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STUMBLING BLOCKS IN FAVOURABLE OUTCOME OF PERIODONTAL SURGERY

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ABSTRACT:

Complications may adversely affect the prognosis, or outcome, of a disease. Complication is a unfavorable result of a disease. Ideally, there should be no complications after any surgery. But still some complications are avoidable whereas some are inevitable under certain circumstances. From the very basics of scaling and root planning to extensive periodontal procedures like flap surgeries and periodontal plastic procedures, periodontal therapy plays a crucial role in the maintenance of entire dentition. Complications after periodontal surgery mostly includes postoperative pain, bleeding, swelling, root hypersensitivity, delayed healing, trismus, bruising, taste changes. As clinicians, we should be able to diagnose the aetiology and provide the proper management of these complications without causing much of discomfort to the patients. This article aims to provide an overview of probable aetiology and management of these complications.

KEYWORDS:

PERIODONTAL SURGERY, COMPLICATIONS, BLEEDING, ROOT HYPERSENSITIVITY.

INTRODUCTION

Studies have shown that modern periodontal therapies are effective in maintaining a healthy natural dentition as well as controlling periodontal disease. Numerous treatment strategies and various techniques have been designed & described to treat periodontal disease. Most of these procedures had drawbacks which were identified, leading to the modifications of the original techniques which lead to better treatment options, but still very less emphasis has been laid on failures. [1]

To understand failures, we have to understand the concept of successful periodontal therapy. In the past, treatment was only considered successful when there was radical elimination of pockets; today the concept of successful treatment has been defined more modestly with clinical parameters like absence of bleeding on probing, reduction in probing pocket depth,gain in clinical attachment level (CAL) and/or reduction in tooth mobility.

CRITERIAS TO CATEGORIZE A PERIODONTAL CASE AS FAILURE.

- persistence of residual periodontal pockets,
- presence of bleeding and/or pus on probing,
- increase in loss of attachment or persistence of tooth mobility

Causes for failure[2] are- 4 I's -

- incorrect patient selection,
- incomplete diagnostic procedures, improper diagnosis & incorrect prognosis,
- inappropriate treatment
- Ill fated healing & absence of maintenance therapy.

1. Incorrect patient selection- A properly educated and motivated patient is a prerequisite for comprehensive periodontal therapy. Smokers who are not ready to quit smoking or follow a certain smoking cessation protocol are always worst candidates for comprehensive periodontal therapy.[3]
2. Incomplete diagnostic procedures, improper diagnosis, and incorrect prognosis: Only the most careful probing of each tooth side, analysis of radiographs, and determination of tooth mobility will reveal the severity of the disease, which requires a correspondingly extensive treatment.[4]
3. Inappropriate treatment- several difficulties stand in the way of sub gingival scaling like uneven course of periodontal pocket, micro-morphology of the root surface and macro morphology of the root surface. So, in many instances elimination of

plaque, especially sub gingival plaque is incomplete which is the main reason for failure of periodontal therapy.

4. Ill fated healing & absence of maintenance therapy- Without regular recall examinations of the patients which are tailored according to the needs of the individual case, recurrence of periodontal disease will occur over a period of time.[5]

POSTOPERATIVE COMPLICATIONS OCCURRING AFTER PERIODONTAL SURGERY CAN BE CATEGORIZED AS FOLLOWING

A. GENERAL COMPLICATIONS ARISING AFTER PERIODONTAL SURGERY:

- Bleeding
- Swelling
- Postoperative pain
- Root hypersensitivity
- Increased tooth mobility
- Delayed wound healing
- Trismus
- Postoperative bacteremia
- Taste changes
- Bruising

B. COMPLICATIONS ARISING DUE TO THE SURGICAL PROCEDURE EMPLOYED

- Local anaesthesia related
- non surgical periodontal therapy related
- supragingival & subgingival irrigation related
- local drug delivery (LDD) of antimicrobial agents related
- Frenectomy related
- crown lengthening related
- depigmentation related
- Flap related
- Graft related
- GTR related
- Suture related
- Periodontal pack related

