Journal of Aeronautic Dentistry

The Journal of Aeronautic Dentistry (JAD) (ISSN 0975 - 0576) is presents original, peer-reviewed articles on conditions of the artificial gravity, microgravity, zero gravity and human factors etc. The eminent personalities like executive editor and editorial board members are the **Crew Scientists and Health and safety officers (Mars Mission), NASA, USA**. The Journal focuses on techniques and developments in aircrews members facing numerous adverse effects such as head and facial barotraumas (barotrauma-related headache, external otitic barotrauma, barosinusitis and barotitis-media), dental barotrauma (barometric pressure-related tooth injury), barodontalgia (barometric pressure-related oro-dental pain). Special considerations have to be made when planning restorative, endodontic, prosthodontic and surgical treatment to an aircrew patient.

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Dentist in space mission

Dental Emergencies and Dental Maintenance needs to be deal with for Space travel, since humans live in micro-gravity for several months to years. What if an astronaut has an abscess or fractures a tooth while on a mission? What if a pre-existing restoration or virgin tooth fractures? How can you maintain proper Oral Hygiene on long flights or extended stays on the ISS? What affect does micro-gravity have on the Oral Cavity as it relates to gingivitis, periodontal disease, and bone loss? Since teeth are housed in bone, what effect will weightlessness have on tooth support; in order to maintain proper bone density? or, does zero gravity affect Maxillary and/or Mandibular bone density at all? After a permanent tooth is extracted, with no bone filler within the "socket", the bone at the extraction site will atrophy.howerver, if you place an implant in the site of a previously extracted tooth, bone will not be lost. My group research and experimentation initiatives are the following: 1. What Dental procedures are compatible in micro-gravity? After research, methods and proven techniques are established, training a selected crew member on the Space Shuttle or working on the ISS for an extended stay is necessary. Dental Emergency Protocol must be realized and standardized in order to prevent what would be a common post-op complication on earth, but in space, would be life threatening. It is imperative that we send that "Aeronautic dentist in space " to perform first response protocol through experimentation. Understanding the affects of tooth extractions (including bleeding time, healing time, infection rate, bone regeneration, bone degeneration, periodontal disease, and caries prevalence). It is in the best interest for space travelers to have a "Dental Emergency and Maintenance Protocol System" available. Such a protocol is imperative for long distance space travel (Mars) or a working settlement including the ISS in space, This Protocol has tremendous significance and reimbursement to all those crew members that may have a Dental Emergency. While strengthening the space program, the knowledge gained from micro-gravity tested procedures would help those who need Emergency Dental Care in Third World Countries. Dental Experimentation needs to become a priority for the safety of anyone who travels in space.

Balwant Rai
Editor-in-Chief

Journal of Aeronautic Dentistry

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Aeronautic dentist: Duties

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ABSTRACT

Good dental health is an essential ingredient of the aeronautic dentistry. Mission requirements dictate that flying personnel receive optimal dental care. The importance of close liaison between the flight surgeon's office and the dental treatment facility cannot be overemphasized. The flight surgeon should be aware of all aircrew personnel who are undergoing dental treatment. The flight surgeon must be notified when drugs or medications are administered to, or prescribed for, the aircrew member. This paper reviewed the duties of aeronautic dentist in space mission.

Key words: Aeronautic dentistry, dentist, space mission

INTRODUCTION

Dental adverse effect prevention was emphasized with the hope that within twenty to thirty years there may be a number of astronaut candidates with no existing dental restorations and with optimum oral health. However, there remains the concern that trauma to teeth could occur within the confines of a zero gravity space capsule as crew members carry out their daily responsibilities. The possibility is evident considering the duration of a space flight to Mars and back could require up to three years. The dental concerns of a space mission are only a small part of a much larger team effort, however, it is one not to be overlooked. An historical review of dentistry's involvement with America's flight and space programs of the 20th Century would be prudent. Many of same questions asked today were addressed in the early days of aviation dentistry as it transitioned into aerospace dentistry. Any past research and experiences would help serve as a foundation to build upon. Aircrew members are not to fly for at least 8 hours after receiving a local or regional dental anesthetic agent according to Air Force Instruction (AFI). The 8-hour grounding time is to be used for dental procedures which require administration of local anesthesia but do not pose a potential impediment to flying performance. Extension of this time will be at the discretion of the flight surgeon with the advise of the treating dentist depending on the nature of the intervention or the disease process.

The flight surgeon should also have a general knowledge of dental problems which may confront aircrew members and be prepared to administer emergency dental treatment. Dental problems of aeromedical interest can be divided into six broad areas: odontalgia, local anesthesia, tooth extraction, facial fractures, dislocation of the mandible, and dental identification.

DENTAL CLASSIFICATION

The system outlined in this section is the classification used in the Air Force to signify a persons dental health status.

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CLASS I

No pathologic oral conditions exist and no treatment is required. This includes:

a. No dental caries or defective restorations.

b. Healthy periodontium; oral prophylaxis not indicated.

c. Replacement of missing teeth not indicated.

d. Unerupted, partially erupted, or malposed teeth that are without historical, clinical, or radiographic signs or symptoms of pathosis, and are not recommended for removal.

e. Stable occlusion; asymptomatic temporomandibular joint.

CLASS II

Oral conditions exist that will not require emergency care within 12 months. These include:

a. Dental caries with minimal extension into dentin; minor defective restorations easily maintainable by the patient.

b. Interim restorations or prostheses which can be maintained by the patient for a 12-month period.

c. Periodontal conditions limited to:

1. Requiring oral prophylaxis

2. Generalized marginal gingivitis.

3. Early periodontitis.

4. Maintenance therapy.

5. Supragingival or subgingival calculus.

d. Unerupted, partially erupted, or malposed teeth recommended for removal that are without historical, clinical, or radiographic signs or symptoms of pathosis.

e. Edentulous areas not requiring immediate replacement.

f. Active orthodontic treatment.

g. Temporomandibular joint dysfunction or myofascial pain patients in maintenance therapy.

CLASS III

Oral conditions exist that may require emergency care within 12 months. These include:

a. Dental caries with moderate or advanced extension into dentin; tooth fractures; or defective restorations not maintainable.

b. Interim (temporary) restorations or prostheses which cannot be maintained by the patient for a 12-month period.

c. Periodontal considerations:

1. Acute gingivitis or pericoronitis.

2. Moderate to advanced periodontitis.

d. Edentulous areas or teeth requiring prosthodontic treatment for adequate mastication, communication, or acceptable esthetics.

e. Unerupted, partially erupted, or malposed teeth with historical, clinical, or radiographic signs or symptoms of pathosis.

f. Chronic oral infections (other than periodontal disease); pathological lesions including:

1. Pulpal or periapical pathology.

2. Lesions requiring biopsy or awaiting biopsy report.

g. Emergency situations requiring therapy to relieve pain, treat trauma, treat acute oral infections, or provide timely follow-up care (e.g., drain or suture removal) until resolved.

h. Temporomandibular joint dysfunction or myofascial pain requiring treatment.

CLASS IV

A dental examination is required. This includes:

a. Overdue for periodic dental examination

b. Determination made that a dental examination is required because of irregularities in dental record, clearance for remote assignment, etc.

Additional Considerations

When determining a patient's classification, the following issues should also be considered:

a. When there is difficulty in determining classification between Class II and III, place patient in Class III.

b. No patient will be cleared for assignment to a remote or isolated location in Class III or IV. Ideally this individual should be in Class I, but assignment actions should not be delayed if the individual is in Class II.[10]

DENTAL WARTIME READINESS

The primary mission of the United States Air Force (USAF) dental officer is to provide for the oral health of the troops. The scope of this oral health care includes management of dental emergencies; definitive dental care at second, third, and fourth echelons; initial stabilization and management of oral and maxillofacial injuries; definitive oral and maxillofacial care at third and forth echelons; and forensic dentistry support.

