

# Pressure force while performing no-incision sub-Tenon's block: Validation of an animal teaching model

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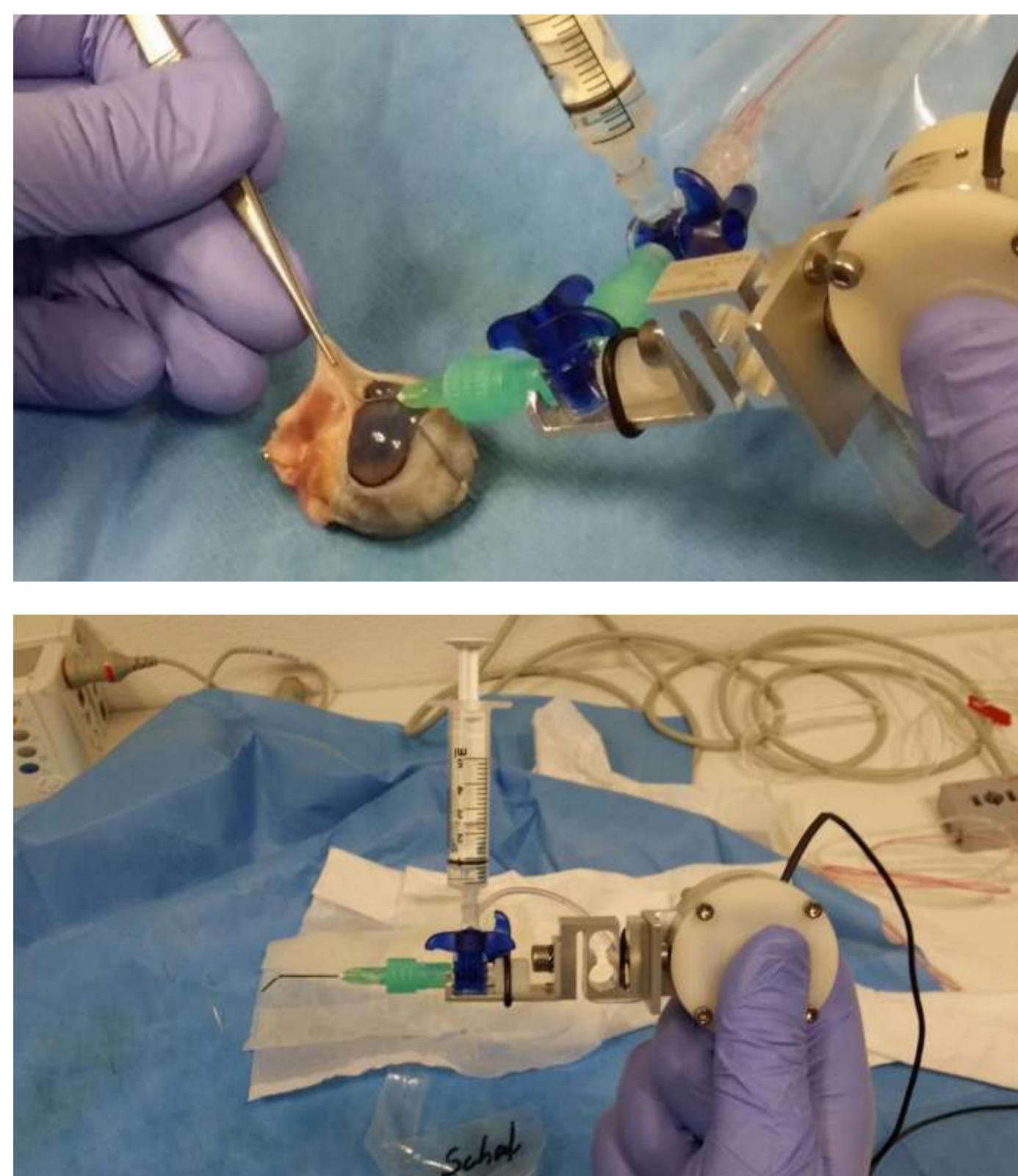
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## INTRODUCTION

With patients getting older and more ophthalmic procedures being performed on old frail patients, anaesthesiologists and operating ophthalmologists alike will find the ability to perform safe ophthalmic regional anaesthesia (ORA) a welcome asset. Given the risk-profile of different methods of ORA and the reluctance of many anaesthesiologists to use scissors on the eye we aim to shed light on the theoretical circumstances pertaining to „no-snip-sub-Tenon's“. We use this latter technique in our everyday practice on aged patients successfully and free of grave complications. Apart from a pig-eye model for classical surgical incision sub-Tenon's blocks no teaching model for this easy and risk-reduced method exist. Experienced anaesthesiologists gauge success of their regional anaesthesia often by haptic sensations and we postulate that most of the learning curve of this particular ophthalmic block is related to pressure sensations on perforation.