BLEEDING –

Post operative bleeding after oral and periodontal surgery is a common complication. The surgical procedure presents a challenge to the body's hemostatic mechanism. Following surgical procedures, hemorrhage can range from a minor leakage or oozing at the site, to extensive or frank bleeding at surgical site. The likelihood of this may be attributed to many factors, like the tissues of mouth and jaw are highly vascular infection intrinsic trauma, presence of foreign bodies. Even after repeated instructions patients tend to play with the area of surgery with their tongue and dislodge the blood clot, which initiates secondary bleeding. The tongue may also cause suction of blood by creating small negative pressures that cause secondary bleeding. salivary enzymes may lyse the blood clot before it gets organized.[6]

Bleeding in a surgical patient can be classified as following:

Primary bleeding –in this the bleeding occurs during the intra-operative period. This is mostly resolved during the surgery, but if any major haemorrhages are recorded, then the patient is monitored closely post-operatively.

Reactive bleeding – occurs within 24 hours of surgery. Mostly it occurs when a ligature slips.

Secondary bleeding – occurs 7-10 days post-surgery. Secondary bleeding is often due to erosion of a vessel from a spreading infection due to contaminated wound [7]

For the management of bleeding it is very important to find the source of bleeding and then the approach for its management should be planned. In case of mild bleeding a pressure pack can be applied for 15- 20 minutes. Still if bleeding is persistent then haemostatic agents like surgicel, gelfoam, microfibrillar collagen (Avitene) etc. can be used. If the bleeding is arterial, then ligating the vessel is considered as the best option (Hofschneider *et al*. also noted that the sublingual and submental arteries may traverse anteriorly very close to the lingual cortical plate, and branches of these arteries may enter accessory foramina along the lingual cortex)[8]

SWELLING

Swelling hinders routine working life of patient usually in first 3 days after surgery. [9] Type of the incision, its extension, tissue manipulation and duration of surgery are some factors that can affect swelling.[10] Smaller incisions usually cause less postoperative swelling and pain. Extraoral swelling is common after periodontal therapy.

Swelling is considered as the body's normal reaction to surgery and repair process. The swelling becomes apparent after the day following surgery and will reach its maximum within 2-3 days post-operatively.[11] Though the swelling subsides within 4-5 days in case if it doesn't then use of antibiotics, corticosteroids, surgical approach to manipulate soft and hard tissues should be considered and lastly considering alternative surgical approaches like piezo surgery, cryosurgery that are less traumatic to tissues should be done [12]

POST-OPERATIVE PAIN-

Postoperative pain can occur as a result of extensive and long surgical procedures; poor tissue handling (including incising with a dull instrument, tissue trauma, and poor local anaesthesia); poor infection control (which increases the risk of postoperative infection); poor knowledge of surgical anatomy (which increases the risk of complications, such as nerve injury and edema) ;patients who underwent the procedures that involved

mucogingival/ bone or surgeries with large wounds; Patients whose healing process might be delayed (e.g. immunosuppressed people, those with uncontrolled diabetes, smokers, those taking bisphosphonates, those with a history of radiotherapy in the head and neck area) ;patients with a past history of high analgesic intake after periodontal surgery ;patients experiencing preoperative anxiety.[13]

For relieving pain initially certain medications like nonsteroidal anti-inflammatory drugs (NSAIDs), such as diclofenac (1 mg/kg) and ibuprofen, paracetamol (15 mg/kg) can be prescribed[14]

ROOT HYPERSENSITIVITY

A minimal root hypersensitivity is considered normal post periodontal surgery, as it gradually reduces in about 2 weeks. During periodontal therapy, scaling and root planing removes the outer layer of hyper mineralized dentine and thus leaves the surface expose to the effect of hydrodynamic phenomenon.[15]