A vital additional role that USAF dental officers perform is as an adjunct to the physician in the delivery of medical care. The dental officers' training and experience make them valuable in the areas of triage, airway management, hemorrhage control, shock management, IV and fluids management, pain control, treatment of lacerations, and operating room assistant.

Finally, the senior dental officer is often qualified to assist in or perform administrative or command roles in wartime. Their seniority, experience, and management training render them valuable assets, especially in a small wartime facility.

ODONTALGIA

Odontalgia (tooth pain) may have several etiologies. (3) Some of the more common conditions encountered in aviators are presented here in the order of presentation, from the most to the least frequent.

Barodontalgia

World War II, with its emphasis on air power, created considerable alarm among those concerned with aviation dentistry (27). Some believed high altitude flying was associated with a new clinical syndrome that included variations ranging from localized toothache to complex head neuralgia. Investigators of that period initiated extensive programs designed to determine the effects of flight on the oral structures. (6) The conclusions of these studies, plus the findings of more recent research, indicate that barodontalgia or "altitude induced toothache" is not a new pathologic entity but a condition intimately associated with pre-existing pathology.

Periodontal disturbances, temporomandibular joint pain; habits of lip biting, grinding, or clamping of teeth, etc., have developed in some fliers as a result of occupational tensions. However, since toothache is the most frequent dental complaint associated with flight, and is the one which responds most favorably to definitive treatment, the remainder of this discussion is limited to this problem. [16, 25]

Determining the origin of pain in these patients is often difficult. If the predisposing factors are of dental origin, they usually represent an acute exacerbation of subclinical symptoms such as pulp exposure, pulp necrosis, or chronic pulpitis.[15, 24]

Diagnosis: The variations in symptoms preclude dogmatic statements, but the following generalities taken from the literature may be helpful:

a. The offending tooth is many times one that has recently been restored by a dentist.

b. If tooth pain occurs during ascent, the tooth is usually vital.

c. If tooth pain occurs during flight, barosinusitis should be suspected. (9) The patient will usually complain of dull tooth pain in one or both of the maxillary posterior quadrants. This pain originates from the middle superior and posterior superior alveolar nerves which lie in the sinus membrane. In barosinusitis, pressure

changes during flight are perceived as pain in the teeth innervated by the middle superior and posterior superior alveolar nerves.

d. Barodontalgia rarely, if ever, affects teeth with healthy pulps or teeth that have been successfully treated endodontically.

e. The idea that air pockets or gas bubbles under restorations cause barodontalgia is a myth. However, the pain is thought to be the result of expanding and escaping gases. These gases are in the pulpal and periapical areas.

f. Classifying the barodontalgia (see figure 12-1) may be helpful in determining its source and therefore help in its treatment.[13,16,25]

Treatment: Prescribe an analgesic if pain persists after flight, then investigate the causes. If it has been determined that periapical pathology exists, follow those procedures outlined in the section on acute periapical abscess. Dental disturbances associated with flight continue to be of major interest to Air Force dentistry.

Class	Symptoms	Cause
I	acute pain on ascent	reversible pulpitis
II	dull pain on ascent	irreversible pulpitis
III	pain on descent	dead, necrotic pulp
IV	pain on ascent or descent without relief on ground	abscess or cyst

Figure 12-1. BARODONTALGIA: Pain emanating from teeth, Pulpalgia

Acute Periapical Abscess

This condition can result when an infection of the pulp reaches out through the apex of the tooth and involves the periodontal tissues [20].

DIAGNOSIS

The patient may give a history of repeated episodes of pain that have gradually become continuous and intense. Increased pressure at the root apex may make the tooth feel elongated to the patient. It may seem to be the first tooth to strike its antagonist when the teeth are brought together. There may be severe pain on percussion. This is a most significant symptom. An untreated periapical abscess may burrow through alveolar bone and manifest clinically as a bright red elevation of mucous membrane (parulis or gum boil), (see figure 12-2). A cellulitis may even develop. Also malaise, anorexia, and an elevated temperature may be noted when there is systemic involvement.

Treatment: Drainage, induced or spontaneous, usually provides immediate relief from pain (26). Two methods may be used to induce drainage:

a. Incise the fluctuant area using a stab procedure. Suture a small drain or slice of surgical tubing in the wound to maintain drainage. This is generally the most successful method for continued relief.

b. Establish drainage through the crown of the tooth. Remove soft decay with a spoon-shaped instrument, carefully create an opening into the pulp chamber. The pain will usually subside when drainage is established .

If drainage is not induced, spontaneous drainage may occur. The acute abscess is then converted to a chronic state subject to repeated acute exacerbations.

The spread of the primary periapical abscess is usually in the direction of least resistance. As a general rule, it may be stated that the cortical bone in closest proximity to the abscess site will be the point of breakthrough. However, positively identifying the involved tooth by its proximity to the parulis is an unreliable procedure.

Anatomic considerations play a large part both in determining the path of progression and the possibilities of serious sequelae resulting from further spread of the infective process (12). As a general statement, periapical abscess spread is usually toward the lateral aspect of the jaws. If the primary infection involves the palatal root of an upper tooth, the soft tissue abscess is usually found in the palate. Palatal roots are present in the

upper molars and first premolars. Abscesses on all other roots in the maxillary dentition tend to burrow through to the facial side. Abscesses developing on the lingual surface of the mandible, to such an extent that they produce drainage into the mouth, are rare. Drainage may, on occasion, occur extraorally without involving the oral mucosa if the path of least resistance is through the cortical bone.

When the spread of a mandibular periapical abscess is directed lingually, the level of bone perforation dictates the course of events. If the breakthrough is above the attachments of the muscles of the floor of the mouth, sublingual infection results. If below these attachments, the avenue of spread is through the fascial spaces of the neck, creating the potential for major complications, such as Ludwig's angina.

Treatment: In cases of more advanced progression, the provision of drainage is still of primary importance. Antibiotics should be administered and their administration continued for 7 to 10 days if the patient is febrile. With soft tissue involvement, the application of moist heat is often helpful in localizing the suppuration.

Emergency treatment centers around the prevention of serious sequelae by establishing drainage and maintaining a high blood level of antibiotics. If the offending tooth can be restored, endodontics (root canal) should be accomplished after the acute symptoms have subsided and the infection is under control. If drainage cannot be established, or if the tooth is so badly broken down that it cannot be restored, extraction should be considered. The final decision on tooth extraction should be made by a dentist having access to X-rays. In any event, do not rely on the use of antibiotics in lieu of establishing drainage.

PERIODONTAL DISEASE AND SOFT TISSUE PATHOLOGY

The great bulk of oral soft tissue disorders are chronic in nature. Generally these lesions are not painful. It is not the purpose of this section to cover the entire fields of oral medicine and periodontal disease but rather to present a discussion of those oral disorders which require immediate treatment by the Air Force physician when a dental consultation is not available. (Editor's note: many of these dental diseases appeared during sickcall at our 2 doctor, no dentist ATC during Desert Shield/ Storm. Phone communication was usually our only means of dental consult).

