

ORIGINAL ARTICLE

A Study on the Use of Autologous Venous Blood for the Management of Alveolar Osteitis

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Abstract:

Objectives: Alveolar Osteitis (AO), commonly known as dry socket, is a painful postoperative complication of tooth extraction. Conventional management is largely palliative. This research was aimed to evaluate the efficacy of autologous venous blood (AVB) placed in the socket as a biologically based method for pain control and enhanced healing in AO.

Materials and Methods: A prospective, comparative, non-randomised interventional research was conducted on 100 patients diagnosed with AO. Subjects were alternately allocated into two groups: the test group (n = 50), treated with autologous venous blood, and the control group (n = 50), managed with zinc oxide eugenol (ZOE) dressing. Pain intensity was assessed using the Visual Analogue Scale (VAS) on days 0, 1, 3, and 7, while clinical healing was evaluated at follow-up visits. Data were analyzed using SPSS software (version 22), and a p-value of less than 0.05 was considered statistically significant (two-tailed test).

Results: The baseline demographic and clinical parameters showed no significant differences between the study groups. By day 3, the AVB group demonstrated significantly greater pain reduction than the ZOE group (mean VAS 2.1 vs 4.6, $p < 0.05$). By day 7, clinical healing scores were significantly superior in the AVB group ($p < 0.05$). No adverse effects were recorded, and patient satisfaction was higher in the AVB group.

Conclusions: Autologous venous blood is a simple, cost-effective, and biologically sound method for managing alveolar osteitis. It provides superior pain relief and enhanced healing compared with conventional ZOE dressing, without observed complications.

Keywords: alveolar osteitis, dry socket, autologous blood, socket healing, third molar extraction

Introduction

Alveolar osteitis (AO), also known as dry socket or fibrinolytic alveolitis, represents one of the most common postoperative complications following tooth extraction. Its incidence ranges from approximately 1–5% in routine extractions and may increase to as high as 38% in mandibular third molar surgeries.¹ The condition is typically characterized by intense pain, loss or dissolution of the blood clot, and delayed socket healing, usually manifesting within 1 to 3 days after extraction.^{2,3}

The pathogenesis of AO is attributed to localised fibrinolysis, where plasmin-mediated dissolution of the clot exposes underlying bone.⁴ Both intrinsic and extrinsic factors contribute, including surgical trauma, bacterial toxins, and host response.^{5,6} Identified risk factors include traumatic extraction, smoking, poor oral hygiene, pre-existing infection, oral contraceptive use, hormonal fluctuations, systemic comorbidities, and advanced age.⁷⁻⁹ In addition, microbial colonisation by species such as *Prevotella* and *Fusobacterium* is strongly implicated.⁹

Management of AO is largely palliative. Conventional treatments include socket irrigation followed by obtundent dressings such as zinc oxide eugenol (ZOE),¹⁰ Alvogyl,¹¹ SaliCept patch,¹² and GECB pastilles.¹²

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Adjunctive therapies such as low-level laser application,¹⁴ platelet-rich fibrin (PRF),¹⁵ and natural agents including Nigella sativa oil¹⁶ and vitamin C¹⁷ have also been studied. While these modalities provide symptomatic relief, limitations include variable effectiveness, expense, or the need for specialised equipment.

Autologous venous blood (AVB), by contrast, is readily available, cost-effective, and inherently biocompatible. It promotes rapid natural clot formation, provides growth factors, reduces nociceptor stimulation, and offers antimicrobial protection via leukocytes.¹⁸ Unlike platelet concentrates such as PRF or PRP, its use requires no centrifugation or specialised infrastructure, making it suitable for routine clinical settings.

This study was undertaken to evaluate the efficacy of AVB application in the management of AO, with emphasis on pain reduction, clinical healing, and patient satisfaction.

Materials and Methods

Study Design and Setting:

A prospective, comparative study was conducted between January 2024 and December 2024 across five centers in Dhaka, Bangladesh: the Departments of Oral and Maxillofacial Surgery, Bangladesh Medical University (BMU), Dhaka Dental College & Hospital; BIRDEM General Hospital, Dhaka National Medical College & Hospital & Armed Forces Medical Institute (AFMI).

