Concerning PUK

(Peripheral Ulcerative Keratitis)

- Autoimmune PUK is usually unilateral and sectoral.
Autoimmune PUK is usually **unilateral** and **sectoral**
Concerning PUK

Autoimmune PUK
Concerning PUK

- Autoimmune PUK is usually *unilateral* and *sectoral*.
- It often heralds *improvement vs worsening* of systemic disease.
Concerning PUK

- Autoimmune PUK is usually **unilateral** and **sectoral**
- It often heralds **exacerbation** of systemic disease
Q

Concerning PUK

- Autoimmune PUK is usually unilateral and sectoral
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With which connective-tissue diseases (CTDs) and/or vasculitides has PUK been associated?
Concerning PUK

- Autoimmune PUK is usually unilateral and sectoral.
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With which connective-tissue diseases (CTDs) and/or vasculitides has PUK been associated?
Pretty much all of them.
Concerning PUK

- Autoimmune PUK is usually unilateral and sectoral.
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*With which connective-tissue diseases (CTDs) and/or vasculitides has PUK been associated?* Pretty much all of them.

*Which three conditions are most likely to present with PUK?*
Autoimmune PUK is usually unilateral and sectoral. It often heralds exacerbation of systemic disease.

With which connective-tissue diseases (CTDs) and/or vasculitides has PUK been associated? Pretty much all of them.

Which three conditions are most likely to present with PUK? Rheumatoid arthritis, Wegener’s granulomatosis, and polyarteritis nodosa.
Autoimmune PUK is usually **unilateral** and **sectoral**. It often heralds **exacerbation** of **systemic disease**.

**Concerning PUK**

- With which connective-tissue diseases (CTDs) and/or vasculitides has PUK been associated? *Pretty much all of them*

- Which three conditions are most likely to present with PUK? *Rheumatoid arthritis, Wegener’s granulomatosis, and polyarteritis nodosa*

  Of these three, which is most likely to be associated with PUK?

Concerning PUK

- Autoimmune PUK is usually unilateral and sectoral.
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**With which connective-tissue diseases (CTDs) and/or vasculitides has PUK been associated?**
Pretty much all of them.

**Which three conditions are most likely to present with PUK?**
Rheumatoid arthritis, Wegener's granulomatosis, and polyarteritis nodosa.

Of these three, which is most likely to be associated with PUK? RA, by a substantial margin.
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What percentage of PUK pts have RA as their underlying condition?
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**Of these three, which is most likely to be associated with PUK?**
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**What percentage of PUK pts have RA as their underlying condition?**
30-40.

**In addition to the peripheral cornea, what other ocular structure is commonly affected in these pts?**
The sclera (i.e., concurrent scleritis is the rule).
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Is PUK the most common ocular manifestation of RA?

- 30-40%

In addition to the peripheral cornea, what other ocular structure is commonly affected in these pts?
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*Concerning PUK*

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*What is, then?*
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**Is PUK the most common ocular manifestation of RA?**
No

**What is, then?**
Keratoconjunctivitis sicca

**What percentage of PUK pts have RA as their underlying condition?**
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Initiate a diagnostic workup (or promptly arrange for a rheumatologist to do so).
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If a PUK pt does not carry a CTD/autoimmune diagnosis, what should the ophthalmologist do?
Initiate a diagnostic workup (or promptly arrange for a rheumatologist to do so)

If the workup is negative, what non-autoimmune diagnosis should you consider?

Gonococcal
Concerning PUK

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Initiate a **diagnostic workup** (or promptly arrange for a rheumatologist to do so)

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Infectious PUK

**If the PUK is associated with copious mucopurulent discharge, what infectious etiology should you consider?**
Gonococcal
Concerning PUK

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Concerning PUK

- Autoimmune PUK is usually **unilateral** and **sectoral**
- It often heralds **exacerbation** of systemic disease
- The treatment goal is to stop K melting through 3 maneuvers:
  1) Improve ____________
  2) Promote ____________ via ____________
  3) Suppress ____________

4 treatment maneuvers
Autoimmune PUK is usually unilateral and sectoral.
It often heralds exacerbation of systemic disease.
The treatment goal is to stop K melting through 3 maneuvers:
1) Improve wetting
2) Promote re-epithelialization via lubes, BCL, patching, glue
   (bandage contact lens)
3) Suppress systemic inflammation
Concerning PUK

- Autoimmune PUK is usually unilateral and sectoral.
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- The treatment goal is to stop K melting through 3 maneuvers:
  1) **Improve wetting**
  2) **Promote re-epithelialization**
  3) **Suppress systemic inflammation**

Of these three maneuvers, which is paramount?
Autoimmune PUK is usually unilateral and sectoral. It often heralds exacerbation of systemic disease. The treatment goal is to stop K melting through 3 maneuvers:

1) Improve wetting
2) Promote re-epithelialization via lubricants, BCL, patching, glue

You should also consider stopping topical steroids, which can delay re-epithelialization. As a general rule: If the cornea is significantly thinned, avoid topical steroids.

