

# Anatomy: Orbit and Extraocular Muscles

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# Session Objectives

- Infer what structures can be affected by blowout fractures of the orbit.
- Differentiate actions and functions of extraocular muscles.
- Describe how extraocular muscles work in pairs to induce or avoid torsion.
- Describe how the extraocular muscles work in pairs to move the eye in primary position.
- Predict lesions in nerves of the orbit based on tests of extraocular muscles.

# Part 1: Orbit Boundaries and Contents

BP: 16.6  
ST: 4.0  
13  
10:25 AM



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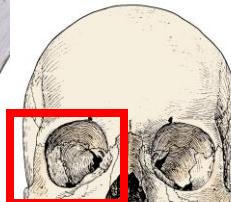
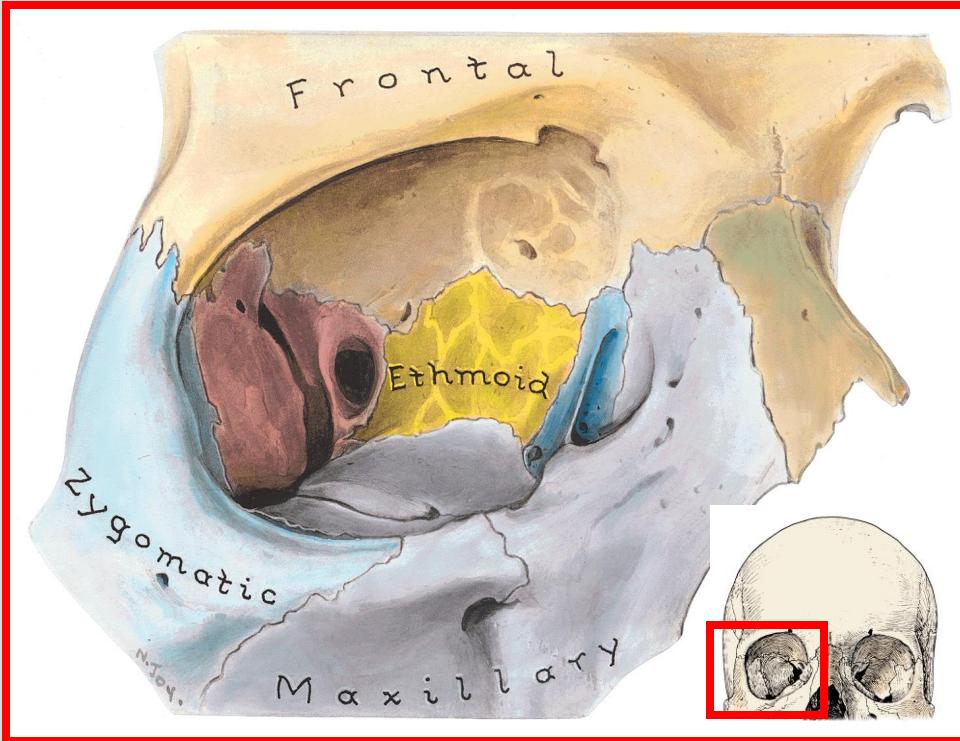
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## Axial MRI of Head

- Orbit is full of adipose tissue!

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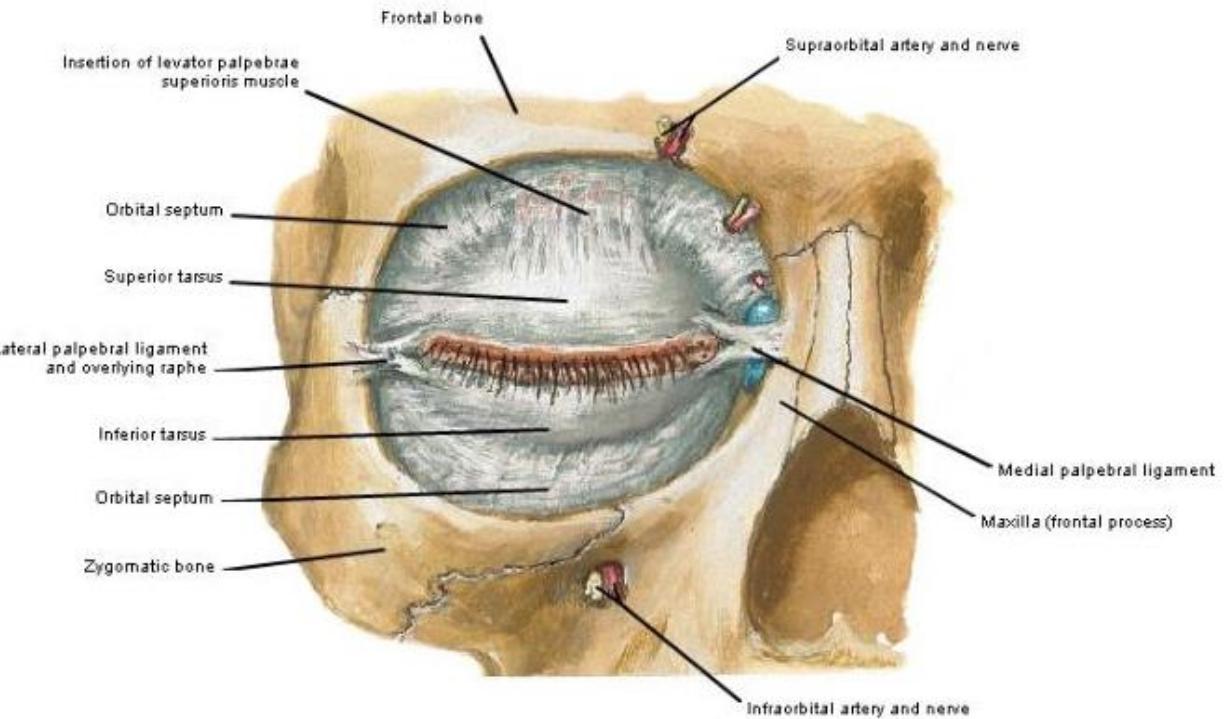
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From COA, Moore and Dalley (2006)

