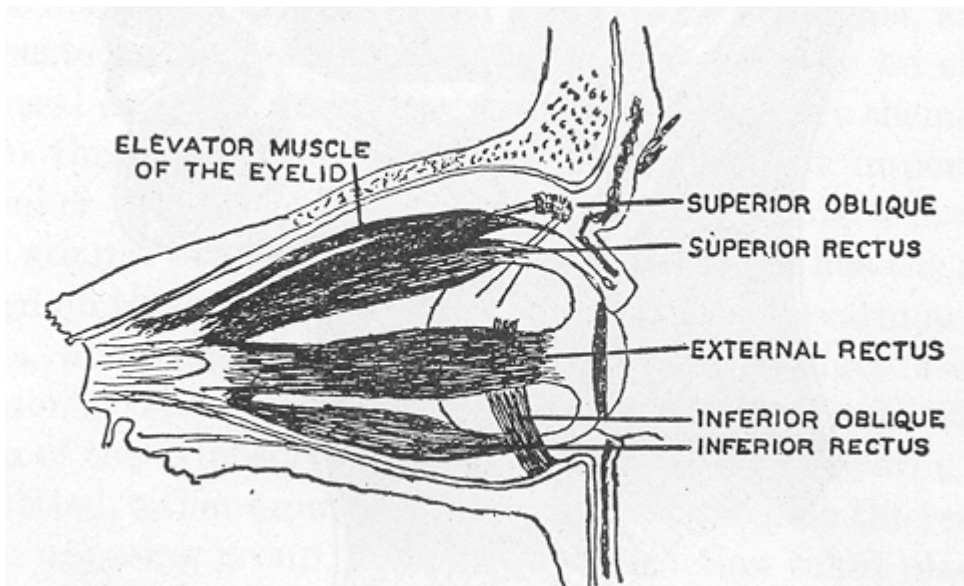


The Extraocular Muscles

The extraocular muscles are muscles involved with the eye. These muscles could move in a given direction. This movement is known as **agonist**. When they move in the same direction, it is known to be **synergist**. When the muscles of the eyes are moving the opposite direction, it is known to be **antagonist**. There are six muscles that help the eye move or rotate up, down, side to side and straight up. These six muscles have six cardinal positions. These six positions are *up/right*, *up/left*, *Right*, *left*, *down/right*, *down/left*. The six muscles are known as medial rectus (MR), lateral rectus (LR), superior rectus (SR), inferior rectus (IR), superior oblique (SO), and inferior oblique (IO).



The table below goes in dept to explain each muscle and their functions.

Type of Muscle	Function	Movement of the Eye
medial rectus (MR)	<ul style="list-style-type: none"> ▪ adduction 	<ul style="list-style-type: none"> ▪ Towards the nose
lateral rectus (LR)	<ul style="list-style-type: none"> ▪ abduction 	<ul style="list-style-type: none"> ▪ Away from the nose
superior rectus (SR)	<ul style="list-style-type: none"> ▪ Elevation ▪ Intorsion ▪ adduction 	<ul style="list-style-type: none"> ▪ upwards ▪ Rotate towards the nose ▪ Inwards
inferior rectus (IR)	<ul style="list-style-type: none"> ▪ Depression ▪ Extorsion ▪ Adduction 	<ul style="list-style-type: none"> ▪ Downward ▪ Top of the eye rotates away form the nose ▪ Inwards
superior oblique (SO)	<ul style="list-style-type: none"> ▪ Intorsion ▪ Depression ▪ abduction 	<ul style="list-style-type: none"> ▪ Top of the eye rotates towards the nose ▪ Downwards ▪ Outwards
inferior oblique (IO)	<ul style="list-style-type: none"> ▪ Extorsion ▪ Elevation ▪ Abduction 	<ul style="list-style-type: none"> ▪ Top of the eye rotates away from the nose ▪ Upwards ▪ Outwards

How they eye moves

An example of they eye moving on the antagonist way would be when someone is looking to the right that the right eye moves towards the corner of the eye causing a contraction on the right lateral rectus while the medial rectus is relaxed. At the same time the left eye is moving towards the nose. At this time the medial rectus of the left eye is contacting while the lateral rectus of the left eye is at rest.

Eye Muscle Innervations

Each muscle innervates with different cranial nerves. The medial rectus, superior rectus, inferior rectus and inferior oblique are all involved with the **cranial nerve (III)** which is known as the **Oculomotor**. It is responsible for movement of the eye. The lateral rectus is involved with **cranial nerve (VI)** which is the **Abducens**. This muscle is responsible for moving the eye laterally. The superior oblique is involved with **cranial never (IV)** which is the **Trochlear**. The Trochlear innervates the eye muscle through a pulley-shaped ligament in the orbit.

