LEARNING OBJECTIVES

1. Why doesn’t Ehlers-Danlos Syndrome (EDS) present more often with high myopia, keratoconus, and lacquer cracks in Bruch’s membrane?
2. What are the most common presenting symptoms of EDS?
3. What are the most common clinical signs of EDS, including subtle ones?
4. How are these EDS problems best treated by the primary-care optometrist?

CONNECTIVE TISSUE DISORDERS AND OPTOMETRY

• The eye and adnexa are both made of connective tissue, from lid tissue, sclera and cornea to the zonules and extra-ocular muscle tendons
• Refractive error, binocularity, and eye disease are all impacted by connective tissue problems

CONNECTIVE TISSUE DISORDERS IN PRIMARY EYE CARE

• Ehlers-Danlos Syndrome
• Pseudoxanthoma Elasticum
• Osteogenesis Imperfecta
• Marfan Syndrome
• Stickler Syndrome
• Others

EHLERS-DANLOS SYNDROMES (EDS)

• This connective tissue disorder comes in several types with slightly different systemic and ocular signs
• Hyperextensible joints, bruising, and abnormal healing are a well-known feature of many types of EDS, especially the most common Type I, Type II, and Type III
• “As of 2017, 13 Ehlers-Danlos syndromes had been characterized, with a significant overlap in features”

2017 GENETIC CLASSIFICATION OF EDS

• Hypermobile
• Classical
• Vascular
• Kyphoscoliosis
• Arthrochalasia
• Dermatospraxis
• Brittle Cornea Syndrome
• Classical-like
• Spondyloplastic
• Musculocontractural
• Myopathic
• Periodontal
• Cardiac-Vascular
MOST COMMON: HYPERMOBILE EHLERS-DANLOS SYNDROME

- "Characterized primarily by joint hypermobility affecting both large and small joints which may lead to recurrent joint subluxations (partial dislocation)
- In general, people with this type have soft, smooth and velvety skin with easy bruising and chronic pain at joints and tendon

CLASSICAL-TYPE EHLERS-DANLOS SYNDROME

- Associated with extremely elastic (stretchy) smooth skin that is fragile and bruises easily, wide, atrophic scars, flat or depressed scars, joint hypermobility
- Molluscoid pseudotumors (calcified hematomas over pressure points such as the elbow and scleroderma flat, atrophic scars, bone, and connective tissue)

VASCULAR-TYPE EHLERS-DANLOS SYNDROME

- "Characterized by thin, translucent skin that is extremely fragile and bruises easily
- Characteristic facial features including large eyes, a thin nose, and lobeless ears
- Joint hypermobility is confined to the small joints (fingers, toes)

KYPHOSCOLIOSIS-TYPE EHLERS-DANLOS SYNDROME

- "Associated with severe hypotonia at birth, delayed motor development, progressive scoliosis, progressive spondylolisthesis, and splenectomy
- Affected people may also have large eyes, a thin nose, and lobeless ears, and arteries that are prone to sclerosis and osteopenia (low bone density)

BRITTLE CORNEA VARIANT OF EHLERS-DANLOS SYNDROME (RARE)

- Brittle Cornea Syndrome (BCS) is "characterized by thin cornea, early onset progressive keratoglobus and blue sclera"
- Like blue sclera, this is rare in ambulatory patients

BRITTLE CORNEA SYNDROME: PRESENTATION AND ANTI SEG OCT
SYSTEMIC SYMPTOMS OF EHLERS-DANLOS SYNDROME

- In general, these patients are athletic, so diagnosis of EDS is often delayed
- Mild hypermobility may have some advantages for pregnancy and childbirth
- But not much later in life, the number of surgeries they have may exceed their age

http://www.marieclaire.co.uk/opinion/ehlers-danlos

INFLAMMATORY DISEASES AND EDS

INFLAMMATORY DISEASES AND EDS

AUTOIMMUNE AND EDS: BECHET DISEASE IN THE NFL/CHOROID


AUTOIMMUNE AND EDS: FIBROMYALGIA AND THE CORNEA


AUTOIMMUNE AND EDS: RHEUMATOID ARTHRITIS

RA AND SCLEROMALACIA
RHEUMATOID ARTHRITIS AND EDS: JOINT SUPPORT RING SPLINTS

OTHER OCULAR CONSEQUENCES OF EHLERS-DANLOS SYNDROME

- Exposure Keratitis
- Corneal Hysteresis
- Refractive Error
- Strabismus
- Postural Orthostatic Tachycardia Syndrome

1. EXPOSURE KERATITIS AND EDS

TREATING DRY EYE IN EDS: ANT-INFLAMMATORIES

TREATING DRY EYE IN EDS: SALAGEN (ORAL PILOCARPINE)

2. CORNEAL HYSTERESIS IN EDS: OCULAR RESPONSE ANALYZER
WHY YOU WON’T OFTEN SEE BLUE SCLERA IN EDS

- Blue sclera is normal in newborns and the elderly
- Adult patients with thin blue sclerae have a brittle cornea and ectasia risk
- The weak cornea and sclera puts the patient at risk for retinal detachment and globe rupture with ocular injury

