

Cholesterol's Effects on the Eyes

Gage Piercy



Road Map

- ◇ Introduction
- ◇ Interest
- ◇ Relation
- ◇ Symptoms
- ◇ Causes
- ◇ Diagnosis
- ◇ Treatments
- ◇ Prevention

Introduction

- ◊ Vision Quality and BMI seem completely unconnected
- ◊ However, Percent Body Fat can impact both our eyesight and eyelids
- ◊ How is this possible?
 - ◊ Vision impairment due to an increased level of cholesterol
 - ◊ Affects various systems of the eye
 - ◊ Eyelids affected by a condition called Xanthelasma
 - ◊ Produces fatty tissue over the epidermis of the eyelids

How I Got Interested

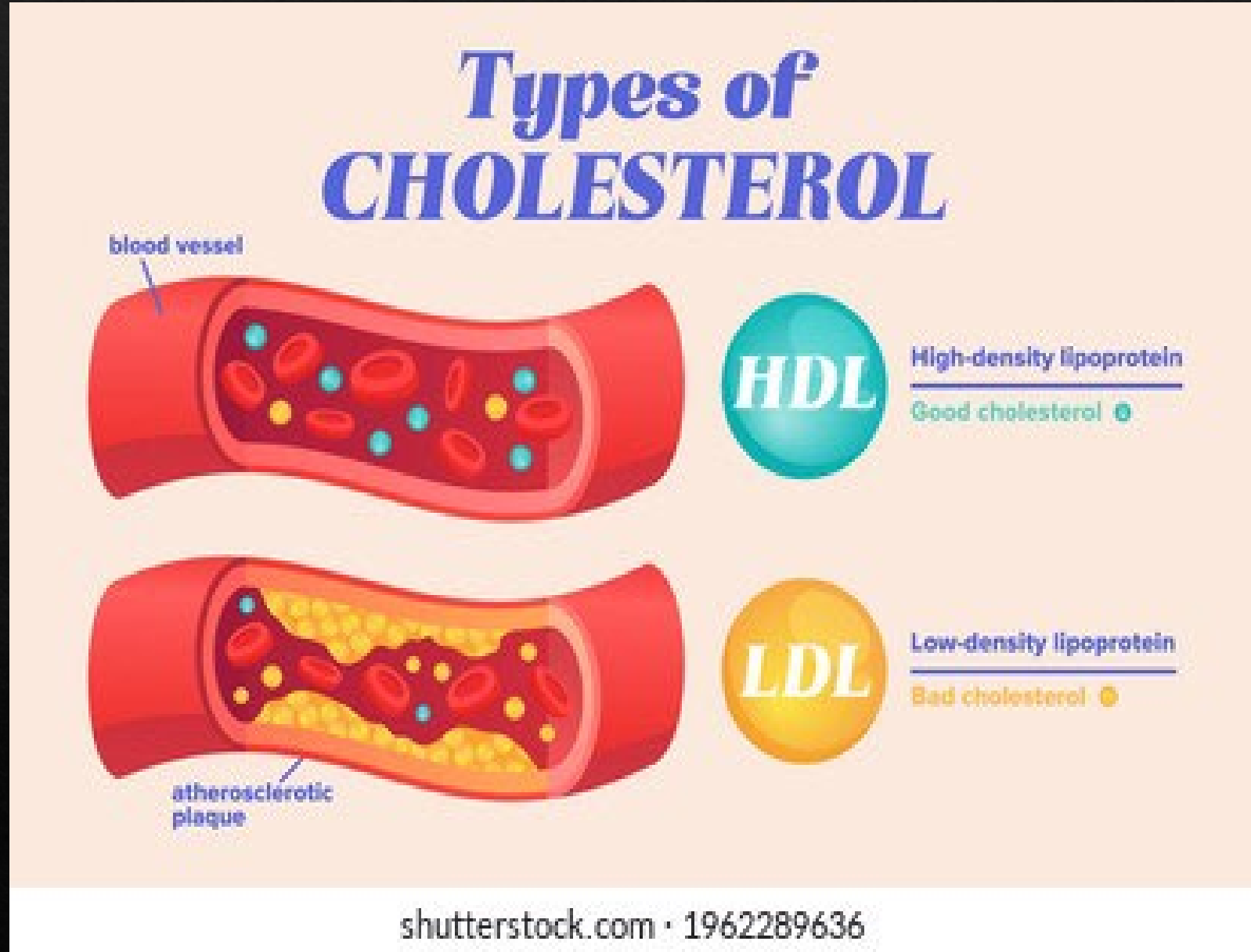
- ◆ My friend's mom had a lipid layer over her eye
 - ◆ Eventually dissipated
 - ◆ Restored her normal eyesight
- ◆ I grew fascinated and researched it
 - ◆ Never heard of anything like it
 - ◆ Interviewed Dr. Reach and studied interesting sources
- ◆ Found a link between cholesterol and the eyes
- ◆ Now I'm here to share my findings!

