

Journal of Surgical and Clinical Dentistry

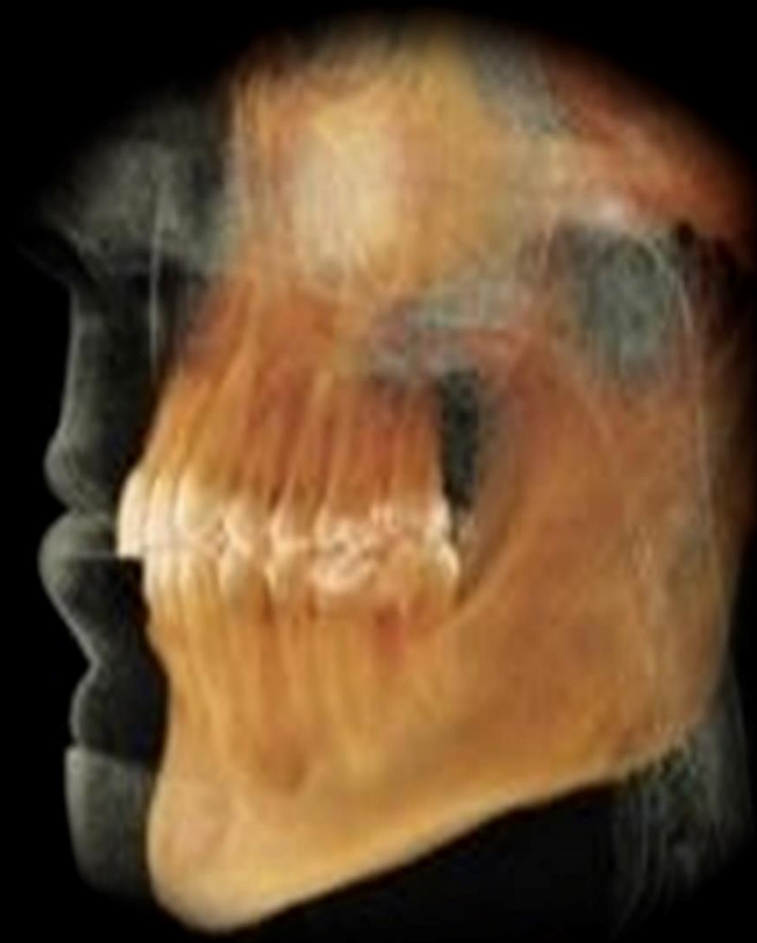
Online ISSN 2358-0356

JSCD

10(1)

July / September

2016



Title: Journal of Surgical and Clinical Dentistry

Short title: J. Surg. Clin. Dent.

Abbreviation: JSCD

Publisher: Master Editora

Periodicity: Quarterly

Indexed: Latindex, Google Scholar, EBSCO host

Start: April, 2014

Editor-in-Chief:

Prof. Dr. Mário dos Anjos Neto Filho [MSc; Dr]

*The **Journal of Surgical and Clinical Dentistry - JSCD** is an editorial product of the **Master Publisher** aimed at disseminating scientific articles only in electronic media, indexed in Latindex, Google Scholar and EBSCO host database.*

*All articles published were formally authorized by the authors and are your sole responsibility. The opinions expressed by the authors of the published articles do not necessarily correspond to the opinions of **Master Publisher**, the **JSCD** and/or its editorial board.*



Master Editora

The Brazilians open access Journals

Dear Researcher,

*We have the great pleasure to entry the tenth edition, volume one, of the **Journal of Surgical and Clinical Dentistry - JSCD**.*

*The **Master Publisher** and the **JSCD** are very grateful to the authors of the articles that brighten this edition of the invaluable collaboration, by immediately accepted our invitation and for the trust placed in this project.*

*The **JSCD** is one of the early open access Journal in Brazil, representing the materialization of the lofty ideals of **Master Publisher** about the broad and unrestricted dissemination of scientific knowledge produced by the Health Sciences.*

*Authors of scientific articles that are interested in the scope of **JSCD**, send your manuscripts for consideration of our editorial board!*

Our eleventh edition will be available in October, 2016!

Happy reading!

