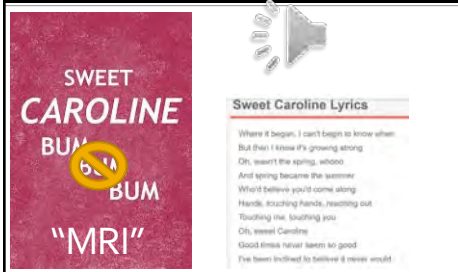


## You'll know when to say it... "MRI"



**SWEET CAROLINE**  
BUM BUM  
"MRI"

**Sweet Caroline Lyrics**

Where it began, I can't begin to know when  
But then I knew it's growing strong  
Oh, wasn't the spring, whoo  
And spring became the summer  
Who'd believe you'd come along  
Hands, touching hands, reaching out  
Touching me, touching you  
Oh, sweet Caroline  
Good times never seem so good  
I've been inclined to believe it since we met

1

## Ptosis: Red flag, red herring, or red alert

- Andrew G. Lee, MD
- Blanton Eye Institute, Houston Methodist Hospital



2

## "Good morning, class!"

- You're supposed to say...
- "Good morning, Dr. Lee"
- Let's try that again
- Good morning, class...
- Better

3

## Red herring, red flag, red alert



4

July 1978: I wanted to be a doctor; 2<sup>nd</sup> choice NASA; 3<sup>rd</sup> Jedi knight



7


## The drop down list...

**QUESTION**

Please indicate your primary specialty.

- ☐ Retina/Vitreous
- ☐ General Ophthalmology
- ☐ Cornea/External Disease
- ☐ Glaucoma
- ☐ Cataract Surgery
- ☐ Refractive Surgery
- ☐ Oculoplastics
- ☐ Optometry
- ☐ Industry
- ☐ Other: **Neuro-ophthalmologist for a day**

10



•Dr. Lee (Houston Methodist Hospital) works as a consultant for Horizon, the United States Department of Justice (DOJ), the National Aeronautics and Space Administration (NASA), and the National Football League (NFL) but the views expressed here are his own and do not represent those of these organizations or the United States government.

Horizon Therapeutics, AstraZeneca, Bristol Myers Squibb, Stoke

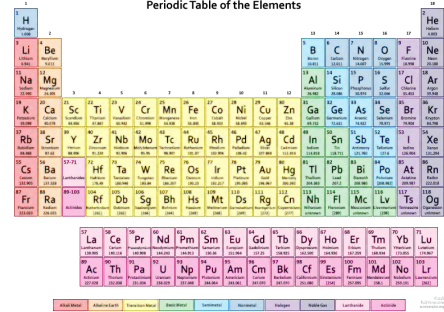
13

### How to spot the wolf in sheep's clothing in your next clinic



15

Periodic Table of the Elements



16

### New "elements": Ah and Um

123

## Ah!

[230]

The Element of Surprise

125


## Um

89.2

The element of confusion

17

### Today, we certainly don't want ZZ




18

### Instead, Ah to Um to Aha



19

## You'll know when to say it... "MRI"



**Sweet Caroline Lyrics**

Where it begins, I can't begin to know when  
But then I know it's growing strong  
Oh, sweetie the spring, whoo-oo  
And spring became the summer  
Who'd believe you'd come along  
Hands, touching hands, reaching out  
Touching me, snuggling you  
Oh, sweet Caroline  
Good times never seem so good  
I've been inclined to believe it never would

20

## Walking on the beach in Oahu



21

## The beautiful Sunday syndrome



22

## Story of a beautiful Sunday morning at that exact spot in Hawaii

- Army Pvs Lockard & Elliot
- Detected aircraft at 7:02am practicing with new equipment (RADAR)
- Reported findings to Fort Shafter but staff had gone to pancake breakfast
- Lt. Tyler received message & told them that it was scheduled flight of B-17s
- Advised radar crew "not to worry"

23

They should have worried... because... that Sunday was a date that will live in infamy: December 7, 1941

- The first use of wartime radar in US



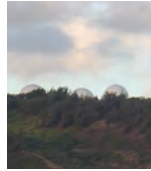
24

## A date that will live in infamy



25

Beautiful Sunday....but what if it had been Monday 8 AM instead



26

Pearl Harbor Remembrance Day:  
December 7 (1941)