3) Suppress systemic inflammation

Concerning PUK

Of these three maneuvers, which is paramount? Controlling the underlying disease process—without this, the other maneuvers are akin to rearranging the deck chairs on the Titanic.
**Concerning PUK**

- Autoimmune PUK is usually **unilateral** and **sectoral**
- It often heralds **exacerbation** of systemic disease
- The treatment goal is to stop K melting through 3 maneuvers:
  1. **Improve wetting**
  2. Promote re-epithelialization via lubes, BG1, patching, glue
  3. Suppress systemic inflammation if local maneuvers are not effective

*How should one improve wetting?*
Concerning PUK

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  3. Suppress systemic inflammation if local maneuvers are

**How should one improve wetting?**
With frequent dosing of preservative-free artificial tears (PF ATs)
Concerning PUK

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  1) **Improve wetting**
  2) Promote re-epithelialization via lubes, BCL, patching, glue
  3) Suppress systemic inflammation if local maneuvers are insufficient

**How should one improve wetting?**
With frequent dosing of preservative-free artificial tears (PF ATs)

**In addition to improving wetting, what other benefit derives from frequent PF AT use?**
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---

**Concerning PUK**

**How should one improve wetting?**

With frequent dosing of preservative-free artificial tears (PF ATs)

**In addition to improving wetting, what other benefit derives from frequent PF AT use?**

They will remove inflammatory cytokines from the ocular surface
Concerning PUK

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What specific sort of glue is being referred to here?
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What specific sort of glue is being referred to here? Cyanoacrylate adhesive.
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3. Suppress systemic inflammation.

What specific sort of glue is being referred to here?
Cyanoacrylate adhesive

How does glue assist in PUK healing?
1) It provides tectonic stability, thereby reducing the risk of perforation.
2) It acts as a barrier preventing PMNs from reaching (and destroying) corneal stroma.
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Concerning PUK

Just prior to perfing

Same eye s/p gluing (and on IMT)

PUK in RA
Autoimmune PUK is usually unilateral and sectoral. It often heralds exacerbation of systemic disease. The treatment goal is to stop K melting through 3 maneuvers:
1) Improve wetting
2) Promote re-epithelialization via lubes, BCL, patching, glue
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Concerning PUK:

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Use of cyanoacrylate adhesive mandates that what other therapeutic maneuver be applied as well?
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- The treatment goal is to stop K melting through 3 maneuvers:
  1) Improve **wetting**
  2) Promote **re-epithelialization** via lubes, **BCL**, patching, **glue**
  3) Suppress systemic inflammation

**Concerning PUK**

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- What bacteria species must you be certain is adequately covered by the antibiotic?
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Use of cyanoacrylate adhesive mandates that what other therapeutic maneuver be applied as well? **A BCL must be placed over the glued cornea**

Use of a BCL mandates that what other therapeutic maneuver be applied as well? An antibiotic drop should be used to prophylax against the possibility of a BCL-induced bacterial superinfection.

What bacteria species must you be certain is adequately covered by the antibiotic? **Pseudomonas**
**Concerning PUK**

- Autoimmune PUK is usually **unilateral** and **sectoral**
- It often heralds **exacerbation** of systemic disease
- The treatment goal is to stop K melting through 3 maneuvers:
  1) Improve **wetting**
  2) Promote **re-epithelialization** via lubes, BCL, patching, glue
     - You should also consider stopping **common ocular drug**, which can delay re-epithelialization. As a general rule: If the cornea is significantly thinned, avoid **same drug**.
  3) Suppress **systemic inflammation**
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- The treatment goal is to stop K melting through 3 maneuvers:
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     - You should also consider stopping **topical steroids**, which can delay re-epithelialization. As a general rule: If the cornea is significantly thinned, avoid **topical steroids**.
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- The treatment goal is to stop K melting through 3 maneuvers:
  1) Improve wetting.
  2) Promote re-epithelialization via lubes, BCL, patching, glue.
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  3) Suppress systemic inflammation.
  4) Conj flap over the peripheral defect?

What about using a conj flap to cover the peripheral defect?
Autoimmune PUK is usually unilateral and sectoral. It often heralds exacerbation of systemic disease. The treatment goal is to stop K melting through 3 maneuvers:
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3) Suppress systemic inflammation
4) Conj flap over the peripheral defect? NO!

What about using a conj flap to cover the peripheral defect? Conj flaps are contraindicated in autoimmune PUK because they bring the conj vasculature (and thus all those nasty blood-borne inflammatory mediators) even closer to the melt.
Autoimmune PUK is usually unilateral and sectoral. It often heralds exacerbation of systemic disease.

