

On behalf of Vision Expo, we sincerely thank you for being with us this year.

Vision Expo Has Gone Green!

We have eliminated all paper session evaluation forms. Please be sure to complete your electronic session evaluations online when you login to request your CE Letter for each course you attended! Your feedback is important to us as our Education Planning Committee considers content and speakers for future meetings to provide you with the best education possible.



disclosures

last 12 months

allergan/abbvie
sun pharma
tarsus pharma
Ocuphire
Bruder
Scope

last 12 months

sydnexis
eyenovia bio
laboratoires Thea
visus/tenpoint
therapeutics
Harrow

last 12 months

aperta biosciences
astareal, inc.
azura ophthalmics
aldeyra therapeutics
Vyluma
Lenz

“All relevant relationships have been mitigated.”

Update on Managing Presbyopia Without Corrective Lenses

milton m. hom
eyemage@mminternet.com
Azusa, CA

Update on Managing Presbyopia Without Corrective Lenses

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eyemage@mminternet.com
Azusa, CA

Update on Managing Presbyopia Without Corrective Lenses

Basics

Drugs

Cases

Tips

By 2030, 2.1 billion people will have
presbyopia.

Yet most still only get readers

Fricke TR, Tahhan N, Resnikoff S, Papas E, Burnett A, Ho SM, Naduvilath T, Naidoo KS.
Global Prevalence of Presbyopia and Vision Impairment from Uncorrected Presbyopia:
Systematic Review, Meta-analysis, and Modelling. Ophthalmology. 2018
Oct;125(10):1492-1499.

Presbyopia

What is your first choice treatment for presbyopia?

1. Drops
2. Anything but drops

Presbyopia

What is the #1 barrier for presbyopia drops? (Choose One)

1. Cost
2. Safety
3. Duration
4. Patient or Doctor skepticism

Presbyopia

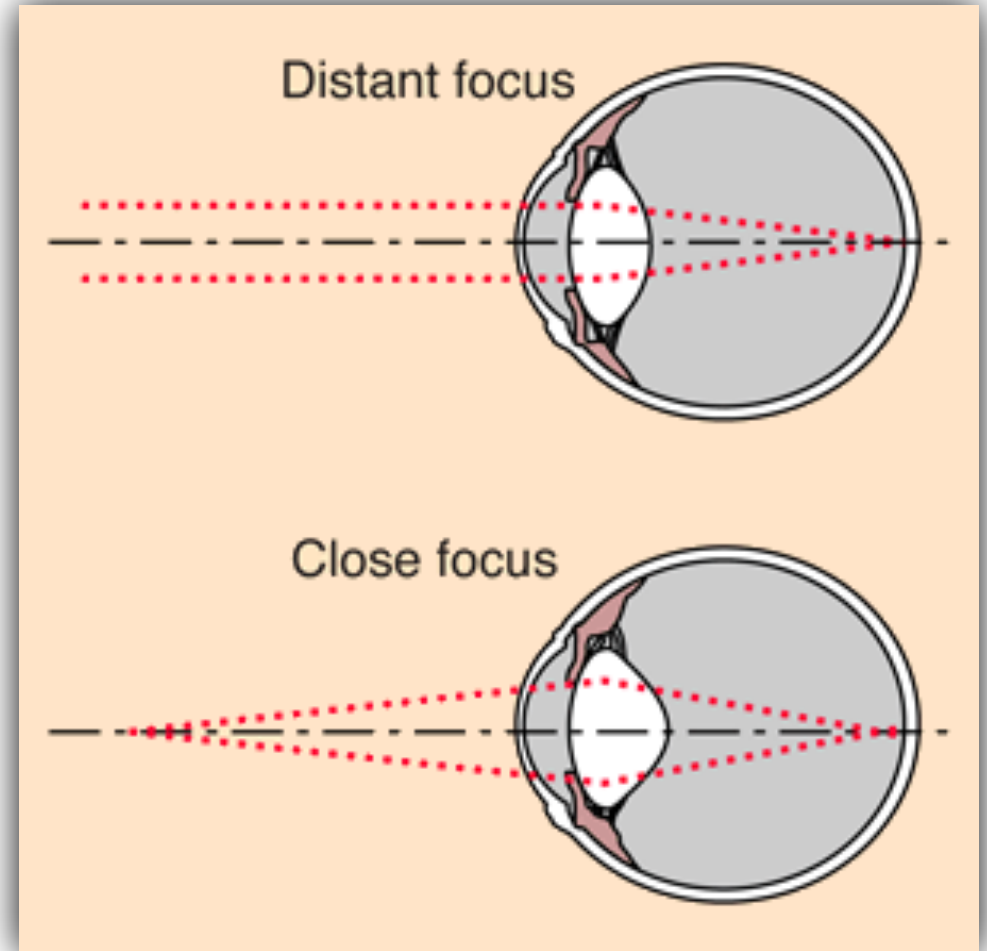
Have you prescribed presbyopia drops?

1. Yes
2. No

Basics

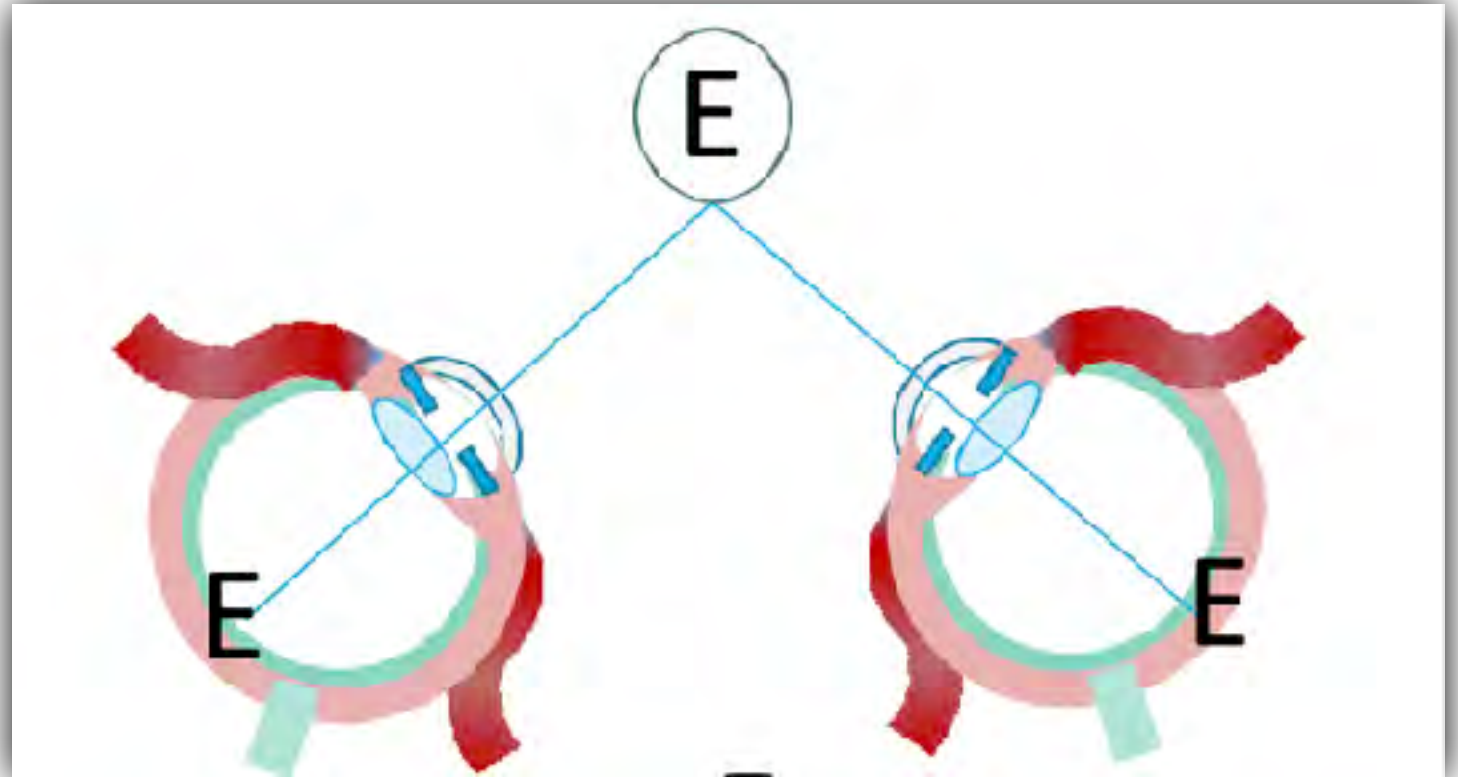
Q: We live in a 3D world. We only have a 2D retina.
How can we perceive different distances?

A: Accommodation



THE NEAR TRIAD

1. Accommodation
2. Convergence
3. Miosis



LENS



Protein homeostasis: live long, won't prosper

Brandon H. Toyama and Martin W. Hetzer*

Salk Institute for Biological Studies, Molecular and Cell Biology Laboratory, 10010 N. Torrey Pines Road, La Jolla, CA 92037 USA

Abstract

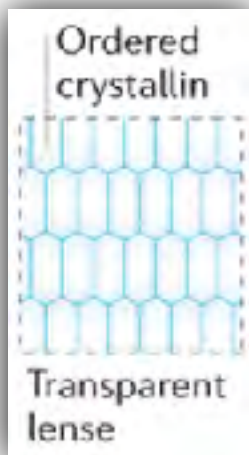
Protein turnover is an effective way of maintaining a functional proteome, as old and potentially damaged polypeptides are destroyed and replaced by newly synthesized copies. An increasing number of intracellular proteins, however, have been identified that evade this turnover process and instead are maintained over a cell's lifetime. This diverse group of long-lived proteins might be particularly prone to accumulation of damage and thus play a critical role in the functional deterioration of key regulatory processes during ageing.