Mário dos Anjos Neto Filho
Editor-in-Chief JSCD

LITERATURE REVIEW

BARODONTALGIA: LITERATURE REVIEW

MIRIÃ LIMA **NOGUEIRA**, ANA CLÁUDIA **VENDEROSCKI**, CAROLINE **HEMKEMEIER**,
MAIARA DAL **BOSCO**, VANESSA RODRIGUES DO **NASCIMENTO**, LUIZ FERNANDO
TOMAZINHO 05

ORIGINAL

SURGICAL TECHNIQUES TO CASES OF CLASS I RECESSIONS CAUSED BY LOWER LABIAL FRENULUM

GABRIELA ANDRADE **SOLDATI**, KARINA MINGARELI RIGUETTE DE **SOUZA**,
TAMIRES **RIGATTI**, LARISSA MAYRA **PALOSKI**, IARA DIAS DE **ALMEIDA**,
EDUARDO AUGUSTO **PFAU** 09

BARODONTALGIA: LITERATURE REVIEW

MIRIÃ LIMA NOGUEIRA¹, ANA CLÁUDIA VENDEROSKI¹, CAROLINE HEMKEMEIER¹, MAIARA DAL BOSCO¹, VANESSA RODRIGUES DO NASCIMENTO², LUIZ FERNANDO TOMAZINHO^{3*}

1. Undergraduate Student of Dentistry, University Paranaense – UNIPAR – Paraná; 2. Master of Radiology, Professor of Dentistry course, at the University Paranaense – UNIPAR –Paraná; 3. Doctor of Biomedical Sciences, Titular Professor of Endodontics, University Paranaense – UNIPAR –Paraná.

* Inajá Street, 3560, Ap. 42, Downtown, Umuarama, Paraná, Brasil. ZIP CODE: 87501-160. tomazinho@unipar.br

Received: 07/26/2016. Accepted: 10/21/2016

ABSTRACT

The barodontalgia can be defined as a painful symptom due to a difference in air pressure during ascent and descent of the aircraft. Generally, most cases barodontalgia place during the ascent, which are related to diseases of the vital pulp, and when the descent, with pulp necrosis or facial barotrauma. Pilots and crew are subject to change in air pressure during flight, these changes can lead to dental pain when there are already installed dental pathologies. The tooth has been treated endodontically or vertical fractures may present painful symptoms due to periodontal pockets or periapical lesions. In the case of impacted teeth pain is due to increased atmospheric pressure pericoronal bag during takeoff of the aircraft. It can be concluded that the barodontalgia is related by the atmospheric pressure difference and occurs when an individual is subjected to such pressure, being on a flight or even diving, so it is very important that the dentist must know the origin and causes as well as the treatment of preventive and curative measures.

KEYWORDS: Barodontalgia, atmospheric pressure, flight, diving

1. INTRODUCTION

Pilots are responsible for maintaining security in the life of the crew and passengers, being necessary to maintain in perfect condition to your health, that are not compromised the lives of others by incapacitation professional. This because of that during the flight, the pilots, crew and passengers are subjected to air pressure changes, and by virtue of a dental pathology may predispose it to some painful symptoms known as barodontalgia.

The barodontalgia can be defined as a painful symptom due to a difference in air pressure during ascent and descent of the aircraft. This pain has the etiology unsatisfactory restorations, dental caries without pulp involvement, pulp necrosis with periapical inflammation, pulpitis, apical periodontitis, impacted teeth, root fracture and barossinusite, the first three being the most common.

The first studies on the modification that the pressure exerted on the body have been performed in 1923 with the beginning of aviation. And during World War II, airplanes were subsonic and non-pressurized, which is why there is

a higher incidence of barodontalgia today. The pilots call "Blue Wing" were the first to report the symptoms, which lingered for a few seconds and ceased so they found the ground with the landing of the aircraft.

After World War II, the US Navy has tested 12,000 of its pilots as the consequences of pressure differences in the body, soil and altitude, and observed the emergence of barodontalgia between 1,500 and 3,500 meters high. In the same period, the US Air Force recorded 114 individuals of 1,176 (9.7%) airmen with reports of one or more of these episodes on their flights^{1,2}.

Generally, most cases barodontalgia place during the ascent, which are related to diseases of the vital pulp, and when the descent, with pulp necrosis or facial barotrauma.

The facial barotrauma, is a barometric trauma related to facial cavities includes barotitis media (middle ear barotrauma), external optical barotrauma and barossinusite (sinus barotrauma). The barotitis media is traumatic inflammation of the middle ear area by the pressure difference between the air in the post-tympanic cavity and the atmosphere. External barotitis is caused by damage to the mucosal lining of the external auditory canal and the eardrum. Barossinusite is inflammation of one or more paranasal sinuses by the pressure difference (usually negative) between the air in the nasal cavity and the surrounding atmosphere³.

