



Q

Graves *aka* Thyroid Eye Disease: True/False

- Graves orbitopathy is secondary to thyroid disease



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Sort of, but not really. Graves is an autoimmune disease that is strongly associated with thyroid dysfunction, but it is not *caused* by it



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Thyroid eye dz (TED) is an autoimmune dz. Research suggests that, moreso than those elsewhere in the body, orbital cell type are highly sensitive to circulating TSH-receptor antibodies (TSH-R Ab)--the same circulating antibodies implicated in many forms of autoimmune thyroid disease.



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*Stimulation of orbital fibroblasts by TSH-R Ab has what effects on these cells?*

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*Stimulation of orbital fibroblasts by TSH-R Ab has what effects on these cells?*

It induces them to secrete glycosaminoglycans (GAGs), as well as pro-inflammatory cytokines (which attract inflammatory cells to the orbit). Stimulation even causes some fibroblasts to differentiate into adipocytes. Thus, much of the histopathology of TED (ie, an orbit full of ground substance, inflammatory cells, etc) can be traced directly to the effects of TSH-R Ab on orbital fibroblasts.



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It induces them to secrete glycosaminoglycans (GAGs), as well as pro-inflammatory cytokines (which attract inflammatory cells to the orbit). Stimulation even causes some fibroblasts to differentiate into adipocytes. Thus, much of the histopathology of TED (ie, an orbit full of ground substance, inflammatory cells, etc) can be traced directly to the effects of TSH-R Ab on orbital fibroblasts.

But to the original question: Note that the above activities are **not** caused by what's going on in the thyroid gland itself. Thus, while TED often coincides with thyroid dysfunction, it does not **result** from it.





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*Speaking of thyroid dysfunction...Is Graves more likely to be associated with hyperthyroidism, or hypothyroidism?*



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*What percent of Graves cases are associated with hyperthyroidism at presentation?*



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About 90



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*What percentage of Graves dz present in association with euthyroid status?*  
About 90%



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Hyperthyroidism

*What percentage of Graves dz present in association with euthyroid status?*  
About 90%  
Yes, albeit uncommonly



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*Speaking of thyroid dysfunction...Is Graves more likely to be associated with hyperthyroidism, or hypothyroidism?*  
Hyperthyroidism

*What percentage of Graves pts are euthyroid at presentation?*  
About 90%

*Can Graves dz present in association with euthyroid status?*  
Yes, albeit uncommonly

*What proportion of Graves pts are euthyroid at presentation?*



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*What proportion of Graves pts are euthyroid at presentation?*  
About 6%





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Yes, albeit uncommonly

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About 6%

*Of the euthyroid presentations, what percent will develop thyroid disease over the next 5 years?*



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Hyperthyroidism

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About 90

*Can Graves dz present in association with euthyroid status?*  
Yes, albeit uncommonly

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About 6%

*Of the euthyroid presentations, what percent will develop thyroid disease over the next 5 years?*  
About half



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*Speaking of thyroid dysfunction...Is Graves more likely to be associated with hyperthyroidism, or hypothyroidism?*  
Hyperthyroidism

*What percentage of Graves dz present in association with euthyroid status?*  
About 90%

*What proportion of Graves pts are euthyroid at presentation?*  
About 6%

*Of the Graves pts who are euthyroid at presentation, what percentage have Graves dz present in association with hypothyroidism?*  
About 10%



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Hyperthyroidism

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About 90%

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About 6%

*Can Graves dz present in association with hypothyroidism?*  
Yes—the remaining 4% are hypothyroid



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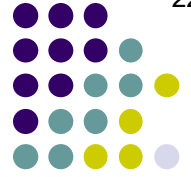
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*Most of these pts have a specific condition—what is it?*



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About 90%

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About 6%

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Yes—the remaining 4% are hypothyroid

*Most of these pts have a specific condition—what is it?*  
Hashimoto's thyroiditis



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- Graves is aggravated by smoking



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*Smoking increases the likelihood of developing TED by how much?*



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*Smoking increases the likelihood of developing TED by how much?*  
A smoker is 7x more likely to develop TED than a nonsmoker!



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- Graves is associated with MS (*multiple sclerosis*)



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*What does MG stand for in this context?*



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*What does MG stand for in this context?*

Myasthenia gravis



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Esotropia



Hypotropia

TED: Strabismus



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- Men and women are at equal risk of TED **Nope**



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- Graves myopathy usually results in an ET and/or a hypotropia. True
- The medial rectus (superior rectus most likely) is *M vs F: Who is at higher risk for developing TED?* inferior (superior rectus most likely) is
- Men and women are at equal risk of TED Nope

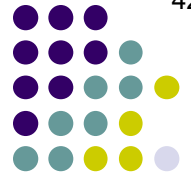




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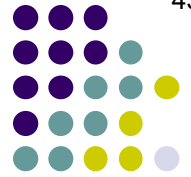
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- Graves myopathy usually results in an ET and/or a hypotropia. True
- The medial rectus (most likely) is the muscle most likely to be affected (superior rectus to least likely) is the inferior rectus. *M vs F: Who is at higher risk for developing TED? Women*
- Men and women are at equal risk of TED **Nope**



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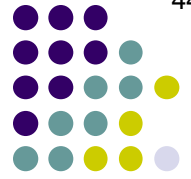
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- The medial rectus (most likely) is the muscle most likely to be affected in TED  
*M vs F: Who is at higher risk for developing TED?*  
Women  
*How much higher is the risk for women?*
- Men and women are at equal risk of TED Nope



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- Graves is associated with MS False; it is associated with MG
- Graves myopathy usually results in an ET and/or a hypotrophic True
- The medial rectus (superior, inferior, lateral, medial) is most likely to be affected (superior, inferior, lateral, medial) is most likely to be affected  
 M vs F: Who is at higher risk for developing TED?  
 Women  
 How much higher is the risk for women?  
 Women are 6x more likely to develop TED than men
- Men and women are at equal risk of TED Nope



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## Graves *aka* Thyroid Eye Disease: True/False

*What is/are the diagnostic criteria for TED?*

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# Q/A

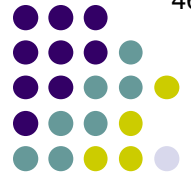
## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

[Redacted box] [Redacted box] [Redacted box]

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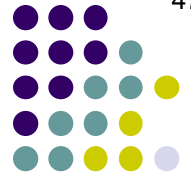
What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

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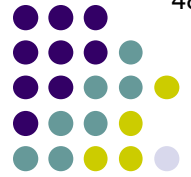
**Autoimmune thyroid dz**

**Typical orbital signs of TED**

**Imaging findings c/w TED**

How is this defined?

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What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

**Autoimmune thyroid dz**

**Typical orbital signs of TED**

**Imaging findings c/w TED**

*How is this defined?*

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of anti-thyroid antibodies

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- Graves is associated with MS False; it is associated with MG
- Graves may be associated with smoking True; Graves patients are encouraged to stop smoking
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What are the typical orbital signs?



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- Graves myopathy is characterized by exotropia and/or a hypotropia
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- Men and women are at equal risk of TED Nope

What are the typical orbital signs?

- Eyelid retraction
- Proptosis
- Restrictive strabismus (in a manner c/w TED myopathy)
- Compressive optic neuropathy
- Edema of the lids and/or conj (ie, chemosis)



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Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of anti-thyroid antibodies

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- Graves may be associated with smoking True; Graves disease is associated with smoking. Patients are encouraged to stop smoking
- Graves is associated with MS False; it is associated with MG
- Graves may be associated with smoking True; Graves disease is associated with smoking. Patients are encouraged to stop smoking
- The most common orbital sign of TED is eyelid retraction
- Men and women are equally affected

What are the typical orbital signs?

--Eyelid retraction

--Proptosis

Is the eyelid retraction unilateral, or bilateral?



A

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

How is this defined?

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of anti-thyroid antibodies

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- Graves is associated with MS False; it is associated with MG
- Graves may be associated with smoking True; Graves disease is associated with smoking. Patients are encouraged to stop smoking
- The most common orbital sign of TED is eyelid retraction and/or a lid lag sign
- The most common orbital sign of TED is eyelid retraction and/or a lid lag sign
- Men and women are equally affected

What are the typical orbital signs?