Heat added

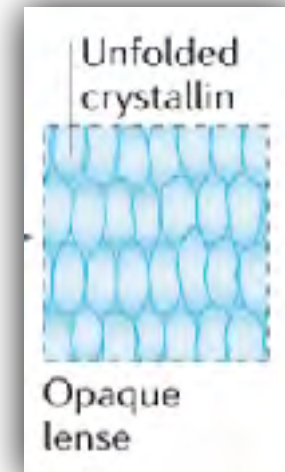


Water soluble Protein

Denatured Protein



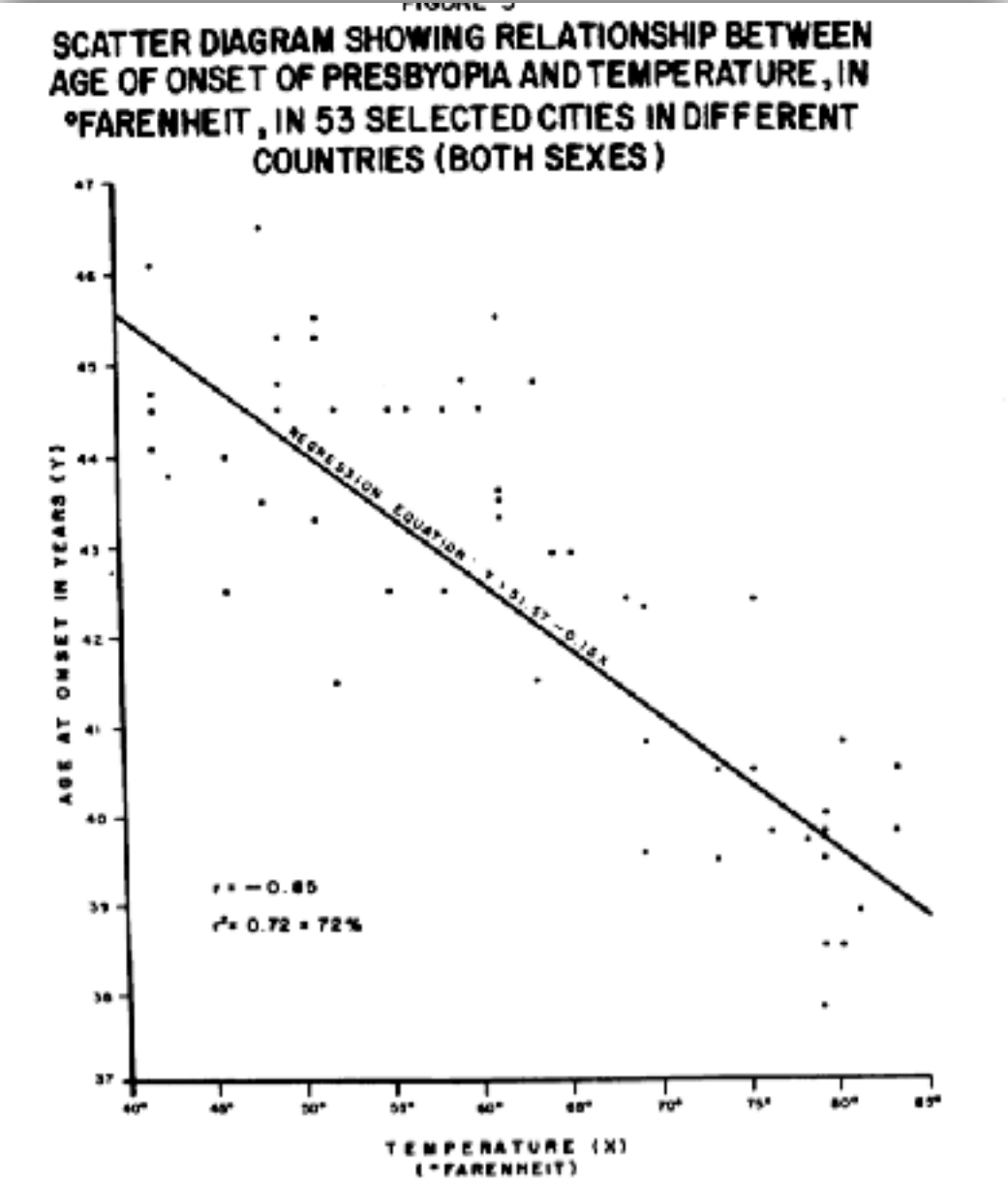
Aging/Heat



PRESBYOPIA AND HEAT

| Country | Average annual annual temperature in Fahrenheit selected cities | Mean onset of Presbyopia for both sexes |
|----------------------|--------------------------------------------------------------------------|-----------------------------------------------|
| Norway | 46 | 46.1 |
| Finland | 46 | 46.5 |
| Alaska | 46 | 44.1 |
| Canada | 42 | 44.7 |
| Sweden | 43 | 43.8 |
| Denmark | 46 | 42.5 |
| North USA | 46 | 44.0 |
| Germany | 48 | 43.5 |
| Ireland | 48 | 46.5 |
| Holland | 49 | 45.3 |
| Belgium | 49 | 44.8 |
| Austria | 49 | 44.5 |
| England | 51 | 45.5 |
| France | 51 | 45.5 |
| Mid USA | 51 | 43.3 |
| Hungary | 52 | 43.5 |
| Bolivia (Mountains) | 52 | 44.5 |
| Peru (Mountains) | 53 | 44.5 |
| Ecuador (Mountains) | 53 | 43.5 |
| Spain | 54 | 44.5 |
| Turkey | 54 | 44.5 |
| Colombia (Mountains) | 54 | 42.5 |
| Chile | 55 | 45.8 |
| Italy | 56 | 44.5 |
| Iran | 52 | 43.5 |
| Mexico | 52 | 45.3 |
| Argentina | 52 | 45.8 |
| Uruguay | 53 | 45.3 |
| South Africa | 53 | 41.3 |
| Australia | 60 | 44.4 |
| Greece | 64 | 42.4 |
| South USA | 65 | 42.4 |
| Peru (Coast) | 66 | 42.4 |
| Guatemala | 66 | 39.6 |
| Costa Rica | 66 | 40.8 |
| Brazil | 66 | 42.3 |
| Bolivia (Tropical) | 72 | 40.3 |
| Egypt | 72 | 39.3 |
| El Salvador | 75 | 40.3 |
| Hawaii | 75 | 42.4 |
| Venezuela | 76 | 38.3 |
| Ecuador (Coast) | 78 | 38.7 |
| India | 79 | 39.9 |
| Colombia (Coast) | 79 | 38.5 |
| Dominican Republic | 79 | 39.3 |
| Haiti | 79 | 38.5 |
| Puerto Rico | 79 | 35.8 |
| Philippines | 79 | 37.8 |
| Indonesia | 80 | 36.5 |
| Panama | 80 | 40.8 |
| Malaysia | 81 | 35.9 |
| Nicaragua | 83 | 36.8 |
| Thailand | 83 | 40.5 |

Miranda MN (1979) The geographic factor in the onset of presbyopia. Trans. Am. Ophthalmol. Soc. 77, 603–621



Drugs

| Company | Drug | Brand | Approved | Mechanism of Action |
|-----------------|-------------------------------------|-----------|----------|--------------------------------------------------------|
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| Viatriis | Phentolamine 0.75% | Nyxol (?) | No | Blocks dilator |

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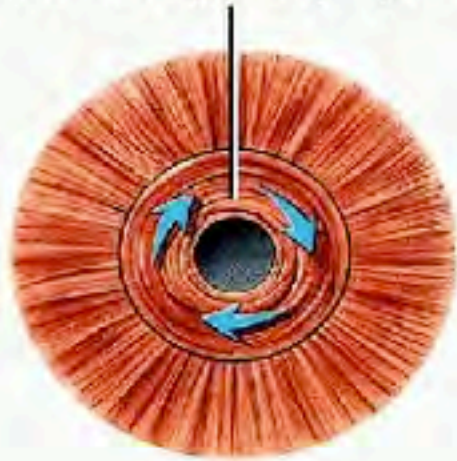
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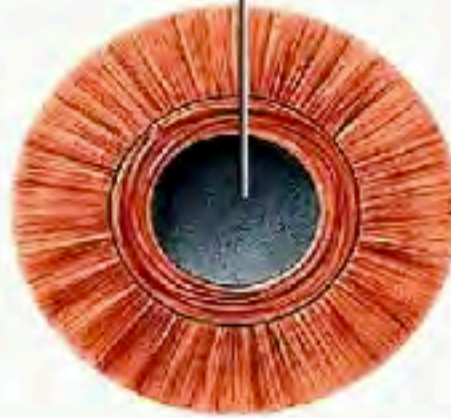
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Pupil constricts as
circular muscles of iris
contract (parasympathetic)



Bright light

Pupil



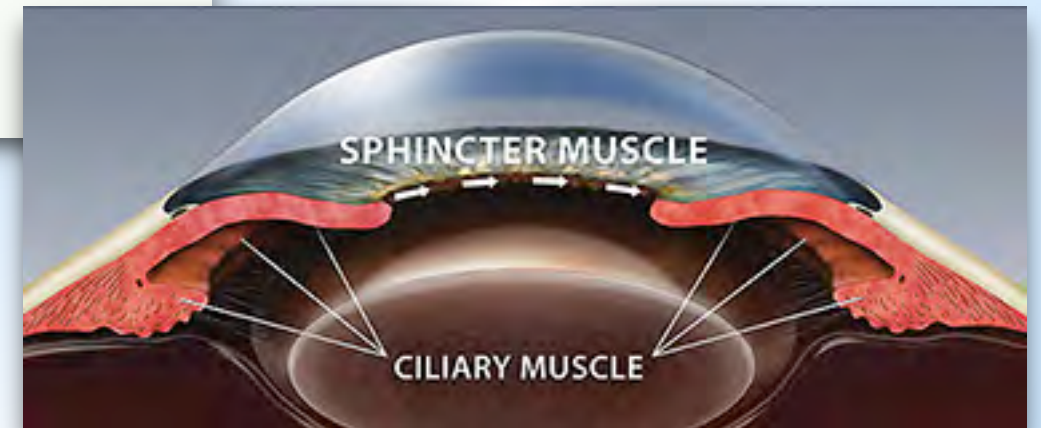
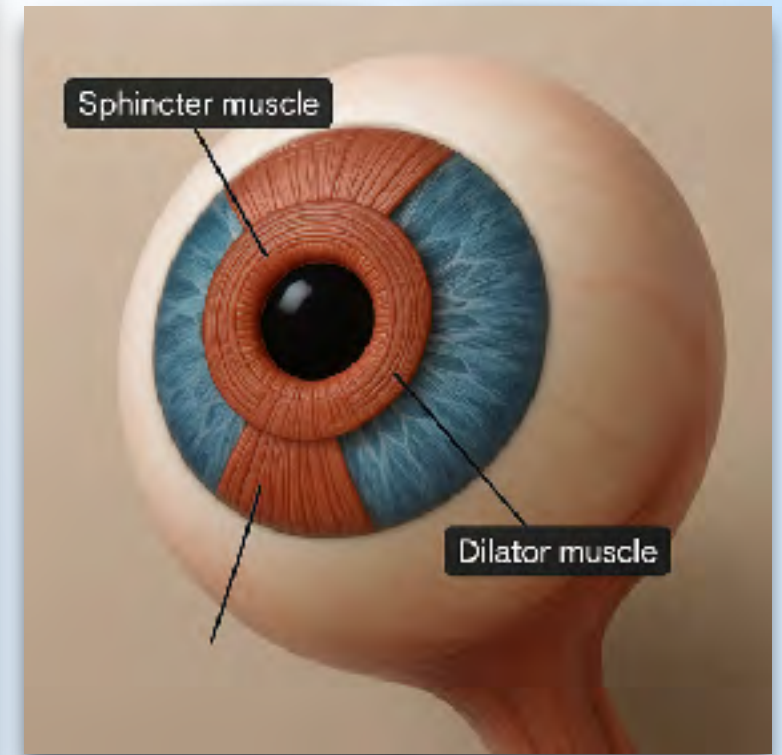
Normal light

Pupil dilates as
radial muscles of iris
contract (sympathetic)



Dim light

Anterior views



<https://www.youtube.com/watch?v=cgmhs2wJfqs>

Pepose JS. Treatment of Presbyopia: One of Several Potential Indications for Nyxol. Presbyopia Physician Dec 2022 Vol 2: 17-20.

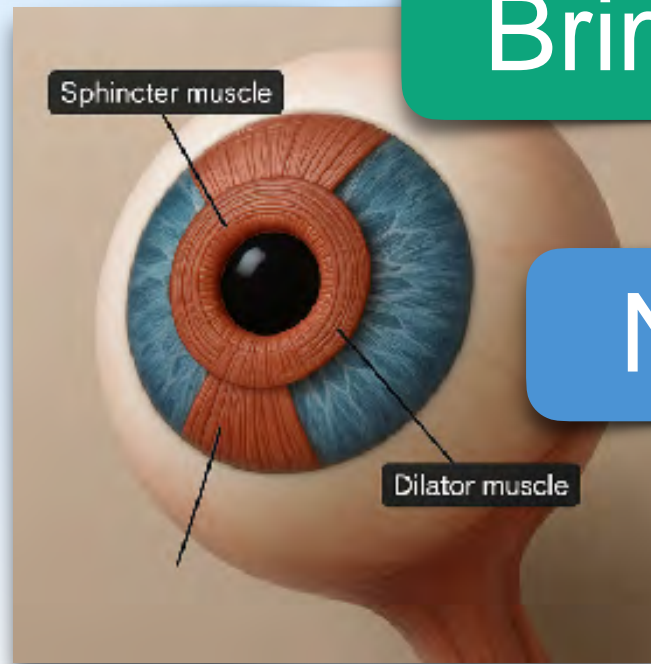
Vizz

Vuity

Qlosi

Brimochol

Nyxol



<https://www.youtube.com/watch?v=cgmhs2wJfq>

Pepose JS. Treatment of Presbyopia: One of Several Potential Indications for Nyxol. Presbyopia Physician Dec 2022 Vol 2: 17-20.