It is of utmost importance to maintain the oral health of both pilots as the airmen to be avoided cases of barodontalgia in the air. This can be done through regular visits to the dentist, which will make radiographs, intra and extraoral for investigation of possible pathological factors.

Thus justified such a literature review where there is rebound both management airmen patients, as in the etiology and diagnosis of cases of barodontalgias.

2. MATERIAL AND METHODS

To carry out this study we chose the proposal of Ganong (1987)⁴, according to the following steps: 1) identification of the research question, followed by a search of the descriptors or keywords; 2) determining the

criteria for inclusion or exclusion of research in online databases; 3) categorization of studies, summarizing and organizing relevant information; 4) assessment of studies for critical analysis of the extracted data; 5) discussion and interpretation of the examination results, contextualizing theoretical knowledge and evaluating their applicability as; 6) presentation of the integrative review and synthesis of knowledge of each article reviewed briefly and systematic way.

In the present study the guiding question of the integrative review was: verify the occurrence where there is rebound both management airmen patients, as in the etiology and diagnosis of cases of barodontalgias

Bases (Latin American and Caribbean Literature on Health Sciences) LILACS, SciELO (Scientific Electronic Library on Line) and PubMed (- NCBI US National Library of Medicine National Center for Biotechnology Information) were consulted. Studies that have addressed the thematic, published from 1946 to 2012, regardless of the languages of publication were included. The following controlled for the search and also used as keywords descriptors were used: Barodontalgia, atmospheric pressure, flight, diving

3. LITERATURA REVIEW

Pilots and crew are subject to change in air pressure during flight, these changes can lead to dental pain when there are already installed dental pathologies. During the dive it can also be observed the change in pressure, so divers can also suffer from episodes of pain^{5,6}.

The pain that affects airmen and divers is known as barodontalgia. Its definition is a sense of acute pain in the tooth caused by atmospheric pressure difference during ascent or descent, this pain can cause dizziness or even incapacitation and early flight order or diving^{5,6,7}.

In 1923 the first cases of pain due to atmospheric pressure have been reported, but it was during the World War II that became more evident due to the use of subsonic aircraft. The pilots complained of acute pain in the tooth that ceased after landing, the phenomenon became known as aerodontalgia^{8,9}.

In the 1940s the same manifestations of pain in divers were reported, receiving the name of "tooth squeeze", dental grip. Currently, it uses the name of barodontalgia because in both situations the pain is caused by changes in atmospheric pressure⁸.

It is that that pain affects both divers and pilots. In divers, the prevalence is 9.2%, when the pressure rises from depth of 33 pés¹ and occurs more frequently in upper teeth. The pilots' prevalence is 21.6% when the pressure rises above 3,000 feet. In flight the barodontalgia affects 11% of the aircrew. The overall change, usually at altitudes of 3000 feet 25000², are the most affected due to rapid and extreme situations maneuvers, because there is no pressurized cabins (constant

pressure). The upper and lower teeth are affected in equal proportion. agricultural pilots do not suffer from barodontalgia due to flying at low altitude^{10,11,12}.

Even with studies there is accuracy in the etiology of barodontalgia. But it is known that to have a pre-existing condition is required in oral and paranasal tissues. The risk for barodontalgia consists of pilots, aircraft crews, caisson workers¹³.

Facial barotrauma

According to Boyle's law, gas volume is inversely proportional to the ambient pressure. The volume changes within the rigid body cavities associated with the change of atmospheric pressure can cause adverse effects, known as barotrauma¹⁴.

The barodontalgia can be confused with facial barotrauma, which is also caused by pressure diferença, but involves the facial cavities and is symptom dental pain. It may present as a traumatic inflammation of the middle ear due to change in pressure between the air in the cavity and the environment, taking the name of barotitis-average, can also present as barosinusitis, which is inflammation of one or more sinus parana -salts. It should be considered the situation for differential diagnosis⁶.

Barosinusitis (also known as sinus barotrauma) is an acute inflammation of one or more paranasal sinuses, produced by the pressure difference (usually negative) between the air present in the sinus cavity and is in the atmosphere³.

Oral and nasal diseases that already exist and should be considered are: acute periapical infection or chronic caries, deep fillings, dental residual cysts, sinusitis and a history of recent surgery⁵.

Barodontalgia

The barodontalgia is a dental pain caused by the change of barometric pressure on a tooth that had asymptomatic, can be servera enough to cause vertigo during flight, incapacitation, and cease flying prematurely¹.

Generally, the pain generated in the ascent of the aircraft is related to vital pulp diseases, and pain in the descent to pulp necrosis or facial barotrauma⁵.