--Eyelid retraction

--Proptosis

Is the eyelid retraction unilateral, or bilateral?

It can be either

## Graves *aka* Thyroid Eye Disease: True/False



53



Unilateral\*



Bilateral

TED: Lid retraction

*\*Or highly asymmetric, at least*



Q

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

How is this defined?

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of anti-thyroid antibodies

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- Graves is associated with MS False; it is associated with MG
- Graves may be associated with smoking True; Graves disease is associated with smoking. Patients are urged to stop smoking
- The most common orbital sign of TED is eyelid retraction. It can be either unilateral or bilateral. TED is characterized by a particular pattern of retraction--what is it?
- Men and women are equally affected by TED

What are the typical orbital signs?

--Eyelid retraction

--Proptosis

Is the eyelid retraction unilateral, or bilateral?

It can be either

TED is characterized by a particular pattern of retraction--what is it?



A

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

How is this defined?

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of anti-thyroid antibodies

- Graves is associated with MS False; it is associated with MG
- Graves may be associated with smoking True; Graves disease is associated with smoking and/or a history of smoking. Patients with Graves disease should be encouraged to stop smoking.
- The most common extraocular muscle involved in TED is the inferior rectus muscle (IRM) (IRM is the most likely to be involved).
- Men and women are equally affected.

What are the typical orbital signs?

--Eyelid retraction

--Proptosis

Is the eyelid retraction unilateral, or bilateral?

It can be either

TED is characterized by a particular pattern of retraction--what is it?

'Temporal flare'



Q

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

How is this defined?

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- Graves is associated with MS False; it is associated with MG
- Graves may be associated with smoking True; Graves disease is associated with smoking. Patients are urged to stop smoking
- The most common orbital sign of TED is eyelid retraction. It can be either unilateral or bilateral. TED is characterized by a particular pattern of retraction--what is it? 'Temporal flare'
- Men and women are equally affected. Men are more likely to have severe disease. What does temporal flare refer to/mean?

What are the typical orbital signs?

--Eyelid retraction

--Proptosis

Is the eyelid retraction unilateral, or bilateral?

It can be either

TED is characterized by a particular pattern of retraction--what is it?

'Temporal flare'

What does temporal flare refer to/mean?





A

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

How is this defined?

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of anti-thyroid antibodies

- Graves is associated with MS False; it is associated with MG

What are the typical orbital signs?

--Eyelid retraction

--Proptosis

Is the eyelid retraction unilateral, or bilateral?

It can be either

TED is characterized by a particular pattern of retraction--what is it?

'Temporal flare'

What does temporal flare refer to/mean?

The fact that the retraction is more pronounced at the temporal aspect of the lid

- Graves may be associated with T and/or a hypothyroidism
- The retraction is likely to be anterior
- Men are more likely to have TED to least
- Men are more likely to have TED to least



## Graves *aka* Thyroid Eye Disease: True/False



TED: Lid retraction with temporal flare



Q

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoantibodies

What well-known brainstem syndrome is associated with lid retraction?

Imaging findings c/w TED

How is TED diagnosed?  
Either by clinical findings or by positive thyroid antibodies

•

with MG

•

Graves myopathy

hypothyroidism

•

The retractor

rectus muscle

likely

•

Men and women

What are the typical orbital signs?

--Eyelid retraction

--Proptosis

Is the eyelid retraction unilateral, or bilateral?

It can be either

TED is characterized by a particular pattern of retraction--what is it?

'Temporal flare'

What does temporal flare refer to/mean?

The fact that the retraction is more pronounced at the temporal aspect of the lid



A

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoantibodies

What well-known brainstem syndrome is associated with lid retraction?

Parinaud syndrome

Imaging findings c/w TED

How is TED diagnosed?  
Either by clinical findings or by positive thyroid antibodies

•

with MG

What are the typical orbital signs?

--Eyelid retraction

--Proptosis

•

Graves myopathy

hypothyroidism

•

The retractor muscles

rectus muscles

likely

Is the eyelid retraction unilateral, or bilateral?

It can be either

TED is characterized by a particular pattern of retraction--what is it?

'Temporal flare'

What does temporal flare refer to/mean?

The fact that the retraction is more pronounced at the temporal aspect of the lid

•

Men



Q

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoir

What well-known brainstem syndrome is associated with lid retraction?

Parinaud syndrome

Imaging findings c/w TED

What is the eponymous name for lid retraction in Parinaud syndrome?

How is  
Either  
thyroid  
one (or  
antibod

What are the typical orbital signs?

--Eyelid retraction

--Ptosis

Is the eyelid retraction unilateral, or bilateral?

It can be either

TED is characterized by a particular pattern of retraction--what is it?

'Temporal flare'

What does temporal flare refer to/mean?

The fact that the retraction is more pronounced at the temporal aspect of the lid

- Graves m
- The r
- Men a



A

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How is  
Either  
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--  
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What are the typical orbital signs?

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--Ptosis

Is the eyelid retraction unilateral, or bilateral?

It can be either

TED is characterized by a particular pattern of retraction--what is it?

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What does temporal flare refer to/mean?

The fact that the retraction is more pronounced at the temporal aspect of the lid



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How is  
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Parinaud's has four cardinal findings. What are the other three?

--Lid retraction

--

--

--

What are the typical orbital signs?

--Eyelid retraction

--Ptosis

Is the eyelid retraction unilateral, or bilateral?

It can be either

TED is characterized by a particular pattern of retraction--what is it?

'Temporal flare'

What does temporal flare refer to/mean?

The fact that the retraction is more pronounced at the temporal aspect of the lid



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What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

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What is the eponymous name for lid retraction in Parinaud syndrome?

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Either  
thyroid  
one (or  
antibod

Parinaud's has four cardinal findings. What are the other three?

--Lid retraction

--Light-near dissociation

--Impaired upgaze

--Convergence-retraction nystagmus

What are the typical orbital signs?

--Eyelid retraction

--Proptosis

Is the eyelid retraction unilateral, or bilateral?

It can be either

TED is characterized by a particular pattern of retraction--what is it?

'Temporal flare'

What does temporal flare refer to/mean?

The fact that the retraction is more pronounced at the temporal aspect of the lid



## Graves aka Thyroid Eye Disease: True/False



Parinaud syndrome. The combination of lid retraction + impaired upgaze gives rise to a characteristic appearance known as *setting sun sign*



Q

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

How is this defined?

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of anti-thyroid antibodies

- Graves is associated with MS False; it is associated with MG

What are the typical orbital signs?

--Eyelid retraction

--Proptosis

- Graves may be associated with smoking True; Graves patients are urged to stop smoking

There is an important exception to the 'absence of lid retraction indicates it isn't Graves dz' contention--in fact, such pts can present with **ptosis**. Under what circumstance might a Graves pt present with no lid retraction, or even frank ptosis?

- Rectus muscles may be enlarged to least 2x normal size
- Menstrual irregularities are likely

'Temporal flare'

What does temporal flare refer to/mean?

- Menstrual irregularities are likely
- The fact that the retraction is more pronounced at the temporal aspect of the lid

# Q/A

## Graves aka Thyroid Eye Disease: True/False



What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

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There is an important exception to the 'absence of lid retraction indicates it isn't Graves dz' contention--in fact, such pts can present with **ptosis**. Under what circumstance might a Graves pt present with no lid retraction, or even frank ptosis? If the pt has concurrent

two words

'Temporal flare'

What does temporal flare refer to/mean?

The fact that the retraction is more pronounced at the temporal aspect of the lid

- Men are more likely to have TED than women



A

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

How is this defined?

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of anti-thyroid antibodies

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What are the typical orbital signs?

--Eyelid retraction

--Proptosis

- Graves may present with T and/or a

There is an important exception to the 'absence of lid retraction indicates it isn't Graves dz' contention--in fact, such pts can present with **ptosis**. Under what circumstance might a Graves pt present with no lid retraction, or even frank ptosis? If the pt has concurrent myasthenia gravis

'Temporal flare'

What does temporal flare refer to/mean?