How Cholesterol Relates to the Eyes

- ◆ Cholesterol important for several reasons:
 - ◆ Component of cell membranes
 - ◆ Helps manufacture various hormones
- ◆ Two main types of cholesterol
 - ◆ High Density Lipoprotein (HDL)
 - ◆ HDL carries cholesterol from artery walls to the liver
 - ◆ The “good” cholesterol
 - ◆ Low Density Lipoprotein (LDL)
 - ◆ LDL transports cholesterol to artery walls and tissues throughout the body
 - ◆ The “bad” cholesterol
- ◆ Includes eye tissue
 - ◆ Excess LDL can affect vision

Cholesterol Types

- ◇ HDL represented by Blue Spheres
- ◇ Flows through arteries and veins without buildup
- ◇ LDL represented by Yellow Spheres
- ◇ Builds up into thick walls of plaque blocking the vessel

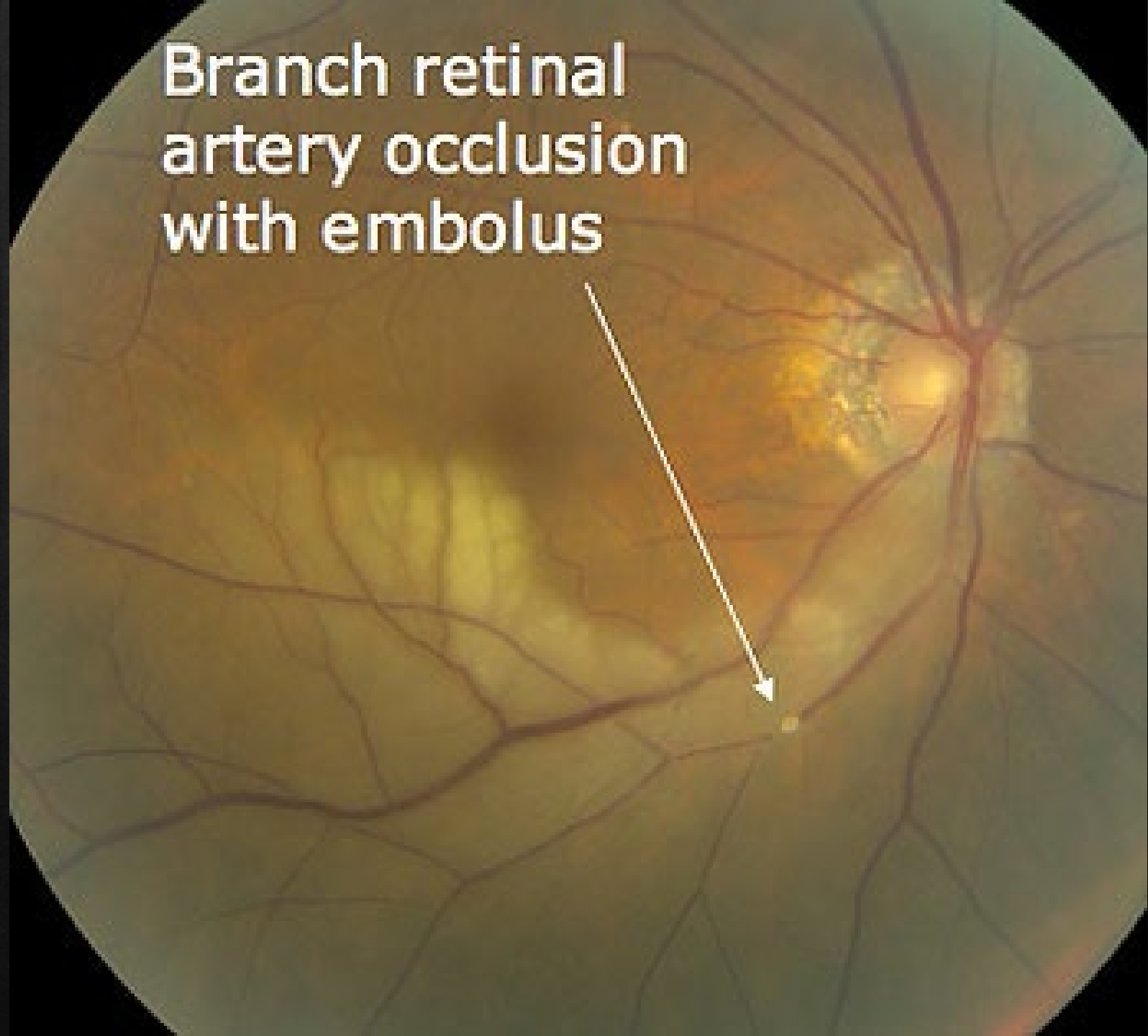


Ocular Symptoms of High LDL

- ◇ Xanthelasma is the most common symptom
- ◇ Other notable symptoms include:
 - ◇ Blockage of the retinal vein and artery
 - ◇ Causes fluid spillage into the retina
 - ◇ Results in blurry vision
 - ◇ Lack of oxygen due to decreased blood flow
 - ◇ Can lead to permanent blindness
 - ◇ Increased pressure in the retina
 - ◇ Results in Glaucoma

Retinal Artery Blockage

- ◈ Arrow points to a small buildup of LDL within the Retinal Artery
- ◈ Restricts blood flow



Xanthelasma: Definition and Symptoms

- ◇ Also called Xanthelasma Palpebra,
