

# *Clinical significance of contact lens related changes of ocular surface tissue observed on optical coherence images*

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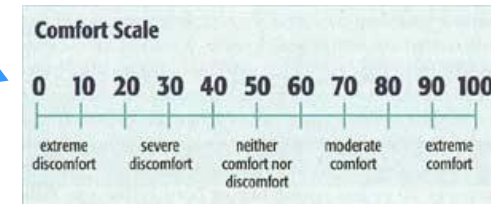
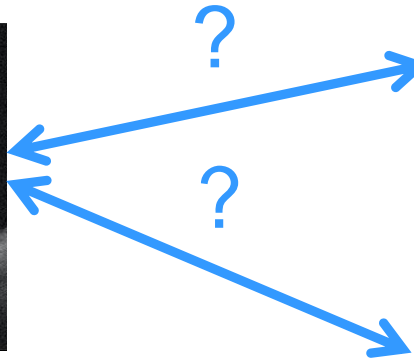
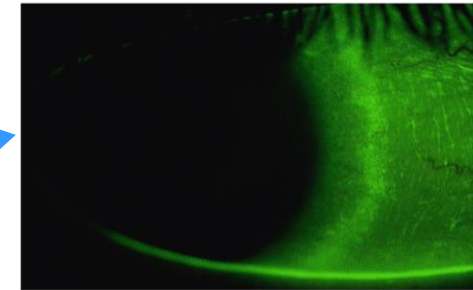
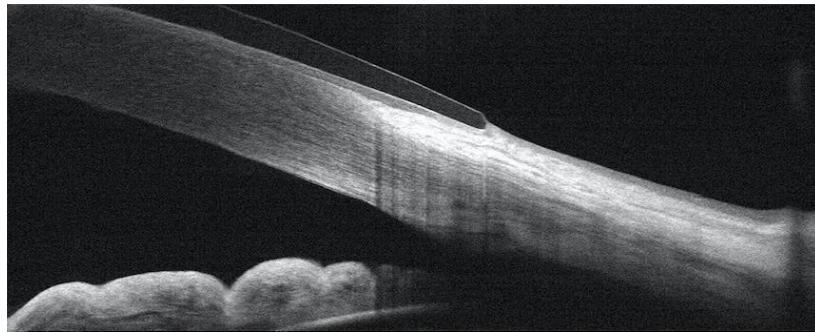
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# Purpose:

- To investigate the relationship between the real contact lens imprint into the conjunctival tissue, observed by OCT and conjunctival staining and contact lens wearing comfort.



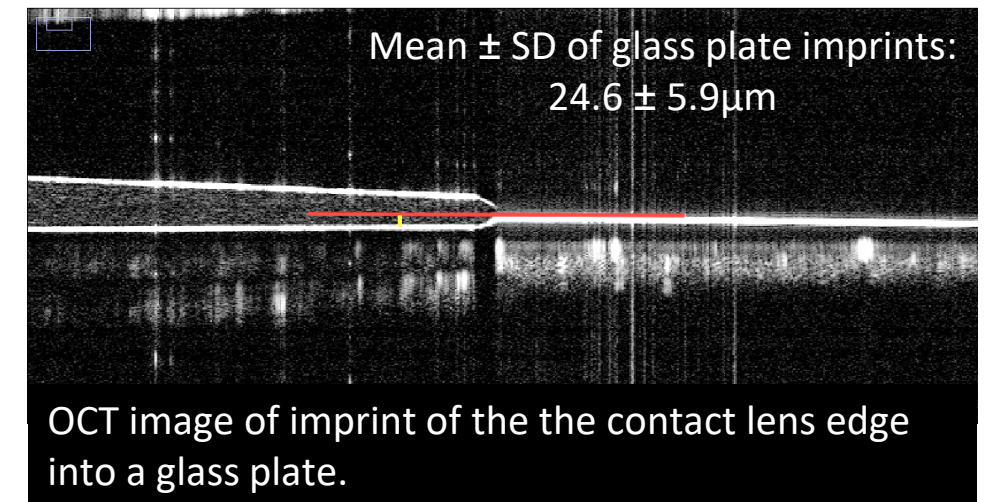
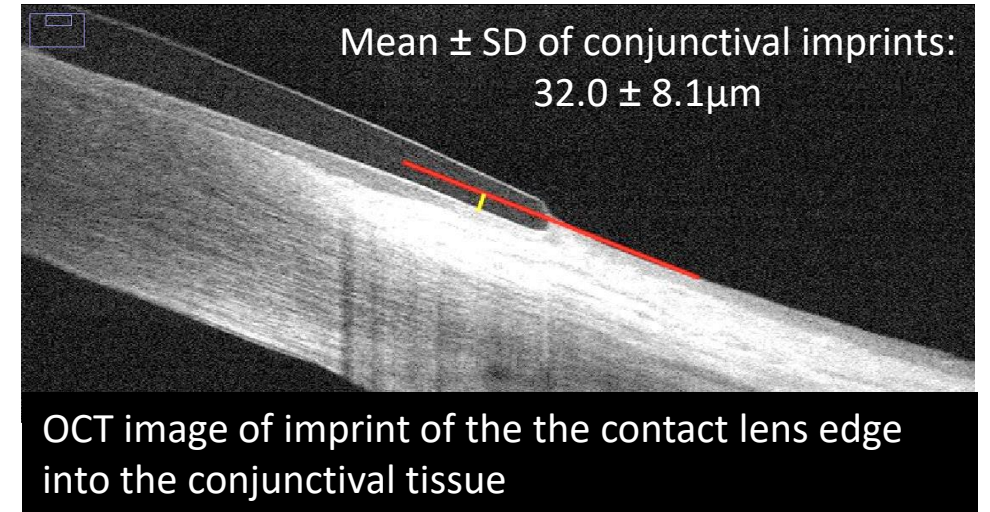
# Methods:

