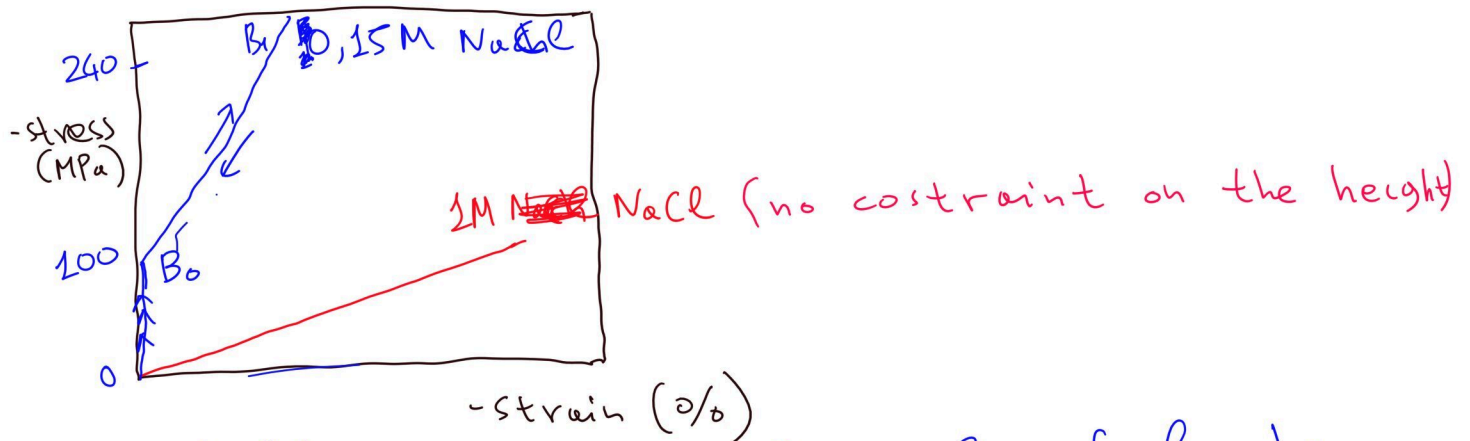
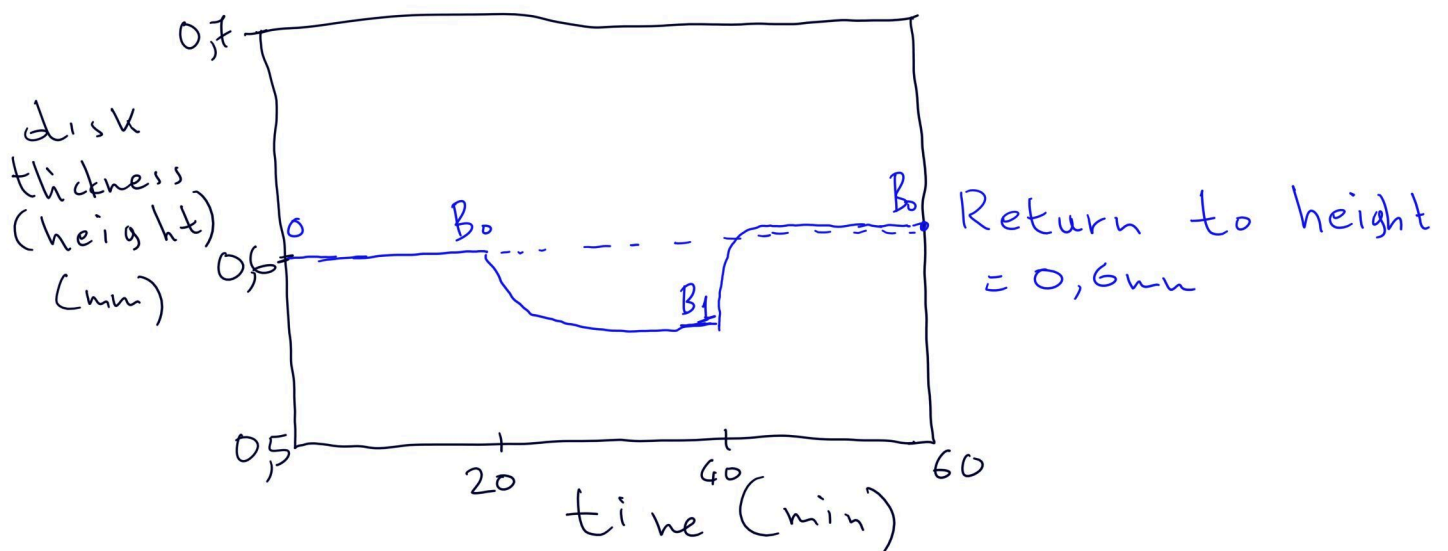