1st Generation

Vuity

Qlosi

2nd Generation

Vizz

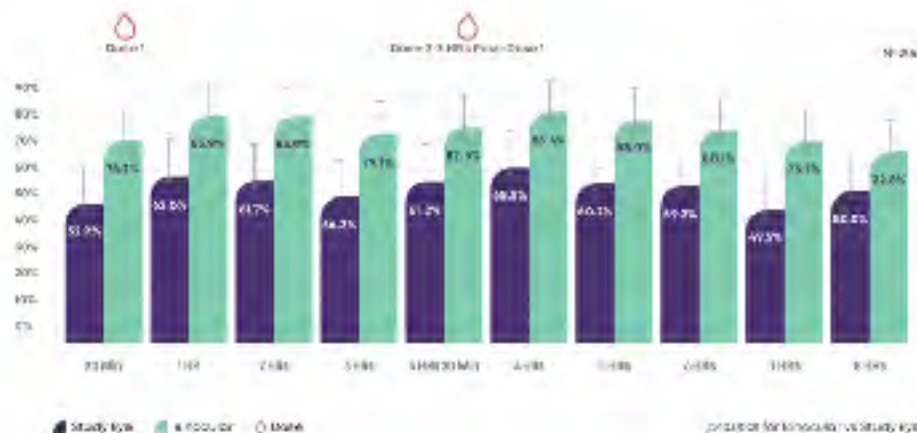
Brimochol

Nyxol

Data Wars

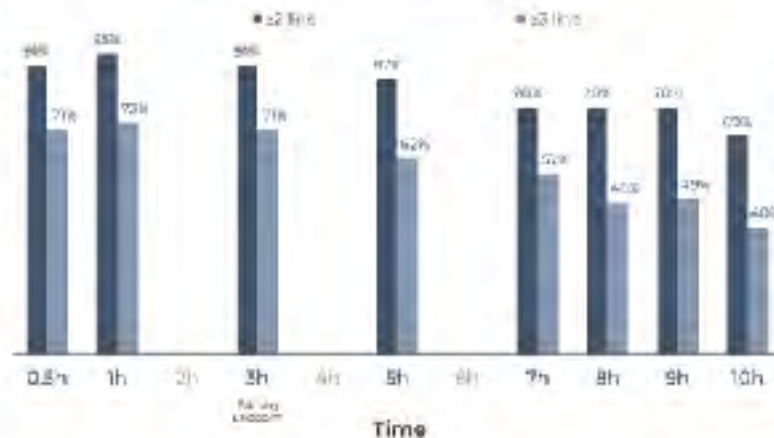
After 2 doses of Qlosi™, functional near vision was extended for up to 8 hours⁵

Day 6—Subjects with BUCVA 20/40 or better in Study Eye (nonocular) vs. B nonocular vision with off baseline subjects with 20/40 or better CIU removed



Source: study is at (a) and (b) in (c) (d) (e) (f) (g) (h) (i) (j) (k) (l) (m) (n) (o) (p) (q) (r) (s) (t) (u) (v) (w) (x) (y) (z) (aa) (ab) (ac) (ad) (ae) (af) (ag) (ah) (ai) (aj) (ak) (al) (am) (an) (ao) (ap) (aq) (ar) (as) (at) (au) (av) (aw) (ax) (ay) (az) (ba) (bb) (bc) (bd) (be) (bf) (bg) (bh) (bi) (bj) (bk) (bl) (bm) (bn) (bo) (bp) (bq) (br) (bs) (bt) (bu) (bv) (bw) (bx) (by) (bz) (ca) (cb) (cc) (cd) (ce) (cf) (cg) (ch) (ci) (cj) (ck) (cl) (cm) (cn) (co) (cp) (cq) (cr) (cs) (ct) (cu) (cv) (cw) (cx) (cy) (cz) (da) (db) (dc) (dd) (de) (df) (dg) (dh) (di) (dj) (dk) (dl) (dm) (dn) (do) (dp) (dq) (dr) (ds) (dt) (du) (dv) (dw) (dx) (dy) (dz) (ea) (eb) (ec) (ed) (ee) (ef) (eg) (eh) (ei) (ej) (ek) (el) (em) (en) (eo) (ep) (eq) (er) (es) (et) (eu) (ev) (ew) (ex) (ey) (ez) (fa) (fb) (fc) (fd) (fe) (ff) (fg) (fh) (fi) (fj) (fk) (fl) (fm) (fn) (fo) (fp) (fq) (fr) (fs) (ft) (fu) (fv) (fw) (fx) (fy) (fz) (ga) (gb) (gc) (gd) (ge) (gf) (gg) (gh) (gi) (gj) (gk) (gl) (gm) (gn) (go) (gp) (gq) (gr) (gs) (gt) (gu) (gv) (gw) (gx) (gy) (gz) (ha) (hb) (hc) (hd) (he) (hf) (hg) (hh) (hi) (hj) (hk) (hl) (hm) (hn) (ho) (hp) (hq) (hr) (hs) (ht) (hu) (hv) (hw) (hx) (hy) (hz) (ia) (ib) (ic) (id) (ie) (if) (ig) (ih) (ii) (ij) (ik) (il) (im) (in) (io) (ip) (iq) (ir) (is) (it) (iu) (iv) (iw) (ix) (iy) (iz) (ja) (jb) (jc) (jd) (je) (jf) (jg) (jh) (ji) (jj) (jk) (jl) (jm) (jn) (jo) (jp) (jq) (jr) (js) (jt) (ju) (jv) (jw) (jx) (jy) (jz) (ka) (kb) (kc) (kd) (ke) (kf) (kg) (kh) (ki) (kj) (kk) (kl) (km) (kn) (ko) (kp) (kq) (kr) (ks) (kt) (ku) (kv) (kw) (kx) (ky) (kz) (la) (lb) (lc) (ld) (le) (lf) (lg) (lh) (li) (lj) (lk) (ll) (lm) (ln) (lo) (lp) (lq) (lr) (ls) (lt) (lu) (lv) (lw) (lx) (ly) (lz) (ma) (mb) (mc) (md) (me) (mf) (mg) (mh) (mi) (mj) (mk) (ml) (mm) (mn) (mo) (mp) (mq) (mr) (ms) (mt) (mu) (mv) (mw) (mx) (my) (mz) (na) (nb) (nc) (nd) (ne) (nf) (ng) (nh) (ni) (nj) (nk) (nl) (nm) (nn) (no) (np) (nq) (nr) (ns) (nt) (nu) (nv) (nw) (nx) (ny) (nz) (oa) (ob) (oc) (od) (oe) (of) (og) (oh) (oi) (oj) (ok) (ol) (om) (on) (oo) (op) (oq) (or) (os) (ot) (ou) (ov) (ow) (ox) (oy) (oz) (pa) (pb) (pc) (pd) (pe) (pf) (pg) (ph) (pi) (pj) (pk) (pl) (pm) (pn) (po) (pp) (pq) (pr) (ps) (pt) (pu) (pv) (pw) (px) (py) (pz) (qa) (qb) (qc) (qd) (qe) (qf) (qg) (qh) (qi) (qj) (qk) (ql) (qm) (qn) (qo) (qp) (qq) (qr) (qs) (qt) (qu) (qv) (qw) (qx) (qy) (qz) (ra) (rb) (rc) (rd) (re) (rf) (rg) (rh) (ri) (rj) (rk) (rl) (rm) (rn) (ro) (rp) (rq) (rr) (rs) (rt) (ru) (rv) (rw) (rx) (ry) (rz) (sa) (sb) (sc) (sd) (se) (sf) (sg) (sh) (si) (sj) (sk) (sl) (sm) (sn) (so) (sp) (sq) (sr) (ss) (st) (su) (sv) (sw) (sx) (sy) (sz) (ta) (tb) (tc) (td) (te) (tf) (tg) (th) (ti) (tj) (tk) (tl) (tm) (tn) (to) (tp) (tq) (tr) (ts) (tt) (tu) (tv) (tw) (tx) (ty) (tz) (ua) (ub) (uc) (ud) (ue) (uf) (ug) (uh) (ui) (uj) (uk) (ul) (um) (un) (uo) (up) (uq) (ur) (us) (ut) (uu) (uv) (uw) (ux) (uy) (uz) (va) (vb) (vc) (vd) (ve) (vf) (vg) (vh) (vi) (vj) (vk) (vl) (vm) (vn) (vo) (vp) (vq) (vr) (vs) (vt) (vu) (vv) (vw) (vx) (vy) (vz) (wa) (wb) (wc) (wd) (we) (wf) (wg) (wh) (wi) (wj) (wk) (wl) (wm) (wn) (wo) (wp) (wq) (wr) (ws) (wt) (wu) (wv) (ww) (wx) (wy) (wz) (xa) (xb) (xc) (xd) (xe) (xf) (xg) (xh) (xi) (xj) (xk) (xl) (xm) (xn) (xo) (xp) (xq) (xr) (xs) (xt) (xu) (xv) (xw) (xx) (xy) (xz) (ya) (yb) (yc) (yd) (ye) (yf) (yg) (yh) (yi) (yj) (yk) (yl) (ym) (yn) (yo) (yp) (yq) (yr) (ys) (yt) (yu) (yv) (yw) (yx) (yy) (yz) (za) (zb) (zc) (zd) (ze) (zf) (zg) (zh) (zi) (zj) (zk) (zl) (zm) (zn) (zo) (zp) (zq) (zr) (zs) (zt) (zu) (zv) (zw) (zx) (zy) (zz)

% of Participants Achieving 22 and 23-Line Near Vision Improvement (on basis of 11-line on mean BUCVA)



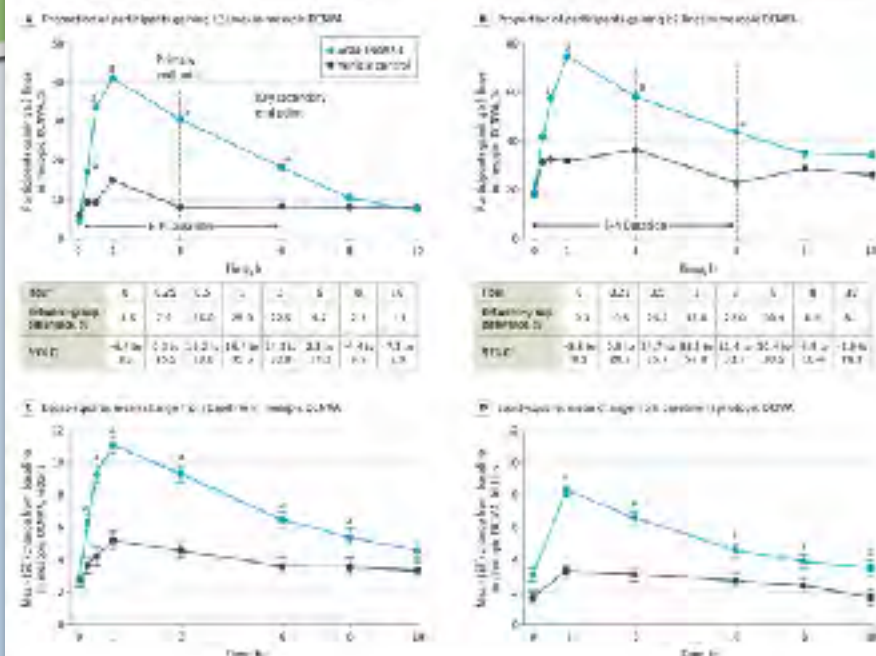
Once daily, rapid onset, long duration for vast majority of presbyopes makes LN200 the ideal presbyopia eye drop

