

Evidence Mapping Permanent Tooth Avulsion in the Pediatric Population

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INTRODUCTION

- Avulsion is one of the most serious traumatic dental injuries and is seen in 0.5-16% of all dental injuries¹. Avulsion most frequently involves maxillary central incisors in the 7-10 years of age group². The treatment of choice in case of an avulsed tooth is replantation.¹
- Prognosis of the tooth is dependent on the viability of the periodontal ligament (PDL) and maturity of the root.²
- One of the serious complications after replantation of an avulsed tooth is root resorption (RR). Meta-analysis by Souza et al, determined the incidence of root resorption by type-replacement RR (51%), inflammatory RR (23.2%), surface RR (13.3%) and internal RR (1.2%).³
- There is a substantial financial burden due to unfavorable avulsion injury outcomes.³ Therefore, it is essential for dentists to be able to more accurately predict, plan for and prepare patients for outcomes based on the best available evidence.
- Evidence mapping is a new method of research that analyzes the existing data and helps explore the gaps in knowledge for additional research and use of funding in the appropriate areas. As per Miake-Lye et al., "There are no authoritative recommendations for what constitutes an evidence map or what methods should be used, and anecdotal evidence suggests heterogeneity in both."⁴

PURPOSE

- The purpose of the study was to vest a graph database and compile the available evidence on permanent tooth avulsion injuries.
- It also identified the areas that need further research and could serve as a framework to capture and organize data related to avulsion.

METHOD

- The study was conducted using a systematic review of the literature to organize evidence-related patterns and outcomes of permanent teeth avulsion in the pediatric population. Medline, PubMed, and Scopus were searched with the following key terms: "Avulsion," "dental," "injury," "in," "permanent teeth," with the additional filters for years (2000 to 2021) and language (English). The final inclusion criteria included: age from 0 to 18 years; follow up period of 18 months; and discussion on intervention (table 1). The exclusion criteria included meta-analysis studies. Average or weighted average calculations were performed for probabilities.