Simulation of a fixed ~~with~~ width experiment, followed by a lift of the fixed width (height) condition

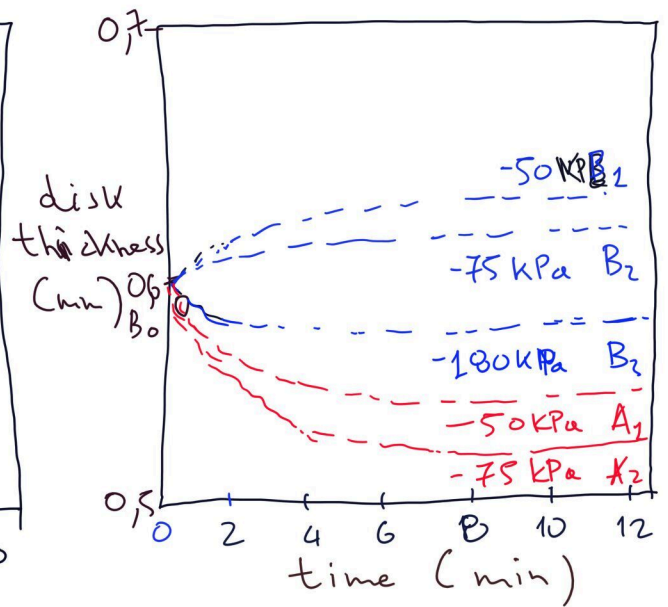
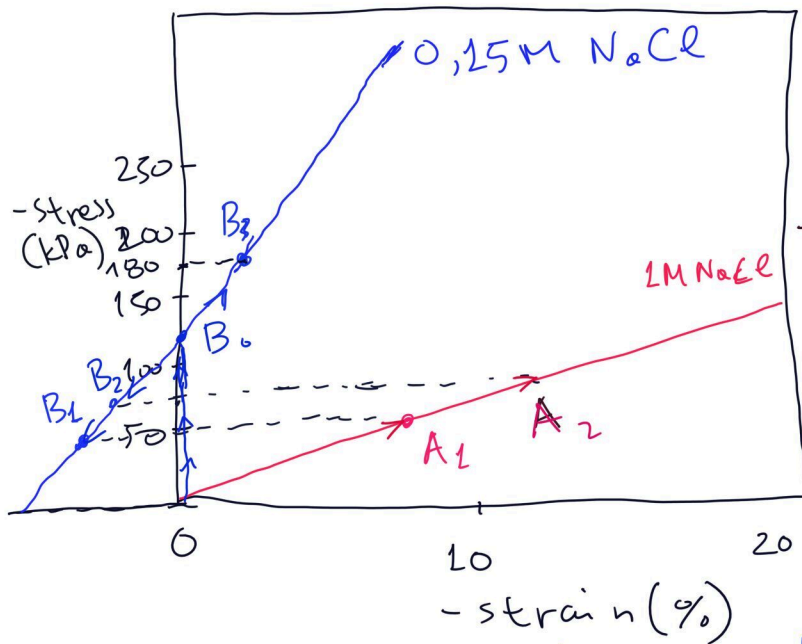


We follow a $O B_0 B_1 B_0$ cycle of loading. In the $O B_0$ part of the loading cycle, the height is fixed. In the $B_0 B_1 B_0$ part of the loading procedure, the restriction on the height change, is lifted (the specimen deforms in the vertical direction).