27

Plenty of blame to go around



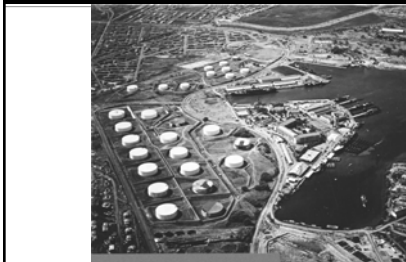
28

Japan however failed to destroy US  
aircraft carriers (at sea)



29

Japan failed to destroy fuel depot



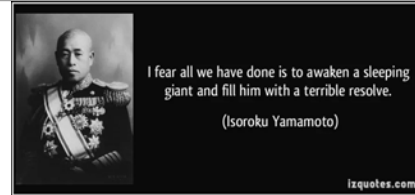
30

9 battleships sunk at Pearl Harbor  
but all but two returned to service



31

### An apocryphal movie quote



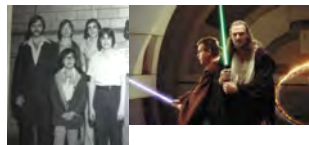
32

### Big red flag



33

### 1978: I wanted to be a doctor...2<sup>nd</sup> choice Jedi knight



35

### Red herring, red flag, red alert



36

### A good hunting dog stays on track despite the red herring



37

### Red flag



38

### Red alert = emergency



39

### Ptosis OS



45

### Behavior change: Don't do this...

- Impression: Ptosis left
- Plan: Schedule ptosis repair next week

46

### Which of the following findings suggests that this ptosis is MG?

- A. Severe pain
- B. Pupil involvement
- C. Trigeminal paresthesia
- D. Variable and fatiguable
  
- Answer D

47

### 75 yo WM with diabetes and painless pupil involved ptosis OS



48

### Red herring, red flag, red alert



49



### Don't fall for that red herring



50

### Which of the following clinical findings is suggestive of aneurysmal CN III palsy in this case?

- A. Diabetes
- B. Anisocoria
- C. Exotropia
- D. Ptosis



- Answer B: Anisocoria with pupil involvement

51

### RED FLAG

52

### Which of the following aneurysms is most likely to produce isolated CN III palsy?

- A. Middle cerebral
  - B. Anterior cerebral
  - C. Posterior cerebral
  - D. Posterior communicating
- Answer D

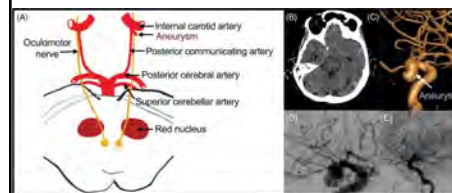
53

### Posterior communicating artery aneurysm



54

### Posterior communicating artery aneurysm parallel to CN III



55

Do not work up third nerve palsy by yourself...Phone a friend



Third nerve palsy

56

75 yo WM with diabetes and painless ptosis OS



57

Which of the following symptoms would suggest aneurysmal rupture?

- A. Worst headache of patient's life
- B. Ptosis of the involved eye
- C. Binocular horizontal diplopia
- D. Relative afferent pupillary defect
- Answer A: Worst HA of life

58

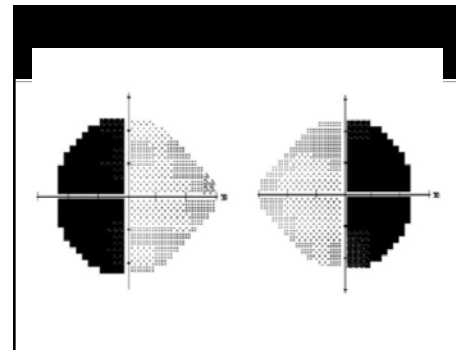
What would make this a red alert?



59



60



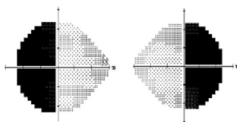
61



Which of the following is the most likely diagnosis for a CN III palsy with visual field shown?

- A. Basilar tip aneurysm
- B. Pituitary apoplexy
- C. Midbrain infarct
- D. Myasthenia gravis

■ Answer B



62

What if it was a child?

