synapse

- solutions for healthcare providers

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Dear colleagues

There are several reasons why you may be reading this newsletter now. One of them is to get the CPD points required by your regulator to maintain your registration. Of course, you may also be struggling with insomnia, or need an excuse not to wash the car or go to the gym… but the first one serves my purpose. You are trying to learn something, and for heaven's sake let's not waste valuable time. If you're going to read it, you may as well remember it and apply it in practice. Learning how to learn can have life-long benefits.

Cognitive and educational psychologists have developed and evaluated many learning techniques, ranging from re-reading to summarising to self-testing. Which one(s) work best? A recent article in Scientific American: Mind has some thought provoking answers.

Self-testing has been proven in hundreds of experiments to improve learning and retention. In one, students were asked to memorise word pairs, half of which were later included in a test. Students who were tested after their learning session and then again a week later remembered 35% of the word pairs. Those who were not tested after the learning remembered only 4% at the 1 week test. The theory is that practice testing triggers a mental search of long-term memory that activates related information. This 'stores' the new information in context and creates multiple connections to it, making it easier to access.

Distributed practice is more effective than cramming. Again, word pairs were memorised by students in sessions that were either back-to-back, one day apart or 30 days apart. The 30-day group remembered the words best: 47% compared with the 'crammers' who remembered 37%.

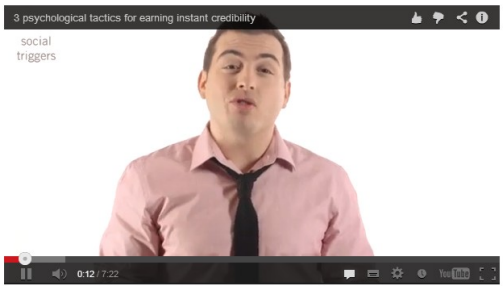
I was mortified to discover some of my favourite techniques under 'what doesn't work.'

Earning credibility

Universities provide an academic basis for qualifying optometrists, but many young professionals struggle to earn credibility.

Our patients have to trust and believe in us to come back.

Click here to watch a 7 minute video describing 3 steps to earning credibility.



- Don't sell/ recommend the same thing to everyone. Customise & adapt your products and services (in collaboration with the patient) to match his/ her own unique needs.
- Give accurate information.
- Provide proof by referring to statistics, your own experience, research or even a reputable website.
- Look the part. OK, that's not in the video. It's just my view. We place so much emphasis on all things visual, so our own appearance and that of the practice should contribute to a professional image. I think the presenter would have been more credible without his tie.

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Highlighting, rereading, summarising and mnemonics ended in this category. 'In controlled studies, highlighting has failed to help US Air Force basic trainees, children and remedial students, as well as typical undergraduates. Underlining was ineffective... whether it was aerodynamics, ancient Greek schools or Tanzania. In fact, it may actually hurt performance… [e.g.] underlining reduced the ability to draw inferences... It may be that underlining draws attention to individual items rather than to connections across items.' Highlighting's usefulness is limited (they report) to the first stage of learning, i.e. to be followed by self testing.

Re-reading's benefit is greatest for the 2nd time, and does not increase much after that. Summarising (the jury's still out) and mnemonics (best for learning new languages) are not recommended by researchers either. In fact, what you are doing now is good for optimal retention. It's very close to self-testing (you have the questions to look forward to) and distributive practice (you are doing your learning at regular intervals.) Saving up all the newsletters and then rushing through them when you're audited means you might get your points, but you don't get the most benefit.

Consider these techniques when you teach your patients about their eye-related conditions. After you've explained, ask them questions to make sure they've understood and to help them assimilate the information. Give them reading material to take home so that they can review the information at a later time (spread the learning) and refer them to specific, trustworthy websites to ensure a consistent and repeated message.