- ◇ Accumulated lipid deposits on epidermis of eyelids
- ◇ Characterized by yellowish papules of cholesterol
- ◇ Limited to the eyelids and not the eyeballs
 - ◇ According to Dr. Reach, it can spread into the inner corners of the eyes
 - ◇ Rarely impairs vision
- ◇ Linked to high levels of LDL



Xanthelasma: Fatty Tissue

- ◆ Yellowish lipid excreted from the ocular region of the epidermis
- ◆ Spreading near the eyes through the tear ducts
- ◆ Cosmetic condition

Causes

- ◇ LDL Deregulation:
 - ◇ Diabetes and Obesity
 - ◇ High Blood Pressure
 - ◇ Causes vision fluctuations and even permanent damage
 - ◇ Hypothyroidism
 - ◇ Regulates cholesterol production and breakdown
 - ◇ Excessive alcohol consumption and smoking
 - ◇ Same as diabetes/obesity
- ◇ Xanthelasma:
 - ◇ LDL Deregulation causes Xanthelasma
 - ◇ LDL issues arise before Xanthelasma
 - ◇ Allows Xanthelasma to be indicator of high LDL
 - ◇ Other causes same as LDL Buildup

LDL Ocular Buildup Diagnosis

- ◇ Microscopic analysis necessary for diagnosis
 - ◇ Search for yellow deposits under the retina
 - ◇ “Drunsen”
 - ◇ Large samples unnaturally high buildup
 - ◇ Small samples normal
 - ◇ Search for gray ring around the cornea
 - ◇ “Arcus”
- ◇ Early Diagnosis important to prevent permanent ocular damage
- ◇ Drunsen and arcus must reach exposed region

