What does the term *Entropion* mean?
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It means the eyelid margin is turning **inward**.
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The Plastics book identifies six general causes of entropion and/or ectropion. What are they? (Note that while most apply to both entropion and ectropion, a few apply only to one or the other.)
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*Let’s look at paralytic ectropion in more detail…*
What is the typical setting/cause of paralytic ectropion?
**Paralytic Ectropion**

*What is the typical setting/cause of paralytic ectropion?*
A facial nerve (CN7) palsy
What is the typical setting/cause of paralytic ectropion?
A facial nerve (CN7) palsy

Upon leaving the skull, CN7 immediately enters the substance of a large gland. Which one?
Paralytic Ectropion

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While in the parotid gland, CN7 splits into branches. How many branches does it (usually) have?
Paralytic Ectropion

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Five
Paralytic Ectropion

Facial nerve branching within the parotid gland
**Paralytic Ectropion**

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- *facial nerve (CN7)* palsy

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- Five

Because of their anatomic relationship, inflammation involving the parotid gland can produce CN7 palsy. Speaking of, there is a classic syndrome involving parotitis and CN7 palsy (along with uveitis and fever). What is the eponymous name of this syndrome?

- Heerfordt syndrome

What is the underlying cause of inflammation in Heerfordt syndrome?

- Sarcoidosis
What is the typical setting/cause of paralytic ectropion?

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Heerfordt syndrome

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In case you’re wondering, this is not useless trivia! You may well see Heerfordt syndrome on the hoof (I have), and it’s definitely in play on the OKAPs, WQEs and Boards.

In the back of your mind, file an image of someone with chipmunk-looking cheeks (that’s the parotitis), facial palsy and uveitis under the headings ‘Heerfordt’ and ‘sarcoidosis.’ Trust me on this one.
Heerfordt syndrome
What is the typical setting/cause of paralytic ectropion?
A facial nerve (CN7) palsy

Paralysis of what facial muscle leads to ectropion?
**Paralytic Ectropion**

What is the typical setting/cause of paralytic ectropion?
A facial nerve (CN7) palsy

*Paralysis of what facial muscle leads to ectropion?*
The orbicularis oculi
Paralytic Ectropion

What is the typical setting/cause of paralytic ectropion?
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Paralysis of what facial muscle leads to ectropion?
The orbicularis oculi

Let’s take a moment to review the anatomy of the orbicularis muscle
**Paralytic Ectropion**

**Q**

What is the typical setting/cause of paralytic ectropion?
A facial nerve (CN7) palsy

Paralysis of what facial muscle leads to ectropion?
The **orbicularis oculi**

What is the basic arrangement of the fibers of the orbicularis?
As multiple concentric bands encircling all or part of the orbital aperture

The ‘multiple bands’ are organized into two basic portions—what are they?

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Paralytic Ectropion

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There’s a fundamental functional distinction between the orbital and palpebral portions. What is it?
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The ‘multiple bands’ are organized into two basic portions—what are they?

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There’s a fundamental functional distinction between the orbital and palpebral portions. What is it?
The palpebral portion is responsible for normal blinking, whereas the orbital portion comes into play only during effortful/voluntary eye closure.
**What is the typical setting/cause of paralytic ectropion?**
A facial nerve (CN7) palsy

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--Orbital: The portion overlying orbital bone
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Orbicularis oculi

Paralytic Ectropion
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Paralysis of what facial muscle leads to ectropion?
The orbicularis oculi

What is the basic arrangement of the fibers of the orbicularis?
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There is a special slip of pretarsal orbicularis that is located at the surface of the lid margin. What is the eponymous name?