The study adhered to the ethical principles outlined in the Declaration of Helsinki. Written informed consent was obtained from all participants prior to inclusion. Formal ethical approval was not required, as the procedure utilized autologous blood and did not introduce any additional risk to the patients.

Sample Size and Eligibility Criteria

A total of 100 patients diagnosed with alveolar osteitis were included.

Inclusion criteria: Age 18–60 years, diagnosis of AO based on Blum’s criteria,³ and provision of informed consent.

Exclusion criteria: Systemic illness affecting healing, bleeding disorders, immunocompromised status, or history of clotting abnormalities.

Group Allocation and Interventions

Participants were alternately assigned into two groups (n = 50 each):

Test Group (AVB): Following socket irrigation, 2–3 mL of autologous venous blood was drawn under aseptic conditions and placed into the socket. A sterile gauze or periodontal dressing (e.g. Coe-Pak) was applied to retain the clot.

Control Group (ZOE): After socket irrigation, a zinc oxide eugenol dressing was placed into the socket.

Postoperative Care

Both groups received standard post-extraction instructions, including avoidance of vigorous rinsing, smoking cessation, and maintenance of oral hygiene.

Outcome Measures

Pain assessment: Pain intensity was recorded using the Visual Analogue Scale (VAS) on days 0, 1, 3, and 7.

Healing Assessment

Clinical evaluation of socket healing was performed at follow-up visits.

Adverse Events: Any complications or side effects were documented.

Statistical Analysis

Data were analysed using SPSS version 22. Continuous variables were expressed as mean $\pm$ SD, and categorical variables as frequencies and percentages. Intergroup comparisons were performed using the independent samples t-test and chi-square test, with statistical significance set at $p < 0.05$ (two-tailed).

Results

Baseline Characteristics:

A total of 100 patients clinically diagnosed with alveolar osteitis were enrolled in the study. The baseline demographic and clinical variables were similar across both groups, with no statistically significant differences observed. The age-wise distribution of the cases is presented in Table-1.

Table-1: Distribution of cases with age range

Age range	No of involved cases	Percentage (%)
18-30	15	15
31-40	23	23
41-50	25	25
51-60	37	37

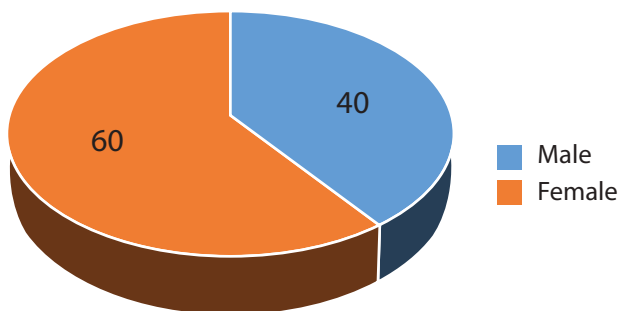
Most patients (37%) were in the 51–60 years age group, while the lowest representation (15%) was from the 18–30 years group. The majority of AO cases followed extraction of mandibular third molars (60%), as summarized in Table-2.

Table-2: Frequency of involvement of extracted tooth with dry socket

Frequency of involvement of tooth extracted	No of cases	Percentage (%)
Mandibular wisdom teeth	60	60%
Mandibular teeth other than 3rd molars	30	30%
Maxillary teeth	10	10%

Gender Distribution

Figure-1 illustrates the gender distribution of the study population. Females were more frequently affected than males.

**Figure-1: Pie chart represents the percentage (%) of male and female affected dry socket.****Pain Scores**

Pain intensity, as measured by the Visual Analogue Scale (VAS), decreased in both groups over time, but the reduction was significantly greater in the AVB group. By day 3, mean VAS was 2.1 in the AVB group compared with 4.6 in the ZOE group ($p < 0.05$). The trend is presented in Figure-2.

