Acta Scientific Ophthalmology (ISSN: 2582-3191)

Volume 8 Issue 12 December 2025

Research Article

# Corneal Wounds: State of Play at the Souleymane Center Medical (CMS), In Conakry

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**DOI:** 10.31080/ASOP.2025.08.0876

**Received:** October 17, 2025

**Published:** November 19, 2025



## Abstract

**Objective:** TThe aim of this study was to establish the state of corneal wounds at the Souleymane Medical Center (CMS).

**Methods:** This was a 6-month observational study from September 1, 2024 to February 28, 2025. We included all patients diagnosed with a corneal wound who received medical and/or surgical treatment at the CMS.

**Results:** During the study period, we collected 209 patients affected by corneal disease from all causes, including 170 patients for corneal wounds, representing a hospital frequency of 81.3%. The age group of 21 to 40 years predominated in 32.4% with an average age of 39 ± 12 years and extremes of 2 and 97 years. Male sex predominated in 56.5% with a sex ratio M/F of 1.3. Eye pain was the most common reason for consultation, at 78.8%. Regarding the nature of the traumatic agent, plant agents and iatrogenic causes topped the list with 37.1% and 25.3% cases respectively. Corneal opacity was the most common optical complication in both the right and left eyes, at 42.9% and 44.1% respectively. Antibiotic eye drops, antiseptic eye drops and NSAID eye drops were the most used medical treatment, respectively 71.2%, 51.8%, 47.1%.

**Conclusion:** Corneal wounds are a real public health problem. It is a very common pathology at CMS.

**Keywords:** Wound; Cornea; CMS; Conakry

## Introduction

A corneal wound is defined as a break in the continuity of one of the tissues covering the cornea with or without loss of substance caused by an external mechanical agent or a pathological cause.

The cornea, due to its location on the anterior surface of the eyeball, is in direct contact with the external environment. Therefore, this location predisposes it to several injuries, traumas and stresses that can affect vision. Among these causes are mechanical injuries, chemical injuries and injuries related to eye surgeries [1].

According to the World Health Organization (WHO) [2], corneal opacity is the fourth most common cause of blindness worldwide, behind cataracts, glaucoma and age-related macular degeneration.

In Japan, in 2019, Shimizu E., *et al.* [3] in their study on higher-order corneal aberrations in eyes with corneal scar after traumatic perforation reported that corneal perforation is an unfortunate sequela of trauma, infectious and inflammatory keratitis. Ocular trauma is the leading cause of corneal perforations (accounting for

about 70% of total cases), followed by infectious keratitis (about 25%). Traumatic corneal perforation is caused by accidents, such as falls, sports, and animal bites. Its frequency is remarkably high in younger individuals, and the damage is often severe.

In Guinea, in 2022, Baldé AK., *et al*. [4] in their study on the epidemiological, clinical and therapeutic profile of corneal trauma reported that depending on the type of trauma, it was a corneal perforation in 67.9% of cases, a contusion in 40.6% of cases, an extra-ocular foreign body in 19.3% of cases and a burn in 4.7% of cases.

Thus, given the high frequency of corneal wounds, the difficulties linked to their optimal and effective management, as well as their poor functional prognosis, it seemed useful to us to choose this present work.

### General objective

Establish the inventory of corneal wounds at CMS.

### Specific objectives

- Determine the frequency of corneal injuries.
- Identify the causes of corneal wounds.
- Describe the management of corneal wounds.
- Identify the complications of corneal wounds.

## Methodology

- The Souleymane Medical Center located in the commune of Ratoma in Conakry (Republic of Guinea) served as the setting for this study.
- This is a 6 -month observational study from September 1, 2024 to February 28, 2025.
- The study focused on all patients admitted to the Souleymane Medical Center (CMS) for a corneal wound and meeting our selection criteria.
- All patients received at the CMS with a positive fluorescein test, who received medical and/or surgical care at the center and who agreed to participate in the study were included in the study.

For the sample size, we used the SCHWATZ formula:

$$N = \frac{Z^2 p(1-p)}{d^2}$$

N: is the sample size.
Z: is the coefficient which is equal to 1.96.
p: is the prevalence which is equal to 0.111.
d: is the margin of error at 0.05 or 5%.

### Sample size

$$N = \frac{Z^2 p(1-p)}{d^2}$$

$$N = \frac{(1{,}96)^2(0{,}111)(1-0{,}111)}{(0{,}05)^2}$$

$$N = 151{,}634099$$

Our sample size is: 152
Our study allowed us to have a sample of 170 patients.
The variables covered both quantitative and qualitative data.

