Lighting and health

The invisible epidemic?

All videos have been removed as permission to distribute has not been given by patients

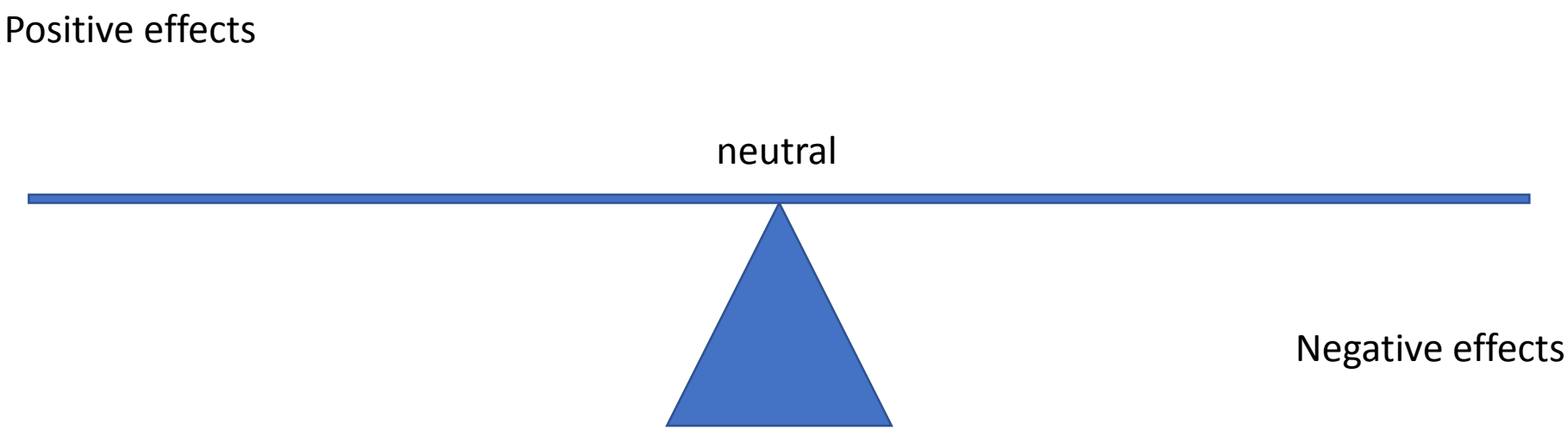
Ian Jordan

- Specialist clinical practice in Ayr Scotland – specialising in the effects of light on visual and other systems
- Designer of filters / lenses / instrumentation / clinical assessment techniques
- Works with Universities, multinational companies, professional bodies…..
- Believes that light is an incredibly powerful tool – and is currently under-utilised – this needs to change

Can physical problems be provoked or treated by light?

When is a movement problem caused by the wrong light?

Good or bad lighting?