Duction, Versions, and Vergences

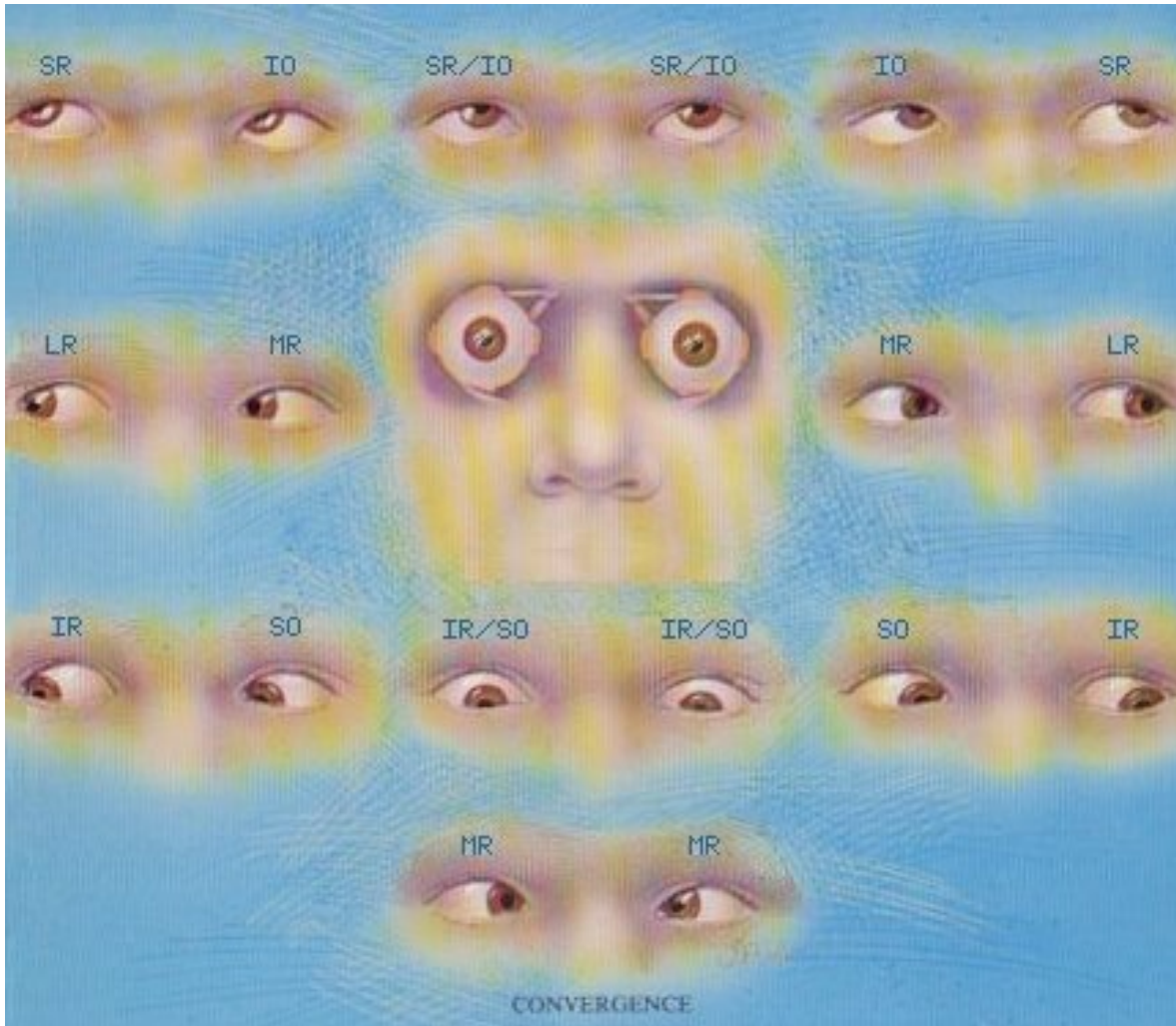
Any movement of the each eye is known as **Duction**. This includes all the movements stated above (adduction, Intorsion, abduction, Depression, elevation, extorsion). Any movement that involves the both of the eye in the same direction is known as **versions**. There are six versional movements and each state the direction of the eye and which muscles are involved.

Versions	Looking to the ...	Muscles involved
Dextroversion movement	right	right lateral rectus left medial rectus
Levoversion movement	left	left lateral rectus right medial rectus
Supraverision movement	straight up	right & left superior recti right & left inferior obliques
Infraverision movement	straight down	right & left inferior recti right & left superior obliques

Dextroelevation	right and up	right superior rectus left inferior oblique
Dextrodepression	right and down	right inferior rectus left superior oblique
Levoelevation,	left and up	right inferior oblique left superior rectus
Levodepression	left and down	right superior oblique left inferior rectus
dextrocycloversion	Right (rotation)	right inferior rectus & inferior oblique left superior rectus & superior oblique
levocycloversion	left (rotation)	left inferior rectus & inferior oblique right superior rectus & superior oblique

Last but not least, the **vergences** means movement of the eye in opposite direction. This movement has two principles, convergence and divergence. Convergence refers to both eyes moving inwards while divergence means both eyes are moving outwards. If the eye is inwards it is known to be “crossed eye”. If the eye is outwards it is known to be “wall eye”.

Over all, this goes to show that the eye could look like a simple thing but involves multiple muscles and these muscles are responsible for different movement. The movements could be agonist, antagonist, and synergist. And each of this movement allow the eye to look at different directions.



**MR = Medial
Rectus**

**SR = Superior
Rectus**

**SO = Superior
Oblique**

**LR = Lateral
Rectus**

**IR = Inferior
Rectus**

**IO = Inferior
Oblique**

Sources

http://www.tedmontgomery.com/the_eye/eom.html

<http://www.face-and-emotion.com/dataface/anatomy/eyemuscles.jsp>