

Challenging cases that may walk into your office tomorrow

Presbyopia and Contact Lenses

Raphael L. Eschmann¹⁾, M.S., MC Optom., F.A.A.O.

Visiting Associate Professor at PCO

¹⁾ Contact Lens Institute, Berne, Switzerland

Presbyopia and contact lenses

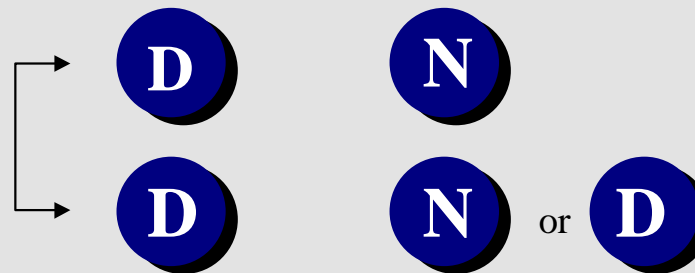
An increasing number of patients is interested in bifocal contact lenses. To be successful in fitting this kind of contact lenses, it is important to pay close attention to the patient's needs and subjective report during the trial period.

Different principles and systems

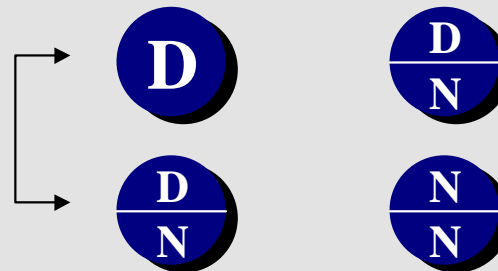
- **Monovision**
 - classic
 - modified
- **Alternating / translating systems**
 - segmented distance and near zones
 - concentric distance and near zones
- **Simultaneous systems**
 - concentric bifocal
 - aspheric multifocal (most popular)
 - concentric aspheric
 - circle toric aspheric
 - aplanatic aspheric
 - diffractive bifocal

Monovision

↓ **Classic monovision** -
we understand a
factual anisometropia:



↓ **Modified monovision**
can be several things:



Principle of classic and modified monovision

Monovision

Monovision (factual anisometropia)

- **Classic Monovision**
 - Dominating eye D
 - Non dominating eye N
- **Modified Monovision (enhanced)**
 - Dominating eye D or multifocal D/N
 - Non dominating eye D/N or N

Different principles and systems, b's and c's

- **Monovision**

benefits:

- clear distance and near vision
- no limitation for monofocal lenses
- easy to fit and good value

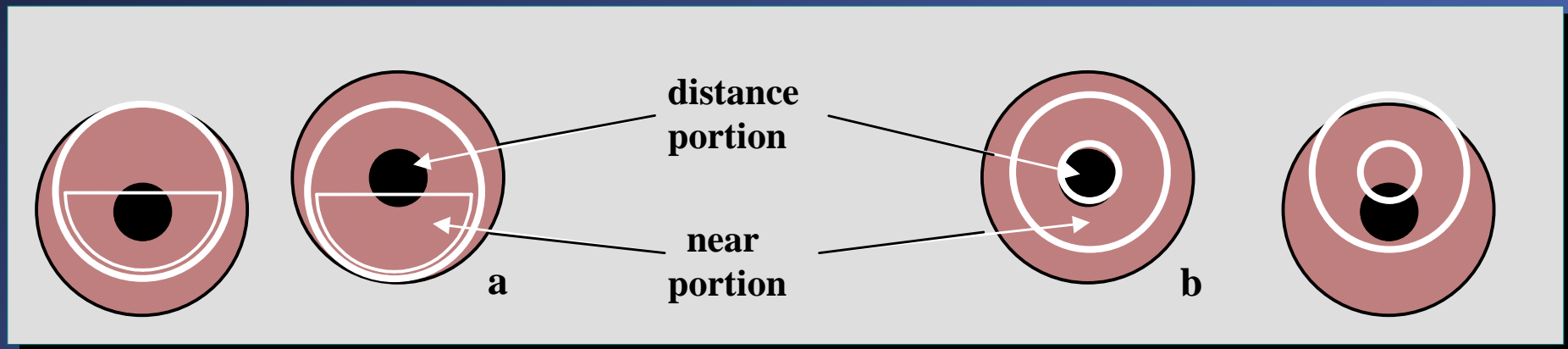
concerns:

