Artificial eye
(Visual prosthetic or Bionic eye)
CONTENTS

- INTRODUCTION
- WHO IS ELIGIBLE?
- DEVICE
- WORKING
- NORMAL & ARTIFICIAL VISION
- TYPES
- DISADVANTAGES
- CONCLUSION
INTRODUCTION

- Form of neural prosthesis to restore vision.
- An externally worn camera and a retinal implanted chip makes it possible.
- It is often usable for those who suffers from age-related macular degeneration (AMD) or retinal pigmentosa.
SUITABLE FOR?

Those who are suffering from Retinal Pigmentosa &

Those who are suffering from age-related macular degeneration (AMD).
Retinal implant

Receiver

Camera

Optic nerve to brain

Implant tacked to retina

Microelectrode array

Tack

Ganglion cells

Area of photoreceptors destroyed by disease

Photoreceptors (rods and cones)
Age-related macular degeneration (AMD)
RETINAL PIGMENTOSA

Fig. 12a. Fundus photo of a normal human retina.

Normal eye
Effect of retinal pigmentosa

before
after
Various stages of Retinal Pigmentosa
DEVICE

An artificial eye consists of-

- Digital camera
- Video-processing microchip
- Radio transmitter
- Radio receiver
- Retinal implant
- **Digital camera**: that's built into a pair of glasses. It captures images in real time and sends images to a microchip.

- **Video-processing microchip**: It processes images into electrical pulses representing patterns of light and dark and sends the pulses to a radio transmitter in the glasses.
- **Radio transmitter** that wirelessly transmits pulses to a receiver implanted above the ear or under the eye.

- **Radio receiver** that sends pulses to the retinal implant by a hair-thin implanted wire.

- **Retinal implant** with an array of 60 electrodes on a chip measuring 1 mm by 1 mm.
1. Camera on glasses views image.
2. Signals are sent to video processing microchip.
3. Processed information is sent back to receiver.
4. Receiver sends information to electrodes in retinal implant.
5. Electrodes stimulate retina to send information to brain.
WORKING - DIAGRAM

LIGHT → VIDEO Camera → MICRO CHIP → RECEIVER → RETINAL IMPLANT

BRAIN → NEURONS
TYPES OF ARTIFICIAL EYES

- **First version** – Consists of 16 electrode array and large sized receiver placed behind ear.
- **Second version** – Designed with 60 electrode array and much smaller receiver placed around the eye.
NORMAL & ARTIFICIAL VISIONS

- **Normal vision** - Begins when light enters and strike on photoreceptor cells. These cells convert light to electric impulses that are sent to brain via optic nerves.

- **Artificial vision** - The camera captures images and sends to retina implant. It stimulates neurons. The stimulated neurons send information to brain via optic nerves.
DISADVANTAGES

- Surgery is required to implant the electrode array.
- Expensive.
- The vision is restored partially.
- Repairing is difficult if any of the devices got damaged.
- Those who lost their visions due to other reasons could not use this device.
CONCLUSION

- Revolutionary piece of technology.
- Good news for AMD and retinal pigmentosa patients.
THANK YOU...

ANY QUESTIONS???????