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In what clinical scenario might a conj flap over a PUK defect be an appropriate treatment maneuver?

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  3) Suppress systemic inflammation
  4) Conj flap over the peripheral defect? **YES!**

In what clinical scenario might a conj flap over a PUK defect be an appropriate treatment maneuver?
In **infectious** PUK, especially when the organism is **type of bug**

What about using a conj flap to cover the peripheral defect?
Conj flaps are contraindicated in autoimmune PUK because they bring the conj vasculature (and thus all those nasty blood-borne inflammatory mediators) even closer to the melt
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     - **3) Suppress systemic inflammation**
     - **4) Conj flap over the peripheral defect? YES!**

**In what clinical scenario might a conj flap over a PUK defect be an appropriate treatment maneuver?**

In **infectious** PUK, especially when the organism is **fungal**

What about using a conj flap to cover the peripheral defect?

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3) Suppress systemic inflammation
4) Conj surgery:

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What conj surgery is very helpful in autoimmune PUK?
Autoimmune PUK is usually unilateral and sectoral. It often heralds exacerbation of systemic disease. The treatment goal is to stop K melting through 3 maneuvers:

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   - You should also consider stopping topical steroids, which can delay re-epithelialization. As a general rule: If the cornea is significantly thinned, avoid topical steroids.
3) Suppress systemic inflammation
4) Conj surgery: Sectoral conj resection

What about using a conj flap to cover the peripheral defect?
Conj flaps are contraindicated in autoimmune PUK because they bring the conj vasculature (and thus all those nasty blood-borne inflammatory mediators) even closer to the melt.

What conj surgery is very helpful in autoimmune PUK?
Sectoral conj resection (ie, cutting the conj away from the PUK zone) can be very effective.
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

Polyarteritis nodosa (PAN)  Relapsing polychondritis (RP)
Rheumatoid arthritis (RA)  Wegener’s granulomatosis (WG)
Mooren’s ulcer (MU)        Churg-Strauss (CS)

- Saddle-nose deformity (2):
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

Polyarteritis nodosa (PAN)  Relapsing polychondritis (RP)
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- Saddle-nose deformity (2): RP; WG
Concerning PUK

Saddle-nose deformity
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

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Rheumatoid arthritis (RA)  
Mooren’s ulcer (MU)  
Relapsing polychondritis (RP)  
Wegener’s granulomatosis (WG)  
Churg-Strauss (CS)

**Saddle-nose deformity (2):** RP; WG

*If a pt with a saddle nose had interstitial keratitis rather than PUK, what diagnosis should you consider?*
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

- Polyarteritis nodosa (PAN)
- Rheumatoid arthritis (RA)
- Mooren’s ulcer (MU)
- Relapsing polychondritis (RP)
- Wegener’s granulomatosis (WG)
- Churg-Strauss (CS)

- **Saddle-nose deformity** (2): RP; WG

If a pt with a saddle nose had interstitial keratitis rather than PUK, what diagnosis should you consider?

Congenital syphilis
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

<table>
<thead>
<tr>
<th>Polyarteritis nodosa (PAN)</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Rheumatoid arthritis (RA)</td>
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</tr>
<tr>
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- Saddle-nose deformity (2): RP; WG
- Asthma and eosinophilia:
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

<table>
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- Saddle-nose deformity (2): RP; WG
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For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

Polyarteritis nodosa (PAN)  Relapsing polychondritis (RP)
Rheumatoid arthritis (RA)  Wegener’s granulomatosis (WG)
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- Saddle-nose deformity (2): RP; WG
- Asthma and eosinophilia: CS
- Deformed auricular pinnae:
A

For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

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- Saddle-nose deformity (2): RP; WG
- Asthma and eosinophilia: CS
- Deformed auricular pinnae: RP
Concerning PUK

Auricular damage in RP
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

Polyarteritis nodosa (PAN)  Relapsing polychondritis (RP)
Rheumatoid arthritis (RA)  Wegener’s granulomatosis (WG)
Mooren’s ulcer (MU)        Churg-Strauss (CS)

- Saddle-nose deformity (2): RP; WG
- Asthma and eosinophilia: CS
- Deformed auricular pinnae: RP
- Ulcer has overhanging edge (2):
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

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- Saddle-nose deformity (2): RP; WG
- Asthma and eosinophilia: CS
- Deformed auricular pinnae: RP
- Ulcer has overhanging edge (2): MU; PAN
Concerning PUK

Mooren’s ulcer. Note the overhanging edge.
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

- Polyarteritis nodosa (PAN)
- Relapsing polychondritis (RP)
- Rheumatoid arthritis (RA)
- Wegener’s granulomatosis (WG)
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- Saddle-nose deformity (2): RP; WG
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- Deformed auricular pinnae: RP
- Ulcer has overhanging edge (2): MU; PAN

What is the classic description regarding the pattern of progression for PUK in both Mooren’s and PAN?
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

- Saddle-nose deformity (2): RP; WG
- Asthma and eosinophilia: CS
- Deformed auricular pinnae: RP
- Ulcer has overhanging edge (2): MU; PAN

What is the classic description regarding the pattern of progression for PUK in both Mooren’s and PAN?

