

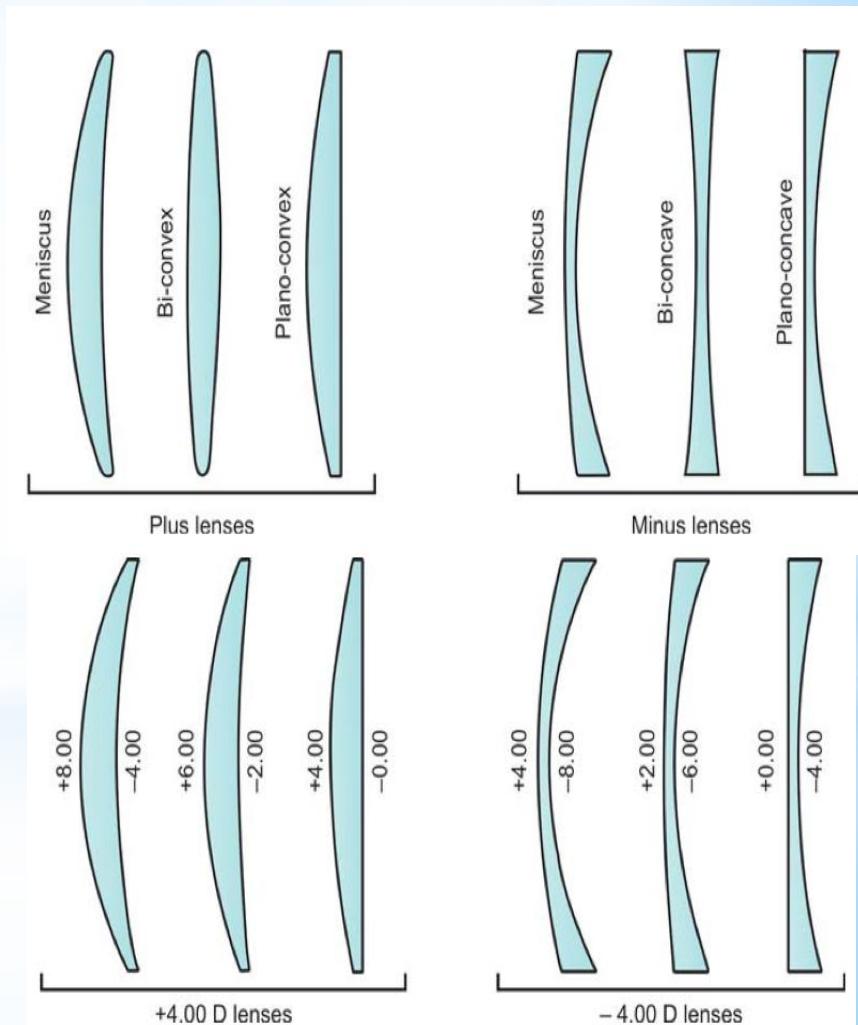
\* New technology in  
eyeglasses and  
contact lenses