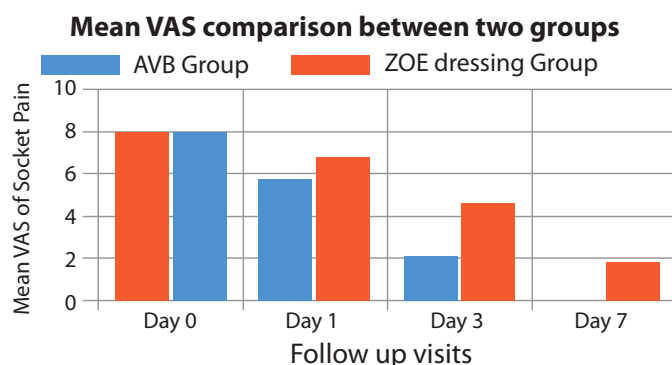
**Figure-2: Comparison of mean VAS values between two groups at different follow up intervals**

Figure-2: Bar chart showing comparison of mean VAS values between two groups across different follow up visits (Day 0, Day 1, Day 3 and Day 7). A p -value of < 0.05

was considered statistically significant.

Healing Outcomes

By day 7, the AVB group demonstrated significantly improved clinical healing compared with the ZOE group ($p < 0.05$). Patients in the AVB group also reported higher overall satisfaction.

Adverse Effects

No complications or adverse reactions were recorded in either group during the follow-up period.

Discussion

Alveolar osteitis (AO) remains one of the most painful and distressing complications following tooth extraction, with a multifactorial aetiology and a variable reported incidence.¹⁻³ Its clinical impact is considerable, leading to prolonged pain, delayed healing, and reduced patient satisfaction. The present study demonstrates that the application of autologous venous blood (AVB) is a simple, effective, and biologically sound approach to AO management, providing superior pain control and improved healing compared with conventional zinc oxide eugenol (ZOE) dressings.

Conventional obtundent dressings such as ZOE and Alvogyl have been widely used owing to their analgesic and antibacterial properties.¹⁰⁻¹² However, their limitations include unpleasant taste, potential local reactions, risk of hypersensitivity to eugenol, and incomplete or delayed healing.^{20,21} Other adjunctive methods, including the SaliCept patch, GECB pastilles, low-level laser therapy, and pharmacological interventions, have produced variable results.^{13-15,24} Platelet-rich derivatives such as PRF and PRP have shown promising outcomes in socket healing,^{16,19,27} but they require additional equipment, laboratory processing, and incur higher costs, making them less feasible in routine clinical practice.

In contrast, AVB offers several biological advantages. It facilitates rapid natural clot formation, providing immediate coverage of exposed alveolar bone and reducing stimulation of nociceptors, which accounts for the significant reduction in pain observed in this study.^{3,18} Moreover, blood-derived growth factors such as PDGF, VEGF, and TGF- β enhance angiogenesis and tissue repair, while leukocytes confer antimicrobial protection, reducing the risk of secondary infection.^{25,26} These mechanisms explain the superior healing and higher patient satisfaction observed in the AVB group compared with the ZOE group.

Our findings are consistent with recent evidence supporting biologically based interventions for AO.^{16,19,27} Compared with PRF or PRP, AVB is cost-effective, time-efficient, and easily applicable in outpatient clinical settings. Importantly, no adverse effects were reported, underscoring its safety.

The limitations of the present study include its non-randomized design, relatively small sample size, and lack of histopathological evaluation of the healing process. To confirm these results and establish standardized guidelines for the clinical application of autologous venous blood (AVB), larger multicenter randomized controlled trials with extended follow-up periods are warranted.

Conclusion

Autologous venous blood (AVB) is a promising, biologically sound, and cost-effective approach for the management of alveolar osteitis. Compared with conventional zinc oxide eugenol dressings, AVB provided superior pain relief, enhanced socket healing, and improved patient satisfaction, without associated complications. Its simplicity and applicability in routine dental practice make it an effective alternative for managing this common postoperative complication. Further multicenter randomised trials are recommended to establish its role as a standard treatment modality.

Conflict of Interest

The authors declare that there are no conflicts of interest related to this study.

Funding

No external funding was received for the conduct of this research.

Acknowledgements

The authors express their sincere gratitude to all participating patients for their cooperation and consent. Appreciation is also extended to the clinical staff for their valuable assistance in patient management and data collection.

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