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RESEARCH ARTICLE

SYSTEMIC REVIEW ARTICLE OF DRY SOCKET: INCIDENCE, PREDISPOSING FACTORS, ETIOLOGY, CLINICAL FEATURES, TREATMENT, AND PREVENTION

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ABSTRACT

Systemically reviewing the topic dry socket and its component: incidence, predisposing factors, aetiology, clinical features, treatment, and prevention. All studies pertaining to the topic and its component were included. Exclusion criteria were applied to exclude studies that were not PubMed indexed. The materials and methods used for this systemic review were to search in the PubMed database, using specific words "Dry Socket, incidence, predisposing factors, aetiology, clinical features, treatment, and prevention" and published in the English language. The articles were reviewed, 20 papers were identified in PubMed but a total of 15 papers were included in the final systemic review according to the specific keywords and materials mentioned above. The occurrence of dry socket in an everyday oral surgery or dental practice is unavoidable. The incidence and predisposing factors of dry socket were remarkable but varied from one study to another. Aetiology of dry socket is not fully understood, different studies suggest different theories behind its occurrence. Clinical features were investigated aiming to determine diagnostic components to identify dry socket. Treatment and prevention of dry socket were reviewed showing a massive verity of treatment modalities and preventive measures.

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INTRODUCTION

Exodontia is one of the most common procedure in oral surgery and dentistry (Nusair, 2007). Dry socket, also referred to as alveolar or fibrinolytic osteitis, is a major complication that follows tooth or teeth extractions (Momeni, 2011). It is an acute inflammation of the alveolar bone around the extracted tooth and characterized by severe pain, breakdown of the clot formed within the socket resulting in the formation of an empty socket, and often filled with food debris (Cohen *et al*., 1995). It exhibits an exposed bone that is not covered by a blood clot or healing epithelium and exists inside or around the perimeter of the socket or alveolus for alone period of time after the extraction procedure (Mamoun, 2018). In this article, we will be reviewing the literature variation of dry socket regarding its incidence, predisposing factors, etiology, clinical features, treatment, and prevention.

Incidence and predisposing factors: The incidence and predisposing factors related to dry socket have been reported in many studies. Akinbami *et al*.(2014) concluded that the incidence of dry socket to be 1.4% of all extracted teeth. He also suggested the predisposing factors of developing dry socket as to be more common in females, fourth decade of life, mandibular teeth more than maxillary, molars more than other teeth and specifically, retained roots and third molars. Another study that was conducted by B- Ra'ed O Abu Hantash *et al*. (2011) reporting the overall frequency of dry socket to be 3.2%.Also, the predisposing factors were investigated showing that having surgical extraction and being a smoker increase the incidence of dry socket from 1.7 % to 15% and from 4% to 12%, respectively. A study conducted by C-Bowe DC *et al*. (2011) observing the incidence of dry socket to be approximately 3% for all routine extractions and can reach over 30% for impacted mandibular third molars. Additionally, many predisposing factors were mention as contributing to the occurrence of dry socket including difficult or traumatic extractions, female sex, tobacco use, oral contraceptives and preexisting infection.

Etiology: In relevance to the cause of dry socket, studies have shown various theories behind it. Birn *et al*. (1973) suggested the exact etiology of dry socketto still remains largely unclear. However, the most widely accepted theory is that it is the result of a partial or complete disintegration of formed blood clots by fibrinolysis. To be specific, an increased local fibrinolysis leads to disintegration of the clot. Another theory suggested by John Mamoun *et al*. (2018) concluded that dry

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socket can occur in a high-stress extraction which induces high compressive forces on alveolar bone surrounding the tooth, and eventually leading to necrosis of osteoblasts within the socket. As a result of that, fibrinolytic activity is initiated which lyses any blood clot that could have formed. Additionally, Bloomer CR *et al.* (2012) reported that dry socket is primarily a biological process and not a mechanical disruption or removal of the clot.Specifically, the increase in fibrinolytic activity could be the main causeof premature loss of the intraalveolar blood clotafter extraction. Supporting the fibrinolytic activity theory, a Noroozi AR *et al*. (2009), concludes that an increased local fibrinolytic activity is the main etiological factor of dry socket.