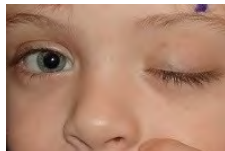


63

Which of the following findings is more likely in CN III palsy in a child vs. adult?

- A. Aneurysm
- B. Amblyopia
- C. Diabetic III
- D. Carotid Fistula

■ Answer B



64

Should we scan third nerve palsy ptosis?



65

Behavior change: Do... do this...

- Impression: Ptosis left
- Differential diagnosis:
  - Levator dehiscence: Most likely, normal LF, high lid crease, contact lens wearer
  - No diplopia or ophthalmoplegia
  - No pain, no pupil abnormality, no evidence MG
  - Remainder of exam normal (Isolated)
- Plan: Schedule ptosis repair next week
- Explained differential diagnosis to patient

66

Finding the wolf: "PERRLA" ≠ NORMAL



67

## Red herring, red flag, red alert



68

## PERRLA is a red herring



69

## Which of the following pupil findings is not assessed by PERRLA?

- A. Pupil size in light
- B. Pupil reactivity to light
- C. Pupil reactivity to accommodation
- D. Anisocoria in dark
  
- Answer D

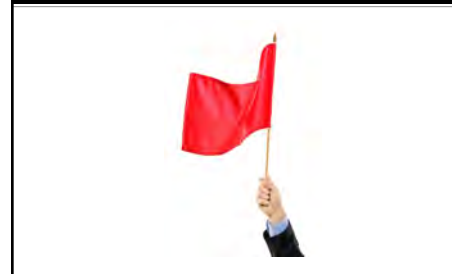
70

If you  
don't look  
for the  
wolf you  
won't find  
the wolf

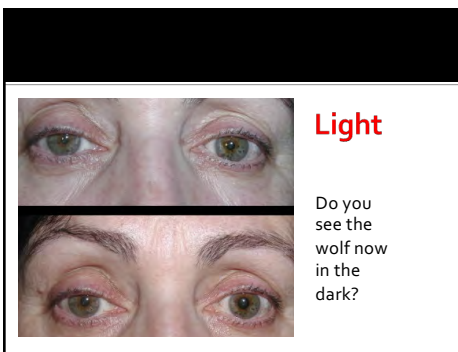


71

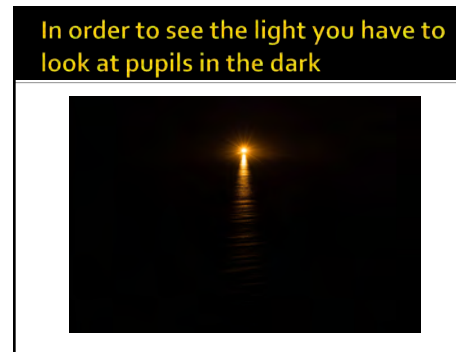
## Red flag



73



72

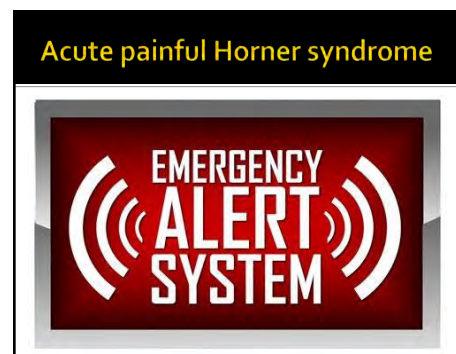
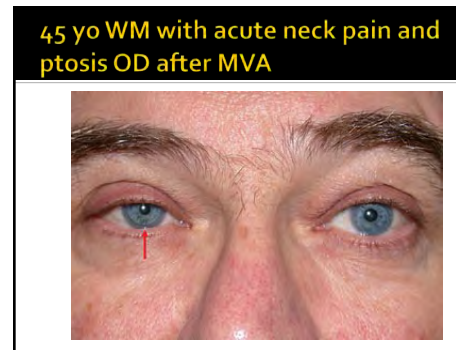


Which of the following ambient lighting conditions is most likely to increase the anisocoria in Horner syndrome?

- A. Bright Light
- B. Darkness
- C. Flashing light
- D. Swinging light

■ Answer B

76



Which of the following lesions is most likely in an acute painful Horner syndrome with neck pain after MVA?

