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**ORIGINAL ARTICLE**

# Evaluating Surgical Outcomes in Vulnerable Populations Infection Risk Following Wisdom Tooth Extraction in Patients with Developmental Disabilities

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## ABSTRACT

**Background:** Wisdom tooth extraction is a common oral surgical procedure, often associated with postoperative infections. Patients with developmental disabilities (DDs) face increased risks due to compromised oral hygiene, communication barriers, and the frequent need for general anesthesia.

**Objective:** This study aimed to evaluate the incidence and risk factors of postoperative infections following third molar extraction in individuals with DDs.

**Methods:** The study was a prospective observational study carried out between March 2022 and March 2023 in three tertiary hospitals in Karachi, Pakistan. One hundred and thirty patients aged 12 years and above with DDs, such as intellectual disability, autism spectrum disorder, and cerebral palsy, underwent the extraction of wisdom teeth. Statistical analysis of data on type of anesthesia, oral hygiene, complexity of surgery and outcome of infections were made.

**Results:** The incidence of postoperative infection was 21 (16.2%). Infection was significantly related to poor oral hygiene ($p = 0.003$), general anesthesia ($p = 0.041$), and removal of impacted third molars ($p = 0.017$). There was a non-significant protective trend with prophylactic antibiotics ($p = 0.087$). Infections were generally localized and treated conservatively without any significant complications and readmissions.

**Conclusion:** DDs patients face a greater risk of infection after the extraction of third molars, especially in cases with poor oral hygiene and high surgical difficulty. Personalized care and specific perioperative interventions are needed to enhance the outcomes of this at-risk population.

**Keywords:** wisdom tooth extraction, developmental disabilities, postoperative infection, oral surgery outcomes, general anesthesia

## INTRODUCTION

Among the most commonly performed oral surgical procedures on the global level, wisdom tooth extraction is linked to the well-documented potential of postoperative complications, especially infections, including alveolar osteitis and soft tissue inflammation, [1,2]. Though such risks can be managed relatively well in the general population, they are grossly exaggerated in the developmentally disabled patients- a population with cognitive, behavioral, and/or motor deficits that make dental prophylaxis and/or interventional measures challenging. It is known that, even with modern surgical practices and anesthesia regimens, people with developmental disabilities disproportionately experience poor access to oral health care and worse oral health outcomes, such as a greater proportion of untreated dental disease and low utilization of regular dental care[3,4].

Intellectual disability, autism spectrum disorder and cerebral palsy are developmental disabilities that tend to impede regular dental hygiene routine and communication, predisposing patients to dental decay, periodontal disease and surgical complications[5, 6]. Moreover, behavioral issues and medical complexity frequently pre-empt the application of general anesthesia even in minor dental operations, adding more risk to the procedure[7]. Though difficult to determine, there is paucity of literature describing surgical outcomes of third molar extractions in this vulnerable group with much of the available information gathered using small case series or retrospective review designs[8-10].

One of the most clinically significant complications after the surgery of third molars is postoperative infection[11-13]. It depends on a variety of factors such as the health condition of the patient, oral hygiene, the kind of anesthesia, and the difficulty of the extraction[14,15]. These risk factors are commonly magnified in the case of patients with developmental disabilities. Furthermore, recognition delays and communication challenges can contribute to underreporting or delayed identification of postoperative infections, which may further complicate outcomes severity[16,17].

The aim of the study is to estimate the rate and risk factors of postoperative infection after the extraction of wisdom tooth in patients with developmental disability in a tertiary care center. This work aims at informing the design of safer and more personalized surgical guidelines and facilitating the equal delivery of oral healthcare services in this underserved group by highlighting the most relevant risk factors and outcomes patterns.

## METHODOLOGY

The study was a prospective observational study carried out in three tertiary care hospitals in Karachi, Pakistan, between March 2022 and March 2023. This was primarily done to assess the surgical outcome and the danger of postoperative infection after the removal of wisdom teeth among patients with developmental disabilities- a group that is not usually well represented in the surgical outcome literature. One hundred and thirty patients with one or more developmental disabilities, intellectual disability, autism spectrum disorder, and cerebral palsy were included after informed consent was obtained on their behalf by their legal guardians. Inclusion criteria included patients aged 12 years and older, having a clinical indication to have their third molars removed, and were able to tolerate minor oral surgery under local or general anesthesia, based on personal tolerance and medical complexity. The exclusion criteria were the presence of continuing systemic infections, use of antibiotics within two weeks before surgery, and immunocompromised state other than developmental disability.