- anisometropia
- asthenopic reactions
- weariness with longer time reading

Alternating / translating systems

- **Segmented distance and near zones**
- **Concentric distance and near zones**

Alternating / translating systems



a) with segmented distance / near portions

b) with concentric distance / near portions

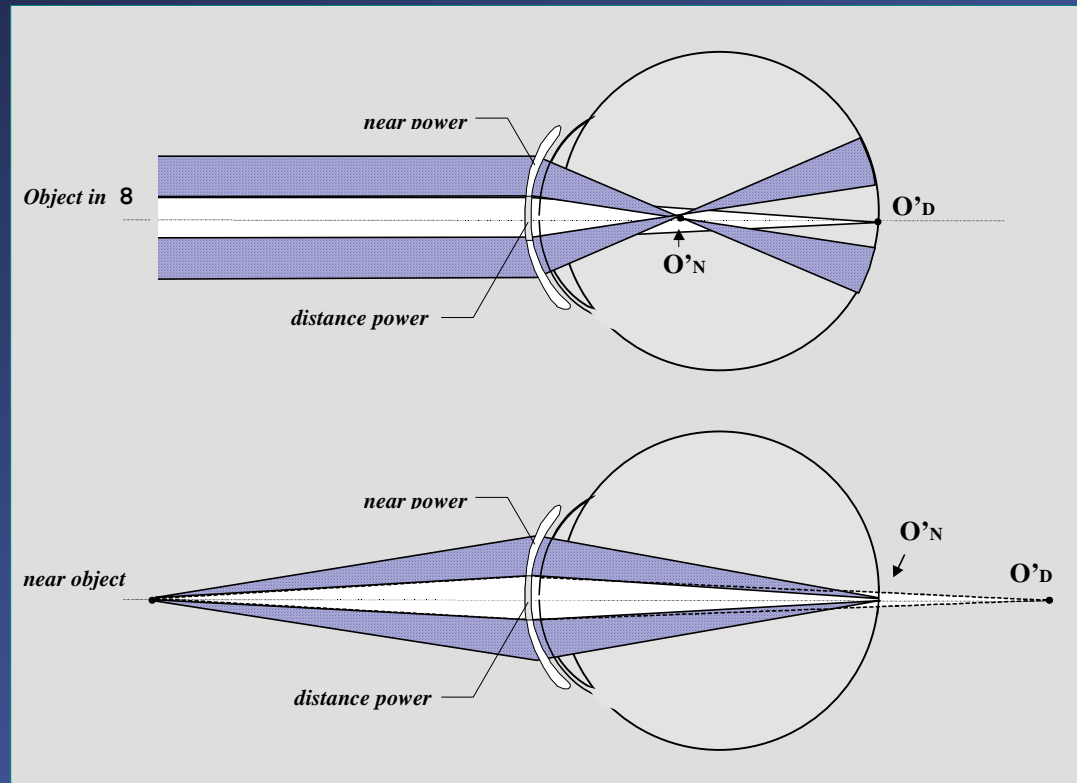
Different principles and systems, b's and c's

- **Alternating / translating systems (RGP CL)**
 - **Segmented distance and near zones**
 - benefits:**
 - large distance and near zones with good quality of picture
 - high add in small steps is possible
 - concerns:**
 - good stabilization depends on many factors
 - **Concentric distance and near zones**
 - benefits:**
 - independent of rotation
 - high add in small steps is possible
 - concerns:**
 - depending on size of pupil and depth of anterior chamber
 - centric and yet mobile fit required

