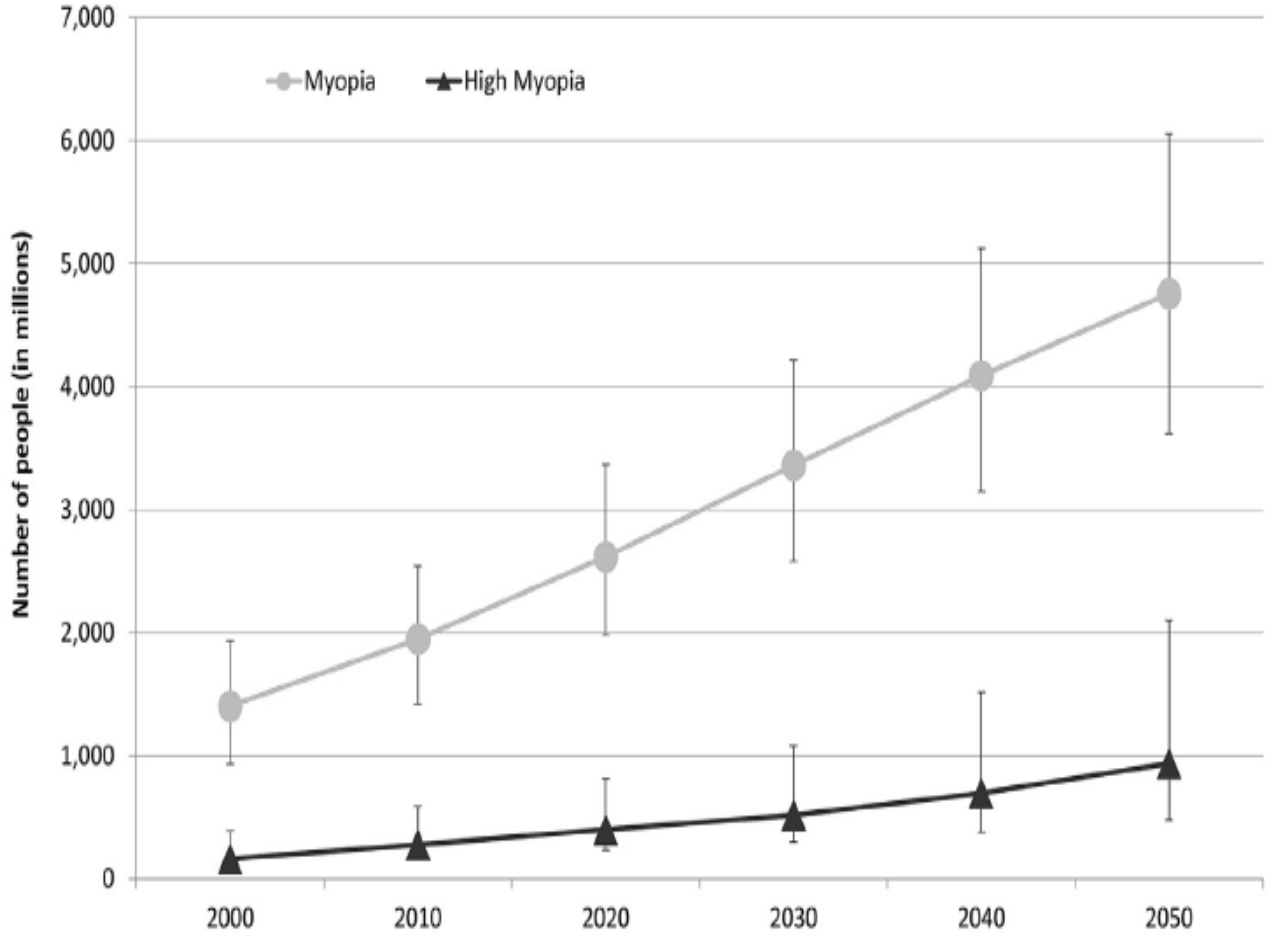
Global trends in myopia management attitudes and strategies in clinical practice. - Wolffsohn, Calossi, Cho, Logan, Santodomingo-Rubido et al. (2016). Contact Lens and Anterior Eye



Global Prevalence of Myopia and High Myopia and Temporal Trends from 2000 through 2050 - Holden, Fricke, Wilson, Jong et al. - 2016 by the American Academy of Ophthalmology

Myopia Global Trends

Myopia and high myopia estimates from 2000 to 2050 suggest significant increases in prevalence globally, with implications for planning services, including managing and preventing myopia related ocular complications and vision loss among almost **1 billion** people with high myopia.

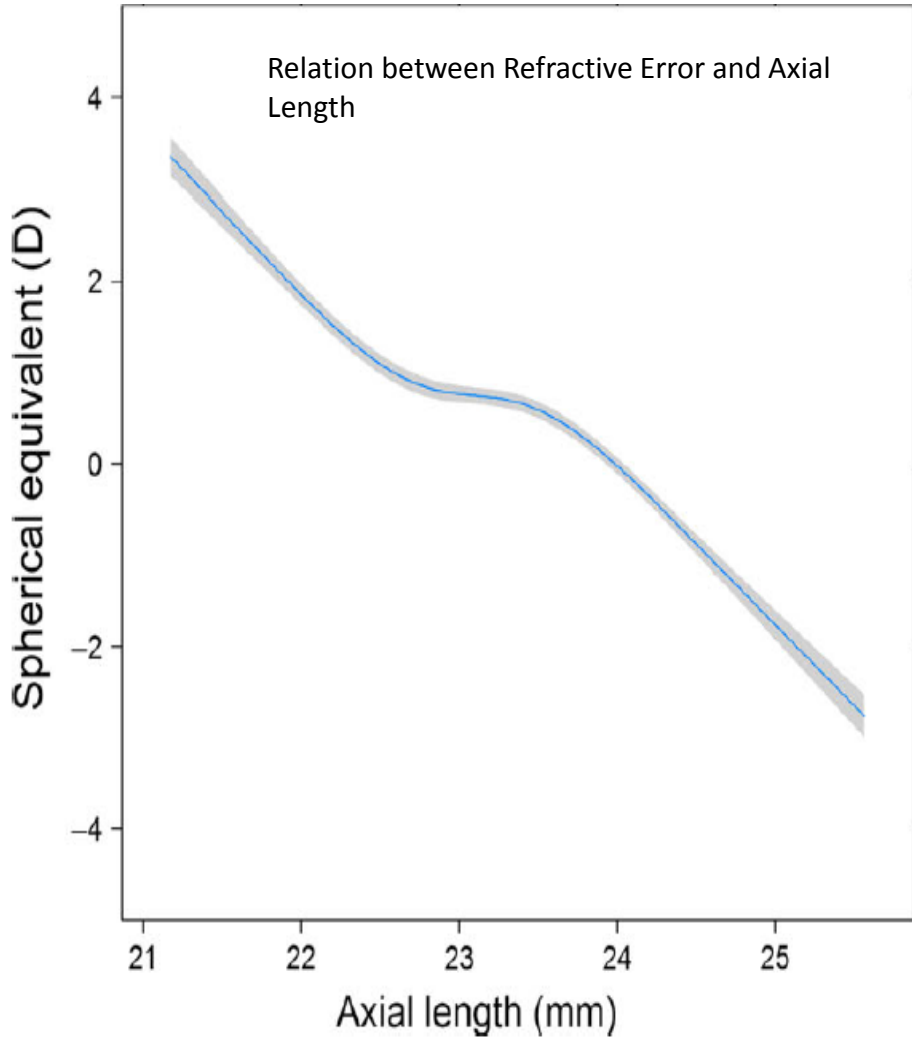


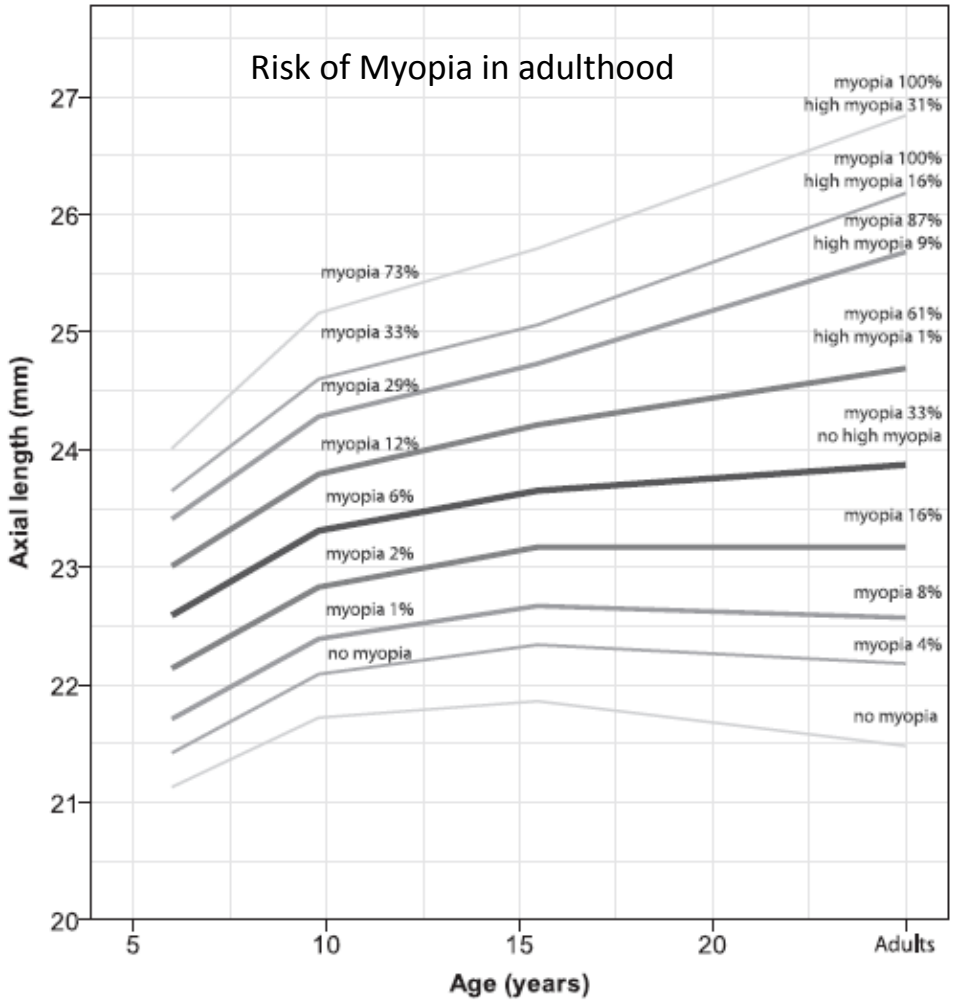
Global Prevalence of Myopia and High Myopia and Temporal Trends from 2000 through 2050 - Holden, Fricke, Wilson, Jong et al. - 2016 by the American Academy of Ophthalmology

Myopia Progression Markers

Axial Length

AL growth rate is the main indicator





Axial length growth and the risk of developing myopia in European children – Tideman, Williams, Guggenheim et al. – Acta Ophtalmologica 2018