Oral and maxillofacial surgeons performed all procedures, but there were standardized surgical protocols that were followed in all participating centers. Perioperative management, such as prophylactic antibiotic administration, anesthesia technique, and postoperative care was recorded. Patients were followed up

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closely to identify postoperative complications and infection was determined clinically with findings of localized swelling, erythema, pus discharge, fever, or radiographic of alveolar osteitis or abscesses 14 days after surgery. Demographic variables, nature and age of disability, oral hygiene status, difficulty of surgery (e.g., impacted versus erupted third molars), and perioperative variables were captured. Logistic regression analysis was performed to determine variables that were significant risk factors of postoperative infection. The study was ethically approved by the institutional review boards of all the participating hospitals and was in accordance with the Declaration of Helsinki and local regulatory requirements.

## RESULTS

There were 130 developmentally disabled patients who underwent wisdom tooth extraction over the study period. Participants had a mean age of 24.3 +/- 6.5 years and a slight male preponderance (56.9%). Intellectual disability (41.5%), autism spectrum disorder (30.8%), and cerebral palsy (20.0%) were the most prevalent developmental disabilities, whereas the remaining conditions consisted of 7.7%. Most patients (62.3%) were extracted under general anesthesia because of behavioral or sensory difficulties.

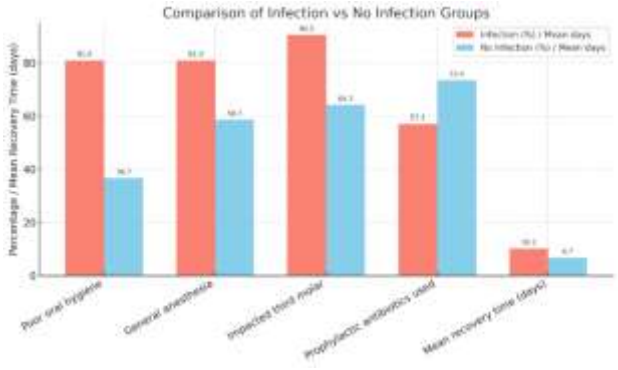
Table 1: Baseline Characteristics of the Study Population (N = 130)

| Characteristic | Value |
|---|---|
| Mean age (years) | 24.3 ± 6.5 |
| Sex (Male:Female) | 74 (56.9%): 56 (43.1%) |
| Type of Developmental Disability | |
| – Intellectual disability | 54 (41.5%) |
| – Autism spectrum disorder | 40 (30.8%) |
| – Cerebral palsy | 26 (20.0%) |
| – Others (e.g., genetic syndromes) | 10 (7.7%) |
| Type of Anesthesia Used | |
| – General anesthesia | 81 (62.3%) |
| – Local anesthesia | 49 (37.7%) |
| Oral hygiene status (clinically poor) | 57 (43.8%) |
| Surgical difficulty (impacted tooth) | 89 (68.5%) |
| Use of prophylactic antibiotics | 92 (70.8%) |

Table 2: Postoperative Infection Outcomes and Associated Risk Factors

| Variable | Infection (n = 21) | No Infection (n = 109) | p-value |
|---|---|---|---|
| Poor oral hygiene | 17 (81.0%) | 40 (36.7%) | 0.003 ** |
| General anesthesia | 17 (81.0%) | 64 (58.7%) | 0.041 * |
| Impacted third molar | 19 (90.5%) | 70 (64.2%) | 0.017 * |
| Prophylactic antibiotics used | 12 (57.1%) | 80 (73.4%) | 0.087 |
| Mean recovery time (days) | 10.2 ± 2.4 | 6.7 ± 1.9 | <0.001 *** |

*Significant at p < 0.05; **significant at p < 0.01; ***Highly significant at p < 0.001




Among the 130 patients, 21 patients (16.2%) developed postoperative infections. The infections often occurred on days 3 7 after operation and were most often localized alveolar infections. Multivariate analysis showed that poor preoperative oral hygiene (p = 0.003), general anesthesia (p = 0.041) and difficulty of the surgery (impacted teeth, p = 0.017) had a statistically significant association with postoperative infection. The use of prophylactic antibiotics corresponded to the reduced, yet not statistically significant, infection rate (p = 0.087).