1) Starts then
2) progresses then
3) progresses
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

- Polyarteritis nodosa (PAN)
- Relapsing polychondritis (RP)
- Rheumatoid arthritis (RA)
- Wegener’s granulomatosis (WG)
- Mooren’s ulcer (MU)
- Churg-Strauss (CS)

- Saddle-nose deformity (2): RP; WG
- Asthma and eosinophilia: CS
- Deformed auricular pinnae: RP
- Ulcer has overhanging edge (2): MU; PAN

What is the classic description regarding the pattern of progression for PUK in both Mooren’s and PAN?

1) Starts **sectoral**, then
2) progresses **circumferentially**, then
3) progresses **centrally**
Saddle-nose deformity (2): RP; WG
Asthma and eosinophilia: CS
Deformed auricular pinnae: RP
Ulcer has overhanging edge (2): MU; PAN
Sclera never involved:
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

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- Saddle-nose deformity (2): RP; WG
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- Deformed auricular pinnae: RP
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For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

- Polyarteritis nodosa (PAN)
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- Saddle-nose deformity (2): RP; WG
- Asthma and eosinophilia: CS
- Deformed auricular pinnae: RP
- Ulcer has overhanging edge (2): MU; PAN
- Sclera *never* involved: MU

Take note! This is a key factor differentiating between Mooren’s and other forms of PUK. In the vast majority of autoimmune PUK cases (including those secondary to PAN), the adjacent sclera will be involved, but not in Mooren’s.
Concerning PUK

Mooren’s ulcer. Note the adjacent sclera is totally quiet.
### Question

For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

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- Saddle-nose deformity (2): RP; WG
- Asthma and eosinophilia: CS
- Deformed auricular pinnae: RP
- Ulcer has overhanging edge (2): MU; PAN
- Sclera never involved: MU
- ANCA positive (2):
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer):

<table>
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<tr>
<th>Cause</th>
<th>PAN</th>
<th>RP</th>
<th>WG</th>
<th>RA</th>
<th>CS</th>
<th>MU</th>
<th>PAN</th>
<th>ANCA</th>
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</tr>
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*Hey, what about PAN??!! Un momento, por favor*
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

Polyarteritis nodosa (PAN)  Relapsing polychondritis (RP)
Rheumatoid arthritis (RA)  Wegener’s granulomatosis (WG)
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Q

- Saddle-nose deformity (2): RP; WG
- Asthma and eosinophilia: CS
- Deformed auricular pinnae: RP
- Ulcer has overhanging edge (2): MU; PAN
- Sclera never involved: MU
- ANCA positive (2): WG; CS

What does ANCA stand for?

Antineutrophil cytoplasmic antibodies

Autoantibodies against antigens found within the cytoplasm of neutrophils

With which specific ANCA pattern is each condition associated?

Wegener’s: Cytoplasmic (c-ANCA)
Churg-Strauss: Perinuclear (p-ANCA)
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

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What does ANCA stand for?
Antineutrophil cytoplasmic antibodies

What are they?
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer):

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Antineutrophil cytoplasmic antibodies

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For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

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*What about PAN? I thought it was ANCA-positive as well.*
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

- Saddle-nose deformity (2): RP; WG
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- Sclera never involved: MU
- ANCA positive (2): WG; CS; **PAN?**

What about PAN? I thought it was ANCA-positive as well.

This is a sticky widget. In the 1990s, rheumatologists determined that the label PAN was being applied to conditions that were actually separate disease entities. Thus, PAN was subdivided into several conditions:

- Classic PAN, which affects only medium- and small-sized ‘muscular’ arteries;
- Microscopic polyangiitis, which affects smaller arteries, arterioles, capillaries and venules.

 Liberatore
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

<table>
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<td>CS, \textbf{PAN}</td>
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\textbf{What about PAN? I thought it was ANCA-positive as well.}

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It turns out microscopic polyangiitis is strongly ANCA-positive, but classic PAN is not. (Because of its ANCA-positivity, microscopic angiitis is now considered to be more closely related to Churg-Strauss, and especially Wegener’s, than it is to PAN).
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What’s the difference between a ‘small-sized’ artery and a ‘smaller’ artery?

Rule of thumb: Classic PAN only affects arteries large enough to be named, whereas microscopic angiitis only affects vessels smaller than that.
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

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For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

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- Saddle-nose deformity (2): RP; WG
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- Ulcer has overhanging edge (2): MU; PAN
- Sclera never involved: MU
- ANCA positive (2): WG; CS; **PAN**?