Simultaneous systems

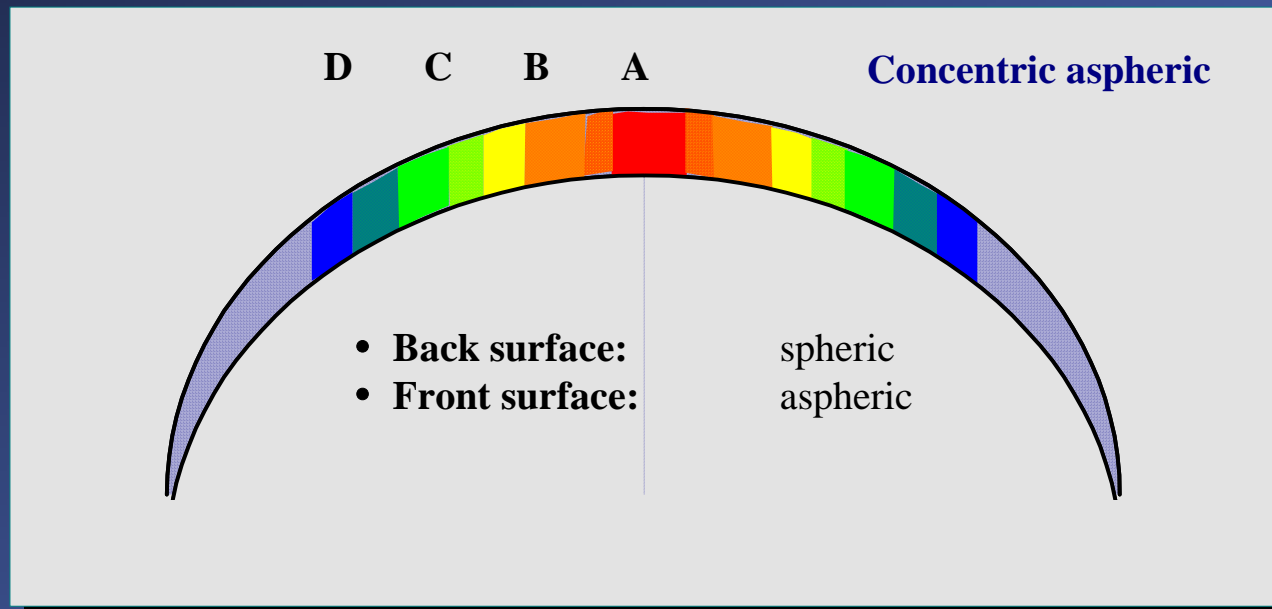
- **concentric bifocal**
- **aspheric multifocal (most popular)**
 - **concentric aspheric**
 - **circle toric aspheric**
 - **aplanatic aspheric**
- **diffractive bifocal**