Though the sensitivity decreases around 2 weeks but if it doesn't then it is recommended to use desensitizing agents like sodium fluoride, stannous fluoride, calcium sodium phosphosilicate bioactive glass (NovaMin®); resins, varnishes, toothpastes (occlusion of dentinal tubules); iontophoresis, lasers and gingival grafts

INCREASED TOOTH MOBILITY

Excisional procedures, particularly with flap retraction and the accompanying removal of interdental tissues, actually devoid a tooth of gingival and periosteal support on a temporary basis. Initial reattachment may be evident in the first 10-14 days after surgery which may be the cause of transient mobility following which more advanced collage nation and renewal of the gingival attachment to tooth and bone occurs which may require 30-45 days or more days. After 30- 45 days if mobility persists then the etiological factor for mobility should be identified and corrected through occlusal adjustment and finally splinting should be done to stabilize the teeth. Although if the mobility is still progressive then extraction can be considered as an option [16]

POSTOPERATIVE BACTEREMIA

There is huge microbial challenge to the patient during periodontal surgery. The occurrence of post surgical bacteremia depends on amount of trauma imposed during surgery. It is documented that 88% of all blood cultures are positive after periodontal therapy. Lengthy procedures increases the chances of transient bacteremia. In postoperative bacteremia *Streptococcus viridans*[17] has been most commonly documented by various authors. Okel and Elliot considered *Staphylococcus albus* coagulase negative as contaminants. However, McEntegart and Porterfield considered *Staphylococcus albus* coagulase negative as pathogenic micro-organisms. Transient bacteremia can be effectively reduced by giving antibiotic prophylaxis before doing any surgery. Amoxicillin is highly effective in reducing post operative bacteremia in periodontal flap surgery and thus in preventing the possible sequelae (infective endocarditis and other systemic maladies) insusceptible patients.

DELAYED WOUND HEALING

Wound healing, as a normal biological process in the human body, is achieved through four precisely and highly programmed phases: haemostasis, inflammation, proliferation, and remodelling. By 7 days surface epithelisation gets completed following periodontal surgery. The most probable cause of delayed wound healing is infection which results in dead necrotic tissue which promotes bacterial growth. Other causes include wound dehiscence (unapproximated flap margins), hematoma, Stitch abscess (infection of suture track), foreign substances (like calculus, tooth fragments, periodontal pack), allergic reactions to graft material, suture material, periodontal pack, tight closure via suturing .[18]

Thorough debridement and irrigation followed by prescription of antibiotics and analgesics usually lowers down the symptoms and accentuates wound healing.

TRISMUS

Trismus is an inability to open the mouth. Trismus after periodontal surgery can occur due to trauma, infection. Infection of masticatory space, inaccurate positioning of needle are known to contribute to trismus during periodontal surgeries. Treatment of trismus varies depending on the aetiological factor. The degree of discomfort and dysfunction varies, but is usually mild when it is due to incorrect positioning of needle in superior alveolar or inferior alveolar nerve block. Management should consists of heat therapy, analgesics, a soft diet and muscle relaxants. Aspirin because of its antiinflammatory properties is beneficial and given in managing the pain associated with trismus and if it is intense pain narcotic analgesic can be given. If required, diazepam (2.5–5 mg three times daily) and other benzodiazepines may be given for muscle relaxation.[19]

TASTE CHANGE

Taste change is also one of the complication after periodontal surgery. It can be due to any infection, trauma to any nerve, invasive procedures or idiopathic. It can also be due to any surgery requiring insertion of a periosteal elevator, sectioning of tooth, lingual flaps etc.