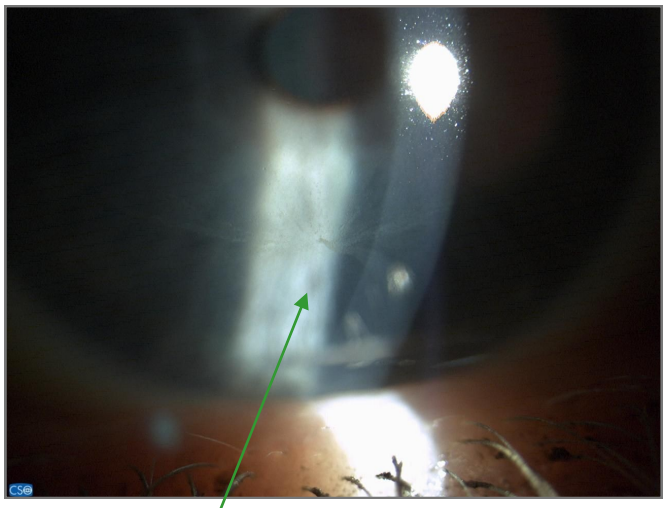
As practising clinicians, we seldom sit down purely to learn new facts. We want to expand or sharpen our critical thinking, and we need to assimilate new information with existing knowledge and experience. One of the best ways to do this is through case studies. Jason Statham's character in The Mechanic says: 'Good judgement comes from experience and a lot of that comes from bad judgement.' Effectively, he says we learn best from our mistakes. I am part of a group that shares case-studies. One of the recent ones had me barking up the wrong tree entirely. What can you learn from my mistakes? (My thanks to Leoni Joubert for this case study and Dirk Booysen for his comments.)

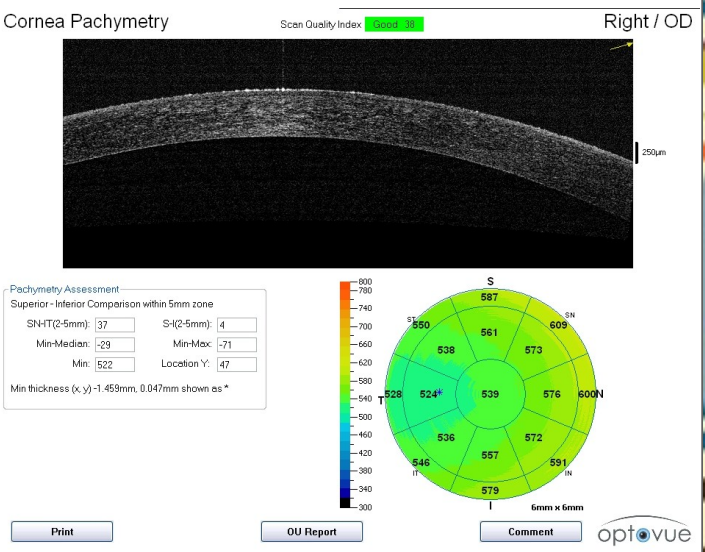
Presenting complaint: A 40-year-old female, Caucasian patient presents with gradually decreasing vision in both eyes over the last month or so at distance and near; worse in the right eye. She has never worn any correction and her vision at distance and near has always been good.

Medical history: Has been very healthy up until she had a bout of tick bite fever about 2 years ago. She is **extremely** averse to Western medicine and is a vegan, green, natural, organic… You get the picture. She visited the homeopath for treatment of the tick bite fever. Various dietary options were tried including cutting out carbs and eating (more!) vegetables and fruit. She had lost 8kgs and was feeling very tired and weak after 6 months of seeing the homeopath and eventually relented and went to see her GP.

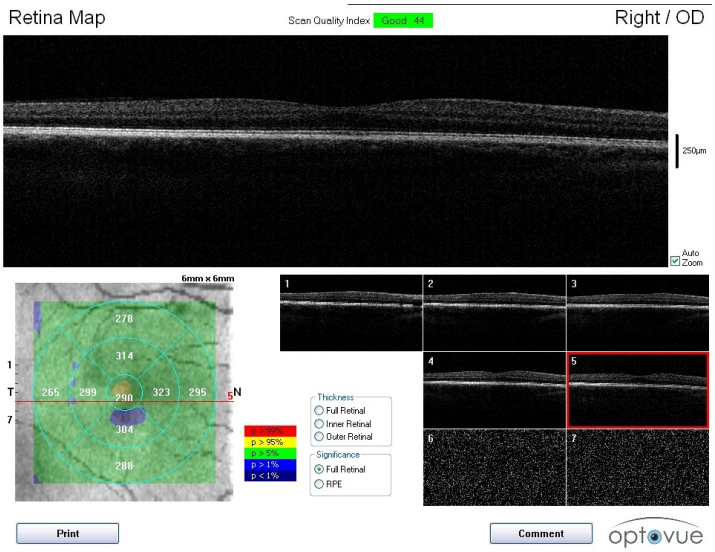
VA unaided (distance):	R: 6/15	with Rx:	–0.25	6/12
	L: 6/9	with Rx:	–0.25	6/9+
VA unaided (near):	J3 OU			

Some more information to help you decide what could be the cause.