Myopia Progression – Treatment

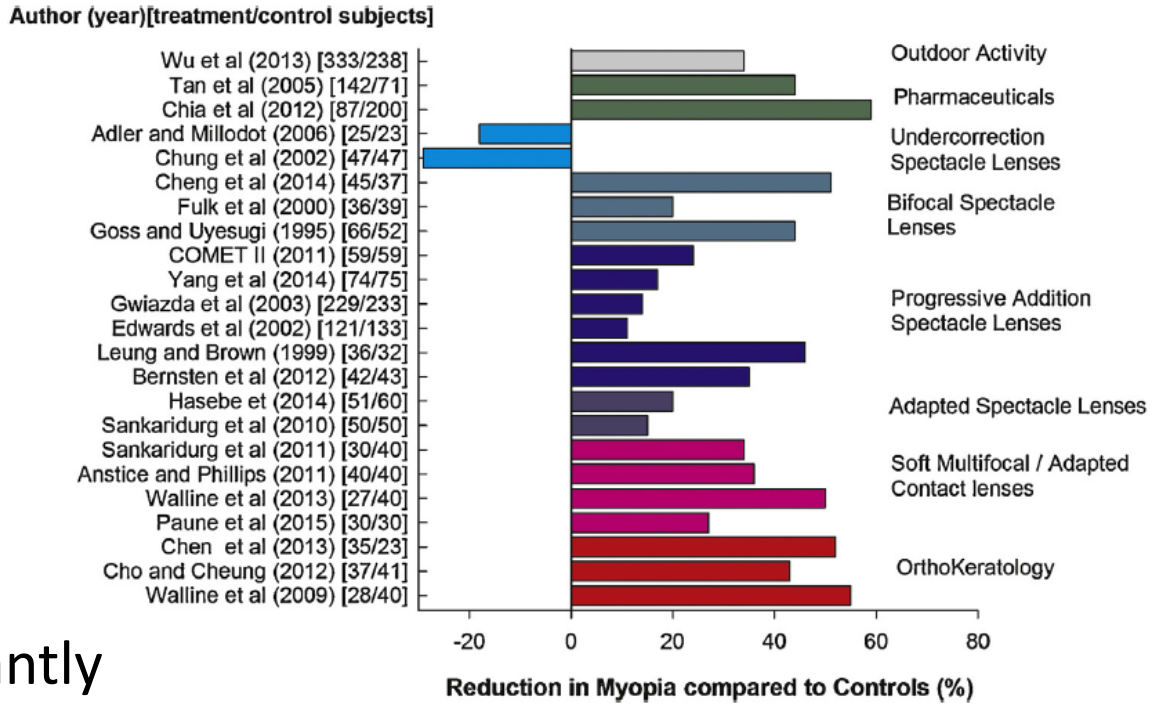
Atropine

(or pirenzepine)

Pros	Cons
High success rate	Side effects

Recent clinical trials demonstrated low-dose atropine eye drops such as 0.01% resulted in retardation of myopia progression, with significantly less side effects compared to higher concentration.

However, a proportion of patients are poor responders, in whom the optimal management remains unclear.



World Health Organization. The impact of myopia and high myopia. Geneva, Switzerland: WHO; 2016.

Myopia Progression – Treatment

Orthokeratology

Perceived effectiveness (defined as the expected level of reduction in childhood myopia progression in percent) of myopia control options by practitioners in different continents. Data are expressed as mean ± S.D.

Continent						
Technique		Asia	Australasia	Europe	North America	South America
Spectacles	Under-correction	6.5 ± 13.9	2.5 ± 7.4	6.4 ± 15.8	2.9 ± 7.9	13.4 ± 23.1
	Single Vision	16.0 ± 23.6	4.2 ± 12.5	10.0 ± 21.8	4.0 ± 14.0	18.1 ± 30.7
	Bifocals	18.4 ± 21.1	14.1 ± 14.8	12.4 ± 17.5	11.6 ± 14.4	12.3 ± 24.2
	Progressive Addition (PALs)	21.3 ± 21.2	16.0 ± 14.0	14.7 ± 18.6	11.3 ± 13.5	12.8 ± 24.8
Contact Lenses	Rigid Gas Permeable (RGP)	23.9 ± 26.9	9.6 ± 13.8	14.1 ± 20.8	9.9 ± 15.4	13.6 ± 27.0
	Single Vision Soft	11.9 ± 20.6	4.1 ± 11.5	10.1 ± 20.5	2.9 ± 10.5	16.0 ± 29.0
	Multifocal Soft	15.5 ± 20.2	22.5 ± 19.3	16.4 ± 25.7	18.4 ± 20.5	11.5 ± 19.7
	Novel Myopia Control Soft	24.4 ± 26.0	29.1 ± 19.3	25.2 ± 25.7	21.5 ± 23.1	18.8 ± 28.5
	Orthokeratology	48.6 ± 29.6	47.8 ± 25.3	44.3 ± 29.0	36.9 ± 30.1	23.9 ± 32.3
Pharmaceutical		31.7 ± 27.8	39.0 ± 32.4	24.2 ± 29.4	21.8 ± 27.0	14.6 ± 23.3
Refractive Surgery		17.4 ± 29.7	11.4 ± 24.3	12.8 ± 25.6	13.5 ± 30.6	18.0 ± 29.4
Increased Time Outdoors		38.7 ± 27.5	29.7 ± 22.0	29.4 ± 26.2	20.5 ± 17.9	35.3 ± 32.0

Orthokeratology (ortho-k), when used for partial or full correction of myopia, has been shown to slow myopic progression in children by 36-56% as compared to their spectacle or contact-lens wearing peers.

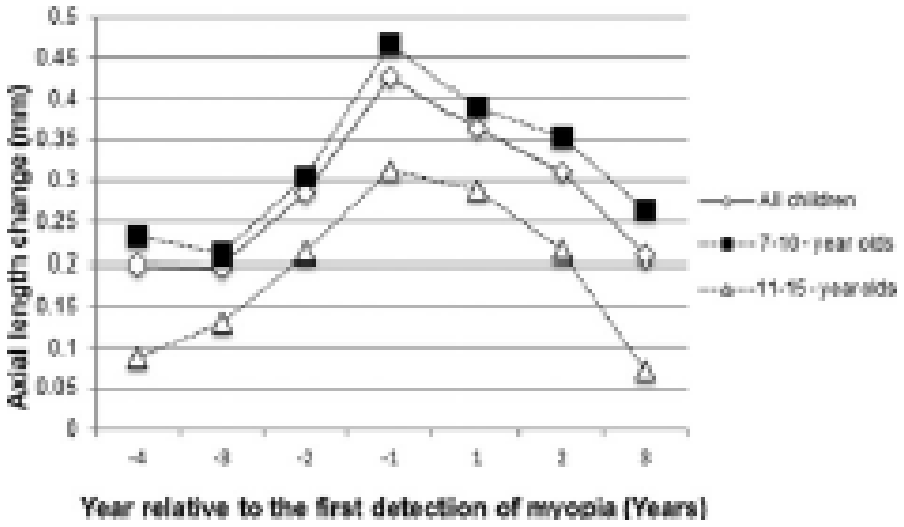
This effect is achieved by limiting the axial elongation of the eye, which is of particular concern in high myopes (>6.00D) and children, where myopic progression has been shown to proceed at a faster rate than average

Charm J, Cho P. High myopia-partial reduction ortho-k: a 2-year randomized study. Optom Vis Sci. 2013 Jun;90(6):530-9. doi: 10.1097/OPX.0b013e3182936

Global trends in myopia management attitudes and strategies in clinical practice. - Wolffsohn, Calossi, Cho, Logan, Santodomingo-Rubido et al. (2016). Contact Lens and Anterior Eye

You can see myopia coming….

- Speeding up of rate of axial length change prior to onset of myopia (18 months before onset)
  - Particularly in younger children
  - Particularly in last year before onset



Measurements and reports are the key….

Thorough baseline data and follow-up

- Cycloplegic refraction
- Binocular status
- Topography
- Biometry

TOPCON Healthcare Solutions

Goal of myopia researchers

- Develop optimized treatments for slowing the growth of the eyeball
  - Aimed at children aged 5-10 years of age
  - Possibly a combination of systemic drug, topical eye drop and contact lens
- Develop a screening device that can predict which children need treatment, even before they become myopic
  - Aim to screen age 4-6 years old, and treat BEFORE they become myopic
    - Refractive error
    - Biometry (axial length starts to expand at a faster rate than refractive error, in the 12-18 months before the eye first becomes myopic)

Look at the Aladdin as the perfect solution for myopia monitoring

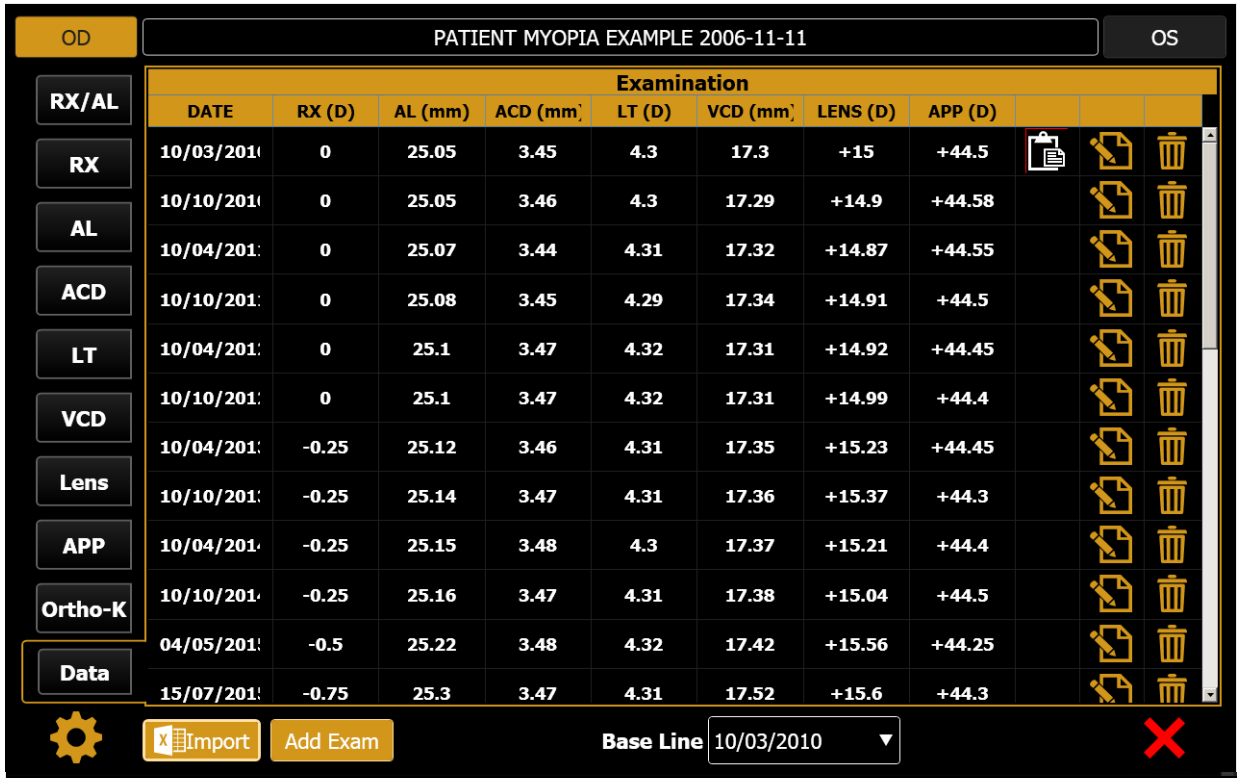
- As an optical biometer the Aladdin with a periodic monitor of axial length can be a screening device that can predict which children need treatment, even before they become myopic