PERIODONTAL DISEASE

Necrotizing ulcerative gingivitis (NUG, Vincent's Infection, Trench Mouth):

a. Presentation: A gnawing pain and marked gingival sensitivity are usually the outstanding complaints. These subjective symptoms are characteristically accompanied by pronounced gingival hemorrhage, a foul metallic taste and fetid odor in the mouth, general malaise, and anorexia (12).

b. Clinical appearance: Necrosis and ulceration are the principal characteristics of this exceedingly painful inflammatory disease of the gingival tissues. Necrotic lesions typically appear between the teeth in the interproximal spaces. These crater like ulcerations, giving the gingiva a "reverse architecture" appearance and covered by a grayish pseudomembrane, are generally pathognomonic.

c. Etiology: Although it was felt for many years that fusospirochetal organisms were responsible, the precise etiology has not been established. It is now considered by many to be an endogenous infection arising as a result of the action of ordinarily harmless surface parasites exposed to an altered environment. It is beyond doubt that general health, diet, fatigue, stress, and oral hygiene are more important as precipitating factors than are proximity, intimacy, and contamination. Indeed, the term "trench mouth" is associated with high numbers of troops suffering from similar conditions of high anxiety, poor diet, compromised general health, etc., not from crowded conditions (20).

d. Treatment: Therapy is the establishment of good oral hygiene so as to break the cycle of

poor oral hygiene, pain, aversion to brushing, infection, anorexia, and so on. Simple emergency treatment is outlined as follows:

1. Gross debridement. Initial debridement can be achieved by having the patient brush the teeth and gums using a soft toothbrush and warm water. Clean the teeth supragingivally with a dental scaler. Thorough rinsing with 3% hydrogen peroxide diluted with water, or a flavored mouthwash, should follow the initial debridement.

2. Place the patient on an adequate diet and advise a copious fluid intake.

3. Dental home care instructions. Emphasize the importance of good home care. Provide the patient with the soft brush used for initial debridement. Recall the patient daily until acute phase subsides. Unless the patient develops systemic manifestations, antibiotic therapy should not be instituted.

Institution of the above regimen will usually suffice for the management of the typical acute case. As a result of this treatment, which can be considered by no means definitive, the acute form subsides and the chronic phase ensues. Although clinical symptoms are minimal, tissue destruction continues unabated unless further corrective measures are instituted. For this reason, definitive dental treatment must be obtained.

If the patient is not improving after 24-hours, blood workups are indicated to rule out other systemic diseases.

PERIODONTAL ABSCESS

a. Presentation: A deep, throbbing, well-localized pain and a tenderness of the gingiva is characteristic .

b. Clinical appearance: This acute suppurative process presents as an ovoid elevation of the gingiva on the lateral aspect of the root (19). The overlaying gingiva is usually red and edematous, with a smooth, shiny surface caused by the edema. The following symptoms may be present:

1. Sensitivity of the tooth to percussion.
2. Mobility of the tooth.
3. Lymphadenitis.
4. General malaise and elevation of temperature in severe cases.

c. Etiology: This condition results from an extension of inflammation and infection from a periodontal pocket into deeper periodontal tissues.

d. Treatment consists of the following procedures:

1. Establish drainage through the gingival crevice using a periodontal probe or scalpel blade.
2. Spread the tissues and irrigate to remove pus and debris from the abscess area.
3. Instruct the patient to use warm saline mouth rinses hourly. With definitive treatment, prognosis is good, depending upon the extent of supporting bone loss around the teeth involved.

The symptoms of a periodontal abscess may resemble those of a periapical abscess. Because of variations in prognosis, it is important to differentiate positively between the two. Involvement of the lateral aspect of a tooth root by a single suppurative lesion, which can be entered from the gingival crevice, is indicative of a periodontal abscess. The presence of suppurative material in the gingival crevice of the affected tooth also points to this diagnosis.

SOFT TISSUE PATHOLOGY

PERICORONITIS

a. Presentation: Marked pain in the area of a partially erupted tooth.

b. Clinical appearance: Pericoronitis is acute inflammation of the tissue overlying and surrounding a partially erupted or erupting tooth-usually a mandibular third molar. The clinical picture is that of a markedly red, swollen, suppurative lesion. The involved tissue is very tender and often accompanied by pain radiating to the ear, throat, and floor of the mouth. Excruciating pain is produced when the opposing tooth impinges upon the

inflamed tissue during mastication. There may be trismus of the masticator muscles on the affected side. Involvement of the cervical nodes, fever, and malaise are common. If this occurs, antibiotic therapy is indicated .

c. Etiology: The principal etiologic factors in pericoronitis are food debris and bacterial waste products which have accumulated under the soft tissue flap, overlying a partially erupted tooth. (2) This tissue is often traumatized during mastication which further exacerbates the situation.

d. Treatment: Satisfactory emergency treatment is as follows:

1. Carefully cleanse beneath the tissue flap using a dental scaler if available. Then flush thoroughly with an irrigating syringe and warm saline.

2. Instruct the patient to rinse with warm saline hourly.

3. Prescribe a soft diet and instruct the patient to refrain from chewing on the affected side of the mouth.

4. Repeat treatment daily until the inflammatory reaction subsides.

Since extraction of the offending tooth, or its antagonist, is frequently necessary, definitive dental treatment is usually indicated. The antagonist is, in the case of the third molar, the opposing maxillary tooth which may have been the culprit in originally impacting food debris under the flap of skin overlying the partially erupted tooth. This opposing tooth then serves to macerate the swollen flap of tissue causing great pain. (20) When deciding to extract the antagonist, it is important to explain this rationale to the patient so as to minimize misunderstanding.

HERPETIC INFECTIONS

The herpes simplex virus (HSV) can be divided into two distinct types: type 1 (HSV-1) commonly associated with oral and facial lesions, and type 2 (HSV-2) associated with genital infection. Although less than 1% of the population has a history of clinically evident HSV-1 primary gingivostomatitis, 70 to 90% show serologic evidence of previous exposure.

a. Primary gingivostomatitis generally occurs early in life (1-3 years) and presents symptoms of headache, pain, extreme sore mouth, cervical lymphadenopathy, and fever. The oral mucosa is fiery red with numerous vesicles that rupture to form painful ulcers. The gingivae are intensely inflamed and appear red on both the marginal and attached gingival. The lesions are self-limiting and heal without scarring in 12-20 days. The virus may become sequestered in a latent state in the regional sensory ganglia (trigeminal), only to reappear as recurrent intraoral herpetic lesions or as herpes labialis. Infectious virus may be spread by these recurrent lesions as well as by some patients who are clinically free of lesions; thus, transmission of the virus to others is possible (21).

b. Recurrent intra-oral herpetic lesions usually present with prodromal symptoms of tingling or slight pain, followed by the formation of vesicles which soon rupture. Characteristically these lesions occur on firmly attached mucosa, and heal in 7 to 10 days. Herpes labialis (cold sores) represent the prime site of the secondary attack of the HSV-1 virus. Precipitating factors, such as the common cold, febrile diseases, exposure to direct sunlight, emotional stress, and mechanical trauma trigger viral multiplication and manifestation of disease.

c. Treatment: Therapy is primarily palliative, and successful management consists of controlling pyrexia and dehydration (particularly with the primary infection), pain, and prevention of secondary infections. Treatment should be symptomatic and supportive as dictated by signs and symptoms of the condition under consideration. Antipyretics may be appropriate for elevated temperatures and antibiotics are only indicated for treatment for secondary infections. Elixir of diphenhydramine HCL, 12.5 mg/5 ml, may be used topically to alleviate the pain associated with these lesions. Any of a number of topical anesthetics would be effective as well. (2)

Aphthous Ulcers (Aphthous Stomatitis,

Canker Sores):

Recurrent aphthous stomatitis (RAS) is one of the most common oral lesions. The lesions are painful, recurrent, single or multiple necrotizing ulcerations of the oral mucosa, and their course is essentially unaltered by modern therapy [21].

a. Clinical appearance: These lesions are similar in appearance to oral herpetic lesions; however, they are usually seen on oral mucosa that does not overlay bone. They may be found on the tongue, mucobuccal folds, floor of the mouth, and soft palate whereas intra-oral herpes is usually found only on mucosa overlying bone. The lesion begins as a small macule that enlarges and progresses to a shallow ulceration of 0.5 to 3.0 cm in diameter. The ulcer is usually round or ovoid, with erythematous, rolled margins. The central area is coated with a gray-white fibrinopurulent pseudomembrane. This gray membrane can be removed with rubbing or trauma and a red bleeding ulcer base is exposed. Lesions persist for 7-14 days and heal spontaneously without scarring.

b. Etiology: Two distinct groups of factors are important to the cause of aphthous ulcers. These are exogenous microbes (viruses or bacteria) and endogenous precipitating factors (hormonal changes, psychological disease). The most obvious and most common precipitating factor for aphthous ulcers is trauma.

c. Treatment: As with oral herpetic lesions, treatment is usually palliative. Several modalities have been attempted to eliminate recurrence and reduce duration of aphthous ulcers, but the therapeutic value of many commonly used treatments remains unproved. Symptomatic therapy is useful with patients with more severe cases of recurrent aphthous stomatitis.Viscous lidocaine or diphenhydramine elixir mouthwashes prove temporary relief, and coagulating agents, such as Negatan, provide relief of pain through caustic action on sensory nerves. Several commercially available over-the-counter remedies are often used to control the pain of aphthous lesions while awaiting healing.