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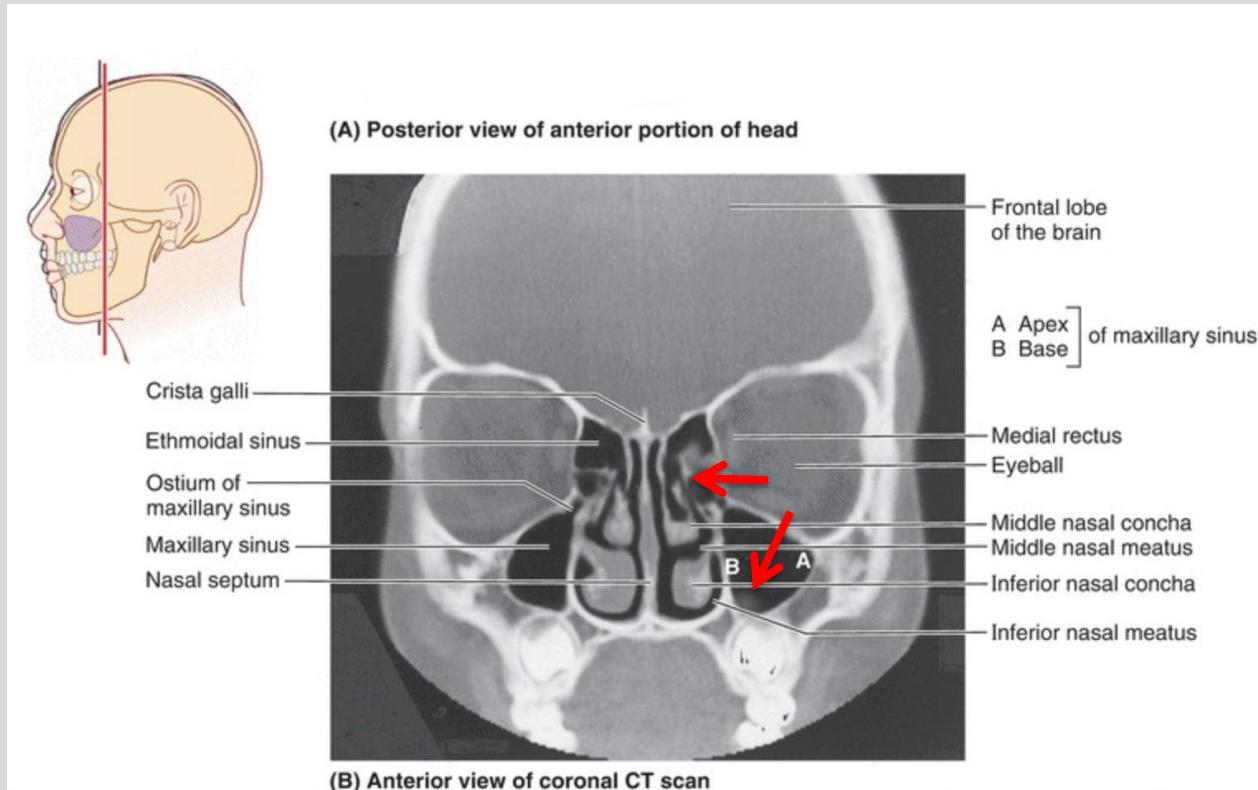


From Netter's Atlas of Anatomy

# Trauma in the Orbit

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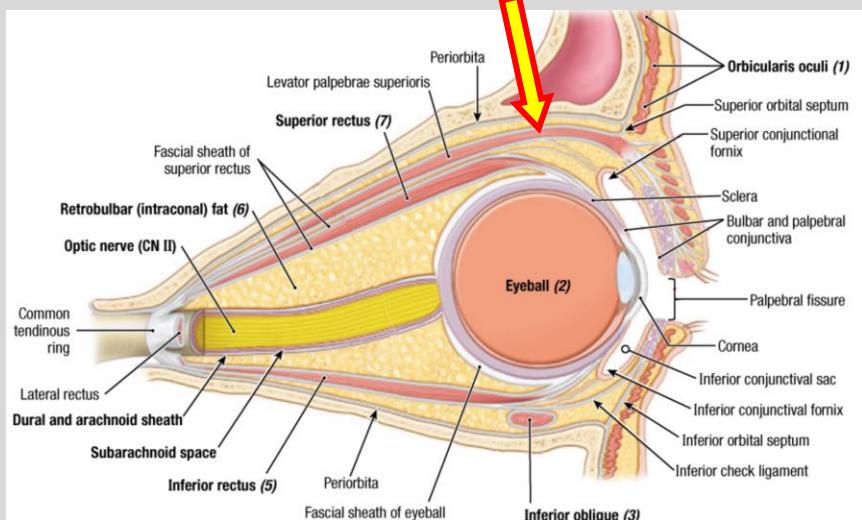


- When under pressure orbit contents can break into surrounding spaces.
- Called blowout fractures

From COA, Moore, Dalley, Agur, 2014

# Levator palpebrae superioris

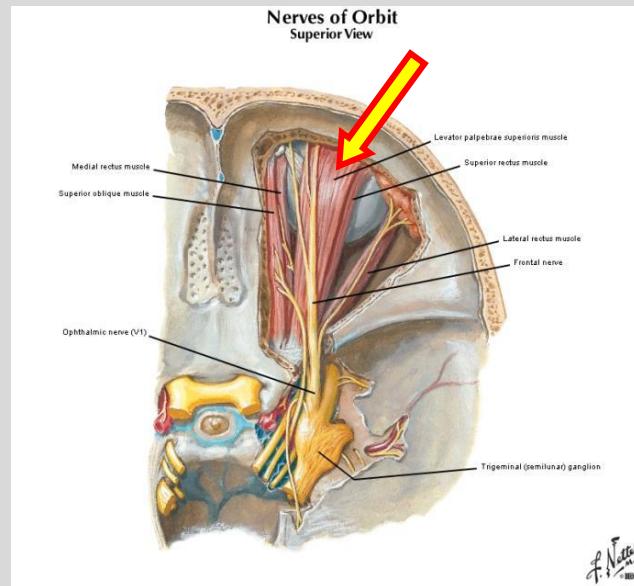
- Origin: lesser wing of sphenoid
- Insertion: superior tarsus and superficial fascia of eyelid
- Contains smooth muscle fibers (superior tarsal or Müller's muscle)



From COA, Moore, Dalley, Agur, 2014

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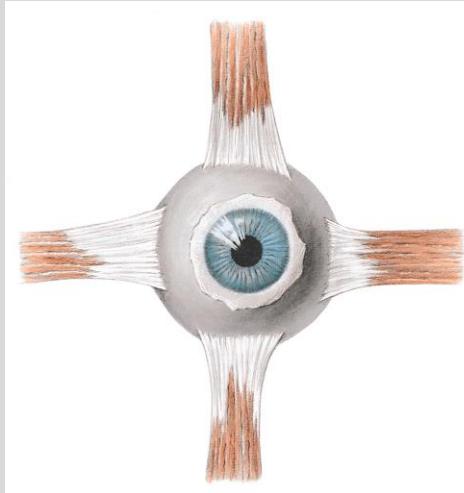
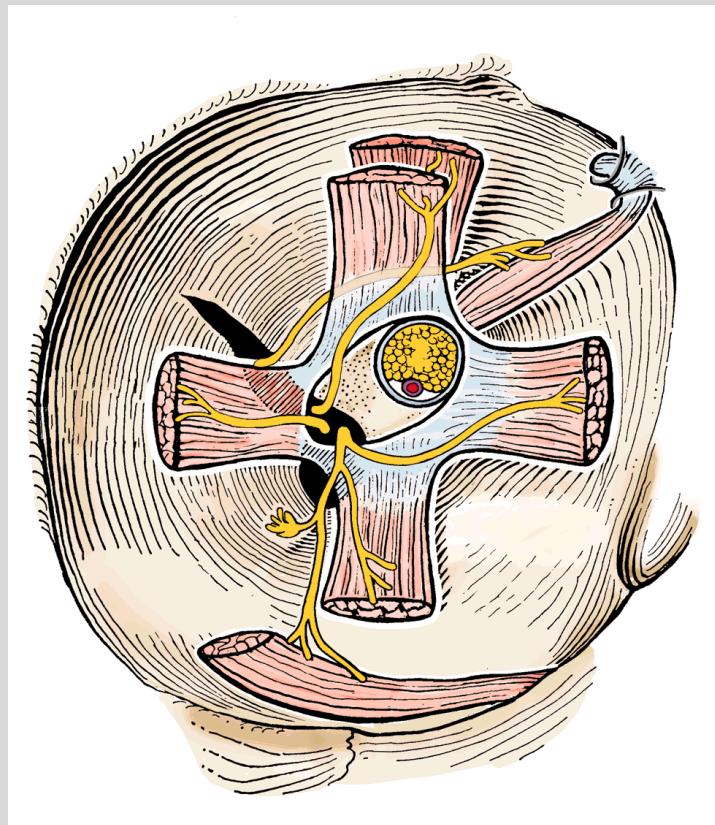