Below is the corresponding disk height-time curve for the $O B_0 B_1 B_0$ cycle of loading

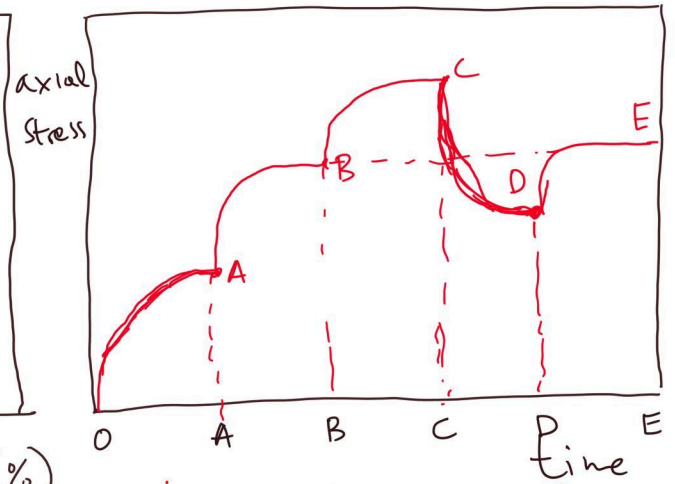
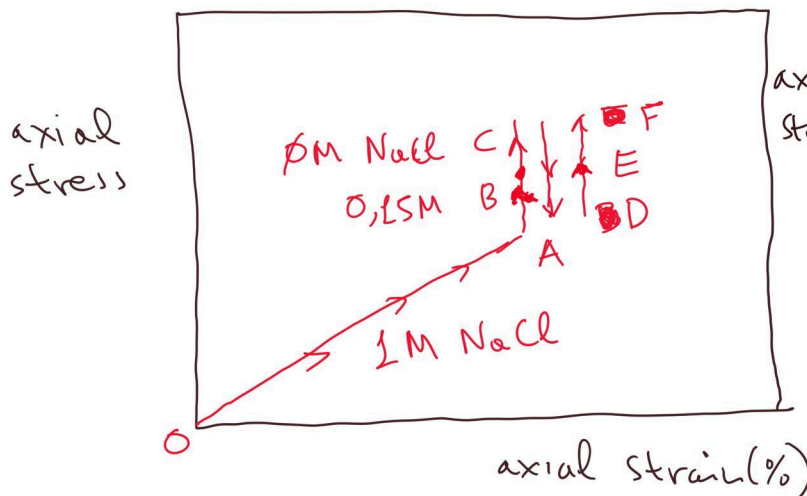


A cyclic test between two curves corresponding to 2 different concentrations.



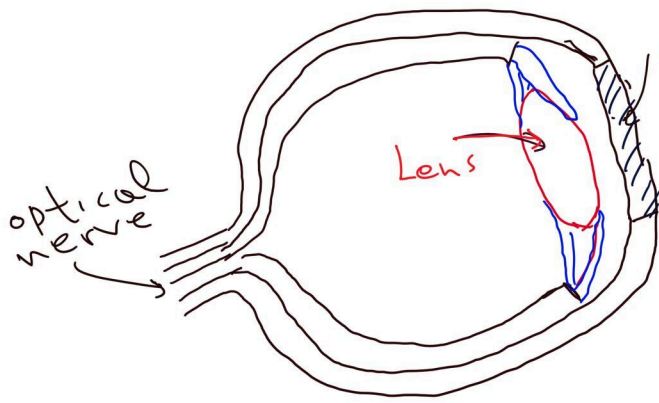
We have a loading path $O B_0 B_2 B_1$ and another loading path $O A_1 A_2$ in the red curve

Experiment with changing ion concentration, along the same loading cycle



The missing $E F$ part of the stress - time curve ends at the same horizontal level with C .