ผศ.นพ.วิชัย ลีละวงศ์เทวัญ

# \*Eyeglasses

## Lens profile/form

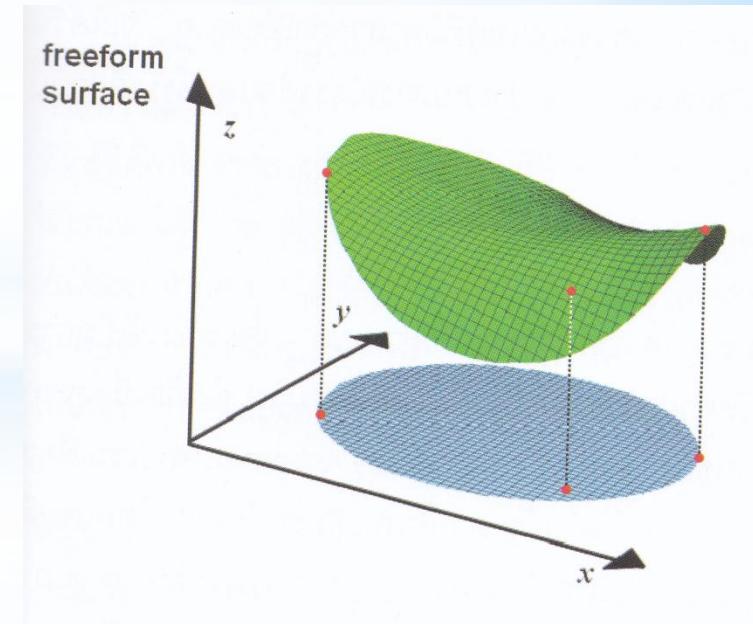
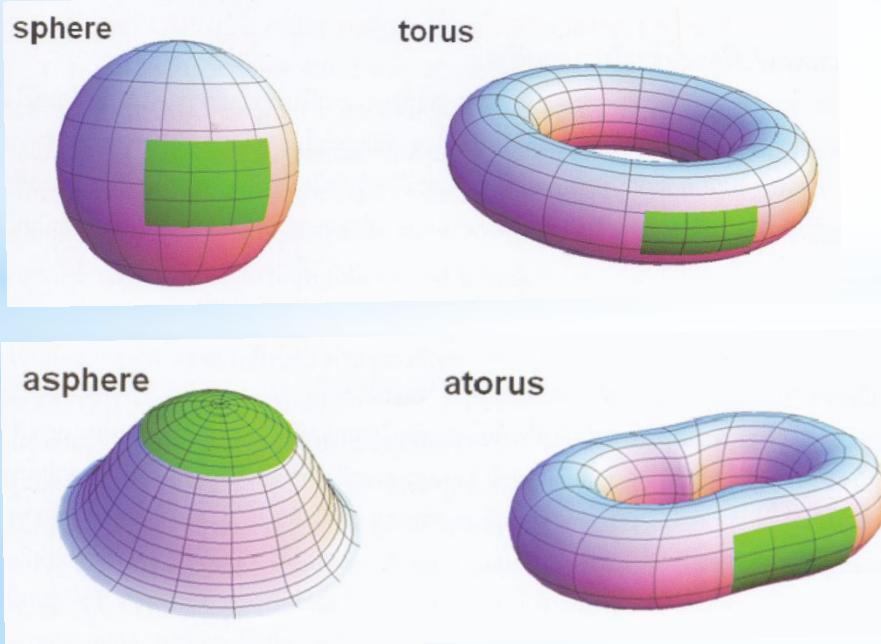
- Semi-finished lens blank
- Most common: convex-concave profile
- $P = \text{Front surface power} + \text{Back surface power}$
- Base curve: Front surface curve



# \*Eyeglasses

## Freeform Technology

- Digital surface designed
- Individual or customized lenses
- Include: single vision, progressive addition lenses, near use, anti-fatigue lenses, computer lenses



# \*Eyeglasses

## Advantage of Freeform Technology

- Compensated distort vision
- Improved visual field
- Improved optics
- Patient friendly

## Available lenses

- Hoyalux ID (HOYA)
- Varilux Physio Enhanced (Essilor)
- Zeiss Individual (Carl Zeiss Vision)
- The Kodak Unique (Signet Armortite)
- iZon Progressive (Ophthonix)
- Shamir Autograph II (Shamir)
- Multigressiv MyView (Rodenstock)

# \*Eyeglasses

## Types of freeform PALs

- Front surface PALs
- Double surface PALs
- Back surface PALs

## Types of PALs

- Standard calculation PALs
- Power optimized PALs
- Fully individual PALs



# \*Eyeglasses

## Standard calculation PALs

- General standard design mold
- Standard parameter of spectacles
- Mean/standard base curve of lenses for power range -> base curve effect in extra power range -> unwanted oblique astigmatism

