



Painful Dry Socket, its Prevention and Treatment: A New Perspective



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Abstract

A new and more effective method of preventing and treating painful dry sockets is described.

Keywords: Traumatic extractions; Female gender; Tobacco use; Oral contraceptive use; Pre-existing infections; Foul taste; Halitosis; Alveolitis sicca dolorosa

Introduction

A recurring problem facing dentists and oral surgeons is the occurrence of painful dry sockets [1]. It occurs in approximately 3% of routine extractions. Following surgical removal of impacted third molars, the frequency rises to approximately 30% [2]. Although many factors have been cited as contributing to the occurrence of dry socket including difficult or traumatic extractions, female gender, tobacco use, oral contraceptive use and pre-existing infections [3], the exact etiology of dry socket is not well understood [4,5]. In painful dry socket, there is facial pain, usually of a continuous throbbing quality, which radiates to the ear and temple [6]. The pain usually begins one to three days after the extraction and may be accompanied by a foul taste and halitosis [7-9]. In some cases, the pain persists for up to ten days post-extraction and is frequently so severe that it is not relieved by even the most potent analgesics [9]. Currently, treatment is based upon the removal of infected debris from the socket, and pain relief with medication applied to the socket. Medicaments such as antibacterials, topical anesthetics, and obtundents, or combinations of the three are used as socket dressings [7]. These medicaments include alvogyl (eugenol, iodoform, and [10], lidocaine ointment [11], zinc oxide and eugenol impregnated cotton wool pellets [12], bismuth subnitrate, iodoform paste (BIPP) on ribbon gauze and metronidazole. Multiple postoperative visits are necessary in 45% of cases, involving significant consequences for the patient as well as being time-consuming for the practitioner [11,13].

The treatment described below is based on the following

chain of events that appear to follow an extraction:

- a) The trauma of extraction leads to localised inflammation and swelling.
- b) If the inflammation and swelling extend to the periosteum of the adjacent tooth, its periosteum will likewise become swollen and edematous.
- c) The consequence of this is a slight extrusion of the adjacent tooth from its socket.
- d) Even limited extrusion of the tooth adjacent to the extraction socket results in premature contact with its opposing tooth.
- e) The prematurity results in increased bite pressure on the already inflamed and swollen periosteum of the tooth adjacent to the extraction socket, which with time results in more periodontal pain and swelling.
- f) The increased periodontal pain causes an acute myofascial dysfunction pain affecting the masseter and temporalis muscles on the affected side.
- g) This in turn causes the throbbing facial and temporal pain that refers to the ear.
- h) If, prior to the extraction, there already existed an occlusal prematurity, the chances of the patient developing post-extraction pain are increased.

Dry socket pain – current widely believed misconceptions

Exposed bone is painful

Contrary to widespread belief, exposed bone is not painful. The literature describes two kinds of dry socket – painful and non-painful, even though the bone is exposed in both types. Hanson and Pindborg termed dry socket accompanied by severe pain “alveolitis sicca dolorosa”, or “painful dry socket”. They called painless dry socket “alveolitis simplex” [14]. If the pain was indeed from the exposed bone, then logic dictates that all dry sockets would be painful. Painless dry socket has also been called “clinical socket” [15]. A vivid illustration of the fact that exposed bone is not painful is in the book “Oral Surgery” by WH Archer. Archer relates the tale of a patient who had 22 teeth extracted and was instructed to keep his mouth clean. Three days later at a post-operative consultation, his mouth was scrupulously clean and there was not a single blood clot in any of the 22 sockets. He had diligently cleaned every tooth socket. The patient had no pain of any kind [16]. Probing the exposed socket bone is not at all painful unless there is a loose bone fragment as a result of fracture during the extraction. Pressure on this loose fragment with the probe may cause pain from the underlying tissues.

In painful dry socket the pain originates from the socket

Although all of the treatments mentioned above are applied to the socket itself, a thorough literature search reveals no evidence that the socket is actually the origin of the pain. The comprehensive Cochrane review of 2012 also makes no mention of the origin of the pain. There is also insufficient evidence that any of the currently

used socket treatments were effective in treating dry socket [17].