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# Recti Muscles

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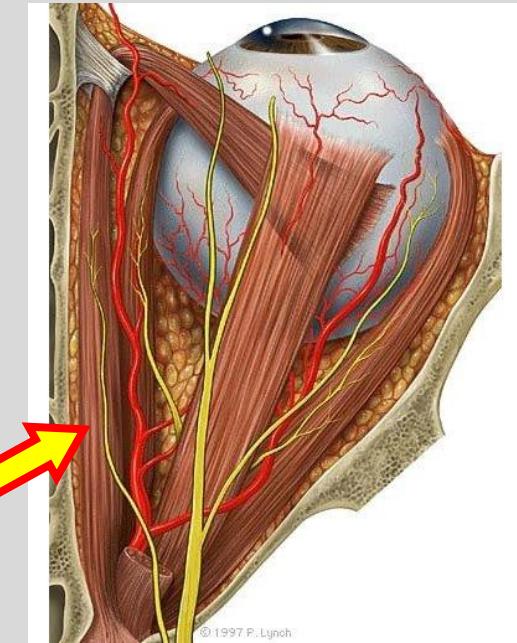


- Superior, inferior, medial, and lateral
- Originate from common tendinous ring
- Insert into sclera immediately posterior to cornea

From COA, Moore and Dalley, Agur, 2005

## Superior oblique

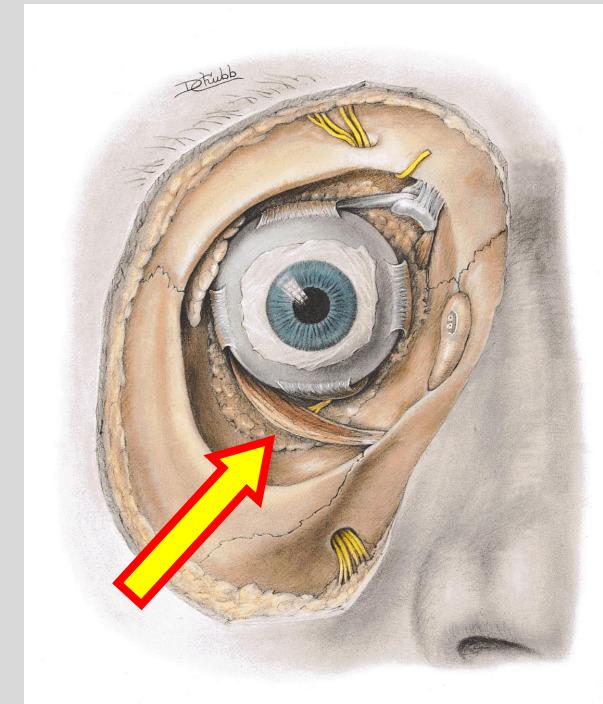
- Originates from lesser wing of sphenoid
- Passes through *trochlea*
- Inserts into sclera deep to superior rectus



# Oblique Muscles

## Inferior oblique

- Originates from medial orbital wall
- Passes posterolaterally beneath eyeball
- Inserts into sclera deep to lateral rectus



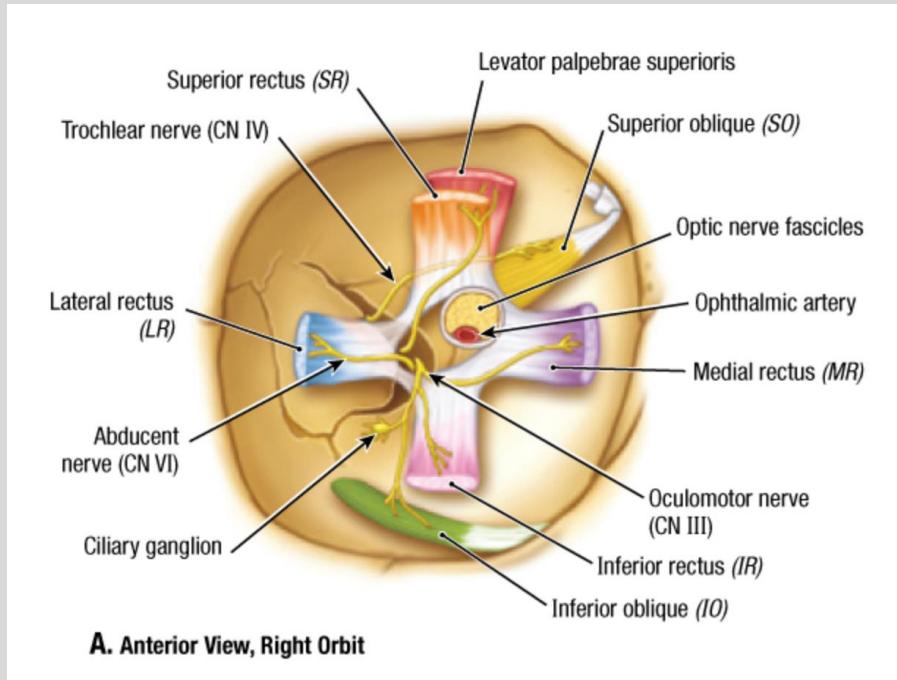
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# Innervation