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*Got it. So if it’s ANCA+ it’s not PAN, right?*
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

- Polyarteritis nodosa (PAN)
- Rheumatoid arthritis (RA)
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- Deformed auricular pinnae: RP
- Ulcer has overhanging edge (2): MU; PAN
- Sclera never involved: MU
- ANCA positive (2): WG; CS; **PAN (10% of cases)**

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Got it. So if it’s ANCA+ it’s not PAN, right? Unfortunately, no. Per the BCSC Uveitis book, ~10% of PAN pts will be c- or p-ANCA positive.
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

- Saddle-nose deformity (2): RP; WG
- Asthma and eosinophilia: CS
- Deformed auricular pinnae: RP
- Ulcer has overhanging edge (2): MU; PAN
- Sclera never involved: MU
- ANCA positive (2): WG; CS; **PAN (10% of cases)**

What about PAN? I thought it was ANCA-positive as well. This is a sticky widget. In the 1990s, rheumatologists determined that the label PAN was being applied to conditions that were actually separate disease entities. Thus, PAN was subdivided into two conditions:

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It turns out microscopic polyangiitis is strongly ANCA-positive, but classic PAN is not. (Because of its ANCA-positivity, microscopic angiitis is now considered to be more closely related to Churg-Strauss, and especially Wegener's, than it is to PAN).

OK, tell me this much at least--are both classic PAN and microscopic angiitis associated with PUK?

Got it. So if it's ANCA+ it's not PAN, right? Unfortunately, no. Per the BCSC Uveitis book, ~10% of PAN pts will be c- or p-ANCA positive.
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Cause</th>
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<tr>
<td>Saddle-nose deformity (2)</td>
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<td>Sclera never involved</td>
<td>MU</td>
</tr>
<tr>
<td>ANCA positive (2)</td>
<td>WG; CS; <strong>PAN (10% of cases)</strong></td>
</tr>
</tbody>
</table>

What about PAN? I thought it was ANCA-positive as well.

This is a sticky widget. In the 1990s, rheumatologists determined that the label PAN was being applied to conditions that were actually separate disease entities. Thus, PAN was subdivided into two conditions:

--- **Classic PAN**, which affects only medium- and small-sized ‘muscular’ arteries; and

--- **Microscopic polyangiitis**, which affects smaller arteries, arterioles, capillaries and venules.

It turns out microscopic polyangiitis is strongly ANCA-positive, but classic PAN is not. (Because of its ANCA-positivity, microscopic angiitis is now considered to be more closely related to Churg-Strauss, and especially Wegener's, than it is to PAN).

OK, tell me this much at least--are both classic PAN and microscopic angiitis associated with PUK?

Yes

Got it. So if it's ANCA+ it's not PAN, right?

Unfortunately, no. Per the BCSC Uveitis book, ~10% of PAN pts will be c- or p-ANCA positive.
Q

For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

- Saddle-nose deformity (2): RP; WG
- Asthma and eosinophilia: CS
- Deformed auricular pinnae: RP
- Ulcer has overhanging edge (2): MU; PAN
- Sclera never involved: MU
- ANCA positive (2): WG; CS; PAN (10% of cases)
- Is a diagnosis of exclusion:
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

Polyarteritis nodosa (PAN)  
Rheumatoid arthritis (RA)  
Mooren’s ulcer (MU)  
Relapsing polychondritis (RP)  
Wegener’s granulomatosis (WG)  
Churg-Strauss (CS)

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- Is a diagnosis of exclusion: MU
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

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- Sclera never involved: MU
- ANCA positive (2): WG; CS; **PAN (10% of cases)**
- Is a diagnosis of exclusion: MU
- Chest X-ray likely abnormal (3):
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

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For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

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<tr>
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For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

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For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

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- Ulcer has overhanging edge (2): MU; PAN
- Sclera never involved: MU
- ANCA positive (2): WG; CS; PAN (10% of cases)
- Is a diagnosis of exclusion: MU
- Chest X-ray likely abnormal (3): WG; CS; RP
- Associated with **hepatitis seropositivity**: PAN

Which hepatitis virus is definitely associated with PAN?
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer):

- **Polyarteritis nodosa (PAN)**
- **Rheumatoid arthritis (RA)**
- **Mooren’s ulcer (MU)**
- **Relapsing polychondritis (RP)**
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- Is a diagnosis of exclusion: MU
- Chest X-ray likely abnormal (3): WG; CS; RP
- Associated with **hepatitis seropositivity: PAN**

Which hepatitis virus is definitely associated with PAN?