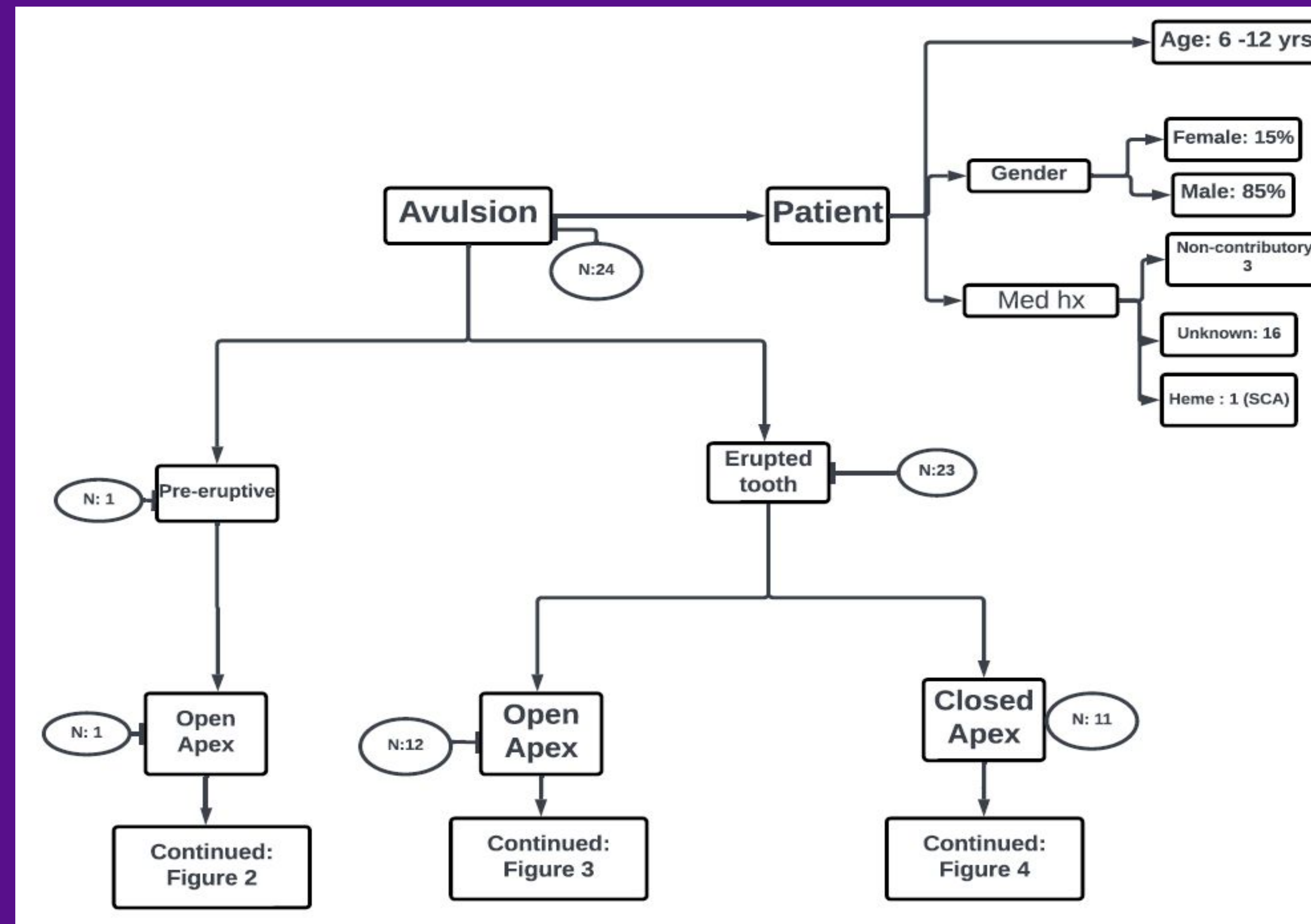


Figure 1: Shows the framework used for evidence mapping including the data