Clinical features: In regard to the clinical features, studies have described dry socket based on multiple perspectives. John Mamoun *et al*. (2018) observed the clinical features of dry socket lesion and described it as the bone inside the socket being exposed, with no exposed bone on the socket occlusal perimeter, and all of the exposed bone is below the projected location of the occlusal surface of the socket when the socket eventually heals. Moreover, the socket bone can be completely exposed or can be covered by food debris and bacterial smears. However, healing could be seen clinicallyasshrinking of the socket occlusal diameter by epithelial growth. Another study conducted by Blum IR *et al*. (2002) described dry socket as the presence of "postoperative pain in and around the extraction site, which increases in severity at any time between one and three days after the extraction, accompanied by a partially or totally disintegrated blood clot within the alveolar socket, with or without halitosis". In addition, Diego Halabi *et al*. (2018) suggested that positive diagnosis of dry socket is is based on two criteria. First, increasing postoperative pain intensity for 4 days within and around the socket. Second, total or partial breakdown of the blood clot in the socket with or without bone exposure.

Treatment: In respect of treatment, different treatment modalities were mentioned in the literature. Tarakji B *et al*. (13)reported that the traditional options of treatment are directed toward palliative care. For instance, irrigation of the surgical site, avoiding curetting the extraction socket and packing with a zinc oxide-eugenol paste on iodoform gauze can be considered to relieve acute pain episodes. Another study conducted by Maria Taberner-Vallverdú *et al*. (2015) shows that curettage and irrigation of the socket should be carried out in dry socket, as well as other suggested therapies such as Low Level Laser Therapy, zinc oxide eugenol and plasma rich in growth factors, which showed improved results in pain relife and alveolar mucosa healing. Bowe DC *et al*. (2011) conducted a study to investigate the management options of dry socket. He claims that the basic treatment for dry sockets is to irrigate out food particles or bacterial material using chlorhexidine gluconate or saline and then fill the socket with a medicament. Also, he suggested the use of microscope magnification to facilitates the irrigation of a dry socket lesion and minimizes contact of the irrigation needle with exposed bone. He also suggests that dry socket medicament to be used covering the exposed bone for enough period of time with a resorbable, but durable cover to protect the bone from different types of irritation. Also, suturing the lesion to retain the medicament or blood clot can be considered to improve the healing process. Additionally, anesthetizing the patient and induce bleeding into the socket by aggressively curetting the socket or using a round bur or No. 330 bur with copious irrigation to avoid over-heating can be performed to facilitate blood clot formation. The majority of treatment modalities aim to optimize the lesion such that the socket is optimally capable of forming an enduring layer of epithelium that covers the exposed bone inside the socket and around the socket occlusal perimeter.

Prevention: The prevention methods and materials of dry socket have been discussed in various studies. Tarakji B *et al*. (13)reported that avoidance of smoking and traumatic extraction should be considered to prevent dry socket. Also, the use of antibiotics, such as, azithromycin and chlorhexidine rinse or gel can be effective in the reduction of dry socket incidence. Similarly, Maria Taberner-Vallverdú *et al*. (14) reported that chlorhexidine administration and platelet rich plasma reduce dry socket development. On the other hand, she claims that antibiotic prescriptions and avoiding tobacco use did not show a significant difference in the reduction of dry socket incidence. However, as she reported, age, history of previous infection and difficulty of extraction are risk factors for developing dry socket and therefore should be taken into consideration. Another study conducted by Rutkowski JL *et al*. (15) showed that platelet-rich plasma (PRP) significantly reduced the incidence of dry socket by 62.1%. Specifically, it is believed that the use of PRP following tooth extraction is a simple, cost-effective technique that can be used to decrease the incidence of dry socket and therefore decrease postoperative pain.

Conclusion

To sum up, dry socket, also referred to as alveolar or fibrinolytic osteitis, is one of the extractions wound healing disorders. It is considered to be one of the most common postoperative complications that results in severe pain "postoperative pain'' inside and around the extraction site, and usually caused by a partial or total disintegrated blood clot within the socket. Dry socket has been discussed in literature to explore its various aspects. In this study, we are reviewing the literature variations of dry socket in regard to its incidence, predisposing factors, etiology, clinical features, treatment, and prevention.

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