3 lines FDA endpoint and 71% achieved at 5hr (primary)

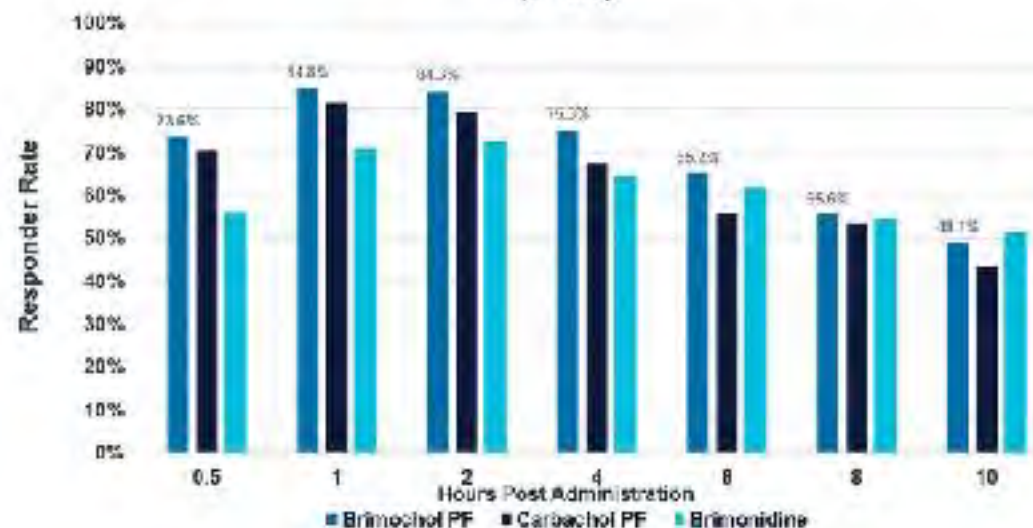
2 lines clinically meaningful and 98% achieved at 1hr

p<0.0001 for all timepoints

Figure 2. High-Contrast, Clinical Visual Outcomes in Day 30



Proportion of Subjects Achieving 20/40 or Better in BUCVA (n=182)



Day 30, Day 8 or Day Whatever?
8 hours, 3 hours, 30 minutes or 10
hours?
Binocular or monocular or both?

| Company | Drug | Brand | Approved | Mechanism of Action |
|-----------------|-------------------------------------|-----------|----------|--------------------------------------------------------|
| Allergan/AbbVie | Pilocarpine 1.25% BID | Vuity | Yes | Iris sphincter+Ciliary muscle |
| Orasis | Pilocarpine 0.4% BID | Qlosi | Yes | Iris sphincter+Ciliary muscle |
| Lenz | Aceclidine 1.75% | Vizz | Yes | Selective Iris sphincter+Ciliary muscle |
| Tenpoint | Brimonidine 0.1% Carbachol 2.75% | Brimochol | No | Iris sphincter+Ciliary muscle+ Blocks dilator |
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Case: Emmetrope

Emmetrope

Changing scenario case: Maria
50 year old female

Emmetrope

Does not want readers

| Company | Drug | Brand | Approved | Mechanism of Action |
|-----------------|-------------------------------------|-----------|----------|--------------------------------------------------------|
| Allergan/AbbVie | Pilocarpine 1.25% BID | Vuity | Yes | Iris sphincter+Ciliary muscle |
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Emmetrope

“emmetropes are at the top of the list for these drops”

Hom M. Patient selection and the X factor. Presbyopia Physician March 2023

Karpecki P. McGee S. Singh RP. Pinning down presbyopia. Review of Optometry Suppl June 30 2025

What?

Emmetrope needs readers

So what?

Emmetrope hates readers

Now what?

Take your pick of the drops; they all work

Case: Duration

Pupil

Changing scenario case: Maria
50 year old female

Air traffic control

On call long hours screens

Using 1st G drop; doesn't last

| Company | Drug | Hour | Improvement | Day |
|-----------------|-------------------------------------|-------|----------------------|--------|
| Allergan/AbbVie | Pilocarpine 1.25% qD | 3hrs | 31% vs. 8% | Day 30 |
| Allergan/AbbVie | Pilocarpine 1.25% BID | 9hrs | 35.1% vs. 7.8% | Day 14 |
| Orasis | Pilocarpine 0.4% BID | 8hrs | 35.5% vs. 19.1% | Day 15 |
| Lenz | Aceclidine 1.75% | 10hrs | 40% vs. 5% | Day 1 |
| | | | 35% vs. 7% | Day 28 |
| Tenpoint | Brimonidine 0.1% Carbachol 2.75% | 10hrs | 49.1% vs. ?? | Day 8? |
| Viartis | Phentolamine 0.75% | 12hrs | “Significantly more” | Day 8 |

<https://investor.viartis.com/news-releases/news-release-details/viartis-announces-positive-top-line-results-second-pivotal-phase>

Jones Hosts: Throw The Reading Glass? (Virtual Presbyopia Expert Panel)- Shared screen with speaker view

McCabe CM. An update on Brimonidol PF. Presbyopia Physician Ophthalmology Management vol 28 Sept 1 2024.

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Kannarr S, El-Harazi SM, Moshirfar M, Lievens C, Kim JL, Peace JH, Safyan E, Liu H, Zheng S, Robinson MR. Safety and Efficacy of Twice-Daily Pilocarpine HCl in Presbyopia: The Virgo Phase 3, Randomized, Double-Masked, Controlled Study. Am J Ophthalmol. 2023 Sep;253:189-200.

Miosis



“These Phase 3 studies demonstrated that twice-a-day dosing, with 2 to 3-hour intervals between doses, produced a statistically significant improvement in DCNVA [near vision] without compromising CDVA [distance vision]”

Holland E, Karpecki P, Fingeret M, Schaeffer J, Gupta P, Fram N, Smits G, Ignacio T, Lindstrom R. Efficacy and Safety of CSF-1 (0.4% Pilocarpine Hydrochloride) in Presbyopia: Pooled Results of the NEAR Phase 3 Randomized, Clinical Trials. Clin Ther. 2024 Feb;46(2):104-113.

What?

Works long hours on screens

So what?

Wants longer duration

Now what?

Use/Switch to 2nd G drop
Increase 1st G to BID

Case: Pupils

Pupil

Changing scenario case: Maria
50 year old female
7mm pupils
Poor near vision with 1st G drop
(Pilo)

| Company | Drug | Brand | Approved | Mechanism of Action |
|-----------------|-------------------------------------|-----------|----------|--------------------------------------------------------|
| Allergan/AbbVie | Pilocarpine 1.25% BID | Vuity | Yes | Iris sphincter+Ciliary muscle |
| Orasis | Pilocarpine 0.4% BID | Qlosi | Yes | Iris sphincter+Ciliary muscle |
| Lenz | Aceclidine 1.75% | Vizz | Yes | Selective Iris sphincter+Ciliary muscle |
| Tenpoint | Brimonidine 0.1% Carbachol 2.75% | Brimochol | No | Iris sphincter+Ciliary muscle+ Blocks dilator |
| Viatriis | Phentolamine 0.75% | Nyxol (?) | No | Blocks dilator |

<https://investor.viatriis.com/news-releases/news-release-details/viatriis-announces-positive-top-line-results-second-pivotal-phase> McCabe CM. An update on Brimochol PF. Presbyopia Physician Ophthalmology Management vol 28 Sept 1 2024.

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Miosis



Hom MM. Pharmacologic treatment of presbyopia. In: M Yanoff dvances in Ophthalmology and Optometry, Volume 9, Chapter 2. *in press*

Pupil size

“...if it's too large, the drop may not achieve the pinhole effect...enhance depth of focus...If the pupil is too small, it may not allow sufficient light for good vision...;”

Cathleen M. McCabe, MD, Eric E. Schmidt, OD The emerging era of presbyopia-correcting eye drops: What's next? Ophthalmology Times: July/August 2025 Volume 50 Issue 4

Pupil size

“Our study findings suggest that the optimum pupil size should be between 2.0 and 2.5 mm.”

Karl Gene Stonecipher; Milton Hom; Daniel H Chang; William Christie; Jiang Yuan; Haixia Liu; Michael R Robinson Optimal pupil size for near-vision improvement without distance-vision loss in the GEMINI studies of AGN-190584 for presbyopia Investigative Ophthalmology & Visual Science June 2022, Vol.63, 1810 – F0426.

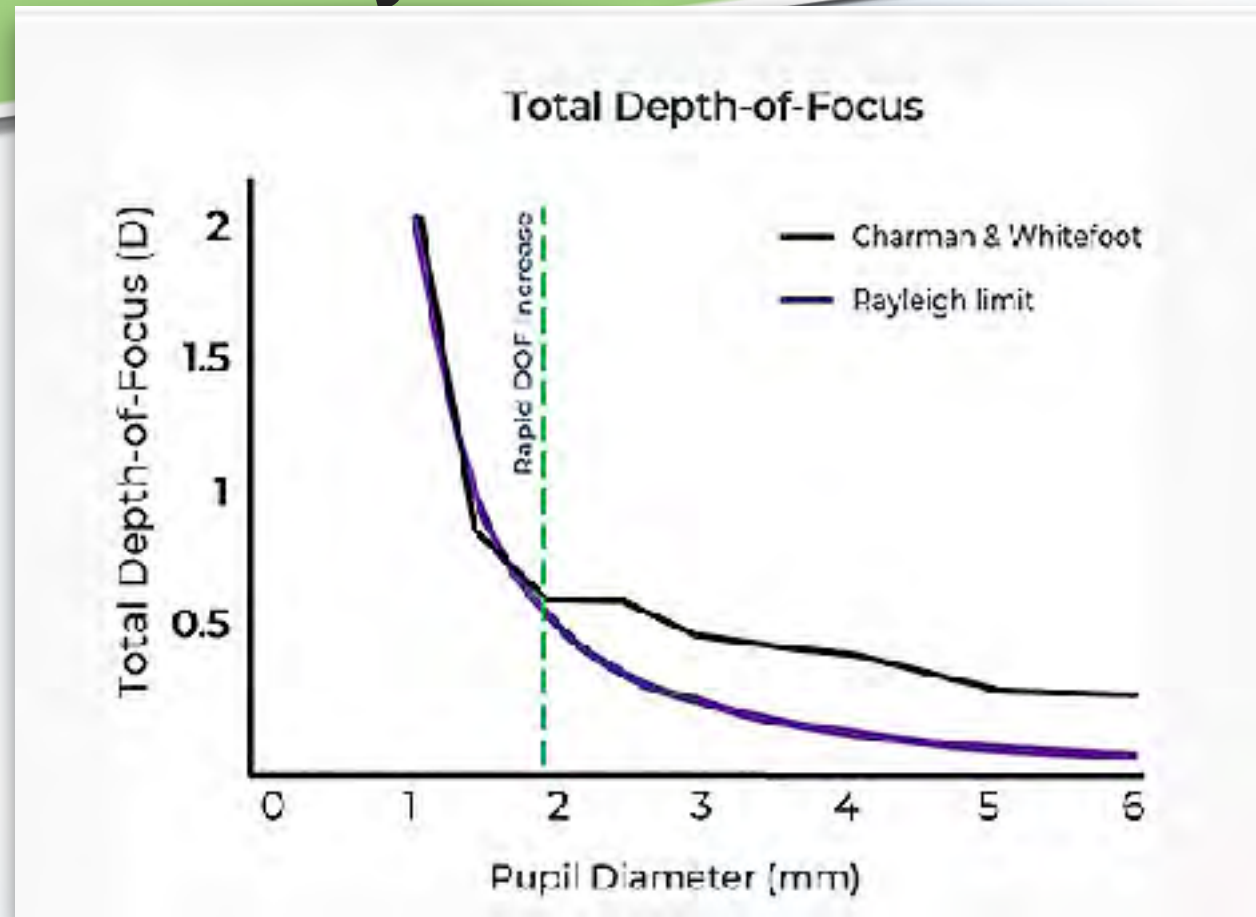
Aceclidine

“formulations maintained an average pupil size of 1.5 mm to 2 mm for 10 hours”