----Preseptal: The part overlying the orbital septum
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Paralytic Ectropion

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What is its appearance-based, non-eponymous name?
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The muscle of Riolan

What is its appearance-based, non-eponymous name?
The gray line

----Preseptal: The part overlying the orbital septum
----Pretarsal: The part overlying the tarsal plates
Muscle of Riolan
(aka the *gray line*)
Paralytic Ectropion

What is the typical setting/cause of paralytic ectropion?
A facial nerve (CN7) palsy

Paralysis of what facial muscle leads to ectropion?
The orbicularis oculi

Of its five, which two branches of CN7 (usually) innervate the orbicularis muscle?
What is the typical setting/cause of paralytic ectropion?
A facial nerve (CN7) palsy

Paralysis of what facial muscle leads to ectropion?
The orbicularis oculi

Of its five, which two branches of CN7 (usually) innervate the orbicularis muscle?
The temporal and zygomatic
Paralytic Ectropion

Orbicularis muscle innervation
What is the typical setting/cause of paralytic ectropion?
A facial nerve (CN7) palsy

Paralysis of what facial muscle leads to ectropion?
The orbicularis oculi

Does the ectropion involve the lower lid, the upper, or both?
What is the typical setting/cause of paralytic ectropion?
A facial nerve (CN7) palsy

Paralysis of what facial muscle leads to ectropion?
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Does the ectropion involve the lower lid, the upper, or both?
The lower only (ectropion is not how orbicularis paralysis manifests in the upper lid)
Paralytic Ectropion

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OK then, how does orbicularis paralysis manifest in the upper lid? As lagophthalmos
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What is lagophthalmos?
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OK then, how does orbicularis paralysis manifest in the upper lid? As lagophthalmos

What is lagophthalmos? The inability to completely close the eyelids
Paralytic lagophthalmos

Paralytic Ectropion

Paralytic lagophthalmos
As for managing paralytic ectropion:

*The overarching treatment goal is…*
As for managing paralytic ectropion:

*The overarching treatment goal is...* protect the cornea from exposure damage
As for managing paralytic ectropion:

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As for managing paralytic ectropion:

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Mild/temporary $\leftarrow$ Two basic levels of paralysis severity $\rightarrow$ Severe/permanent
As for managing paralytic ectropion:

The overarching treatment goal is... protect the cornea from exposure damage

If the paralysis/ectropion is...

Mild/temporary ← Two basic levels of paralysis severity → Severe/permanent
As for managing paralytic ectropion:

*The overarching treatment goal is…protect the cornea from exposure damage*

If the paralysis/ectropion is…

Mild/temporary ↔ Severe/permanent

…these maneuvers will likely be needed to protect the cornea
As for managing paralytic ectropion:

The overarching treatment goal is... protect the cornea from exposure damage

If the paralysis/ectropion is...

- Mild/temporary
  - Lubrication
  - Ointment
  - Lid taping

Two basic levels of paralysis severity

- Severe/permanent
  - Tarsorrhaphy
  - Gold weight placement
  - Lid tightening

...these maneuvers will likely be needed to protect the cornea
As for managing paralytic ectropion:

The overarching treatment goal is... protect the cornea from exposure damage.

If the paralysis/ectropion is...

There are two common ways to categorize tarsorrhaphies. What are they?

...these maneuvers will likely be needed to protect the cornea.

Severe/permanent

Tarsorrhaphy

Lid taping

Gold weight placement

Lid tightening
As for managing paralytic ectropion:

The overarching treatment goal is to protect the cornea from exposure damage.

If the paralysis/ectropion is...

...these maneuvers will likely be needed to protect the cornea.

There are two common ways to categorize tarsorrhaphies. What are they? One is to categorize them in terms of their permanency; the other, in terms of their extent.
As for managing paralytic ectropion:

The overarching treatment goal is… protect the cornea from exposure damage

If the paralysis/ectropion is...

...these maneuvers will likely be needed to protect the cornea

With respect to permanency: What are the two types of tarsorrhaphy?

Mild/temporary
- Lubrication
- Ointment
- Lid taping

Severe/permanent
- Tarsorrhaphy
  - Lid tightening
  - Gold weight placement

Two basic levels of paralysis severity

With respect to...

Permanency

Extent
As for managing paralytic ectropion:

The overarching treatment goal is... protect the cornea from exposure damage.

If the paralysis/ectropion is...

With respect to permanency: What are the two types of tarsorrhaphy?

Temporary

Permanent

Two basic levels of paralysis severity

With respect to...

