

# Ptosis surgery in Bukavu, Democratic Republic of the Congo: comparative study of two surgical techniques

## Abstract

**Introduction:** The objective of this study is to report the results of the management of ptosis in our practice by comparing two techniques, one consisting of the resection of the levator of the upper eyelid and the other of the suspension of the upper eyelid to the frontal muscle.

**Methodology:** This is a prospective study of all consecutive ptosis patients in two ophthalmology departments in Bukavu (in Democratic Republic of the Congo) from 1 January 2018 to 31 December 2021. All patients were operated on by the same surgeon with a minimum of 6 months follow-up post-operatively.

**Results:** A total of 55 patients were treated for ptosis during the study period, including 31 with upper eyelid levator resection and 24 with upper eyelid suspension to frontal muscle. We found that male sex, cosmetic gene, congenital ptosis, left location, moderate degree and isolated ptosis were predominant in both groups of patients, but statistical comparison between these two groups was not significant ( $p > 0.05$ ). For post-operative complications, there was a statistically significant difference between the two treatments ( $p = 0.0002$ ). After treatment, the statistical analysis shows that the median value of visual acuity in patients who underwent upper eyelid levator resection was significantly higher than that in patients who underwent upper eyelid suspension to frontal muscle ( $p = 0.021$ ).

**Conclusion:** The results of this study show that resection of the upper eyelid levator seems to be the best surgical technique compared to the suspension to the frontal muscle in our context.

**Keywords:** ptosis, upper eyelid levator resection, upper eyelid suspension to the frontal muscle, bukavu

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## Introduction

Blepharoptosis, or ptosis, as it is more commonly known, is a fall of the upper eyelid due to an impotence of the eyelid elevator, which may be congenital or acquired.<sup>1</sup> Ptosis can affect people of all ages, from newborns to older people. Ptosis may be due to a myogenic, neurogenic, fascial, mechanical, or traumatic cause.<sup>2,3</sup> This disorder is caused by malfunction of the muscles and/or nerves that regulate the elevation of the eyelid.<sup>4</sup> It most often results from acquired involutive dehiscence of the levator fascia after insertion on the tarsus. Other less common mechanisms include congenital ptosis due to levator muscle hypofunction, myogenic ptosis due to levator muscle weakness itself as occurs in some muscular dystrophies, and neurogenic ptosis resulting from complete or partial loss of the third cranial nerve and/or sympathetic fibers feeding the Müller muscle.<sup>2</sup> Management of ptosis depends on age, etiology, involvement of one or both eyelids, severity of ptosis, levator function, and presence of additional ophthalmologic or neurologic abnormalities.<sup>5</sup> Surgical management is an emergency when the upper eyelid blocks the visual axis causing major visual discomfort with the threat of amblyopia in children, whose most common eyelid defect is eyelid malformation, in addition to the cosmetic discomfort.<sup>1</sup> Several surgical techniques may be offered depending on the degree of ptosis and the function of the levator muscle of the upper eyelid. The operating result is most often satisfactory without any postoperative complications.<sup>5,6</sup>

The objective of this study is to report results of the management of ptosis in our practice by comparing two techniques, one consisting

of the upper eyelid levator resection and the other of the suspension of the upper eyelid to the frontal muscle.

## Material and methods

This is a cross sectional study of all cases of ptosis admitted to the ophthalmology departments of the Panzi Hospital and the Ophthalmological clinic CBM CELPA in Bukavu (DRC) from 1 January 2018 to 31 December 2021. All patients were operated on by the same surgeon and were followed for at least 6 months postoperatively. All patients had a complete physical examination, including the degree of upper eyelid droop and levator muscle function.

All patients with ptosis (unilateral or bilateral) were examined and each patient underwent a complete examination including:

- An interrogatory (research of the notion of heredity, etiological factor, mode of installation of the ptosis, evolution, etc.);
- Examination of the ptosis (height of the palpebral fissure, palpebral fold, functional value of the levator, epinephrine test, etc.);
- Eyelid examination (occlusion, associated malformations, scarring, tarsal and conjunctival conditions);
- Examination of the ocular half (deductions, versions, Charles Bell sign, intrinsic motility);
- Detection of mandibulopalebral synkinesia (Marcus Gunn syndrome)

- f. Examination of the eyeball (pupillary state, corneal state, lacrimation, etc.);
- g. A visual function test;
- h. Operations depending on the etiology (scanner, neurological examination, electromyography, etc.)

The main surgical techniques performed were resection of the upper eyelid levator in 31 patients and suspension of the upper eyelid from the frontal muscle in 24 patients.