The fact that the retraction is more pronounced at the temporal aspect of the lid

- Men a



Q

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

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- Graves is associated with MS False; **it is associated with MG**

What are the typical orbital signs?

--Eyelid retraction

--Proptosis

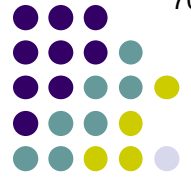
- Graves myasthenia gravis T and/or a

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'Temporal flare'

What one word best characterizes the clinical course of ptosis in MG?

- aspect of the lid



A

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

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What one word best characterizes the clinical course of ptosis in MG? **Variable**. That is, one would expect the degree of ptosis to vary from exam to exam.

aspect of the lid



Q

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

How is this defined?

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of anti-thyroid antibodies

- Graves is associated with MS False; it is associated with MG
- Graves myopathy is associated with smoking True; Graves patients are urged to stop smoking
- Graves is associated with MS False; it is associated with MG
- Graves myopathy is associated with smoking True; Graves patients are urged to stop smoking
- The most common extraocular muscle involved in TED is the inferior rectus (most likely)
- Men are more likely to have TED than women

What are the typical orbital signs?

--Eyelid retraction

--**Proptosis**

--Restrictive strabismus (in a manner c/w TED myopathy)

Is the proptosis unilateral, or bilateral?



A

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

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--**Proptosis**

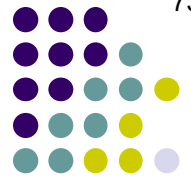
--Restrictive strabismus (in a manner c/w TED myopathy)

Is the proptosis unilateral, or bilateral?

It can be either



## Graves *aka* Thyroid Eye Disease: True/False



73



Unilateral\*



Bilateral

TED: Proptosis

*\*Or highly asymmetric, at least*



Q

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

How is this defined?

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of anti-thyroid antibodies

- Graves is associated with MS False; it is associated with MG
- Graves myopathy is characterized by T and/or a hypotrophic inferior rectus (superior rectus is more likely)
- The most common cause of unilateral proptosis in adults is TED
- Men are more likely to have TED than women

What are the typical orbital signs?

--Eyelid retraction

--**Proptosis**

--Restrictive strabismus (in a manner c/w TED myopathy)

Is the proptosis unilateral, or bilateral?

It can be either

Where does TED rank as a cause of unilateral proptosis in adults?



A

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

How is this defined?

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of anti-thyroid antibodies

- Graves is associated with MS False; it is associated with MG
- Graves myopathy is associated with smoking True; Graves is associated with smoking and/or a history of smoking
- The most common extraocular muscle involved in TED is the inferior rectus (likely)
- Men are more likely to have TED than women

What are the typical orbital signs?

--Eyelid retraction

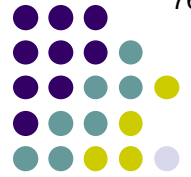
--**Proptosis**

--Restrictive strabismus (in a manner c/w TED myopathy)

Is the proptosis unilateral, or bilateral?

It can be either

Where does TED rank as a cause of unilateral proptosis in adults?  
#1



Q

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

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- Graves is associated with MS False; it is associated with MG
- Graves myopathy is associated with smoking True; Graves is associated with smoking. Urged to stop smoking
- The most common cause of unilateral proptosis in adults is TED (superior rectus likely)
- Men are more likely to have TED than women

What are the typical orbital signs?

--Eyelid retraction

--**Proptosis**

--Restrictive strabismus (in a manner c/w TED myopathy)

Is the proptosis unilateral, or bilateral?

It can be either

Where does TED rank as a cause of unilateral proptosis in adults?  
#1

Where does TED rank as a cause of **bilateral** proptosis in adults?



A

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

How is this defined?

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of anti-thyroid antibodies

- Graves is associated with MS False; it is associated with MG
- Graves myopathy is a myopathy characterized by T and/or a hypotrophic inferior rectus (superior rectus is more likely)
- The most common cause of unilateral proptosis in adults is TED #1
- Men and women are equally affected by TED

What are the typical orbital signs?

--Eyelid retraction

--**Proptosis**

--Restrictive strabismus (in a manner c/w TED myopathy)

Is the proptosis unilateral, or bilateral?

It can be either

Where does TED rank as a cause of unilateral proptosis in adults?

#1

Where does TED rank as a cause of **bilateral** proptosis in adults?

#1



Q

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

How is this defined?

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of anti-thyroid antibodies

- Graves is associated with MS False; it is associated with MG

What about in the **pediatric** population--is the relationship between proptosis and Graves dz as strong?

- Graves dz is associated with MG

- The rectus muscles are the most likely to be affected (not the extraocular muscles)

Where does TED rank as a cause of unilateral proptosis <sup>kids</sup> in ~~adults~~? #1

Where does TED rank as a cause of **bilateral** proptosis <sup>kids</sup> in ~~adults~~? #1

- Men are more likely to have TED than women



# Q/A

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

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How is this defined?

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What about in the **pediatric** population--is the relationship between proptosis and Graves dz as strong?

No. Graves is rare in children, and when it does occur, only about 10% of pts present with proptosis. (Rule of thumb: In children, proptosis is more likely to be **inflammatory** or **traumatic** than to be inflammatory.)

- The **lateral rectus** (most likely)
- Men a

Where does TED rank as a cause of unilateral proptosis in <sup>kids</sup> adults? #1

Where does TED rank as a cause of **bilateral** proptosis in <sup>kids</sup> adults? #1



A

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

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No. Graves is rare in children, and when it does occur, only about 10% of pts present with proptosis. (Rule of thumb: In children, proptosis is more likely to be infectious or neoplastic than to be inflammatory.)

Where does TED rank as a cause of unilateral proptosis in <sup>kids</sup>adults?  
#1

Where does TED rank as a cause of **bilateral** proptosis in <sup>kids</sup>adults?  
#1





Q

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

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How is this defined?

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of anti-thyroid antibodies

- Graves is associated with MS False; it is associated with MG
- Graves myopathy is characterized by and/or a hypotropia
  - Eyelid retraction
  - Proptosis
  - Restrictive strabismus (in a manner c/w TED myopathy)
  - Compensatory strabismus
  - Edema
- The median rectus is the first muscle to be affected False; the order (most to least likely) is IR>MR>SR>LR
- Men and women are at equal risk of TED Nope

What are the typical orbital signs?

- Eyelid retraction
- Proptosis
- Restrictive strabismus (in a manner c/w TED myopathy)
- Compensatory strabismus
- Edema

What does this mean, 'in a manner c/w TED myopathy'?



A

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

How is this defined?

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of anti-thyroid antibodies

- Graves is associated with MS False; it is associated with MG
- Graves myopathy is characterized by one or more of the following:
  - Eyelid retraction
  - Proptosis
  - Restrictive strabismus (in a manner c/w TED myopathy)
  - Compensatory hypertropia
  - Edema
- The median rectus is the first extraocular muscle to be affected. False; the order (most to least likely) is **IR>MR>SR>LR**
- Men and women are at equal risk of TED Nope

What are the typical orbital signs?

- Eyelid retraction
- Proptosis
- Restrictive strabismus (in a manner c/w TED myopathy)
- Compensatory hypertropia
- Edema

What does this mean, 'in a manner c/w TED myopathy'?

It means in **this order**

**IR>MR>SR>LR**



Q

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

How is this defined?

Either the pt has a known thyroid condition, or s/he tests positive for one (or more) of a host of antibodies

Which of these is the most common orbital sign in TED?

What are the typical orbital signs?

- Eyelid retraction
- Proptosis
- Restrictive strabismus (in a manner c/w TED myopathy)
- Compressive optic neuropathy
- Edema of the lids and/or conj (ie, chemosis)

- Graves is associated with MG
- Graves may be associated with hypotrophic thyroidism
- The medial rectus is more likely than the inferior rectus to be affected False; the order (most to least likely) is IR>MR>SR>LR
- Men and women are at equal risk of TED Nope



A

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

How is this defined?

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of autoantibodies

Which of these is the most common orbital sign in TED?

Lid retraction

What are the typical orbital signs?