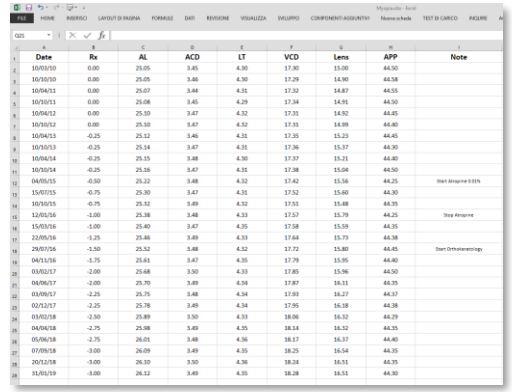
- As a corneal topographer and pupilometer the Aladdin provides support during myopic treatment with contact lenses for orthokeratology

TOPCON Healthcare Solutions

ALADDIN Myopia Module

- Monitor Myopia Progression on patients under treatment
- Establish Myopia Progression alert rules
- Follow Orthokeratology treatment in detail
- Collect, manage and review data from other sources



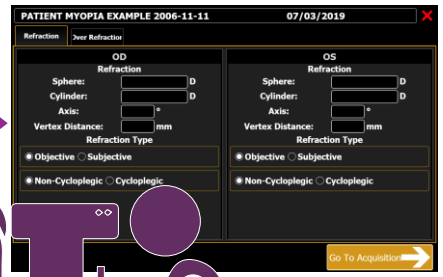


TOPCON Healthcare Solutions

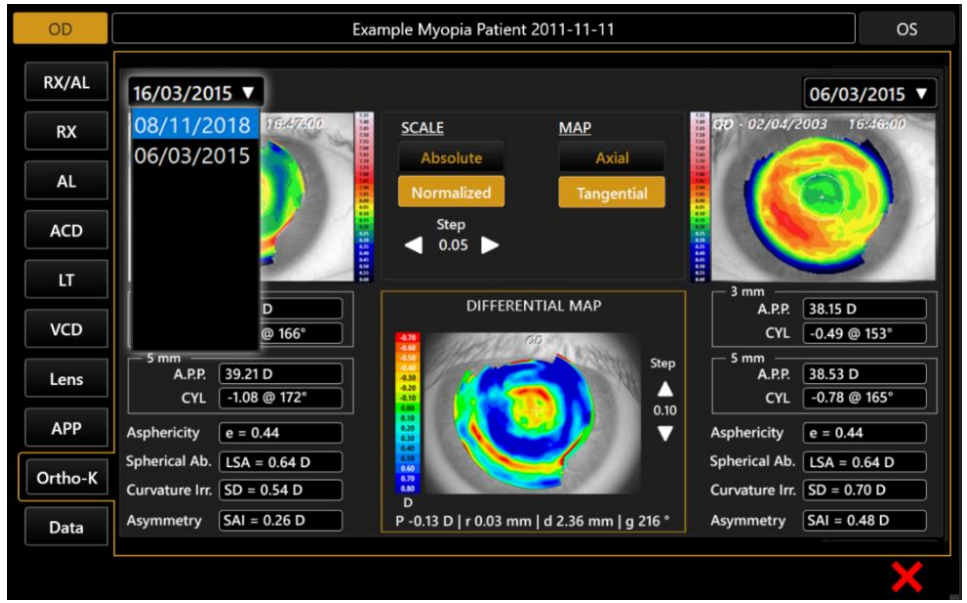
ALADDIN Myopia Module

Myopia Module Workflow

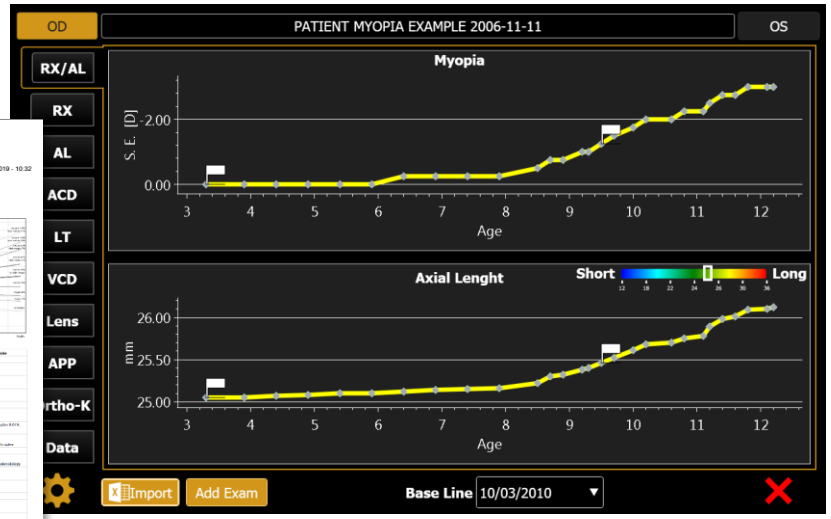
Refractive Error measurement

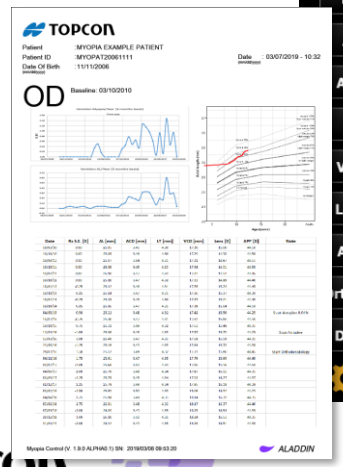


Biometry measurement



Analyse & Treat





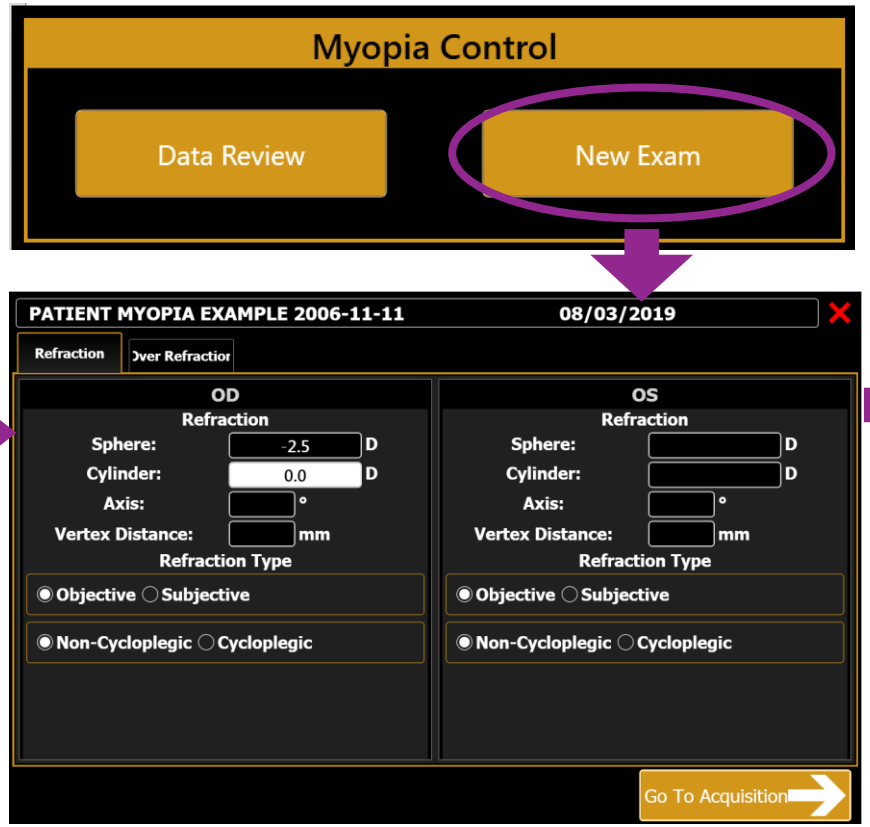
Follow Up

TOPCON Healthcare Solutions

ALADDIN Myopia Module

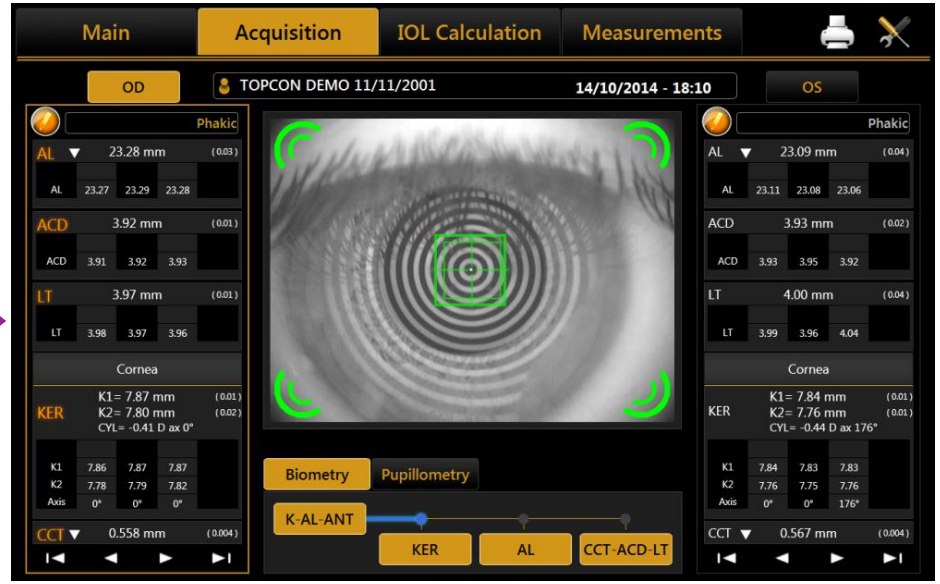
Acquisition Flow

Subjective/Objective Refraction



Refraction data input

(handles also Over Refraction in case of Ortho-K treatment)