It is considered that the pain associated with periapical lesions can arise both in ascent and in descent of the aircraft, but in most cases, occurs in the ascent¹⁵.

The tooth has been treated endodontically or vertical fractures may present painful symptoms due to periodontal pockets or periapical lesions. In the case of impacted teeth pain is due to increased atmospheric pressure pericoronal bag during takeoff of the aircraft⁵.

It is contraindicated in direct pulp capping airmen patients and recommends endodontic treatment in cases where there is suspicion of invasion of the pulp chamber.

When the dentist performing, endodontic treatment should carefully apply the temporary restoration. In addition, you should train the patient air to detect if there is any break in the restoration. In a pressure change of environment, not filled root canal may lead to emphysema and a facial also the extravasation of intra root canal content to periapical tissues infected^{7,16,17}.

Oral surgery

When extracting an upper posterior tooth, the dentist must discard the existence of oroantral communication. The oroantral communication can lead to sinusitis and potential adverse consequences after exposure to a pressure change of environment. When diagnosed, it is indicated surgery for closing the communication oroantral^{18,19}.

4. DISCUSSION

Due to the growing number of professional and amateur divers, air passengers, pilots and flight attendants, be they military or companies particular air, the dentists may face with oral conditions related to flying or diving of which require treatment and previous knowledge.

For the group of people susceptible to barodontalgia is related to exposure to sharp variations in atmospheric frequency¹⁹.

Such symptoms are most common in fighter pilots²⁰. Likewise this condition occurs due to a sudden difference between the atmospheric air in the tooth cavity and the air present in the environment¹⁵. Hence this atmospheric difference between the two environments result in compression of some important masticatory elements such as alveolar bone, periodontal ligament and nerve endings of the dental pulp. Therefore, this pressure will lead to exacerbated symptoms the patient.

We must not consider Barodontalgia as a pathological condition, but rather a symptom that arises in most cases due to a condition potentiating a preexisting dental problem. Such dental problems would be tooth decay, impacted teeth, faulty restorations, impacted teeth, fractured teeth, pulpitis, pulp necrosis, apical periodontitis, periodontal pockets, presence of cystic or granuloma lesion, root fracture.

The barodontalgia not only affects restored teeth but also healthy elements²¹.

Still relates pulp condition of the dental element with the ascent or descent of an aircraft, or for it to barodontalgia during ascent would be closely linked to pulp problems in that the pulp is still vital, whereas this symptom during the descent of aircraft could be linked to a pulp necrosis or a facial barotrauma²².

A proof of the damage caused by atmospheric force exerted on the teeth were reported through a case of avulsion and amalgam restoration fracture when an amateur diver reached 35 m depth during the dive, this is

deeper than what would be used. Moreover, the author also related cause of the damage, it is closely linked to the high-pressure air which was contained in the drum which gave oxygenation support during the dive, higher than the atmospheric air, which have passed a weak point or fault restoration and caused damage²³.

This fact was also confirmed in a study of the German Navy, which were subject to the effects of changing atmospheric frequency in the dentition over time, where significant differences in deterioration of teeth more exacerbated way professionals found that were in charge of diver or navy-frog men, when compared to the positions in which there was no such exposure as in submarines²⁴.

By suggesting that civilian or military pilots do not resume their activities until passing through an adjustment of its dental elements by means of a dental treatment. In this case, the suggestion given by the author is not relevant since a good condition of a tooth, the professional is predisposed to suffer from problems such as barodontalgia that it can put at risk during their work. Another factor recommended by the author refers to radical treatment option in case of coronary pulp exposure through the pulpectomy, and still makes a contraindication caveat to direct pulp capping in cases of airmen, it claims that there is a risk of air penetration and reaches the pulp if you choose the direct pulp capping^{25,26}.

Some authors recommend as a preventive and cautious approach to conduct a thorough analysis of the cavity floor, for the avoidance of doubt whether or not the exposure of the pulp after the end of caries removal, if it has not been such exposure recommend a protection floor with restorative material calcium hydroxide base, and then immediately to restore a definitive materials^{27,28 29}.

Because of the frequency of cases of barodontalgias not as high in the clinical routine, this factor turns out to be essential for professionals' dentists stay tuned for the care of their patients. For only through a well-made history along with additional tests will get a correct diagnosis and therefore successful treatment.

5. CONCLUSION

It can be concluded that the barodontalgia is related by the atmospheric pressure difference and occurs when an individual is subjected to such pressure, being on a flight or even diving, so it is very important that the dentist must know the origin and causes as well as the treatment of preventive and curative measures.