--Eyelid retraction

--Proptosis

--Restrictive strabismus (in a manner c/w TED myopathy)

--Compressive optic neuropathy

--Edema of the lids and/or conj (ie, chemosis)

- Graves is associated with MG
- Graves may present with hypotropia
- The medial rectus is more likely than the inferior rectus to be affected False; the order (most to least likely) is IR>MR>SR>LR
- Men and women are at equal risk of TED Nope



Q

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

How is this defined?

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of autoantibodies

Which of these is the most common orbital sign in TED?

Lid retraction

What percent of TED pts will demonstrate lid retraction at presentation?

- Graves is associated with MG
- Graves is more likely to be associated with hyperthyroidism than hypothyroidism
- The medial rectus is more likely than the inferior rectus to be affected False; the order (most to least likely) is IR>MR>SR>LR
- Men and women are at equal risk of TED Nope

What are the typical orbital signs?

--Eyelid retraction

--Proptosis

--Restrictive strabismus (in a manner c/w TED myopathy)

--Compressive optic neuropathy

--Edema of the lids and/or conj (ie, chemosis)



A

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

How is this defined?

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of autoantibodies

Which of these is the most common orbital sign in TED?

Lid retraction

What percent of TED pts will demonstrate lid retraction at presentation?

About 75

What are the typical orbital signs?

--Eyelid retraction

--Proptosis

--Restrictive strabismus (in a manner c/w TED myopathy)

--Compressive optic neuropathy

--Edema of the lids and/or conj (ie, chemosis)

- Graves is associated with MG
- Graves may present with exophthalmos and/or a restrictive myopathy
- The medial rectus is more likely than the inferior rectus to be affected False; the order (most to least likely) is IR>MR>SR>LR
- Men and women are at equal risk of TED Nope



Q

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

How is this defined?

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of antibodies

Which of these is the most common orbital sign in TED?

Lid retraction

What percent of TED pts will demonstrate lid retraction at presentation?

About 75

What percent with demonstrate it at some point during the disease process?

What are the typical orbital signs?

--Eyelid retraction

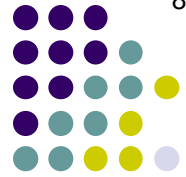
--Proptosis

--Restrictive strabismus (in a manner c/w TED myopathy)

--Compressive optic neuropathy

--Edema of the lids and/or conj (ie, chemosis)

- Graves is associated with MG
- Graves may present with hypotropia
- The medial rectus is more likely than the inferior rectus to be affected False; the order (most to least likely) is IR>MR>SR>LR
- Men and women are at equal risk of TED Nope



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## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

How is this defined?

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of antibodies

Which of these is the most common orbital sign in TED?

Lid retraction

What percent of TED pts will demonstrate lid retraction at presentation?

About 75

What percent with demonstrate it at some point during the disease process?

Over 90

What are the typical orbital signs?

--Eyelid retraction

--Proptosis

--Restrictive strabismus (in a manner c/w TED myopathy)

--Compressive optic neuropathy

--Edema of the lids and/or conj (ie, chemosis)

- Graves is associated with MG
- Graves may present with hypotropia
- The medial rectus is more likely than the inferior rectus to be affected False; the order (most to least likely) is IR>MR>SR>LR
- Men and women are at equal risk of TED Nope



## Graves *aka* Thyroid Eye Disease: True/False

## Imaging findings c/w TED

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of anti-thyroid antibodies

- Graves is associated with MS False; it is associated with MG
  - Graves sim T and/or a hypotro
  - The m rectus to likely) is
  - Men and women are at equal risk of TED Nope
- What are the typical orbital signs?
- Eye retraction
  - Proptosis
- In the present context, to what does the term lid lag refer?*

lid <sup>any</sup>

*In the present context, to what does the term lid lag refer?*



A

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

How is this defined?

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of anti-thyroid antibodies

- Graves is associated with MS False; it is associated with MG
- Graves is associated with smoking True; Graves patients are urged to stop smoking
- Graves is associated with MS False; it is associated with MG
- Graves is associated with smoking True; Graves patients are urged to stop smoking
- The most common extraocular muscle involved (superior rectus to a lesser extent, lateral rectus to a lesser extent, inferior rectus to a lesser extent, medial rectus to a lesser extent) is likely) is
- Men and women are at equal risk of TED Nope

What are the typical orbital signs?

--Eye retraction  
--Proptosis  
--Lid lag

In the present context, to what does the term lid lag refer?

When a person who \*doesn't\* have TED moves into downgaze, their upper lid margin will follow the globe. In contrast, when a TED pt looks down, their upper lid remains elevated, ie, it 'lags.' This is a classic TED finding.

## Graves *aka* Thyroid Eye Disease: True/False



91



Unilateral. Note how the normal right upper lid 'follows' the eye into downgaze



Bilateral

TED: Lid lag

## Graves *aka* Thyroid Eye Disease: True/False

## Imaging findings c/w TED

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of anti-thyroid antibodies

- Graves is associated with MS False; it is associated with MG
  - Graves sim T and/or a hypotrochosis
  - The m rectus to likely) is
  - Men and women are at equal risk of TED Nope
- What are the typical orbital signs?
- Eye retraction
  - Proptosis
- In the present context, to what does the term lid lag refer?*
- When a person who \*doesn't\* have TED moves into downgaze, their upper lid margin will follow the globe. In contrast, when a TED pt looks down, their upper lid remains elevated, ie, it 'lags.' This is a classic TED finding.
- What is the eponymous name for lid lag?*

- lid retraction
- Proptosis

When a person who \*doesn't\* have TED moves into downgaze, their upper lid margin will follow the globe. In contrast, when a TED pt looks down, their upper lid remains elevated, ie, it 'lags.' This is a classic TED finding.

What is the eponymous name for lid lag?



A

## Graves aka Thyroid Eye Disease: True/False

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Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

How is this defined?

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of anti-thyroid antibodies

- Graves is associated with MS False; it is associated with MG
- Graves is associated with smoking True; Graves patients are urged to stop smoking
- Graves is associated with MS False; it is associated with MG
- Graves is associated with smoking True; Graves patients are urged to stop smoking
- The most common extraocular muscle involved (superior rectus is most likely) is the superior rectus
- Men and women are at equal risk of TED Nope

What are the typical orbital signs?

--Eye retraction  
--Proptosis  
*lag*  
*lid*

In the present context, to what does the term lid lag refer?

When a person who \*doesn't\* have TED moves into downgaze, their upper lid margin will follow the globe. In contrast, when a TED pt looks down, their upper lid remains elevated, ie, it 'lags.' This is a classic TED finding.

What is the eponymous name for lid lag?

von Graefe's sign



Q

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

How is this defined?

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of anti-thyroid antibodies

- Graves is associated with MG
- Graves is associated with hypothyroidism
- The most common extraocular muscle involved (likely) is the inferior rectus
- Men and women are at equal risk of TED

It may be classic for TED, but is it pathognomonic?

What are the typical signs of TED?  
 --Lid lag  
 --Eye retraction  
 --Proptosis

In the present context

When a person who "doesn't" have TED moves into downgaze, their upper lid margin will follow the globe. In contrast, when a TED pt looks down, their upper lid remains elevated, ie, it 'lags'. **This is a classic TED finding.**

What is the eponymous name for lid lag?  
 von Graefe's sign



A

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

How is this defined?

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of anti-thyroid antibodies

- Graves is associated with MG
- Graves is associated with hypotrophy
- The most likely) is
- Men and women are at equal risk of TED Nope

It may be classic for TED, but is it pathognomonic?

No

What are the typical signs of TED?

- Eye retraction
- Proptosis

lid lag

In the present context

When a person who \*doesn't\* have TED moves into downgaze, their upper lid margin will follow the globe. In contrast, when a TED pt looks down, their upper lid remains elevated, ie, it 'lags'. **This is a classic TED finding.**

What is the eponymous name for lid lag?  
von Graefe's sign



Q

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

How is this defined?

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of anti-thyroid antibodies

- Graves is associated with MG
- Graves is associated with hypothyroidism
- The most common extraocular muscle involved (likely) is the inferior rectus
- Men and women are at equal risk of TED

It may be classic for TED, but is it pathognomonic?  
No

What is the eponymous name for lid lag when it is present in a non-TED pt?