## Results

During the study period, we received 3652 patients for consultation; 209 cases of corneal pathologies; 3443 cases for other pathologies and corneal wounds only represented 170 cases, a frequency of 4.7% (190 eyes).

We noted a slight male predominance at 56.5% of cases and only 43.5% of cases for the female sex; with a sex ratio of 1.3.

The age group between 21 and 40 years was the most represented with 55 cases or 32.4%, followed by that between 0 and 20 years with 46 cases (27.1% of cases); then that between 61 and 80 years with 34 cases or 20% and that between 41 and 60 years with 28 cases (16.5% of cases). The average age was 39 ±12 years with extremes between 2 years and 97 years.

According to the socio-professional category, workers were the most represented, with a frequency of 28.2%; pupils and students 20%; housewives 15.9% of cases and bureaucrats 12.4%.

Distribution according to marital status, the majority of patients were married (50.6%), while 40.6% were single and 8.8% were widowed.

**Table I:** Distribution of the 170 patients according to the reasons for consultations.

| Reasons for consultations | Effective | Proportion (%) |
|---|---|---|
| Eye pain | 138 | 81.2 |
| Visual blur | 111 | 65.3 |
| Redness | 101 | 59.4 |
| Watering eyes | 78 | 45.9 |
| Itching | 71 | 41.8 |
| Secretion | 35 | 20.6 |
| Photophobia | 22 | 12.9 |
| Headaches | 16 | 9.4 |
| Feeling of CE | 15 | 8.8 |

In the ophthalmological history, trauma was recorded in 121 cases; corneal infections in 28 cases and eye surgery in 21 cases.

The time to admission was between 1 month and 6 months for 42.4% of patients; more than 6 months for 40.6% of patients and less than 1 month for 17.1% of patients.

The main circumstance of occurrence was work accidents in 35.9% of cases; idiopathic in 28.8% of cases; games and sports in 20.6% of cases; domestic accidents in 8.2% of cases and fights in 4.1% of cases.

The involvement according to laterality allowed us to note 98 cases for the right eye, 52 cases for the left eye and 20 cases for bilateral forms.

In the right eye, the distribution according to visual acuity was in the majority of cases ≥ 3/10 for 94 cases then less than 1/20 for 73 cases; between 1/20 and 1/10 for 4 cases and not evaluated for only 3 cases. As for the left eye, visual acuity was ≥ 3/10 for 99 cases; less than 1/20 for 69; between 1/20 and 3/10 for 10 cases; between 1/20 and 1/10 for 7 cases and not evaluated for 5 cases.

**Table II:** Distribution of the 170 patients according to the nature of the traumatic agent.

| Nature of the aggressor | Effective | Proportion (%) |
|---|---|---|
| Plant object | 63 | 37.1 |
| Idiopathic | 43 | 25.3 |
| metal object | 19 | 11.2 |
| Punch | 11 | 6.5 |
| Pebbles | 10 | 5.9 |
| Chemical burn | 07 | 4.1 |
| Nail clipping | 06 | 3.5 |
| Thermal burn | 05 | 2.9 |
| Lens | 04 | 2.4 |
| Ball kick | 02 | 1.2 |
| Total | 170 | 100 |

Slit lamp examination of the right eye revealed corneal scars in 41.6% of cases; corneal abscesses in 11.1%; corneal ulcerations in 5.8% of cases and KPS in 3.7% of cases. Slit lamp examination of the left eye revealed corneal scars in 17.9% of cases; corneal abscesses in 13.7% of cases; corneal ulcerations in 6.3% of cases and KPS in 2.6% of cases.

**Table III:** Distribution of the 190 eyes according to the Ocular Trauma Classification Group (OTC) classification.

| Classification | OD workforce | %OD | OG squad | %OG |
|---|---|---|---|---|
| Zone 1 | 67 | 35.3 | 43 | 22.6 |
| Zone 2 | 35 | 18.4 | 22 | 11.6 |
| Zone 3 | 16 | 8.4 | 07 | 3.7 |

Zone 1: Isolated corneal wound to the cornea or corneo -scleral limbus;

Zone 2: Wound not extending beyond 5 mm from the corneo -scleral limbus;

Zone 3: Wound extending beyond 5 mm of the corneo -scleral limbus.