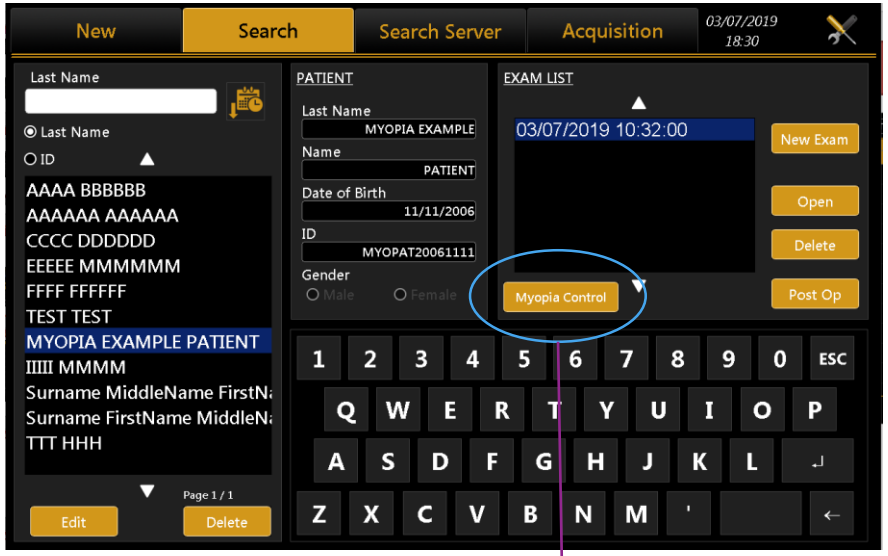


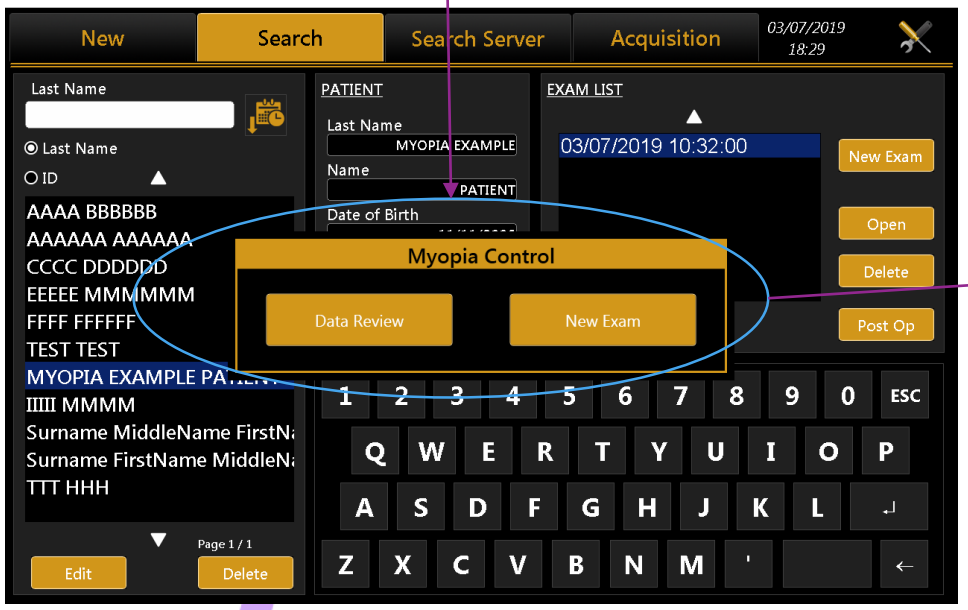
Topography+Biometry acquisition

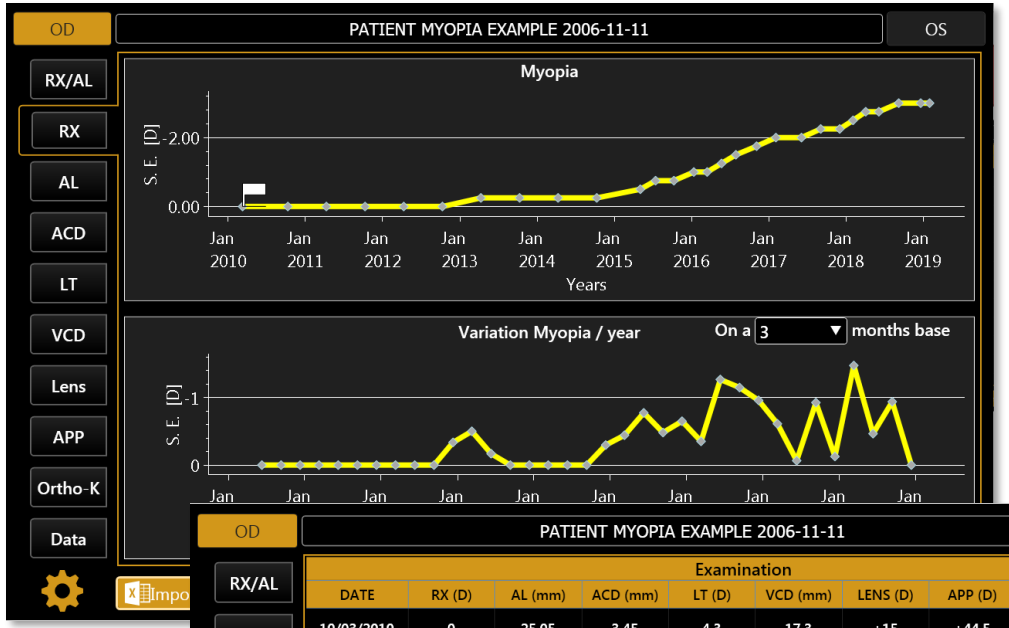
TOPCON Healthcare Solutions

ALADDIN Myopia Module

Data Review





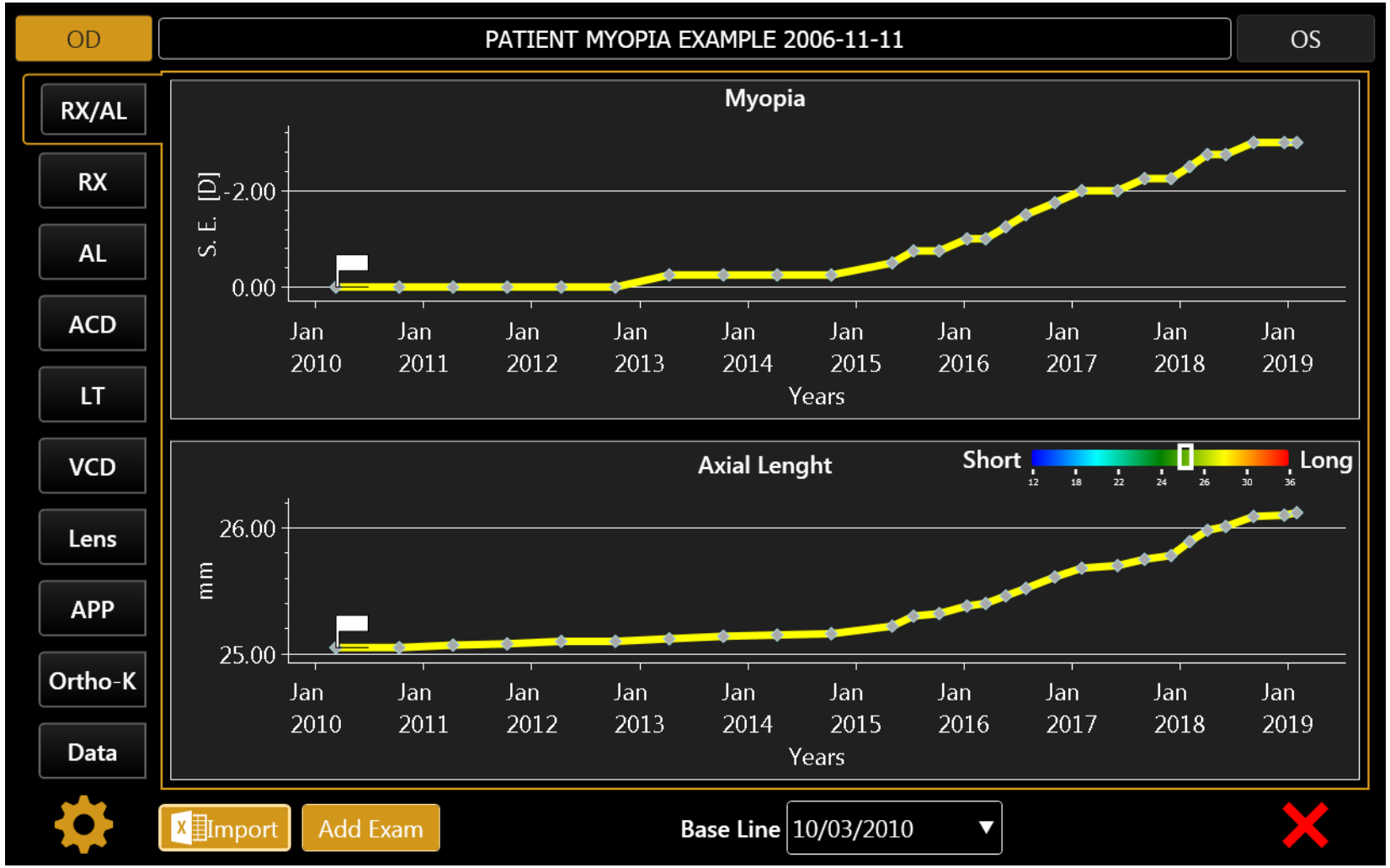


TOPCON Healthcare Solutions

ALADDIN Myopia Module

Refraction and Axial Length Trends

Review absolute trends by date or by patient age

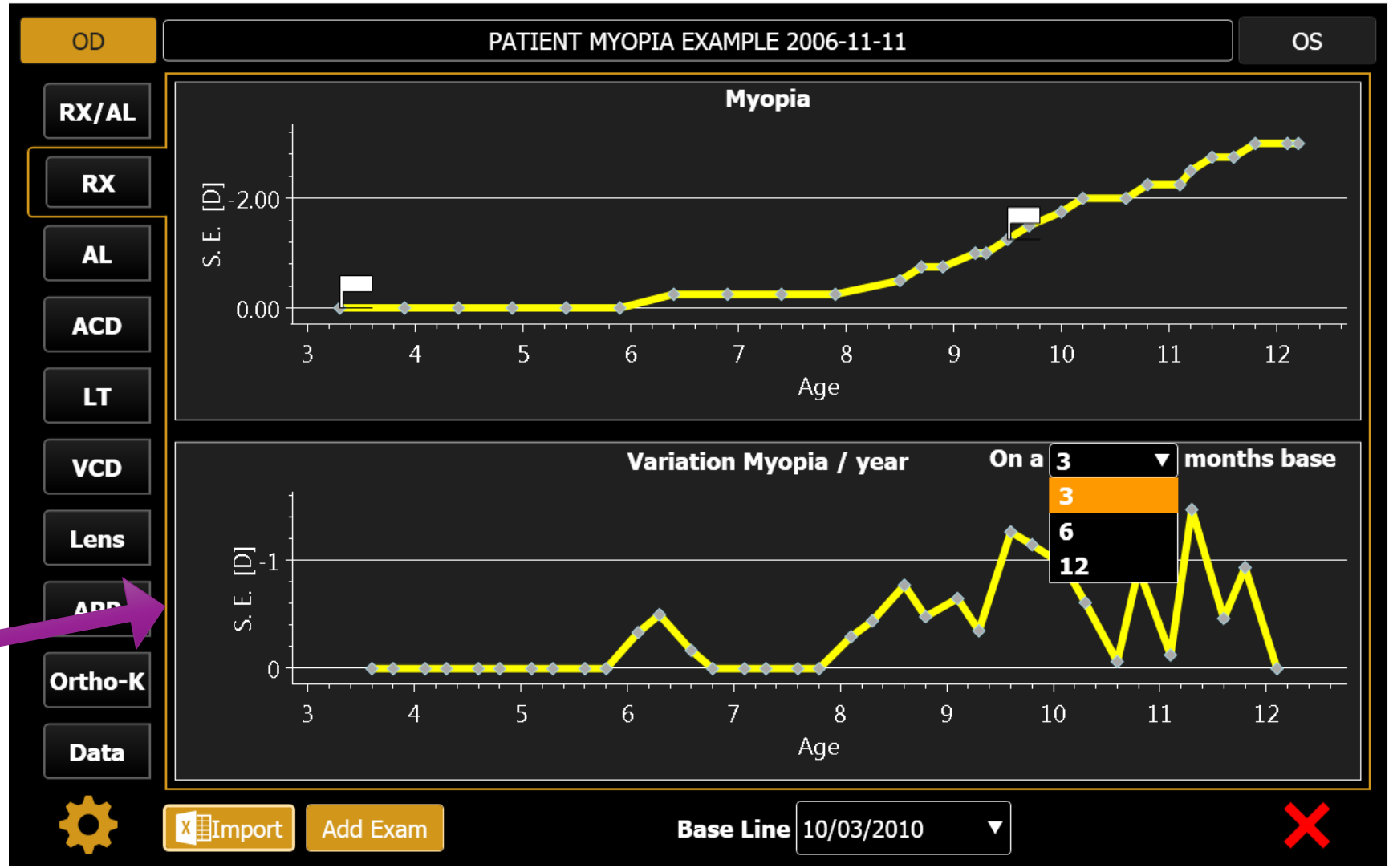


Refractive Error progression

Refraction S.E.