Hepatitis B
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

Polyarteritis nodosa (PAN)
Rheumatoid arthritis (RA)
Mooren’s ulcer (MU)
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- Sclera never involved: MU
- ANCA positive (2): WG; CS; PAN (10% of cases)
- Is a diagnosis of exclusion: MU
- Chest X-ray likely abnormal (3): WG; CS; RP
- Associated with hepatitis seropositivity: PAN

Which hepatitis virus is definitely associated with PAN?
Hepatitis B

What percent of PAN pts test positive for are Hep B surface Ag?
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

- Polyarteritis nodosa (PAN)
- Rheumatoid arthritis (RA)
- Mooren’s ulcer (MU)
- Relapsing polychondritis (RP)
- Wegener’s granulomatosis (WG)
- Churg-Strauss (CS)

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- Asthma and eosinophilia: CS
- Deformed auricular pinnae: RP
- Ulcer has overhanging edge (2): MU; PAN
- Sclera never involved: MU
- ANCA positive (2): WG; CS; PAN (10% of cases)
- Is a diagnosis of exclusion: MU
- Chest X-ray likely abnormal (3): WG; CS; RP
- Associated with **hepatitis seropositivity**: PAN

Which hepatitis virus is definitely associated with PAN?
Hepatitis B

What percent of PAN pts test positive for are Hep B surface Ag?
About 10
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

<table>
<thead>
<tr>
<th>Causes of PUK</th>
<th>Associated With</th>
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</thead>
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- Ulcer has overhanging edge (2): MU; PAN
- Sclera never involved: MU
- ANCA positive (2): WG; CS; PAN (10% of cases)
- Is a diagnosis of exclusion: MU
- Chest X-ray likely abnormal (3): WG; CS; RP
- Associated with hepatitis seropositivity: PAN

Which hepatitis virus is definitely associated with PAN?
Hepatitis B

Which form is probably associated, but the evidence is not as strong as for B?
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

<table>
<thead>
<tr>
<th>Causes of PUK</th>
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<th>WG</th>
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For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

- Polyarteritis nodosa (PAN)
- Rheumatoid arthritis (RA)
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- Relapsing polychondritis (RP)
- Wegener’s granulomatosis (WG)
- Churg-Strauss (CS)

Which hepatitis virus is definitely associated with PAN?
Hepatitis B

Which form is probably associated, but the evidence is not as strong as for B?
Hepatitis C
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer):

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- ANCA positive (2): WG; CS; **PAN (10% of cases)**
- Is a diagnosis of exclusion: MU
- Chest X-ray likely abnormal (3): WG; CS; RP
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- Associated with helminthic seropositivity:
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

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- Is a diagnosis of exclusion: MU
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For each statement, identify which of these causes of PUK is/are associated (some will more than one answer):

Polyarteritis nodosa (PAN)  
Rheumatoid arthritis (RA)  
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- ANCA positive (2): WG; CS; **PAN (10% of cases)**
- Is a diagnosis of exclusion: MU
- Chest X-ray likely abnormal (3): WG; CS; RP
- Associated with hepatitis seropositivity: PAN
- Associated with helminthic seropositivity: MU
- Renal function may be impaired (4): WG; PAN; CS; RP
- Chronic, tx-resistant sinusitis common:
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

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- Is a diagnosis of exclusion: MU
- Chest X-ray likely abnormal (3): WG; CS; RP
- Associated with hepatitis seropositivity: PAN
- Associated with helminthic seropositivity: MU
- Renal function may be impaired (4): WG; PAN; CS; RP
- Chronic, tx-resistant sinusitis common: WG

**Extremely** painful:
For each statement, identify which of these causes of PUK is/are associated (some will more than one answer)

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- Ulcer has overhanging edge (2): MU; PAN
- Sclera never involved: MU
- ANCA positive (2): WG; CS; **PAN (10% of cases)**
- Is a diagnosis of exclusion: MU
- Chest X-ray likely abnormal (3): WG; CS; RP
- Associated with hepatitis seropositivity: PAN
- Associated with helminthic seropositivity: MU
- Renal function may be impaired (4): WG; PAN; CS; RP
- Chronic, tx-resistant sinusitis common: WG
- **Extremely** painful: MU

*(All forms of inflammatory PUK are painful, but Mooren’s is considered to be exceptionally so.)*
Concerning PUK

- With respect to manifesting PUK, which of the following doesn’t belong, and why?
  - RA, Mooren’s, Behçet, IBD  
    
  (IBD = Inflammatory bowel disease)
With respect to manifesting PUK, which of the following doesn’t belong, and why?

- RA, Mooren’s, Behçet, IBD
With respect to manifesting PUK, which of the following doesn’t belong, and why?

- RA, **Mooren’s**, Behçet, IBD

*Why is Mooren’s the oddball in this group?*
With respect to manifesting PUK, which of the following doesn’t belong, and why?

- RA, Mooren’s, Behçet, IBD

Why is Mooren’s the oddball in this group?
PUK in the others is due to a systemic condition, whereas Mooren’s is, by definition, ocular only.
With respect to manifesting PUK, which of the following doesn’t belong, and why?