Hom MM. Pharmacologic treatment of presbyopia. In: M. Yanoff advances in Ophthalmology and Optometry, Volume 9, Chapter 2. *in press*

Eiden SB. Oldrich M. Differentiating Miotic for Pharmacological Management of Presbyopia. Presbyopia physician Sept 2023 Vol 3:12-14

Myopic shift



Charman WN. Pinholes and presbyopia: solution or sideshow? Ophthalmic and Physiological Optics, 39:1, 1-10, Jan 2019

Eiden SB. Oldrich M. Differentiating Miotics for Pharmacological Management of Presbyopia. Presbyopia physician Sept 2023 Vol 3:12-14

Pupil

Changing scenario case: Maria
50 year old female
7mm pupils
Poor near vision with 1st G drop
(Pilo)

Presbyopia drugs

| Drug | Brand/ Manufacturer | Pupil size | RD risk | Mechanism of action |
|-----------------------------------------|---------------------------------------|------------|---------|--------------------------------------------------------|
| Pilocarpine | Vuity Qlosi | 2-3mm | Yes | Iris sphincter+Ciliary muscle |
| Brimochol (brimonidine +cabechol) | Visus/Tenpoint | 2-3mm | Yes | Iris sphincter+Ciliary muscle+ Blocks dilator |
| Aceclidine | Lenz | 1-1.5mm | Yes | Iris sphincter+Ciliary muscle |
| Phentolamine | Viatrix Ocuphire/ Opus Genetics | 3-4mm | No | Blocks dilator |

Pepose JS, Hartman PJ, DuBiner HB, Abrams MA, Smyth-Medina RJ, Moroi SE, Meyer AR, Sooch MP, Jaber RM, Charizanis K, Klapman SA, Amin AT, Yousif JE, Lazar ES, Karpecki PM, Slonim CB, McDonald MB. Phentolamine Mesylate Ophthalmic Solution Provides Lasting Pupil Modulation and Improves Near Visual Acuity in Presbyopic Glaucoma Patients in a Randomized Phase 2b Clinical Trial. Clin Ophthalmol. 2021 Jan 8;15:79-91. doi: 10.2147/OPTH.S278169. PMID: 33447013; PMCID: PMC7802916.

What?

Large pupils

So what?

1st G drop doesn't work

Now what?

Switch to aceclidine
(smallest pupils)

Case: Kappa

Pupil

Changing scenario case: Maria
50 year old female
Poor near vision with 2nd G drop
Tried several multifocal CL-no
success, experienced halos

| Company | Drug | Brand | Approved | Mechanism of Action |
|-----------------|-------------------------------------|-----------|----------|--------------------------------------------------------|
| Allergan/AbbVie | Pilocarpine 1.25% BID | Vuity | Yes | Iris sphincter+Ciliary muscle |
| Orasis | Pilocarpine 0.4% BID | Qlosi | Yes | Iris sphincter+Ciliary muscle |
| Lenz | Aceclidine 1.75% | Vizz | Yes | Selective Iris sphincter+Ciliary muscle |
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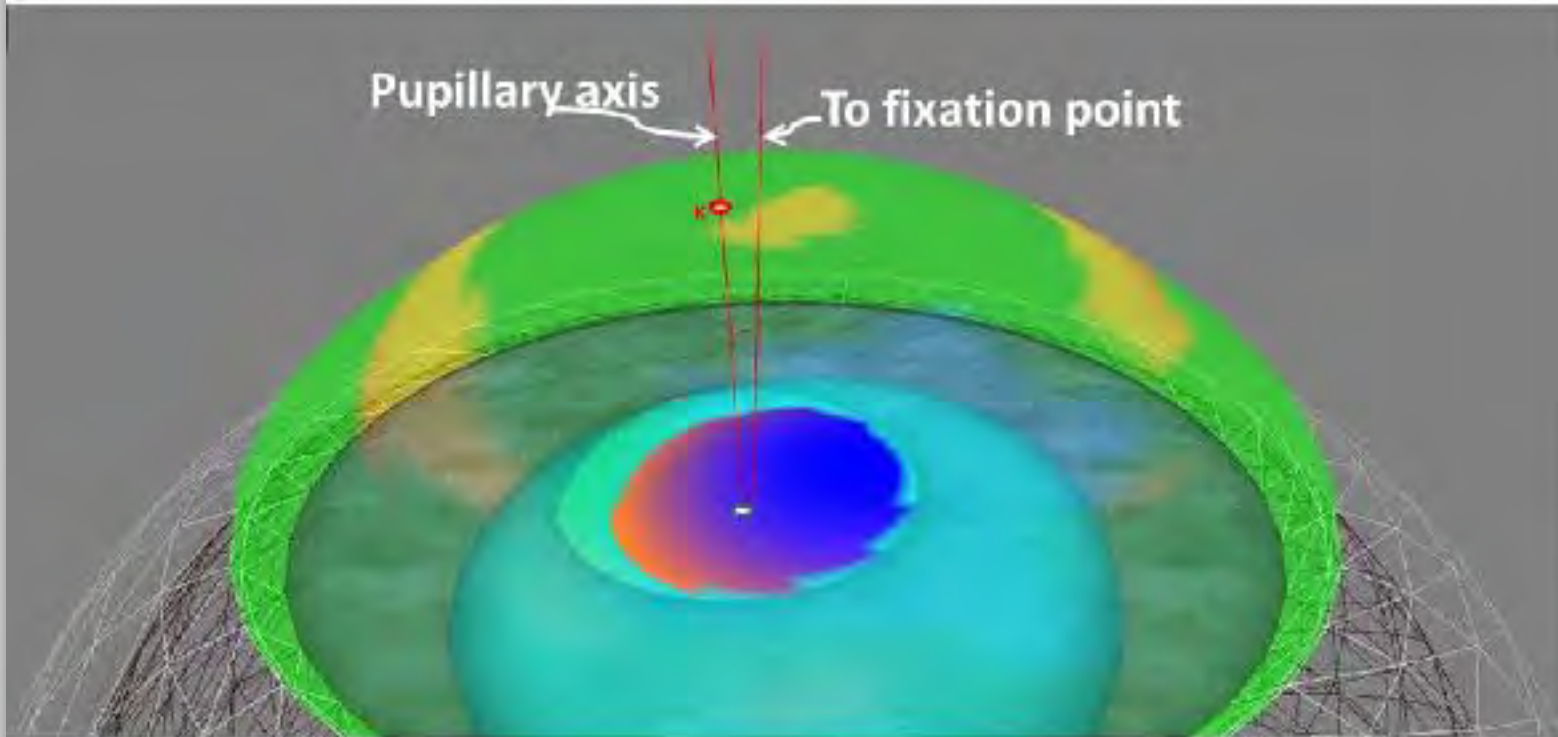
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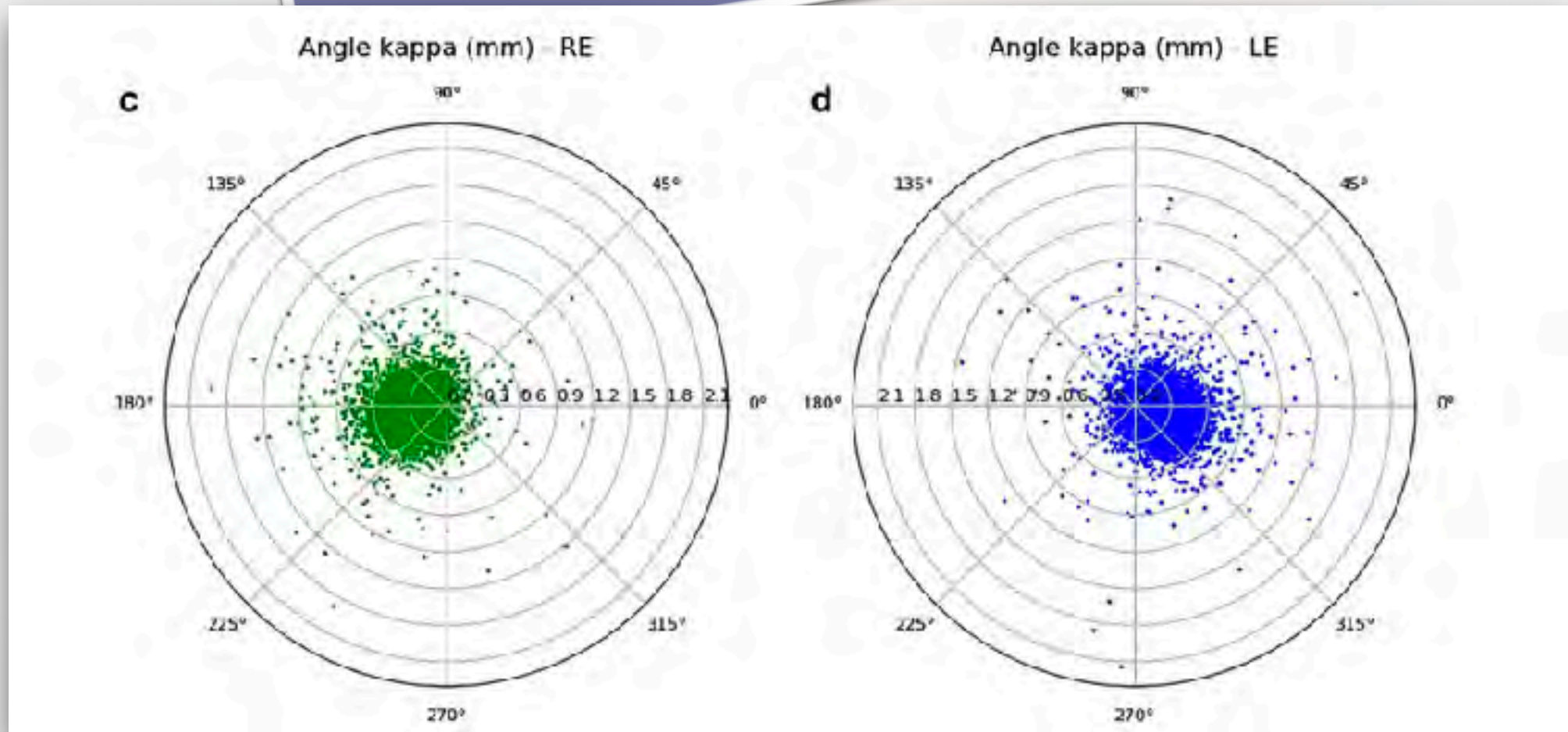
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KAPPA ANGLE