Review absolute trend together with yearly growth calculated on a 3/6/12 months basis

Time-wise yearly variation

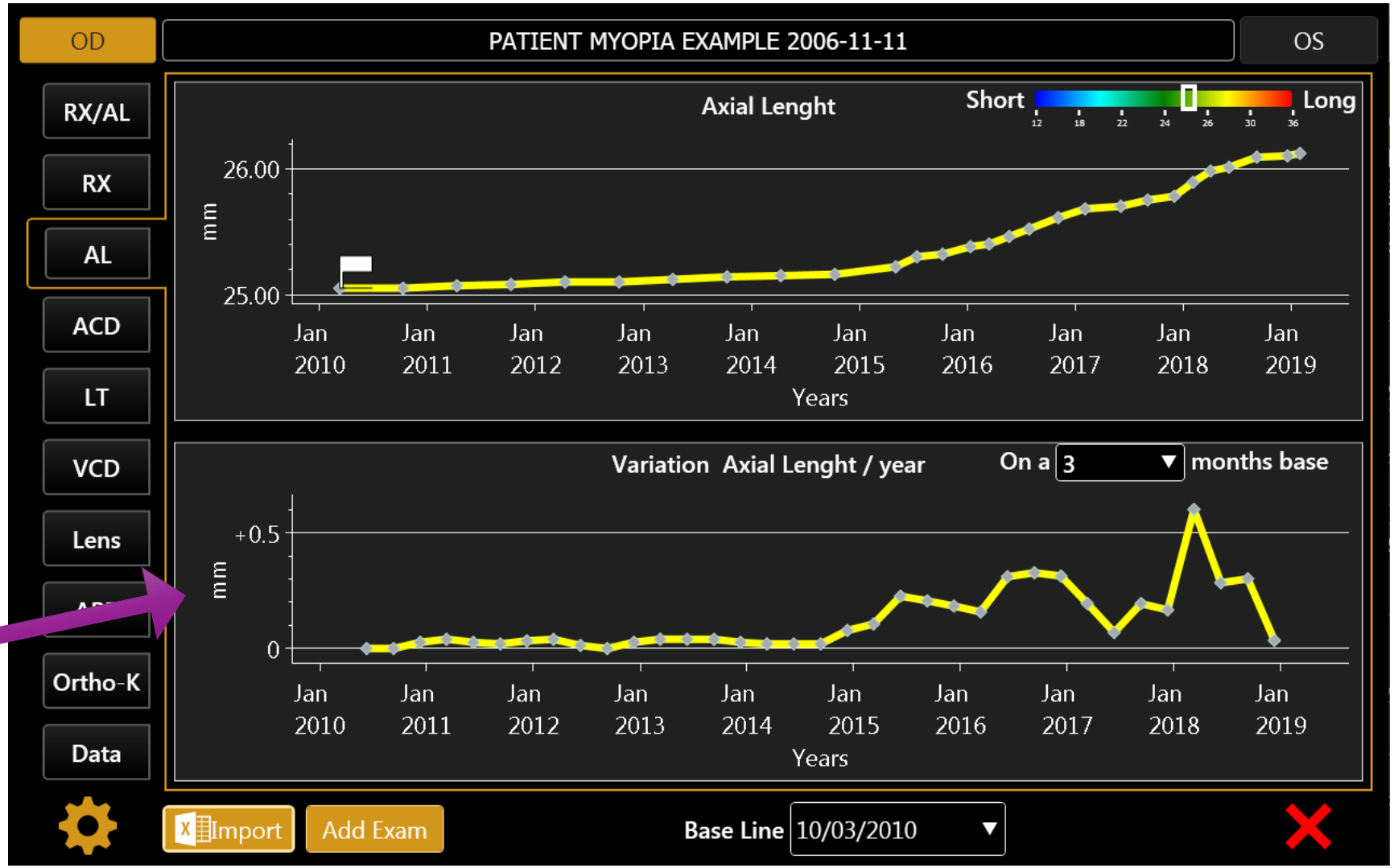


Axial Length progression

Axial Length

Review absolute trend together with yearly growth calculated on a 3/6/12 months basis

