Argus II and Vision Rehab – Making It Work!!
About Us!!!!

Work for Focal Point UK – Vision Rehab contractor for Second Sight

Vision Rehab Specialist – over 20 years

Certified Low Vision Therapist (CLVT)

Ex-RNIB Low Vision Officer – over 7 years

Work with Optima Low Vision Services

Was O + M tutor on Rehab Studies course at Canterbury University/KAB for 8 years
What to expect today!!!!

• Describe how Argus II works
• Identify main principles of vision rehab with Argus System
• Explain how to use ‘artificial’ functional vision provided by Argus II
• Integrating Argus II into O + M
The Patient Experience

What do people who have Argus II think of the system??
Peoples’ feedback about Argus II

‘It’s a wonderful feeling to see something, as little as it is’
‘It’s always good to know if the lights are on or off, and where the doors are. Before I was imagining where the furniture was, now I can see it. It improves my quality of life’
« I can see windows, doors, and other objects. I can also see movements of the persons I talk to. When I am with others. I am no longer in an imaginary world.»
Working with Argus - Visual Rehab process?

- Rehabilitation = re-learning ‘old’ skills
- Habilitation = learning ‘new’ skills and concepts
- Visual Association information
- Other sensory input, and environmental information
- Use of Visual memory important
All about Retinitis Pigmentosa – clinical symptoms

healthy eye  diseased eye

Source: National Eye Institute
The UK Patients!!!

• 2008 UK based clinical trial = 11 patients

• All RP patients – functionally ‘blind’

• Many have been ‘totally blind’ for many years – in some case 20 – 30 years

• Functional as ‘blind’ people – developed systems and strategies

• O + M - Mix of cane / guide dog users
The Argus and the People

• About Retinitis Pigmentosa – genetic retinal dystrophy
• Prevalence : 1/4000 people
• Clinical symptoms – progressive condition, deterioration of photoreceptors in retina, leading to peripheral field loss
• Functional impact = peripheral field loss leaves some central field - ‘tunnel’ vision (variable), night blindness
The Argus and the People

- RP is an eye condition that can lead to total blindness
- People using Argus have NPL or small amount of light perception - many been totally blind for 20-30 years #
- UK clinical trial started 2008 – 11 patients from Manchester MRE Hospital and Moorfields Eye Hospital, London
Argus II – the evidence?

Identifying Peoples’ Needs – Anglia Ruskin Univ, Cambridge and RP Fighting Blindness

FLORA outcomes – identified progress and benefits particularly in O + M

5-year performance outcome report - clinical trial, Moorfields, London

Patient feedback and experience
The Argus II System

- Camera
- Transmitter Coil
- Video Processing Unit (VPU)
Licences and Approvals

CE + FDA

2011 + 2013
All about Argus II

World’s first FDA licenced and CE marked Electronic Retinal Prosthesis system

First developed in 1992

Argus I 2002 – Argus II 2006 and various upgrades

45 clinical centers

13 countries

Over 230 implant surgeries worldwide (May 17)
Where is Argus II?

United States
UK and Canada
Germany
France
Spain
Italy
Iran
Turkey
Holland
Taiwan
Saudi Arabia
South Korea
All about Argus II – system components
System components – on the outside!

- Glasses – dark or clear lenses
- Frame mounted miniature video camera
- External antennae + associated electronics
- Video processing unit (VPU) – wire connected to glasses frome
- VPU is a control box – on/off switch and for 3 x filters and polarity control button
System components – on the outside!

- The Filters - 1. standard, 2. high contrast and 3. edge detection
- Powerpack – externally mounted battery
System components – on the inside!

• The Implant – comprised of internal antennae secured to outside of eye with scleral band

• Electrode array unit fitted inside the eye

• The array unit lies on top of retina, over the fovea

• Has 60 individual externally controlled electrodes
System components – on the inside: The Array!
Training to use Argus System
‘Low Vision’ Training to use Argus® II System
‘Low Vision’ Training to use Argus® II System

• Understand ‘artificial vision’
• People need to ‘re-learn’ how to see again
• Use of visual memory important
• Good body awareness/image, and posture essential eg. For camera position
• Learn and interpret images being seen when using the system
‘Low Vision’ Training to use Argus® II System

• Understand and develop use of System ie. Filters / Polarity

• System does not give colour vision

• Does not provide distance appreciation – can provide image detection up to four metres away
Argus II Treatment and Training Process

- Eligibility for surgery
- Basic in clinic training
- Low vision trainings
- Home O&M training
- Patient trainings with RP
- Fitting
Using Argus - What will Argus II do?

• Using the filters – Standard, high contrast, edge detection
• Polarity – positive and negative imaging
• Identifying environmental clues and landmarks
• Using in different light levels – can give varying light responses
What does someone see with Argus II?