In the present context

When a person who "doesn't" have TED moves into downgaze, their upper lid margin will follow the globe. In contrast, when a TED pt looks down, their upper lid remains elevated, ie, it 'lags'. **This is a classic TED finding.**

What is the eponymous name for lid lag?  
von Graefe's sign





# A

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

How is this defined?

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of anti-thyroid antibodies

- Graves is associated with MG
- Graves is associated with hypothyroidism
- The most common extraocular muscle involved (likely) is the inferior rectus
- Men and women are at equal risk of TED

It may be classic for TED, but is it pathognomonic?  
No

What is the eponymous name for lid lag when it is present in a non-TED pt?

**Pseudo-von Graefe's sign**

In the present context, when a person who "doesn't" have TED moves into downgaze, their upper lid margin will follow the globe. In contrast, when a TED pt looks down, their upper lid remains elevated, ie, it 'lags'. **This is a classic TED finding.**

What is the eponymous name for lid lag?  
**Pseudo-von Graefe's sign**

What are the types of lid lag?  
--Eye retract  
--Proptosis

lag  
lid

## Graves *aka* Thyroid Eye Disease: True/False

## Imaging findings c/w TED

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of anti-thyroid antibodies

- Graves is associated with MS False; it is associated with MG

--Eyelid retraction

- Graves myopathy

There is a form of **ptosis** that is associated with lid lag—which one?

# QA

## Graves aka Thyroid Eye Disease: True/False



What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

How is this defined?

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of anti-thyroid antibodies

- Graves is associated with MS False; it is associated with MG

What are the typical orbital signs?

--Eye retraction  
Proptosis

- Graves may be associated with T and/or a

There is a form of **ptosis** that is associated with lid lag—which one?

Congenital myogenic ptosis

- 
- Men and women are at equal risk of TED Nope

# QA

## Graves aka Thyroid Eye Disease: True/False



What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

How is this defined?

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of anti-thyroid antibodies

- Graves is associated with MS False; it is associated with MG

What are the typical orbital signs?

--Eye retraction

--Proptosis

- Graves may be associated with hyperthyroidism T and/or a

There is a form of **ptosis** that is associated with lid lag—which one?

Congenital myogenic ptosis. In downgaze, the appearance will suggest lid retraction.

- 
- Men and women are at equal risk of TED Nope

# QA

## Graves aka Thyroid Eye Disease: True/False



What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

How is this defined?

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of anti-thyroid antibodies

- Graves is associated with MS False; it is associated with MG

What are the typical orbital signs?

--Eye retraction

--Proptosis

- Graves may be associated with smoking True; Graves is associated with smoking. If you are a smoker, you are urged to stop smoking

There is a form of **ptosis** that is associated with lid lag—which one?

Congenital myogenic ptosis. In downgaze, the appearance will suggest lid retraction.

- In a nutshell, what is the pathogenesis of congenital myogenic ptosis?

- Men and women are at equal risk of TED Nope



# QA

## Graves aka Thyroid Eye Disease: True/False

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- In a nutshell, what is the pathogenesis of congenital myogenic ptosis?  
The levator fails to develop properly, with some or all of its muscle fibers replaced by fibrofatty tissue

- Men and women are at equal risk of TED Nope

# QA

## Graves aka Thyroid Eye Disease: True/False



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- Graves is associated with MS False; it is associated with MG

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What are the typical orbital signs?

--Eye retraction  
Proptosis

lag  
lid ^

There is a form of **ptosis** that is associated with lid lag—which one?

Congenital myogenic ptosis. In downgaze, the appearance will suggest lid retraction.

- In a nutshell, what is the pathogenesis of congenital myogenic ptosis?  
The levator fails to develop properly, with some or all of its muscle fibers replaced by fibrofatty tissue

OK, I can see how a lack of functioning levator leads to ptosis, but why do these pts have lid lag?

- Men and women are at equal risk of TED Nope

# QA

## Graves aka Thyroid Eye Disease: True/False



What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

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Typical orbital signs of TED

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--Eye retraction

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lag  
lid  
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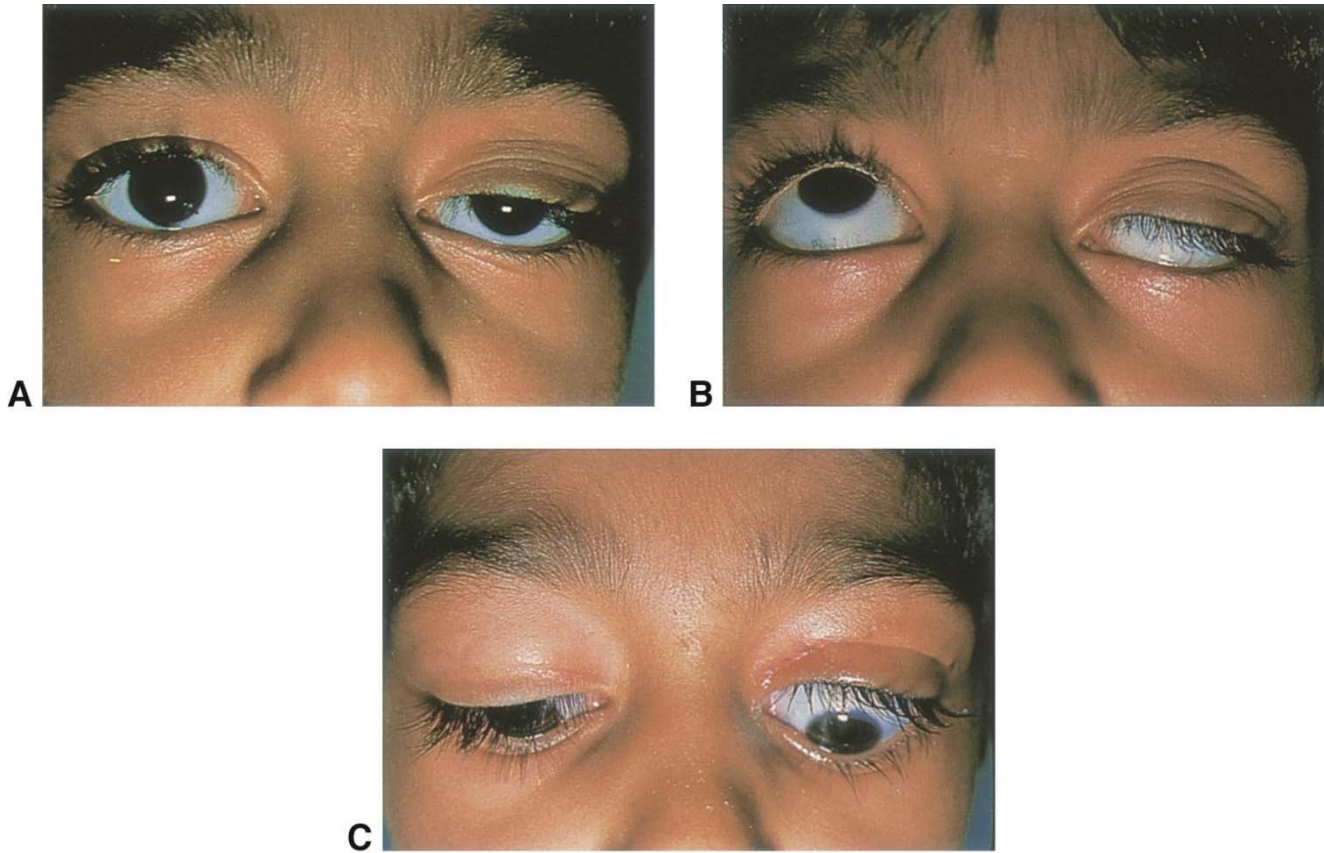
OK, I can see how a lack of functioning levator leads to ptosis, but why do these pts have lid lag?  
Because the fibrofatty tissue can neither contract (causing ptosis) nor relax (causing lid lag)

- Men and women are at equal risk of TED Nope





## Graves *aka* Thyroid Eye Disease: True/False



Congenital myogenic ptosis. A, ptosis. B, failed elevation in upgaze. C, lid lag in downgaze

## Graves-like Thyroid Eye Disease: True/False

*What well-known phenomenon associated with a cranial-nerve palsy frequently manifests with lid lag?*

*What are the typical orbital signs?*

--Eye retraction  
Proptosis

- Graves myopathy and/or a

*There is a form of ptosis that is associated with lid lag—which one?*

Congenital myogenic ptosis. In downgaze, the appearance will suggest lid retraction.