Time-wise yearly variation



TOPCON Healthcare Solutions

ALADDIN Myopia Module

Axial Sections yearly progression

ACD

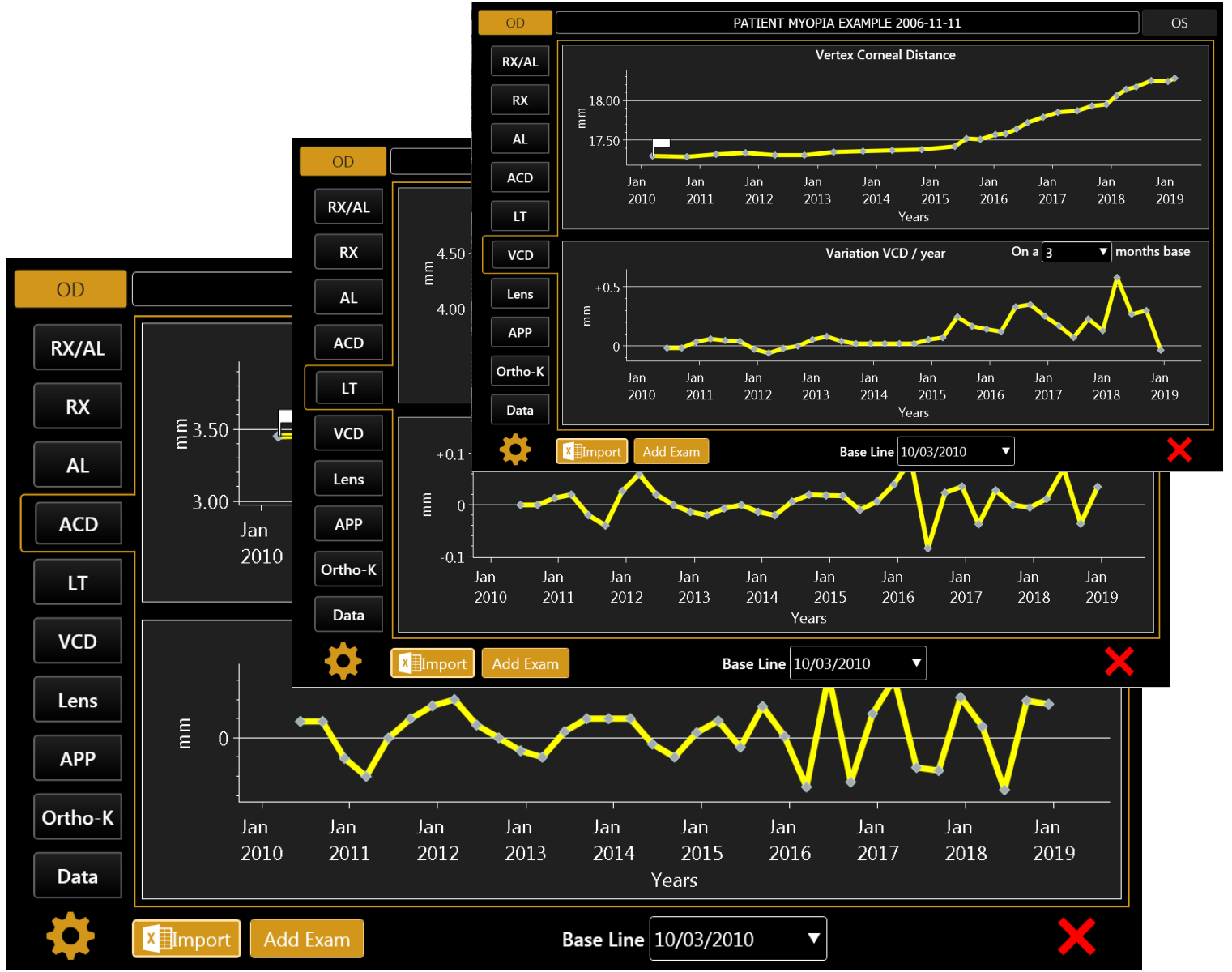
LT

VCD

Axial sections decomposed

Absolute trends over Time-wise yearly variations

Push forward your knowledge on Myopia progression



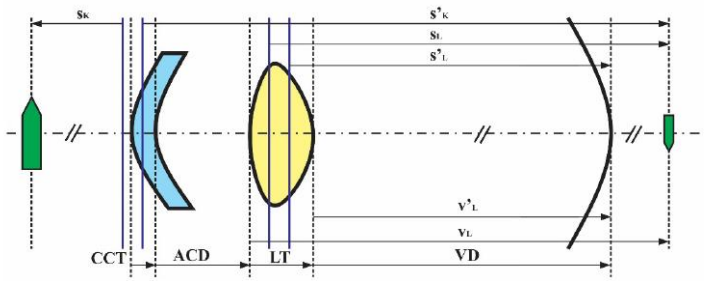
TOPCON Healthcare Solutions

ALADDIN Myopia Module

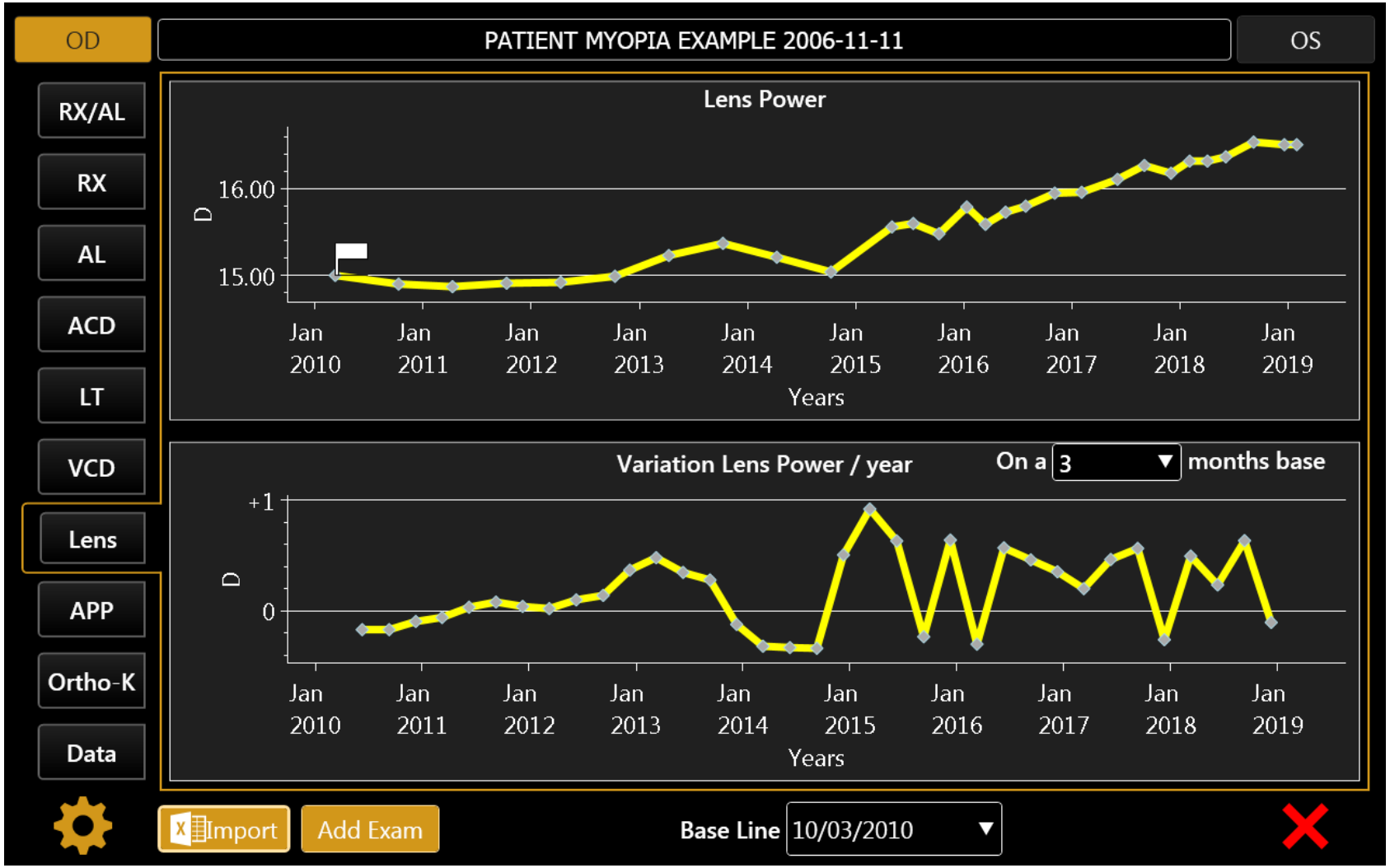
Lens Power progression

Lens Power variations

Observe variations of crystalline lens power over time



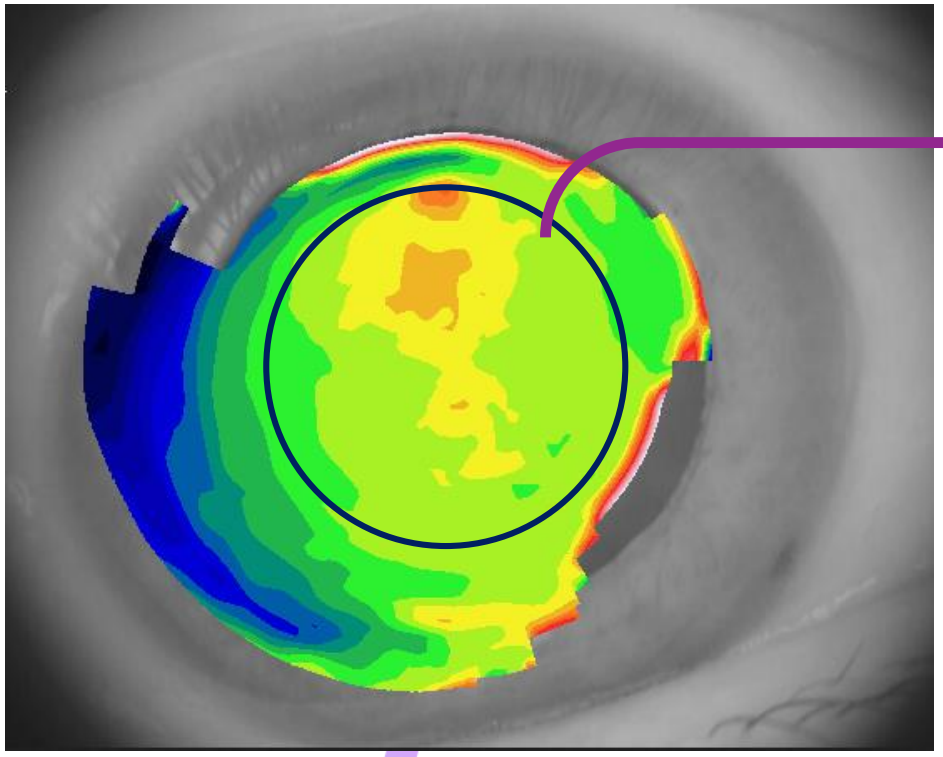
BENNET Formula

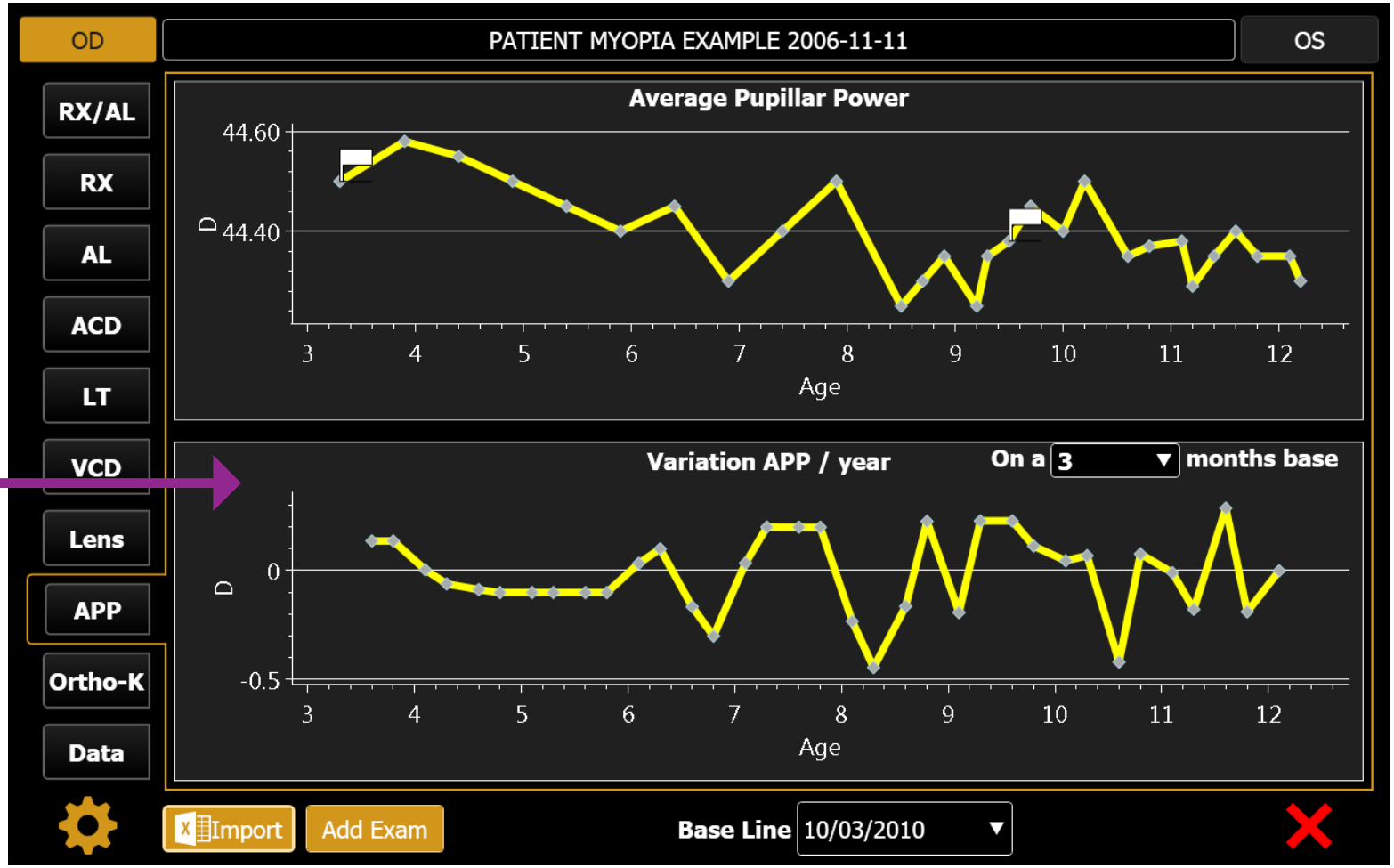


Average Pupillar power progression

A.P.P.

Average Pupillar Power





TOPCON Healthcare Solutions

ALADDIN Myopia Module

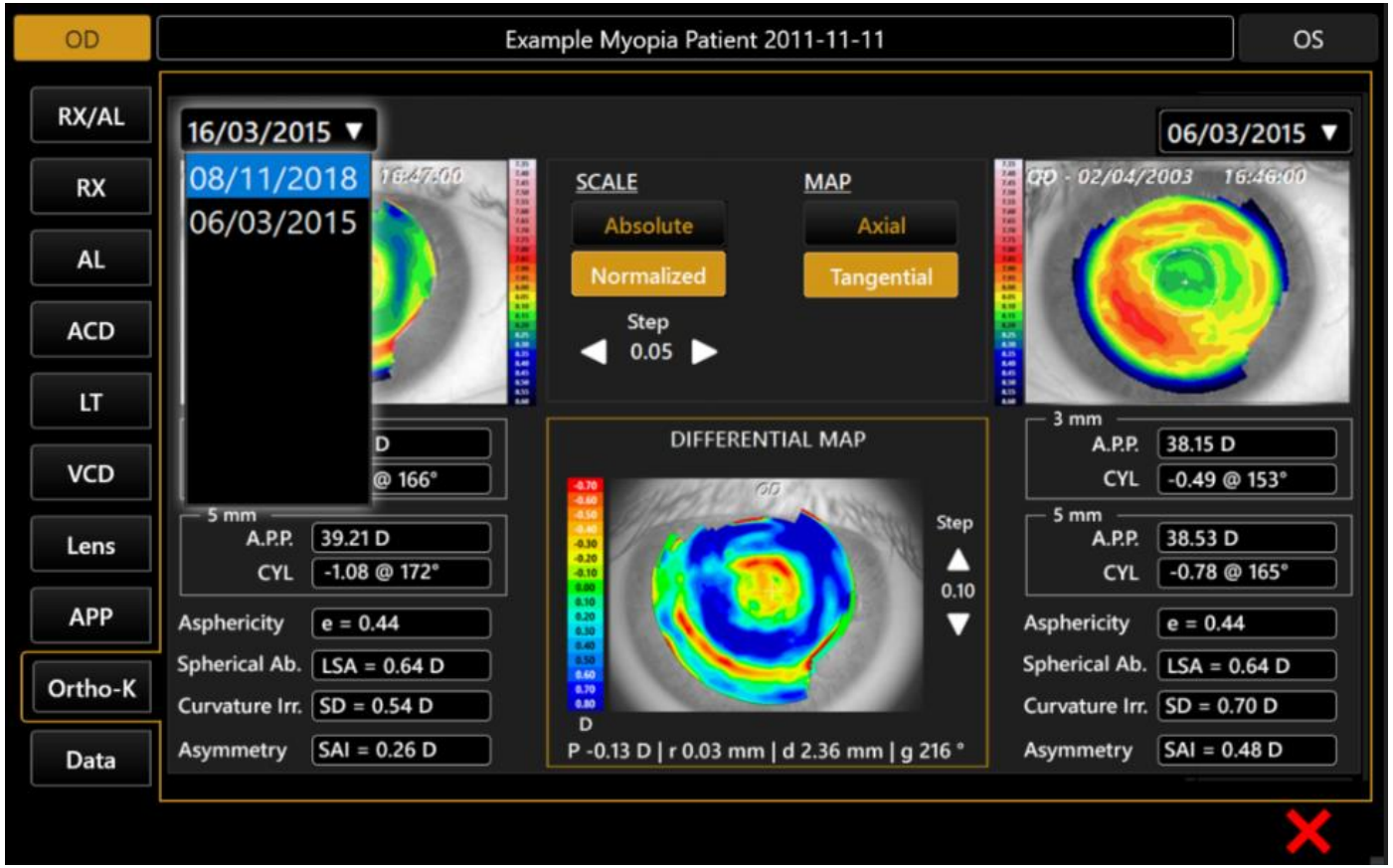
Ortho-K treatment Follow Up

Combine
Myopia Progression Follow Up
with
Orthokeratology Treatment
control

- Corneal Topography Overview

- Keratorefractive Indexes
  - Average Pupillar Power
  - Aspheriticity
  - Spherical Aberration
  - Asymmetry
  - Curvature Irregularity

