

doi: 10.3978/j.issn.1000-4432.2021.03.15

View this article at: <http://dx.doi.org/10.3978/j.issn.1000-4432.2021.03.15>

## 电弧光致双眼角膜烧伤1例

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**[摘要]** 报告1例因电路短路产生电弧光烧伤患者双眼角膜的病例。专科检查:双眼角膜缘颞侧球结膜缺血区小于1/3, 角膜上皮呈白色混浊, 上皮部分脱落。入院给予清除角膜表面白色坏死组织、抗炎、扩瞳对症治疗, 2周后角膜恢复透明, 随访3个月患者晶状体及眼底未见明显异常; 探讨电弧光在眼球不同部位的致病机制。

**[关键词]** 电弧光; 角膜; 烧伤

## A case report of corneal burn caused by arc light

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**Abstract** A case of corneal burn caused by arc light due to electrical short is reported. Specialist examination: ischemic areas of the temporal limbus bulbar conjunctiva in both eyes were less than 1/3, the corneal epithelium was white and cloudy, and the epithelium was partially peeled. The corneas became transparent after 2 weeks' treatment of removing the white necrotic tissue, anti-inflammatory and dilating pupil. During the follow-up within 3 months, the patient's lens and fundus showed no obvious abnormalities. The injury mechanism of arc light caused by electrical short to the eyeball is discussed.

**Keywords** arc light; corneal; burn

电路短路可产生高热、电弧光, 使眼部产生一系列热损伤及光辐射损伤<sup>[1]</sup>。电击伤后引起白内障, 眼底病变多见, 但引起角膜损伤的临床很少报道, 现报告我院收治的1例电弧光致双眼角膜烧伤病例。

### 1 临床资料

患者男, 52岁, 在工作中接通400 V的交流电后, 瞬间产生电弧灼伤患者颜面部及双上肢, 患者与电源接触距离约50 cm; 患者被电弧灼伤0.5 h

收稿日期 (Date of reception): 2021-01-25

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后送入院。体格检查：前额头发及眉毛烧焦，整个颜面部皮肤烧伤，烧伤面积约3%。眼科检查：双目光感，光定位准确，双眼睑皮肤焦黑色，睫毛烧焦，球结膜充血水肿，角膜缘球结膜颞侧缺血区小于1/3，角膜上皮呈白色混浊，上皮部分脱落，隐约透见虹膜纹理，余结构窥不清(图1)。诊断：1)颜面部，双上肢前臂皮肤II度电烧伤(烧伤面积约5%); 2)双眼角膜III度烧伤。

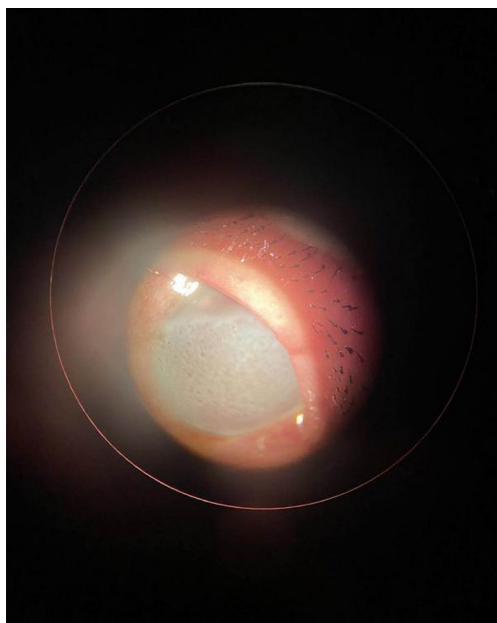


图1 患者烧伤0.5 h后左眼前节照片

Figure 1 Photo of the burned anterior left eye after half an hour

治疗方法：1)入院后给予大量生理盐水冲洗烧伤部位；2)4 h后双眼角膜表面白色坏死组织开始剥脱(图2)，在表面麻醉下予清除干净角膜创面坏死组织；给予患者双眼配戴绷带镜促进角膜修复；妥布霉素地塞米松滴眼液抗炎；美多丽滴眼液充分散瞳、防止炎性粘连；小牛血眼用去蛋白凝胶修复角膜上皮；肝素钠，自制自体血清频滴双眼。

