

# 干眼与抑郁症的相关性研究进展

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## 摘要

干眼是一种由多因素引起的慢性眼表疾病, 其特征为泪膜稳态失衡和眼部不适症状。近年来, 大量研究发现干眼与抑郁症之间存在显著的双向关联: 干眼患者中抑郁症的发生率明显升高, 而抑郁症患者也更易罹患干眼。两者可能通过炎症反应、脑功能异常、肠道菌群失调及睡眠障碍等多重途径相互影响, 形成恶性循环。此外, 不同类型的抗抑郁药物对干眼具有差异性影响, 既可能改善, 也可能因抗胆碱能作用加重干眼症状, 其作用机制尚需进一步研究。文章系统综述了干眼与抑郁症的流行病学关联、潜在共同发病机制及现有治疗策略, 提出通过中药、电针、运动疗法、抗抑郁药物与常规干眼治疗的综合干预模式, 有望在多层面改善干眼合并抑郁症患者的症状与生活质量。未来研究应聚焦机制性探索与临床转化, 为两种疾病的精准联合治疗提供理论依据和实践指导。

关键词: 干眼; 抑郁症; 抗抑郁药; 脑功能异常; 肠道菌群; 治疗

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## Research progress on the correlation of dry eye with depression

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## Abstract

Dry eye disease is a chronic ocular surface disorder of multifactorial origin, characterized by a loss of tear film homeostasis and associated with a range of ocular discomfort symptoms. Growing evidence underscores a significant bidirectional relationship between dry eye and

depression: individuals with dry eye disease exhibit a higher prevalence of depressive disorders, and conversely, those diagnosed with depression demonstrate an increased susceptibility to developing dry eye. This interplay is mediated through several pathophysiological pathways, such as chronic inflammation, cerebral functional alterations, gut microbiome dysregulation, and sleep disturbances, which may collectively sustain a vicious cycle. The use of antidepressant therapy introduces further complexity, exerting heterogeneous effects on dry eye—some agents may offer symptomatic relief, whereas others can aggravate ocular surface impairment. The mechanisms responsible for these differential outcomes remain incompletely elucidated and merit further investigation. This review systematically consolidates epidemiological data on the dry eye-depression link, examines potential shared pathological mechanisms, and evaluates current therapeutic options. We propose an integrated management approach that combines conventional dry eye treatments, such as traditional Chinese medicine, electroacupuncture, physical activity and antidepressants—a multimodal strategy that may yield synergistic benefits in alleviating both ocular and affective symptoms, thereby improving overall quality of life. Moving forward, research should focus on deciphering the underlying mechanistic pathways and facilitating the translation of these insights into clinical practice to inform targeted, combined treatment regimens for patients with dry eye and depression.

• KEYWORDS: dry eye; depression; antidepressant; cerebral dysfunction; gut microbiota; therapy

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## 0 引言

干眼是一种多因素的、有症状的疾病, 其特征是泪膜和/或眼表的稳态丧失, 其中泪膜不稳定和高渗性, 眼表炎症和损伤以及神经感觉异常是病因, 常表现为眼部干涩、灼热感和视力模糊等症状, 对患者的视觉功能和生活质量造成显著影响<sup>[1]</sup>。随着环境污染加剧、人口老龄化和电子屏幕使用的普及, 干眼的发病率逐年上升, 全球患病率达 5%~50%, 已成为威胁公共健康的重要疾病<sup>[2]</sup>。研究表明, 干眼不仅导致视觉功能受损, 还对患者的心理健康造成显著的负面影响<sup>[3]</sup>。

抑郁症是一种常见的精神障碍, 主要表现为情绪低落、兴趣丧失和认知功能障碍, 对个体和社会健康构成了极大负担<sup>[4]</sup>。据报道, 患有抑郁症的眼科患者面临显著更

