THERAPEUTIC CONTACT LENSES

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INTRODUCTION

- *therapeuein”* _greac_ = *heal, treat*

- Therapeutic contact lenses are special contact lenses used for the treatment of the ocular surface diseases
CONTACT LENS TYPES

- Hydrogels
  - Low water content 38-45%
  - Mid-water content 45-55%
  - High water content 67-80%
- Extra thin glycercyl methacrylate lens
  - giant papillary conjunctivitis was considerably reduced
- Silicone elastomer lenses
  - Extremely high oxygen transmisibility, much less vascularisation
SILICONE HYDROGEL LENSES

- FDA approved for therapeutic use

**Advantages**
- High oxygen supply - limit hypoxic stress in overnight wear, no vascularisation
- Low dehydration – good post lens tear film
- Good surface wettability – less deposits

**Disadvantages**
- Relatively small diameter
- The topic medication must be non-preserved
- Extended wear – risk for microbial keratitis, infiltrates
CONTACT LENS TYPES

- RGP corneal lenses
- Scleral lenses and rings

**Collagen shields**
- Collagen from bovine/porcine
- It biodegrades on eye in 12, 24 or 72 hours
- Reservoir for medication
- Dk/t equivalent of 63% water soft lens
INDICATIONS OF THERAPEUTIC CONTACT LENSES

1. MEDICAL DISEASES:

Conjunctival diseases:
- pemphigus, Stevens Johnson syndrome

Corneal diseases:
- epithelial-superficial punctate keratitis, filamentary keratopathy, keratitis sicca, corneal abrasion, recurrent corneal erosion, corneoconjunctival burns
- stromal: profound corneal sterile ulcerations;
- endothelial: aphakic/pseudophakic bullous keratopathy, Fuchs’ endothelial dystrophy
2. SURGICAL DISEASES:

- small penetrating corneal wounds
- large corneal wounds without endoocular membrane issue until suture
- aphakic and pseudophakic bullous keratopathy;
- large filtration bulla after trabeculectomy with athalamia;
- corneal graft after alkali burns
- after photorefractive keratectomy for antiallgic effect and restoration of binocularity
We used TCL for next purposes:

1. **Pain relief**
   - Edemato-bullous keratopathy
   - Recurrent corneal erosion or corneal ulceration after corneal foreign body
   - Herpetic keratopathy
   - Corneo – conjunctival burns

2. **Improving corneal re-epithelization**
   - Recurrent corneal erosions
   - Exposure keratopathy
   - Corneal burns
   - Chronic corneal ulcerations
   - Neurotrophic keratopathy

3. **Tectonic effect**
   - Descemetocel after corneal ulceration
   - Corneal – and corneoscleral laceration without endooocular membrane issue

4. **Permitting binocular vision**
   - All cases
SELECTION OF TCL

- According to the specific disorder
- Oxygen transmissibility
- Parameter range
- Parameter stability
- Wettability of surface
- Lubricity
- Deposits
- Modulus
- Economical
SELECTION OF TCL

Lens fitting
- Good centration
- Good corneal coverage
- Mobility
- Epithelium intact with corneal oedema – TCL normal to loose fit for tear exchange
- Epithelium not intact – TCL for pain relief – steep fit by increasing lens diameter or reduce base curve
- Edge design of soft lens - major impact on mobility
SELECTION OF TCL

- **Fit assessed** in 20 min and again in 60 min (dehydration effects)

- **Aftercare**
  - Hygiene, compliance

- **Follow-up** 24h, 72h, 1 week, 2 weeks, 1 month
- Lens replacement - disposables
INSTRUMENTATION

- Slit-lamp examination—difuse or lower light intensity (photophobia)
- Fluoresceine, rose bengal, lissamine green
- Schirmer test
- Keratometry – fellow eye
- Topography
Bullous keratopathy – severe complication after cataract surgery, with very disturbing clinical signs (pain, tearing, red eye, foreign body sensation)