- *In a nutshell, what is the pathogenesis of congenital myogenic ptosis?*

The levator fails to develop properly, with some or all of its muscle fibers replaced by fibrofatty tissue

*OK, I can see how a lack of functioning levator leads to ptosis, but why do these pts have lid lag?*

Because the fibrofatty tissue can neither contract (causing ptosis) nor relax (causing lid lag)

- Men and women are at equal risk of TED Nope

## Graves ophthalmopathy: True/False

What well-known phenomenon associated with a cranial-nerve palsy frequently manifests with lid lag?  
Aberrant regeneration after CN3 palsy

What are the typical orbital signs?

--Eye retraction  
Proptosis

Graves myopathy

T and/or a

There is a form of ptosis that is associated with lid lag—which one?

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Men and women are at equal risk of TED. Nope

## Graves ophthalmopathy: True/False

*What well-known phenomenon associated with a cranial-nerve palsy frequently manifests with lid lag?*  
 Aberrant regeneration after CN3 palsy

*What the heck is aberrant regeneration?*

*What are the typical orbital signs?*

--Eye retraction  
 Proptosis

- Graves myopathy and/or a

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Because the fibrofatty tissue can neither contract (causing ptosis) nor relax (causing lid lag)

- Men and women are at equal risk of TED Nope

## Graves aka Thyroid Eye Disease: True/False

*What well-known phenomenon associated with a cranial-nerve palsy frequently manifests with lid lag?*  
 Aberrant regeneration after CN3 palsy

*What the heck is aberrant regeneration?*

A phenomenon in which healing nerve fibers form incorrect connections, resulting in impulses intended for one muscle stimulating a different one

*What are the typical orbital signs?*

--Eye retraction  
 Proptosis

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*What are the three potential mechanisms of CN3 palsy?*

--?  
 --?  
 --?

*What are the typical orbital signs?*

--Eye retraction  
 --Proptosis

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*There is a form of ptosis that is associated with lid lag—which one?*

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*What are the three potential mechanisms of CN3 palsy?*

- Ischemic
- Traumatic
- Compressive

*What are the typical orbital signs?*

- Eye retraction
- Proptosis

● Graves myopathy and/or a

*There is a form of ptosis that is associated with lid lag—which one?*

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*What are the three potential mechanisms of CN3 palsy? Which is the most common cause?*

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- Traumatic
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*What are the typical orbital signs?*

- Eye lid lag
- Eye retraction
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- Ischemic—most common
- Traumatic
- Compressive

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- Eye retraction
- Proptosis

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*What the heck is aberrant regeneration?*

A phenomenon in which healing nerve fibers form incorrect connections, resulting in impulses intended for one muscle stimulating a different one

*What are the three potential mechanisms of CN3 palsy? Which is the most common cause? Which cause is never associated with aberrant regeneration?*

--Ischemic—most common

--Traumatic

--Compressive

*What are the typical orbital signs?*

--Eye lid lag

--Eye retraction

--Proptosis

- Graves myopathy and/or a

*There is a form of ptosis that is associated with lid lag—which one?*

Congenital myogenic ptosis. In downgaze, the appearance will suggest lid retraction.

*In a nutshell, what is the pathogenesis of congenital myogenic ptosis?*

The levator fails to develop properly, with some or all of its muscle fibers replaced by fibrofatty tissue

*OK, I can see how a lack of functioning levator leads to ptosis, but why do these pts have lid lag?*

Because the fibrofatty tissue can neither contract (causing ptosis) nor relax (causing lid lag)

- Men and women are at equal risk of TED Nope

## Graves ophthalmopathy: True/False

*What well-known phenomenon associated with a cranial-nerve palsy frequently manifests with lid lag?*  
Aberrant regeneration after CN3 palsy

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*What are the classic CN3 aberrant regeneration mis-connections?*

--?

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- Traumatic
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*What are the classic CN3 aberrant regeneration mis-connections?*

- Attempted adduction or depression→eyelid retraction
- Attempted globe adduction, elevation or depression→miosis of the pupil

*What are the typical orbital signs?*

- Eye lid lag
- Eye retraction
- Proptosis

● Graves myopathy and/or a

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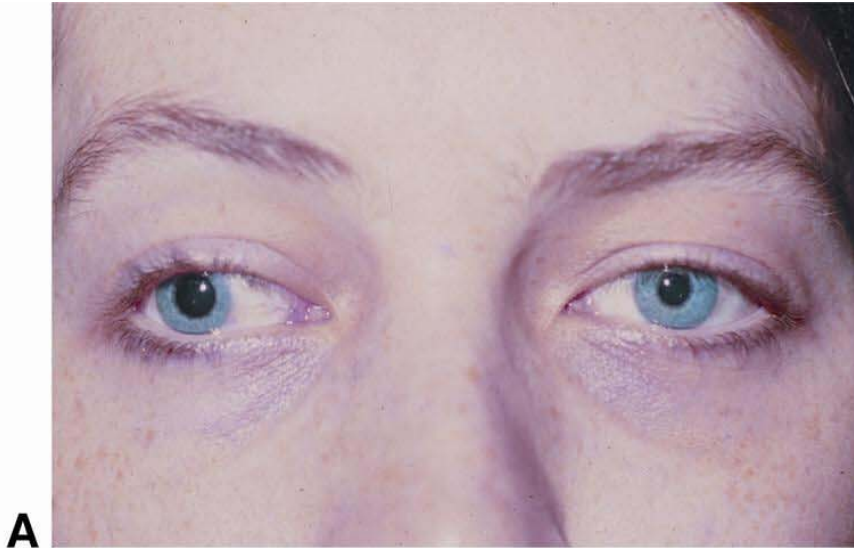
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## Graves *aka* Thyroid Eye Disease: True/False

118

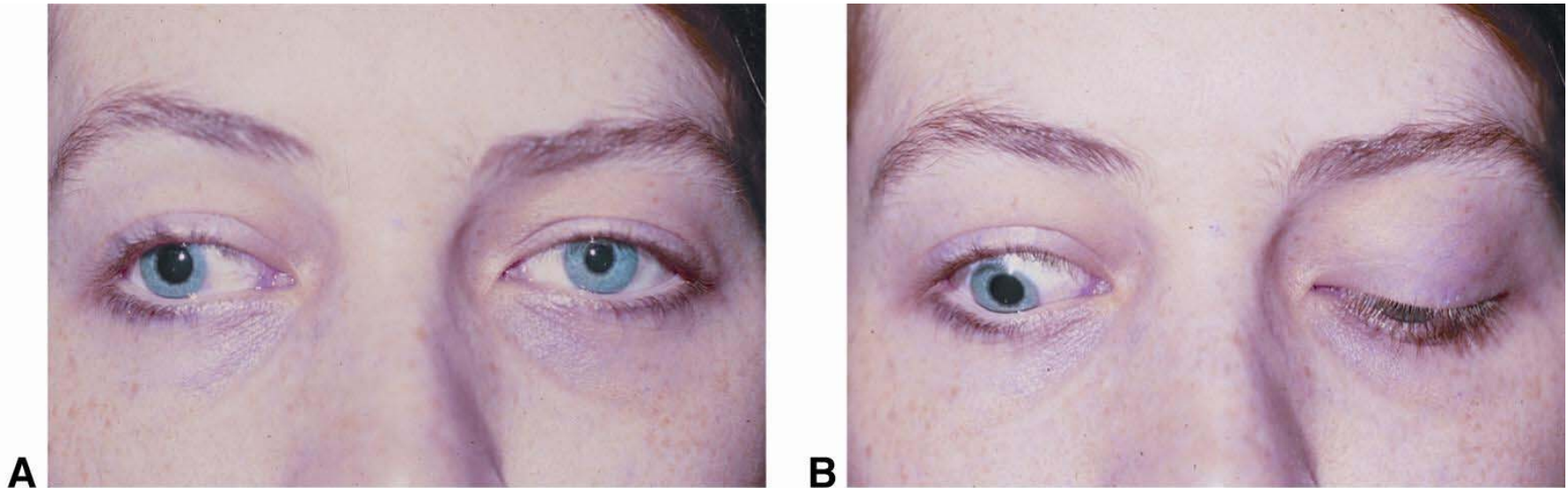


Aberrant regeneration of the right third nerve. A, In primary gaze, there is mild ptosis, pupillary mydriasis, and exotropia, all on the right.