Aphthous type ulcers have been reported as a component of other more serious systemic and local diseases including periadenitis mucosa necrotica recurrens (PMNR, Sutton's disease), Beheets disease, Reiter's syndrome, leukopenias, Crohn's disease, and ulcerative colitis. The foregoing should be considered with patients with severe recurrent aphthous stomatitis (RAS) [22].

PROBLEMS INVOLVING TOOTH STRUCTURE

Dental Caries

Terminology: For convenience, the crown of a tooth is described in terms of five surfaces: occlusal (biting surface), lingual (tongue surface), facial (cheek surface), and two interproximal surfaces-mesial and distal .

Diagnosis: Dental caries (decay) generally does not cause pain when diagnosed and treated early. (2) Undetected or if left untreated, caries will eventually cause mild discomfort to severe pain as the carious lesion progresses .

The patient with tooth pain from dental caries will usually present with one or more of the following signs and symptoms:

a. Intermittent or continuous pain often associated with eating.

b. A visible break in the continuity of the enamel surface.

c. A brownish-black discoloration of the dentin and overlying enamel.

A. These teeth are clinically free of caries although bacterial plague may exist on the surface.

B. Cavitation of the enamel has started. This is difficult to observe, but the lesion is detectable in an X-ray.

C. Caries has invaded the dentin and is approaching the pulp.

D. Early pulp involvement.

E. The crown of the tooth is destroyed; the pulp necrotic; and a periapical abscess present.

Treatment: Since the majority of carious

dentin is necrotic debris, it is frequently possible to remove much of the carious dentin required for palliation without using a local anesthetic. A local anesthetic should be used if soft caries removal elicits pain. (See attachment 1 for a list of instruments).

a. Remove most of the soft decayed material with a spoon-shaped instrument .

b. Since these large carious lesions frequently approximate the pulp, considerable caution should be exerted to avoid penetrating the pulp chamber. Remove as much of the soft decayed material as practical.

c. Irrigate the cavity with warm water until loose debris has been removed.

d. Isolate the tooth with cotton rolls, or gauze packs, and gently dry the cavity with cotton pledgets .

e. If intermediate restorative material (IRM) is available, it is the restorative material of choice. Mix the powder and liquid as per the manufacturer's instruction and place in the prepared cavity . If IRM is not available, zinc oxide powder can be mixed with two or three drops of eugenol until a very thick mix is obtained. The cavity can then be filled with the mixed zinc oxide eugenol. If a suitable mixing surface is not available, use a finger cot or finger cut from a glove. Add the powder and liquid and kneed the mixture to a putty-like consistency.

f. Relieve possible interference with opposing teeth by asking the patient to bite several times. Surplus filling material is easily removed and surface contour of the restoration established by applying light pressure with a moist cotton pledget. The IRM will harden within a few minutes. Caution the patient not to use the treated tooth in masticatory function for the next 24 hours (i.e. don't chew on the side of the mouth with the treated tooth).

g. If IRM or zinc oxide is not available, a cotton pledget impregnated with a liquid anodyne can be left in the cavity.

h. Instruct the patient that the restoration is temporary. Emphasize that it will keep the patient comfortable until a permanent restoration can be placed by a dental officer.

TOOTH FRACTURE

The anterior teeth are particularly susceptible to traumatic tooth fracture. (4) Three general types of fractures may be encountered. The classification and emergency treatment for the bulk of these injuries are summarized.

TYPE 1

a. Fracture of the tooth which involves enamel only .

b. No treatment required. An emory board may smooth the sharp "snags."

TYPE 2

a. Fracture of the tooth which involves enamel and dentin, but not pulp .

b. Treatment:

1. Wash tooth with normal saline or water.

2. Isolate and dry the tooth.

3. The best temporary covering for the exposed dentine is a chemically activated glass ionomer cement. These cements chemically bond to dentine and are the best material for covering dentinal exposures. Ketac-Cem is available on the GSA stock listing #6520-01-211-9601, however there are many other brands available (i.e. Fugi GI cement).

4. If a glass ionomer cement is not available, cover all exposed dentine with a zinc oxide-eugenol (CavitecR) or a calcium hydroxide (DycalR, LifeR) base.

5. If a glass ionomer cement was not used, cover the base and adjacent enamel with several coats of cavity varnish (CopaliteR). Cavity varnish has low solubility in oral fluids.

6. Refer to dental officer.

TYPE 3

a. Fracture of the crown which involvesenamel, dentin, and the pulp .

b. Treatment:

1. Wash with normal saline.

2. Isolate and dry the tooth. Any hemorrhaging must be controlled.

3. Cover the pulp and dentin with a calcium hydroxide base. A zinc oxide-eugenol base may be used if calcium hydroxide is not available.

4. The calcium hydroxide or zinc oxide-eugenol base and adjacent enamel should then be covered by a glass ionomer cement. If glass ionomer cement is not available, cover the calcium hydroxide or zinc oxide-eugenol base and adjacent enamel with several coats of cavity varnish.

5. Refer to dental officer.

Tooth fractures usually do not require the immediate attention of a dental officer if the flight surgeon treats the patient in the prescribed manner. Endodontic treatment (root canal therapy) may be required at a later date, particularly in cases where the tooth fracture involved the pulp (20).

TOOTH AVULSION

Another condition to which the anterior teeth are particularly susceptible is tooth avulsion. The patient who presents with an avulsed tooth in hand can be adequately treated by the flight surgeon. The treatment should be initiated as soon as possible. The tooth should be washed by flushing with saline (never scrape the tooth or attempt to clean with hand instruments) and if possible reimplant in the socket immediately (3,20). If a dentist is nearby, and if clot formation in the socket precludes reimplantation, the tooth can be stored in saline and the patient transported to the dentist for treatment. If no dentist is available, the clot should be removed from the socket and the tooth reimplanted. The reimplanted tooth should then be stabilized. Today most dentists do this with composite resin using an acid etching technique. The flight surgeon probably would not have this material available, therefore, the tooth should be stabilized with wire. If the patient can be transported to a dentist within a reasonable period of time, wiring the implanted tooth is not necessary. In this case, the tooth can be stabilized in the socket with the patient's fingers.

GINGIVAL ABRASION

Abrasion is the progressive loss of cementum and dentin by a mechanical process without the action of bacteria. These lesions usually occur on the facial surfaces of the teeth near the gingival border. Sensitivity usually increases as more dentin is exposed and as the abrasion progresses towards the pulp (20). The involved surfaces of the tooth will be hard, smooth, and polished in appearance. These teeth may be abnormally sensitive to sweets, thermal changes, or air passing over the abraded surfaces .

Gingival recession results in an exposure of the surface (cementum) of the root. Exposed cementum is easily removed. The abrasive action of routine tooth brushing with commercially available tooth brush and paste will remove exposed cementum in a relatively short period of time leaving exposed dentin which may or may not be painful.