WHY REFRACTIVE SURGERY IS CONTRAINDICATED IN EDS

TREATING POST-LASIK ECTASIA IN EDS: SCLERAL CONTACT LENSES

- Corneal transplants are a particular challenge for most EDS patients with keratoconus due to risk of a ruptured globe
- Descemet’s membrane from the donor eye must be sutured on in a ring first, followed by a PK 3 months later

SCLERAL LENSES TREAT POST-LASIK ECTASIA AND DRY EYE IN EDS

TREATING POST-LASIK ECTASIA: KERARING

ANTERIOR SEGMENT OCT FOR EDS AFTER KERARING
TREATING ECTASIA IN EDS WITH CORNEAL COLLAGEN CROSS-LINKING

3. REFRACTIVE ERROR IN EDS

- Most casual references to Ehlers-Danlos syndrome and the eye report high myopia in these patients.
- While scleral or corneal hyperextensibility would logically result in myopia, these patients are often too sick to report to us in an ambulatory setting.
- But they may have another connective tissue disorder.

HIGH MYOPIA IN EDS?
OD: -8.00 D, OS: -14.00 D

EDS DIFFERENTIAL DIAGNOSIS: STICKLER SYNDROME

- Also called Hereditary Progressive Arthro-Ophthalmopathy, an autosomal dominant connective tissue disease.
- Like Marfan, it causes very high myopia and possible retinal detachment.
- It is seen as frequently as one in 7,500 patients.
- One characteristic feature is a vitreous veil, as seen here.

AMBYLOPIA, STRABISMUS AND STICKLER SYNDROME

- One way in which Stickler patient can present is with strabismus secondary to retinal detachment.
- In this Stickler patient, an RD in OS resulted in LET.
- If the eye turn occurs before age 2, it is amblyogenic.
- More often, the poor VA in the strabismic eye is because the detachment affects the macula and is not true amblyopia.

ANTERIOR SEGMENT FEATURES OF STICKLER SYNDROME: CATARACT

http://www.corneaclinic.com/collagencrosslinking.html

https://medicalpictures.net/stickler-syndrome-pictures/
POSTERIOR SEGMENT FEATURES OF STICKLER SYNDROME

- Other anterior segment complications are rare
- For example, glaucoma is only seen in 5% of Stickler cases, although ocular HTN can occur
- However, congenital, progressive myopia is universal
- Retinal detachment is common
- See here is a peripheral area of circumferential lattice degeneration, an early sign

RADIAL LATTICE DEGENERATION IN STICKLER SYNDROME

- Minor ocular trauma can cause vitreous hemorrhage and/or retinal detachments
- The vitreous is typically liquified with midperipheral circumferential condensations
- Radial perivascular patches of lattice degeneration are present in the posterior pole or midperiphery
- These patients have a 50% lifetime risk of retinal detachment

PROGRESSION OF LATTICE DEGENERATION IN STICKLER SYNDROME

- Wright, Handbook of Pediatric Retinal Disease, Figures 6-3 and 6-4, page 183

SYSTEMIC FEATURES OF STICKLER SYNDROME

- Sensorineural hearing loss (25%)
- High arched palate (25%)
- Progressive arthropathy (joint disease) is more pronounced
- Conversely, instead of stiffness, joints have hyperextendable joints
- Mitral valve prolapse is seen in almost half (45%)
TREATING STICKLER SYNDROME

- Many of these patients may need laser photocoagulation for retinal holes and tears.
- Some will need vitrectomy and scleral buckling for RD.
- Like Marfan, you will want to have these patients tested for heart and valve defects.
- An Heberman Feeder baby bottle can be used for Stickler babies with an arch palate.

LISTENING FOR ORBITAL BRUIT IN CAROTID-CAVERNOUS FISTULA

TREATING INDIRECT FISTULA AND D1: DIAMOX (ACETAZOLAMIDE)

5. POSTURAL ORTHOSTATIC TACHYCARDIA SYNDROME IN EDS

VISUAL SNOW AND POTS
VF LOSS IN A 12 YO WITH EDS: CURED WITH GATORADE?!? (THANKS TO DRS. DIEP & NGUYEN)

BOTTOM LINES ON EHLERS-DANLOS SYNDROME

- EDS tests all your optometric skills, from anterior to posterior segment
- While there are many structure effects of EDS, the patient wants you to treat their symptoms
- These patients will bring in multiple generations of their family with varying penetrance of the disease

QUESTIONS? THANK YOU!

READINGS AND REFERENCES

- Today’s lecture was inspired by The Handbook of Pediatric Eye and Systemic Disease, edited by Kenneth Wright, MD.
- See chapter 5, called “Connective Tissue, Skin, and Bone Disorders”, by Elias Traboulsi.
- Ehlers-Danlos Syndrome has a great entry at Epocrates online if you upgrade to the disease database: https://online.epocrates.com/noFrame/showPage.do?method=diseases&MonographId=570&ActiveSectionId=11