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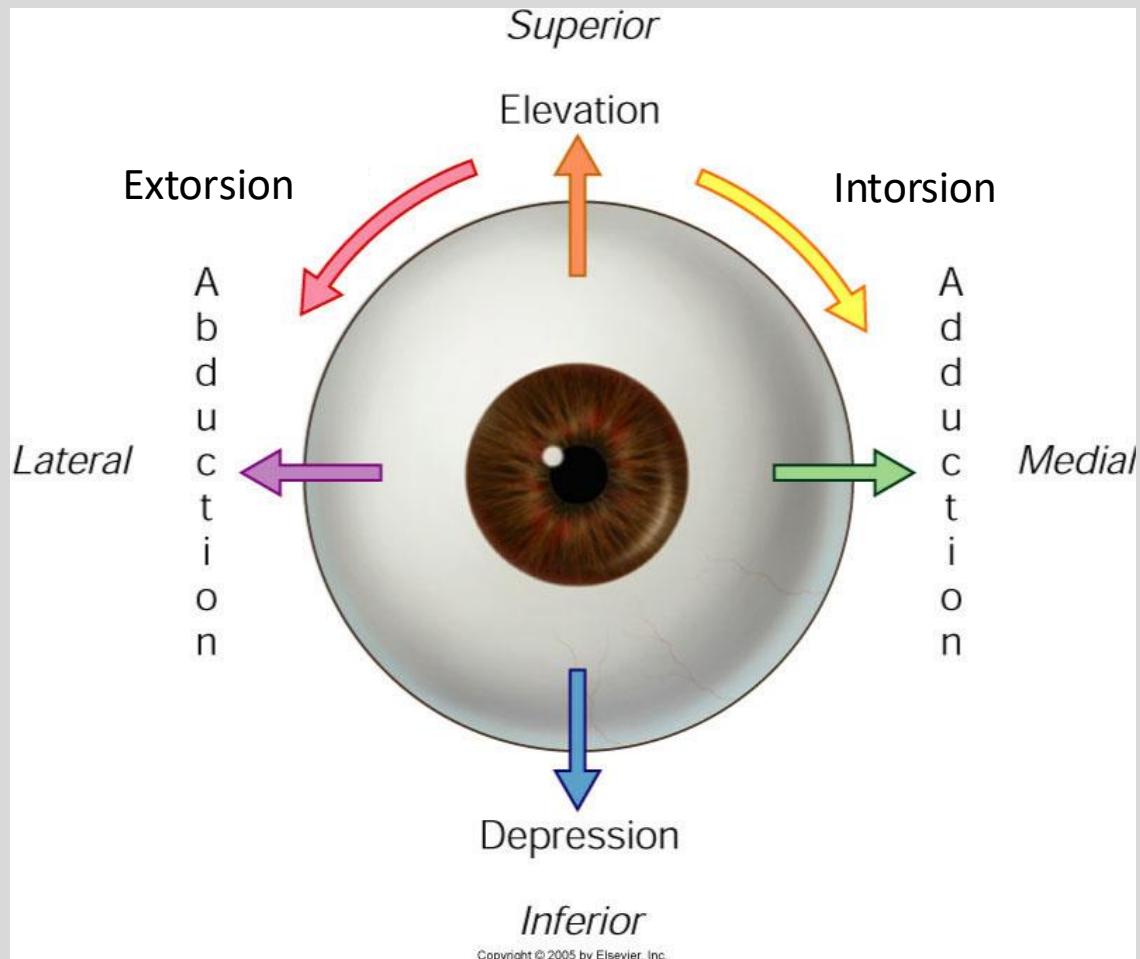


From COA, Moore, Dalley, Agur, 2014

- Superior Tarsal (Muller's) muscle: postganglionic sympathetics from superior cervical ganglion

- $SO_4 LR_6 AO_3$
- Superior Oblique: Trochlear n. (CNIV)
- Lateral Rectus: Abducens n. (CNVI)
- All Others: Oculomotor n. (CNIII)

# Part 2: Simple Movements of the Eye



## Actions on Eyeball

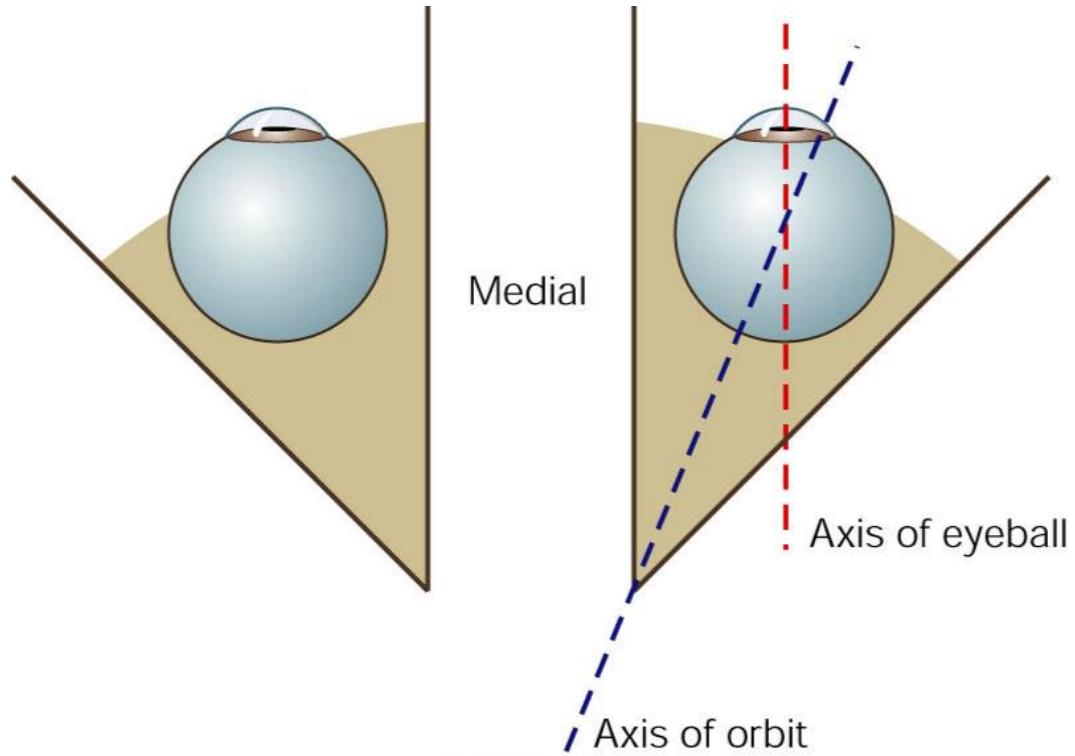
# *Actions vs. functions* of extraocular muscles