治疗2周后：颜面部皮肤均已修复；眼科检查右眼视力0.6，左眼视力0.5；右眼眼压15mmHg (1 mmHg=0.133 kPa)，左眼14 mmHg；双眼球结膜无充血，角膜透明(图3，4)，前房中深，角膜后沉着

物(-)，晶状体透明，眼底未见明显异常(图5，6)。随访3个月后患者晶状体及眼底未见明显异常。



图2 患者烧伤4 h后左眼前节照片

Figure 2 Photo of the burned anterior left eye after 4 hours

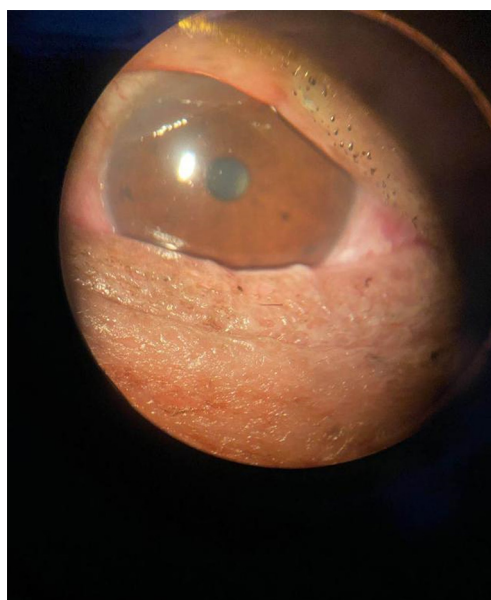


图3 患者治疗2周后左眼前节照片

Figure 3 Photo of the anterior of left eye after 2 weeks treatments

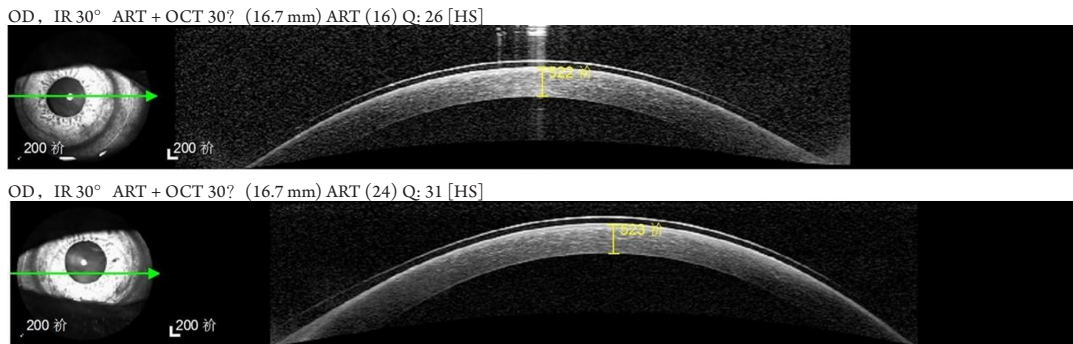


图4 患者烧伤1周后前节OCT  
Figure 4 The anterior OCT after 1 week

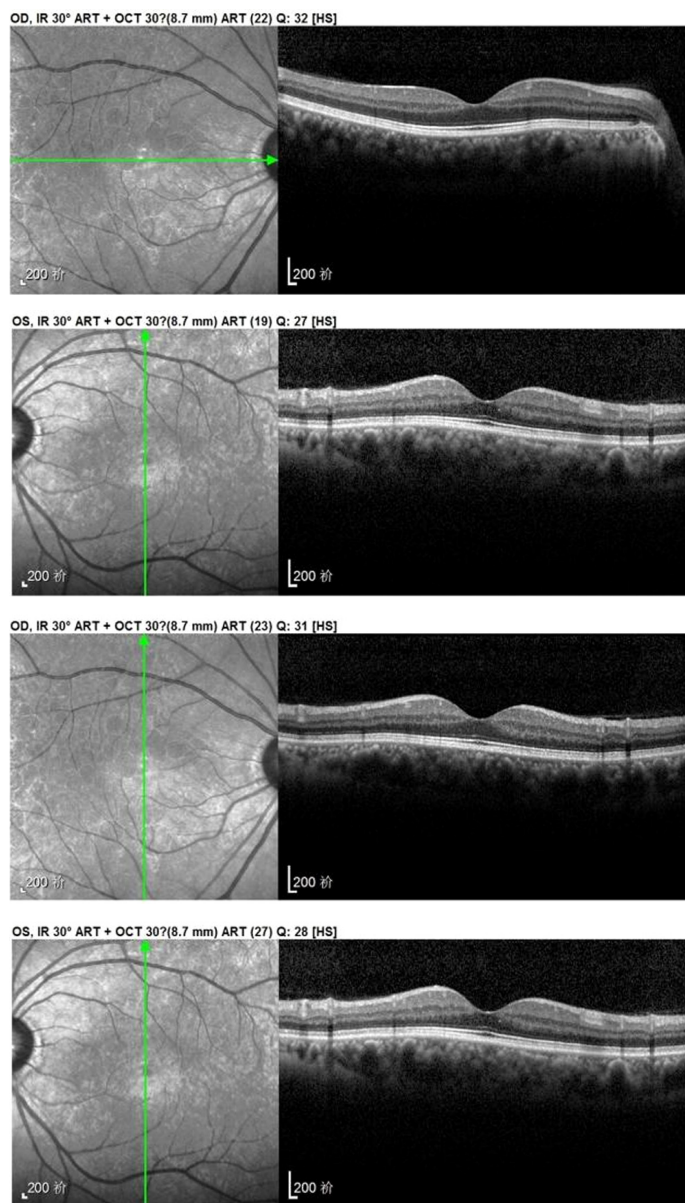


图5 患者烧伤1周后眼底黄斑OCT  
Figure 5 Macular OCT after 1 week

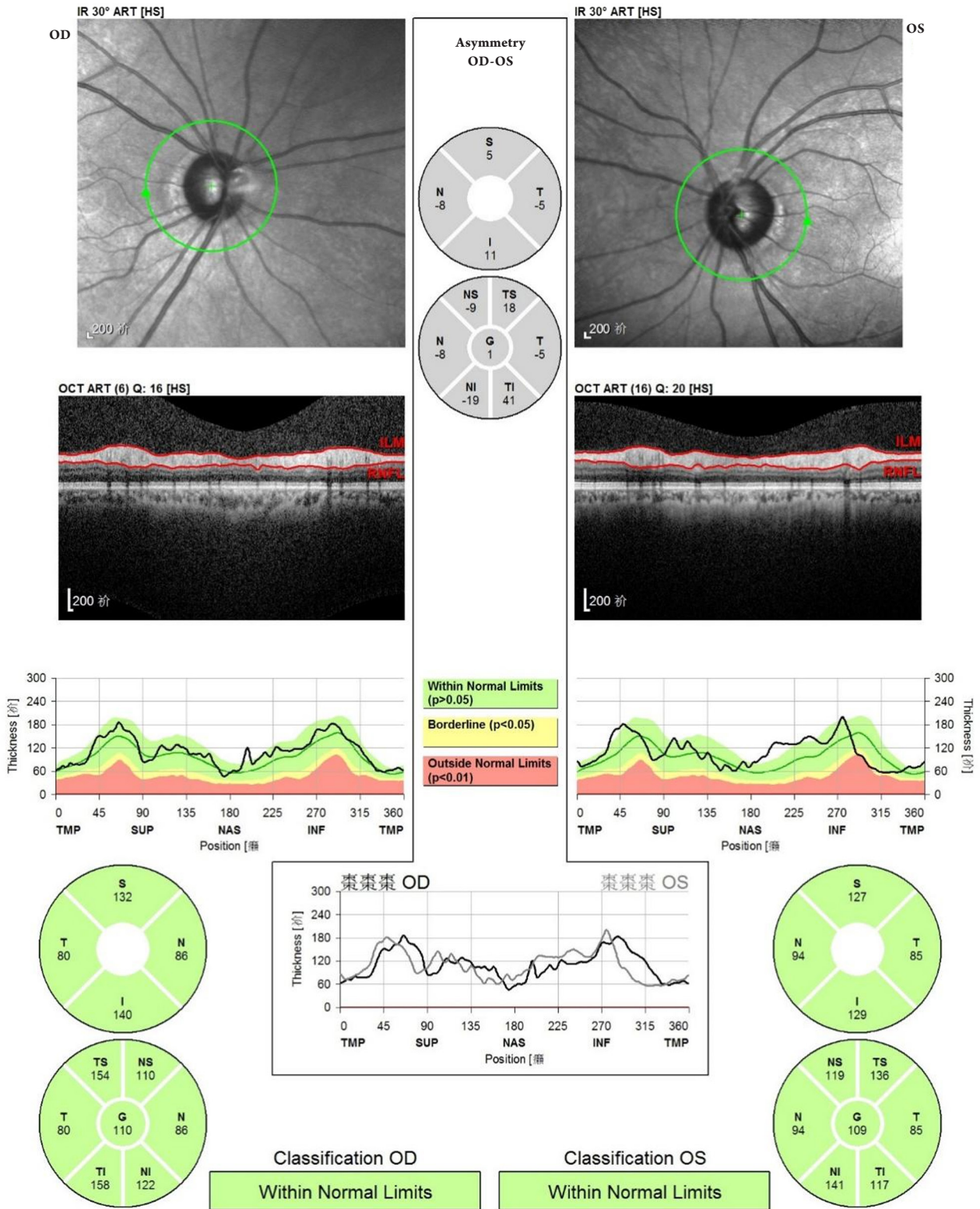