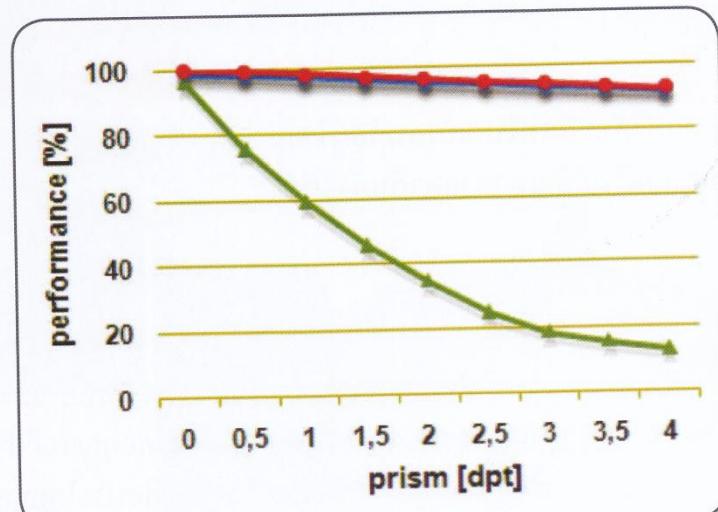
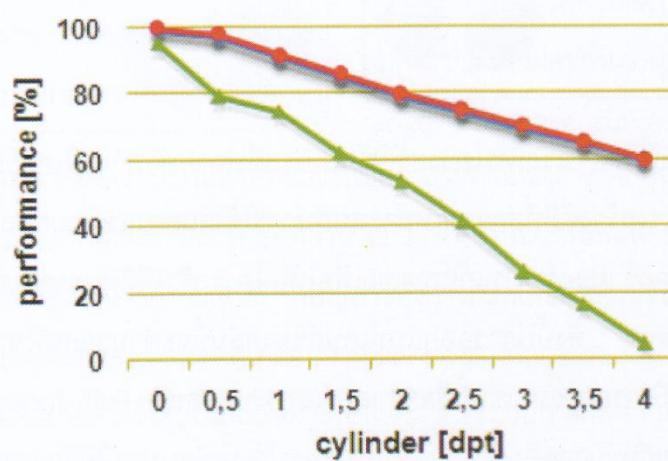
## Power optimized PALs

- Computerized design
- Good quality lenses structure for power range
- Calculation only power, PD, PH, no spectacles parameter involved

## Fully individual PALs

- Computerized design
- Calculation included power, PD, PH, and spectacles parameter

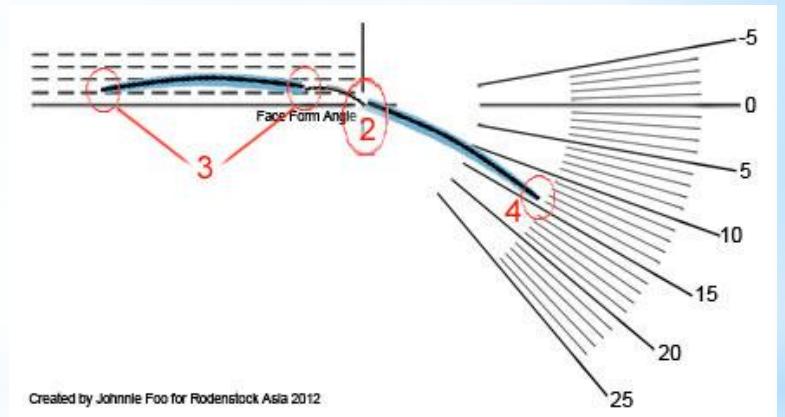
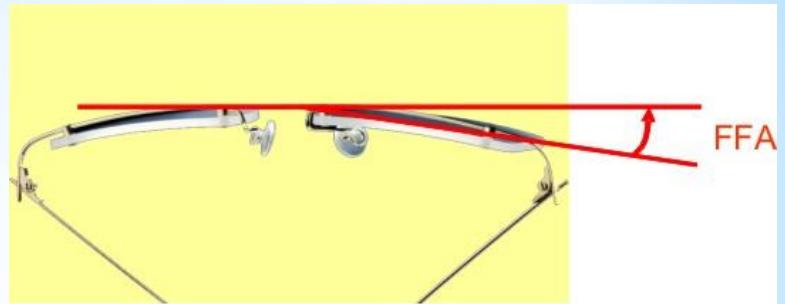
# \*Eyeglasses



# \*Eyeglasses

## Spectacles parameter

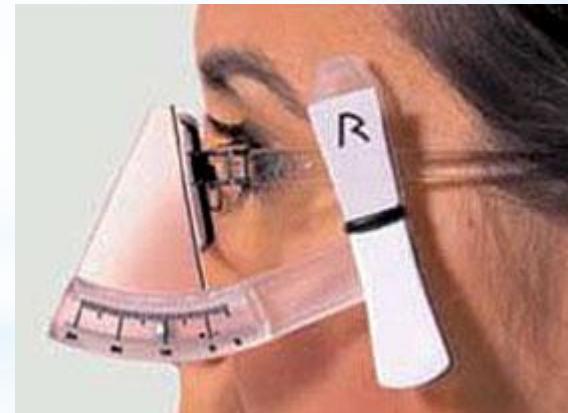
- Face form angle: 5-10 degree
- Pantoscopic tilt: 7-12 degree
- Vertex distance: 11-15 mm.