It is important to regular visits to the dentist for oral health maintenance for prevention of the condition, so that it does not interfere with the welfare of professional.

REFERENCES

- [01] Eidelman D. Vertigo of dental origin: case reports. *Aviat Space Environ Med.* 1981 Feb; 52(2):122-4.
- [02] Kennebeck R, Knutzon KF, Goldhush AA, *et al.* Symposium on problems of aviation dentistry. *J Am Dent Assoc.* 1946; 33:827-44. PMID:20989532.
- [03] Hanna HH, Thomas-Yarington C. Otolaryngology in aerospace medicine. In: DeHart RL, ed. *Fundamentals of aerospace medicine*. Philadelphia, PA: Lea and Febiger; 1985; 525-36.
- [04] Gangog LH. Integrative reviews of nursing research. *Res Nurs Health.* 19987; 10(1):1-11.
- [05] Marceliano-Alves MFV, Miranda RB, Macedo, RPVS, *et al.* A barodontalgia em voo e o diagnóstico diferencial de dor odontogênica: relato de caso. *Revista de Odontologia da UNESP.* 2012; 41(4):287-91.
- [06] Marceliano-Alves, MVF, Medeiros UV, Fidel SR. *et al.* Barodontalgia em voo e diagnóstico diferencial de dor odontogênica. *Full Dentistry Science.* 2011; 2(7): 1-6.
- [07] Papiernick M, Grabowska A, SkoskieWicz-Malinowska K. *et al.* Prevalence and reasons of barodontalgia in non-professional divers. *Dentistry and Medical Problem.* 2009; 46(1):69-74.
- [08] Zadik Y. Aviation dentistry: current concepts and practice. *Br Dent J.* 2009; 206:11-4.
- [09] Ferjentisk E, Aker F. Barodontalgia: A system of classification. *Military Medicine.* 1982; 147:299-304.
- [10] Kollman W. Incidence and possible causes of dental pain during simulated high altitude flights. *J. Endod.* 1993, 19:154 - 9.
- [11] Zadik Y. Barodontalgia due to odontogenic inflammation in the jawbone. *Aviat Space Environ Med.* 2006; 77:864-6.
- [12] Lions KM, Rodda JC. Barodontalgia: a review, and the influence of simulate diving on microleakage and the retention of full cast crowns. *MiLit Med.* 1999; 164:221-7.
- [13] Robichaud, R, McNally ME. Barodontalgia as a differential diagnosis symptoms and findings. *J Can Dent Assoc.* 2005; 71:39-42.
- [14] Stewart TW Jr. Common otolaryngologic problems of flying. *Am Fam Physician* 1979; 19: 113-119.
- [15] Zadik Y, Chapnick L, Goldstein, L. In-flight barodontalgia: analysis of 29 cases in military aircrew. *Aviat Space Environ Med.* 2007; 78:593-6.
- [16] Halm T, Saghy, E. The effect of changes in air pressure during flight on teeth and jaw-bones. *Int Dent J.* 1963; 13: 569-572.
- [17] Verunac JJ. Recurrent severe facial emphysema in a submariner. *J Am Dent Assoc.* 1973; 87:1192-1194.
- [18] Susarla SM., Blaaser BF, Magalnick, D. Third molar surgery and associated complications. *Oral Maxillofac Surg Clin North Am.* 2003; 15: 177-186.
- [19] Zadik Y, Einy S. Aviation dentistry. In Goldstein L (ed). *Aviation medicine.* pp 197-208. The Publishing House of Israeli Ministry of Defense. 2006.
- [20] Rauch JW. Barodontalgia- dental pain related to ambiente pressure change. *Gen dent.* 1985; 33:313-5.
- [21] Rossi DG. Health policy directive no. 411: Aviation and diving- dental considerations. Surgeon General, Australians Defence Force, [S.n],[S.v],1995.
- [22] Sognnares RF. Further studies of aviation dentistry. *ActaOdontol Scand.* 1965; 7:165-73.
- [23] Zadik Y. Barodontalgia: what have we learned in the past decade?. *Oral Surg Oral Med Oral Pathol Oral RadiolEndod.* 2010; 109(4):65-9.
- [24] Peker I, Erten, H, Kayaoglu G. Avulsão e fratura de restaurações dentárias durante o mergulho. *JADA.* 2011; 11(2):6-9.
- [25] Goethe WH, Bater H, Laban C. Barodontalgia and barotrauma in the human teeth: findings in navy divers, frogmen, and submariners of the Federal Republic of Germany. *Mil Med.* 1989; 154(10):491-495.
- [26] Fleury Jean ERL, *et al.* ,Aerodontalgia. Report of a case. *Verstomatol Chir Maxillofac.* 1998; 89(1):15-20.
- [27] Alves M FVM.A barodontalgia em voo e o diagnóstico diferencial de dor odontogênica: relato de caso. *Rev. Odontol., Unesp.* 2012; 41(4):287-91.
- [28] Assis C De. Barodontalgia. *Rev. Bras.odontol., Rio de Janeiro.* 2012; 69(2):216-9.
- [29] Gorordo A. De, Mazur FV, Chanin K, Varon J. Diving emergencies. *Resuscitation.* 2003; 59(2):171-180.