高的经济负担,其年度增量支出为5 894.86美元,在全美范围内推算每年额外增加224亿美元<sup>[5]</sup>。近年来,越来越多的研究表明,干眼与抑郁症之间存在显著的双向关联。干眼患者中抑郁症的患病率显著高于普通人群,而抑郁症患者由于脑功能障碍及炎症反应等原因,亦更易出现干眼症状。

尽管干眼与抑郁症的相关性已引起学术界的广泛关注,但目前的研究主要集中于临床观察,其潜在的双向机制仍未被完全揭示。此外,针对干眼与抑郁症共病患者的优化治疗策略尚处于探索阶段。因此,系统总结干眼与抑郁症之间的流行病学证据、潜在发病机制及治疗策略,对于完善相关疾病管理、提高患者生活质量具有重要意义。本文将围绕干眼与抑郁症的流行病学关联、共同的发病机制及其可能的治疗方法展开综述,以期为未来的研究和临床实践提供新的思路与方向。

## 1 流行病学关联

近年来,干眼与抑郁症的相关性已引起广泛关注。多项研究表明,干眼患者抑郁症症状的发生率显著高于普通人群,且两者之间存在显著的临床相关性<sup>[6]</sup>。Zheng等<sup>[7]</sup>对28项研究进行汇总分析,结果显示眼科疾病的总体抑郁症患病率为25%,其中干眼患者的抑郁症患病率最高,达到29%。一项基于“全美研究计划”的大规模研究显示,干眼患者的抑郁症患病风险显著增加,其患病率高达31.6%,是无干眼患者的3倍以上,且这一关联在黑人群体中尤为突出<sup>[8]</sup>。干眼患者的抑郁评分也高于对照组,并且几项研究发现,干眼与抑郁症的严重程度相关<sup>[9-10]</sup>,其中重度干眼患者的抑郁症状更为常见<sup>[11]</sup>。

反之,抑郁症患者的干眼患病率也显著增高,抑郁症患者可能患中度至重度干眼<sup>[12]</sup>。Lee等<sup>[13]</sup>通过回顾性病例对照研究发现,抑郁症患者的干眼患病率显著高于对照组(21.90% vs 12.76%)。Ulusoy等<sup>[14]</sup>对新诊断的抑郁症患者进行了调查,发现即便排除抗抑郁药物的影响,这一结论依然成立。值得注意的是,有些研究指出,抑郁症与干眼的主观症状相关,而与客观体征无关<sup>[15]</sup>,即干眼患者中伴有视力模糊和眼痛等主观症状的个体更容易罹患抑郁症,而仅出现为角膜染色、泪膜破裂时间缩短或Schirmer试验等异常的患者,与抑郁症之间未发现显著关联<sup>[16]</sup>。因此,在评估干眼患者是否伴随抑郁症时,应更加注重患者的主观眼部症状,而不仅仅依赖于客观检查结果。

这些发现表明,干眼和抑郁症之间存在双向因果关联<sup>[17]</sup>:干眼增加抑郁症的风险,而抑郁症亦可促进干眼的

发生或加重,两者相互影响,形成恶性循环。因此,在治疗干眼或抑郁症患者时,应将两者视为共病进行综合管理。

## 2 抗抑郁药对干眼的影响

随着抑郁症患病率的不断上升,抗抑郁药物的使用频率也呈现持续增长的趋势<sup>[18]</sup>。三环类抗抑郁药(tricyclic antidepressants, TCAs)、选择性5-羟色胺再摄取抑制剂(selective serotonin reuptake inhibitors, SSRIs)以及选择性5-羟色胺和去甲肾上腺素再摄取抑制剂(serotonin and norepinephrine reuptake inhibitors, SNRIs)是治疗抑郁症患者的常用药物。研究证实抑郁症与抗抑郁药使用均独立关联于干眼发病风险<sup>[19]</sup>,且抗抑郁药物对干眼的作用机制是复杂多方面的。

