

Ocular Surface Disease Diagnostic and Treatment Algorithm

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Tear osmolarity testing helps me assess the ocular surface prior to cataract surgery. If I notice an abnormal number or an asymmetry in the results between the two eyes, it alerts the patient and me to pre-existing disease. I begin treating the ocular surface and bring the patient back for preoperative testing to ensure more reliable data. The more accurate the collected data, the less the likelihood of a refractive surprise.

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First visit: SPEED dry eye symptom questionnaire

If 1 or more dry eye symptoms, technician performs TearLab and MMP-9 test prior to additional workup

TearLab Osmolarity Test

MMP-9

Normal

If <300 mOsm/L and symmetric*

Look for additional signs of DED; if none, rule out dry eye

Abnormal

If ≥ 300 mOsm/L or asymmetric*

Determine Severity:

- Mild: $\sim 300 - 319$ mOsm/L
- Moderate: $\sim 320 - 339$ mOsm/L
- Severe: ≥ 340 mOsm/L

Slit Lamp Exam

1. Lissamine green and fluorescein staining
2. Evaluation of meibomian glands

Look for:

MGD, blepharitis
SPK, PEK, PEE

Baseline treatment protocol recommended to DED patients:

1. Adequate hydration
2. Lid hygiene
3. Preservative free artificial tears
4. High quality omega-3 supplement
5. Cyclosporine
6. If moderate or severe DED, additional medications may be prescribed (i.e., topical steroids, or combination antibiotic/steroids, etc.)

DED Patient Education:

1. DED is not 'cured' with a one time treatment
2. DED is chronic and requires on-going treatment
3. Requires collaboration and communication between patient and doctor
4. Environmental changes recommended: redirect air conditioner/heat vents/fans away from face, etc.
5. Email DED educational videos to patient

1-2 month follow up for DED diagnosis

* Asymmetric defined as a difference greater than 8 mOsm/L between eyes

Diagnosed with DED, return visit 1-2 month follow up: SPEED dry eye symptom questionnaire

TearLab and MMP-9 testing performed to monitor efficacy of prescribed treatment

TearLab Osmolarity Test

MMP-9

Slit Lamp Exam

1. Lissamine green and fluorescein staining
2. Meibomian gland imaging with LipiView
3. Evaluation of meibomian glands
4. Monitor treatment efficacy with TearLab results as compared to previous visit

Look for:

MGD, blepharitis, lid abnormalities, conjunctival chalasis, SPK, PEK, PEE

Abnormal

If ≥ 300 mOsm/L or asymmetric*

Determine severity/track therapeutic response:

- Mild: $\sim 300 - 319$ mOsm/L
- Moderate: $\sim 320 - 339$ mOsm/L
- Severe: ≥ 340 mOsm/L

Treatment protocol recommended to DED patients on follow up:

1. Increase of omega-3 from 2 to 4 capsules daily, with largest meal.
2. Continue heated microwaveable mask, 1-2 times daily.
3. Preservative free artificial tears OU PRN.
4. Maintain hydration

Increased treatment protocol recommended if signs/symptoms or TearLab results do not improve:

1. Start cyclosporine ophthalmic emulsion 0.05% OU BID
2. Discuss and recommend LipiFlow[†] depending on gland dropout with meibomian gland imaging

Schedule for 4 month follow up to repeat testing and monitor efficacy of therapy

* Asymmetric defined as a difference greater than 8 mOsm/L between eyes

4 month follow up for DED: SPEED dry eye symptom questionnaire

Follow up for DED –TearLab and MMP-9 testing performed to monitor efficacy of recommended treatment

TearLab Osmolarity Test

MMP-9

Slit Lamp Exam

1. Lissamine green and fluorescein staining
2. Evaluation of meibomian glands
3. Monitor treatment efficacy with TearLab results as compared to previous visit

Look for:

MGD, blepharitis, lid abnormalities, conjunctival chalasis, SPK, PEK, PEE

Abnormal

If ≥ 300 mOsm/L or asymmetric*

Determine severity/track therapeutic response:

- Mild: $\sim 300 - 319$ mOsm/L
- Moderate: $\sim 320 - 339$ mOsm/L
- Severe: ≥ 340 mOsm/L

Treatment protocol recommended to DED patients on 4 month follow up:

1. Continue omega-3 treatment: 4 capsules daily, or 1 tsp high potency liquid, with largest meal
2. Continue heated microwaveable mask, 1-2 times daily.
3. Preservative free artificial tears OU PRN
4. Maintain hydration
5. Continue cyclosporine ophthalmic emulsion 0.05% OU BID
6. Increase frequency of lid hygiene treatments

Treatment progression if **no improvement** in clinical signs/symptoms or TearLab results:

1. Add humidifier to bedroom and start running 1 hour prior to bed
2. Start a short course of loteprednol etabonate ophthalmic suspension 0.5% OU BID for 1-3 weeks
3. Perform omega index test to make sure patient is within the therapeutic range of 8% or greater
4. Recommend LipiFlow[†] if not already performed at previous visit

Schedule for 4 month follow up to repeat testing and monitor efficacy of therapy

* Asymmetric defined as a difference greater than 8 mOsm/L between eyes

Second 4 month follow up for DED: SPEED dry eye symptom questionnaire

Follow up for DED –TearLab and MMP-9 performed to monitor response to therapy and disease progression

TearLab Osmolarity Test

MMP-9

Slit Lamp Exam

1. Lissamine green and fluorescein staining
2. Evaluation of meibomian glands
3. Monitor treatment efficacy with TearLab results as compared to previous visit

Look for:

MGD, blepharitis, lid abnormalities, conjunctival chalasis, SPK, PEK, PEE

Abnormal

If ≥ 300 mOsm/L or asymmetric*

Determine severity/track therapeutic response:

- Mild: $\sim 300 - 319$ mOsm/L
- Moderate: $\sim 320 - 339$ mOsm/L
- Severe: ≥ 340 mOsm/L

Treatment protocol recommended to DED patients on 4 month follow up:

1. Continue omega-3 treatment: 4 capsules daily, or 1 tsp high potency liquid, with largest meal.
2. Continue heated microwaveable mask, 1-2 times daily.
3. Preservative free artificial tears OU PRN.
4. Maintain hydration
5. Continue cyclosporine ophthalmic emulsion 0.05% OU BID
6. Continue humidifier at night

If no improvement in clinical signs/ symptoms or TearLab results:

1. Perform Sjogrens test
2. Recommend LipiFlow[†] thermal pulsation treatment if not performed at previous visit
3. If LipiFlow[†] done in past 6 months, consider IPL (intense pulsed light) as adjunctive treatment
4. Insert punctal plugs to both lower lids
5. Preservative free artificial ointment at bedtime

Schedule for 4 month follow up to repeat testing and monitor efficacy of therapy

* Asymmetric defined as a difference greater than 8 mOsm/L between eyes

**For patient with severe DED,
regimen is as follows:**



Treatment protocol recommended to DED patients on 4 month follow up:

1. Continue omega-3 treatment: 4 capsules daily, or 1 tsp high potency liquid, with largest meal
2. Continue heated microwaveable mask, 1-2 times daily
3. Preservative free artificial tears OU PRN
4. Maintain hydration
5. Continue cyclosporine ophthalmic emulsion 0.05% OU BID
6. Continue humidifier at night
7. IPL: series of 4 treatments and repeated maintenance treatments prn
8. Consider adding punctal plugs to both upper lids
9. Consider amniotic membrane corneal bandage (Prokera[†])
10. Consider serum tears