EAS Journal of Dentistry and Oral Medicine
Abbreviated Key Title: EAS J Dent Oral Med
ISSN: 2663-1849 (Print) & ISSN: 2663-7324 (Online)
Published By East African Scholars Publisher, Kenya

OPEN ACCESS

Volume-8 | Issue-1 | Jan-Feb-2026 | DOI: https://doi.org/10.36349/easjdom.2026.v08i01.004

Review Article

Impacted Canine in the Third Decade of Life: An Overview of Management Options

Maheswaran T[1], Giri GVV[2]*, Thulasidasan A[3], Azhagu Sivani V[4], Sornaa N[5], Ivin Elsa John[5]

[1]Professor, Department of Oral and Maxillofacial Pathology, Adhiparasakthi Dental College and Hospital, Tamil Nadu, India
[2]Professor and Head, Department of Oral and Maxillofacial Surgery, Adhiparasakthi Dental College and Hospital, Tamil Nadu, India
[3]Assistant Professor, Department of Orthodontics, Adhiparasakthi Dental College and Hospital, Tamil Nadu, India
[4]Assistant Professor, Department of Oral and Maxillofacial Surgery, Indira Gandhi Institute of Dental Science, Puducherry, India
[5]Assistant Professor, Department of Oral Medicine and Radiology, Chettinad Dental College & Research Institute, Tamil Nadu, India

Article History
Received: 26.11.2025
Accepted: 17.01.2026
Published: 19.01.2026

Journal homepage:
https://www.easpublisher.com

Quick Response Code

Abstract: Impacted maxillary canines present unique challenges when diagnosed during the third decade of life. Treatment options include surgical exposure with orthodontic traction, auto transplantation, extraction with prosthetic replacement, and observation only. Success rates decline with advancing age, particularly beyond the age of 30 years. The treatment duration is significantly prolonged compared to that in adolescents, and complications such as ankylosis become more prevalent. Clinicians must carefully evaluate patient-specific factors, including tooth position, root development, and patient preferences, when selecting optimal management strategies for this age group.

Keywords: Impaction, Orthodontic Traction, Auto transplantation, Ankylosis.

INTRODUCTION

Maxillary canines are the second most commonly impacted teeth after third molars, affecting approximately two percent of the population [1]. Although early detection during adolescence is ideal, many cases remain undiagnosed until adulthood [2]. Adults in their third decade face distinct challenges compared to younger patients, including reduced treatment success rates, prolonged treatment duration, and increased risk of complications [3]. This review examines evidence-based management approaches for impacted canines in patients aged 20-30 years, focusing on surgical techniques, orthodontic outcomes, and alternative treatment modalities.

Orthodontic Treatment Outcomes in Adults

The prognosis for impacted canines decreases substantially with patient age. Research involving adults with a mean age of approximately 29 years demonstrated a success rate of less than 70 percent, compared to 100 percent in adolescent controls. Also, all treatment failures occurred in patients aged > 30 years [3]. The distance from the canine cusp to the occlusal plane, mesial positioning, and patient age are strongly correlated with the treatment duration [4]. Treatment duration and number of visits required for canine resolution significantly increased in adult patients, even for similarly positioned impactions [3]. Studies have indicated that surgical exposure followed by orthodontic traction can result in complications affecting supporting tissues, including bone loss, root resorption, and gingival recession [5].

Surgical Exposure Techniques

Two primary surgical approaches exist for canine exposure: open and closed techniques [6]. The open technique involves surgical exposure followed by autonomous or assisted eruption, whereas the closed technique involves bonding an attachment before wound closure and subsequent orthodontic traction. Meta-analytical evidence suggests open exposure reduces initial alignment duration by approximately two months and demonstrates lower ankylosis risk [7]. However, randomized controlled trials have found no significant differences in periodontal outcomes between these techniques [8]. Aesthetic evaluations have revealed that closed exposure techniques may produce superior outcomes, although canines treated with closed exposure exhibit darker coloration and delayed cold test responses

***Corresponding Author:** Giri GVV
Professor and Head, Department of Oral and Maxillofacial Surgery, Adhiparasakthi Dental College and Hospital, Tamil Nadu, India

[9]. Cochrane reviews concluded that the current evidence does not definitively favor either technique for palatally impacted canines [10].

Autotransplantation as an Alternative

Autotransplantation is a viable alternative when orthodontic treatment is declined or is contraindicated [11]. Systematic reviews have demonstrated survival rates approaching 68 percent after 21 years, with some teeth surviving beyond 27 years. Success factors include younger age, female sex, minimized extraoral time, and appropriate endodontic management. Complications include ankylosis, root resorption, infection, and tooth darkening [12]. Guided autotransplantation using three-dimensional printed templates has demonstrated promising outcomes, even in mature donor teeth [13]. Clinical studies have reported favorable periodontal parameters with no significant attachment loss when combined with guided bone regeneration [11]. Five-year longitudinal data indicate acceptable periodontal health in transplanted canines, although progressive root resorption necessitates extraction in occasional cases [14].

Extraction and Implant Replacement

When orthodontic alignment or autotransplantation proves unfeasible, extraction with prosthetic replacement becomes appropriate [15]. Indications for extraction include severe impaction with unfavorable positioning, acceptable occlusion with premolar substitution, pathological changes, or patient preference [2]. Implant-based solutions include tilted implants with success rates of 93-99 percent, and splinted short implants with 87-90 percent success. Limited long-term data exist on immediate implant placement following canine extraction. Digital planning and navigation-guided implant placement facilitate optimal positioning while avoiding impacted canines [15].

Age-Related Considerations

The probability of ankylosis increases dramatically with age, rising from approximately one percent at 15 years of age to nearly 97 percent by 45 years of age. This age-dependent deterioration significantly impacts treatment selection in patients in their third decade of life [16]. Orthodontically induced root resorption of adjacent incisors shows a weak correlation with canine impaction, although initial root length demonstrates a positive association. Canine impaction severity does not predict the risk of resorption [17].

CONCLUSION

Management of impacted canines in the third decade requires individualized treatment planning, considering patient age, tooth position, root development, and patient preferences. While surgical exposure with orthodontic traction remains feasible, success rates decline, and treatment duration increases compared to those in adolescents. Autotransplantation is a conservative alternative with acceptable long-term outcomes in selected cases. Extraction with prosthetic replacement offers predictable results when tooth preservation is impractical. Clinicians should counsel patients regarding age-related prognostic factors, realistic treatment timelines, and potential complications to facilitate informed decision making.

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Cite This Article: Maheswaran T, Giri GVV, Thulasidasan A, Azhagu Sivani V, Sornaa N, Ivin Elsa John (2026). Impacted Canine in the Third Decade of Life: An Overview of Management Options. *EAS J Dent Oral Med, 8*(1), 19-21.