在服用抗抑郁药物的患者中观察到的最早和最突出的副作用是眼睛干涩<sup>[20]</sup>。动物实验显示,SSRIs可通过增加泪液中5-羟色胺水平,激活NF-κB信号通路,引发角膜上皮细胞炎症和细胞凋亡,从而破坏眼表屏障功能并加重干眼<sup>[21]</sup>。有研究指出,氯米帕明(TCAs)显著抑制了大鼠反射性和胆碱能诱导的泪液分泌,而艾司西酞普兰(SSRIs)仅对反射性泪液分泌产生抑制作用,提示不同类型的抗抑郁药影响干眼的机制不同。进一步的临床研究发现,TCAs使用者的干眼发生率较高,而SSRIs和SNRIs对眼表的影响较小<sup>[22-23]</sup>。在SNRIs中,度洛西汀对泪液参数的影响最为显著<sup>[24]</sup>。

然而,部分研究发现某些抗抑郁药可能对干眼症状具有改善作用。例如,去甲替林(TCAs)能够有效缓解神经性角膜疼痛患者的症状,尤其是那些对其他治疗方法耐受性差或效果不佳的患者<sup>[25]</sup>。阿米替林(TCAs)通过抑制豚鼠角膜冷热感受器活性,减轻干眼患者的冷敏感和不适感<sup>[26]</sup>。此外,SNRIs在治疗慢性眼痛方面有一定疗效<sup>[27]</sup>,其对眼表的损伤较SSRIs轻微,并通过激活MAPK信号通路减轻炎症反应,可能是治疗抑郁症相关干眼的更优选择<sup>[28]</sup>。基于这些研究结果得出,抗抑郁药在改善抑郁症症状方面的积极作用是超过其对干眼的潜在副作用。抗抑郁药对干眼影响结果的不一致,可能与不同类别抗抑郁药的作用机制差异及剂量使用不同有关,见表1。因此,对于抗抑郁药对干眼的作用尚需进一步研究,为患者的个性化用药提供更科学的指导。

## 3 干眼与抑郁症的共病机制

目前,抑郁症与干眼的发病机制尚未完全明确,普遍认为是多因素共同作用的结果。可能涉及的机制包括炎症因子的调节异常、脑功能异常、肠道菌群失调以及睡眠障碍等多方面因素。

表1 不同抗抑郁药对干眼的影响

年份	抗抑郁药类别	研究发现
2019	SSRIs	帕罗西汀通过升高泪液5-羟色胺激活NF-κB通路加重抑郁大鼠相关干眼 <sup>[21]</sup>
2021	TCAs和SSRIs	TCAs(氯米帕明)抑制了大鼠反射性和胆碱能诱导的泪液分泌,SSRIs(艾司西酞普兰)仅对反射性泪液分泌产生抑制作用 <sup>[22]</sup>
2022	TCAs,SSRIs和SNRIs	TCAs(阿米替林)使用者的干眼发生率较高,而SSRIs和SNRIs对眼表的影响较小 <sup>[23]</sup>
2021	SSRIs和SNRIs	在SNRIs中,度洛西汀对泪液参数的影响最为显著 <sup>[24]</sup>
2020	TCAs	去甲替林能够有效缓解神经性角膜疼痛患者的症状 <sup>[25]</sup>
2018	TCAs	阿米替林通过抑制豚鼠角膜冷热感受器活性,减轻干眼患者的冷敏感和不适感 <sup>[26]</sup>
2024	SNRIs	SNRIs对干眼患者的慢性眼痛有一定疗效 <sup>[27]</sup>
2023	SSRIs和SNRIs	SNRIs(度洛西汀)对大鼠眼表的损伤较SSRIs(帕罗西汀)轻,度洛西汀通过升 <sup>[28]</sup>

