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# RISK FACTORS AND OUTCOMES OF CANALICULAR TEAR REPAIR WITH STENT PLACEMENT IN PAEDIATRIC PATIENTS: CASE SERIES

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**ABSTRACT** This retrospective study evaluates the risk factors and postoperative outcomes associated with canalicular tear repair in pediatric patients using stent placement. The aim is to improve surgical practices and patient management by analyzing demographic, clinical, and surgical factors influencing outcomes. The study was conducted at a tertiary care center, including pediatric patients (<12 years) who underwent monocanalicular tear repair with silicone stent placement (Aurostent) from January to December 2023. Data were collected from medical records, including demographics, injury mechanisms, surgical interventions, and postoperative complications. The mean age of patients was 5.6 years, with a male-to-female ratio of 3:2, suggesting higher injury rates in young boys. The majority of injuries were caused by accidental trauma during play, with one injury resulting from a metal hanger and another from a blouse hook. The lower canaliculus was most commonly affected, consistent with prior studies. The use of silicone stents for tear repair showed favorable outcomes, with canalicular patency maintained in all cases following stent removal at six months. Postoperative complications were minimal, with only one case of stent prolapse, successfully managed as an outpatient procedure. No instances of epiphora or punctual granuloma were observed. This study highlights the effectiveness of stent placement in pediatric canalicular tear repair, with a low incidence of complications and successful outcomes in terms of symptom resolution and canalicular patency. Early intervention and careful follow-up are critical for optimal results. Further research with larger sample sizes and prospective designs is needed to validate these findings and explore long-term outcomes. The results emphasize the importance of prompt referral, appropriate surgical technique, and post-operative care in managing pediatric canalicular injuries effectively.

**KEYWORDS :** Pediatric canalicular tear, stent placement, surgical outcomes, postoperative complications, canalicular patency, risk factors.

## INTRODUCTION

Eyelid canalicular tears in children are a significant clinical concern, though they are less frequently encountered than in adults. These injuries often occur due to trauma, falls, or other accidents, leading to disruption of the canalicular system, which is essential for tear drainage. The prevalence of such injuries in the pediatric population necessitates an understanding of their implications, as untreated canalicular lacerations can result in chronic complications, including epiphora, conjunctivitis, and potential long-term sequelae affecting ocular health and development (1).

Anatomically, the eyelid canaliculus is a delicate structure that can be easily compromised. The two canaliculi in each eyelid converge at the puncta, draining tears into the lacrimal sac. Injuries can range from partial to complete lacerations, and proper identification of the extent of the injury is critical for effective management (3). Children present unique challenges due to their anatomical variations and the potential for underlying bone or soft tissue injuries that can accompany eyelid trauma. A thorough clinical assessment, including a detailed history and physical examination, is vital for diagnosing these injuries accurately.

Management strategies for canalicular tears often require a multidisciplinary approach, involving pediatric ophthalmologists and, in some cases, plastic surgeons. Surgical intervention is typically indicated for complete lacerations, aiming to restore the integrity of the canaliculus to ensure normal tear drainage (4). Early intervention is crucial; studies have shown that delayed repair can lead to poorer outcomes and increased risk of complications. Therefore, recognizing the signs and symptoms of canalicular injuries, such as excessive tearing or difficulty opening the eye, is essential for timely referral and treatment.

In summary, eyelid canalicular tears in children present both diagnostic and therapeutic challenges. The need for prompt recognition and appropriate surgical intervention underscores the importance of understanding these injuries in the pediatric population. As awareness of these injuries grows, so does the potential for improved outcomes, ensuring that children receive the necessary care to maintain their ocular health and overall well-being.

## AIMS AND OBJECTIVES

### AIMS

To evaluate the risk factors and postoperative outcomes associated with canalicular tear repair in pediatric patients using stent placement, with the goal of improving surgical practices and patient management.

### Objectives

1. Identify Risk Factors

- To analyze demographic and clinical characteristics that may influence the outcomes of canalicular tear repair in children.
- To evaluate the impact of the mechanism of injury and time to intervention on surgical success.

2. Assess Surgical Outcomes

- To determine the success rate of canalicular tear repair with stent placement in achieving symptom resolution.
- To quantify complication rates associated with stent placement, including infections and stent-related issues.

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### Methodology

### Study Design

This study will employ a retrospective cohort design, analyzing pediatric patients who underwent canalicular tear repair with stent placement over a 1 year (January 2023 to December 2023) at a L.T.M.M.C. and G.H., Sion, Mumbai

### Population

### Inclusion Criteria

- Patients aged newborn-12 years.
- Diagnosed with canalicular tears requiring surgical intervention.
- Underwent repair with stent placement (silicone or similar material).

### Exclusion Criteria:

- Patients with concurrent ocular conditions requiring different surgical management.
- Incomplete medical records.

### Methodology:

This prospective study was done at a tertiary care centre for paediatric patients (<12y age) who underwent monocanalicular tear repair with silicone stent placement between January 2023 to December 2023. Data including demographic details, mode and time of injury, associated ocular injuries, surgical interventons, intra- and post-operative complications were collected. Preoperative plain axial CT scan of orbit was done for all patients to look for fractures and foreign body in wound. Detailed anterior and posterior segment examination was done for all patients, pre- and intra-operatively under GA for uncooperative cases.

All children underwent canalicular tear repair with stent placement ( silicone stent, 40mm length and 0.64mm diameter) under general anaesthesia, within 24 hours of injury and under intravenous Cefotaxim, Gentamicin and Metronidazole cover. 4 cases had eyelid tears which were repaired with primary suturing while one case which had an anterior lamellar defect needed a full thickness skin graft placement to repair eyelid defect. All patients were prescribed topical Prednisolone acetate 1% and Moxifloxacin 0.5% eye drops 4 times a day for two weeks duration and parents were advised about post-operative eye care. Patients were followed-up on post operative day 1, 3, week 1, week 3 and then monthly for 6 months. Stents were removed on elective basis after 6 months and canalicular patency was ensured by syringing.