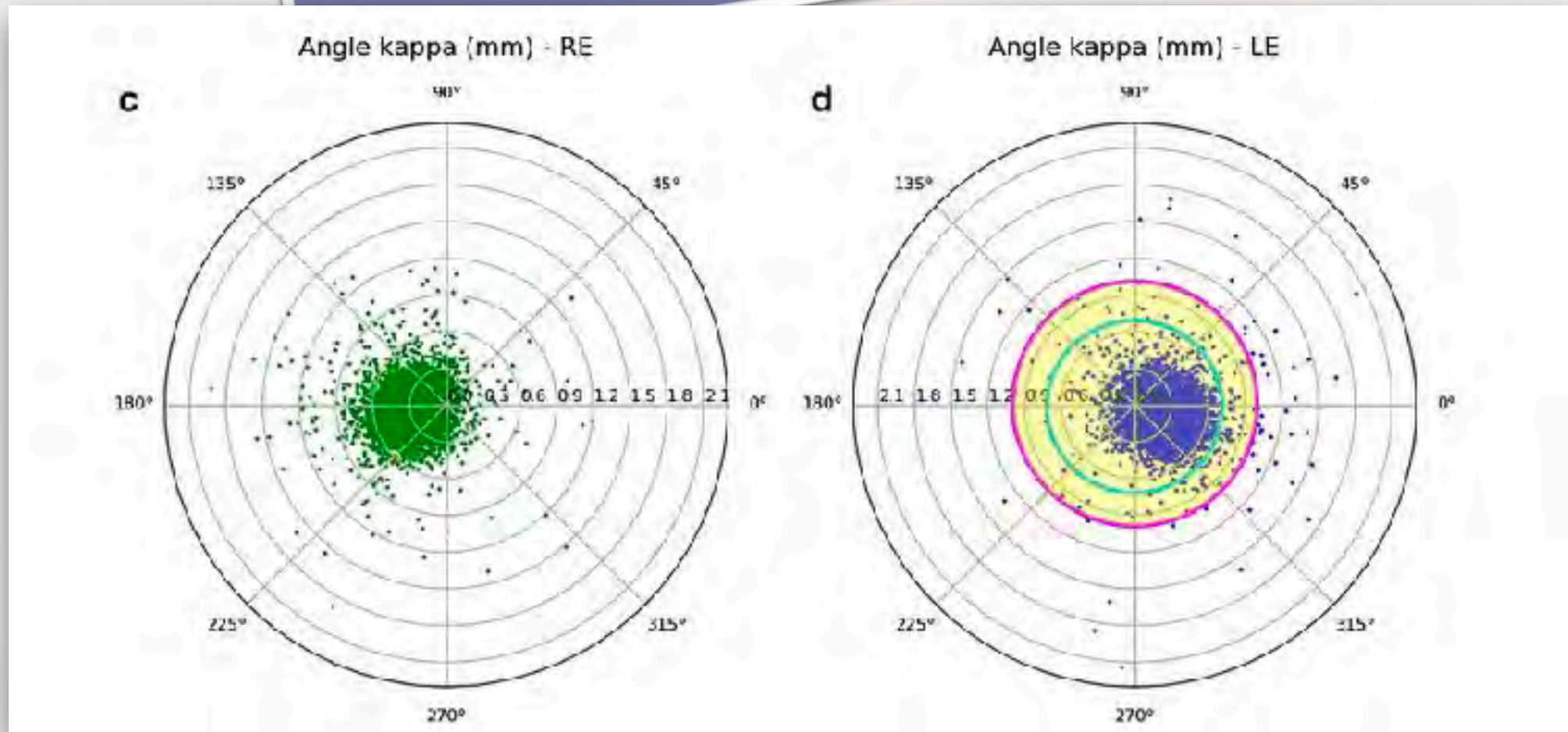


Pupil Wars



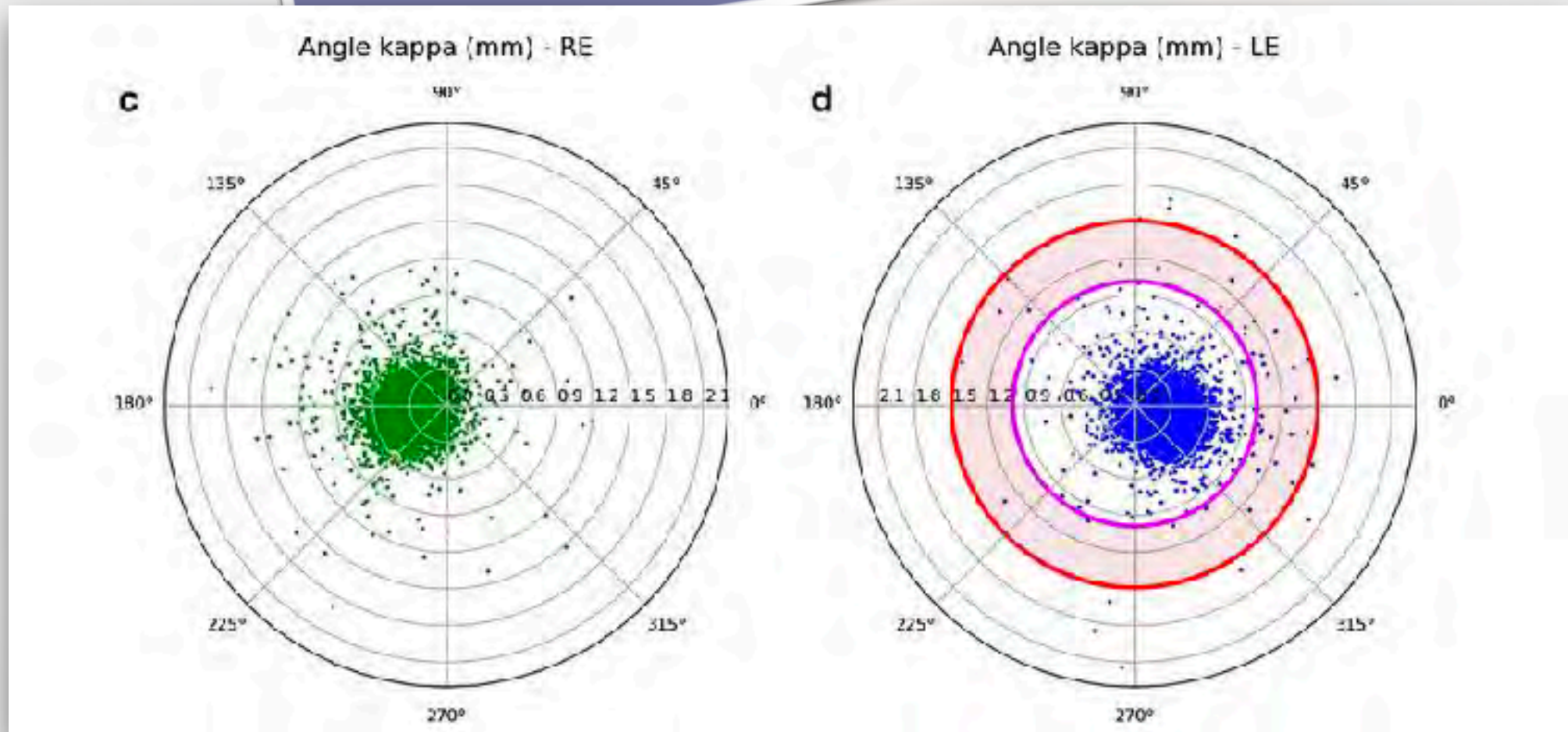
Neuman G, Abulafia A, Wasser L, Zadok D. Distribution of angle alpha and angle kappa offsets among adult candidates for cataract surgery. *Graefes Arch Clin Exp Ophthalmol*. 2025 Jan;263(1):157-170. doi: 10.1007/s00417-024-06596-6. Epub 2024 Aug 6. PMID: 39103696; PMCID: PMC11807017.

Pupil Wars



Neuman G, Abulafia A, Wasser L, Zadok D. Distribution of angle alpha and angle kappa offsets among adult candidates for cataract surgery. *Graefes Arch Clin Exp Ophthalmol*. 2025 Jan;263(1):157-170. doi: 10.1007/s00417-024-06596-6. Epub 2024 Aug 6. PMID: 39103696; PMCID: PMC11807017.

Pupil Wars



Neuman G, Abulafia A, Wasser L, Zadok D. Distribution of angle alpha and angle kappa offsets among adult candidates for cataract surgery. *Graefes Arch Clin Exp Ophthalmol*. 2025 Jan;263(1):157-170. doi: 10.1007/s00417-024-06596-6. Epub 2024 Aug 6. PMID: 39103696; PMCID: PMC11807017.

What?

CL Multifocal failure

So what?

2nd G drop gives halos, vision little improvement

Now what?

Switch to 1st G (Pilo)

Case: Neuro

Neuroadaptation

Changing scenario case: Maria
50 year old female

Using 1st G drop for a few days

Computer vision adequate; near
vision almost there

Wished she could see better

Neuroadaptation

Neuroadaption

“the circuitry that is in place is not sufficient to deal with this new challenge. New circuitry has to be laid down.”

Pat Phillips. New Lens, Same Brain: The Importance of Neuroadaptation EyeNet Magazine July 01, 2007

Neuroadaptation

“neuroadaptation is the process by which the necessary neurocircuitry is put in place”

Pat Phillips. New Lens, Same Brain: The Importance of Neuroadaptation EyeNet Magazine July 01, 2007

Neuroadaption

“the drop clarifies—not magnifies—
images..the brain is quite plastic and able
to interpret new images, it needs time to
adapt.”

Lievens C, McGee S, Micheletti M, Zhang Z, Schachter S. Increased depth of focus from pilocarpine HCl ophthalmic solution 1.25% in mild and moderate presbyopia. Invest Ophthalmol Vis Sci. 2023;64(8):2509.

Holland E, Karpecki P, Fingeret M, et al. Efficacy and safety of CSF-1 (0.4% pilocarpine hydrochloride) in presbyopia: pooled results of the NEAR phase 3 randomized, clinical trials. Clin Ther. 2024;46(2):104-113.

Neuroadaption

“ DOF [Depth of Field] increased until at least day 14, while the reduction in pupil diameter was stable”

Lievens C, McGee S, Micheletti M, Zhang Z, Schachter S. Increased depth of focus from pilocarpine HCl ophthalmic solution 1.25% in mild and moderate presbyopia. Invest Ophthalmol Vis Sci. 2023;64(8):2509.

Holland E, Karpecki P, Fingeret M, et al. Efficacy and safety of CSF-1 (0.4% pilocarpine hydrochloride) in presbyopia: pooled results of the NEAR phase 3 randomized, clinical trials. Clin Ther. 2024;46(2):104-113.

“routine use enables faster neuroadaptation compared with as-needed use”

“Try daily use for the first 7 days, as neuroadaptation and side effects get better with use”

“use the medication once daily for the first 2 weeks”

Lang J. Tips on using Vuity. Presbyopia Physician Mar 2022

Karpecki P, McGee S, Singh RP. Pinning down presbyopia. Review of Optometry Suppl June 30 2025

Lievens C, McGee S, Micheletti M, Zhang Z, Schachter S. Increased depth of focus from pilocarpine HCl ophthalmic solution 1.25% in mild and moderate presbyopia. Invest Ophthalmol Vis Sci. 2023;64(8):2509.

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What?

Vision OK, wishes it was better

So what?

Only using for a few days/intermittent use

Now what?

Use drops every day consistently for 2 weeks

Encourage adherence vs switching too early.