SURGICAL TECHNIQUES TO CASES OF CLASS I RECESSIONS CAUSED BY LOWER LABIAL FRENULUM

GABRIELA ANDRADE SOLDATI¹, KARINA MINGARELI RIGUETTE DE SOUZA¹, TAMIRES RIGATTI¹,
¹LARISSA MAYRA PALOSKI¹, IARA DIAS DE ALMEIDA¹, EDUARDO AUGUSTO PFAU^{2*}

1. Dentist of the Course of Dentistry. Academics of the PIC and PIBIC program of Universidade Paranaense- UNIPAR - Umuarama PR; 2. Professor of the Dentistry Course of UNIPAR.

* Av. Angelo Moreira da Fonseca 5651, zone 1A, Umuarama, Paraná, Brasil. ZIP CODE: CEP 87594050. epfau@unipar.br

Received: 09/18/2016. Accepted: 11/10/2016

ABSTRACT

The gingival recessions are currently one of the major gum problems that affect different population groups, without distinction of gender or socioeconomic status. Recessions are defined as changes in the gingival margin, resulting from the apical migration of the gums causing the exposure of tooth roots. The aim of this study is to compare two surgical techniques for correction of these defects gum. **Materials and Methods:** Patients were divided into two groups, the group (A) was subjected to classical technique of free gingival graft and then coronal repositioning. The second group (Group B) was subjected to the Modified Apically Repositioned Flap (MARF technique) associated with polypropylene barrier and after 60 days was performed root coverage with tissue by tunneling technique. The free gingival graft (FGG) technique in quantitative ratio also proved more effective than the alternative proposed technique, but for the comfort of the patients, the MARF technique with non-resorbable membrane was preferred by them, mainly by avoiding second surgical moment to obtain the grafted material. Considering the second surgical stage for the root coverage, it shows that both technique of coronal repositioning as the tunneling connective tissue, were effective in the treatment of Miller Class I recessions.

KEYWORDS: Barodotalgia, atmospheric pressure, flight, diving

1. INTRODUCTION

The growing concern of modern society to achieve the ideal smile arouses in patients the perception of problems related to the gingival tissues. Thus, the presence of alterations in the position of the gingival margin causing root exposure has been considered a serious aesthetic problem¹.

There are currently several periodontal surgical techniques for the recovery of dental roots. Free Gingival Grafts (FGG) have been frequently indicated for the treatment of gingival defects responsible for the exposure of dental root surfaces. Introduced by Bjorn in 1963, the FGG technique, still today, represents the main surgical

technique for increasing keratinized tissue width, increasing vestibule extension and eliminating the insertion of brakes, proving to be a predictable procedure for the treatment of mucogingival deformities. The surgical technique of FGG consists briefly in the deinsertion of a gingival fragment containing epithelial and connective tissues from a donor site and transfer to the recipient bed. This technique is used when there is insufficient amount of keratinized gingival tissue adjacent to mucogingival defects, and/ or when it is desired to convert a periodontal biotype considered to be thinner in a thicker biotype. However, this FGG technique is widely rejected as an option for treatment by patients, since the difference in graft staining after healing at the receptor site compromises aesthetic results. Also, the discomfort present in the donor area, which is, most of the time, exposing a large area of connective tissue responsible for postoperative pain noted².

Faced with the limitation of the FGG technique, new techniques of tissue manipulation have been developed. The Modified Apical Repositioning Retain technique³, otherwise known as MARF is a technique that has as main advantage the increase of the keratinized gingival band specifically in the area of the mucogingival defect, and thus eliminates the need to remove tissue from a second donor bed.