注:TCAs为三环类抗抑郁药;SSRIs为选择性5-羟色胺再摄取抑制剂;SNRIs为选择性5-羟色胺去甲肾上腺素再摄取抑制剂。

**3.1 炎症因子** 炎症反应是干眼和抑郁症的共同发病机制之一。有研究指出,抑郁症患者的泪液中促炎细胞因子(如 IL-17、TNF- $\alpha$ )水平显著升高,且与干眼的严重程度密切相关,这表明炎症因子可能在两种疾病的发生和发展中发挥关键作用<sup>[29]</sup>。此外,未接受治疗的抑郁症患者显示出基线炎症水平显著升高(如 TNF- $\alpha$  和 IL-6),进一步排除了抗抑郁药物对炎症的干扰作用<sup>[30]</sup>。动物实验同样支持了这一观点。例如,慢性不可预知温和刺激(CUMS)抑郁模型大鼠的泪液和角膜组织中 IL-1 $\beta$  及 TNF- $\alpha$  表达显著增加,同时泪液分泌减少,说明抑郁症通过加重眼表炎症引起干眼症状<sup>[21]</sup>。

干眼还可能通过神经炎症反应影响特定脑区功能,从而加重抑郁症的进展。例如,Xu 等研究发现在眶外泪腺切除的干眼小鼠模型中,岛叶皮层的促炎因子(IL-6、IL-1 $\beta$  和 TNF- $\alpha$ )水平显著升高,这不仅加重了角膜超敏反应和疼痛感,还引发焦虑样行为<sup>[30]</sup>。Zhou 等<sup>[31]</sup>发现激活  $\alpha$ 7nAChR 可通过下调 CD86 $^+$  M1 型巨噬细胞比例,从而减轻干眼小鼠的神经炎症反应。此外,干眼还能增加三叉神经脑干感觉复合体(trigeminal brainstem sensory complex, TBSC)中的促炎标志物水平,从而导致角膜机械异常性疼痛<sup>[32]</sup>。由于慢性疼痛与抑郁症的发生存在显著关联,这提示干眼引发的疼痛可能是诱发抑郁的重要途径之一。因此,干眼可能通过引发岛叶皮层和 TBSC 相关脑区的神经炎症反应,进一步加重抑郁症的进展。

**3.2 脑功能障碍** 近年来,越来越多的证据表明,脑功能障碍在干眼和抑郁症之间的相互作用中起着关键作用。干眼不仅限于眼表的病理改变,还对特定脑区的功能产生影响。例如,Yu 等<sup>[33]</sup>利用静息态功能磁共振成像技术(functional magnetic resonance imaging, fMRI)发现,干眼患者在额中回、额下回和额上回的区域一致性(regional homogeneity, ReHo)值显著降低,其中右侧额中回和右侧额中回/额下回与抑郁评分显著相关<sup>[34]</sup>。这些脑区与情绪调节和认知功能密切相关,提示干眼可能通过影响这些脑区的功能活动,加重抑郁症状。此外,Kaido 等<sup>[35]</sup>通过脑电图(EEG)检测发现,干眼患者的额叶脑区存在功能异常;Ono 等<sup>[36]</sup>利用功能性近红外光谱(fNIRS)进一步证实,干眼患者的主观症状评分与前额叶皮层活动显著相关。同时,抑郁症的发生与前额叶皮层的功能变化存在密切联系<sup>[37]</sup>,表明前额叶皮层可能是干眼患者出现抑郁症状的关键脑区。

另一方面,抑郁症导致相关的脑区功能障碍可能加重干眼症状。研究显示,抑郁患者海马<sup>[38]</sup>、岛叶<sup>[39]</sup>和枕叶<sup>[40]</sup>以及额叶皮层<sup>[41]</sup>均存在结构或功能的改变。Xie 等<sup>[38]</sup>利用机器学习辅助的 MALDI-MSI 技术分析了抑郁症相关干眼模型中海马脑区的代谢变化,结果发现该模型中 CDP-乙醇胺水平下降,而磷脂酰肌醇、三磷酸鸟苷(GTP)及二十碳二烯酸显著升高。这些代谢特征的改变可能为识别抑郁症相关干眼患者的潜在生物标志物提供线索。Xu 等<sup>[30]</sup>利用 fMRI 技术发现,干眼患者岛叶皮层的功能活动变化与眼痛症状显著相关。此外,Liang 等<sup>[34]</sup>发现左侧距状沟的功能变化与干眼患者的视力模糊密切相关。距状沟位于大脑半球内侧的枕叶区域,是初级视觉皮层的核心部分,主要负责视觉信息的处理。这提示抑郁