Concentric bifocal



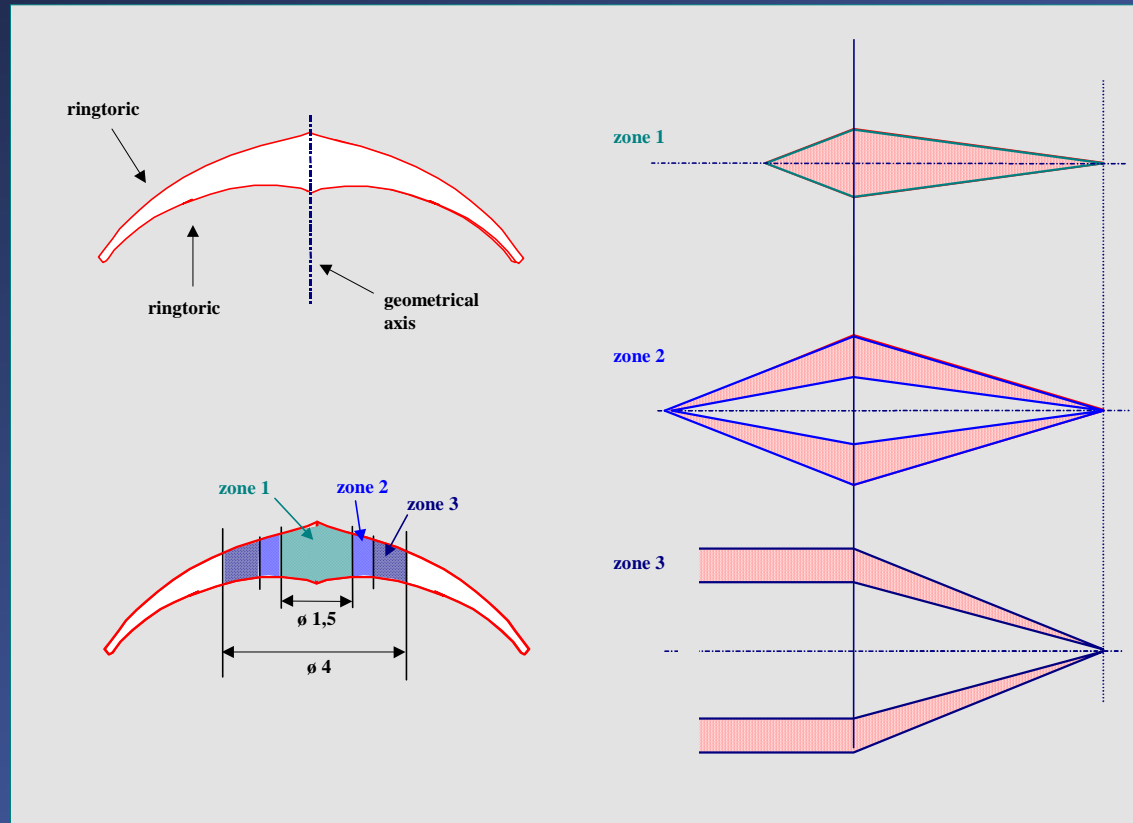
Mode of action of the concentric type
of simultaneous vision lens

Concentric aspheric



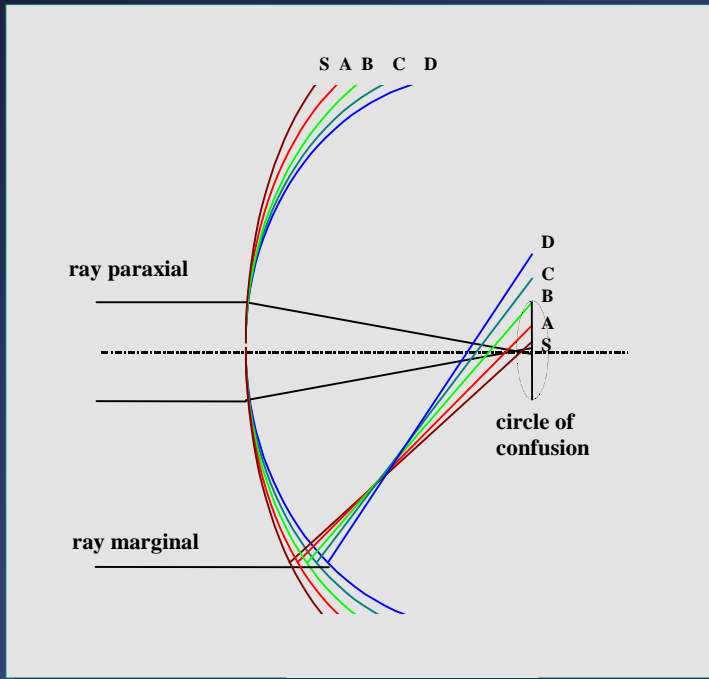
A) near B) and C) intermediate D) distance