- 17 subjects (26.6 SD± 3.6 years, 7 females)
- Custom silicone hydrogel lens (Visell SIH 50; Hecht Contactlinsen GmbH, Au, Germany)
  - Lens B was fitted according to the manufacturer's recommendation
  - Lens A was fitted 0.4mm flatter
  - Lens C was fitted 0.4mm steeper
- After 4 hours of lens wear the contact lens edge in the area of the conjunctiva was imaged nasally and temporally using OCT.



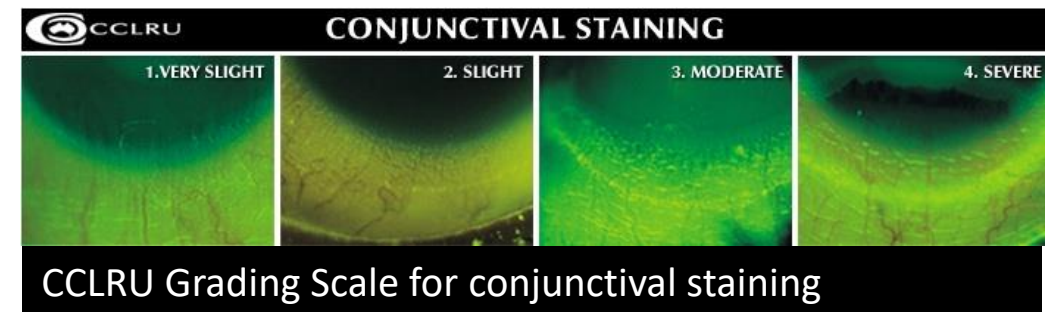
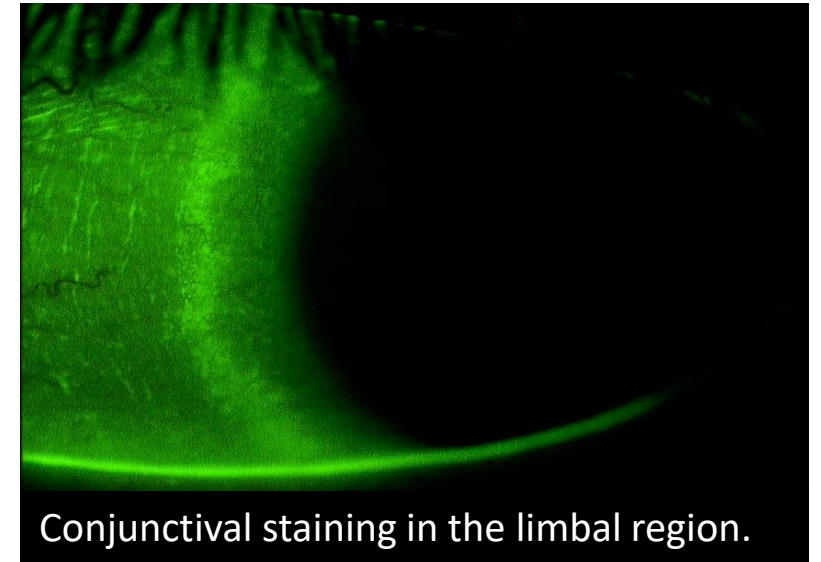
# Methods:

- Distortion correction
  - To correct the distortions the imprint of all worn lenses was measured on a glass plate afterwards.
- Real imprint = conjunctival imprint – glass plate imprint



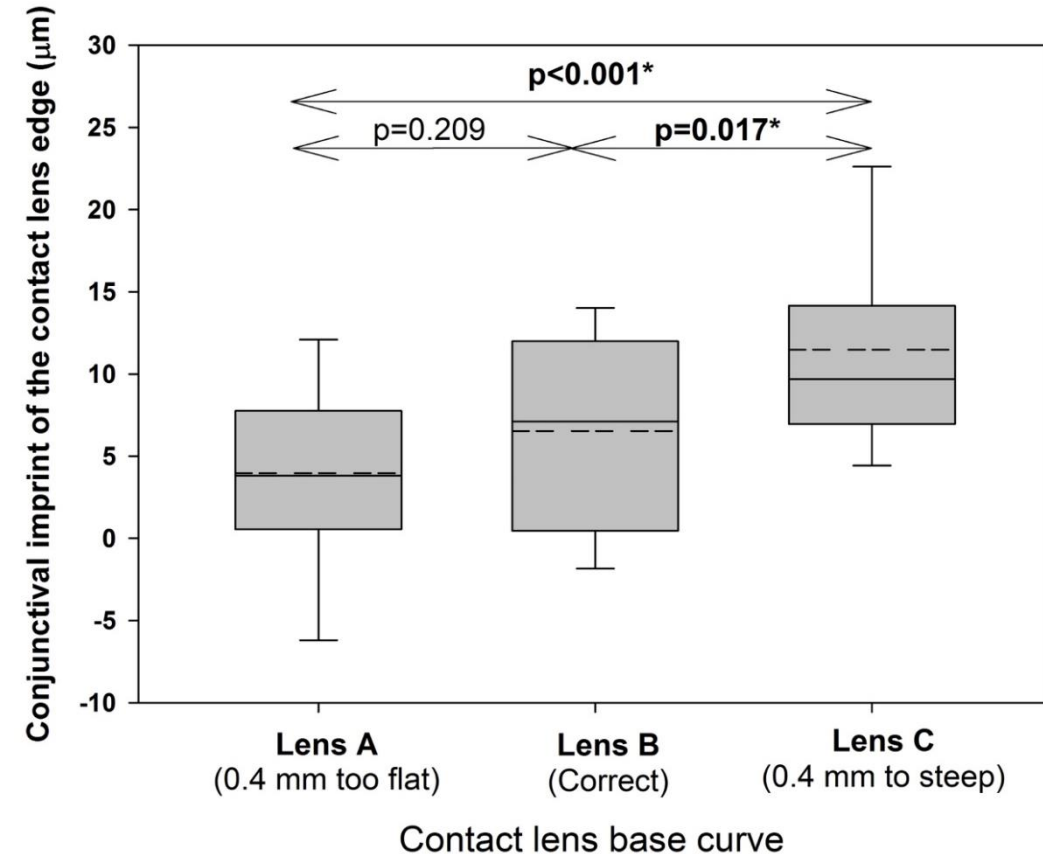
# Methods:

- Conjunctival fluorescein staining in the limbal region after 4 hours of lens wear was classified using the CCLRU Grading Scale.
- Comfort scoring was based on visual analog scales from 0 (very poor) to 100 (excellent).