This condition usually requires no immediate treatment other than pain control through self-application of a commercially available toothpaste prepared for "sensitive teeth" (SensodyneR, ThermodentR) (2). This condition is often initiated, or exacerbated, by the use of a very abrasive toothpaste or extremely hard tooth brush. Counsel the patient to use up and down strokes when brushing so as to brush "with the grain of the tooth", not cross-grain strokes which may lead to scratching and further abrasion. Long-term treatment involves restoring severely abraded areas with various dentin-bonding restorative materials.

LOCAL ANESTHESIA

The pain control required for dental procedures may be accomplished by local or general anesthetic methods. Local anesthesia is usually the method of choice (11).

ARMAMENTARIUM

Local anesthetic agents used for dentistry are administered intra-orally with a cartridge type aspirating syringe. A 27 gauge, 1 3/8-inch needle is usually used for conduction (block) or infiltration; whereas, the 27 gauge, 1-inch needle is usually used for infiltration. A 2% solution of lidocaine with epinephrine (1:100,000) is the most commonly used local anesthetic in dentistry. For patients who should not receive epinephrine, local anesthetics without a vasoconstrictor are indicated (i.e., 3% mepivacaine without vasoconstrictor) (11).

Additionally, a long-acting (6-8 hours) anesthetic, bupivicaine, is available and may be of use for extended pain relief when only minimal treatment is available.

MAXILLARY AREA

Infiltration will provide adequate anesthesia in the maxillary teeth. The facial and palatal injections required for effective anesthesia are carried out as follows:

FACIAL INJECTION

a. Insert the needle into the mucobuccal fold directly above the tooth to be anesthetized. This fold is formed by the junction of the alveolar mucosa with that of the lip or cheek .

b. Advance the needle upward for about three-eighths inch, approximately to the apical end of the root. Maintain the point of the needle in close proximity to the maxilla.

c. Slowly deposit 1 1/2 cc of solution.

PALATAL INJECTION

a. A palatal infiltration is usually not necessary for anesthesia of the maxillary anterior teeth; however, it may be required for the maxillary posterior teeth which have palatal roots (first bicuspid and all molars).

b. Insert the needle one-half inch above the gingival margin of the tooth to be anesthetized .

c. Gradually expel one-half cc solution in the submucosal area. After a 5-minute interval, the facial and palatal tissues should be anesthetized.

MANDIBULAR AREA

Conduction anesthesia is the method of choice in anesthetizing the lower teeth (11). The inferior alveolar nerve is blocked as it enters the mandibular foramen on the medial aspect of the ramus. This foramen is located midway between the anterior and posterior borders of the ramus and approximately one-half inch above the biting surface of the lower molar teeth. The width of the ramus at this level can be estimated by placing the thumb on the anterior surface of the ramus intra-orally, and the index finger on the posterior surface extra-orally. The inferior alveolar and lingual nerve are anesthetized by a single injection .

The inferior alveolar-lingual injection is carried out as follows:

a. Place the index finger on the biting surface of the lower molar teeth so that the ball of the finger will contact the junction of the medial surface and the anterior border of the ramus. The fingernail will then be parallel to and facing the sagital plane.

b. Place the barrel of the syringe on the lower bicuspids of the side opposite that to be anesthetized.

c. Insert the needle at a point one-half inch posterior to the tip of the finger and on a line bisecting the finger nail. The angulations

established by carrying out steps b and c are maintained throughout the procedure .

d. Advance the needle to contact the medial surface of the ramus. One-inch penetration will usually suffice to position the needle point in direct proximity with the mandibular foramen.

e. Pull back approximately 3mm on the syringe plunger to provide slight aspirating suction. If blood is drawn in the glass anesthetic carpule, withdraw the needle and try again.

f. If no blood is aspirated, slowly deposit approximately 1 1/2 cc of solution at this position.

g. Withdraw the needle halfway, aspirate as before, and inject one-half cc of the agent to anesthetize the lingual nerve.

TOOTH EXTRACTION

Today the vast majority of tooth pain can be successfully treated without tooth extraction. A flight surgeon treating a patient with tooth pain should consider extraction only when all other emergency treatment modalities have failed. If extraction is required, the patient should be treated palliatively with analgesics (including local anesthesia) and antibiotics until someone trained in surgical tooth removal is available (2). Even an extraction which appears relatively simple can be deceiving. It is important to remember that the potential complications of tooth extraction can be far more painful and debilitating than the original condition requiring extraction. The complications include fractures of bone (ranging from a minor alveolar fracture to a major fracture of the mandible), fractured roots, hemorrhage, paresthesia, infection, and displacement of a tooth, or tooth fragment, into a sinus or tissue space. As a result, the flight surgeon with no training in oral surgery should treat pain that requires extraction palliatively and make arrangements for definitive treatment as soon as possible.

POST EXTRACTION COMPLICATIONS

Even though most flight surgeons will never have to extract a tooth, many may be faced with the problem of treating a patient with a post-extraction complication. The two most common post-extraction complications are pain and hemorrhage (3).

Pain: Mild pain or discomfort immediately following tooth extraction is not unusual. Placing a patient on the appropriate analgesics before the local anesthesia has worn off will usually prevent the immediate type of post surgical discomfort or pain. If a patient has not taken the post operative medication and does present with pain, the condition can usually be corrected with the prescription of appropriate analgesics. This pain is usually easily controlled with mild analgesics although some cases may require more powerful medication. Severe pain immediately following surgery is an indication that there may be other complications. The patient with severe pain immediately after surgery should be referred back to the dentist who performed the surgery, if possible. Sometimes reinjection of local anesthetic is the only effective pain control in such cases.

Occasionally a patient will complain of a severe, constant, radiating pain that began 3 to 5 days postoperatively. This delayed pain arises from a condition known as local osteitis or "dry socket." The treatment for this condition is simply to place a eugenol gauze dressing within the bony socket. Pain relief will be almost immediate. Change the dressing daily until the site becomes desensitized, usually 7-10 days. At the initial appointment the tooth socket should be irrigated with warm saline. The socket should then be "packed" with one to two inches of 1/4 inch iodoform gauze saturated with eugenol. This dressing should be changed daily for the first 3 to 5 days. Generally the pack changes can then be extended to every other day. The patient will inform you if more frequent pack changes are necessary. Patient comfort determines when the treatment is no longer required.

Hemorrhage: The hemorrhage normally associated with tooth extraction is easily controlled initially by placing gauze sponges over the extraction site and having the patient close to create pressure. The gauze is then removed 20 to 30 minutes postoperatively. In the majority of cases this will be all that is needed to control post-op hemorrhage.

Discoloration of the saliva due to the presence of the blood clot at the extraction site or intermittent capillary hemorrhaging is to be expected postoperatively. Heavy hemorrhaging is not normal and must be treated immediately. Generally this heavy bleeding is caused by the loss of the blood clot at the extraction site or the failure of a clot to form there. In either case, if repeated attempts by the patient to control the hemorrhage by applying pressure gauze dressings have failed, they will usually seek dental or medical attention. If no dentist is available the following treatment should be rendered:

a. Apply pressure with gauze sponges over the area for 30 minutes.

b. If bleeding persists:

1. Remove the clot and pack the extraction site with an absorbable gelatin sponge (Gelfoam) and a hemostatic agent (surgicel). Place gauze sponges over the surgical site and have the patient close and maintain pressure on the gauze for 30 minutes. A new, and expensive treatment modality available for this procedure is microfibriller collagen (AviteneR). Local anesthesia using an anesthetic with a vasoconstrictor can reduce bleeding enough to allow clot formation. In addition, suturing across the socket and papillae with 3-0 silk or chromic suture should be considered. An x-ray of the area should be taken at this point. If dental periapical x-ray film is not available, a lateral oblique or occlusal film should be taken and studied for possible fractures, bony fragments, or retained root fragments. At this time a blood workup should also be initiated to include a platelet count, PT, PTT, and bleeding time.