**Table IV:** Distribution of the 190 eyes according to optical impairment.

| Optical Alteration OD | OD workforce | %OD | OG squad | %OG |
|---|---|---|---|---|
| Corneal opacity | 63 | 33.2 | 35 | 18.4 |
| Astigmatism | 39 | 20.5 | 23 | 12.1 |
| Edema | 09 | 4.7 | 12 | 6.3 |
| Monocular diplopia | 07 | 3.7 | 02 | 1.1 |

We also classified the damage according to the aesthetic alterations felt; in the right eye, we noted cases of corneal scarring in 80 cases; a dystrophic cornea in 21 cases and neovascularization of the cornea in 17 cases. While in the left eye, we noted 49 cases of visible corneal scarring; 19 cases of dystrophic corneas and 4 cases of neovascularization of the cornea.

According to the alteration of comfort perceived by the patients, in the right eye; 32.4% of cases of foreign body sensation were noted; chronic tearing in 24.7% of cases; photophobia in 22.9% of cases and luminous halos in 20% of cases. So at In the left eye, 18.4% of cases had foreign body sensations; chronic tearing occurred in 10% of cases; photophobia occurred in 5.8% of cases; and luminous halos occurred in 3.7% of cases.

**Table V:** Distribution of the 190 eyes according to the topical treatment administered.

| Topic Treatment | Effective | Proportion (%) |
|---|---|---|
| Antibiotic eye drops | 121 | 63.7 |
| Antiseptic eye drops | 88 | 46.3 |
| NSAID eye drops | 80 | 42.1 |
| Healing eye drops | 75 | 39.5 |
| Corticosteroid eye drops | 70 | 36.8 |
| Cycloplegic eye drops | 20 | 10.5 |
| Antihistamine eye drops | 19 | 10 |
| Miotic eye drops | 15 | 7.9 |
| Artificial tear in eye drops | 12 | 6.3 |
| Antifungal eye drops | 1 | 0.5 |
| **Surgical treatment** | **Effective** | **Proportion (%)** |
| Corneal suture | 97 | 51.1 |
| Subconjunctival injection | 44 | 23.2 |
| No treatment | 29 | 15.3 |

In some cases, photochromic lenses were prescribed in 27.9% of cases; therapeutic lenses were used in 6.2% of cases.

## Iconography

### Case No. 1

This is a 28-year-old worker patient seen for consultation for eye pain following trauma in whom the clinical examination revealed a deep and extensive central ulceration assessed by the fluorescein test.

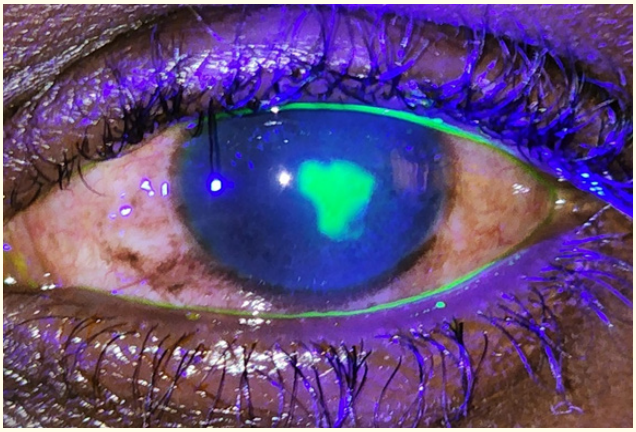

**Figure 1**

### Case No. 2

his is a 12-year-old female student who was seen for eye pain with decreased visual acuity following trauma and the clinical examination revealed a corneal perforation with hernia of the inferior iris complicated by endophthalmitis.

**Figure 2**

### Case No. 3

These images evoke the ultimate complication of corneal wounds after healing, resulting in corneal scarring.

**Figure 3**

## Discussion

The interest of our work lies in the fact that it focused on a condition that could affect the functional prognosis of the eye, but also in the fact that there are few studies on the subject in our context.

We conducted a 6-month descriptive cross-sectional study from September 1, 2024 to February 28, 2025, the aim of which was to study the outcome of corneal wounds at the Souleymane Medical Center.

This study certainly had limitations and difficulties, including the absence of corneal grafts and the loss of sight of some of our patients during the post-treatment follow-up period. However, it remains of interest because it has informed us about the frequency and problems of corneal wounds.

During the survey period, we collected 3652 patients affected by corneal disease from all causes, including 170 cases for corneal wounds, i.e. a hospital frequency of 4.7%. This frequency is close to that of Sissoko M., *et al*. [5] in 2020 in Mali who found a frequency of 4.8%. This high frequency of corneal damage could be justified by the fact that the cornea is the part of the eye most exposed to the external environment.