Corneal deposits are evident but the central corneal thickness (CCT) looks fine aside from some corneal haze. The disc and retinal vasculature looks OK. There may be some macular changes (pigment, loss of reflex) but the OCT looks fairly normal.



This lady has to be taking something. What causes vortex/ verticillate keratopathy?

- Amiodarone: An anti–arrhythmic medication use to treat ventricular tachycardia or ventricular fibrillation. No heart condition is mentioned in the case history.
- Chloroquine or hydroxychloroquine: These drugs are used in the prevention and treatment of malaria, for arthritis and for systemic lupus erythematosus. These drugs are melanotrophic (i.e. they concentrate in melanin-containing cells such as RPE) Arthritis-like symptoms may persist after tick-bite fever, so our patient may be on this.
- Phenothiazines: Antipsychotics. No indication that she would need this medication.
- Indomethacin: This is a non-steroidal anti-inflammatory drug (NSAID) which is used a pain killer/ analgesic in gout, ankylosing spondilitis and arthritis. It causes corneal deposits, optic neuritis and RPE changes and is a strong contender.

Where to from here? What would you check?

- Colour vision: Normal colour vision rules out optic neuritis and retinal toxicity.
- Pinhole VA to check whether the cause is refractive.

- Lenses: Does she have cataracts?
- IOP: Just in case.
- Fundus autofluorescence (FAF) may help to exclude RPE changes from chloroquin.
- Speak to her GP and find out what she is taking and not reporting.

Having kept us in suspense, Leoni fills in the details:
After 6 months of tick bite fever the patient finally went to the GP, who referred her to a specialist physician. At this stage she was so sick that she couldn't even dress herself! Blood tests confirmed Rickettsia infection (often carried by ticks—see more information below). Rickettsia is easily treated early but having delayed seeking treatment the condition had worsened and the organism had infected her whole body, even causing organ damage (kidneys etc.) Now the problem is twofold:

1. At this stage it is very difficult to eradicate this organism and...
2. permanent damage has been done.

She went on huge doses of antibiotics and Nivaquin (chloroquine) which she will have to stay on for 18—36 months to eradicate the infection. She alternates antibiotics to prevent resistance build-up. The chloroquine is used to help break the cell walls so the antibiotics can work. She does 3 weeks of antibiotics followed by 1 week of chloroquine per month.

We have already listed chloroquine as a possible culprit for the whorls on the cornea. It is generally used prophylactically as an anti-malarial agent, i.e. not for extended periods. It is also used chronically for arthritis and in rare cases such as our patient. Needless to say, high doses over long periods of time can cause problems, including ocular complications. The corneal photos show vortex keratopathy. From the OCT of the cornea you can see that the patterns are in the epithelium. They are quite extensive and have led to her VA being affected. Her lenses were clear and her macula was OK (some small artefacts on the photo look like dots). OCT of retina was OK. Colour vision was normal.

What are we worried about? Prolonged use can lead to serious maculopathy which will worsen her vision permanently. If she stops the medication the corneal changes will disappear but if she gets maculopathy it does not go away with cessation of the medication. She is on the brink of this possibility. Retinotoxicity is relatively rare, but this case illustrates that the consequences are significant. Modern technology allows us to offer increasingly relevant and accurate monitoring of patients on chronic or long term chloroquine/hydroxychloroquine. The following baseline and ongoing monitoring guidelines are aimed at early detection:

Step 1 – Primary care and eye care provider
Education of the patient regarding potential issues associated with the medication. The patient must be engaged in the process and the discussion should be documented in the history chart. Unfortunately, at the advanced stage of the condition in our patient, she has limited options.

Step 2 – Primary care and eye care provider
Baseline ocular examination prior to initiation of hydroxyl/chloroquine.