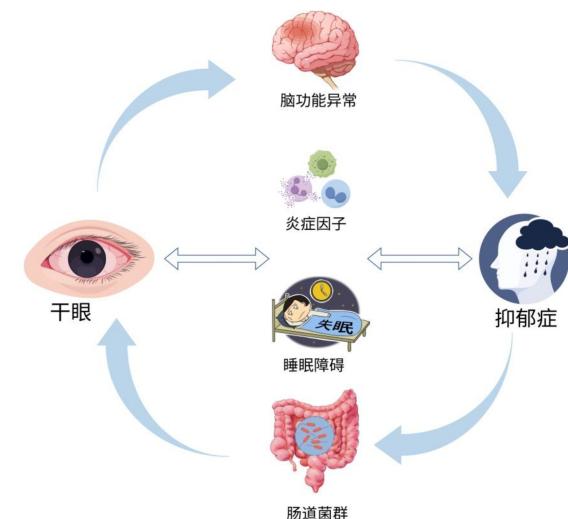


图 1 干眼与抑郁症的共病机制(本图由 Figdraw 绘制)。

症患者可能通过影响左侧距状沟的功能,加重干眼的视力模糊症状。综上所述,干眼可能通过影响前额叶皮层的活动加剧抑郁情绪,而抑郁症则可通过改变岛叶皮层和距状沟脑区功能,加重干眼的视力模糊和眼痛症状。此外,为明确干眼与抑郁症是否存在共病,可利用无创成像技术(如 fMRI、fNIRS 和 EEG)检测特定脑区的功能变化,从而提供更精准的诊断依据。

**3.3 肠道菌群** 人类肠道微生物群的细菌门,主要包括厚壁菌门、拟杆菌门、梭杆菌门、放线杆菌门和变形杆菌门等,其中厚壁菌门和拟杆菌门占肠道菌群的 90%<sup>[42]</sup>。研究表明,肠道菌群的失衡可能通过“肠-眼轴”<sup>[43-44]</sup>和“肠-脑轴”<sup>[45]</sup>影响干眼症状和抑郁情绪的发生和加重。干眼患者中,拟杆菌门和厚壁菌门的组成发生显著变化,其中拟杆菌门增加而厚壁菌门减少<sup>[46-47]</sup>。Moon 等<sup>[47]</sup>研究指出,肠道菌群失调与干眼严重程度显著相关,其中角膜染色评分与拟杆菌门呈显著正相关,而与双歧杆菌呈负相关。这提示增加肠道内拟杆菌门数量增加可能加重干眼症状。Yoon 等<sup>[48]</sup>发现衰老小鼠的肠道菌群失调与干眼严重程度显著相关,特定微生物类群(如变形菌门和拟杆菌属)的丰度变化与角膜染色评分增加或泪液分泌减少有关,这些研究提示,调节肠道菌群可能成为治疗年龄相关干眼症的新策略。此外,Yun 等<sup>[49]</sup>发现给予干眼小鼠口服抗炎益生菌(如植物乳杆菌和两歧双歧杆菌)能够调节眼表炎症及肠道微生物群的组成比例,从而缓解干眼症状。另有研究发现,将健康小鼠的粪便微生物群移植至无菌小鼠后,可改善其干眼症状<sup>[50]</sup>。