Case: Shift

Myopic shift

Changing scenario case: Maria
50 year old female

-4.00 wearing progressives

Cannot see with glasses (using
1st G drop)

Myopic shift

Iris sphincter v ciliary muscle

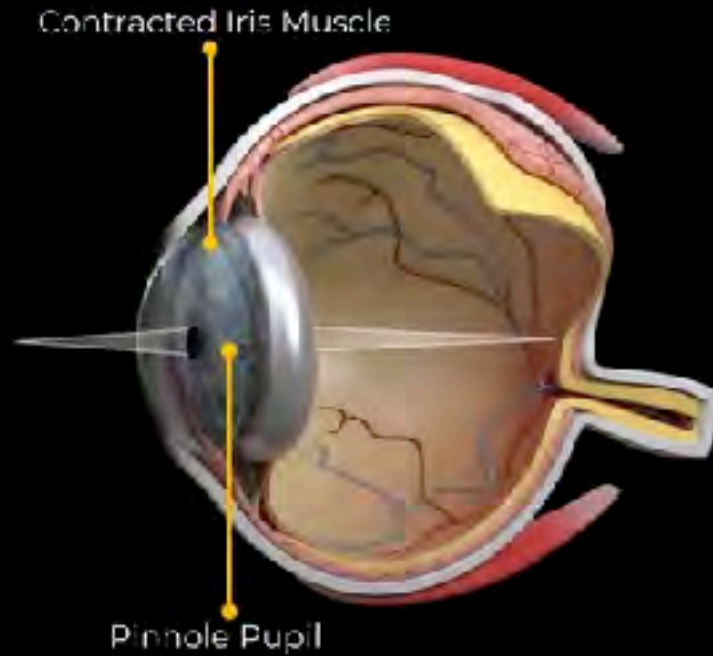
“Previous experiments have shown that short-term pilocarpine treatment can produce transitory myopia”

“pilocarpine induced transitory myopia due to a decrease in the anterior lens radius of curvature”

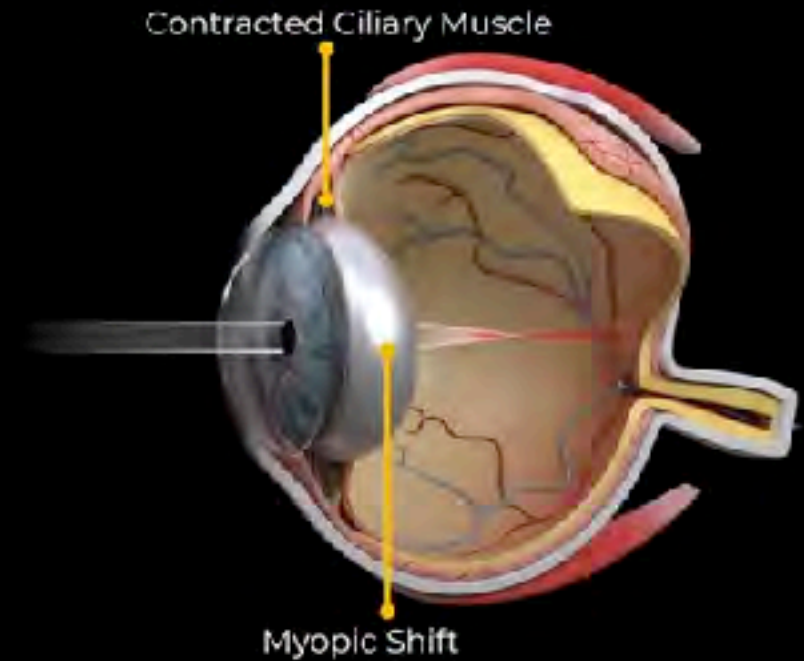
Fang F, Huang F, Xie R, Li C, Liu Y, Zhu Y, Qu J & Zhou X. Effects of muscarinic receptor modulators on ocular biometry of guinea pigs. *Ophthalmic Physiol Opt* 2015; 35: 60–69. doi: 10.1111/opo.12166

Xie Y, Wang M, Cong Y, Cheng M, Wang S, Wang G. The pilocarpine-induced ciliary body contraction affects the elastic modulus and collagen of cornea and sclera in early development. *Biomed Pharmacother*. 2018 Dec;108:1816-1824. doi: 10.1016/j.biopha.2018.10.032. Epub 2018 Oct 17. PMID: 30372887.

Create a pinhole pupil



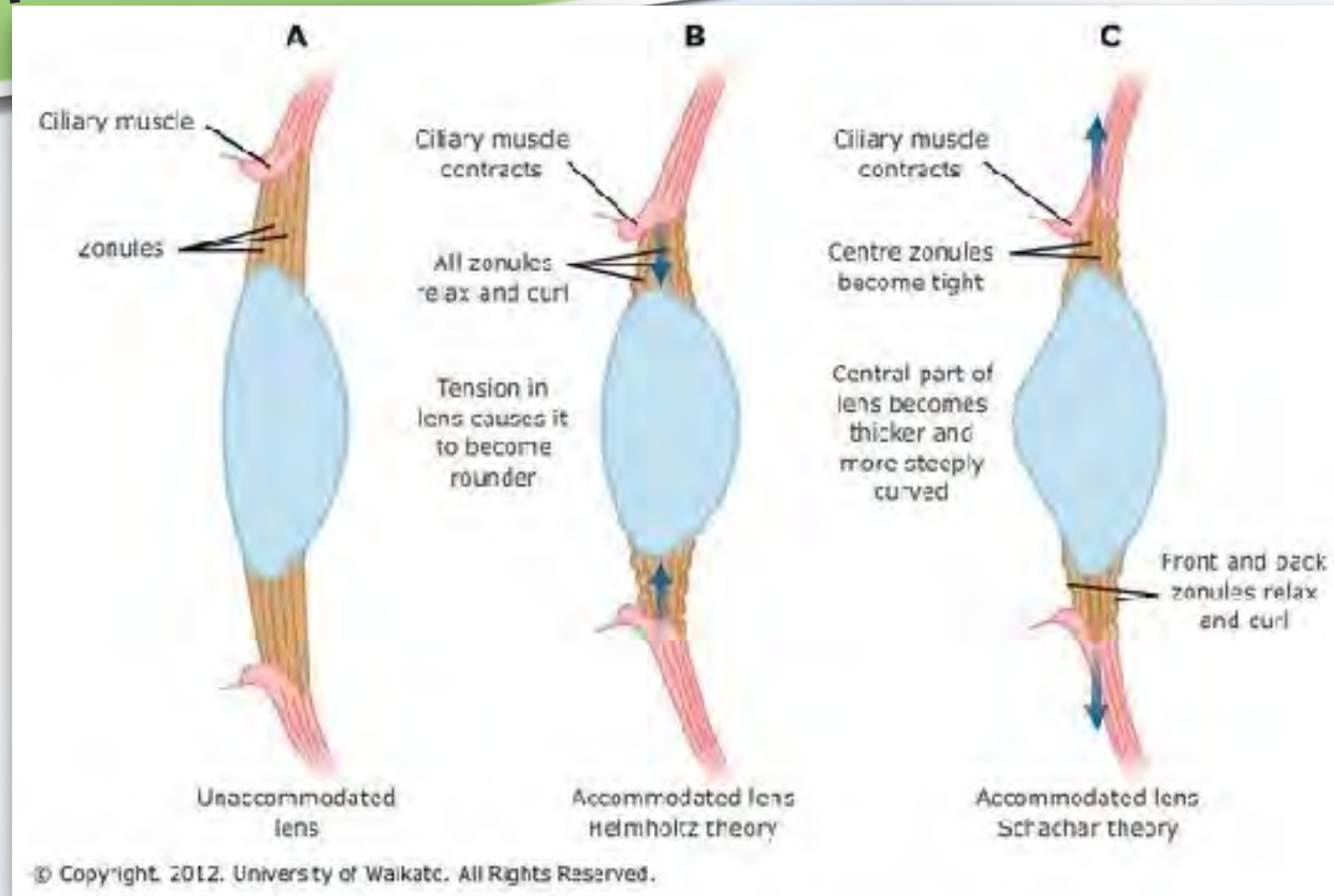
While avoiding a myopic shift



“Lens curvature $\uparrow \rightarrow$ temporary myopia”

Eiden SB. Oldrich M. Differentiating Miotics for Pharmacological Management of Presbyopia. Presbyopia physician Sept 2023 Vol 3:12-14

Iris sphincter v ciliary muscle



How the eye focuses light Science Learning Hub – Pokapū Akoranga
Pūtaiao, University of Waikato, www.sciencelearn.org.nz April 18 2012.

| Company | Drug | Brand | Approved | Mechanism of Action |
|-----------------|-------------------------------------|-----------|----------|--------------------------------------------------------|
| Allergan/AbbVie | Pilocarpine 1.25% BID | Vuity | Yes | Iris sphincter+Ciliary muscle |
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| Lenz | Aceclidine 1.75% | Vizz | Yes | Selective Iris sphincter+Ciliary muscle |
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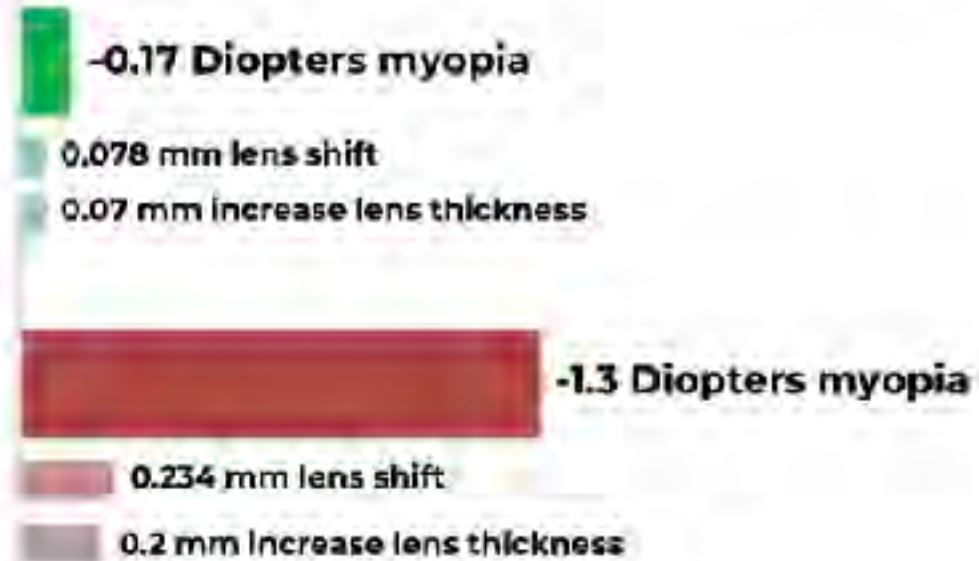
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Myopic shift

2% Aceclidine

2% Pilocarpine

Corresponding ciliary stimulation



François J, Goes F. Ultrasonographic study of the effect of different miotics on the eye components. *Ophthalmologica*. 1977;175(6):328-38.

Eiden SB. Oldrich M. Differentiating Miotics for Pharmacological Management of Presbyopia. *Presbyopia physician* Sept 2023 Vol 3:12-14

Myopic shift

-4.00

Pilocarpine, carbachol:

Needs glasses; must be new

Cannot see with old glasses

Aceclidine:

You can still use your old glasses

What?

-4.00 myope Cannot see with glasses

So what?

Using 1st G drop (myopic shift)

Now what?

Switch to aceclidine
(no myopic shift)

Case: Shift 2

Myopic shift

Changing scenario case: Maria
50 year old female
+1.50 wearing progressives
2nd G drop still requires glasses

Myopic shift

+1.50

Pilocarpine, carbachol:
No glasses needed

Aceclidine:
Must use glasses

-4 2>1 noMS +1.50 1>2 wantMS

Myopic shift

| Drop | Glasses needed? | |
|---------------------|-----------------|----------------|
| | -4.00 | +1.50 |
| 1st G (Pilo) | Yes (new) | No |
| 2nd G aceclidine | Yes (habitual) | Yes (habitual) |

What?