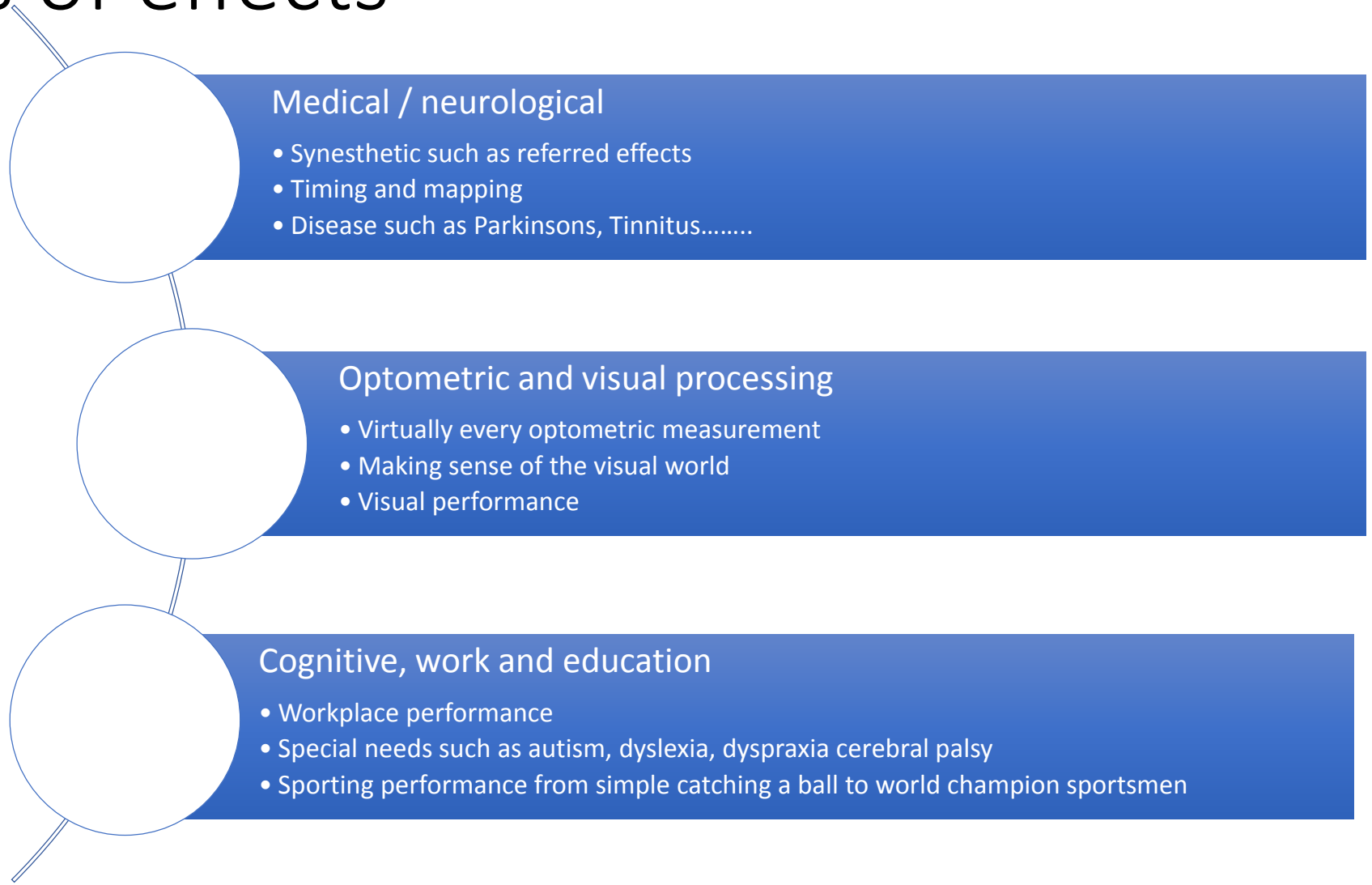


All lighting can be both positive and negative – it's just a question of ensuring the positive is paramount – and this may need to be determined individually

The effects of light and colour are

- Variable – from minimal to life changing (effects of light can be devastating)
- Predictable
- Form symptom clusters
- Provocative of symptoms – light causes many physical effects
- Almost always ignored by the medical and optical professions with little or no training in
  - Recognition of problems
  - Assessment techniques
  - Prescribing methods
  - Effects of light modification

Types of effects



Determining optimum lighting is complex and beyond this presentation but

- We use univariance (i.e. we separate LMS cone cell pathways)
- We use Hue, saturation, luminosity
- We use forced choice within colour space
- We find optimum position in colour space
- We find gamut in which visual system performs optimally and a negative gamut
- We add ambient light and calculate optimum lighting / whether a filter is required – and what it is
- We emulate light + filter combinations and can determine tolerances

We can even assess non verbal / non cooperative patients

Most people have not seen the potential effects of light….. so I will introduce you to a small selection of patients

This is a neurological condition (Wilsons disease) which can be treated with light modification or using filters to modify the light input

The effects are extreme

Parkinsons' – the effects of colour and lighting are significant – but never addressed

Tremor usually resolves in the right light

Dyskinesia may stop immediately if visual stimulus is controlled adequately

Tinnitus – treatable using lights?

Clinical trials have now been completed

A treatment for tinnitus using lighting is now being trialled at Leicester University Medical School

Don’t forget pain and arthritis

Referred pain / touch is common if visual processing due to lighting is unstable

Not knowing your body and where it is
can have disastrous consequences

It is affected by lighting

The lighting causes her not to feel things
in the right place – so we can either
modify the lighting or use a tint!

Timing is also critical – lighting has been known to have an effect since 1922!

We can accurately tune visual processing speed using a vectored Pulfrich intervention

This enables the McGurk effect (when vision and speech are desynchronised the wrong sound is heard) to be countered and speech and language to be processed adequately

It is critical in work and education – yet never addressed

We get non verbal children to speak – inappropriate lighting can prevent speech in some children

The effects in vision of colour and lighting can be startling – yet the training for the professional is minimal

Standard training is that visual fields cannot be increased or reduced by lighting / filters

This is incorrect

Yet it is still being taught!