- RA, Mooren’s, Behçet, IBD

And in this group?

- Mooren’s, Terrien’s marginal, Sarcoid, SLE
Concerning PUK

- With respect to manifesting PUK, which of the following doesn’t belong, and why?
  - RA, Mooren’s, Behçet, IBD

- And in this group?
  - Mooren’s, *Terrien’s marginal*, Sarcoid, SLE
Q

Concerning PUK

- With respect to manifesting PUK, which of the following doesn’t belong, and why?
  - RA, Mooren’s, Behçet, IBD

- And in this group?
  - Mooren’s, Terrien’s marginal, Sarcoid, SLE

Why is Terrien’s the oddball in this group?
Concerning PUK

- With respect to manifesting PUK, which of the following doesn’t belong, and why?
  - RA, Mooren’s, Behçet, IBD

- And in this group?
  - Mooren’s, Terrien’s marginal, Sarcoid, SLE

Why is Terrien’s the oddball in this group?
Two reasons:
-- PUUK in the others is an inflammatory process; Terrien’s is noninflammatory
-- As implied by the word ‘ulcerative’ in the name, the corneal epithelium is disrupted in PUK. In contrast, the epithelium is intact in Terrien’s.
Speaking of Terrien’s…

Is it a common, or an uncommon condition?

Why is Terrien’s the oddball in this group?

Two reasons:

--PUK in the others is an inflammatory process; Terrien’s is noninflammatory

--As implied by the word ‘ulcerative’ in the name, the corneal epithelium is disrupted in PUK. In contrast, the epithelium is intact in Terrien’s.
Which of the following doesn’t belong, and why?
- RA, Mooren’s, Behçet, IBD

And in this group?
- Mooren’s, Terrien’s marginal, Sarcoid, SLE

PUK in the others is due to a systemic condition; Mooren’s is, by definition, ocular only.

Concerning PUK

Speaking of Terrien’s…

Is it a common, or an uncommon condition?
Uncommon

Is it a common, or an uncommon condition?

Uncommon

Does it have a gender predilection?
Yes, males are more commonly affected

Is it unilateral, or bilateral?
Bilateral, although involvement can be asymmetric

Which sector of the cornea is involved first, and how does it progress?
It starts superiorly, then spreads circumferentially (but may not reach the inferior K)

Does it affect vision? If so, how?
Yes, by inducing high astigmatism

Why is Terrien’s the oddball in this group?

Two reasons:
--PUK in the others is an inflammatory process; Terrien’s is noninflammatory
--As implied by the word ‘ulcerative’ in the name, the corneal epithelium is disrupted in PUK. In contrast, the epithelium is intact in Terrien’s.
Which of the following doesn’t belong, and why?

RA, Mooren’s, Behçet, IBD

And in this group?

Mooren’s, Terrien’s marginal, Sarcoid, SLE

PUK in the others is due to a systemic condition; Mooren’s is, by definition, ocular only.

PUK in the others is an inflammatory process; Terrien’s is noninflammatory.

Concerning PUK

Speaking of Terrien’s…

Is it a common, or an uncommon condition?
Uncommon

Does it have a gender predilection?
Yes, males are more commonly affected

Is it unilateral, or bilateral?
Bilateral, although involvement can be asymmetric

Which sector of the cornea is involved first, and how does it progress?
It starts superiorly, then spreads circumferentially (but may not reach the inferior K)

Is the involved epithelium absent, or intact?
Intact (Terrien’s is a stromal, not epithelial condition)

Does it affect vision? If so, how?
Yes, by inducing high astigmatism

Why is Terrien’s the oddball in this group?
Two reasons:
--PUK in the others is an inflammatory process; Terrien’s is noninflammatory
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Speaking of Terrien’s…

*Is it a common, or an uncommon condition?*
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Speaking of Terrien’s…
Is it a common, or an uncommon condition?
Uncommon

Who is the typical Terrien’s pt?

Does it have a gender predilection?
While once thought to be more common in males, it is now considered equal

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Speaking of Terrien’s…

Is it a common, or an uncommon condition?

Uncommon

Who is the typical Terrien’s pt?

A young adult (late teens - early 30s)

Does it have a gender predilection?

While once thought to be more common in males, it is now considered equal

Why is Terrien’s the oddball in this group?

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Which sector of the cornea is involved first, and how does it progress?

It starts superiorly, then spreads circumferentially (but may not reach the inferior K)

Is the involved epithelium absent, or intact?

Intact (Terrien’s is a stromal, not epithelial condition)

Does it affect vision? If so, how?

Yes, by inducing high astigmatism

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The leading edge is characterized by the presence of…
The trailing portion is characterized by the presence of…

A vascular pannus

Why is Terrien’s the oddball in this group?
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Which of the following doesn’t belong, and why? RA, Mooren’s, Behçet, IBD

And in this group? Mooren’s, Terrien’s marginal, Sarcoid, SLE

PUK in the others is due to a systemic condition; Mooren’s is, by definition, ocular only. PUK in the others is an inflammatory process; Terrien’s is noninflammatory.