Recently Mourinho *et al.* (2015)⁴ have suggested the use of a non-resorbable polypropylene membrane in order to improve the quantitative result of keratinized gingiva formation obtained by the original MARF technique.

Considering the importance of the minimal presence of gingiva inserted around teeth to maintain periodontal health, the development of alternative techniques that promote the increase of keratinized gingiva is justified. Thus, this paper aims to present, through a case report, options for Surgical techniques for cases of recessions class I caused by lower lip brake, comparing the results obtained between the classic technique of free gingival graft and that of MARF associated with a polypropylene

barrier for Increase the inserted gingival range and later the root covering with tunneled connective tissue.

2. MATERIAL AND METHODS

The group of participants involved in this study consisted of 4 patients, aged between 20 and 30 years, two men and two women being selected at the Dental Clinic of “Universidade Paranaense” - UNIPAR - Umuarama - Paraná. These patients were informed by the researcher about the purpose of the research and soon after, those who voluntarily agreed, received and signed the informed consent form, which was previously submitted and approved by the Research Ethics Committee, According to guidelines for the protection of the research subject established by Resolution No. 196/96 of the National Health Council of the Ministry of Health.

We excluded from this study individuals with systemic diseases such as diabetes, cardiovascular disorders; Diseases of the immune system; Coagulation diseases; Psychiatric and neurological diseases; Patients treated with radiation recently (two-year period); Patients treated with chemotherapy recently (two-year period); smoking; pregnant women; infants; Patients with a history of alcohol and drug abuse; Patients with poor plaque control and/ or inflammatory diseases located in the soft tissues adjacent to areas with surgical indication.

3. RESULTS

Patients participating in this study should present recessions of the lower anterior region classified as Miller class I, with a maximum exposure of 4 mm of dental root and influence of the lower lip brake (Figure 1).



Figure 1. Initial case registry, performed with the free gingival graft technique.

Patients received the same type of surgical procedure on the same day, and one group (Group A) underwent a free gingival graft technique (Figure 2) and after 60 days the root coverage was performed by the coronally repositioned flap technique (Figure 3 and 4). Another group (Group B) was submitted to a Modified Apical Repositioning (MARF) flap technique associated to the poly-

propylene barrier (Figure 5 and 6) and after 60 days the root canal with connective tissue was performed using the tunneling technique (Figure 7 and 8).



Figure 2. Free gingival graft stabilized with suture.



Figure 3. Gingival graft free after 60 days.



Figure 4. Second surgery with root coverage using the technique of coronary repositioning of the free gingival graft.

4. DISCUSSION

The presence of gingival recessions has been reported as an aesthetic periodontal problem perceived by the patients, which may be associated with the discomfort

caused by dentin hypersensitivity or even root caries⁵.



Figure 5. Recording initial of 3 mm recession, treated by MARF technique with polypropylene barrier.



Figure 6. MARF technique with non-resorbable polypropylene barrier.



Figure 7. Gingival appearance after 60 days of the MARF technique with the non-resorbable membrane.



Figure 8. Second surgery with root coverage by connective tissue

tunneling technique.



Figure 9. Post-operative 3 months of coronary repositioning of the free gingival graft.



Figure 10. Post-operative 3 months of connective tissue tunneling technique.

The literature reports a great diversity of factors related to the etiology of gingival recessions. Thus, these alterations of the gingival margin that as a consequence exposes the dental roots can be observed both in patients with periodontal health clinics and patients with periodontal diseases. Individuals with periodontal health usually present with brushing trauma in areas of fine biotypes and predisposing conditions related to the presence of shallow vestibule, anomalous insertions of lip braces or flanges, untreated cervical caries lesions, fixed or removable, orthodontic movement outside the bone limits, or even inadequate dental positioning⁶. The patients participating in our study had periodontal health, but the presence of shallow gingival recessions with root exposures of up to 4 millimeters and with the origin influenced by the presence of anomalous insertion of the lower lip brake.

The identification and treatment of etiological factors are important steps for successful treatment of gingival recessions. In many cases, the absence or the small range of gingiva inserted leads to the need for additional preparatory surgeries to be performed after the root recoil. Much is discussed about the importance of the minimal

amount of keratinized gingival tissue responsible for maintaining the integrity of the periodontium⁷ and peri-implant tissues^{8,9,10}. Thus, mucogingival surgeries have been widely used to adjust or improve soft tissue conditions around teeth and implants^{11,12}.