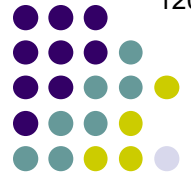
## Graves *aka* Thyroid Eye Disease: True/False



119



Aberrant regeneration of the right third nerve. A, In primary gaze, there is mild ptosis, pupillary mydriasis, and exotropia, all on the right. B, With attempted downward gaze, the right eyelid retracts as fibers of the right third nerve supplying the inferior rectus now also innervate the levator muscle



Q

## Graves aka Thyroid Eye Disease: True/False

What is/are the diagnostic criteria for TED? Pt must have at least two of the following:

Autoimmune thyroid dz

Typical orbital signs of TED

Imaging findings c/w TED

How is this defined?

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of anti-thyroid antibodies

What are these findings?

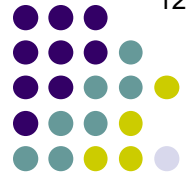
Next Q

- Graves is associated with MS False; it is associated with MG
- Graves myopathy is characterized by hypertropia and/or a hypotropia
- The medial rectus is more likely than the inferior rectus to be affected False; the order (most to least likely) is IR>MR>SR>LR
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What are the typical orbital signs?

- Eyelid retraction
- Proptosis
- Restrictive strabismus (in a manner c/w TED myopathy)
- Compressive optic neuropathy
- Edema of the lids and/or conj (ie, chemosis)





# A

## Graves aka Thyroid Eye Disease: True/False

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*How is this defined?*

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of anti-thyroid antibodies

*What are these findings?*

Enlargement of the EOMs (in a manner c/w TED myopathy)

- Graves is associated with MS False; it is associated with MG
- Graves myopathy is characterized by symmetric enlargement of the EOMs, most commonly the superior and/or inferior rectus muscles, leading to restrictive strabismus and/or a hypotropia
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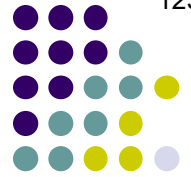
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What does this mean, 'in a manner c/w TED myopathy'?

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It means two things:

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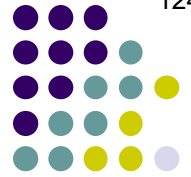
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# A/Q

## Graves aka Thyroid Eye Disease: True/False



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shape

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'two words'

--

What are the typical orbital signs of TED?

--Eyelid retraction

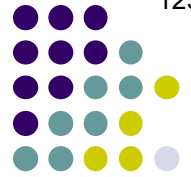
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# A

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How is this defined?

Either the pt has a known autoimmune thyroid condition, or s/he tests positive for one (or more) of a host of anti-thyroid antibodies

What are these findings?

Enlargement of the EOMs (in a manner c/w TED myopathy)

What does this mean, 'in a manner c/w TED myopathy'?

It means two things:

--Enlargement of the EOMs is fusiform, aka 'tendon sparing'

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What are the typical orbital signs of TED?

--Eyelid retraction

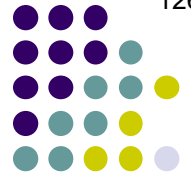
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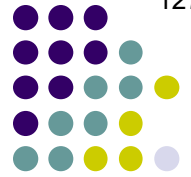
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## Graves *aka* Thyroid Eye Disease: True/False



TED: Tendon-sparing EOM enlargement



Q

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It means two things:

- Enlargement of the EOMs is fusiform, aka 'tendon sparing'
- Involvement of the EOMs occurs...[in what order?]

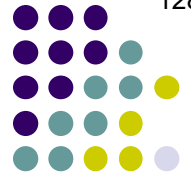
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- Eyelid retraction
- Proptosis
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- Graves is associated with MG
- Graves myopathy is characterized by enlargement of the EOMs in a manner c/w TED myopathy and/or a hypotropia
- The medial rectus is more likely than the inferior rectus to be affected False; the order (most to least likely) is IR>MR>SR>LR
- Men and women are at equal risk of TED Nope

A

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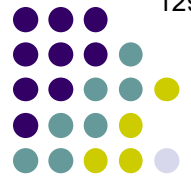
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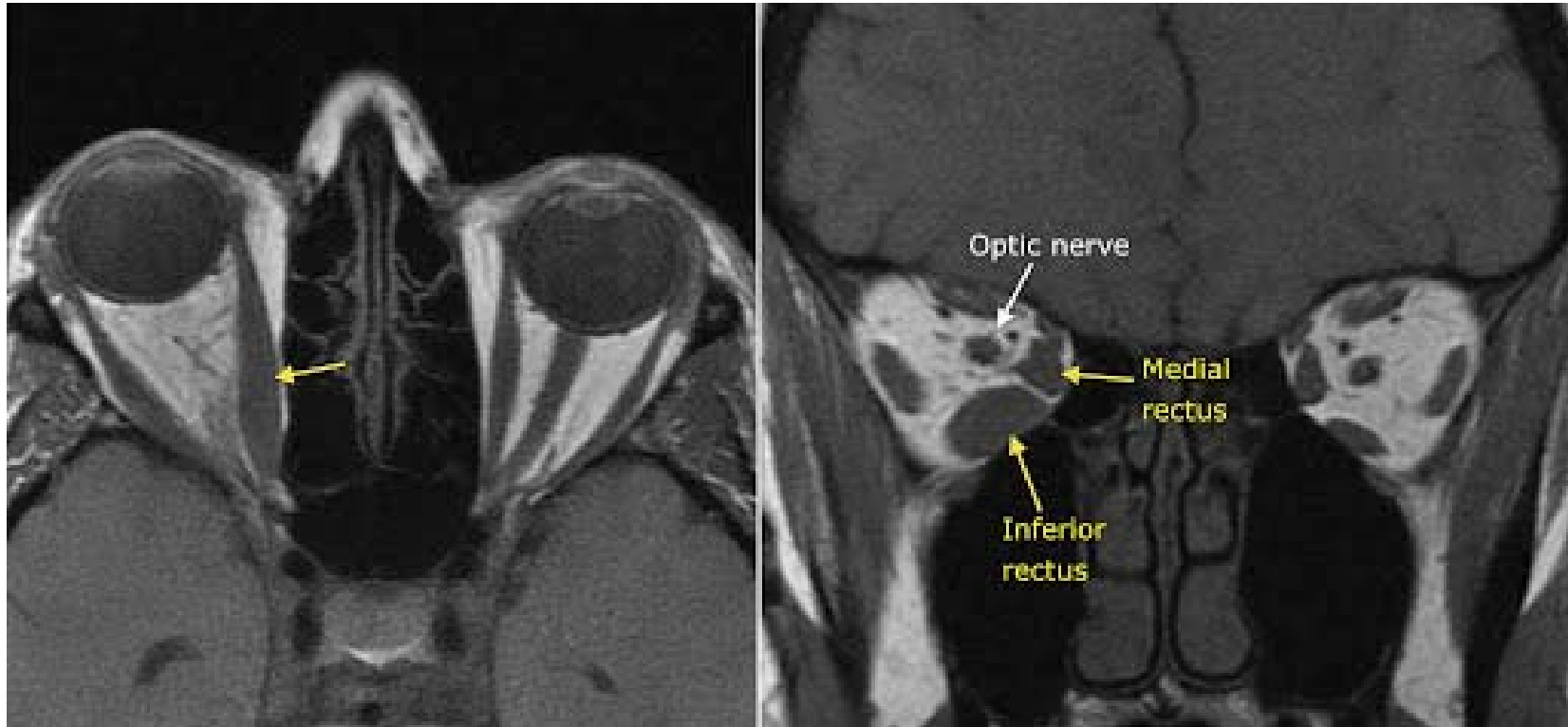
**IR>MR>SR>LR**