- TCL fit steep for reducing the pain
- high oxygen delivery in advance of a penetrating keratoplasty to reduce the risk of vascularisation
BULLOUS KERATOPATHY
BULLOUS KERATOPATHY
OCULAR PATHOLOGY - TCL USED FOR REDUCING PAIN

- Thygeson superficial punctate keratitis – in severe cases, as a pressure patch, for relieving pain and foreign body sensation.
Filamentary keratitis – very painful disease
- for severe persistent cases,
- resolution in 4 days and disappearance in 2 weeks, but they can recur
- intense lubrication, risk of infection

Superior limbic keratoconjunctivitis
- Fit TCL with large diameter - soft lens
- Pay attention to complications!
Recurrent Corneal Erosions (RCE) syndrome is a condition that is characterized by a disturbance at the level of the corneal epithelial basement membrane, resulting in defective adhesions and recurrent breakdowns of the epithelium:

- after trauma or in anterior epithelial distrophies – 10 %
- Disposable, steep and thick TCL used for 2-6 month
The use of the therapeutic bandage lens is a useful and simple way to treat recurrent corneal erosions in any non-surgical ophthalmological unit.

**Persistent corneal epithelial defects**
- TCL or collagen shields until new epithelium reattaches to the newly secreted basement membrane.
OCULAR PATHOLOGY - TCL USED FOR WOUND HEALING

- **Herpes simplex** (no active virus)
  - TCL used in the late phase of infection
OCULAR PATHOLOGY - TCL USED FOR WOUND HEALING

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OCULAR PATHOLOGY - TCL USED FOR WOUND HEALING

- Neurotrophic keratopathy (palsies of nV)
  - decreased sensitivity of the cornea
Neurotrophic keratopathy (palsies of nV)
- sometimes the patient lose the TCL because of the decreased sensitivity of the cornea
OCULAR PATHOLOGY - TCL USED FOR WOUND HEALING - DESCEMETOCEL

- C.I., 49 years old – LE: neurotrophic keratopathy stage 3 (corneal perforation), after recurrent herpetic keratitis
- The topic treatment consisted of nonsteroidian anti-inflammatories, antivirals, corneal trophics, therapeutic contact lens – no success
- It was necessary to apply a multistratified amniotic membrane to cover the perforation and other amniotic membrane transplant fixated with TCL
OCULAR PATHOLOGY - TCL USED FOR OCULAR SURFACE PROTECTION

- Steven-Johnson syndrome and ocular pemphigus
  - Scleral lenses
  - large (15-20mm) thick soft lenses

- Severe dry eye
  - Scleral lenses
OCULAR PATHOLOGY - TCL USED FOR OCULAR SURFACE PROTECTION

- Lid deformities with exposure keratitis
  - (palsies of n VII)
OCULAR PATHOLOGY - TCL USED FOR OCULAR SURFACE PROTECTION

- Lid deformities with exposure keratitis
OCULAR PATHOLOGY - TCL USED FOR OCULAR SURFACE PROTECTION

- **Entropion**
- **Ectropion**
- **Trichiazis**
  - for optical and therapeutical purpose

- Extended carcinoma on the whole face and the upper and lower lid – after many plastic surgical interventions becomes lagophtalmus with exposure keratophaty
OCULAR PATHOLOGY - TCL USED FOR OCULAR SURFACE PROTECTION

- Keratoconus- piggy-back
OCULAR INJURIES

- **Chemical burns**
  TCL may inhibit the passage of certain proteolytic enzymes present in the tear film to the stroma, thus preventing the progressive ulcerative process.
- For peripheral defect low water content soft lenses may stimulate vascular ingrowth and arrest the ulcerative process.
- When the lids are also involved, a scleral lens is of choice.
- In alkali burns - scleral lenses and very large soft lenses help prevent simblefaron in later stages.
RE: old corneo-conjunctival chemical burn

RE: amniotic membrane transplant - surgery

RE 14 days postop.
- LE: chemical burn

- LE: amniotic membrane transplant

- 1 month postop.