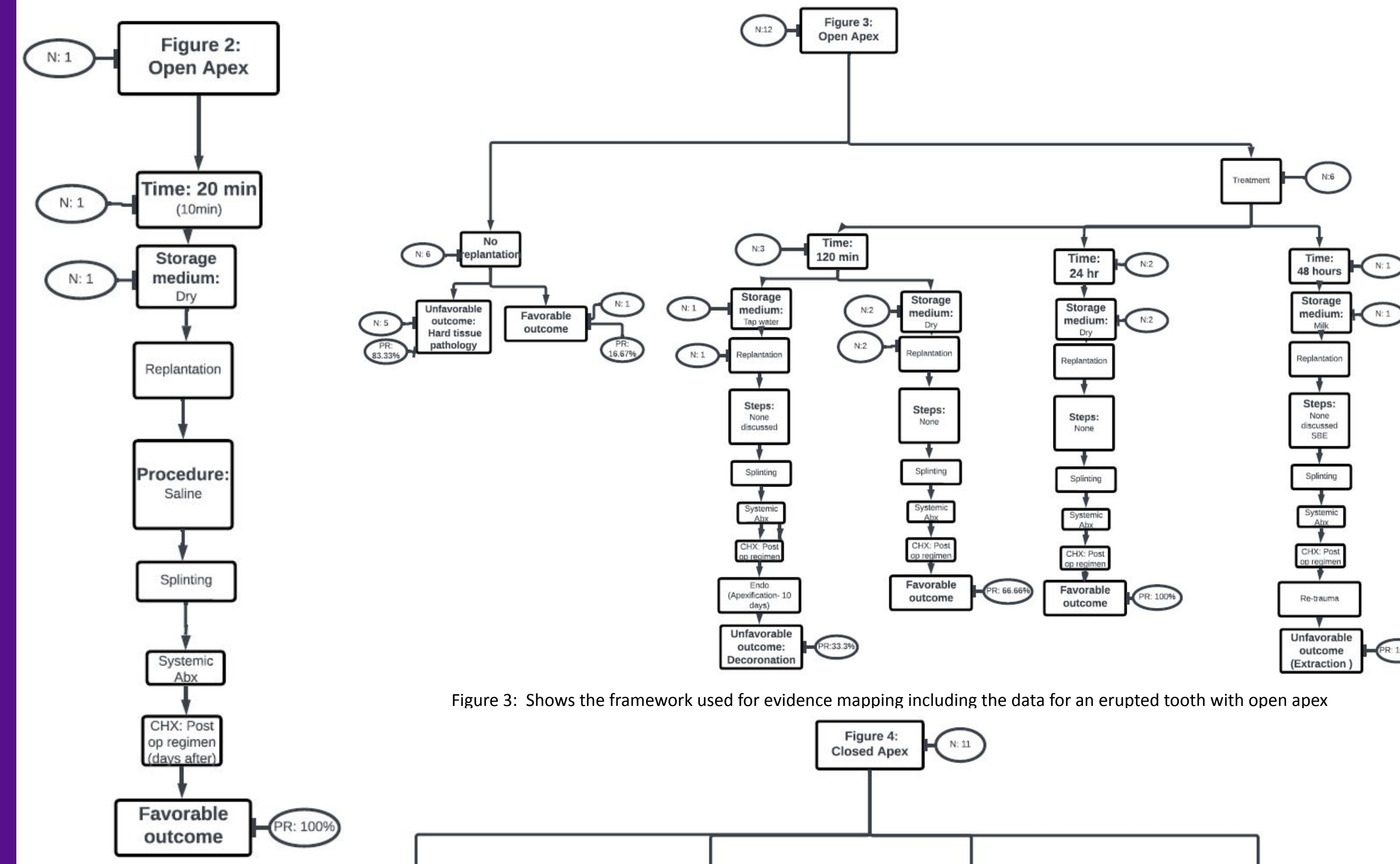


Figure 3: Shows the framework used for evidence mapping including the data for an erupted tooth with open apex