Concerning PUK

Speaking of Terrien’s…

Is it a common, or an uncommon condition? Uncommon

Does it have a gender predilection? While once thought to be more common in males, it is now considered equal.

Is it unilateral, or bilateral? Bilateral, although involvement can be asymmetric.

Which sector of the cornea is involved first, and how does it progress? It starts superiorly, then spreads circumferentially (but may not reach the inferior K).

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The leading edge is characterized by the presence of…Lipid

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*Is the pannus deep, or superficial?*
Superficial

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**Mooren’s, Terrien’s marginal, Sarcoid, SLE**

*Does Terrien’s render the cornea thinner than normal?*
Yes

Why is Terrien’s the oddball in this group?

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Does Terrien's render the cornea thinner than normal?
Yes

Is the thinned Terrien's cornea at risk for rupture with mild trauma?
Yes

Do these patients need to wear protective eyewear?
Yes
Speaking of Terrien's…

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Which of the following doesn't belong, and why?

RA, Mooren's, Behçet, IBD

And in this group?

Mooren's, Terrien's marginal, Sarcoid, SLE

PUK in the others is due to a systemic condition; Mooren's is, by definition, ocular only.

Concerning PUK

Speaking of Terrien's...

Uncommon

Is it a common, or an uncommon condition?

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*Is it unilateral, or bilateral?*
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**Which sector of the cornea is involved first, and how does it progress?**
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Yes, by inducing high astigmatism

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Mooren’s, **Terrien’s marginal**, Sarcoid, SLE

**Why is Terrien’s the oddball in this group?**
Two reasons:
--PUK in the others is an inflammatory process; Terrien’s is noninflammatory
--As implied by the word ‘ulcerative’ in the name, the corneal epithelium is disrupted in PUK. In contrast, the epithelium is intact in Terrien’s.

**Does Terrien’s render the cornea thinner than normal?**
Yes

**Is the thinned Terrien’s cornea at risk for rupture with mild trauma?**
Yes

**Do these pt need to wear protective eyewear?**
Yes
Speaking of Terrien’s…

**Is it a common, or an uncommon condition?**
Uncommon

**Does it have a gender predilection?**
While once thought to be more common in males, it is now considered equal

**Is it unilateral, or bilateral?**
Bilateral, although involvement can be asymmetric

**There is a lookalike condition--rarer than Terrien’s--which differs in that**
1) *it is more likely to occur in children*, and 2) *it is inflammatory in nature.*

**What is it?**

*Fuchs' superficial marginal keratitis*

**Does it affect vision? If so, how?**
Yes, by inducing high astigmatism

*Why is Terrien’s the oddball in this group?*
Two reasons:
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**Does Terrien’s render the cornea thinner than normal?**
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**Is the thinned Terrien’s cornea at risk for rupture with mild trauma?**
Yes

**Do these pt need to wear protective eyewear?**
Yes
Which of the following doesn’t belong, and why?
RA, Mooren’s, Behçet, IBD

And in this group?
Mooren’s, Terrien’s marginal, Sarcoid, SLE

PUK in the others is due to a systemic condition; Mooren’s is, by definition, ocular only.

Concerning PUK

Speaking of Terrien’s…
Is it a common, or an uncommon condition?
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Is the involved epithelium absent, or intact?
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Does it affect vision? If so, how?
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Do these pt need to wear protective eyewear?
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Concerning PUK

- All of the following are true concerning Mooren’s ulcer *except* (could be more than one):
  - Cause is unknown
  - One clinical type presents as a unilateral PUK in the elderly
  - The other type presents as bilateral disease in young African women
  - Patients with the ‘African’ variety often have a history of systemic helminth infection
  - Mooren’s responds readily to aggressive local therapy
Concerning PUK

All of the following are true concerning Mooren’s ulcer except (could be more than one):

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- One clinical type presents as a unilateral PUK in the elderly \( T \text{ men} \)
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\[ A \]
Concerning PUK

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- Mooren’s responds readily to aggressive local therapy

Mooren’s ulcer is a chronic, progressive PUK. By definition, the cause is unknown. It starts sectorally, progresses circumferentially, then finally centrally. The leading edge is undermined and de-epithelialized. Two clinical varieties are recognized: Unilateral disease in the elderly, and rapidly progressive, severe bilateral disease that strikes young African men. These men usually are seropositive for helminthic disease.

The plethora of treatments stands as gloomy testimony to the relative ineffectiveness of each. Ocular modalities include topical steroids, BCL, n-acetylcysteine drops, topical cyclosporine and conjunctival resection. Quite often, systemic immunosuppressives are needed: steroids, MTX, and/or cyclophosphamide.