- Differential Map

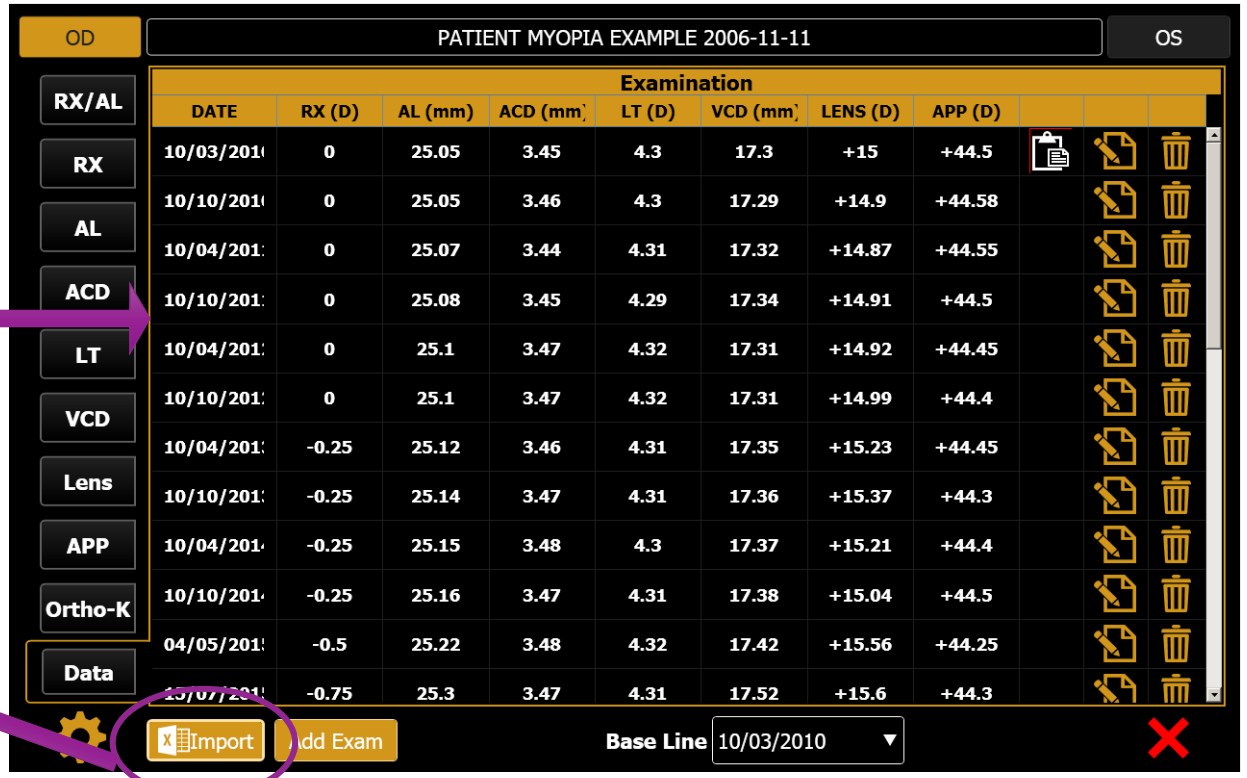


TOPCON Healthcare Solutions

ALADDIN Myopia Module

Import Data

	A	B	C	D	E	F	G	H	I
1	Date	Rx	AL	ACD	LT	VCD	Lens	APP	Note
2	10/03/10	0.00	25.05	3.45	4.30	17.30	15.00	44.50	
3	10/10/10	0.00	25.05	3.46	4.30	17.29	14.90	44.58	
4	10/04/11	0.00	25.07	3.44	4.31	17.32	14.87	44.55	
5	10/10/11	0.00	25.08	3.45	4.29	17.34	14.91	44.50	
6	10/04/12	0.00	25.10	3.47	4.32	17.31	14.92	44.45	
7	10/10/12	0.00	25.10	3.47	4.32	17.31	14.99	44.40	
8	10/04/13	-0.25	25.12	3.46	4.31	17.35	15.23	44.45	
9	10/10/13	-0.25	25.14	3.47	4.31	17.36	15.37	44.30	
10	10/04/14	-0.25	25.15	3.48	4.30	17.37	15.21	44.40	
11	10/10/14	-0.25	25.16	3.47	4.31	17.38	15.04	44.50	
12	04/05/15	-0.50	25.22	3.48	4.32	17.42	15.56	44.25	Start Atropine 0.01%
13	15/07/15	-0.75	25.30	3.47	4.31	17.52	15.60	44.30	
14	10/10/15	-0.75	25.32	3.49	4.32	17.51	15.48	44.35	
15	12/01/16	-1.00	25.38	3.48	4.33	17.57	15.79	44.25	Stop Atropine
16	15/03/16	-1.00	25.40	3.47	4.35	17.58	15.59	44.35	
17	22/05/16	-1.25	25.46	3.49	4.33	17.64	15.73	44.38	
18	29/07/16	-1.50	25.52	3.48	4.32	17.72	15.80	44.45	Start Orthokeratology
19	04/11/16	-1.75	25.61	3.47	4.35	17.79	15.95	44.40	



Import any pre-existing history into the Aladdin Myopia Module using a simple format