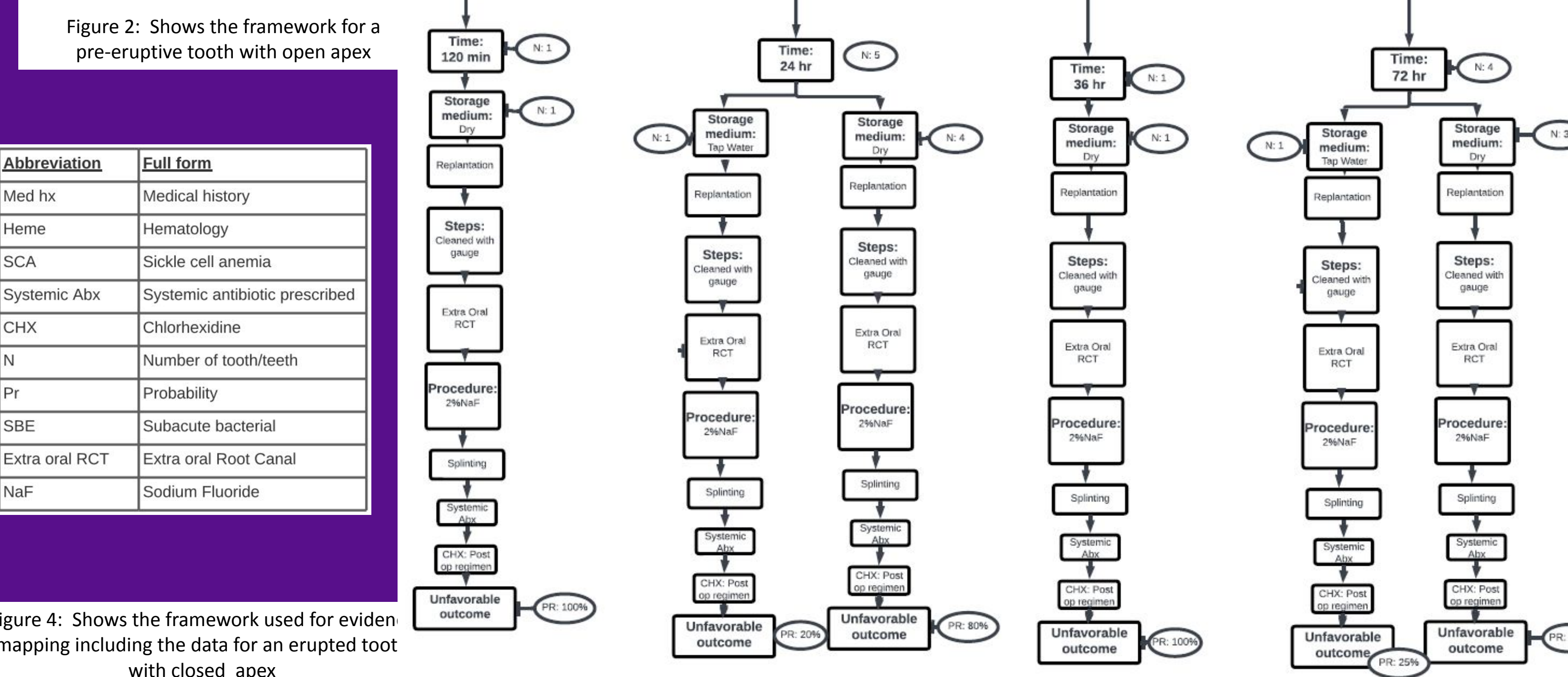


Figure 4: Shows the framework used for evidence mapping including the data for an erupted tooth with closed apex

| Abbreviation | Full form |
|----------------|--------------------------------|
| Med hx | Medical history |
| Heme | Hematology |
| SCA | Sickle cell anemia |
| Systemic Abx | Systemic antibiotic prescribed |
| CHX | Chlorhexidine |
| N | Number of tooth/teeth |
| Pr | Probability |
| SBE | Subacute bacterial |
| Extra oral RCT | Extra oral Root Canal |
| NaF | Sodium Fluoride |

| Criteria's | Table 1: Describes the criteria used and steps | | | | Table 2: Describes the review and number of studies included | | | |
|--|--|---------------|--------------|------------------------|--|---|--------------|---------------------------|
| | Screening period (Initial) | Second review | Third review | Final included studies | Screening period | Second review | Third review | Final review |
| Collection of databases | | | | | Medline: 2431 | PubMed: 12 | Scopus: 10 | |
| Title (with avulsion and permanent teeth injury) | ■ | | | | Medline: 24 | PubMed: 4 | Scopus: 4 | |
| Abstract (with avulsion and permanent teeth injury) | ■ | | | | Medline: 8 | PubMed: 1 | Scopus: 0 | |
| Abstract with stated inclusion and exclusion criteria (by first and second reviewer) | | ■ | | | Duplicate study: 1 | Unable to retrieve original database: 2 | | |
| Complete studies with inclusion and exclusion criteria | | | ■ | | | | | Final included studies: 6 |
| In case of disagreement, review by third reviewer | | | ■ | | | | | |
| Review of studies and complete set of databases | | | | ■ | | | | |

RESULTS

- After initial review of 2,453 studies, 32 studies were included (Medline: 24, PubMed: 4, Scopus: 4). In the final review, eight studies qualified for the systematic review and analysis (Medline: 8, PubMed:1 (duplicate study), Scopus: none). Six studies were included (unable to get original data for two studies) for final evidence mapping (table 2).
- A traversal graph of patterns and outcomes was designed. A node-to-node relationship was established and allocated with edge-probabilities reported from the literature (figure 1-4).

CONCLUSIONS

- Mapping of clinical patterns and outcomes using traversal graph patterns is a feasible method to define and quantify outcomes for dental avulsion injuries in permanent teeth.
- It identified areas that need focused research and has the potential to provide predictive knowledge for clinical decision-making.

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