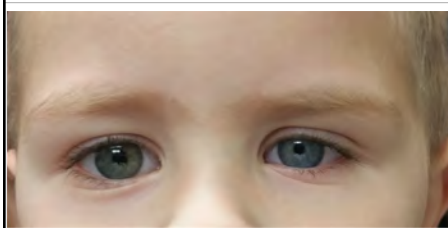
- A. Pancoast lesion
- B. Carotid dissection
- C. ICA aneurysm
- D. Vertebrobasilar insufficiency
- Answer B

80

WHAT IF...?

81

Horner syndrome in a child



82

Which of the following tumors is most likely in a child with an isolated Horner syndrome?

- A. Neuroblastoma
- B. Retinoblastoma
- C. Rhabdomyosarcoma
- D. Wilm's tumor
- Answer A

83

Should we scan acute Horner syndrome ptosis?



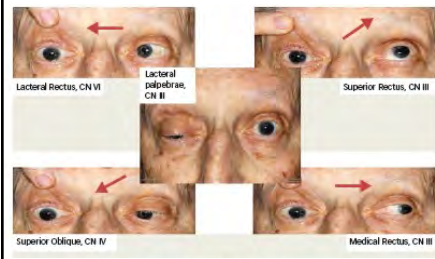
84

Red herring, red flag, red alert



85

### 65 yo WM with prostate CA



86

### Which of the following is the most likely metastatic location for prostate CA?

- A. Orbit
- B. Brain
- C. Bone
- D. Eye
- Answer C

87

### Red herring, red flag, red alert



88

### Red Flag Warning



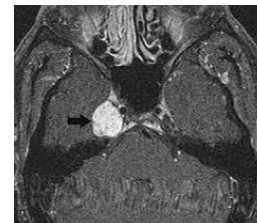
89

### Which of the following is the most likely localization for unilateral CN III, IV, V<sub>1</sub>, V<sub>2</sub> and VI in metastatic prostate CA?

- A. Orbit
- B. Cavernous sinus
- C. Brainstem
- D. Occipital lobe
- Answer B

90

### Beware cavernous sinus syndrome



91

Which of the following is the most likely localization for unilateral CN III, IV, V1, and VI in metastatic prostate CA with RAPD?

- A. Cavernous sinus
- B. Orbit
- C. Brainstem
- D. Occipital lobe
- Answer B

92

Optic neuropathy moves lesion from cavernous sinus to orbital apex



93

70 yo WM with ptosis OD



94

Red herring, red flag, red alert



95

Partial palsy, partial ptosis, partial pupil



96

Which of the following clinical features is most likely to suggest ischemia rather than aneurysm in CN III palsy?

- A. Partial palsy
- B. Pupil involvement
- C. Complete, pupil spared
- D. Severe pain
- Answer C

97



38 yo Bangladeshi male with ptosis  
OD



Eye 20: 1319-1321 (2006)

98

Red herring, red flag, red alert



99

RED FLAG  
WARNING

100

Which of the following clinical findings is most likely to suggest orbital localization in unilateral CN III palsy?

- A. Trigeminal V2 involvement
- B. Proptosis
- C. Papilledema
- D. First order Horner syndrome
- Answer B

101

Red herring, red flag, red alert



102

Should we scan ptosis with lid fullness?



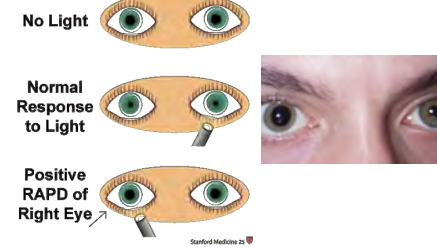
103

50 yo immunosuppressed renal transplant  
with ptosis OD plus RAPD OD



104

How can we test RAPD OD?



105

Red herring, red flag, red alert



106

Reverse RAPD = big red flag



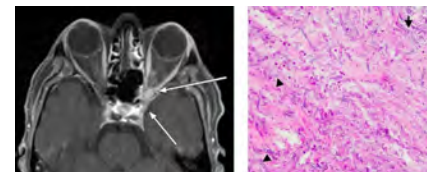
107

What are the ocular requirements  
for testing for an RAPD?