NERVE DAMAGE

Nerve damage has also been linked to the experience of the operator and procedures performed under various forms of sedation. It can also be associated with the use of local anesthetic. Sometimes needle directly contact the tissues and can traumatizes the nerve which can alter the sensation. Damage to smaller intraneural blood vessels can cause intraneural hematoma. Healing process can also be impede by compression of the nerve.[20]

B. COMPLICATIONS ARISING DURING EACH STEP OF THE PROCEDURE EMPLOYED

1. **LOCAL ANAESTHESIA RELATED-** The most common complications arising from local anaesthesia via needle insertion or is attributed to solution include toxicity, syncope, allergy, trismus, paraesthesia etc.[21]

   Local anaesthetic toxicity is due to systemic absorption of an excessive amount of the drug. In patients suffering from local anesthesia toxicity adequate oxygen supply should be ensured, cardiovascular status should be assessed throughout and medical assistance should be provided.[22]

   Syncope most often occurs when the blood pressure is too low (hypotension) and the heart doesn't pump a normal supply of oxygen to the brain. Recovery is almost instantaneous if the patient has simply fainted. Then maintain airway, check pulse (if absent, indicates cardiac arrest), and start CPR immediately

   Allergy is a hypersensitive reaction that occurs through exposure to an antigen (Ag) such as a drug (as L.A. agent) which the patient has been previously exposed to it, resulting in an Ag - Ab reaction. Allergic reactions can be effectively managed by the administration of anti-histaminic (benadryl 20 - 40 mg IV or IM.), epinephrine 1:1000 concentration 0.3 mg SC. or IM. Bronchodilator via inhaler, corticosteroid 100mg IV. Hydrocortisone hemisuccinate [23]

   Hematoma can occur due to injury of the blood vessel by penetration of needle to far distally during Posterior superior alveolar nerve block. Emergency management begins by gently cleaning the mouth and locating the source of bleeding and the application of cold compress, pressure packs, or styptics. Tranexamic acid -500 mg in 5 ml by slow IV injection is the drug of choice.[24]

2. **NON SURGICAL PERIODONTAL THERAPY RELATED**

   Persistence of inflammation because of residual embedded calculus which in turn can be due to a wide variety of reasons, such as, inadequate accessibility & visibility seen in deep pockets & in complex anatomical areas of the tooth like the furcation areas, grooves & concavities present on the root surface. Condition of the instruments: dull instruments frequently cause burnishing of the calculus instead of removing it in totality. Faulty techniques of instrumentation: decreased angulation can lead to burnishing of the calculus & prevent it from being removed in total. Increased angulation can lead to laceration and trauma to the gingival tissues. Abscess formation can also be noticed in situations wherein residual calculus is embedded in the tissues

3. **SUPRAGINGIVAL & SUBGINGIVAL IRRIGATION RELATED**

   Persistence of inflammation as the irrigant solution cannot be penetrated into deeper pockets. ii) The drug present in the irrigant gets thrown out of the gingival sulcus/periodontal pocket by the constantly oozing crevicular fluid (which is known as "wash-out effect").

4. **LOCAL DRUG DELIVERY (LDD) OF ANTIMICROBIAL AGENTS RELATED**

   Difficulty in placing the LDD in inaccessible, deep pockets and in furcations, ii) development of resistance among bacterias, iii) time consuming and expensive if many sites are involved with periodontal disease.

5. **FRENECTOMY RELATED**

   Frenectomy procedures may fail due to i) Reattachment of the frenum as a result of improper incision design, & failure to sever the underlying periosteal attachment, therefore care should be taken to design the incision and to completely remove the muscle fibre attachment and ii) If sutures are not placed properly gaping of the wound may occur leading to hindrance in healing.

6. **CROWN LENGTHENING RELATED**

   Failures associated with this procedure are primarily due to i) Inflammation of thegingiva due to violation of the biological width (defined as the combined physiologic dimension of the junctional epithelium & the supracrestal connective tissue attachment which is approximately 2mm). So, the minimum distance between the bone crest & the gingival marginshould be 3 mm or more to prevent impingement of the restoration on to the biologic width. ii) In cases of surgical crown lengthening, excessive removal of the bone can lead to down gradation of the prognosis of the tooth