## METHODS

Pressure forces were measured on prepared goat's eyes, pig's eyes, sheep's eyes (all fresh frozen and defrosted) and human cadaver's eyes (preserved without formaldehyde), using a specifically designed mounting, holding a pressure force sensor (up to 10 N, Transmetra GmbH, Switzerland) along the longitudinal axis as well as a three-way stopcock with attached sterile single-use needle. Data processing was done using Matlab (The Mathworks, Natick, USA) and statistical analysis using R (The R Foundation). Preliminary analysis made use of Linear Mixed Effect Model Regression and Likelihood Ratio Test.

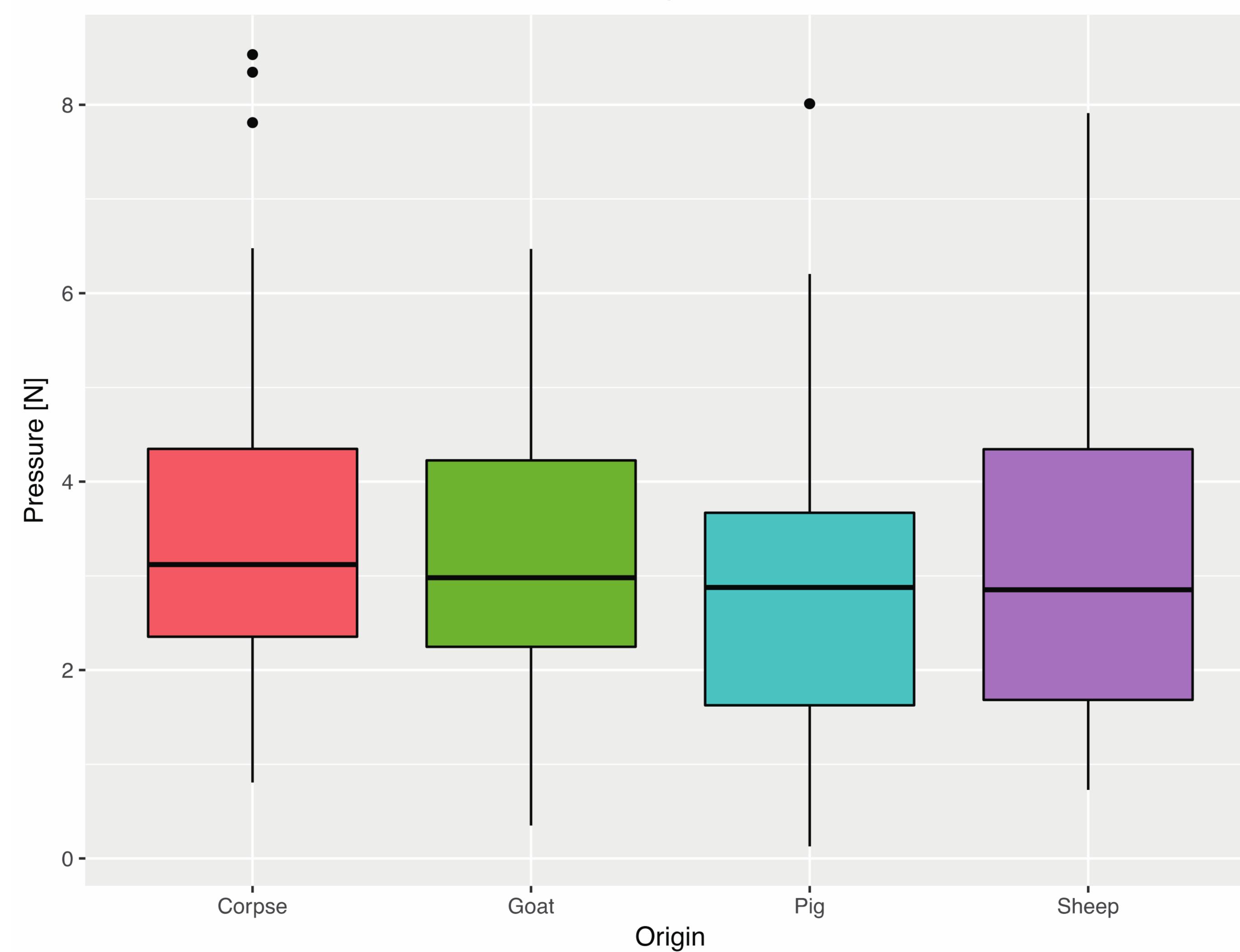
## RESULTS

Baseline characteristics are shown in table 1. Of the 220 observations on goat's, pig's, sheep's and human cadaver's eyes, the species the eye was taken from didn't affect the pressure force ( $X^2(3) = 3.8984, p = 0.2726$ ) needed to perforate the bulbar conjunctiva and Tenon's capsule.