Mild/temporary

- Lubrication
- Ointment
- Lid taping

Severe/permanent

- Tarsorrhaphy
- Gold weight placement
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...these maneuvers will likely be needed to protect the cornea

Extent
As for managing paralytic ectropion:

The overarching treatment goal is... protect the cornea from exposure damage.

**Paralytic Ectropion**

- **Permanency**
  - Temporary
  - Permanent

**If the paralysis/ectropion is...**

**Temporary**
- Lubrication
- Ointment
- Lid taping

**Severe/permanent**
- Tarsorrhaphy
  - Gold weight placement
  - Lid tightening

**With respect to extent:** What are the two types of tarsorrhaphy?

...these maneuvers will likely be needed to protect the cornea.
As for managing paralytic ectropion:

The overarching treatment goal is... protect the cornea from exposure damage.

If the paralysis/ectropion is...

- Mild/temporary
  - Lubrication
  - Ointment
  - Lid taping

- Severe/permanent
  - Tarsorrhaphy
  - Gold weight placement
  - Lid tightening

With respect to extent: What are the two types of tarsorrhaphy?

- Partial
- Complete

With respect to permanency:

- Temporary
- Permanent
As for managing paralytic ectropion:

The overarching treatment goal is... protect the cornea from exposure damage if the paralysis/ectropion is...

If the paralysis/ectropion is...

...these maneuvers will likely be needed to protect the cornea

In terms of technique, temporary and permanent tarsorrhaphies differ in a couple of key ways. What are they?

- Lubrication
- Ointment
- Lid taping

Tarsorrhaphy

Partial

Complete

Extent

With respect to...

Gold weight placement
Lid tightening

Temporary

Permanent

Permanancy

Extent

In terms of technique, temporary and permanent tarsorrhaphies differ in a couple of key ways. What are they?
As for managing paralytic ectropion:

The overarching treatment goal is…protect the cornea from exposure damage

If the paralysis/ectropion is…

...these maneuvers will likely be needed to protect the cornea

In terms of technique, temporary and permanent tarsorrhaphies differ in a couple of key ways. What are they? They are 1) the type of suture used, and 2) how the lid-margin epithelium is handled.
Q

As for managing paralytic ectropion:

The overarching treatment goal is...protect the cornea from exposure damage

In terms of technique, temporary and permanent tarsorrhaphies differ in a couple of key ways. What are they? They are 1) the type of suture used, and 2) how the lid-margin epithelium is handled.

What sort of suture is used for:
- temporary tars?
- permanent tars?

These maneuvers will likely be needed to protect the cornea...
As for managing paralytic ectropion:

The overarching treatment goal is... protect the cornea from exposure damage.

In terms of technique, temporary and permanent tarsorrhaphies differ in a couple of key ways. What are they? They are 1) the type of suture used, and 2) how the lid-margin epithelium is handled.

**What sort of suture is used for:**
- temporary tars? **Nonabsorbable**
- permanent tars? **Absorbable**

...these maneuvers will likely be needed to protect the cornea...
Q

• As for managing paralytic ectropion:

The overarching treatment goal is... protect the cornea from exposure damage.

In terms of the paralysis/severity of... key ways. What are they?

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What sort of suture is used for:
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How is the epithelium handled in:
  -- temporary tars?
  -- permanent tars?

... these maneuvers will likely be needed to protect the cornea.
As for managing paralytic ectropion:

The overarching treatment goal is to protect the cornea from exposure damage.

In terms of paralytic/ectropion severity, there are two basic levels of:
- Mild/temporary
- Severe/permanent

What sort of suture is used for:
- temporary tars? Nonabsorbable
- permanent tars? Absorbable

How is the epithelium handled in:
- temporary tars? It is left alone
- permanent tars? It is denuded

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**What’s the purpose of denuding the lid-margin epithelium?**

As they heal, raw upper and lower lid margins will fuse, thereby making the tars permanent (as an aside, this is why absorbable sutures can be used—once the margins fuse, suture tension is no longer needed to maintain closure).
As for managing paralytic ectropion:

The overarching treatment goal is...protect the cornea from exposure damage.