- A. Two eyes with two working pupils
- B. One eye with one working pupil
- C. Two eyes with one working pupil
- D. Two eyes with no working pupils
- Answer C

108

Beware immunosuppression



109

### Red herring, red flag, red alert



110

### Red alert



111

### Beware the black eschar (but don't wait for it to occur)



112

Which of the following is most likely etiology in immunocompromised patient with acute ophthalmoplegia, a black eschar, and sinus disease?

- A. Fungus
- B. Bacteria
- C. Virus
- D. Protozoa
  
- Answer A

113

### Should we scan immunosuppressed ptosis?



114

### Lee's P's

- Proptosis (orbit)
- Pupil involvement (aneurysm)
- Pain V<sub>1</sub> (cavernous sinus)
- Paresthesia (V<sub>1</sub>)
- Perception loss (optic neuropathy)

115

### What if...?



116

### Lee's P's not allowed in MG

- Proptosis
- Pupil involvement
- Pain
- Paresthesia (V1)
- Perception loss (optic neuropathy)

117

### Which of the following findings excludes MG from cause of ptosis?

- A. Partial ptosis
- B. Complete ptosis
- C. Painless ptosis
- D. Pupil involvement
- Answer D

118

### Beware diplopia & check motility



119

### Beware the red flag in ptosis



If you have a problem in any one of these three areas: ptosis, anisocoria, or diplopia

Then you must document normal exams in other two areas before saying it is benign

120

### Ptosis OD but no diplopia



121

### Red herring, red flag, red alert



122

### Ptosis as occluder



123

### Ptosis OD since childhood



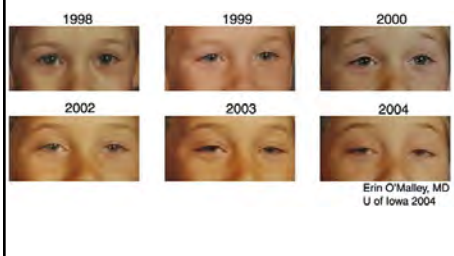
130

### When would congenital or childhood ptosis be a red herring?



131

### CPEO



132

### Which of the following findings excludes myopathic CPEO?

- A. Painless
  - B. Ptosis
  - C. Bilateral
  - D. Pupil involvement
- Answer D

133

### Myopathic ptosis



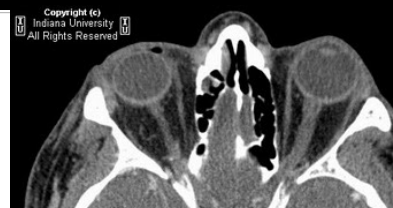
134

### CPEO



135

### CPEO: extraocular muscle atrophy



136

### Intermittent ptosis



137

### Red herring, red flag, red alert



138

### Variability and fatigue: red flags



139



### Selfie, selfie, selfie

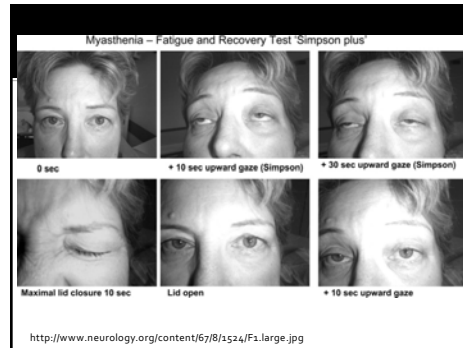


140

### Myasthenia gravis

- Painless
- Pupil spared
- Non-proptotic
- Variable
- Fatiguable

141



142

### Tensilon test



Tensilon test: Before (left); After (right)

143

### Ice test: Left side



Acute severe ocular myasthenia in a 92-year-old woman  
Y Delaney, R Khooshabeh and L Benjamin. Eye (2002) 16, 323-324