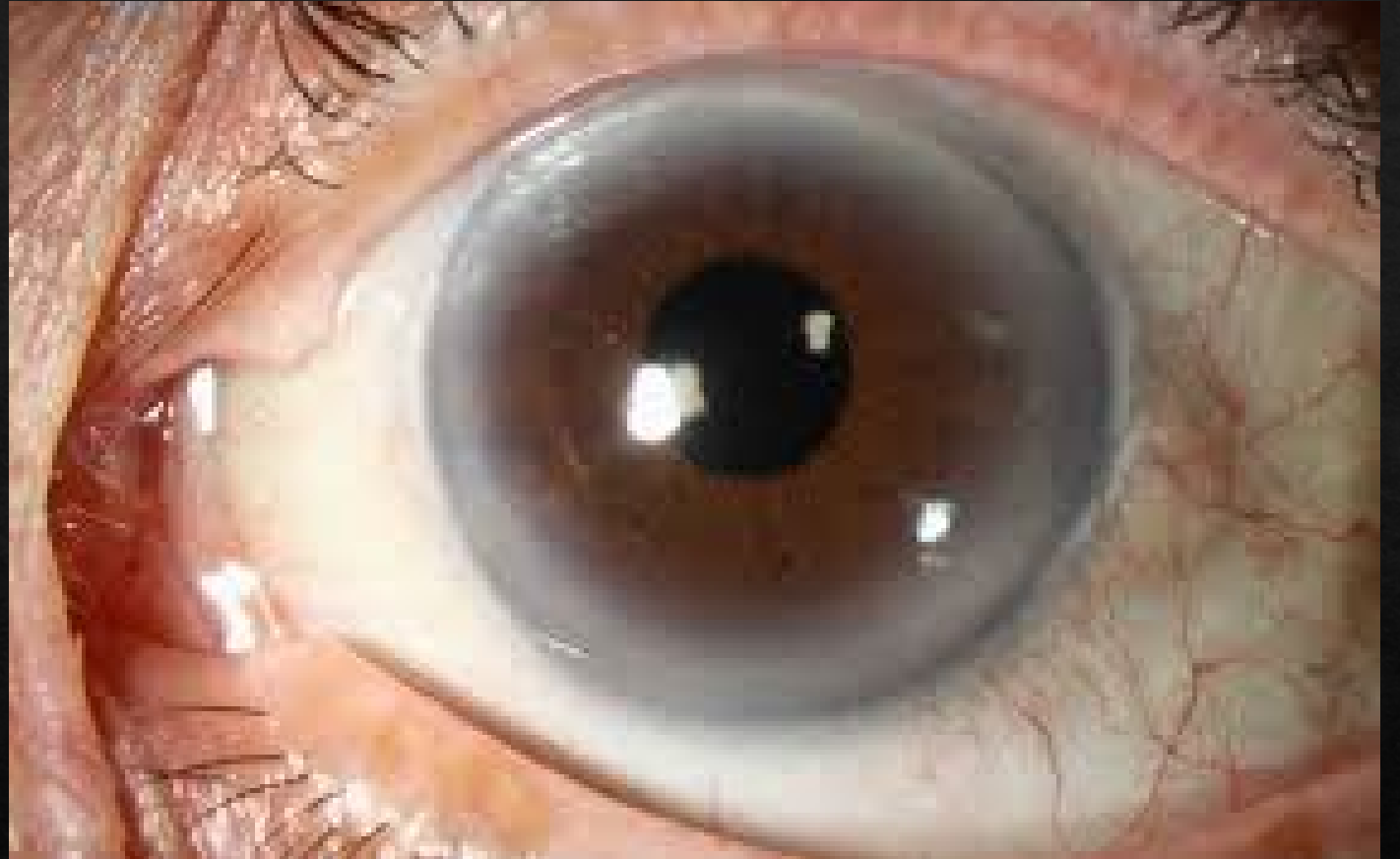


Drusen Image

- ◊ Characterized by yellow, spotty areas
- ◊ Buildup representative of macular degeneration
- ◊ Results in significant ocular damage if left untreated

Arcus Image

- ❖ Large, cloudy ring surrounding the iris
- ❖ Cholesterol deposits reach the anterior region of the cornea within the eye
- ❖ Clear sign of LDL buildup in the eye



Xanthelasma Diagnosis

- ◇ Diagnosis relatively simple
 - ◇ Analyze eyelid epidermis
 - ◇ Detect high lipid concentration
- ◇ Xanthelasma also used to diagnose high LDL in the eyes
 - ◇ Much faster than analyzing drusen and arcus
- ◇ Diagnosis not urgent unless comorbid with high LDL
 - ◇ Cosmetic condition, harmless