	Corpse	Goat	Pig	Sheep
n	103	22	52	42
Pressure [N] (Median [IQR])	3.12 [2.35, 4.35]	2.98 [2.25, 4.23]	2.88 [1.63, 3.67]	2.85 [1.68, 4.34]

Table 1: Baseline characteristics

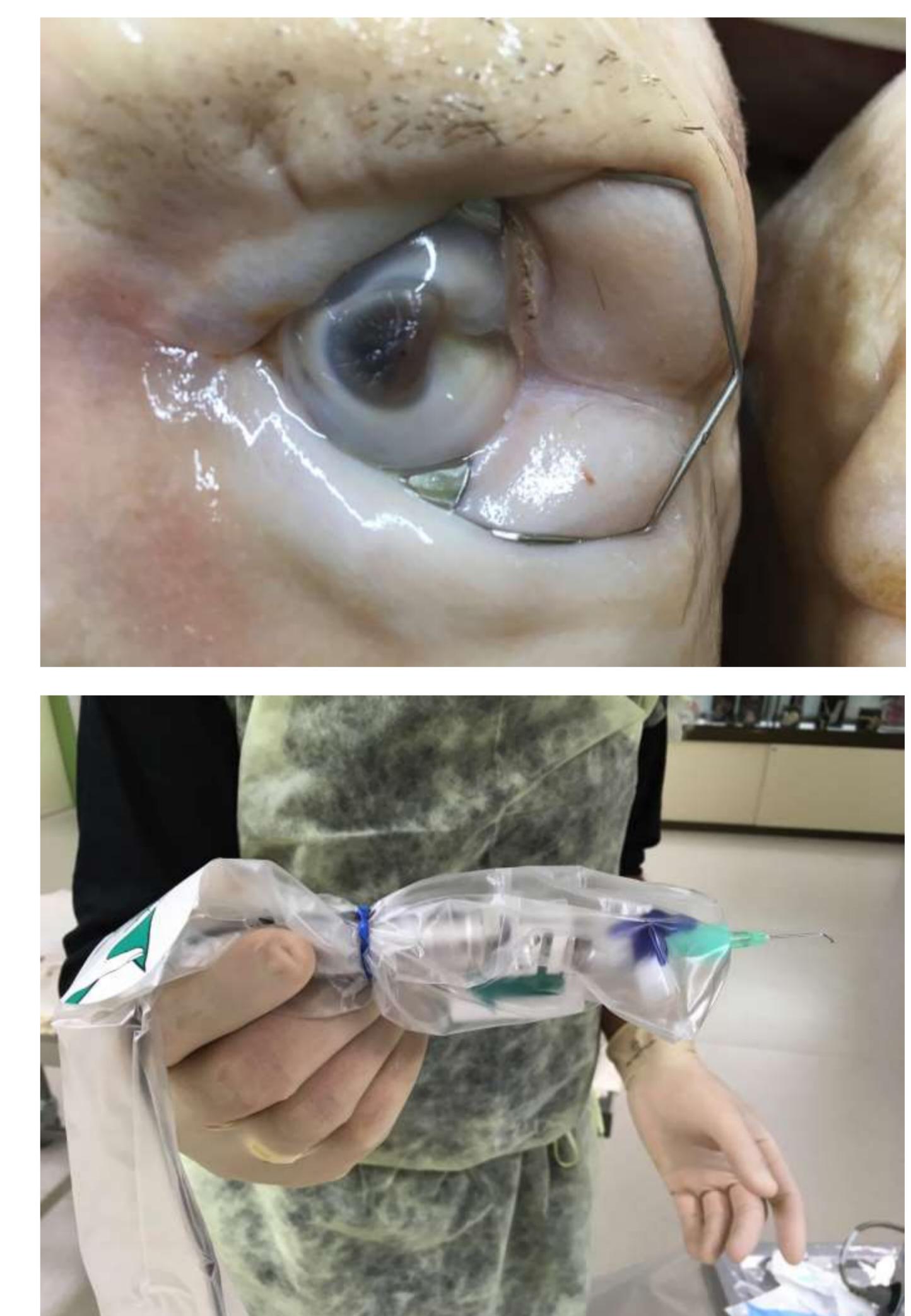
Tenon's Fascia perforation pressure by origin



## CONCLUSIONS

From the preliminary analysis we can state that the species the eye was taken from has no significant influence on the pressure force during perforation of the double layer of bulbar conjunctiva and Tenon's fascia. This is in accord with our teaching experience that has led us have ten junior consultants perform the block confidently over the last two years. All reported practice on animal models to be „very helpful“.

Further investigation has to be done, especially on living human's eyes, to prove that incisionless sub-Tenon's blocks could safely be learned on animal's eyes. In the near future Anterior Chamber Optical Coherence Tomography will be used to measure tissue layer thickness (bulbar conjunctiva and Tenon's fascia) beforehand and to correlate it with pressure forces.



## LITERATURE

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