

# EFFECT OF THE POWER AND TIME OF APPLICATION OF FOGGING LENSES IN THE CONTROL OF ACCOMMODATION

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## PURPOSE

An essential factor for a successful refraction assessment is the control of accommodation. Methods for controlling accommodation are:

- By invasive means: Using drugs (cycloplegia).
- By non-invasive means: Adding positive lenses, also known as **fogging**.

In the fogging technique, however, the optimal amount of power and time of application of plus lenses are unclear, which prompted us to study the optimal fogging lens and its time of application to achieve the maximum relaxation of accommodation (RoA).

## MATERIAL AND METHODS

**Subjects:** 20 young adults between 18 and 30 years old ( $24.7 \pm 3.4$  years old) with mean refractive error of  $-0.59 \pm 1.37D$  in terms of spheric equivalent.

**Measurements:** Changes in accommodation were monitored at 10Hz frequency by means of a Hartmann-Shack aberrometer while wearing six different fogging lens powers relative to the manifest refraction (+1.00D, +1.50D, +2.00D, +2.50D, +3.00D and +4.00D).

Each lens was placed in front of the eye for 60s while the participant was looking at a VA chart placed at 6m. Contralateral eye was occluded during measurements.

Lenses were presented in a random order, with a wash-up time between trials of 90s.

**Analysis:** For studying the variation within time, 55 seconds of recording were analyzed for each participant obtaining 5 time slots of 11s each one. For each interval, the median was obtained.

In order to get results clinically interesting, cases with a mean RoA over 0.12D and below -0.12D were analyzed in more detail.

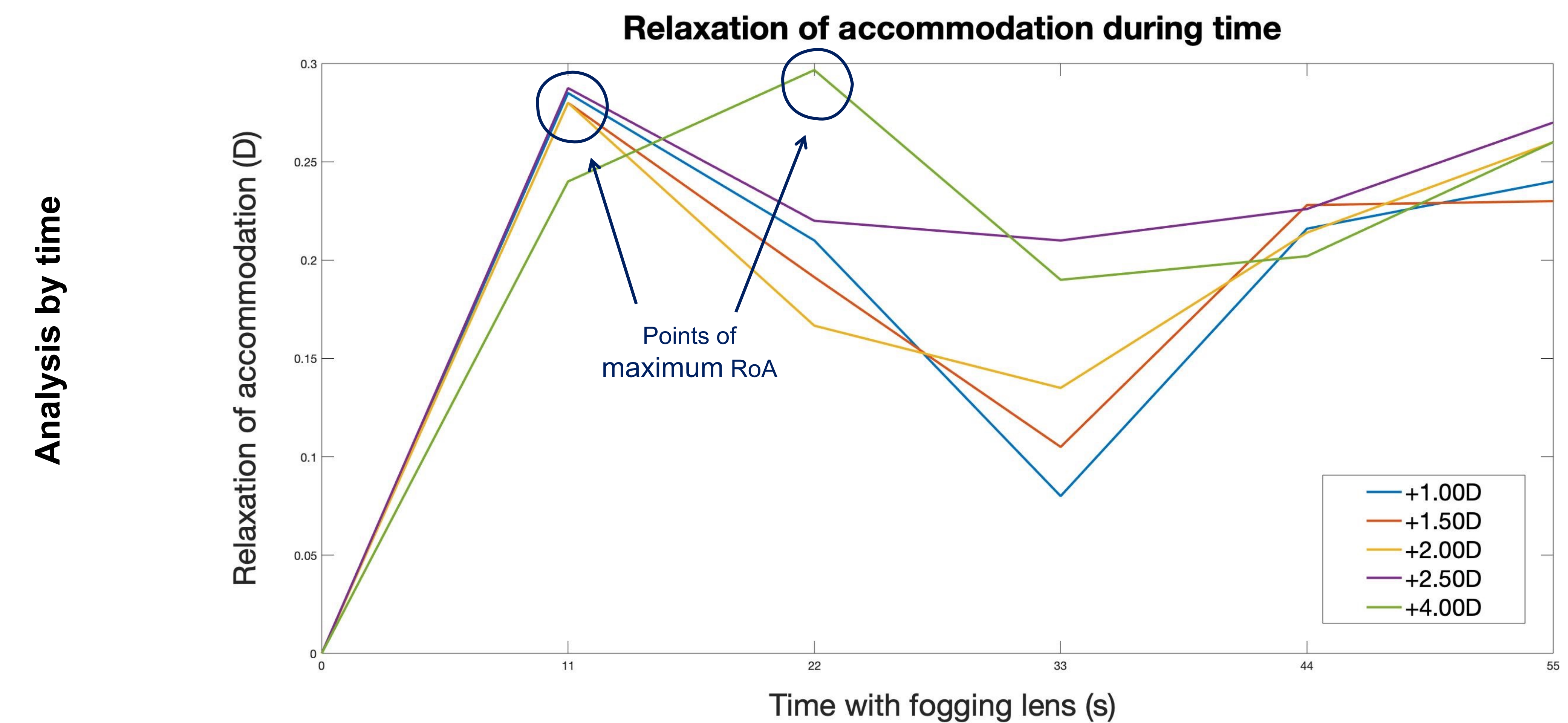


## RESULTS

Lens power (D)	All cases	Positive RoA		Negative RoA	
	Mean RoA (D)	Number of cases	Mean RoA (D)	Number of cases	Mean RoA (D)
+1.00	$0.01 \pm 0.15$	<b>4</b>	<b><math>0.28 \pm 0.08</math></b>	3	$-0.23 \pm 0.08$
+1.50	$-0.04 \pm 0.16$	<b>3</b>	<b><math>0.24 \pm 0.10</math></b>	6	$-0.24 \pm 0.12$
+2.00	$-0.08 \pm 0.14$	<b>2</b>	<b><math>0.15 \pm 0.01</math></b>	6	$-0.26 \pm 0.12$
+2.50	$-0.02 \pm 0.20$	<b>5</b>	<b><math>0.21 \pm 0.07</math></b>	4	$-0.39 \pm 0.22$
+3.00	$-0.12 \pm 0.19$	0	-	7	<b><math>-0.29 \pm 0.27</math></b>
+4.00	$-0.06 \pm 0.30$	1	0.25	7	<b><math>-0.33 \pm 0.12</math></b>

\*Sign convention for RoA:

- + for accommodation relaxing
- for accommodation activating



**Figure 1.** Relaxation of accommodation (RoA) within time in cases with mean RoA over 0.12D. Normalized at time 0s.

## CONCLUSIONS

- Real time monitorization permits to determine changes in accommodation with different power and time of fogging lenses.
- Better results for relaxing accommodation were obtained for lens powers between +1D and +2.5D and a time of application between 11s and 22s.
- The countereffect of high-power fogging lenses was seen in lenses of +3D and +4D, that probably could lead accommodation to the resting state due to the high blur.
- Further research with a larger sample should be performed to confirm these preliminary results due to the high between-subject variability.