图6 患者烧伤1周后视神经厚度

Figure 6 Photo of the optic nerve thickness after 1 week

## 2 讨论

电流经过人体内的电烧伤, 发生白内障及眼底黄斑区损伤的报道较多<sup>[2-5]</sup>, 蔡用舒等<sup>[6-7]</sup>考虑是电流经过房水到达晶状体前囊时, 电阻较大, 产生较大的热能, 从而破坏晶状体前囊, 发生电击性白内障。前囊下混浊是电击性白内障较常见的病变部位, 可能与上皮细胞变形后产生囊膜皱纹和视轴上形成的纤维斑块有关<sup>[8-10]</sup>。电路短路产生的电弧光中的红外线和可见光通过屈光间质时, 部分被屈光间质吸收, 使视网膜色素上皮吸收大量红外线、可见光后温度增高, 致黄斑部视网膜和脉络膜灼伤<sup>[11]</sup>。邵东平等<sup>[12]</sup>研究发现: 电弧光导致的视网膜损伤主要以黄斑中心凹外层的光感受器细胞的损伤和细胞凋亡为主, 而黄斑区的内层均不受影响。杨效群等<sup>[13]</sup>报道1例被电弧光(35 kV)击伤的患者1周后发现单眼白内障, 未报道角膜有烧伤; 卢嫵等<sup>[14-15]</sup>报道了电弧光致黄斑损伤, 也未报道角膜有烧伤, 考虑晶状体及黄斑区损伤是由于电弧光中的红外线引起晶状体及视网膜损伤。本例患者角膜损伤较重, 但无晶状体及眼底黄斑区的损伤, 可能由于电路短路当时与患者距离较近, 电弧光瞬间产生的高温和电弧光中的紫外线在极短时间内致角膜上皮中的蛋白质变性凝固坏死, 形成一层白色保护膜, 从而阻止了电弧光中的热能及紫外线, 红外线继续进入眼内灼伤晶状体及眼底黄斑区。

本研究认为, 电流短路产生的电弧光损害角膜、晶状体、视网膜、脉络膜, 可能与电路短路当时的电压、电流、患者与电弧光的接触距离、接触时间及患者当时是否注视电弧光等多种因素有关。目前电路短路后产生的电弧光对眼球的损害临床报道较少, 电弧光致病的发生机制尚不明确, 尚需大量动物试验证明。

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本文引用: 张婧. 电弧光致双眼角膜烧伤1例[J]. 眼科学报, 2021, 36(3): 244-249. doi: 10.3978/j.issn.1000-4432.2021.03.15

**Cite this article as:** ZHANG Jing. A case report of corneal burn caused by arc light[J]. Yan Ke Xue Bao, 2021, 36(3): 244-249. doi: 10.3978/j.issn.1000-4432.2021.03.15