- Graves is associated with MG
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- The medial rectus is more likely than the inferior rectus to be affected. False; the order (most to least likely) is **IR>MR>SR>LR**
- Men and women are at equal risk of TED Nope





## Graves *aka* Thyroid Eye Disease: True/False



TED: Tendon-sparing EOM enlargement involving the IR > MR



# Q

## Graves *aka* Thyroid Eye Disease: True/False

*What is the natural history of TED?*

- Graves myopathy usually results in an ET and/or a hypotropia True
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## Graves *aka* Thyroid Eye Disease: True/False

*What is the natural history of TED?*

It is a self-limited disease that tends to 'burn itself out' over time, but may leave disfiguring sequelae

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## Graves aka Thyroid Eye Disease: True/False

*What is the natural history of TED?*

It is a self-limited disease that tends to **'burn itself out' over time**, but may leave disfiguring sequelae

*On average, how long does it take to burn itself out?*

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*How long for smokers?*

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*How long for nonsmokers? ~1 year*  
*How long for smokers? 2-3 years*

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--Mild disease can be managed (?)

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*What is the natural history of TED?*

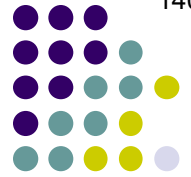
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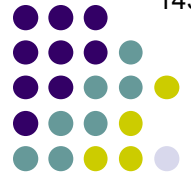
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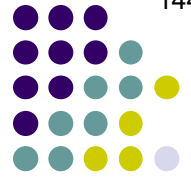
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*How is TED managed?*

Other than smoking

*A biologic is now FDA-approved for TED. What is the brand name?*

--Mild disease can

--Moderate disease

--Severe disease

neuropathy. This necessitates more aggressive steroid therapy, and consideration should be given to the use of steroid-sparing IMT and/or orbital radiation therapy. a last resort.

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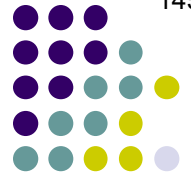
(itation)

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and/or optic

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- The medial rectus is more likely than the inferior rectus to be affected False; the order (most to least likely) is IR>MR>SR>LR
- Men and women are at equal risk of TED Nope





# A

## Graves aka Thyroid Eye Disease: True/False

*What is the natural history of TED?*

It is a self-limited disease that tends to 'burn itself out' over time, but may leave disfiguring sequelae

*How is TED managed?*

Other than smoking

*A biologic is now FDA-approved for TED. What is the brand name?*

Tepezza

... disease severity:

--Mild disease can

(inflammation)

--Moderate disease

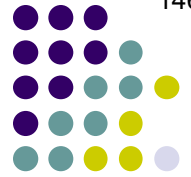
PO steroids

--Severe disease

and/or optic

neuropathy. This necessitates more aggressive steroid therapy, and consideration should be given to the use of steroid-sparing IMT and/or orbital radiation therapy. a last resort.

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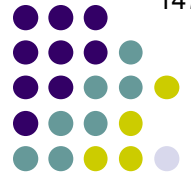
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Teprotumumab

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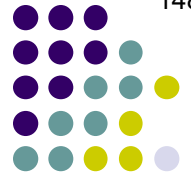
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**Teprotumu-mab**

--Moderate disease

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neu

use

*What does the stem -mab indicate?*

... disease severity:

... (irritation)

... PO steroids

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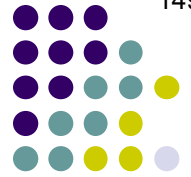
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Other than smoking Tepezza

*--Mild disease can be managed with (what)? What is its trade name?*

**Teprotumu-mab**

*--Moderate disease can be managed with (what)?*

PO steroids

*What does the stem -mab indicate?*

It indicates the med is a two words

--Severe disease can be managed with (what)? and/or optic  
neurotomy and consideration should be given to the  
use of (what) as a last resort.

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That the antibody is human, ie, it didn't derive from work done on another species

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It indicates the med is a monoclonal antibody

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That the antibody is human, ie, it didn't derive from work done on another species

*What does the infix –tum- indicate?*

That the molecule is used against tumors  
(teprotumumab was developed as an anti-cancer med)

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--Moderate disease

*What does it target?*

It binds to and blocks the receptor for insulin-like growth factor 1 (IGF-1)

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*Graves ophthalmopathy usually results in an FT and/or o*  
*If surgery during active TED is relatively contraindicated, when should it be considered?*

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*If surgery during active TED is relatively contraindicated, when should it be considered?*

Once the pt is one word, and his/her orbital condition has been stable for at least amount of time





# A

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*If surgery during active TED is relatively contraindicated, when should it be considered?*

Once the pt is euthyroid, and his/her orbital condition has been stable for at least 6 months



Q

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*If surgery during active TED is relatively contraindicated, when should it be considered?*

Once the pt is euthyroid, and his/her orbital condition has been stable for at least 6 months

*Suppose a pt meeting those criteria needs orbital decompression, has strabismus, and also has malpositioned eyelids. What should the overall surgical strategy be?*



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Once the pt is euthyroid, and his/her orbital condition has been stable for at least 6 months

*Suppose a pt meeting those criteria needs orbital decompression, has strabismus, and also has malpositioned eyelids. What should the overall surgical strategy be?*

Because orbital-decompression surgery will affect both EOM and lid position, the decompression surgery must precede strabismus and/or lid surgery. Likewise, because strabismus surgery will affect lid position, the strabismus surgery must precede the lid surgery.



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*If surgery during active TED is relatively contraindicated, when should it be considered?*

Once the pt is euthyroid, and his/her orbital condition has been stable for at least 6 months

*Suppose a pt meeting those criteria needs orbital decompression, has strabismus, and also has malpositioned eyelids. What should the overall surgical strategy be?*

Because orbital-decompression surgery will affect both EOM and lid position, the decompression surgery must precede strabismus and/or lid surgery. Likewise, because strabismus surgery will affect lid position, the strabismus surgery must precede the lid surgery. Putting it all together, the surgical order is as follows:

1. Decompression
2. Strabismus
3. Eyelids



Q

## Graves aka Thyroid Eye Disease: True/False

*What is the natural history of TED?*

It is a self-limited disease that tends to 'burn itself out' over time, but may leave disfiguring sequelae

*How is TED managed?*

Or *What about treating the concurrent thyroid disease?*

--/

--/

--Severe disease involves sight-threatening complications such as corneal decompensation, and/or optic neuropathy. This necessitates more aggressive steroid therapy, and consideration should be given to the use of steroid-sparing IMT and/or orbital radiation therapy.

- Graves myopathy usually results in an ET and/or a hypotropia True
- The medial rectus is more likely than the inferior rectus to be affected False; the order (most to least likely) is IR>MR>SR>LR
- Men and women are at equal risk of TED Nope



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## Graves aka Thyroid Eye Disease: True/False

*What is the natural history of TED?*

It is a self-limited disease that tends to 'burn itself out' over time, but may leave disfiguring sequelae

*How is TED managed?*

Of course, the first step is to ensure the patient is euthyroid. *What about treating the concurrent thyroid disease?*

--/ Rendering the pt euthyroid is an important goal for TED pts (to be pursued by Endo/IM, of course).

--/ Severe disease involves sight-threatening complications such as corneal decompensation, and/or optic neuropathy. This necessitates more aggressive steroid therapy, and consideration should be given to the use of steroid-sparing IMT and/or orbital radiation therapy.

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Of course, the first step is to ensure the patient is euthyroid. *What about treating the concurrent thyroid disease?*

Rendering the pt euthyroid is an important goal for TED pts (to be pursued by Endo/IM, of course). However, it is important to note that some treatments in this regard can aggravate the TED by increasing immune activity against the TSH-receptor antigens that are responsible for TED.

--Severe disease involves sight-threatening complications such as corneal decompensation, and/or optic neuropathy. This necessitates more aggressive steroid therapy, and consideration should be given to the use of steroid-sparing IMT and/or orbital radiation therapy.

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