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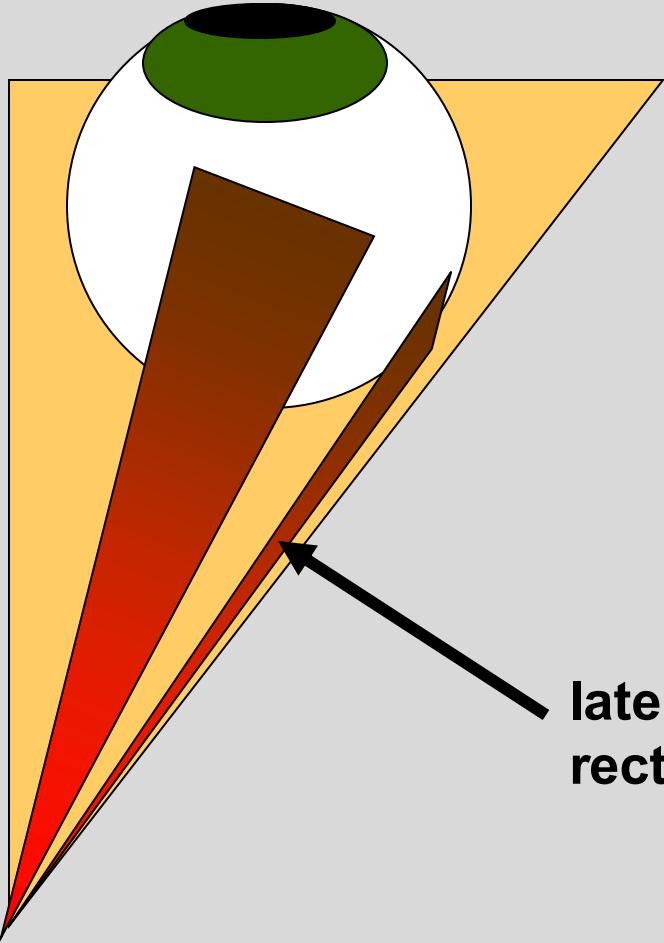
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- *Action* is what it would do if acted in isolation
- A muscle's *function* is what it *actually* contributes to a particular motion
- Sometimes these are the same – example: Levator palpebrae superioris