2. If a major vessel, such as the inferior alveolar artery, was lacerated during surgery, one to two inches of iodoform gauze impregnated with bacitracin ointment should be tightly packed into the wound and left in place for 2 to 3 days.

FACIAL FRACTURES

Early temporary stabilization of facial fractures has vital therapeutic implications. Immobilization of the fractured elements makes the patient more comfortable and is instrumental in controlling shock, infection, pain, swelling, trismus, and hemorrhage. Furthermore, it has a direct bearing upon the re-establishment of normal masticatory function and on the final cosmetic result. Evacuation of the patient for definitive treatment can be carried out more expeditiously, and with less resultant trauma, when temporary stabilization has been accomplished (28).

The immediate treatment of facial trauma consists of:

a. the establishment of an airway

b. the control of hemorrhage

c. the treatment of shock

d. the evaluation of neurologic findings.

After consideration of these basic therapeutic measures, and the possibility of cervical spine injury, early temporary stabilization will greatly contribute to the successful treatment of facial fractures (16).

DIAGNOSIS

This section will be limited to diagnostic procedures and to the presentation of simple, effective techniques for temporary stabilization. Diagnosis is more difficult when edematous distortion and muscular trismus are present. A thorough clinical examination should include inspection and palpation of the masticatory system for the following:

a. Wounds, swelling, and discoloration.

b. Pain, tenderness, crepitus, and mobility at suspected fracture sites.

c. Facial asymmetry.

d. Trismus.

e. Abnormal mandibular excursions.

f. Altered occlusal relationship of the teeth.

g. Segmental alveolar fractures. Pressure should be exerted upon each tooth to determine the integrity of the underlying alveolar bone.

h. When facilities are available, a radiographic survey should include the following (17, 21):

1. Posterior-anterior view of the head.

2. Right and left lateral oblique views of the mandible and maxilla.

3. Reverse Towne's projection.

4. Waters' view.

5. Submental-vertex view.

6. Panorex, if available.

TEMPORARY STABILIZATION

The method of choice in attaining temporary stabilization of the mandible is inter-arch fixation (5,16). In maxillary fractures, the intact mandible is used as a splint against which the elements of the maxilla are repositioned and immobilized. In mandibular fractures, the intact maxilla is used as the splint. Although inter-arch wiring may be accomplished without the use of an anesthetic, local anesthesia will facilitate the procedures. Stainless steel wire of .016 inch diameter is ideal. (24)

A minimum of two posterior teeth in each quadrant should be selected for wiring. Each of these teeth should be firm and have an opponent in the opposite arch; this is, the biting surfaces of the upper and lower teeth selected for wiring should contact when the jaws are brought together.

WIRING IS CARRIED OUT AS FOLLOWS

a. Pass a 2-inch length of wire around the neck of the tooth (see figure 12-18).

b. Twist tightly with a hemostat to prevent its slipping over the crown (see figure 12-19).

c. Twist the free ends completely.

d. Cut the twisted wire one-half inch from the tooth.

e. Form a loop with the twisted end (figure 12-20).

f. Adapt this loop against the gingiva.

g. Form similar loops on all the teeth selected for wiring.

h. Anchor small intermaxillary elastic bands on these curved loops so that the forces tend to bring the upper and lower jaws together. Elastic loops may be cut from pipette tubing .

Repositioning of fractured elements by judicious manipulation may be necessary during fixation. (28) However, a satisfactory occlusal relationship and a realignment of the displaced bony fragments will usually be achieved within 24 to 48 hours after the application of this gentle intermaxillary elastic traction.

If armamentarium limitations preclude stabilization by interarch fixation, a head bandage may be employed. Although the head bandage is less effective when compared to elastic traction, it is of benefit in providing gross stabilization.

EMERGENCY RELEASE

It is absolutely necessary to provide a means of emergency release from fixation which can be used by the patient or an attendant. A pair of scissors, suitable for cutting wire or elastics, placed around the patient's neck, is the simplest means to provide release from interarch elastics .

EVACUATION

The basic problem in the evacuation of these patients are the immobilized jaws. Fixation will have been accomplished by inter-arch elastics or inter-arch wires. Provision must be

made for the rapid release of either types of fixation. A patient with jaw fixation could experience serious respiratory difficulties resulting from the aspiration of vomitus caused by motion sickness. Careful evaluation and preparation of the patient for evacuation will greatly reduce the incidence of this complication (1).

Two of the principal concerns regarding patient aeromedical evacuation are:

a. Susceptibility to motion sickness. The attendant should be provided with this information. Oral and parenteral administration of certain antihistaminic preparations has been shown to be effective in reducing the incidence of motion sickness.

b. Type of fixation employed and a method of removal. As mentioned earlier in this section a pair of scissors suitable for cutting wire or elastic should be placed around the neck of each fixated patient. An alternative is to pass a strong cord, such as dental floss, through the inter-arch elastic band, tying the free ends of the cord, and taping them to the patient's cheek .Both the patient and attendants should be instructed as to the use of the scissors and the "rip cord" in releasing the jaws.

DISLOCATION OF THE MANDIBLE

Dislocation of the mandible may be bilateral with the mandibular condyles displaced anteriorly. In the unilateral type, the chin deviates away from the dislocated condyle. Either type of dislocation makes speech difficult and creates severe trismus.

Reduction of the dislocated jaw is normally accomplished without anesthesia. Narcotics are effective in relieving pain and apprehension; in addition, they relax the muscles of mastication. In the more resistant cases, general anesthesia may be required.

Repositioning of the dislocated mandible is accomplished in the following manner:

a. Wrap the thumbs with several thicknesses of gauze or towel. This provides protection against snap closure of the mandible.

b. Place the thumbs outside the biting surface of the lower molar teeth on the lateral eminence of the mandible and extend the fingers to grasp the under surface of the mandible .Thumbs placed directly on the biting surfaces of the teeth are likely candidates for trauma.

c. Exert downward pressure with the thumbs to bring the condyle below the articular eminences .The fourth and fifth fingers may be used to exert an upward pressure on the symphysis.

d. Maintain this pressure and force the mandible posteriorly. This will usually return the condyles to normal position .

e. Caution the patient to avoid excessive opening of the mouth for several weeks.

f. Prescribe a soft diet.

Normally, the pain following repositioning continues for approximately 72 hours. Analgesics should adequately control this pain. If marked pain persists, or if there is a tendency toward recurrence of dislocation, immobilization is indicated. This may be effected by interarch fixation or head bandages (23, 31).

DENTAL IDENTIFICATION

In a mass casualty situation (aircraft crash, natural disasters, or modern warfare), positive identification of the deceased may be extremely difficult. In many instances, the comparison of a thorough post-mortem dental examination to existing ante-mortem dental records is the only means available for identification. Restorations, missing teeth, prostheses, and dental anomalies can be just as valuable as fingerprints. A single restoration can be unique enough to lead to positive identification.

The physician at the scene may be required to perform the post-mortem dental examination and complete certain records that will be compared to existing documents. Before an accurate evaluation can be made, the examiner must be familiar with certain basic information concerning dental

terminology and the restorative materials used in dentistry [15].

TERMINOLOGY

The complete adult dentition consists of 32 teeth: 12 molars, 8 bicuspids, 4 cuspids, and 8 incisors. They are assigned numbers from 1 to 32 beginning with the patient's upper (maxillary) right third molar (#1), continuing around to the maxillary left third molar (#16), down to the patient's lower (mandibular) left third molar (#17), and continuing around to the mandibular right third molar (#32).

Occlusal surface is the biting surface (in anterior teeth this is called the incisal surface).