144

### Enhancement of ptosis



145

### When would this be a red alert?



146

### What if....

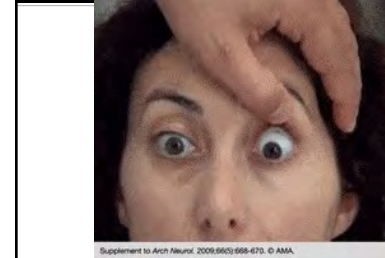


148

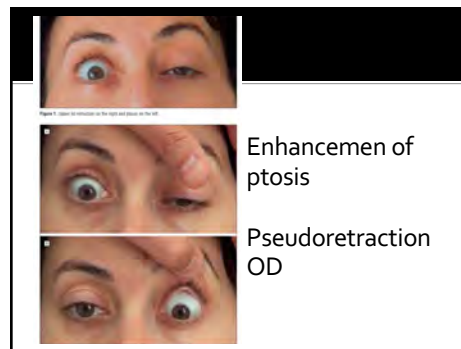
### Plus minus sign



149



150



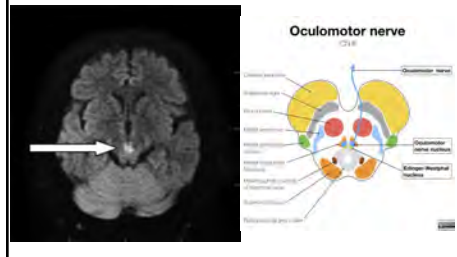
151

### Plus minus syndrome



152

### Plus minus syndrome



153

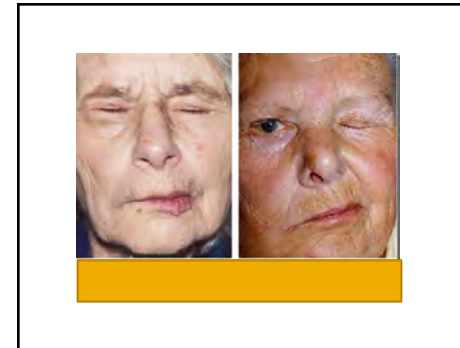
Which of the following structures is involved in the plus minus syndrome?

- A. Occipital lobe
- B. Midbrain
- C. Pons
- D. Medulla
- Answer B

154



157

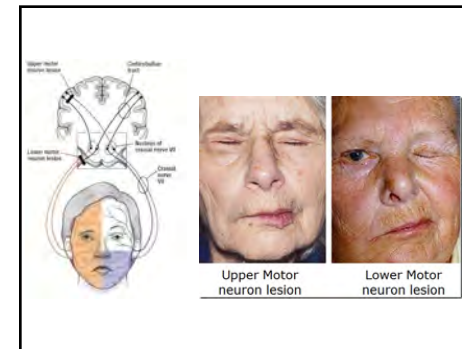


158

Involvement of which of the following parts of the face suggests upper motor neuron CN VII palsy?

- A. Lower face only
- B. Upper face only
- C. Both Upper and lower face
- D. Neither upper nor lower face
- Answer A

159



160

### Pseudoptosis from CN VII



161

Which of the following is the mechanism is the cause of pseudoptosis in CN VII palsy?

- A. Aberrant regeneration
  - B. Concomitant CN III palsy
  - C. Concomitant Horner syndrome
  - D. Cavernous sinus involvement
- Answer A

162

### Pseudoptosis (CN VII)



163

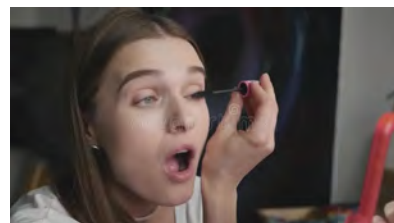
### Aberrant synkinesis CN V



[www.oculist.net/.../duanes/pages/v5/v5c078.html](http://www.oculist.net/.../duanes/pages/v5/v5c078.html)

164

### Did you ever notice that...



165

### Synkinesis vs. aberrancy



166

### Aberrant regeneration CN III



Practical Neurology: BMJ

167

### Ischemia cannot cause aberrant regeneration in CN III palsy

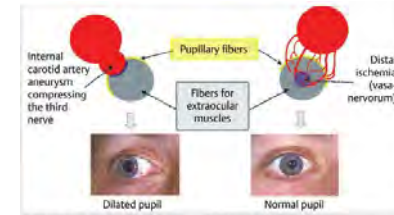


Fig 13.94 Mechanism of pupillary involvement in lesions of the third nerve. External compression of the third nerve will present with dilation of the pupil in addition to ophthalmoplegia.