- Level of functional vision = ‘artificial vision’
- Series of pixelized ‘light flashes’, which give shape and form providing an image
- Covers central 20 degrees, compares to 30cm seen at arms length
- Interpreting light and dark light sources seen
- Persistence levels – length of time an image can be seen, can vary from 4 secs to less than a second
What does someone see with Argus II?

- Using the filters – standard, high contrast, edge detection
- Polarity – positive and negative imaging may be easier for different tasks
- Identifying environmental clues and landmarks
- Used in different light levels – can give different light responses
The Argus II rehab journey

• FLORA Round 1 – Functional Low Vision Rehab Assessments

• Stage 1 assessments – compared functioning with and without the system

• Identified any additional rehab training needs

• FLORA Round 2
Argus II and Vision Rehab

4 specific domain areas:

• Visual Orientation and navigation

• Mobility – supporting physical movement and locomotion

• Social inclusion - Interaction with others

• Activities of Daily Living (ADL)
Vision Rehab and Argus II – basic skills

- Need to manage personal expectations of the system
- Identified need to set realistic training ‘goals’ and objectives
- Physical rehab – posture and ergonomics
- Emotional and Psychological impact of Argus II
Using Argus II system

Using Functional Vision – what can a person ‘see’ with Argus II
Functional vision with Argus II – what do people ‘see’

- Location light or light reflective sources
- Light ‘flashes’, shape and form
- Various levels of persistence - length of time the flash can be seen for
- Uses both positive and negative images
- Beneficial to use the system with other senses eg. Hearing
Visual orientation skills

• Locating / detection of objects in space
• Supports orientation by locating landmarks and ref points
• Recognising objects – shape recognition and size of visual target
• Use visual association and memory – connect by location for various clues
What does someone see with Argus II?

• Level of functional vision = ‘artificial vision’
• Series of ‘light flashes’ which give shape and form providing an image
• Interpreting light and dark light sources
• Persistence levels – length of time an image can be seen, can vary from 4 secs to less than a second
• Using the filters – standard, high contrast, edge detection
Using ‘artificial’ functional Vision

• People do not know what they are ‘seeing’ – operate as a ‘blind’ person
• Many have visually ‘switched off’
• Need to learn and interpret what system is telling them
• Polarity – positive and negative imaging
Using ‘artificial’ functional vision

• Identification of environmental clues

• Using in different light levels – can give light ‘overload’ in bright conditions

• Compare the different filters for various tasks/environments

• Scanning, tracking and tracing skills – may need to learn individual skills
Identification of landmarks and reference points!!!
Vision Rehab and Artificial vision – O + M Skills

- Good body image and awareness
- Good spatial awareness
- Good posture and physical movement and skills
- Use pre-cane skills with the system
Orientation and Mobility – Indoor travel

- indoor light sources and reflective surfaces,
- Contrasting surfaces - doors and door frames, floor and wall contrast, flooring
- Identifying indoor fixtures and fittings
- Static skills and physical movement / locomotion
- Accessing known environments – ‘mental mapping skills’
Long Cane skills for Arugs
Orientation and Mobility – Outdoor Travel

• High levels of contrast beneficial
• Identify different contrast and light responses on the ground to follow as a ‘line of travel’
• Natural light levels: sunlight and overcast cloudy days – using different filters
• Accessing different types of built environment – known and unfamiliar
O and M Skills – Outdoor Travel

• Beneficial to have good long cane skills
• If not, cane training recommended
• Development work taking place to integrate use of Argus II with a guide dog
O and M Skills – Outdoor Travel
Teaching habilitation skills to use Argus = new skills

• Learning to scan with the head, and not the eyes, using systematic search patterns
• Consider posture / ergonomics with Argus
• Physical fatigue – neck ache (be aware)
• Camera - hand coordination to allow for the ‘off-set’ of camera mount and the effect on head and body posture
What are the benefits of Argus II?

- Artificial vision provides a level of functional vision that would not exist otherwise for people with RP
- Enhances spatial awareness
- Provides additional environmental information and clues for O + M
- Important for social inclusion
- Motivation and quality of life
The future – what next!!

• Further development of the system for people with RP – eg. New glasses
• Feasibility study for AMD patients
• Developing good practice guide for integrating use of a guide dog
• On-going development of rehab strategies
• Continued evaluation of outcomes
• More implants in more countries!!
Conclusions

• Argus II – world’s first CE and FDA approved retinal prosthesis device
• Over 230 people worldwide – May 17
• Mainly O + M, also ADL and social inclusion
• ‘Vision’ training essential to maximise the use of the system
• Evidence supports positive quality of life outcomes and patient experiences
• Argus development to continue!!!
Thank you