+1.50 hyperope, has to wear Rx; doesn't want to wear glasses

So what?

Using aceclidine

Now what?

Switch to 1st G (myopic shift)

We want the myopic shift!

Case: Myopia

Myope

Changing scenario case: Maria
50 year old female

-6.00 myope

Family history of retinal
detachment

Retinal exam normal

| Company | Drug | Brand | Approved | Mechanism of Action |
|-----------------|-------------------------------------|-----------|----------|--------------------------------------------------------|
| Allergan/AbbVie | Pilocarpine 1.25% BID | Vuity | Yes | Iris sphincter+Ciliary muscle |
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Retinal detachment

Vuity

3 cases of retinal detachment in 2 patients:

47 year old male

Flashes floaters after 3 days

Retinal detachment and retinal tear both eyes

46 year old male

5 weeks

Retinal detachment and sub retinal fluid into macula

Al-Khersan, Hasenin, Harry W. Flynn Jr, and Justin H. Townsend. "Retinal Detachments Associated with Topical Pilocarpine Use for Presbyopia: Pilocarpine-Associated Retinal Detachments." American Journal of Ophthalmology (2022).

Vuity

2 cases:

60-70 year old pseudophakic males

10 days retinal detachment one eye

High myopia

Lattice degeneration

Prior retinal detachment

Eton, Emily A., et al. "Rhegmatogenous Retinal Detachment Following Initiation of Pilocarpine Hydrochloride Ophthalmic Solution 1.25% for Treatment of Presbyopia." *Retinal Cases and Brief Reports* (2022): 10-1097.

FDA Adverse Events Reporting System (FAERS) Public Dashboard

424 cases in 2022:

Headache (106) 25%

Drug ineffective (99) 23.5%

Retinal detachment (29) 6.84%

Vitreous floaters (29) 6.84%

Vitreous detachment (24) 5.66%

<https://fis.fda.gov/sense/app/95239e26-e0be-42d9-a960-9a5f7f1c25ee/sheet/45beeb74-30ab-46be-8267-5756582633b4/state/analysis>

May 27 - Written By Buck Wimberly

My Vuity Story

This is copy and pasted from original Facebook post on April 12, 2022.
[View the Facebook post.](#) [Copy & Paste](#)



WARNING: The eye patch may look cool, but my Vuity story hasn't been. I was prescribed Vuity drops at an optometry visit where I just had eye exams done. We'd also heard about them on the [TikTok](#). The new drops by Allergan Abbvie are designed to help certain patients not have to use readers or bifocals.



<https://www.myrdstory.com/blog/my-vuity-story>

New Labeling

Vuity

-----WARNINGS AND PRECAUTIONS-----

- Blurred Vision: Patients should be advised not to drive or operate machinery if vision is not clear (e.g., blurred vision). Exercise caution in night driving and other hazardous activities in poor illumination. (5.1)
- Risk of Retinal Detachment: Rare cases of retinal detachment and retinal tear have been reported with miotics, including VUITY. Individuals with pre-existing retinal disease are at increased risk. Therefore, examination of the retina is advised in all patients prior to initiation of therapy. Patients should be advised to seek immediate medical care with sudden onset of flashing lights, floaters, or vision loss. (5.2)
- Iritis: Caution is advised in patients with iritis. (5.3)

Retinal detachment

“Fewer cases were reported to the FDA...
indicating that incidence of RD...
decreased after the package insert
update”

Retinal detachment

“I will not prescribe...for presbyopia to anyone with more than -6.0 D myopia or whose axial length is > 26 mm.”

-Selina McGee

Myope

Changing scenario case: Maria
50 year old female

-6.00 myope

Family history of retinal
detachment

Retinal exam normal

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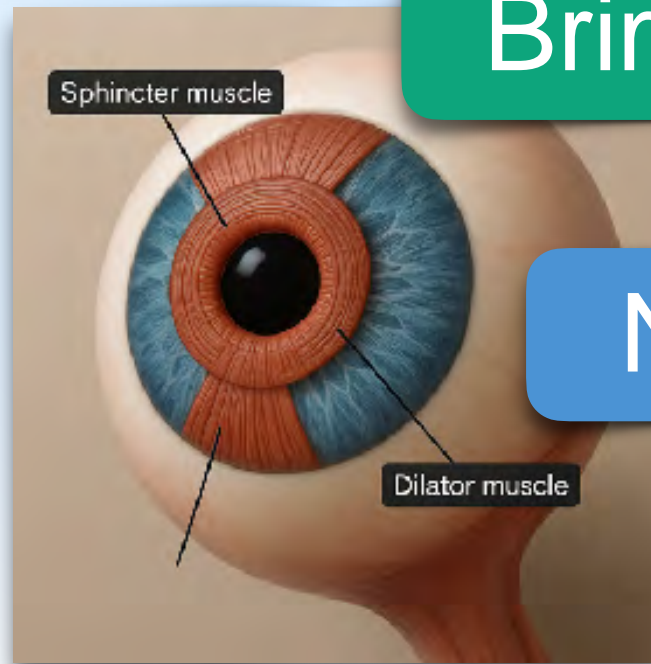
Vizz

Vuity

Qlosi

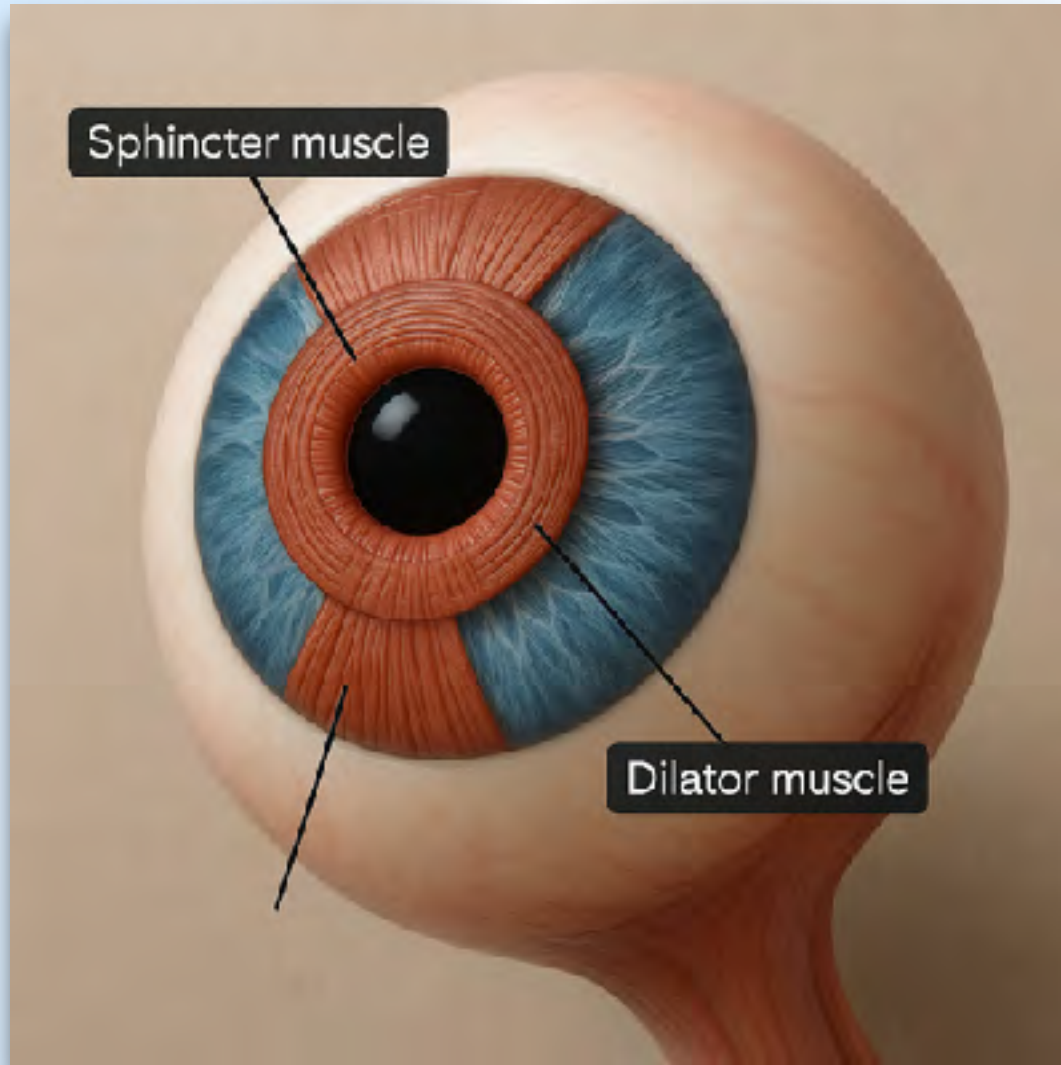
Brimochol

Nyxol



<https://www.youtube.com/watch?v=cgmhs2wJfq>

Pepose JS. Treatment of Presbyopia: One of Several Potential Indications for Nyxol. Presbyopia Physician Dec 2022 Vol 2: 17-20.



Brimochol

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What?

-6.00 myope Family history of RD

So what?

Normal retinas; concerned about risk

Now what?

1st Phentolamine 2nd aceclidine

Case: Tolerability

Tolerability

Changing scenario case: Maria
50 year old female
Likes vision 2nd G drop
Drop uncomfortable

| Company | Drug | Brand | Approved | Mechanism of Action |
|-----------------|-------------------------------------|-----------|----------|--------------------------------------------------------|
| Allergan/AbbVie | Pilocarpine 1.25% BID | Vuity | Yes | Iris sphincter+Ciliary muscle |
| Orasis | Pilocarpine 0.4% BID | Qlosi | Yes | Iris sphincter+Ciliary muscle |
| Lenz | Aceclidine 1.75% | Vizz | Yes | Selective Iris sphincter+Ciliary muscle |
| Tenpoint | Brimonidine 0.1% Carbachol 2.75% | Brimochol | No | Iris sphincter+Ciliary muscle+ Blocks dilator |
| Viatriis | Phentolamine 0.75% | Nyxol (?) | No | Blocks dilator |

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| Company | Drug | Instillation Pain |
|-----------------|--------------------------|----------------------|
| Allergan/AbbVie | Pilocarpine 1.25% qD | 1-5% |
| Orasis | Pilocarpine 0.4% BID | 5.0% |
| Lenz | Aceclidine | 20.1% |
| Tenpoint | Brimonidine Carbechol | 14% |
| Viatriis | Phentolamine | ? |

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Vuity

“pHast” technology: pH 4.5 bottle pH 7.0 in eye

Qlosi

Inactive Ingredients:

Hydropropylmethylcellulose (HPMC)

Sodium hyaluronate (HA)

What?

Loves vision; but uncomfortable

So what?

Using 2nd G drop

Now what?

Switch to 1st G

Tip sheet

- 🕒 Time matters: effect at 15 min, best at 2 weeks;
1st G Not long enough? try BID or 2nd G
- 🕶 Intermediate matters: Use the +1.25 rule, works for intermediate minimum; commonly sees up to +2.00 to +2.50
- 👁 Pupil matters: Pupil too small: dimming;
too large: reduced near effect.
- ⚡ Side effects: mild headaches, mostly mild;
goes away after a few minutes
- ❤ Lifestyle: weekend “date drug” or daily use-customize to patient

thank you!

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eyemage@mminternet.com