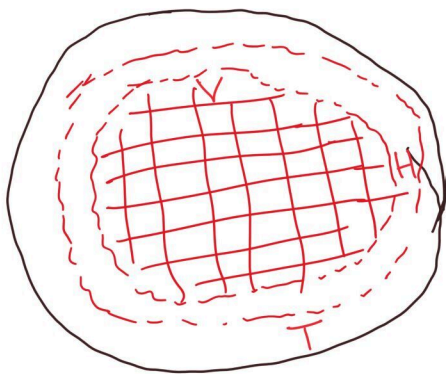
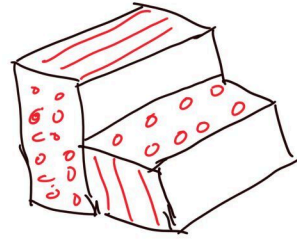
Cornea



Cornea : It's a transparent "spherical" disk

Cornea consists of lamellae with differently oriented collagen fibers

The projection of the spherical disk on a plane which is in contact with the disk's circumference, looks like this



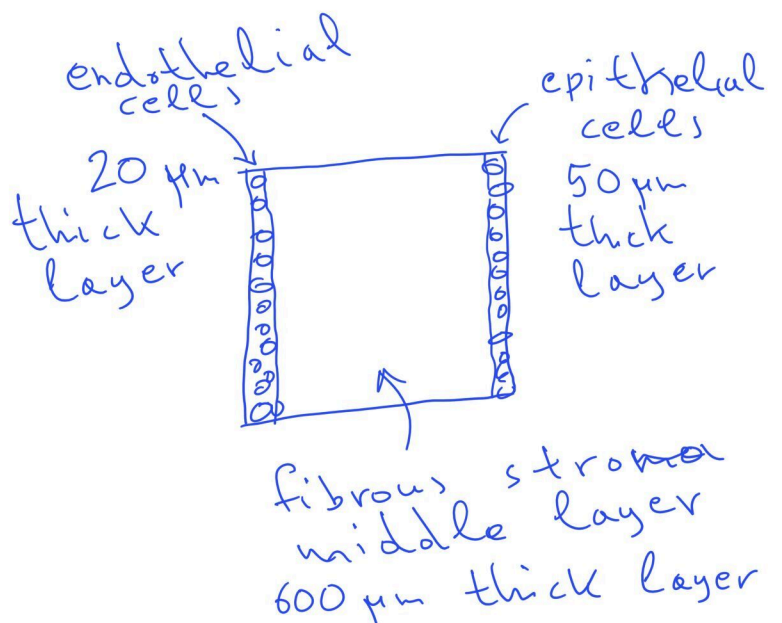
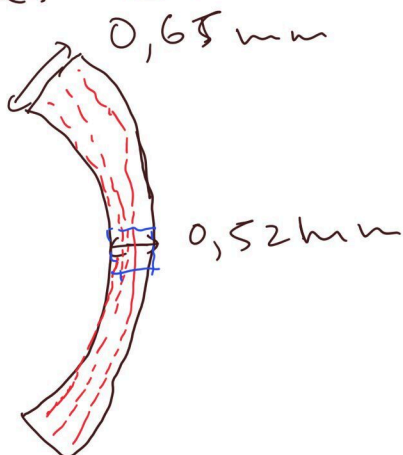
We have vertical, horizontal, and tangential collagen fibers,