7. **DEPIGMENTATION RELATED**

   If the procedure of depigmentation is carried out with electrocautery, care should be exercised to prevent necrosis of bone. So, contact of the cautery instruments with underlying bone should be avoided. If chemicals are used to produce depigmentation, there may be damage to the bone and underlying tissue because the depth of action of these chemicals is not controlled

8. **FLAP RELATED**

   Flap related complications occur most commonly due to improper incisions which if it is not made up to the bone/root surface could result in inappropriate visibility and access of operative area or could cause overexposure of bone leading to bone resorption; improper debridement which may be considered as crucial factor in the success of periodontal therapy; also, improper suturing which affects the flap approximation and can lead

to reoccurrence of disease [25]

9. GRAFT RELATED

Loosened sutures could lead to displacement of grafts or contamination of graft. Inadequate size of the graft or improper root preparation for graft may lead to failure of graft. Also, allergic reaction to the grafts are rare but can occur in a hypersensitive patient. Commonest failure associated with root coverage procedures is recipient bed is too small to provide adequate blood supply [25]

10. GUIDED TISSUE REGENERATION (GTR) RELATED

Failures in GTR procedures can result in swelling which is most commonly associated with pain, sloughing which can be attributed to a decrease in the vascular supply to the flap in the early stages of healing, membrane exposure. Out of these membrane exposures is the major complication associated with GTR technique with a prevalence in the range of 50 to 100%. Cortellini *et al*., 1990; Selvig *et al*., 1992 reported that the prevalence of membrane exposure can be highly reduced with the use of access flaps, specifically designed to preserve the interdental tissues (modified papilla preservation technique) [26]

11. SUTURE RELATED

Is known to arise commonly from suture breakage which results in inappropriate flap approximation. If sutures are too loose it could lead to exposure of GTR membrane or graft displacement or if they are too tight then it leads to devitalisation of tissue. Also, type of suture should be chosen carefully as monofilament sutures are considered more sterile than the braided suture because of the "wicking effect" of braided sutures that pulls the bacteria & fluid into the wound site. All of these problems could be avoided by choosing the correct type of suture material placed through proper technique[27]

12. PERIODONTAL PACK RELATED

Most commonly encountered complications of periodontal pack are allergy associated with eugenol based packs. Baer and Wertheimer (1961) in their studies showed that periodontal dressings can cause greater inflammatory infiltration on the bone and the inflammatory reaction is greater when the dressing is directly placed on the bone compared with the time when it is placed on the periosteum[28]

13. TREATMENT OF FURCATION RELATED

Inability to maintain the fur cal area free of plaque either by the patient or by the lack of access to the clinician.

CONCLUSION

Periodontal therapy is an essential component in providing better dental care. Selection of the most suitable technique for treatment, evaluation of the complications associated with it paves the path for favorable outcomes with utmost patient satisfaction. Keeping in mind that complications may occur post surgery and managing them thoroughly by including them in treatment planning is the wise decision.

REFERENCES

1. Rateitschak KH. Periodontal treatment failure. Parodontol. 1991; 2(3):223-34.

2. Abbas F, van Winkelhoff AJ. Pitfalls in diagnosis and treatment of periodontal diseases. Ned Tijdschr Tandheelkd. 2009; 116(6):317-21.

3. Johnson GK, Hill M. Cigarette smoking and the periodontal patient. J Periodontol. 2004; 75(2):196-209.

4. Rateitschak KH. Failure of periodontal treatment. Quintessence Int. 1994; 25(7):449- 57.

5. Tan AE. Periodontal maintenance. Aust Dent J. 2009; 54:S110-7.

6. Pertson L. J. (editor). Contemporary Oral and Maxillofacial Surgery, 3rd edition. C.V. Mosby Company, St. Louis.Chapter 3 "Principles of surgery"; Hupp JR.1998;48-49. Chapter 11 "Prevention and management of surgical complications"; Peterson LJ. 1998;270-273

7. Druckman RF, Fowler EB, Breault LG. Post-surgical hemorrhage: formation of a" liver clot" secondary to periodontal plastic surgery. The journal of contemporary dental practice. 2001; 2(2):62-71.