Facial surface is the surface contacted by the lip or cheek.

Lingual surface is the surface contacted by the tongue.

Palatal surface is the surface adjacent to the palate or roof of the mouth.

Mesial surface is the interproximal surface nearer to the anterior midpoint of the dental arch.

Distal surface is the interproximal surface facing away from the anterior midpoint of the dental arch. 1. American A

The mesial surfaces of the two central incisors contact each other; the distal surface of the central incisor contacts the mesial surface of the adjacent lateral incisor, and so on .

Abbreviations used to describe the surface or surfaces destroyed by caries or those involved in restorations are:

a. Occlusal - O

b. Incisal - I

c. Facial - F

d. Lingual - L

e. Mesial - M

f. Distal - D

Abbreviations can be used singularly or in combination (i.e., F,D, MOD, or DOF).

Restorative materials commonly used are:

a. Amalgam: a silver colored alloy of mercury, silver, and other metal components.

b. Gold: either cast inlays and crowns or gold foil that is condensed into cavity preparations.

c. Non-metallic material (composite resin, acrylic resin, silicate, porcelain): tooth colored materials used primarily in anterior teeth for aesthetic purposes.

d. Temporary restorations - white, pink, yellow, or blue cements used as intermediate filling materials.

Destroyed tooth structure may be replaced partially or completely by any of these materials or by a combination of materials. Restorations involving multiple surfaces may require cast gold inlays, partial crowns, or full crowns (either gold or porcelain veneered). These can be single crowns or part of fixed (cemented) partial dentures replacing one or more teeth (17).

Missing teeth can also be replaced with removable partial dentures, or in a totally edentulous arch, by a complete denture. The materials most commonly used are:

a. Acrylic Resin: tissue colored plastic base material that covers edentulous areas and supports the artificial teeth.

b. Chrome colored metal or gold: these materials comprise that framework clasps, and connectors that provide rigidity and retention in a removable partial denture.

THE POST-MORTEM DENTAL EXAMINATION

In most cases, the post-mortem dental examination will be done by a dental officer or team of dental officers who have experience in this area. However, there may be situations for which such personnel are not available. In these cases the physician at the scene may be required to assume this responsibility (7,).

Armamentarium: The supplies and equipment needed to do a thorough exam may not be readily available. However, a list of basic items would include: a supplemental

light source for adequate illumination, a mouth prop to open the jaws, tongue blades, 4" x 4" gauze to remove debris from the teeth, a mouth mirror, and face masks and surgical gloves.

PROCEDURE

a. Gain entry into the oral cavity.

b. Remove debris and wipe the teeth clean.

c. Check for the presence of prostheses (complete dentures, removable or fixed partial dentures).

d. Start with tooth #1 and inspect each tooth. Note missing teeth, existing restorations (surfaces involved and materials used), and any obvious caries.

The front is used to chart missing teeth and existing restorations. Blocks are provided to list caries (by surfaces involved) and restorations (by surfaces involved and materials used). Note that posterior teeth (molars and bicuspids) are illustrated in three aspects. The top figure is the facial surface, the middle figure is the occlusal surface, and the bottom figure is the lingual surface. The back of this form is used to describe dentures and list any dental anomalies or abnormalities. Specific characteristics are noted by the following:

a. Edentulous Arch: Inscribe two crossing lines, each running from the uppermost aspect of one-third molar to the lowermost aspect of the third molar on the opposite side.

b. Individual Missing Teeth: Draw an "X" on the root or roots of each natural tooth that is not present in the mouth. This applies to unerupted, extracted, congenitally missing teeth as well as those lost posthumously. Indicate the latter by placing "PX" between the outline of the tooth and its corresponding numeral.

c. Deciduous ("Baby") Teeth: Deciduous teeth are assigned the same numbers as the permanent teeth they replace. If a deciduous tooth is present in place of a permanent tooth that never developed or erupted, place a "D" around the corresponding tooth number. If a deciduous tooth has been retained in addition to its permanent successor, indicate its relative position with a block letter "D" around its appropriate numeral.

e. Single Gold Restoration

f. Non-metallic Restorations: Draw only the outline of size, location, and shape of restoration.

g. Combination Restorations: Outline each restoration and indicate material used.

H. DENTURES

1. Removable Partial Dentures: Draw a horizontal line between the outline of the teeth and the numerals over the teeth replaced by the dentures (25).

2. Fixed Partial Denture: Outline each aspect, including crowns on existing teeth as well as replacements for missing ones. Indicate materials used as outlined above with one exception. Show gold in a fixed partial denture by inscribing diagonal parallel lines. (24).

Describe all dentures in detail in the "Dentures" section on the back of this form. Follow the directions given there

REFERENCES

1. Academy of Orthopedic Surgeons. Emergency Care and Transportation of the Sick and Injured. 3rd Edition 1981.
2. American Dental Association. Accepted Dental Therapeutics. (published annually), Chicago, IL.
3. American Dental Association. Dental Desk Reference. (published annually).
4. Andeasen J. Traumatic Injuries of the Teeth. 2nd ed. C.V. Mosby, Co.1981.
5. Beumer J, Curtis TA, Firtell DN. Maxillofacial Rehabilitation. C.V. Mosby, Co.1979.
6. Carpousis A. Aviation and teeth with special reference to acrodontalgia. Aerospace Med and Bio. 1954;3:83.
7. Cottone JA, Standish SM. Outline of Forensic Dentistry. Chicago: Yearbook Medical Publishers, 1982.

8. Air Force Instruction. Medical Examination and Medical Standards. 1994, 48-123.
9. Air Force Pamphlet, Hyperbaric Chamber Operations. 161-27.
10. Air Force Regulation, Management and Administration of USAF Dental Activities. 162-1.
11. Dripps, Eckenhoff, Vandam. Introduction to Anesthesia--Principles of Life Practice. 5th ed. WB Saunders Co.
12. Eversole LR. Clinical Outline of Oral Pathology. 2nd ed. Lea & Febiger. 1984.
13. Ferjentsik E, Aker F. (1982), Barodontalgia: A system of Classification. Military Medicine. 1982; 147:299.
14. Goaz PW, White SC. Oral Radiology: Principles and Interpretations. CV Mosby Co, 1982.
15. Jerman AC (1981). Military requirements for dental identification of human remains. Military Medicine. 1981; 146: 4.
16. Kelly JF. Management of War Injuries to the Jaws and Related Structures. Superintendent of Documents. Stock No. 008-045-00018-
17. Laney WR, Gilbilisco JA. Diagnosis and Treatment in Prosthodontics. Lea & Febiger, 1983.
18. Langland OE, Sippy, Langlais RP. Textbook of Dental Radiology. Charles C. Thomas Co, 1984.
19. Lindhe. Textbook of Clinical Periodontology. 11th ed. W.B. Saunders, 1984.
20. Malamed SF. Handbook of Medical Emergencies in the Dental Office, 2nd ed. CV Mosby Co, 1982.
21. Pindborg JJ. Atlas of Diseases of the Oral Mucosa, 4th ed. WB Saunders, 1985.
22. Rauch JW. Barodontalgia - Dental pain related to ambient pressure change. General Dentistry. 1985; 313-5.
23. Rose LF, Kaye D. Internal Medicine for Dentistry. CV Mosby, St Louis, 1983.
24. Schillingburg HT, Hobo S, Whitsett LD. Fundamentals of Fixed Prosthodontics. Quintessence Publishing Company, current edition.
25. Steward KI, Rudd KL, Kuebker WA. Removable Partial Prosthodontics. CV Mosby, 1982.
26. Topazian R, Goldberg M. Management of Infections of the Oral and Maxillofacial Regions. WB Saunders.
27. Weiner L, Horn EC. Etiology of aerodontalgia. Air Surg Bull. 1945; 2: 156-162.
28. Wiener SL. Trauma Management for Civilian and Military Physicians. WB Saunders Co, 1986.