Treatment for LDL Buildup

Medication

- ◊ Notable medications
 - ◊ PCSK9 Inhibitors
 - ◊ Statins
 - ◊ Bile Acid Sequestrants
- ◊ All three perform similar functions
 - ◊ Directly reduce LDL
 - ◊ Lowers the rate of absorption of LDL

Laser Therapy

- ◊ Laser Therapy other notable option
 - ◊ Limited to cases of relatively few fatty deposits
 - ◊ Otherwise too much to deal with
- ◊ Results in lower levels of LDL

Treatment for Xanthelasma

- ◇ Xanthelasma treatment only surgical
- ◇ Dr. Reach shared a few methods of removing fatty tissue
 - ◇ Cryotherapy
 - ◇ Freeze and remove the tissue.
 - ◇ First prescribed treatment method.
 - ◇ Laser Removal
 - ◇ Laser technology removes and destroys fatty tissue
 - ◇ Radio Frequency Ablation
 - ◇ Shrinks the fatty growth via radio waves
 - ◇ Chemical Peel
 - ◇ Face application product peels away lipid tissue

Ways to Remove Cholesterol Deposits



Surgical removal:
simple excision with a small blade,
accompanied by a traditional
eyelid surgery, or blepharoplasty



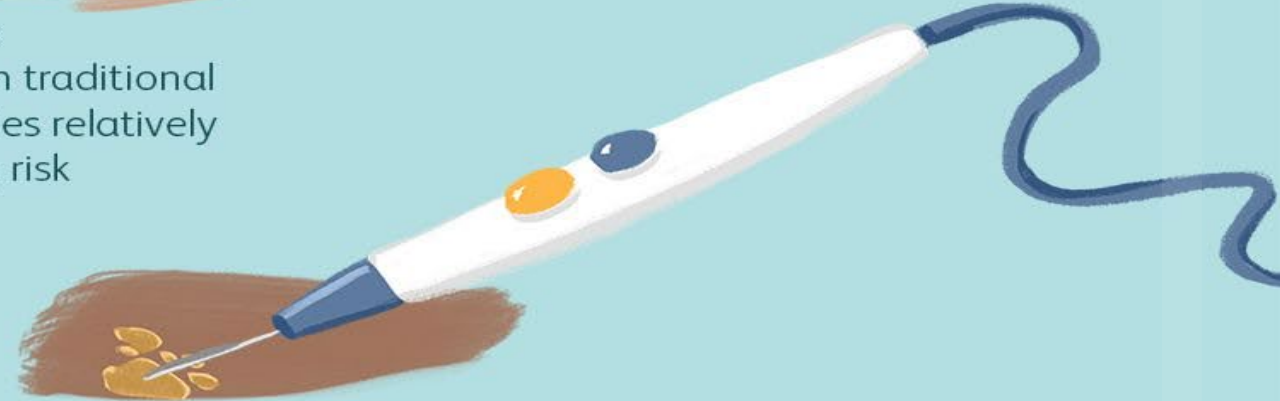
Laser ablation:
less invasive than traditional
surgery and carries relatively
minimal scarring risk



Electrodesiccation:
burning and scraping away
unwanted tissue growth



Cryotherapy:
controlled freezing of specific tissues



Chemical cauterization:
applying a chemical agent like chlorinated
acetic acid to the skin tissue that needs
to be treated to remove the lesion

Prevention

- ◇ Preventing/mitigating LDL buildup and Xanthelasma simple
 - ◇ Common methods
- ◇ As described by Dr. Reach:
 - ◇ Eating a Healthy Diet
 - ◇ Focus on cholesterol intake
 - ◇ Proper Exercise
 - ◇ Thyroid Level Checkup
 - ◇ May need medication if irregular
 - ◇ Restraining alcohol and smoking abuse

Conclusion

- ◆ Cholesterol is a significant force that can degrade vision quality and eyelid tissue due to LDL buildup and Xanthelasma
- ◆ Cholesterol and the ocular region seem very distant from one another
 - ◆ However, it's clear that the two are more closely associated than most think.
- ◆ Hopefully the results of this research raised awareness of how much high cholesterol can affect your vision and eyelid tissue.
- ◆ The ocular system is one of the body's most important functions, and it's important to take all measures into account when seeking to protect it.

References

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