- Lubrication
- Tarsorrhaphy
- Gold weight placement
- Lid tightening

If the paralysis/ectropion is...

...these maneuvers will likely be needed to protect the cornea.

<table>
<thead>
<tr>
<th>Permanancy</th>
<th>Temporary</th>
<th>Permanent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete</td>
<td>Partial</td>
<td>Complete</td>
</tr>
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</table>

With respect to...

- Extent
- How is the epithelium handled in:
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As for managing paralytic ectropion:

The overarching treatment goal is... protect the cornea from exposure damage.

If the paralysis/ectropion is...

- Permanent
- Temporary

Mild/temporary

- Lubrication

Severe/permanent

- Gold weight placement
- Lid tightening
- Tarsorrhaphy

Are partial tarsorrhaphies placed medially, or temporally?

Permanancy

Partial

Complete

Extent

With respect to...

Two basic levels of paralysis severity
As for managing paralytic ectropion:

The overarching treatment goal is to protect the cornea from exposure damage.

If the paralysis/ectropion is...

- **Mild/temporary**
  - Lubrication

- **Severe/permanent**
  - Tarsorrhaphy
    - Gold weight placement
    - Lid tightening

Are partial tarsorrhaphies placed medially, or temporally? Per the *Orbit* book, either is acceptable. (Although IMHO temporal placement is preferred as it is technically easier to perform, has better cosmesis, and does not risk compromising the lacrimal apparatus. Just my $0.02.)
Paralytic Ectropion

Partial tarsorrhaphy
As for managing paralytic ectropion:

The overarching treatment goal is to protect the cornea from exposure damage.

- **Lubrication**
- **Ointment**
- **Lid taping**
- **Tarsorrhaphy**
- **Gold weight placement**
- **Lid tightening**

If the paralysis/ectropion is...

- ...these maneuvers will likely be needed to protect the cornea.

### Permanancy vs. Extent

**Temporary**
- With respect to... (Partial/Complete)
- **Tarsorrhaphy**
  - Gold weight placement
  - Lid tightening

**Permanent**
- With respect to...

**Nonabsorbable**
- for temporary tars

**Absorbable**
- for permanent tars

### How is the epithelium handled?

- with temporary tars? **Not handled**
- with permanent tars? **Denuded**

In terms of technique, temporary and permanent tarsorrhaphies differ in a couple of key ways. What are they?

- 1) the type of suture used, and
- 2) how the lid-margin epithelium is handled.

What's the purpose of denuding the lid-margin epithelium?

As they heal, the raw upper and lower lid margins will fuse, thereby making the tars permanent. (As an aside, this is why absorbable sutures can be used—once the margins fuse, suture tension is no longer needed to maintain lid closure.)

Note that the BCSC Orbit book is not a fan of the permanent tarsorrhaphy—says it “should be avoided” unless absolutely necessary.
As for managing paralytic ectropion:

The overarching treatment goal is... protect the cornea from exposure damage.

If the paralysis/ectropion is...

Mild/temporary
- Lubrication
- Ointment
- Lid taping

Severe/permanent
- Tarsorrhaphy
- Gold weight placement
- Lid tightening

Instead, it advocates for gold weight placement in conjunction with lid tightening to protect the cornea.
As for managing paralytic ectropion:

The overarching treatment goal is... protect the cornea from exposure damage

If the paralysis/ectropion is...

There is an alternative technique that can be used to create a complete temporary tarsorrhaphy without sutures. What is it?

...these maneuvers will likely be needed to protect the cornea
Q/A

- As for managing paralytic ectropion:

  The overarching treatment goal is...protect the cornea from exposure damage...

  If the paralysis/ectropion is...

  ...these maneuvers will likely be needed to protect the cornea...

  There is an alternative technique that can be used to create a complete temporary tarsorrhaphy without sutures. What is it? The muscle can be paralyzed with an injection of botulinum toxin.
As for managing paralytic ectropion:

The overarching treatment goal is... protect the cornea from exposure damage.

If the paralysis/ectropion is...

...these maneuvers will likely be needed to protect the cornea.