- After the correction of trichiasis
OCULAR INJURIES

- **Corneal abrasions**
  - instead of ocular patch

- **Corneal lacerations without perforation**
  - no infected, limbal wounds (less vascularisation)

- **Corneal perforations**
  - TCL with or without cyano-acrylate glue, after or instead of sutures
  - central injuries (less astigmatism)
OCULAR INJURIES

- **RE:** Corneal wound which needed minimal suture + TCL
OCULAR INJURIES

- RE: Inferior corneal wound with iris issue
- Minimal suture + TCL
OCULAR INJURIES

- LE: Inferior wound without membrane issue, TCL
In most cases the therapeutic contact lens avoids the suture or minimizes it
POST SURGERY

Pterygium

- Reduce pain
- Promote corneal epithelisation
- Reduce number and severity of recurrences
POST SURGERY
PTERYGİUM
POST SURGERY PTERYGIUM

TCL & AMT
POST SURGERY PTERYGIUM

TCL
POST SURGERY
PTERYGIUM

TCL & AMT
POST SURGERY

Cataract

- Leaking incision – positive Seidel
POST SURGERY

Cataract

- Leaking incision – positive Seidel
POST SURGERY

Glaucoma

- leaking drainage bleb
- large diameter 14-16 mm
POST SURGERY
OTHER INDICATIONS

- **Refractive surgery**
  - PRK, LASEK, LASIK
  - Promotes healthy wound-healing by preventing corneal dessication, particularly when surface ablation leaves the stroma bare – within 4 days.
  - Prevents extremely thin flaps to be dislodged

- **Keratoplasty**
  - delayed epithelial healing,
  - epithelial filament formation,
  - steps in host – graft junction,
  - loose sutures

- **Collagen cross linking**

- **Ocular surface reconstruction with amniotic membrane**
  - They allow the cell growth and adhesion to take place without interference from the blinking eyelids and also protect the eyelids from irritations caused by sutures.

- After vitrectomy
COMPLICATIONS

- We should never forget that we fit TCL on an illness eye and we have to be much more precautious
  - Corneal oedema
  - Corneal vascularisation
  - Corneal infiltrates
  - Deposits
  - Giant papillary conjunctivitis
  - Infection (extended wear, diabetes, corticosteroids)
    - Corneal ulcer with/without hypopion, microbial conjunctivitis etc.
  - Hypopion

Antibiotics and other ointments – should be preservative free
COMPLICATIONS – RELATED TO:

**Patient**
- Severity of disease
- Dry eye
- Topical steroids
- Compliance
- Hygiene
- General health (Diabetes, etc.)
- Motivation

**Lens**
- Hypoxia
- Deposition
- Mechanical trauma
- Poor fit
- Extended wear
INSTEAD OF CONCLUSIONS
KEEP IN MIND

- Soft lenses are preferred because of the large diameter, supple nature, low movement amplitude and enhanced comfort.

- Silicone hydrogel lenses, available since 1999 and approved for therapeutic use, became the first choice because of very high oxygen transmissibility, lower on-eye dehydration and good comfort and coverage of the eye surface.
INSTEAD OF CONCLUSIONS
TO TAKE HOME

- TCL are offering great benefits in ocular surface pathology
- Reducing pain, avoiding ocular patch, restoring binocularity, TCL is improving the quality of life for our patient with ocular disorders – especially in children!
THE 10TH CONGRESS OF THE ROMANIAN CONTACT LENS SOCIETY

“THERAPEUTICAL OPTIONS IN OCULAR SURFACE PATHOLOGY”

SIBIU, ROMANIA – HILTON HOTEL

5th November – 7th November 2010

INFO: http://www.contactologia.ro