同时,抑郁症的发生与肠道菌群失调密切相关,表现为抗炎细菌的减少与促炎细菌的增多<sup>[51-52]</sup>。例如,Liu 等<sup>[53]</sup>研究发现炎症性抑郁症患者肠道菌群中促炎菌科和拟杆菌属的相对丰度显著升高,而抗炎菌(如梭菌科和梭状芽孢杆菌)的相对丰度降低。这种失衡导致肠黏膜炎症因子水平及通透性升高,进一步激活中枢神经系统的神经炎症,从而加剧抑郁症的发生和发展。此外,拟杆菌属的丰度在中度和重度抑郁症患者中显著增加<sup>[54]</sup>,而其增加也与干眼症状的加重密切相关。这提示肠道中拟杆菌属数量的增加可能是干眼与抑郁症的共同危险因素。目前,通过移植健康人肠道微生物或口服益生菌已成为抑郁

症患者常用的辅助治疗方法<sup>[55-56]</sup>。因此,针对菌群失调这一干眼合并抑郁症的重要共同发病机制,口服益生菌制剂或实施粪菌移植可作为该类患者的潜在治疗策略。

**3.4 睡眠障碍** 干眼与抑郁症之间存在显著关联,主观睡眠质量和睡眠潜伏期在二者关系中起到重要的中介作用<sup>[57]</sup>,提示睡眠障碍可能在干眼与抑郁症的相互影响中起关键作用。研究表明,干眼的严重程度与失眠的严重程度呈正相关<sup>[58]</sup>,尤其是高眼痛干眼患者的失眠严重程度指数 (insomnia severity index, ISI) 更高。干眼患者更容易经历主观睡眠质量差、睡眠时间缩短和睡眠潜伏期延长<sup>[59]</sup>,睡眠障碍被认为是抑郁症的重要危险因素,提示干眼可能通过影响睡眠质量加重抑郁症状。此外,改善睡眠质量可减轻干眼患者的抑郁症状<sup>[60]</sup>,这从反面支持了干眼通过睡眠障碍加重抑郁症的观点。

现有研究显示,抑郁症患者普遍存在睡眠问题,其中最常见的主观睡眠问题是失眠<sup>[61]</sup>,因此抑郁症可导致显著的睡眠障碍。睡眠剥夺可通过多种机制诱发并加重干眼的发生与发展<sup>[62]</sup>,提示抑郁症通过睡眠障碍途径加重干眼症状。例如,Tang 等<sup>[63]</sup>研究发现睡眠不足通过损害泪液系统功能诱发干眼。此外,睡眠剥夺还能够抑制角膜上皮中 PPAR $\alpha$  的表达,并增加泪膜中的活性氧 (ROS) 水平<sup>[64]</sup>,从而加重干眼症状。上述研究表明,睡眠障碍在干眼与抑郁症之间发挥重要的中介作用:干眼可通过降低睡眠质量加重抑郁症状,而抑郁症则可通过睡眠剥夺进一步加重干眼。改善睡眠质量对干眼和抑郁症患者都具有重要的积极影响。

以上研究表明,炎症因子、脑功能障碍、肠道菌群失调以及睡眠障碍是干眼和抑郁症的共病机制。此外,也有研究发现抑郁症大鼠通过升高泪腺 5-羟色胺加重干眼<sup>[65]</sup>。