Circle toric aspheric



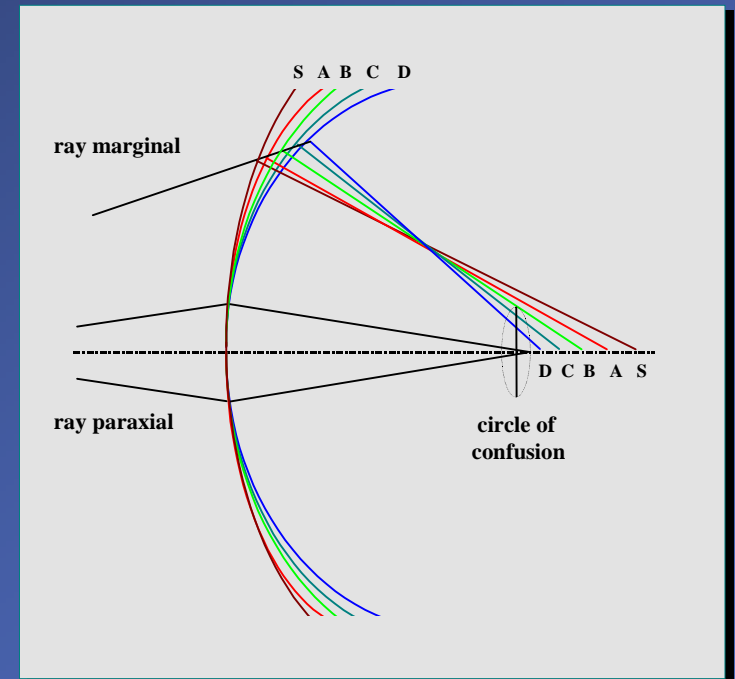
Principle of circle toric aspheric lens

Aplanatic aspheric



Distance vision with front aspheric;

S= no Add
A= low Add
D= high Add

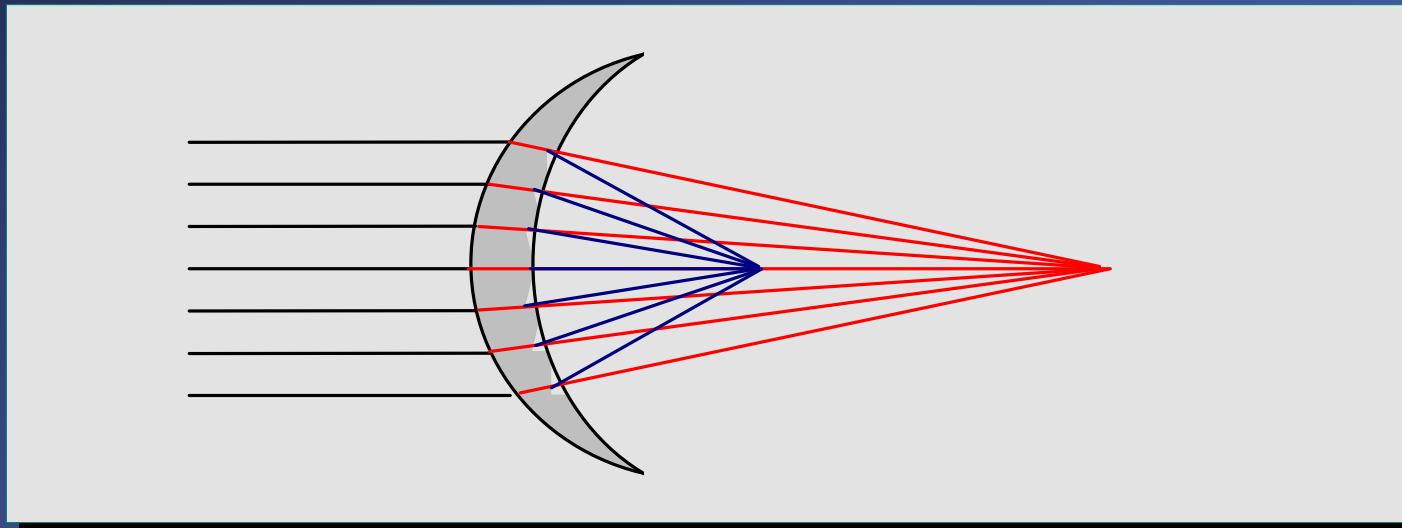


Near vision with front surface aspheric (aplanatic system);