The diagnosis and treatment of “dry socket pain”: This paper describes a radical departure from the current thinking on the cause and treatment of dry socket pain, and describes:

- i. How to diagnose of the origin of the pain in dry socket
- ii. Simple preventive precautions which dramatically reduce the incidence of post-operative “dry socket” pain. This is particularly pertinent in patients undergoing third molar removal.
- iii. A new and highly efficacious treatment of post-extraction “dry socket pain”.

Diagnostic tests determine the origin of the pain:

- i. The teeth are percussed with the back of a mouth mirror, starting three or four teeth from the affected socket, progressively percussing the teeth towards the socket. Invariably one or both of the teeth immediately adjacent to the socket are more tender to percussion than the other teeth. In cases of removal of lower third molars, the lower second molar is always more sensitive to percussion when the patient has post-operative pain. This tenderness to percussion indicates that the periodontal ligament of the adjacent tooth is painfully inflamed.
- ii. The muscles of mastication are then examined.

Compressing the antero-superior attachment of the masseter muscle to the zygomatic process (Figure 1) between thumb and forefinger will in most cases be painful, but other parts of the masseter may also be tender.

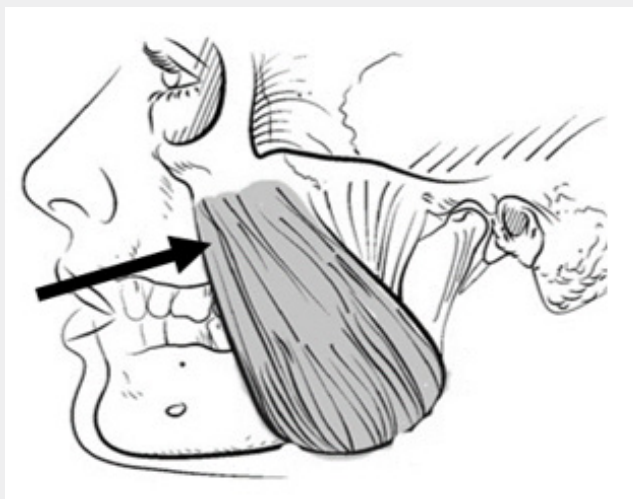


Figure 1: The most tender part of the masseter muscle in most cases of dry socket.

Any part of the temporalis muscle may also be tender to palpation.

This muscle tenderness explains why the most common symptom of dry socket is a continuous throbbing facial and

temporal pain that radiates to the ear [6]. Pain from the masseter muscle commonly radiates to the ear [18,19].

Prevention of dry socket pain: The main object of prevention is to reduce or eliminate post-operative pain. Although

the suggested procedure does not prevent clot breakdown or the occurrence of dry socket, it prevents the dry socket from causing pain. Prior to extracting a tooth, the adjacent teeth are percussed to ascertain whether they are at all tender to percussion. If the adjacent tooth/teeth are painful to percussion, then the chances of post-extraction pain are increased. If the adjacent teeth are indeed painful to percussion, then the bite should be equilibrated prior to the extraction to eliminate any prematurities. This will minimise the chances of a dry socket becoming painful.

Pressure from impacted lower third molars frequently causes slight extrusion of the lower second molar, which leads to premature contact. These cause the second molar to become tender to percussion. Patients who have pre-operative tenderness to percussion of the lower second molars are more prone to developing post-operative pain. Pre-operative occlusal equilibration of the second molars to remove premature contacts is effective in reducing the frequency of post-operative pain.

The author has been using this preventive treatment for forty years and has found that the incidence of post-operative pain following third molar removal has dramatically decreased.

Treatment of dry socket pain: The successful treatment of painful dry socket can usually be achieved in a single visit, eliminating the necessity of repeated time-consuming visits. If the

tooth adjacent to the extraction site is tender to percussion, then a simple bite equilibration results in almost instantaneous relief of the patient's pain. In cases of third molar removal, the palatal plunger cusp of the upper second molar is frequently (but not always) involved, and minor occlusal adjustment of this cusp is then all that is necessary.

The results of successful equilibration are frequently an immediate and dramatic reduction in the patient's pain and discomfort. If the patient does not immediately feel a difference, then it indicates that further equilibration is necessary.