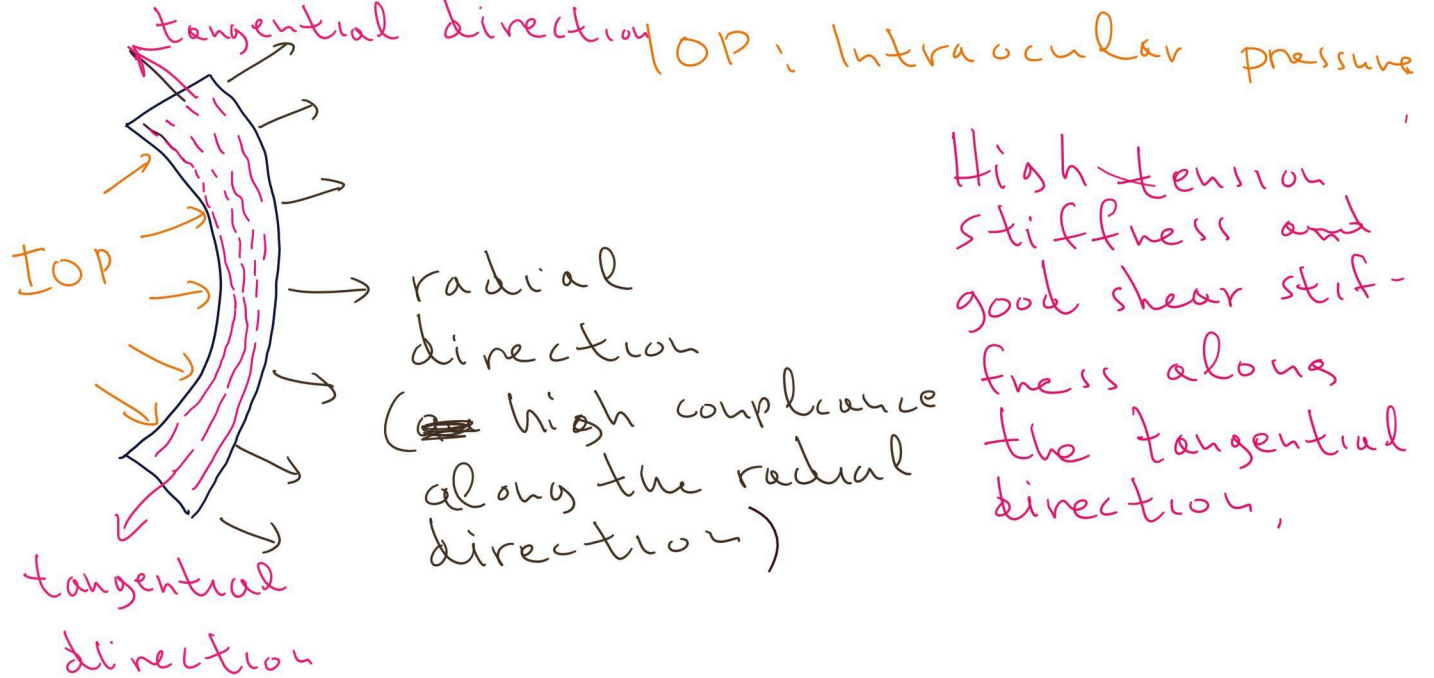
T: tangential fibers

H: horizontal fibers

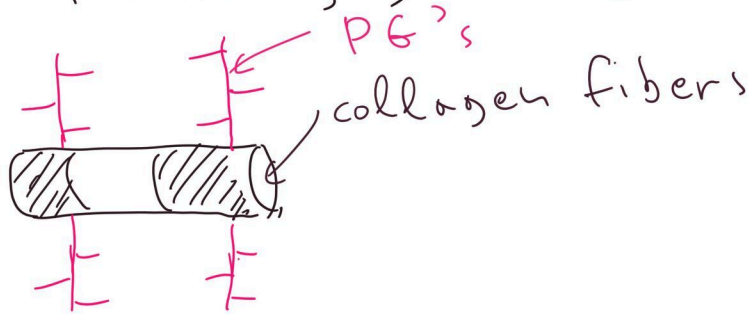
V: vertical fibers

A diameter cross section of the disk looks like





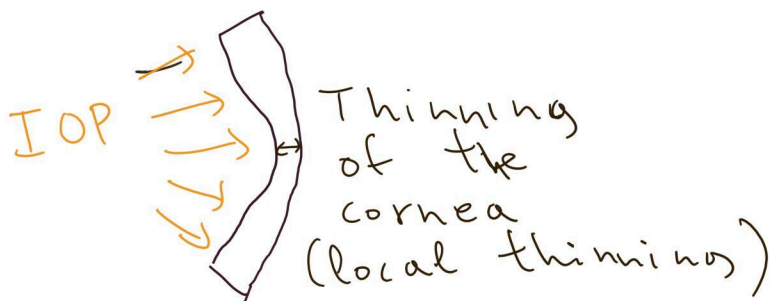
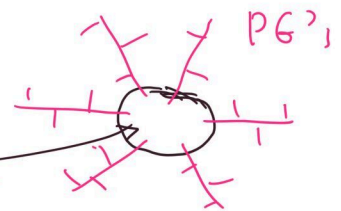
On the collagen fibers, are attached the proteoglycans (PG's)



Looking at a cross section of a collagen fiber we see this

In case of breakage of the collagen fibers, we have extensive deformation of the cornea.

cross section of a collagen fiber

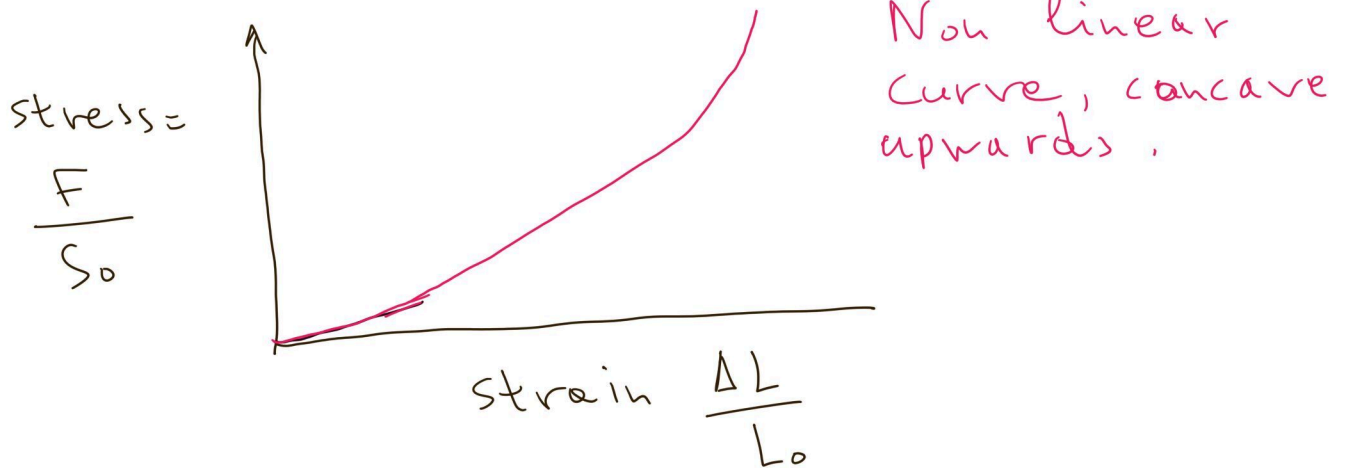


Also we have large variation of the thickness of the cornea, along a meridian of the cornea.

Clamping (fixed support) at the edges of the cornea, prevents the thinning of the cornea close to the edges of it.

There transport phenomena (water and ions) between the cornea and aqueous humor, the liquid that fills the space between the cornea and the lens.

Typical stress-strain curve for the cornea specimen cut from the central part of the cornea



From specimen excised outside from the central part of the cornea, we get



Both concave upwards and downwards curve.