# \*Eyeglasses

## Spectacles parameter

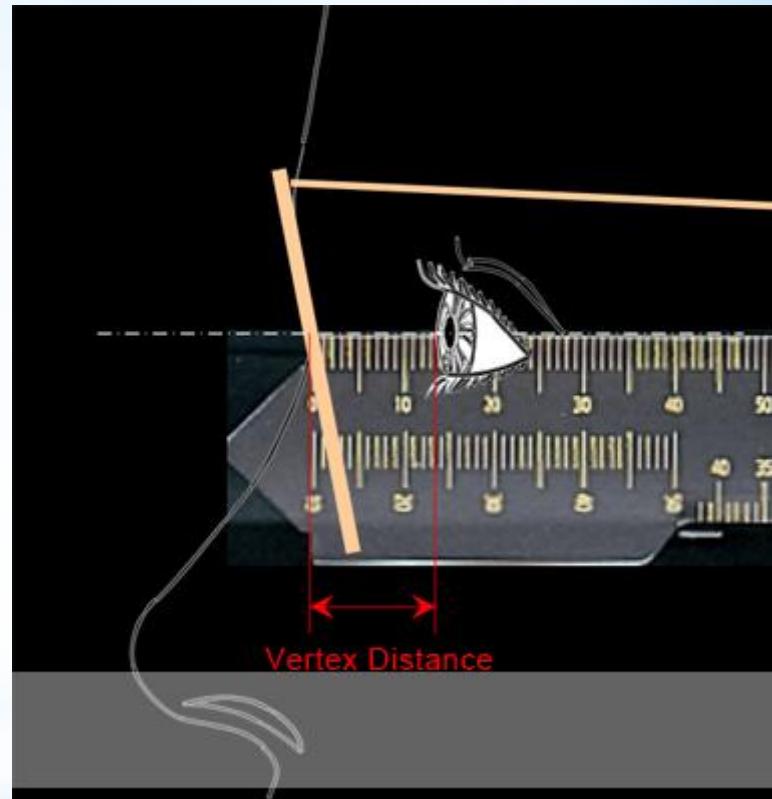
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# \*Eyeglasses

## Spectacles parameter

- Face form angle: 5-10 degree
- Pantoscopic tilt: 7-12 degree
- **Vertex distance: 11-15 mm.**



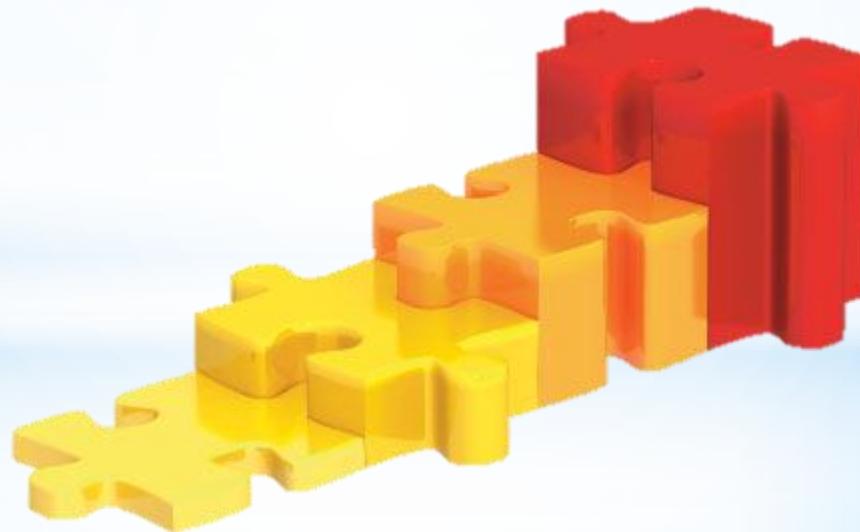
# \*Contact lenses

Development of soft contact lenses hydrogels

1960: first polyhydroxyethyl methacrylate (pHEMA/HEMA) as soft C/L material

1971: first main stream hydrogels C/L

1999: first silicone hydrogels



# \*Contact lenses

Why silicone hydrogels?