#### 4 干眼合并抑郁症的治疗

针对干眼引起的抑郁情绪或抑郁症导致的干眼症状,目前的治疗可从以下几个方面进行探讨,包括中药治疗、干眼疗法、抗抑郁药、电针疗法以及运动疗法:(1)中药治疗:中药在改善抑郁相关干眼方面展现出显著潜力。例如,金合欢素、柴胡皂苷 F 和木犀草素通过阻断炎症通路,能够有效缓解抑郁情绪及其相关的干眼症状<sup>[66-68]</sup>。(2)干眼疗法:干眼的常用治疗方法包括人工泪液、蒸汽热敷和强脉冲激光 (IPL)。Uchino 等<sup>[69]</sup>使用蒸汽热敷眼罩显著改善了眼表健康,并降低了主观抑郁评分。此外,人工泪液<sup>[70]</sup>和强脉冲光 (intense pulsed light, IPL)<sup>[71]</sup>也在缓解干眼相关抑郁症状方面表现出一定效果。(3)抗抑郁药:三环类抗抑郁药去甲替林可显著缓解神经性角膜疼痛患者的症状,尤其适用于对其他治疗手段疗效欠佳或耐受性较差的患者<sup>[25]</sup>。此外,阿米替林能够通过抑制豚鼠角膜冷热感受器的活性,从而减轻干眼患者的冷敏感和不适感<sup>[26]</sup>。同时,研究还发现,5-羟色胺和去甲肾上腺素再摄取抑制剂在慢性眼痛的治疗中亦具有一定的临床疗效<sup>[27]</sup>。(4)电针疗法:除了传统治疗方法,电针疗法是临床广泛认可的抑郁症治疗方法<sup>[72]</sup>,不仅能够有效改善抑郁症状,还能缓解抑郁引起的失眠和干眼症状。例如,Lu 等<sup>[73]</sup>开展一项多中心、随机、假对照试验,纳入 168 例轻、中度干眼患者,电针可以改善干眼症状、泪液分泌和泪膜

稳定性。Wan 等<sup>[74]</sup>发现电针通过 TNF- $\alpha$  介导的 ERK1/2/P2X 减轻了疼痛,并缓解了干眼大鼠的焦虑行为。(5)运动疗法:运动被认为是有效的抑郁症治疗方式,且可作为心理治疗和药物治疗的核心辅助方法<sup>[75-76]</sup>。Nakano 等<sup>[77]</sup>发现跑轮运动有助于从干眼小鼠引起的抑郁状态中恢复,表明适当运动对干眼患者缓解抑郁情绪具有潜在益处。

综上所述,针对干眼合并抑郁症的患者,结合中药治疗、干眼疗法、抗抑郁药、电针疗法以及运动疗法的综合干预策略,能够更全面地改善患者的眼部症状和心理健康,为提高患者的生活质量提供多维度的治疗支持。

#### 5 小结

近年来,干眼与抑郁症的双向关联已成为研究热点。流行病学数据显示,干眼患者中抑郁症的患病率显著升高,而抑郁症患者也更易出现干眼症状,两者相互影响,形成恶性循环。炎症因子、脑功能异常、肠道菌群失调以及睡眠障碍被认为是两者共同的关键病理机制。此外,抗抑郁药对干眼的影响存在争议,主要与药物类别及作用机制有关。传统三环类及部分 SSRIs 药物因抗胆碱能作用易加重干眼,而 SNRIs 类药物则因潜在抗炎及促进角膜修复作用显示出相对优势。临床选择需综合评估药物对眼表的影响,实现精神症状与干眼管理的平衡。尽管近年来干眼与抑郁症的关联及治疗取得了一定进展,但目前干眼与抑郁症研究仍存在局限。(1)干眼患者存在一定的脑功能异常,但尚缺乏针对性研究评估神经调控技术(如经颅磁刺激、经颅直流电刺激和经颅交流电刺激等)在干眼治疗中的效果。(2)抗抑郁药对干眼的影响存在一定争议,不同类型的抗抑郁药可能通过不同机制影响泪液分泌和眼表状态,仍需进一步研究其具体作用机制。(3)干眼与抑郁症的相关性研究主要集中于临床层面,而其潜在的机制研究仍相对匮乏,亟需开展更多基础研究以阐明二者之间的内在联系。总之,干眼与抑郁症是具有共同病理生理基础(如炎症反应、脑功能异常)的共病,二者相互加剧,形成恶性循环。这一认识要求临床诊疗打破学科界限,建立眼科与精神科的协同管理机制。在药物选择上,需兼顾精神症状控制与眼表保护,优先考虑对干眼影响较小的抗抑郁药物。未来治疗方向将聚焦于融合精准医疗理念与多学科协作的个体化方案。

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