*Let's start with the  
simple cases ...*

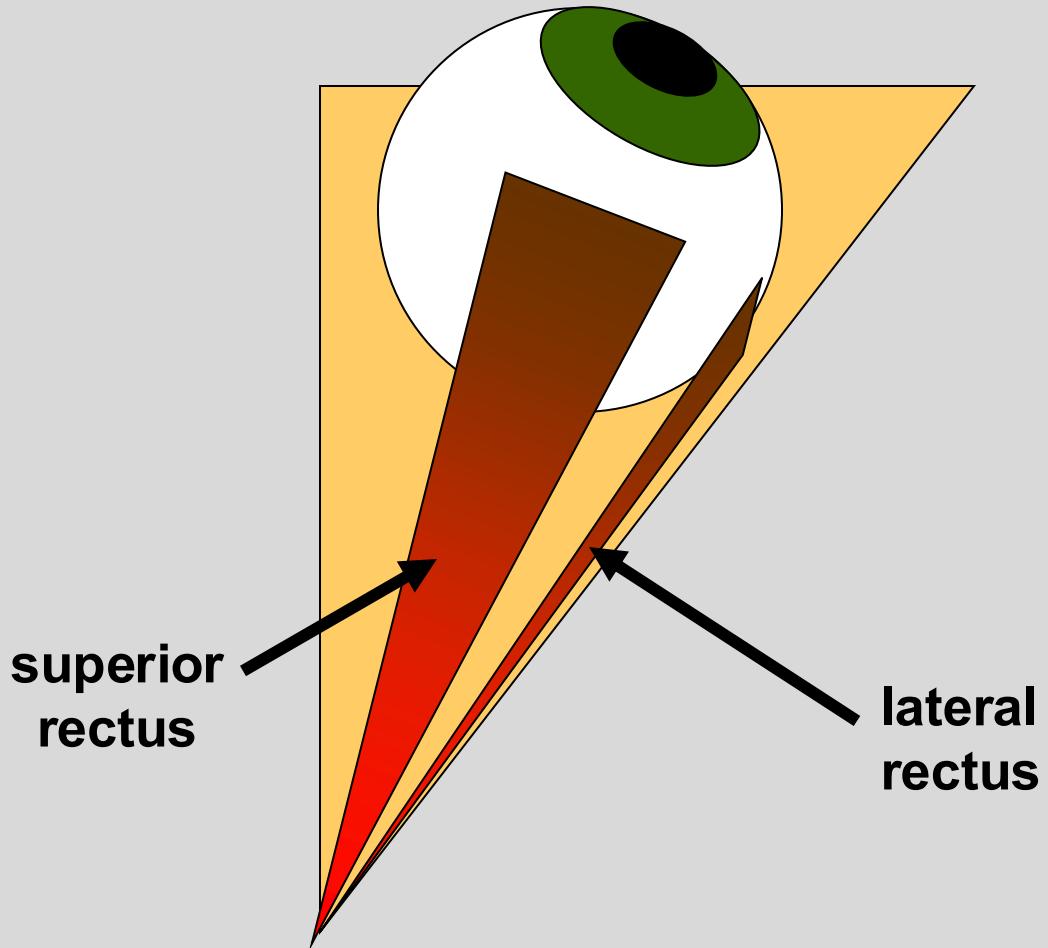


## Elevation of the Abducted Eye

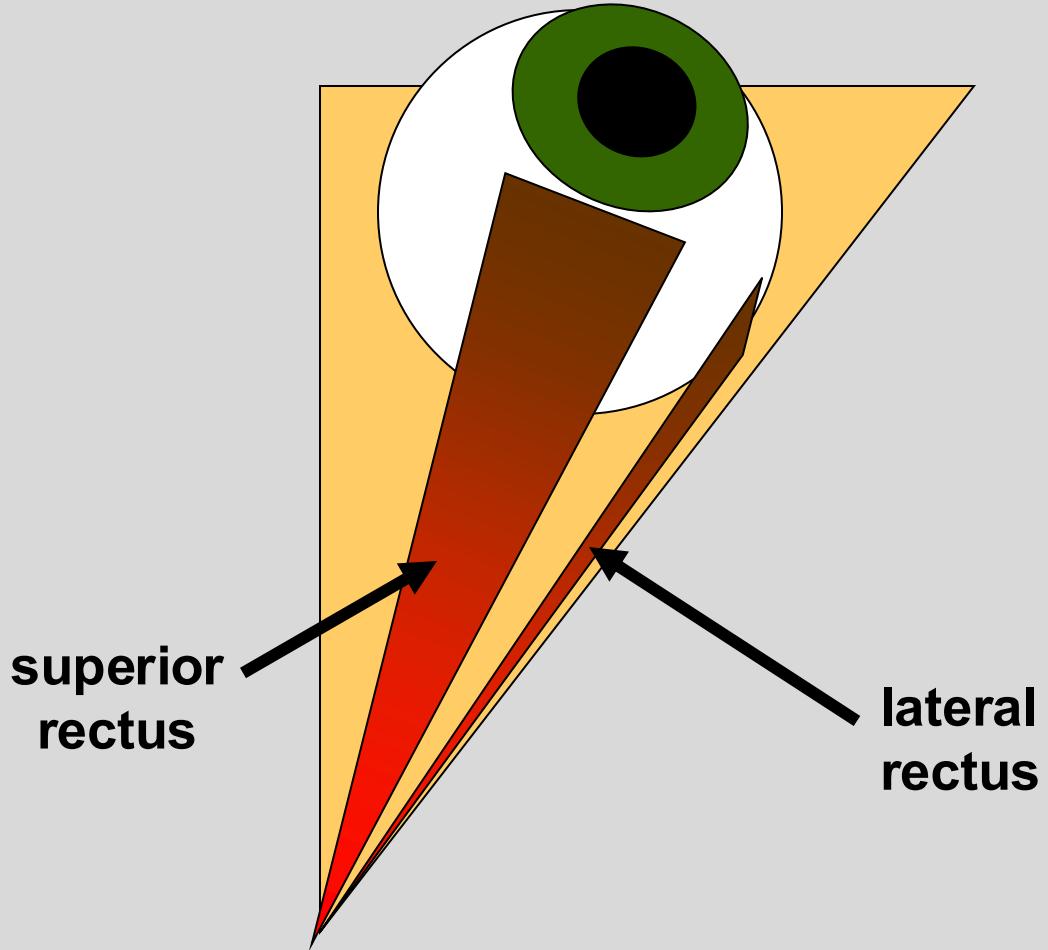


**lateral  
rectus**

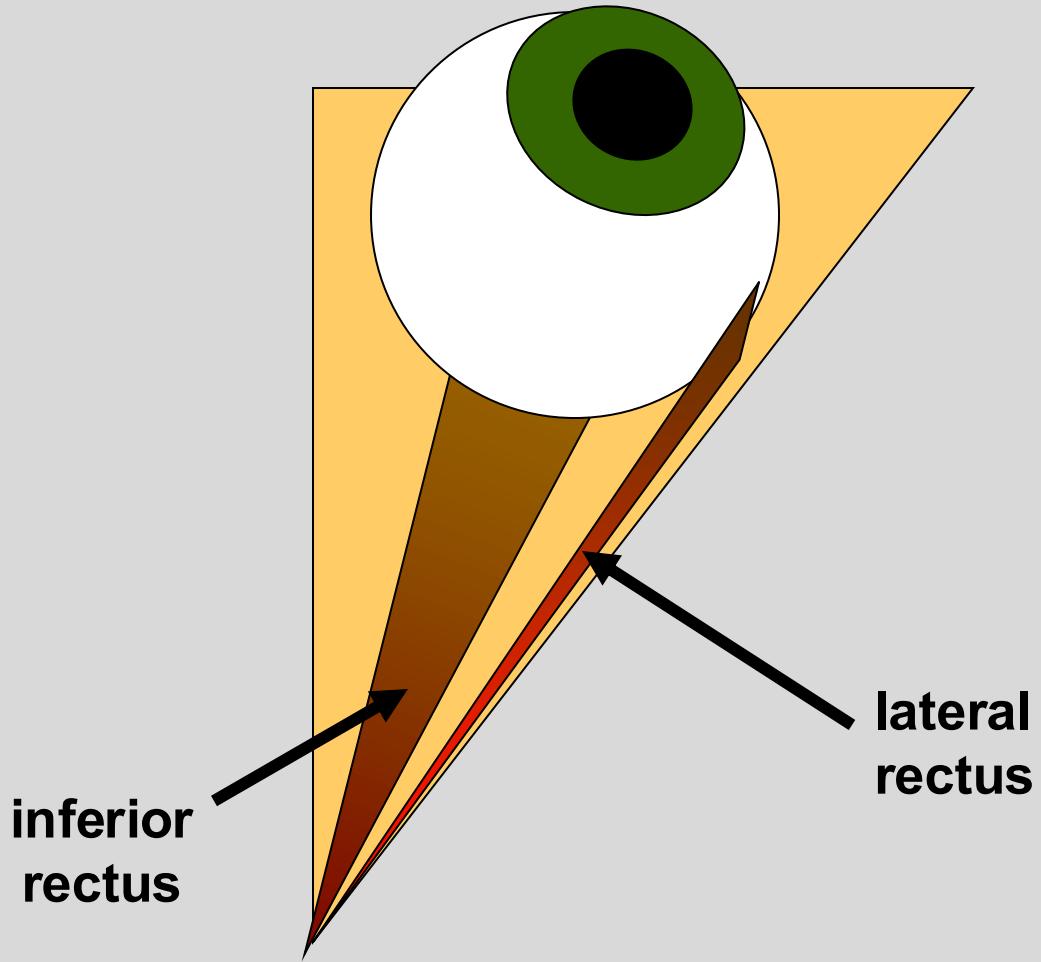
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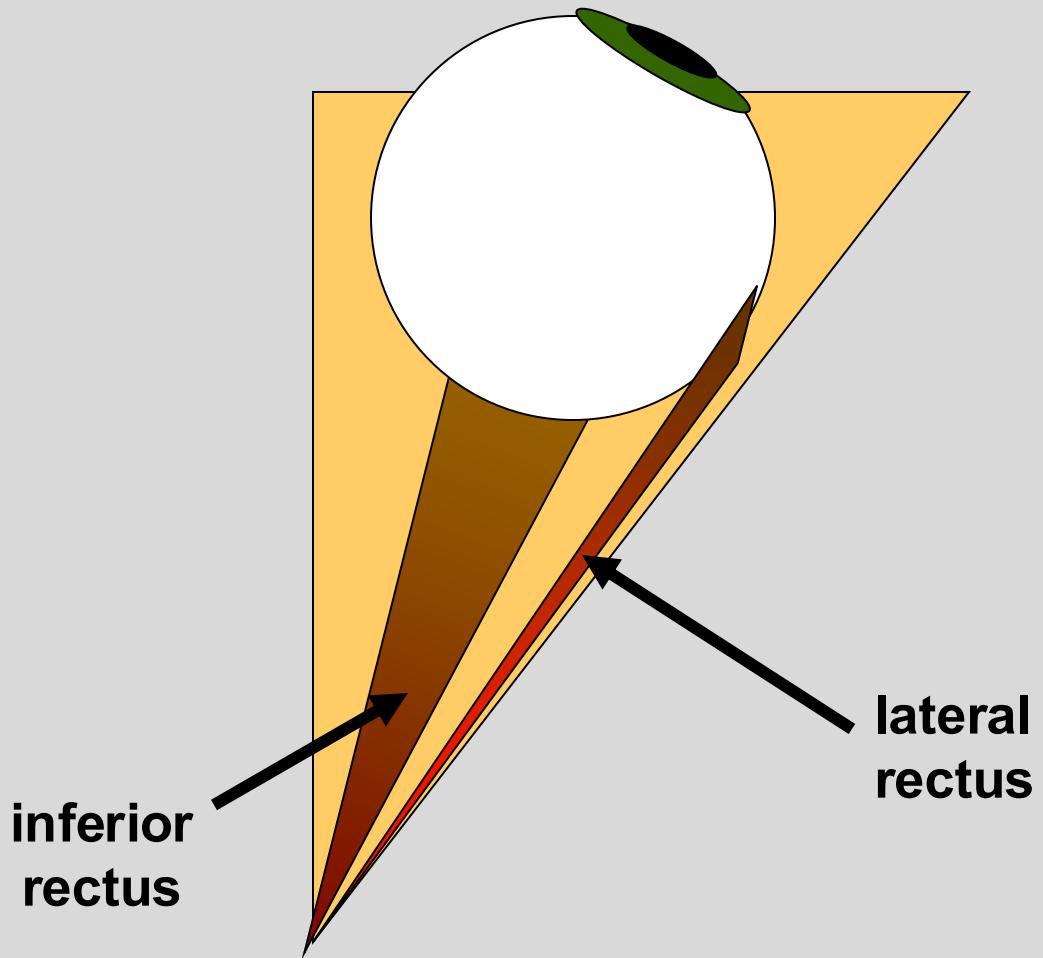
## Elevation of the Abducted Eye