We systematically looked for eye abnormalities or associated synkinesia. In children, we routinely tested them for amblyopia before surgery. Children were operated under general anesthesia and adults under local anesthesia. The surgical technique depended on the degree of ptosis of the upper eyelid and the function of its levator. The schedule for post-operative control was set at D1, D7, D15 and D30 and once a month thereafter.

The post-operative result was evaluated after 1 month according to the 4 modalities of Escales.<sup>7</sup>

- i. Excellent result: symmetry between the two eyes with satisfactory upward lift of the upper eyelid.
- ii. Good result: a discrete asymmetry that only the specialist can detect, either a residual ptosis  $\leq 2$  mm with a pupil fully cleared or a small asymmetry concerning the eyelid fold or eyebrow.

iii. Moderate result: a residual ptosis of 3 mm but the pupil is still clear with or without incomplete occlusion without corneal exposure.

iv. Poor outcome: Marked hypocorrection or hypercorrection.

The descriptive analysis was performed using calculations of proportions for qualitative variables (frequencies, percentages) and medians with interquartile range (IQR) for quantitative variables not normally distributed after verification by the Shapiro test. The Mann-Whitney U test was used to compare the medians between the two types of surgical treatment administered. Ethical considerations have been respected. This study has been submitted to the Medical Ethics Committee of the Official University of Bukavu for review and approval (Approval No: UOB/CEM/08/2022). The anonymity and confidentiality of the patients were ensured by using codes instead of their names, so that no information could be linked to specific patients.

## Results

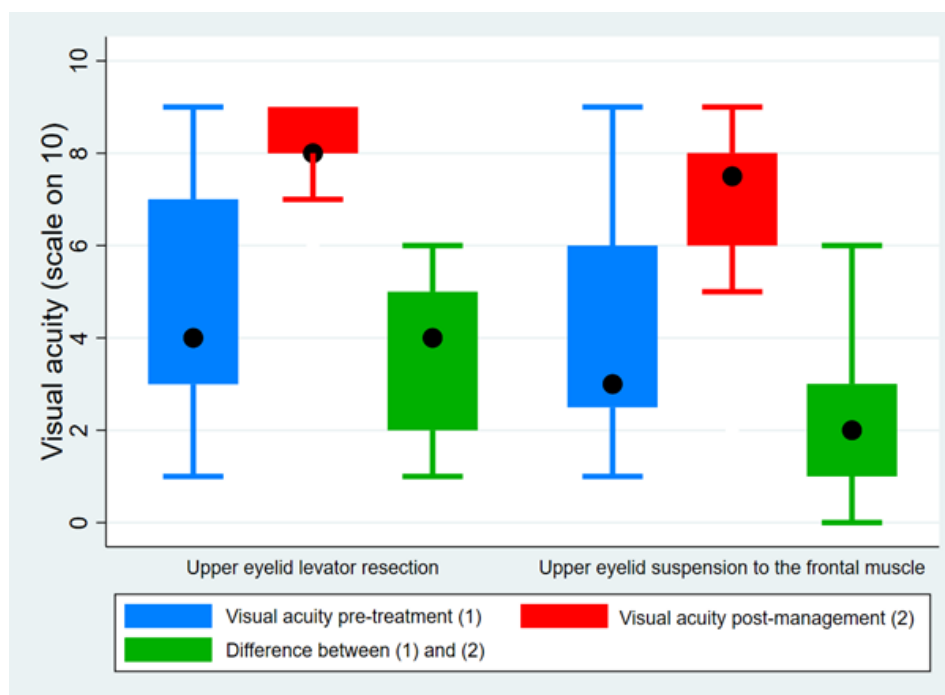
A total of 55 patients were treated for ptosis during the study period of which 31 with upper eyelid levator resection and 24 with upper eyelid suspension to the frontal muscle. Table 1 presents this study population grouped by type of treatment received. The median age was 13 years (IQR: 12 – 24 years) in resected patients and 14 years (IQR: 11.5 – 23.5 years) in suspended patients; the comparison of these two medians was not statistically significant ( $p=0.918$ ).