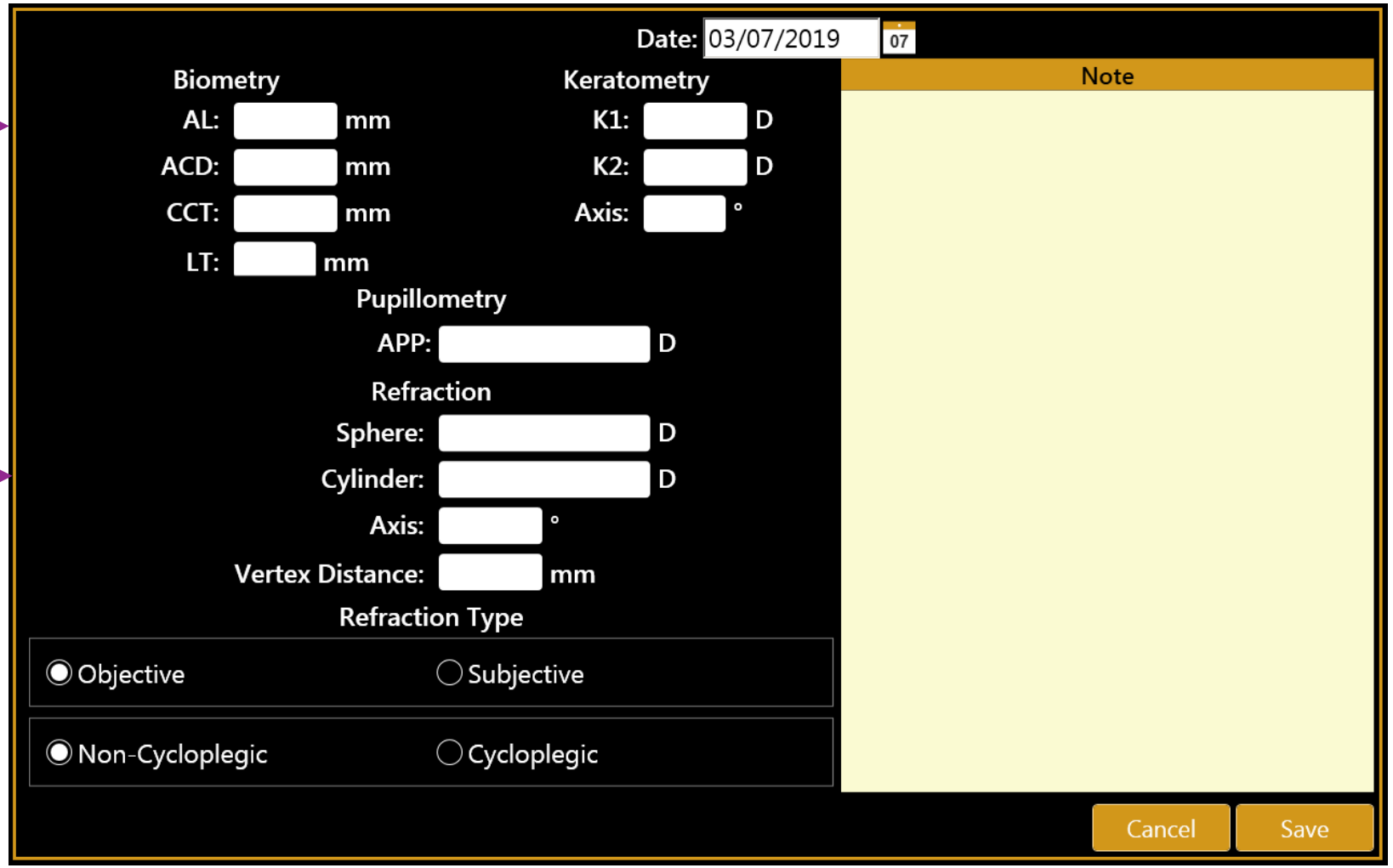
TOPCON Healthcare Solutions

ALADDIN Myopia Module

Manage Data

- Add New Data Manually

- Edit/Delete Existing Data



Progression Baseline

Change Baseline for the progression trends to a custom date during the follow Up

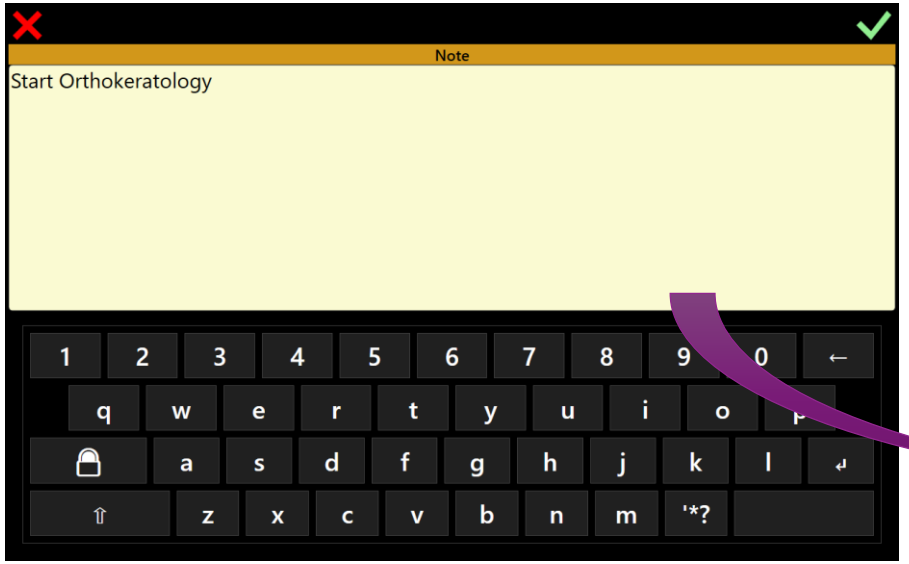
TOPCON Healthcare Solutions

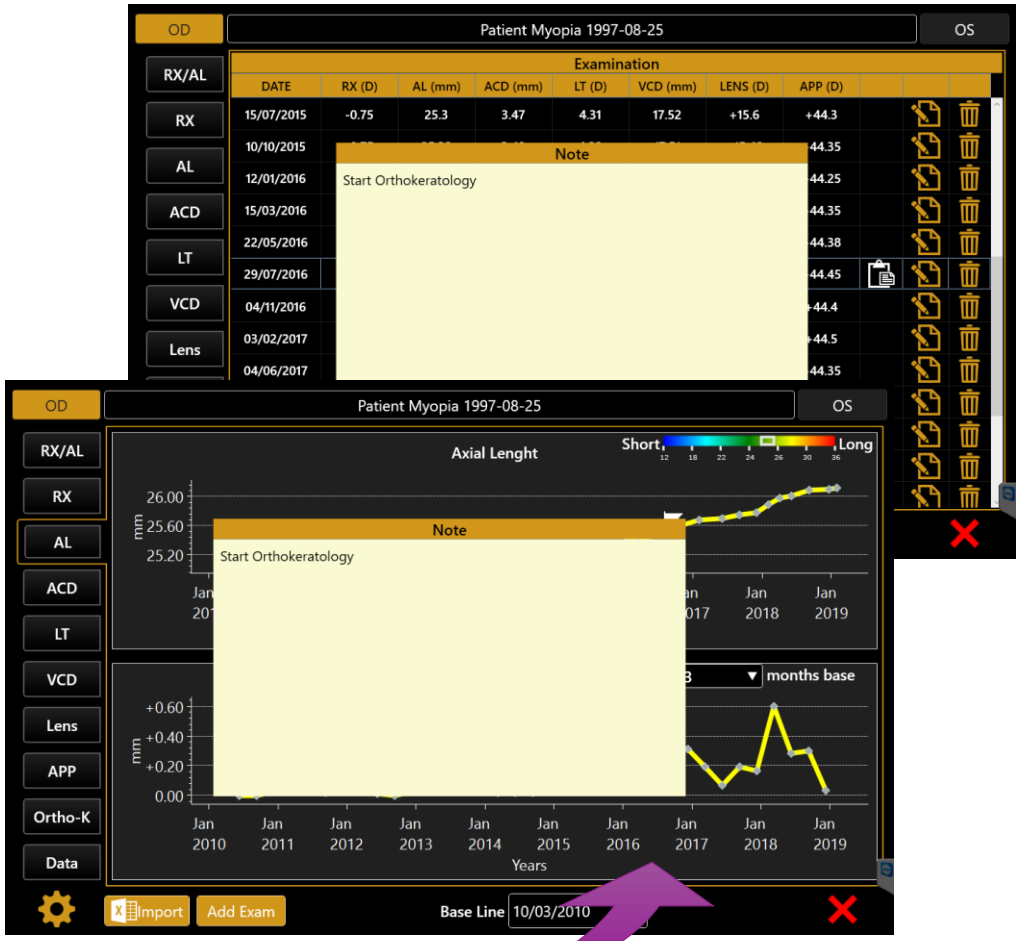
ALADDIN Myopia Module

Decision tracking support

Add Custom Notes in correspondence of Dates

Review them on the trends charts





Report

Export Myopia Module Follow Up

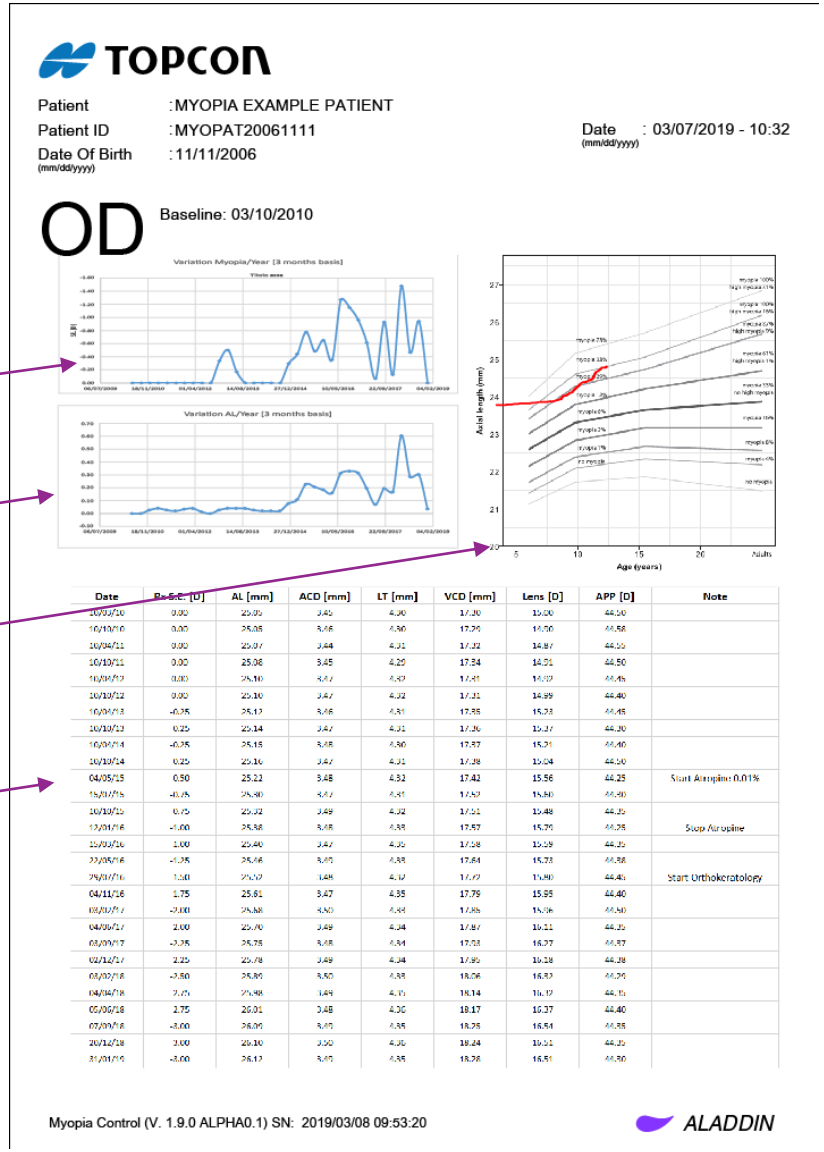
Show effectiveness of the treatment

Myopia yearly variation

Axial Length yearly variation

Axial length trend over Myopia risk map

Data with Annotations


TOPCON

Patient :MYOPIA EXAMPLE PATIENT
Patient ID :MYOPAT20061111
Date Of Birth (mm/dd/yyyy) :11/11/2006
Date (mm/dd/yyyy) : 03/07/2019 - 10:32

OD Baseline: 03/10/2010

Variation Myopia/Year [3 months basis]

Variation AL/Year [3 months basis]

Axial length (mm)

Age (years)

Date	Ref. S.E. [D]	AL [mm]	ACD [mm]	LT [mm]	VCD [mm]	Lens [D]	APP [D]	Note
10/03/10	0.00	25.05	3.45	4.30	17.30	15.00	44.50	
10/10/10	0.00	25.06	3.46	4.30	17.30	14.98	44.58	
10/04/11	0.00	25.07	3.44	4.31	17.32	14.87	44.55	
10/10/11	0.00	25.08	3.45	4.29	17.34	14.91	44.50	
10/04/12	0.00	25.10	3.47	4.29	17.31	14.91	44.45	
10/10/12	0.00	25.10	3.47	4.32	17.31	14.89	44.40	
10/04/13	-0.25	25.12	3.46	4.31	17.35	15.03	44.45	
10/10/13	0.25	25.14	3.47	4.31	17.36	15.17	44.30	
10/04/14	-0.25	25.15	3.48	4.30	17.37	15.21	44.40	
10/10/14	0.25	25.16	3.47	4.31	17.38	15.04	44.50	
04/05/15	0.50	25.22	3.48	4.32	17.42	15.56	44.25	Start Atropine 0.01%
15/03/15	-0.25	25.30	3.47	4.31	17.53	15.80	44.30	
10/10/15	0.75	25.32	3.49	4.32	17.51	15.48	44.35	
12/04/16	-1.00	25.58	3.48	4.38	17.57	15.75	44.25	Stop Atropine
10/03/16	1.00	25.40	3.47	4.35	17.58	15.59	44.35	
27/05/16	-1.25	25.48	3.45	4.38	17.64	15.73	44.38	
29/07/16	1.50	25.57	3.48	4.40	17.72	15.80	44.45	Start Orthokeratology
04/11/16	1.75	25.61	3.47	4.35	17.79	15.95	44.40	
08/03/17	-2.00	25.68	3.50	4.44	17.86	15.96	44.40	
04/06/17	2.00	25.70	3.49	4.34	17.87	16.11	44.35	
08/09/17	-2.25	25.75	3.48	4.34	17.93	16.07	44.37	
02/12/17	2.25	25.78	3.49	4.34	17.95	16.28	44.38	
08/02/18	-2.50	25.86	3.50	4.38	18.06	16.33	44.36	
04/06/18	2.75	25.98	3.49	4.35	18.14	16.37	44.35	
05/06/18	2.75	26.01	3.48	4.30	18.17	16.37	44.40	
07/09/18	-3.00	26.06	3.47	4.35	18.25	16.54	44.35	
20/12/18	3.00	26.10	3.50	4.36	18.24	16.51	44.35	
31/01/19	-3.00	26.12	3.47	4.35	18.28	16.51	44.30	

Myopia Control (V. 1.9.0 ALPHA0.1) SN: 2019/03/08 09:53:20

ALADDIN

TOPCON Healthcare Solutions

ALADDIN Myopia Module

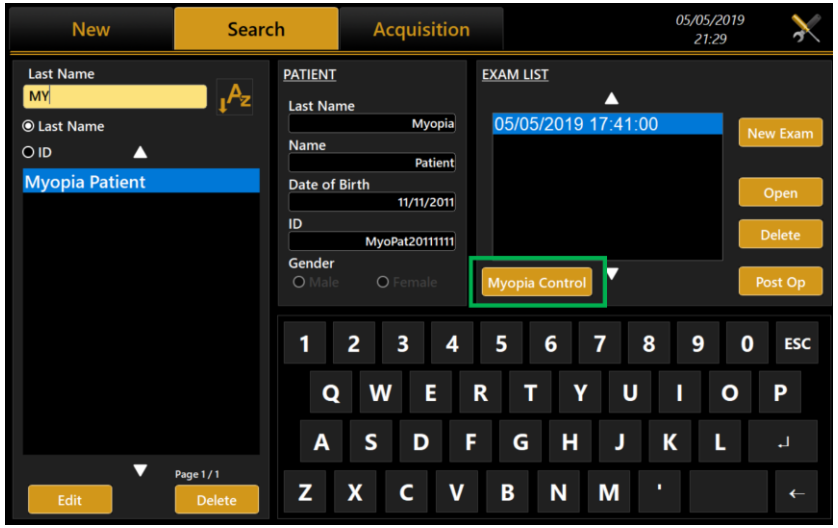
Conclusions

- **Myopia monitoring is important**
- **The use of a biometer is required as a screening device**
- **The use of a corneal topographer is recommended for ortho-k treatment**
- **The Aladdin represent the ideal device to support myopia monitoring**

TOPCON Healthcare Solutions

Availability

- **The Myopia Module will be available for every Aladdin HW3.0 with Software Upgrade to version 1.9.0**
- **The MM entry point button in the patient list will be available if the Myopia Module is enabled from the settings. There will be a checkbox for enable/disable in the Settings**



TOPCON Healthcare Solutions

Thank you!

TOPCON
Healthcare Solutions