There are some caveats however:

a) The tenderness of the involved tooth may prevent the use of articulating paper to pinpoint which part of the tooth is in premature occlusion.

b) The equilibration should be carried out on the opposing tooth if possible, as the involved tooth may be painful to work on.

With regard to socket debridement to address the problem of foul taste and halitosis, the patient is provided with a syringe with a curved nozzle that can easily be inserted into the socket and is instructed how to irrigate the socket after meals.

For this purpose, Monoject 412 is recommended (Figure 2), but any suitably shaped syringe would suffice.



Figure 2: Monoject 412 syringe for socket debridement.

Discussion

The Cochrane Collaboration published a review in 2012 of the local interventions for the management of dry sockets. The aim of this systematic review was to analyse the different methods currently used in the management of dry sockets [17]. Although dry socket is one of the most studied complications in dentistry, [20] and despite the plethora of different methods used in the management of dry socket pain, a further review concluded in 2015 that there was no evidence to support any of the interventions

currently in use [21]. An earlier study had found that the incidence of painful dry socket following single extractions was 5%, whereas the occurrence of the condition following multiple extractions was 2.1%. Statistically, the difference between these proportions is highly significant ($P < 0.001$) [22].

Krogh confirmed that the more adjacent teeth removed at one operation, the less the danger of (painful) dry socket development per extraction socket [23]. This is counter-intuitive. It would be expected that the number of painful dry sockets should increase

in linear proportion to the number of teeth removed. However, consider the role of the periodontal membrane in influencing pain. If one tooth is removed, unless it is a third molar, there is usually a tooth on either side of it, which means that there are two teeth adjacent to the single extraction socket, either or both of which may experience periodontal inflammation and contribute to pain. If however two adjacent teeth are removed, then there is still a tooth on either side of the gap that may become painful. Hence again only two possibly painful teeth but now per two sockets. Effectively the chances of painful dry socket are halved. If three adjacent teeth are extracted, then there are still only two possibly painful teeth, meaning that the potential incidence of painful dry socket per tooth socket is now further reduced. This explains Krogh's observation that "the more adjacent teeth removed at one operation, the less the danger of dry socket development" [23].

There are observations relevant to and supportive of these concepts:

a) The author has never seen a case of painful dry socket following a full dental clearance, even though clot breakdown frequently occurs in these cases. He has also been unable to find a single report of this in the literature. This supports the understanding that if there are no teeth adjacent to the extraction site, dry sockets, if they do occur, are not painful.

b) Dry socket pain also never occurs when fractured mandibles are immobilised, even when teeth in the fracture line have been extracted or teeth have been lost during the trauma. When a fractured mandible is wired in occlusion, the teeth adjacent to the extracted teeth cannot be extruded by periapical oedema, because they are firmly in occlusion. There are likewise no reports in the literature of dry socket pain occurring when the jaws are wired in occlusion for the treatment of fractured mandibles.

Conclusion

The pain of dry socket results from periodontal edema and the resultant occlusal prematurities affecting the tooth or teeth next to the socket. These occlusal prematurities are the most likely cause of the muscle pain that develops one to three days post-extraction. The prevention of post-operative pain is accomplished by equilibration of the bite before undertaking the extraction or surgical removal of a tooth. This is only necessary if the tooth adjacent to the extraction socket is tender to percussion before the extraction. If the teeth adjacent to the extraction are not sensitive to percussion before the extraction, the chances of painful dry socket developing are considerably reduced. On the contrary, if the teeth adjacent to the extraction are sensitive to percussion, the chances of post-extraction pain are greatly enhanced. The recommended treatment of painful dry socket is to equilibrate the bite by removing the premature contacts of the teeth adjacent to the extraction socket, together with ensuring that the socket is kept free of debris.

Practical implications

The advantages of this treatment are not restricted to rapid relief of the patient's pain and discomfort. Multiple postoperative visits are also no longer necessary, minimizing inconvenience for both patient and practitioner.

Footnote

The author has practiced as a Maxillo-Facial and Oral Surgeon since 1973 and over the years has removed countless impacted wisdom teeth. He has not found it necessary to use any socket medication since 1979.

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