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Barosinusitis

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ABSTRACT

Aerosinusitis, also called barosinusitis, sinus squeeze or sinus barotrauma is a painful inflammation and sometimes bleeding of the membrane of the paranasal sinus cavities, normally the frontal sinus. It is caused by a difference in air pressures inside and outside the cavities. Most cases occur in scuba divers and fliers, and is easily diagnosed when presented to physicians immediately after exposure.On the other hand, the problem may remain undiagnosed when the history fails to relate the symptoms to exposure to environmental pressure changes or if the focus is on other etiologies.This paper reviwed the sign and symptoms , diagnosis of barosinusitis Kay words- Barosinusitis, flying, pressure

INTRODUCTION

Barotrauma of the paranasal sinuses is a risk factor for anyone exposed to ambient pressure changes. These pressure changes most often result from travel through mountainous regions, flying, or diving. Barosinusitis is characterized by inflammation of one or more of the paranasal sinuses. Inflammation is caused by a pressure gradient, almost always negative, between the sinus cavity and the surrounding ambient environment.

INTRODUCTION

Barosinusitis: occurs in divers, pilots, and flight attendants; may occur in conjunction with severe rhinosinusitis on CT, although, in some cases, CT negative; recommendation-consider operating on grounded pilot with focal disease, negative CT, and disease pattern consistent with barosinusitis; in one study, 98% of pilots grounded for barosinusitis returned to work after functional endoscopic sinus surgery (FESS).

PATHOPHYSIOLOGY

The paranasal sinuses have rigid walls with relatively small ostia for gas exchange and mucus transport. Physical gas laws, particularly Boyle's Law, apply to this space. Boyle's Law states that at constant temperature, the volume of a gas is inversely proportional to the pressure placed upon it.

To show how Boyle's Law affects the sinuses, consider the case of an individual with normal sinuses exposed to pressure changes while flying in an unpressurized aircraft. As the individual transitions to higher altitude, the ambient pressure surrounding the sinus cavity decreases, and the air in the sinuses expands and equalizes through the natural ostium. Upon descent, ambient air pressure increases, the air in the sinuses contracts, and air moves into the sinus cavity, preventing a pressure gradient from developing.

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Now consider the same flight in someone who has an upper respiratory tract infection (URTI) with tissue edema and secretions blocking the natural sinus ostia. In this individual, tissue edema and debris will not allow free pressure equalization. Again, as the individual moves up in altitude, the ambient pressure decreases, and volume in the sinus cavity increases. A positive pressure develops in the sinus. With this positive pressure, tissue edema gradually decreases enough to allow debris and air to escape the natural ostium. Air pressure then equalizes. When the individual descends, the ambient pressure increases. Pressure cannot equalize across the nasal cavity to the sinus because of blockage at the ostium. Air volume decreases in the sinus cavity, creating a negative pressure.

At this point, a condition exists in which the volume of the sinus must be filled if the pressure gradient is to be eliminated. In mild-to-moderate cases, vascular engorgement and generalized submucosal edema occur. Over time, transudate and mucus fill the volume, reducing negative pressure and decreasing symptoms. In severe cases, especially with rapid onset, the sinus mucosa is stripped from the subjacent bone, resulting in severe pain and hematoma formation.

CLINICAL HISTORY

Differentiate sinus barotrauma from other causes of facial pain and headache. The history is particularly important in shortening the differential. In sinus barotrauma, a condition of barometric pressure change always exists either during or shortly after onset of symptoms.

1. With mild sinus barotrauma, the patient reports the following:
2. Mild pressure or pain over 1 or more of the sinuses that develops after return to sea level or starting point
3. Worsening congestion
4. Occasional epistaxis
5. With more severe sinus barotrauma, the patient notes the following possibly incapacitating symptoms:
6. Sudden onset of typically severe and sharp pain and pressure
7. Pain is typically in the forehead, mid face, or retro orbital.
8. Epistaxis

PHYSICAL

Physical findings may be relatively sparse in mild cases of barosinusitis. In severe cases, the patient may have marked pain in the forehead, face, and upper teeth. This pain is typically unilateral. Erythema, edema, congested mucous membranes, epistaxis, and tenderness to palpation of the face may occur.

CAUSES

The following activities and conditions place individuals at particular risk for barosinusitis:

1. Scuba and sport diving
2. Sky diving
3. Flying in military/high-performance air craft
4. URTI or sinusitis in persons exposed to pressure changes
5. Poorly controlled allergies or anatomic ab normalities of the nose and paranasal sinuses

Other Problems to Be Considered

Seasonal or perineal allergic rhinitis

Mucosal irritation from smoke or other environmental agents

Nasal polyposis

Nasal septal deviation

Concha bullosa

Infraorbital ethmoid cells

Benign or malignant sinus or nasal cavity tumors

REFERENCES

1. Parsons DS, Chambers DW, Boyd EM. Long-term follow-up of aviators after functional endoscopic sinus surgery for sinus barotrauma. Aviat Space

Environ Med. 1997; 68(11): 1029-34.

2. Vaughan WC. Review of balloon sinuplasty. Curr Opin Otolaryngol Head Neck Surg. 2008; 16(1): 2-9.
3. Hanna HH, Tarington CT. Otolaryngology in aero space medicine. In: DeHart RL, ed. Fundamentals of Aerospace Medicine. Philadelphia: Lippincott Williams & Wilkins. 1985; 520-530.
4. Jones JS, Sheffield W, White LJ, et al. A double-blind comparison between oral pseudoephedrine and topical oxymetazoline in the prevention of barotrauma during air travel. Am J Emerg Med. 1998; 16(3): 262-4..
5. Setliff RC 3rd. Minimally invasive sinus surgery: the rationale and the technique. Otolaryngol Clin North Am. 1996; 29(1): 115-24.

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Malignant Tumors of the Sinuses
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Nasal Polyps, Surgical Treatment
Sinusitis, Acute, Medical Treatment
Sinusitis, Chronic, Medical Treatment
Sinusitis, Ethmoid, Acute, Surgical Treatment
Sinusitis, Frontal, Acute, Surgical Treatment
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Sinusitis, Maxillary, Acute, Surgical Treatment
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Turbinate Dysfunction

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This century will be the century of the brain. Intelligence will define success of individuals; it remains the main ingredient of success. Developed and used properly, intelligence of an individual takes him to greater heights. Ask yourself, is your child intelligent! If yes, is he or she utilizing the capacity as well as he can? I believe majority of people, up to 80% may not be using their brain to best potential. Once a substantial part of life has passed, effective use of this human faculty cannot take one very far. So, parents need to know how does their child grow and how he becomes intelligent in due course of time. As the pressure for intelligence increases, the child is asked to perform in different aspects of life equally well. At times, it may be counter-productive. Facts about various facets of intelligence are given here. Other topics like emotional intelligence, delayed development, retardation, vaccines, advice to parents and attitude have also been discussed in a nutshell. The aim of this book is to help the child reach the best intellectual capacity. I think if the book turns even one individual into a user of his best intelligence potential, it is a success.

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This book has been addressed to young doctors who take care of children, such as postgraduate students, junior doctors working in various capacities in Pediatrics and private practitioners. Standard Pediatric practices as well as diseases have been described in a nutshell. List of causes, differential diagnosis and tips for examination have been given to help examination-going students revise it quickly. Parent guidance techniques, vaccination and food have been included for private practitioners and family physicians that see a large child population in our country. Parents can have some understanding of how the doctors will try to manage a particular condition in a child systematically. A list of commonly used pediatric drugs and dosage is also given. Some views on controversies in Pediatrics have also been included. Few important techniques have been described which include procedures like endotracheal intubations, collecting blood samples and ventilation. I hope this book helps young doctors serve children better.

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World Wide Web

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