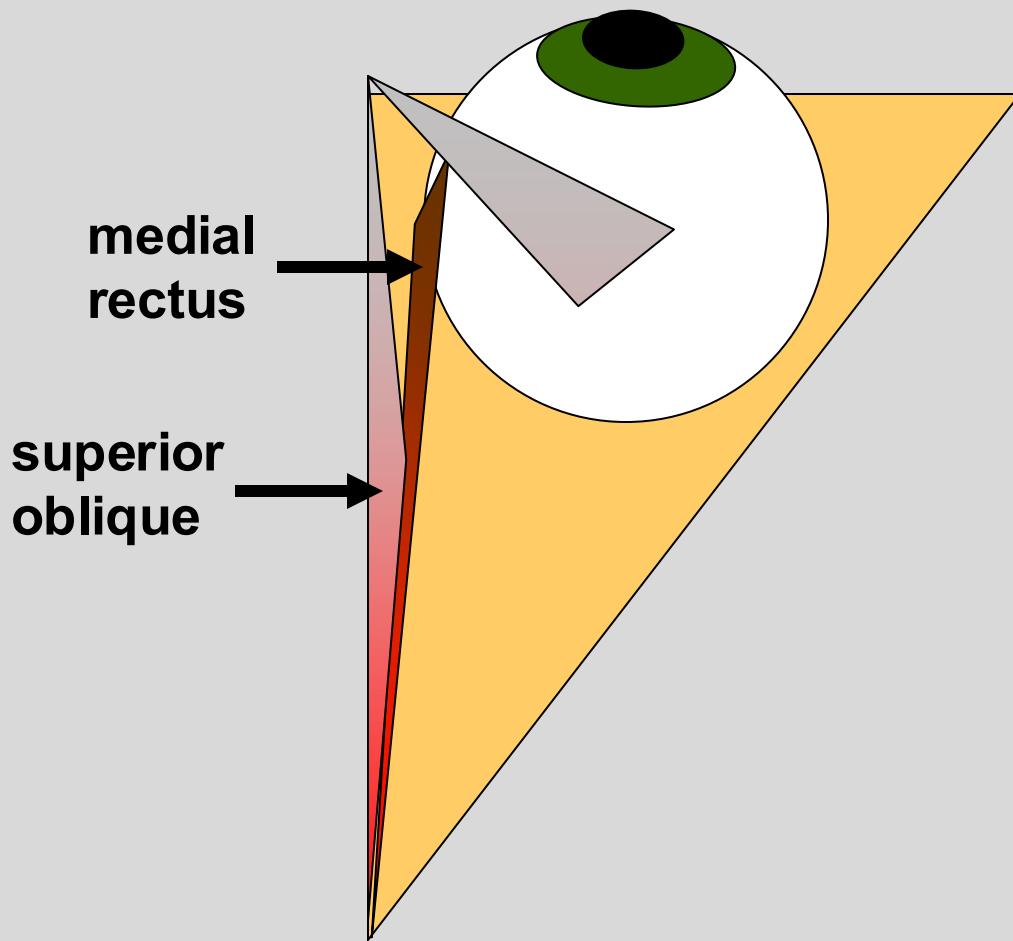


## Depression of the Abducted Eye

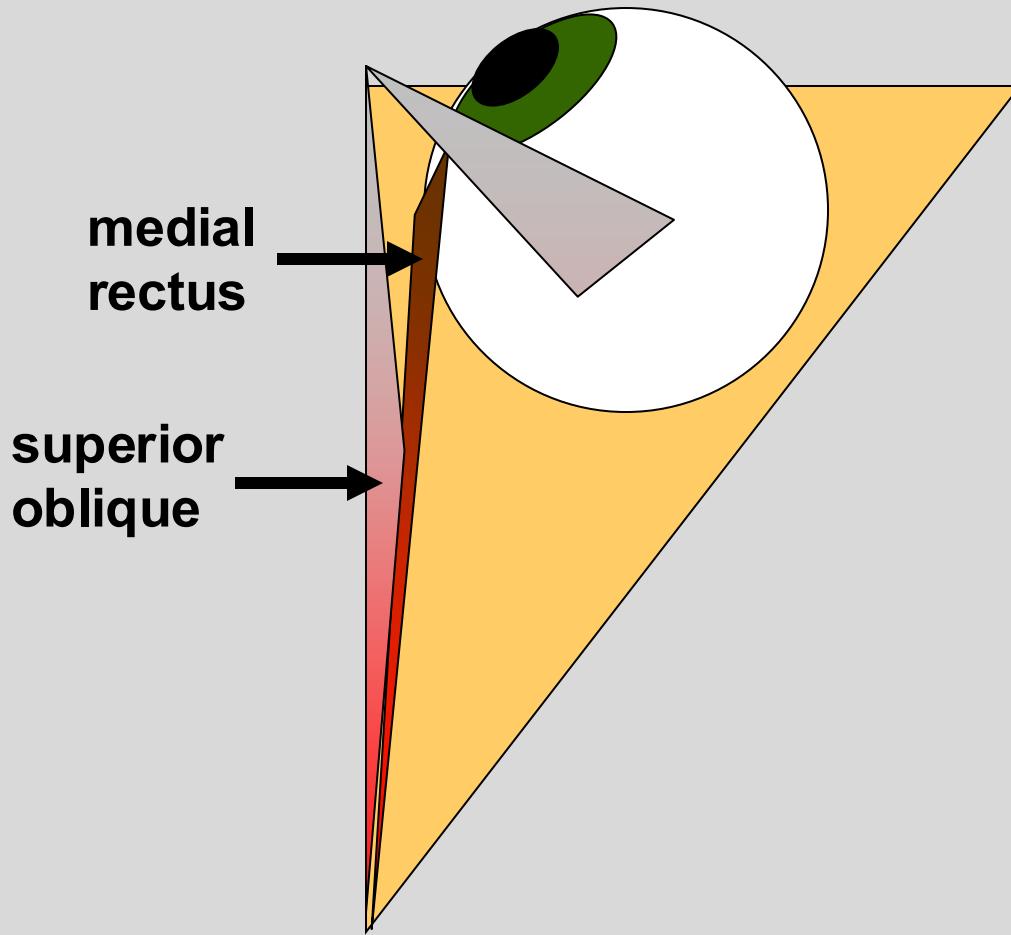


## Depression of the Abducted Eye

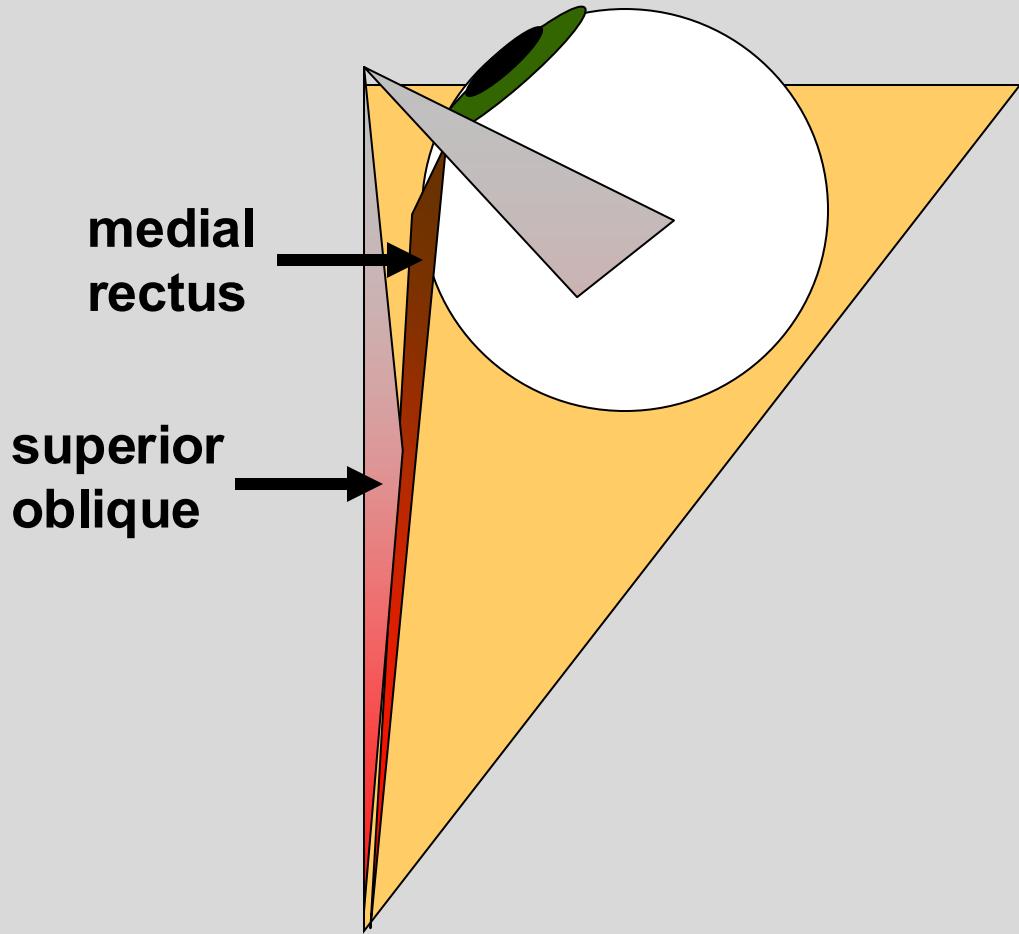