Advantage

- Increase O<sub>2</sub> transmissibility ( $Dk/t$ ; D= O<sub>2</sub> diffusivity, k= O<sub>2</sub> solubility, t= lens thickness)
- Less dehydration

Disadvantage

- Hydrophobic: correct by manipulated lens surface or structure to be hydrophilic
- Stiffness (high modulus)
- Costly

# \*Contact lenses

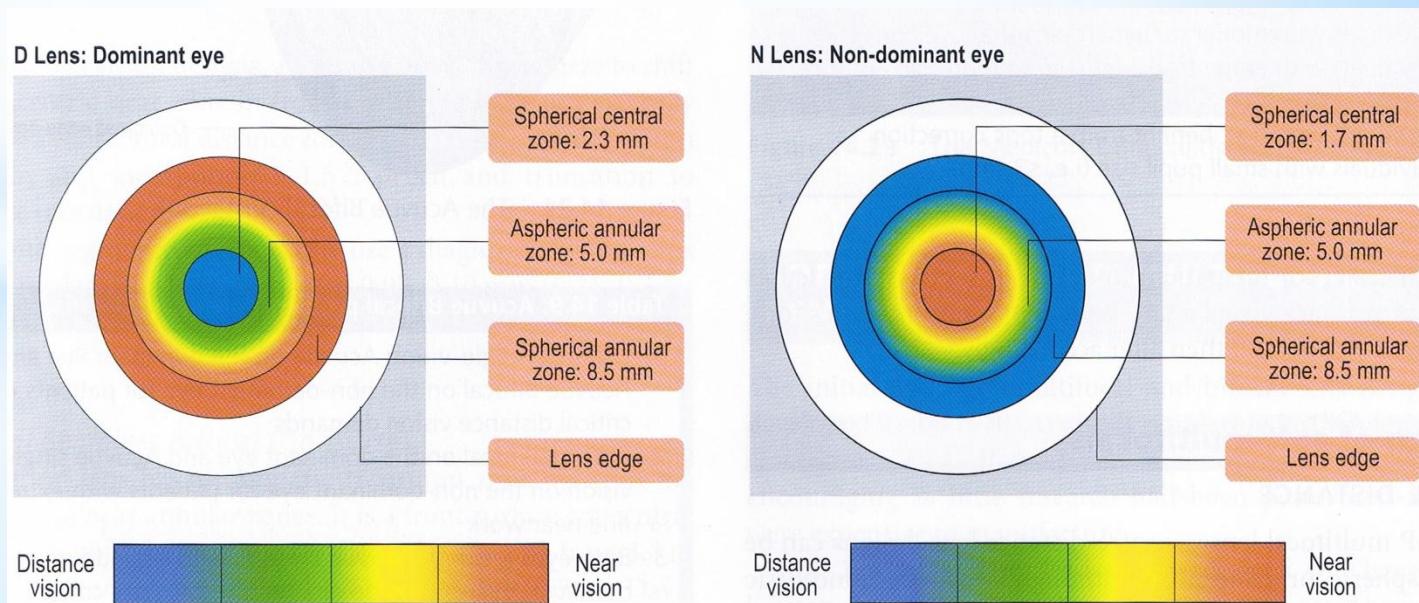
Proprietary name	PureVision	Focus Night & Day	Acuvue Advance	Maxim soft 1 day (Clariti)
Material	Balafilcon A	Lotrafilcon A	Galyfilcon A	Filcon II 3
Manufacturer	Bausch & Lomb	CIBA Vision	Vistakon	Cooper vision
Centre thickness (@ -3.00 D mm)	0.09	0.08	0.07	0.07
Water Content	38%	24%	47%	56%
Oxygen permeability ( $\times 10^{-11}$ Dk)	99	140	60	-
Oxygen transmissibility ( $\times 10^{-9}$ Dk/t)	110	175	86	86
Modulus (psi)	148	238	65	73
Surface treatment	Plasma oxidation, producing glassy islands	25 nm plasma coating with high refractive index	No	No

