Dental Trauma Decision-Making Pathway Impact in Emergency Medicine

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BACKGROUND

Emergency department (ED) providers frequently manage dental trauma, such as avulsions and fractures, but often lack the experience to handle these injuries optimally.[1] Research shows that while ED providers are confident in managing dental emergencies, many are uncomfortable with procedures such as replanting avulsed teeth.[1,3,4] Few use formal decision-making pathways, which could improve patient outcomes.[2,3]

The availability of dental resources varies across EDs, if having any dentist on staff they are frequently oral and maxillofacial surgeons (OMFS). While OMFS are deftly trained in complex trauma care, less severe cases could be managed by ED providers with simple interventions.[5] However, these opportunities are often missed due to limited training.[5] Public awareness of proper dental trauma care is also lacking, as many non-dental professionals don't recognize the importance of timely replantation.[6]

Delays in treatment further hinder outcomes, as patients often wait hours for care.[4] Integrating dental education into medical training and using decision-support tools could improve ED providers' ability to manage dental trauma.[6,7,8] This study aims to evaluate whether a validated decision-making pathway can enhance care and lead to better patient outcomes.

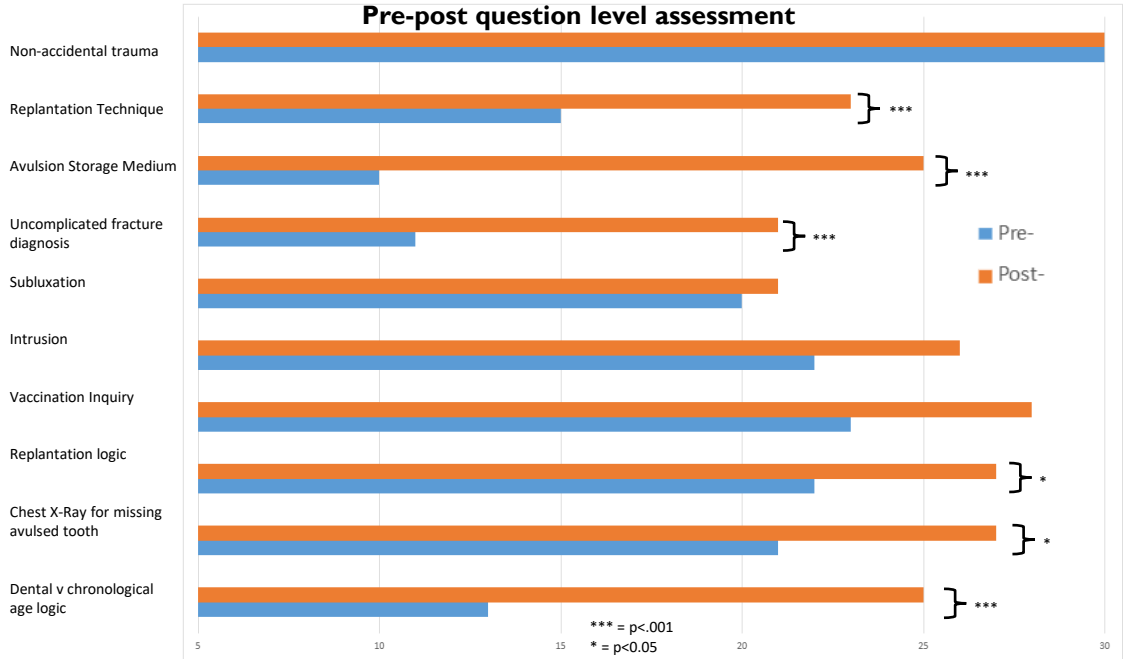
PURPOSE

This study evaluated the effectiveness of a decision-making pathway in improving emergency department (ED) providers' clinical decisions regarding dental trauma management.

METHODS

Children's National Hospital ED providers completed a survey featuring clinical vignettes and multiple-choice questions, designed to assess responses to common dental emergencies with and without the decision-making pathway. Changes in individual responses were analyzed using the Wilcoxon Signed-Rank test (P< .05), while a McNemar analysis (P< .05) assessed question-level accuracy improvements.

RESULTS



Above: This graph compares the number of correct answers pre- and post – pathway implementation for each of 10 questions. Statistical significance is highlighted with P values. Blue bars represent respondents without the pathway while Orange bars represent the number of respondents while using the pathway.

Beside: Table summarizes questions topics, McNemer Statistics and P values for each question. P-values are in a color graded scale of significance where 6 of 10 questions are significant (P<0.05) and 4 of those are (P<.001).

Question Topic	McNemer Statistic	P-value
Dental v chronological age logic	12	<.001
Chest X-Ray for missing avulsed tooth	4.5	0.034
Replantation logic	5	0.025
Vaccination Inquiry	2.6700	0.11
Intrusion	0.11	0.74
Subluxation	1.29	0.26
Uncomplicated Fracture	12	<.001
Avulsion storage medium	12.25	<.001
Replantation Technique	9	<.001
Non-accidental trauma	0	1

DISCUSSION

This study shows that a decision-making pathway significantly improves ED providers' accuracy in managing dental trauma, with a 22% mean improvement. Key areas of improvement included avulsion storage, distinguishing primary from permanent teeth, and managing fractures. Non-accidental trauma identification remained perfect, reflecting existing proficiency.

The findings underscore the value of decision-support tools in addressing knowledge gaps, particularly in time-sensitive scenarios like tooth avulsion and replantation. The high usability ratings (81% found the pathway clear) and willingness to adopt the tool (45% strongly willing, 29% probably willing) suggest its practicality for clinical implementation.

However, the study is limited by its single-center design and small sample size. Future research should expand to pediatric and general EDs nationwide to validate these findings and explore the pathway's impact on patient outcomes. Integrating such tools into medical training and ED workflows could bridge critical gaps in dental trauma care, ultimately improving outcomes for patients and reducing unnecessary delays in treatment.

CONCLUSIONS

- The decision-making pathway significantly improved ED providers' accuracy in managing dental trauma, particularly in avulsion storage, fracture management, and distinguishing primary from permanent teeth.
- High usability ratings and provider willingness to adopt the tool suggest its practicality for clinical implementation.
- Future research should expand to nationwide EDs to validate findings and assess the pathway's impact on patient outcomes.

REFERENCES