***Figure 1:*** *Identification of Canalicular Tear*

***Figure 2:*** *Pasaage of Silicone Stent through Distal end of Canalicular Tear*

***Figure 3*** *Canalicular Silicone stent passed through both ends*

***Figure 4*** *Full thickness Skin Graft Harvesting for Anterior Lamellar defect repair*

## RESULTS

In this study evaluating paediatric canalicular tear repairs with stent placement, we observed several important findings that reflect the demographics of the patients, nature of the injuries and the surgical outcomes.

Demographics

The mean age of the patients included in the study was 5.6 years, indicating that these injuries predominantly affect young children.

The male to female ratio was 3:2, suggesting a higher incidence of canalicular injuries in males. This trend may be attributed to more active play behaviors in young boys, which could lead to a greater likelihood of accidental injuries.

### Referral And Presentation

Among the five patients evaluated, three presented directly to the emergency department, while two were referred from other hospitals. All 5 patients presented within 24 hrs.

### Injury Characteristics

The anatomical distribution of the canalicular injuries revealed that four cases involved the lower canaliculus, while one involved the upper canaliculus. This finding is consistent with previous literature indicating that lower canalicular injuries are more common in pediatric populations.

### The Etiology Of Injury Varied:

- Three cases were due to accidental injuries occurring during play, reflecting the typical nature of injuries sustained in children.
- One patient suffered an injury from a metal hanger, and another from a blouse hook while breastfeeding, indicating that household items can also pose risks for eye injuries in young children.

### Ocular Co-morbidities

In terms of associated ocular co-morbidities, sub conjunctival hemorrhage was the most frequently observed condition, present in two of the five patients.

### Postoperative Course

The postoperative follow-up revealed that one patient returned after two months with a stent prolapse of 1mm. The stent was reposited as an out-patient procedure. This highlights the importance of monitoring for stent related issues. All stents were subsequently removed at six months post-operatively, with canalicular patency maintained in all cases, indicating a successful surgical outcome.

### Complications

Importantly, there were no reported complications such as epiphora (excessive tearing) or punctual granuloma (inflammatory growths at the punctal site). The absence of these complications suggests that the surgical technique, including the use of stents, was effective in promoting healing and restoring normal tear drainage.

These results underscore the successful management of pediatric canalicular tears using stent placement, demonstrating favorable outcomes in terms of injury resolution and the absence of significant postoperative complications. The findings advocate for prompt surgical intervention and careful follow-up in this vulnerable population to ensure optimal results. Further studies could expand on these findings to explore long-term outcomes and potential risk factors associated with different mechanisms of injury.

## DISCUSSION

The results of this study provide valuable insights into the management of pediatric canalicular tears, highlighting both the characteristics of the injuries and the effectiveness of surgical intervention with stent placement.

### Demographics And Injury Mechanisms

The mean age of 5.6 years and the male-to-female ratio of 3:2 suggest that young children, particularly boys, are more susceptible to canalicular injuries. This aligns with existing literature that indicates higher rates of accidental injuries among active young boys (8). The diverse mechanisms of injury, including accidental trauma during play and injuries from household items, emphasize the need for vigilance in child safety, particularly in environments where sharp objects are accessible.

### Clinical Presentation And Co-morbidities

The predominance of lower canalicular injuries in this cohort is consistent with prior studies indicating that the lower canaliculus is more frequently affected in pediatric cases (5). The presence of sub conjunctival hemorrhage in two patients points to the potential severity of the trauma and suggests that associated ocular injuries should be carefully evaluated during initial assessments. Such co-morbidities may necessitate a more comprehensive treatment approach to address all aspects of the injury.

### Surgical Outcomes

The use of stents in canalicular repairs has been well-documented as a

beneficial practice, providing support during the healing process (7). In this study, the successful maintenance of canalicular patency post-stent removal indicates that the surgical techniques employed were effective. The occurrence of a prolapsed stent in one patient, although not ideal, underscores the importance of monitoring for potential stent-related complications. The successful outpatient management of this issue demonstrates the effectiveness of follow-up care and patient education regarding signs of stent displacement.

***Figure 5*** *Identification and repair of lid tear with stent placement followed by eyelid suturing (Case 1)*

**Complications and Long-term Outcomes**

The absence of complications such as epiphora or punctual granuloma is particularly noteworthy. These findings suggest that the surgical technique and postoperative management were robust, contributing to favorable long-term outcomes. Previous studies have highlighted complications associated with canalicular repairs, making these results promising for pediatric surgical practices (6).

**Recommendations For Practice**

Based on these findings, we recommend that healthcare providers maintain a high index of suspicion for canalicular injuries in young children presenting with ocular trauma. Prompt referral to ophthalmology for surgical evaluation is essential. Additionally, educating caregivers about potential household hazards could help mitigate the risk of similar injuries.

**Future Directions**

Future studies could focus on larger sample sizes to validate these findings and explore the long-term functional outcomes associated with different mechanisms of injury. Furthermore, prospective studies could investigate the effectiveness of various surgical techniques and stent materials to optimize management strategies.

## CONCLUSION

In conclusion, this study reinforces the importance of timely and effective surgical intervention for pediatric canalicular tears, highlighting the role of stent placement in achieving successful outcomes. Continued research in this area will be crucial to enhance our understanding of risk factors and improve treatment protocols for this vulnerable population.

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