Step 3 – Eye care provider

Assess the patient and carefully document:

- Visual complaints, including near vision
- Thorough medical history
- Duration and dosage of hydroxyl/chloroquine
- Best corrected visual acuities
- Slitlamp evaluation of corneal epithelium for vortex deposits
- Careful dilated ocular examination including assessment of the macula for pigmentary abnormalities and peripheral retina for vascular changes
- Visual field evaluation with 10-2 or equal resolution (2 degrees) with attention to pattern deviation

Step 4 – Eye care provider

Apply at least one of the following specialized tests or obtain a consult to do so:

- Spectral domain OCT (SD-OCT) assessing inner and outer retinal thickness and inner/ outer segment juncture in the perifoveal region
- Autofluorescence imaging to reveal subtle retinal pigment epithelial layer (RPE) defects and early photoreceptor damage
- Multifocal electroretinogram (ERG) to assess for localized paracentral depression

In the US academic circles, fundus photography, the older time-domain OCT, fluorescein angiography, full-field ERG and EOG, colour vision testing, Amsler grid and 24-2 visual field testing are described as 'no longer considered standard of care.'

Step 5 – Primary and eye care provider

After the baseline examination, screening for toxicity should be done on an annual basis, commencing no later than 5 years after starting the medication. Our patient's macula may be at risk in spite of the short term use invisioned. Her doses are higher than those associated with chronic use to manage arthritis. This step is a minimum and clinical judgement should guide providers. If the drug is discontinued when signs of toxicity appear, monitoring should continue.

Leoni has e-mailed her findings to the physician who will have to decide how to proceed from here. She cannot stop the treatment now as the infection is bound to flare up again. Hopefully a different agent can be used instead of the chloroquine.

What have we learnt? Delaying treatment of these types of infections can cause serious permanent damage to organs and lead to secondary problems due to treatment itself. The irony is that the 'Western' medications that she was forced to take are now causing all these problems, unfortunately reinforcing her resolve to avoid such medications.

Was the alternative practitioner treating this patient negligent? When your treatment of a very ill patient is not having the desired effect, the ethical thing is to refer them to someone who can help, and not 6 months later.

Some info on *Rickettsia*

Rickettsia is a genus of non-motile, Gram-negative, non-sporeforming, highly pleomorphic bacteria that can present as cocci (0.1 µm in diameter), rods (1–4 µm long) or thread-like (10 µm long). Being obligate intracellular parasites, the *Rickettsia* survival depends on entry, growth, and replication within the cytoplasm of eukaryotic host cells (typically endothelial cells).

Because of this, *Rickettsia* cannot live in artificial nutrient environments and are grown either in tissue or embryo cultures (typically, chicken embryos are used). In the past they were positioned somewhere between viruses and true bacteria. However unlike Chlamydia, Mycoplasma, and Ureaplasma, *Rickettsial* organisms possess true cell walls similar to other gram-negative bacteria. The majority of *Rickettsia* bacteria are susceptible to antibiotics of the tetracycline group.

Despite the similar name, *Rickettsia* bacteria do not cause rickets, which is a result of vitamin D deficiency.

Rickettsia species are carried by many ticks, fleas, and lice, and cause diseases in humans such as typhus, *rickettsial* pox, Boutonneuse fever, African tick bite fever…

For more information on the Southern African strain, I have attached an article from the SA Family Practice Journal. It is for your own interest and will not be covered in the CPD questions. My thanks again to Leoni Joubert and Dirk Booysen.

Until next time!

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Questions

Please submit answers by e-mail to optometry@synapse.org.za

1. Learning and retention in adults is enhanced by underlining or highlighting.
2. Inexperienced professionals should identify one brand of contact lenses that works well on most patients so that they can safely recommend them to all patients.
3. Re-reading text for a second time helps us to memorise the contents.
4. Patients should be discouraged from searching the internet for health information.
5. Chronic use of indomethacin causes cataracts.
6. Corneal deposits may occur after amiodarone, chloroquine or phenothiazine use.
7. Rickettsia is spread through poorly cooked meat.
8. Chloroquin is used prophylactically for tick bite fever.
9. Obligate intracellular parasites cannot reproduce outside their host cell, meaning that the parasite's reproduction is entirely reliant on intracellular resources.
10. Tick bite fever can result in lingering arthritis.