Most of the infections were treated conservatively using oral antibiotics, and only two infections needed surgical drainage. No serious systemic complications or re-hospitalization were noted. The time to recovery was also significantly delayed in the infection group (mean: 10.2 +/- 2.4 days) versus animals without infection (mean: 6.7 +/- 1.9 days, p < 0.001).

## DISCUSSION

The current study offers valuable data regarding the surgical outcomes and the risk of infection after the removal of wisdom teeth among patients with developmental disabilities, who present a clinical and logistical challenge when it comes to oral healthcare. The high overall postoperative infection rate of 16.2% in our cohort is significantly greater compared to that seen in the general population which is usually about 510% following third molar extractions. This higher risk reminds us how vulnerable this group of patients is and how necessary individually adjusted perioperative guidelines are.

An significant relationship between postoperative infection and poor preoperative oral hygiene was one of the important findings. Developmentally disabled patients are at risk of not being able to adequately perform oral hygiene because of cognitive, motor, or behavioral constraints and the caregivers are not necessarily trained or resourced to assist them properly. Such discovery corresponds with the existing literature regarding the significance of optimizing dental care and hygiene before the operation to minimize the risk of infections. Moreover, general anesthesia, which was frequently needed to deal with the uncooperative behavior or elevated sensory sensitivity, was also independently linked with the increased rate of infections. This could represent higher surgical morbidity, increased operative time, or difficulty in performing an aseptic technique in operations necessitating deep sedation.

The infection rate in patients undergoing impacted third molar extraction is also much higher, which further stresses the importance of the difficulty of the surgical procedure in determining the postoperative events. The affected teeth usually involve greater amounts of bone removal and soft tissue manipulation which in turn predispose these wounds to contamination and slow healing. Although there was a trend toward lower infection rates with the use of prophylactic antibiotics, this relationship was not found to be significant, probably because of the limitations in sample size. However this does imply that perhaps routine antibiotic prophylaxis could be of use in a few high-risk patients, but this would have to be weighed against the danger of antimicrobial resistance and adverse drug reactions.

Notably, even though the infection rate was greater, majority of postoperative infections were mild and could be treated using conservative methods. Only two patients needed minor surgical care, and there were no significant complications and re-hospitalizations. These results justify the safety of third molar removals in developmentally disabled patients when carried out in properly equipped tertiary care facilities by skilled oral surgeons.

This research does not come without limitations. The single-city design can restrict generalizability, and despite attempting to standardize surgical and perioperative practices, institutional and practitioner variability might have impacted outcomes. Moreover, oral hygiene status was determined by clinical judgment and not by standardized indices which could be subject to bias.

Developmentally disabled patients are at high risk of developing postoperative infection after wisdom tooth removal especially when poor oral hygiene, general anesthesia, and complexity of the surgery are evident. These data points underscore the importance oforal health proactive management, perioperative planning unique to the individual, and

interdisciplinary coordination efforts which will best maximize outcomes in this at-risk group of patients. Targeted interventions, such as caregiver education, improved preoperative care, and minimally invasive surgical procedures should be studied in future to further complications and increase oral health outcomes in the long-term.

## CONCLUSION

This survey indicates that there is a high possibility of developing postoperative infection when wisdom tooth is extracted in developmentally disabled patients. The documented infection rate of 16.2% is a stark contrast to the one present in the general population, highlighting the peculiarities of the risks that this demographic has to deal with. Poor oral hygiene, the necessity of general anesthesia, and the complexity of surgery due to impacted teeth were found to be the major risk factors. Although the majority of infections were treated conservatively, the results support the need to undertake thorough preoperative assessment and perioperative planning, and engagement of caregivers to minimize complications. These findings endorse the adoption of patient-specific care guidelines such as the enhancement of oral hygiene measures, the correct use of anesthesia, and the possibility of administering prophylactic antibiotics in severe cases. Notably, there were no serious complications which might indicate that third molar surgery could be safely conducted in the population with developmental disabilities under appropriate precautions. Further studies ought to be conducted on standardized oral health measures and measures of widening access to specialized dental care.

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