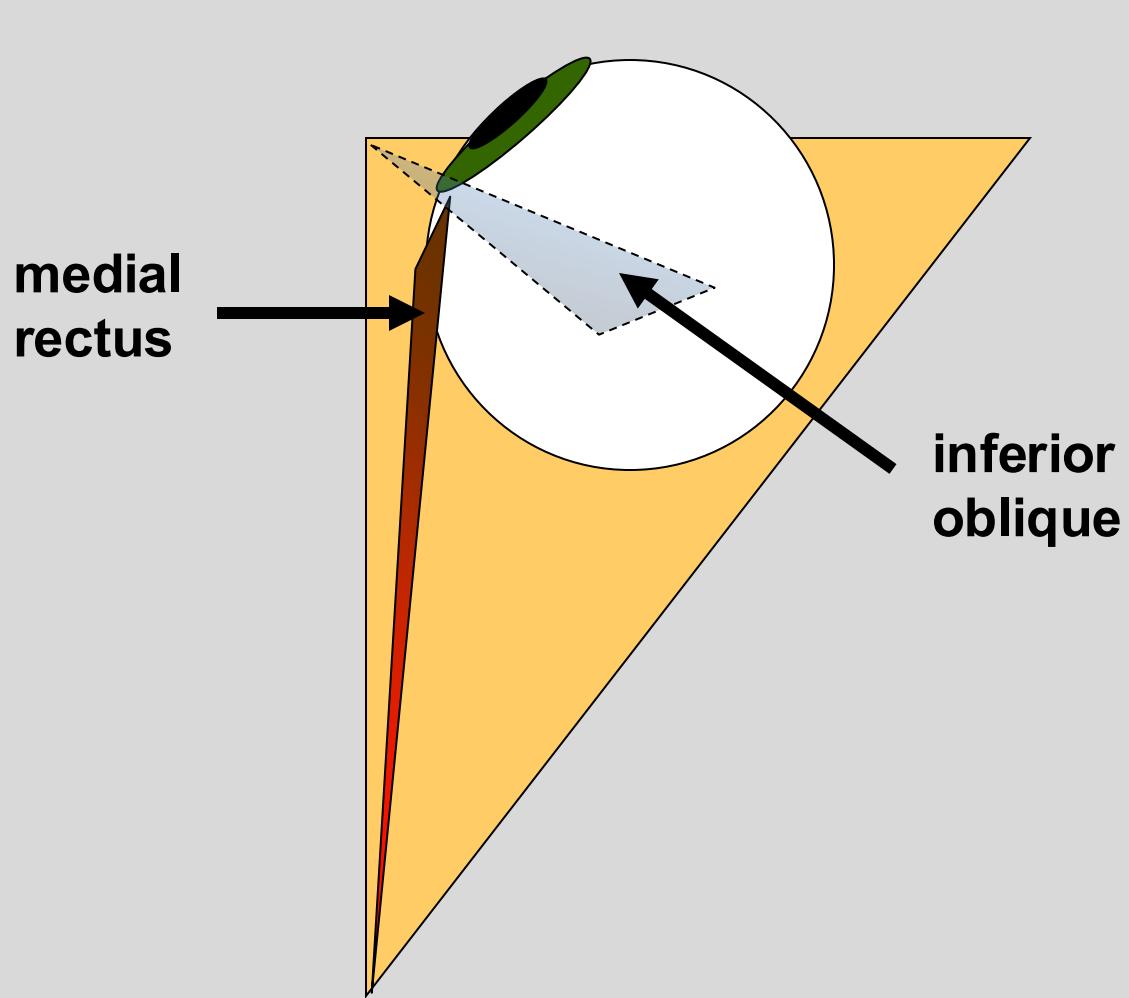
**Depression of the  
Adducted Eye**



**Depression of the  
Adducted Eye**



## Depression of the Adducted Eye



Elevation of the  
Adducted Eye