**Table 1** Distribution of patients according to the different types of surgical treatment received

Variables	Upper eyelid levator resection (n=31)	Upper eyelid suspension to the frontal muscle (n=24)	p-value
Age, median (IQR) in years	13 (12 – 24)	14 (11.5 – 23.5)	0.918
<b>Sex</b>			0.162
Male	15 (48.4%)	17 (70.8%)	
Female	16 (51.2%)	7 (29.2%)	
<b>Reason for consultation</b>			0.767
Aesthetic gene	14 (45.2%)	9 (37.5%)	
Decline in vision	17 (54.8%)	15 (62.5%)	
<b>Ptosis type</b>			1.000
Acquired	7 (22.6%)	5 (20.8%)	
Congenital	24 (77.4%)	19 (79.2%)	
<b>Side</b>			0.128
Left	16 (51.6%)	15 (62.5%)	
Right	15 (48.4%)	7 (29.2%)	
Both	0 (0.0%)	2 (8.3%)	
<b>Visual acuity pre-management (1), median (IQR)</b>	4 (3 – 7)	3 (2.5 – 6)	0.556
<b>Visual acuity post-management (2), median (IQR)</b>	8 (8 – 9)	7.5 (6 – 9)	0.021
Difference between (1) and (2), median (IQR)	4 (2 – 5)	2 (1 – 3)	0.007
<b>Degree of ptosis</b>			0.261
Minor	2 (6.5%)	5 (20.8%)	
Moderate	20 (64.5%)	12 (50.0%)	
Major	9 (29.0%)	7 (29.2%)	
<b>Associated abnormalities</b>			0.287
None	21 (67.7%)	11 (45.8%)	
Amblyopia	5 (16.1%)	7 (29.2%)	
Blepharophimosis syndrome	4 (12.9%)	3 (12.5%)	
Congenital oculomotor muscle fibrosis syndrome	1 (3.2%)	3 (12.5%)	
<b>Postoperative complications</b>			0.0002
None	24 (77.4%)	15 (62.5%)	
Inflammatory granuloma	7 (22.6%)	0 (0.0%)	
Suture thread release	0 (0.0%)	9 (37.5%)	
<b>Functional evolution</b>			0.307
Good	30 (96.8%)	21 (87.5%)	
Hypocorrection	1 (3.2%)	3 (12.5%)	

We found that male sex, cosmetic gene, congenital ptosis, left location, moderate degree, and isolated ptosis were predominant in both groups of the patients, but statistical comparison between these two groups was not significant ( $p > 0.05$ ) (Table 1). For post-operative complications, there was a statistically significant difference between the two treatments ( $p = 0.0002$ ). Suture thread release was observed only during suspension and inflammatory granuloma was observed only during resection. Comparison between the two types of surgical treatment shows that (Table 1 & Figure 1):

- Prior to treatment, there was no statistical difference between the median values of visual acuity in resected and suspended patients ( $p = 0.556$ );
- After treatment, statistical analysis shows that the median value of visual acuity in resected patients was significantly higher than in suspended patients ( $p = 0.021$ );
- When comparing pre- and post-management visual acuity values, we found that the median of this difference was significantly higher in resected patients than in suspended patients ( $p = 0.007$ ).



**Figure 1** Values of visual acuity before management and after management according to the different types of surgical treatment received.

## Discussion

Treatment of ptosis depends on age, etiology, involvement of one or both eyelids, severity of ptosis, levator function, and presence of additional eye or nerve abnormalities. Usually, treatment of ptosis includes a monitoring and waiting policy, a prosthesis, drugs, or surgery.<sup>8</sup> Surgical indications may be functional in view of the risk of impaired development of visual function when ptosis obstructs the visual axis, and cosmetic.<sup>9</sup> Children with congenital ptosis are often operated on at age 3 or 4 years before school entry. However, when ptosis is amblyogenic due to its unilaterality and importance, the intervention is an emergency and is performed during the first months of life.<sup>10,11</sup> In cases associated with oculomotor abnormalities (strabismus, verticality paralysis, oculomotor paralysis), ptosis surgery is offered only after the globe is recentered into the primary position unless there is a significant risk of amblyopia.<sup>11</sup> Ptosis surgery in children uses a general anesthetic, but adults do not, making the intraoperative evaluation of how wide the fissure in the eyelid is made more difficult.

The choice of surgical technique is based on physical examination findings (degree of ptosis and function of levator muscle). Whenever possible, surgery on the upper eyelid elevator is preferred; suspension techniques may be reserved for unusable upper eyelid elevators. Analysis of the results of our series allows us to note that resection

of the levator muscle of the upper eyelid was the most used surgical technique (56.4% of the cases), followed by suspension to the frontal muscle (43.6%). Resection of the levator muscle of the upper eyelid appears to be the best compared with suspension of the frontal muscle because it gives good functional results with good improvement of visual acuity but also it has fewer complications and the cost of producing it is reduced. The frontal muscle suspension uses different suspension materials.<sup>12,13</sup>

## Conclusion

The results of this study show that resection of the upper eyelid levator seems to be the best surgical technique compared to the upper eyelid suspension to the frontal muscle in our context. Early diagnosis and appropriate management can sufficiently improve the functional and cosmetic outcome of surgery. A good pre-operative examination and regular post-operative follow-up will reduce the risk of related complications.

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## Conflicts of interest

The author declares that there are no conflicts of interest.

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