The right lighting is essential in this patients house

He waited 14 years to have his field restored

Even conditions such as strabismus (squint) may be both caused or alleviated using lighting

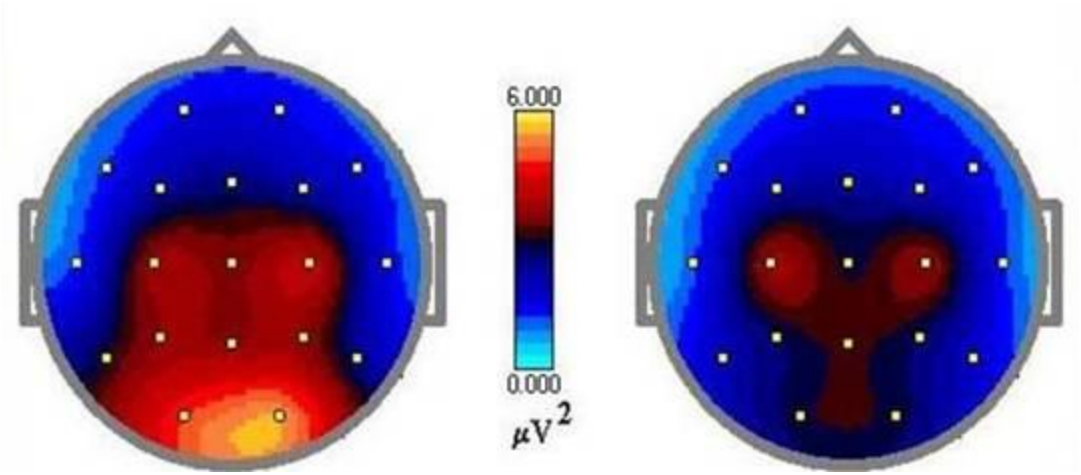
Causing dissociation leading to strabismus using lighting

Current treatment – nothing like as effective

Preventing a strabismus using colour (squint appears in white light – stops when red is attenuated)

The effects of these (and other optometric effects) of inappropriate lighting for a person leads to

- Educational underachievement – at least 10% of children have significant problems
- Difficulties in the workplace
- Sickness – days off



Changes in brain arousal by modifying lighting (in research and development project we undertook around 15 years ago)

This composite QEEG demonstrates the changes in the occipital cortex to lighting

Acknowledgements to Dr B Steffert,
Prof Y Kropitov

Special needs almost always are affected by lighting

- Autism
- Dyslexia
- Dyspraxia
- Cerebral Palsy

Autism – the condition in which there is n trust of sensory inputs

There are so many positive and negative effects of lighting in autism – that it would take a whole day just to show the videos!

The trick is to get it right – then the life of the person is MUCH better

Get it wrong…….. By using the wrong lighting

Facial recognition and expression recognition is critical – and can result in anxiety if not addressed

The only way of treating these problems is by lighting modification

Or tinted spectacles

It can also be provoked by the wrong lighting

Imagine

You have never seen a face before (you have face blindness)

How do you react?

1.5 million people in the UK have problems with faces (NHS figures)

What about when you see your own face for the first time

How would you feel?

Anxiety?

Terror?

Or upset and angry that it has been provoked by the lighting>

Or if faces appear to detach from the body

How scared would you be?

We see a patient a month with these symptoms – normally treated using anti psychotic drugs!

When the lighting (or tint) is correct – symptoms cease!

What happens if your mother looks like a monster

And so do you

The answer is – change the lighting

Human centric lighting – good or bad?

Good

- For many people it will be ideal lighting

Bad

- For some it is the worst possible lighting – particularly those with special needs

But – it can be modified on an individual basis – lighting is best determined individually - an opportunity?

The future is individual centric lighting

Human centric lighting

- A good start
- Fighting against optical professions – they actively want to inhibit blue
- Inadequate for some – for some it will provoke symptoms
- Changing circadian rhythms can have unwanted side effects e.g.magnocellular or dorsal stream difficulties
- LEDs – problems are surfacing for significant numbers – but they can be addressed!
- Much more research is needed

The future

- Lighting is at the start of an exciting time
- Lighting can be used to replace or augment drugs / medical treatments – but much more research is necessary
- Lighting in the workplace and at school needs to be determined individually – one size does not fit all
- A whole new rethink of lighting needs to take place – this is a massive commercial opportunity – I look forward to seeing the changes

The future is in your hands – good luck!

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I am happy to help but cannot comment on individual problems unseen