168

### Which of the following mechanisms of CN III palsy cannot produce aberrant regeneration?

- A. Trauma
- B. Ischemia
- C. Tumor
- D. Aneurysm
- Answer B

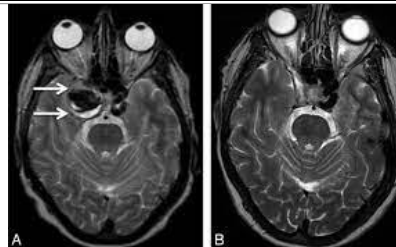
169

### When getting better is worse



170

### Cavernous aneurysm s/p endovascular obliteration



American Journal of Neuroradiology February 2012, 33 (2) 323-326; DOI:

171



65 y/o WF with facial weakness after left TAB

(Am J Ophthalmol 2011;151:251-255)

172

## 173



## 175

- Answer C



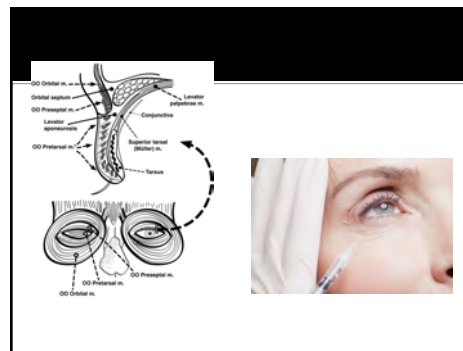
## 176



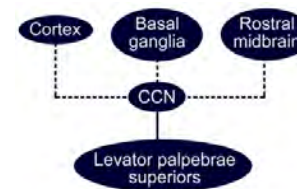
## 177



Figure 1. A) Inability to open her right eyelid prior to botulinum injection. B) Shown are the injection sites of 2 units per loci

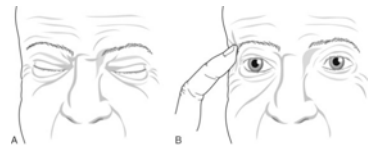


## 179





### Sensory trick for blepharospasm

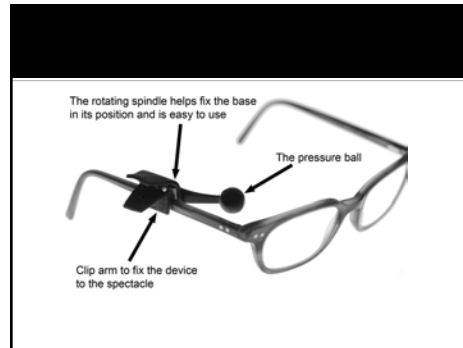


180

### Press-op hidden by her "bangs"

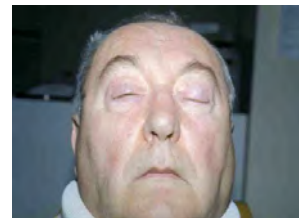


181



182

### Apraxia of eyelid opening

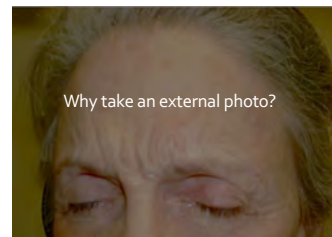


183



184

80 yo woman with acute V1 pain & burning left forehead and scalp tenderness. ESR 60. On steroids. Sent for GCA evaluation and TAB. Ptosis LUL.



185

I took that first photo because 2 days later....



186

### Take home messages

- Ptosis is not an etiologic diagnosis
- You must have a differential diagnosis
- It can be a big deal
  - So make sure it is ISOLATED
  - Also make sure it is not myasthenia gravis, third nerve palsy, or Horner syndrome
- No one will fault you for missing levator dehiscence
- There are life threatening etiologies for ptosis
- Don't operate until you document that it is not MG or neurogenic ptosis

187

### Red herring, red flag, red alert



189

### Summary: Five ways to find the wolf in your clinic

1. Ptosis with **anisocoria**
2. Ptosis with **variability/fatigue/recurrence**
3. Ptosis with **diplopia**
4. Ptosis with **aberrant regeneration**
5. Ptosis with **pain in elderly**

190

The moral of the story: How did four Iowans save one billion lives worldwide?