We observed a male predominance with a M/F sex ratio of 1.3. This predominance is consistent with that reported by N'Guessan LMA., *et al*. [6] in Ivory Coast in 2020 who found 62.3% with a sex ratio of 2.13. This could be explained by the fact that adult men are more often exposed to activities with a high risk of corneal damage during their professions than women. Just like in children, little boys by their turbulence and their tendency to violent sports and dangerous games.

The most represented age group was 21 to 40 years old with an average age of 39 ± 12 years and extremes of 2 and 97 years. Our result is close to those of Hajar B., *et al*. [7] in Morocco 2015 and Khalidi., *et al*. [8] in Fez in 2010 who found an age range between 10 and 29 years with a respective average of 27.8 years and 24.36 years. These results are not far from the numerous observations of other authors. This allowed us to conclude that corneal wounds are conditions with a predilection of the young subject under 40 years which is in accordance with the age where professional activity is often intense, leading to functional and aesthetic damage on the one hand and considerably impacting the quality of life on the other hand.

Most of our patients resided in the urban area of Conakry. This high frequency could be explained by the geographical accessibility of our study setting, which is an important element in the use of health services.

The most dominant occupation in this study was that of workers, at 27.6%. Our result is similar to that of Ebana MSR., *et al*. [9] in Cameroon in 2019 and Sovogui MD., *et al*. [10] in Guinea (2022) who reported the same professional category with 23.6% and 37.2% of cases respectively. However, our result is different from that of Baldé AK., *et al*. [4] in Guinea in 2022 who reported that pupils and/or students were the majority socio-professional category, i.e. 26.5%. Our result could be explained by the risk incurred by workers during the exercise of their profession.

In relation to the circumstances of occurrence, our results are confirmed by others such as Merle H., *et al*. [15] in Australia (2020), Maloba V., *et al*. [11] in the DRC (2020) who reported respectively 71% and 36.4% of cases of work accidents.

Eye pain was the most common reason for consultation. Our results are consistent with those of Atipo-Tsiba PW [12] at the Brazzaville University Hospital (2015) who reported pain as the primary reason for consultation, i.e. 67%.

This could be explained by the fact that the cornea is the most densely innervated tissue in the body with a nerve density 300 to 600 times greater than that of the skin [13].

The nature of the traumatic agent varies from one study to another depending on the realities of the field, in our series plant agents were the most predominant, followed by iatrogenic causes, and metallic agents and punches came in 3$^{rd}$ and 4$^{th}$ position. This predominance of plant agents is in agreement with that of Sovogui MD., *et al*. [10] in Guinea (2022) who reported 31.7%.

On the other hand, Bounsif Z., *et al*. [12] as well as Traoré L in his 2022 doctoral thesis in medicine in Bamako [14] found a result opposite to ours, with a predominance of metallic objects as traumatic agents. This observation is related to the majority socio-professional categories (workers) encountered in our study who, through their work, are exposed to the agents mentioned.

In the majority of cases, visual acuity without post-therapeutic correction was ≥ 3/10 in both the right and left eyes. Our result is different from that of Boukhrissa M., *et al*. [15] in Morocco in 2016 who found a final visual acuity < 1/10 in 71.6% of patients.

Corneal opacity was the most common optical complication in our series. Our result is similar to that of Atipo-Tsiba PW [16] in Congo Brazzaville in 2015 who reported that corneal opacification was the most dominant complication. Regarding aesthetic complications, they were dominated by corneal patches, which supports the result of Sovogui MD., *et al*. [10] in Guinea in 2022 who reported that corneal patches were the most common in the eyes.

All our patients received medical treatment, as in the study by Hajar B., *et al*. [7] in Morocco. However, our result is different from those of Merle H., *et al*. [17] in 2020 in whom 39% of cases were treated medically and 10% of cases were placed under observation. Compared to surgical treatment, our result is lower than that found in the study by Merle H., *et al*. [17] in 2020, in which 48% of cases received surgical treatment. Therapeutic corrective lenses were also used in 53 patients.

NB: During our study, 20.5% of patients should have benefited from a corneal transplant, but due to the lack of our technical platform, these patients were referred to other countries with a suitable technical platform.

## Conclusion

Corneal injuries are a real public health problem. They are a very common condition at the Souleymane Medical Center. This study revealed a male predominance. The workers represented the dominant socio-professional category while the eye pain was the main reason for consultation. Plant objects, iatrogenic causes as well as objects metallic came topped the list regarding the nature of traumatic agents. Corneal opacity was the most common optical complication in the eyes. Prevention remains the most effective treatment. However, it is essential to continue this study over a long period of time with a large sample size to strengthen these conclusions.

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