S= no Add
A= low Add
D= high Add

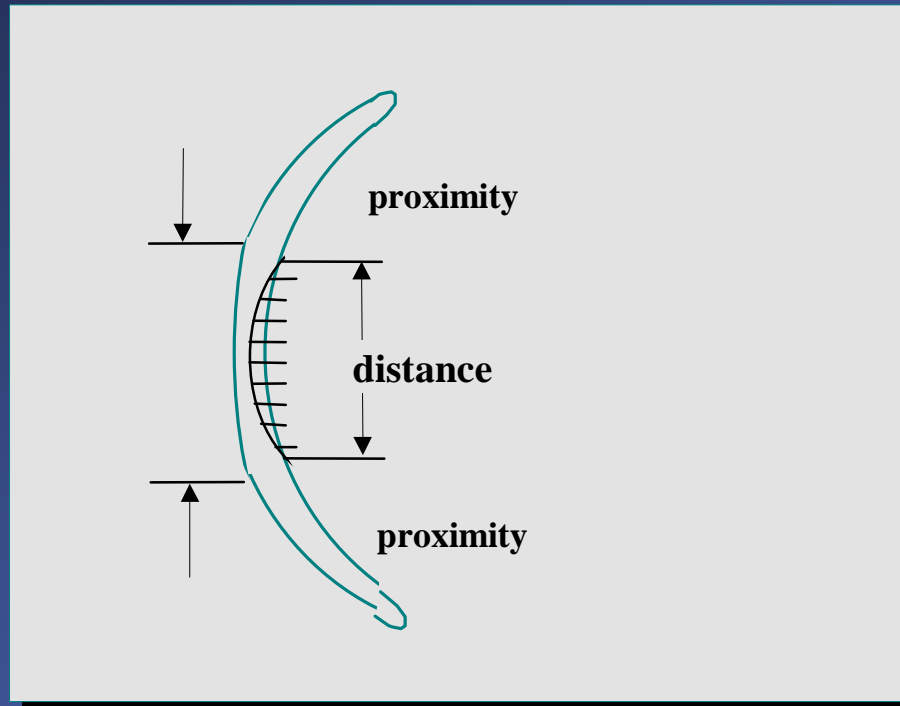
Principle of aplanatic spheric lens

Diffractive bifocal



Principle of diffractive lens

Combination of translating and simultaneous system



**Cross section DOZ of
front and back surface**

Different principles and systems, b's and c's

- **Simultaneous systems (soft CL) I**

- **concentric bifocal**

benefits:

- **two clear and differentiable images**
- **power well determinable**

concerns:

- **possible interference of segment line**
- **no intermediate distance**

Different principles and systems, b's and c's

- **Simultaneous systems (Soft CL) II**

- **aspheric multifocal I**

- **front surface aspheric**

benefits:

- provide higher add than back surface aspheric
- as pupil constricts in synkinetic action during reading, more of the pupil is covered by rays for near vision zone

concerns:

- pupil dependent
- performance of CL highly dependent on manufacturing process regarding aspheric changes on the lens surface

Different principles and systems, b's and c's

- **Simultaneous systems (Soft CL) II**

- **aspheric multifocal II**

- **back surface aspheric**

benefits: - good vision for distance

- for young or early presbyopes with low add
(< 1.5 D)

concerns: - all CL with center for distance, generally little add due to low asphericity, lens flexure and constriction of pupil when reading

Different principles and systems, b's and c's

- **Simultaneous systems (Soft CL) II**
 - **aspheric multifocal III**
 - **front/back surface**

benefits: - good stereoscopic vision for near,
intermediate and far distance

concerns: - dependent on pupil

Different principles and systems, b's and c's

- **Simultaneous systems (Soft CL) III**

- **diffractive bifocal**

benefits:

- independent of pupil, gaze and rotation
- high add possible

concerns:

- ghost images
- reduction on contrast sensitivity, especially in dim illumination

Different principles and systems, b's and c's

- **Simultaneous systems (RGP CL)**

- **concentric bifocal**

benefits:

- usable for small palpebral aperture
- high add possible ($> 4 D$)
- different DOZ possible

concerns:

- possible interference of segment line
- no intermediate distance

Different principles and systems, b's and c's

- **Simultaneous systems (RGP CL)**

- **aspheric multifocal**

- **front surface aspheric**

benefits: - provide higher add than back surface aspheric

concerns: - pupil dependent

- performance of CL highly dependent on manufacturing process regarding aspheric changes on the lens surface

Different principles and systems, b's and c's

- **Simultaneous systems (RGP CL)**

- **aspheric multifocal**

- **back surface aspheric**

benefits:

- excellent for gaze-independent vision
- good vision in the intermediate zone (computers, etc.)

concerns:

- verification requires small aperture on lensometer (2mm)

Different principles and systems, b's and c's

- **Simultaneous systems (RGP CL)**
 - **aspheric multifocal**
 - **front/back surface**

benefits:

- excellent for gaze-independent vision
- good vision in the intermediate zone (computers, etc.)

concerns:

- verification requires small aperture on lensometer (2mm)

Different principles and systems, b's and c's

- **Simultaneous systems (RGP CL)**
 - **diffractive bifocal**
 - benefits:**
 - independent of pupil, gaze and rotation
 - concerns:**
 - ghost images
 - reduction on contrast sensitivity, especially in dim illumination

Different principles and systems, b's and c's

- **Translating and simultaneous systems (RGP)**

- benefits:**
- vision is possible in intermediate distance
 - CL symmetric to rotation
 - are easier to fit than the translating type
 - give a higher spontaneous tolerance

- concerns:**
- require good centration
 - central steep fitting (physiological issue)

Objective criteria determining success or failure

- Lid positions and tonus, corneal diameters, sulcus form, tear film
- Topography of cornea
- Size of pupil, adaptation in different illumination conditions
- Profile of Px
 - previous contact lens wear
 - user of computer, other “particular” visual habits or needs

Natural Selectivity

The term “selectivity” is known in ethnology. The types of selectivity seem to depend on whether the behavior is natural or empirical. For the CL wearer the “natural selectivity” is of importance.

With bifocal or multifocal lenses experience shows, that approx. in 50% - natural selectivity is present in an acceptable or sufficient extent and that there seems to be no actual learning process.

A test of the visual acuities - the only parameters to enable the measurement of selectivity - showed, after three weeks of wearing multifocal lenses, the same acuities as on the first day of testing. Even after several years these comparative values remain constant¹⁾.

¹⁾ Dremmel S.H. et al

Disposable Soft CL offered in our Institute (monthly replacement)

CL Name	CL Type	Add	Design
Essilor Rhythmic multifocal	simultaneous N in center D in periphery	+ 0.75 to + 2.00	front aspheric
J + J Acuvue Bifocal	simultaneous concentric rings D in center and periphery D + N in 3 alternating circles	+ 1.00, + 1.50, + 2.00, + 2.50	front circle aspheric
B + L Occasions	simultaneous N in center D in periphery	+ 1.50 (over +)	front aspheric

Subjective criteria determining success or failure

- **There is no real learning process for multifocal lenses but the NATURAL SELECTIVITY is of importance**
- **Visual acuity for distance has to remain good and the visual acuity for near should enable to read with comfort**
- **Contrast has to remain on a maximum level**

Factors to be considered when fitting bifocal or multifocal contact lenses |

- **The diameter of the pupil and its position regarding distance and near zones mostly determine the effective visual performance**
- **Accommodative demand with CL is higher for myopic and lower for hyperopic eyes at near in comparison to spectacles**
- **The visual acuity and defined reading performance in the office do not guarantee that the system will satisfy the patient's need in everyday use**

Factors to be considered when fitting bifocal or multifocal contact lenses II

- **Listen to the patient at the first session and during the follow up, consider psychological aspects**
- **Start with the least complicated system, but offer and fit different types of lenses and systems**
- **If one system does not work, do not use a different brand based on a similar concept, but try a new system**

**Thank you very much
for your attention**



Bern, Capital of Switzerland