8. Hofschneider U, Tepper G, Gahleitner A, Ulm C. Assessment of the blood supply to the mental region for reduction of bleeding complications during implant surgery in the inter foramina region. Int J Oral Maxillofac Implants. 1999; 14:379-383.

9. Alexander RE, Throndson RR. A review of periop¬erative corticosteroid use in dentoalveolar surgery. Oral Surg Oral Med Oral Pathol OralRadiolEndod. 2000;90:406-15.

10. Berne RM, Levy MN, Koeppen BM, Stanton BA. Phys¬iology. 5th ed.New York: Elsevier Inc.; 2004.

11. Sortino F, Cicciù M. Strategies used to inhibit postoperative swelling following removal of impacted lower third molar. Dental research journal. 2011; 8(4):162.

12. Rajpal J, Arora A, Prasad R, Gupta MM. Preventing postoperative swelling after periodontal surgery.

Journal of Oral Research and Review. 2015; 7(1):31.

13. Baer PN, Wertheimer FW. A histologic study of the effects of several periodontal dressings on periosteal-covered and denuded bone. J Dent Res. 1961; 40:858-870.

14. 17. Skaleric U, Petelin M. Causes and treatment of hypersensitivity in tooth root. Zobozdravstveni vestnik. 1989; 44(4-5):113-6.

15. Cox CF. Etiology and treatment of root hypersensitivity. American journal of dentistry. 1994; 7(5):266-70.

16. Polson AM. Interrelationship of inflammation and tooth mobility (trauma) in pathogenesis of periodontal disease. Journal of clinical periodontology. 1980; 7(5):351-60.

17. Okell CC, Elliot SD. Bacteremia and oral sepsis with special references to the etiology of subacute endocar¬ditis. Lancet. 1935;28:533-43

18. Dhanrajani PJ, Jonaidel O. Trismus: aetiology, differential diagnosis and treatment. Dental update. 2002; 29(2):88-94.

19. Malamed SF. Handbook of Local Anesthesia, 3rd ed. St. Louis: C.V. Mosby Co., 1990; pp.248–249.26. Lazan¬sky JP, Robinson L, Rodofsky L. Factors influencing the incidence of bacteremias following surgical procedures in the oral cavity. J Dent Res. 1949;28:533-43.

20. Pogrel MA, Thamby S. Permanent nerve involvement resulting from inferior alveolar nerve blocks. J Am Dent Assoc 2000;131:901–7.

21. Dabas H, Gandhi G, Thukral H, Saikia J, Bhattacharya M, Bhardwaj D. Recent Advances in Local Anesthesia–A Review.

22. 27. Haas DA. An update on local anesthetics in dentistry. Journal-Canadian Dental Association. 2002; 68(9):546-52.

23. Fielding AF, Rachiele DP, Frazier G. Lingual nerve paresthesia following third molar surgery: a retrospective clinical study. Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology. 1997; 84(4):345-8.

24. Haas DA. An update on local anesthetics in dentistry. Journal-Canadian Dental Association. 2002; 68(9):546-52.

25. Wikesjö UM, Nilvéus RE, Selvig KA. Significance of early healing events on periodontal repair: a review. Journal of periodontology. 1992; 63(3):158-65.

26. Cortellini P, Bartolucci E, Clauser C, Pini Prato GP. Localized ridge augmentation using guided tissue regeneration in humans. A report of nine cases. Clinical Oral Implants Research. 1993; 4(4):203-9.

27. Javed F, Al-Askar M, Almas K, Romanos GE, Al-Hezaimi K. Tissue reactions to various suture materials used in oral surgical interventions. ISRN dentistry, 2012.

28. Baer PN, Wertheimer FW. A histologic study of the effects of several periodontal dressings on periosteal-covered and denuded bone. Journal of Dental Research. 1961; 40(4):858.