191

### Iowa is a small state

- US population: over 300+ million
- Iowa population: 3.4 million



192



Norman Borlaug? The most famous person  
whom you never heard of

*The Lost Choice. Andy And*

193

ONE PERSON  
CAN MAKE A  
DIFFERENCE,  
AND EVERYONE  
SHOULD TRY

—JOHN F. KENNEDY—

194

## Norman Borlaug



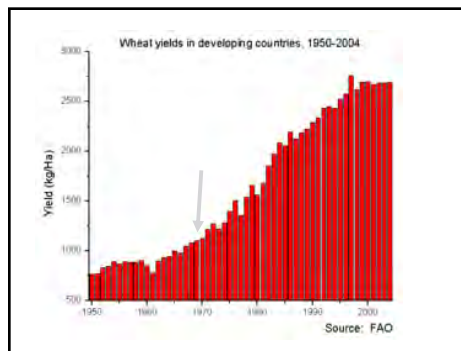
- Born, Creston, Iowa (1914)
- Won Nobel Peace Prize (1970)
- Wheat/corn hybrids in arid climates
- But that's not the cool part

195

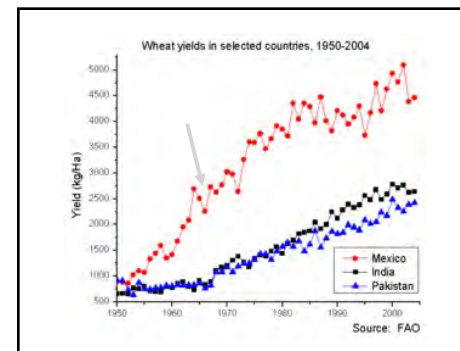
## Borlaug Green Revolution

- High-yield dwarf wheat resisted plant pests & diseases
- Yielded two to 6x times more grain
- Pakistan: 4.6 to 8.4 million tons (1965-1970)
- India: 12.3 to 20 million tons
- Mexico 6 X increase
- Mexico => exporter wheat (1963)

196



197



198

## Henry Wallace



- No Borlaug without Henry Wallace
- Henry Wallace was from Des Moines, Iowa
- He was Agriculture Secretary & later Vice President under FDR
- 1940 **Henry Wallace**: vacationed in Mexico
- He noted yield of corn was much lower than his native Iowa
- Idea - **start an agriculture experimental station like Iowa**

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## The Mexico Agricultural Station

- Borlaug selected for agricultural station in Mexico started by Henry Wallace
- Bruce Alberts, President National Academy of Sciences USA: Borlaug may have saved "more human lives than any other person in history"
- **Prevented worldwide famine & saved an estimated one billion lives!**
- But that's not the cool part...



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## Who influenced Henry Wallace

- As a 6 year-old, Henry Wallace **used to take walks with a student at Iowa State named George Washington Carver**
- "His (Carver's) faith in me aroused in me a natural instinct to excel and deepened my appreciation of plants in a way I can never forget."—H. Wallace



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## Yes, that George Washington Carver

- Born a slave
- Orphaned in infancy
- Mother kidnapped by slavers
- Couldn't get an education because of the color of his skin
- Started formal school at age 12



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## George Washington Carver trained in Iowa

- **First black student at Simpson College (Iowa)** studying art & piano
- **Etta May Budd** was one of his professors
  - Helped him find gardening jobs (working way thru school)
  - Encouraged him to study plants instead of painting them
  - Helped admit to Iowa State (1894) where her father was Professor/chair of Horticulture
- Carver => **first black and first black teacher** at Iowa State before his amazing career at Tuskegee



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## Why am I telling you this story?...

- You might not be a Norman Borlaug
- You might not be a George Washington Carver
- You might not even be a Henry Wallace
- But you can be, should be, ARE... an Etta May Budd!



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July 1978: I  
wanted to be a  
doctor; 2<sup>nd</sup>  
choice NASA;  
3<sup>rd</sup> Jedi knight



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1978: I wanted to be a doctor...2<sup>nd</sup>  
choice NASA, 3<sup>rd</sup> choice: Jedi knight



It turns out that I got to  
do all three

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Who was your Etta Mae?



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But more importantly....  
Who are you Etta Mae Budd to?



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"MRI"



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**Thanks for your time and attention**

- Andrew G. Lee, MD
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