There is an alternative technique that can be used to create a complete temporary tarsorrhaphy without sutures. What is it? The levator muscle can be paralyzed with an injection of botulinum toxin.

With respect to...

Extent

Complete

Partial

Lid tightening

Gold weight placement

Tarsorrhaphy

Permanancy

Temporary

Permanent

Severe/permanent

Mild/temporary

Lubrication

Lid taping
A 10-year-old female with right meta-herpetic corneal ulcer (top left). Anterior transcutaneous chemodenervation of levator muscle was performed with Botox (top right). One week after chemodenervation demonstrating complete ptosis (bottom left). Patient in upgaze demonstrating preserved superior rectus function (bottom right).

Neurotoxin (botulinum) tarsorrhaphy
Also, when managing paralytic ectropion…

- Remember: $7 + 5 = ?$ [Note: Not 12]
Also, when managing paralytic ectropion…
  
- Remember: $7 + 5 = Tarsorrhaphy$
Also, when managing paralytic ectropion…

- Remember: \( 7 + 5 = \text{tarsorrhaphy} \)

7 + 5 = tarsorrhaphy? What on earth is that supposed to mean?
Also, when managing paralytic ectropion...

- Remember: $7 + 5 = \text{Tarsorrhaphy}$

$7 + 5 = \text{tarsorrhaphy}$? What on earth is that supposed to mean? It means if a pt has both a CN7 palsy preventing lid closure \textbf{and} decreased corneal sensation (ie, CN5 dysfunction), then s/he is at very high risk for \textbf{exposure keratopathy}, and prophylactic \textbf{tarsorrhaphy} (or similar procedure) should be strongly considered.
Also, when managing paralytic ectropion...

- Remember: \((\text{CN})7 + (\text{CN})5 = \text{Tarsorrhaphy}\)

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What does this imply about the initial evaluation of a pt presenting with paralytic ectropion?
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What two broad categories of conditions causing paralytic ectropion are most likely to also result in loss of corneal sensation?
Also, when managing paralytic ectropion…

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What does this imply about the initial evaluation of a pt presenting with paralytic ectropion? That it must include assessment of corneal sensation.

What two broad categories of conditions causing paralytic ectropion are most likely to also result in loss of corneal sensation? CVA, and intracranial surgery.
Also, when managing paralytic ectropion...

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What is the most common cause of simultaneous loss of CNs 5 & 7?
Q/A

- Also, when managing paralytic ectropion...
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What does this imply about the initial evaluation of a pt presenting with paralytic ectropion? That it must include assessment of corneal sensation.

What two broad categories of conditions causing paralytic ectropion are most likely to also result in loss of corneal sensation? CVA, and intracranial surgery.

What is the most common cause of simultaneous loss of CNs 5 & 7? Tumor type (two words) - resection surgery.
Also, when managing paralytic ectropion...

Remember: \((\text{CN})_7 + (\text{CN})_5 = \text{Tarsorrhaphy}\)

7 + 5 = tarsorrhaphy? What on earth is that supposed to mean? It means if a pt has both a CN7 palsy preventing lid closure and decreased corneal sensation (ie, CN5 dysfunction), then s/he is at very high risk for exposure keratopathy, and prophylactic tarsorrhaphy (or similar procedure) should be strongly considered.

What does this imply about the initial evaluation of a pt presenting with paralytic ectropion? That it must include assessment of corneal sensation.

What two broad categories of conditions causing paralytic ectropion are most likely to also result in loss of corneal sensation? CVA, and intracranial surgery.

What is the most common cause of simultaneous loss of CNs 5 & 7? Acoustic neuroma resection surgery.
**Paralytic Ectropion**

**A.** A 33-year-old woman with complete right facial paralysis following resection of a large acoustic neuroma resulting in the loss of the facial nerve at the skull base.

**B.** Lagophthalmos with corneal exposure despite the presence of Bell's phenomenon.

**C,D.** Shortly after the initial tumor surgery, a 1 g gold weight was placed in the upper eyelid, followed by cross facial nerve graft. Three weeks later, full closure is achieved.