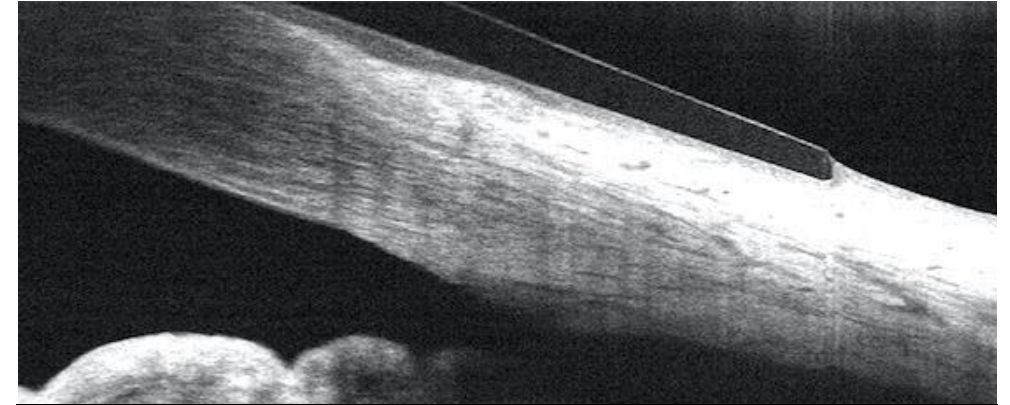
# Results:

- Mean imprint of the contact lens edges was  $32.0 \pm 8.1 \mu\text{m}$  before and  $7.3 \pm 6.5 \mu\text{m}$  after distortion correction of the OCT images.
- The distortion corrected imprint with the 0.4mm steeper lens ( $11.5 \pm 6.2 \mu\text{m}$ ) was significantly greater compared to the correct lens ( $6.5 \pm 5.9 \mu\text{m}$ ) ( $p=0.017$ ) and greater compared to the 0.4 mm flatter lens ( $3.9 \pm 5.3 \mu\text{m}$ ) ( $p<0.001$ ).
- There was no statistically significant difference between the correct lens and the 0.4 mm flatter lens ( $p=0.209$ ).

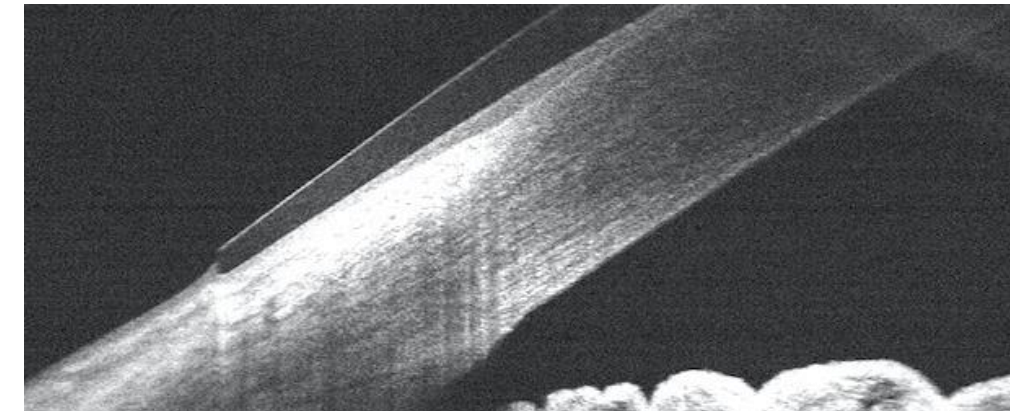


# Results:

- The nasally measured imprint ( $11.4 \pm 9.0 \mu\text{m}$ ) was significantly greater than the temporally measured ( $3.3 \pm 7.6 \mu\text{m}$ ) ( $p < 0.001$ ).
- Conjunctival imprint did not correlate with conjunctival fluorescein staining ( $p = 0.387$ ) or wearing comfort ( $p = 0.966$ ).



Example of a nasally observed greater imprint.



Example of a temporally observed smaller imprint.



# Conclusions:

- The observed conjunctival imprints are a combination of real conjunctival compression and artefacts.
- A deeper imprint of the contact lens into the conjunctiva caused by a steeper base curve was not related to clinical significant staining or changes in comfort.
- Differences between nasal and temporal imprint are likely caused by variations of conjunctival thickness and the shape of the underlying sclera.