# \*Contact lenses

## Multifocal contact lens

Principles (Proclear Multifocal/Frequency 55 multifocal)

- Presbyope
- Simultaneous vision C/L
- Spherical and aspherical design lens
- Modified monovision: dominant eye and non-dominant eye
- D lens/distance lens for dominant eye, N lens/near lens for non-dominant eye

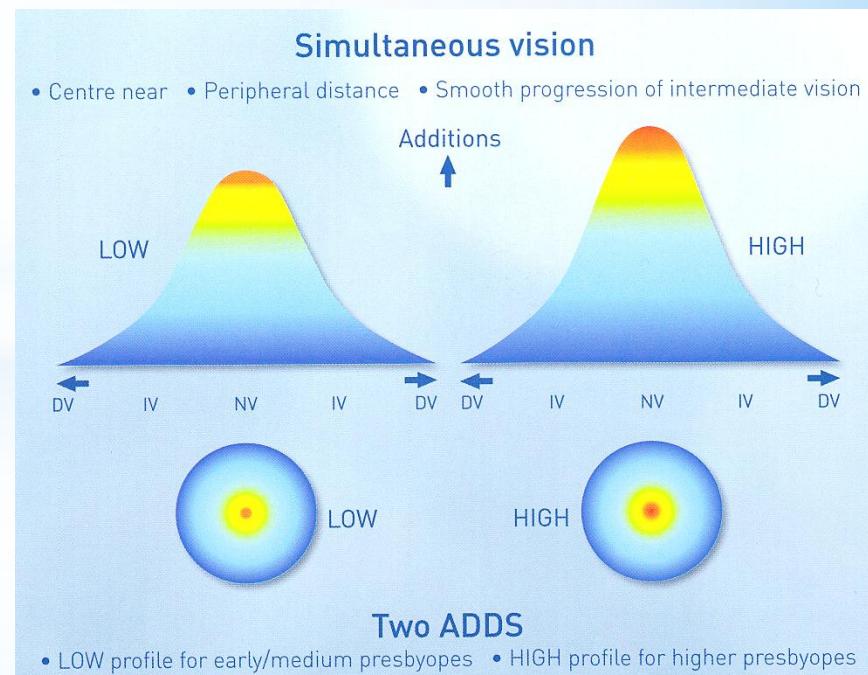


# \*Contact lenses

## Multifocal contact lens

Principles (Maxim soft 1 day multifocal/clariti 1day multifocal)

- Presbyope
- Simultaneous vision C/L
- Aspherical design lens
- Modified monovision: dominant eye and non-dominant eye
- Center near, peripheral distance
- Low add and high add profile



# \*Contact lenses

Patient	Eye Dominance	Spectacles ADD +0.75 to +1.75	Spectacles ADD +2.00 to +2.25	Spectacles ADD +2.50 and over
Hyperopes	Dominant Eye	Best Sphere Add low	Best sphere +0.25 Add low	Best sphere +0.25 Add low
	Non dominant Eye	Best sphere +0.25 Add low	Best sphere +0.50 Add low	Best sphere +0.25 Add high
Myopes Emmetropes	Dominant Eye	Best Sphere Add low	Best Sphere Add low	Best Sphere +0.25 Add low
	Non dominant Eye	Best Sphere Add low	Best Sphere +0.50 Add low	Best Sphere +0.25 Add high

# \*Contact lenses

Proprietary name	Frequency 55 multifocal	Proclear Multifocal	Maxim soft 1 day multifocal (Clariti)
Material	Methafilcon A	Omafilcon A	Filcon II 3 (silicon hydrogel)
Manufacturer	Cooper vision	Cooper vision	Cooper vision
Centre thickness (@ -3.00 D) mm	0.16	0.16	0.07
Water Content	55%	62%	56%
Oxygen transmissibility ( $\times 10^{-9}$ ) (Dk/t)	15	21	86
Modulus (psi)	-	-	73
Lens design	D lens: center distance, peripheral near N lens: center near, peripheral distance		center near, peripheral distance Low add and high add profile

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