Among the surgical techniques for the recoating of gingival recessions the main and best known are the semilunar flap positioned coronally¹³, the pedicled grafts¹⁴, Coronal Repositioning Retail¹⁵, associated or not with subepithelial connective tissue grafts^{16,17} and the tunneling or envelope technique described by Raetzke (1985)¹⁸. This technique is indicated for root coverage in areas isolated from marginal tissue recession and was used in our study. The technique consists of the partial-thickness tunnel flap extending 3 to 5 mm laterally and apically to the recession area, including the interdental papillae without rupturing them, then the connective tissue graft is stabilized with sutures.

Classically the technique of free gingival graft is described in the literature since the 60's as the most effective therapeutic method to increase the gingival range inserted and consequently preventive way of progression of gingival recessions¹⁹. When we have a range of apical keratinized recession, the coronal repositioned flap has been suggested as a good treatment option, this was possible to be confirmed in our study since the patients who received the treatment with free gingival graft and posterior coronal repositioning of retail had 100% coverage of Miller's Class I recessions. As a disadvantage of this type of surgical approach it is possible to observe a discrete color difference between the graft and the adjacent area, which can be interpreted as limiting the technique in regions of high expectation for aesthetic result.

Alternative surgical techniques to the FGG technique have been extensively studied, such as the apically displaced flap and the apically modified repositioned flap used alone or in combination with autogenous and/ or allogeneic grafts, have shown good results for tissue augmentation keratinized^{3,4}. In our research the same methodology was used in the technique described by Mourinho *et al.* (2015)⁴. It is noted that the use of the polypropylene barrier promotes a better amount of keratinized tissue, being effective in increasing the range of gingiva inserted in areas of gingival recessions. The association of the connective tissue graft performed by the tunneling technique allowed the complete recovers of the Miller Class I recess located in the lower anterior region, with the advantage of presenting a more acceptable final aesthetic result when compared with the technique of coronary repositioning of the gingival graft free.

5. CONCLUSION

Despite the small number of participants in this study, it can be observed that both operative techniques were

effective and fulfilled the purpose of improving the gingival tissue condition. The free gingival graft technique in quantitative proportion was still more effective than the proposed alternative technique, but with respect to comfort for the patient, the MARF technique with the non-resorbable membrane was preferred by the patients, mainly to avoid a second bed to obtain the grafted material. Considering the second surgical stage for root coverage, it can be observed that both the coronary repositioning technique and the tunneling of the connective tissue were effective for the treatment of Miller's class I recessions.

REFERENCES

- [1] Zaher CA, Hachem J, Puhan MA, Mom-Belli A. Interest in periodontology and preferences for treatment focalized gingival recessions. *J Clin Periodontol.* 2005; 32:375–382.
- [2] Feitosa DS, Santamaria MP, Sallum EA, Nociti Junior FH, Casati Mz, Toledo S. indications of free gingival grafts. *RGO.* 2008; 26(2):1-6.
- [3] Carnio J, Camargo PM, Passanezi E. Increasing the apico-coronal dimension of attached gingiva using the Modified Apically Repositioned Flap Technique: a case series with a 6-month follow-up. *J Periodontol.* 2007; 78(9):1825-1830.
- [4] Mourinho AG, Alves SS, Pfau VJM, Pfau EA. Use of non-reabsorbable membrane associated with surgical technique to increase attached gingiva. *Journal of Surgical and Clinical Dentistry.* 2015; 4(1):08-13.
- [5] Trentin MS, Cezaro L, Durigon M, Oliveira CA. Enxerto de tecido conjuntivo subepitelial como alternativa ao tratamento de recessões gengivais múltiplas – relato de caso. *Full Dent. Sci.* 2015; 6(23):243-249.
- [6] Alves RV, Alves CF, Perrell GEC, Pontes TM. Free gingival graft in the treatment of class II gingival recession – case report with 1-year of follow-up. *INPerio.* 2016; 1(1):128-34.
- [7] Lang NP, Loe H. The relationship between the width of keratinized gingiva na gingival health. *J. Clin Periodontol.* 1972; 43(10): 623-7
- [8] Lin GH, Chan HL, Wang HL. The significance of keratinized mucosa on implant health: a systematic review. *J Periodontol.* 2013; 84(12): 1755-67.
- [9] Brito C, Tenebaum HC, Wong BK, Schmitt C, Nogueira-Filho G. Is keratinized mucosa indispensable to maintain peri-implant health? A systematic review of the literature. *J Biomed Mater Res B Appl Biomater.* 2014; 102(3):643-50.
- [10] Carvalho RD, Cartaxo AC, Martins ARLA, Gurgel BCV. Keratinized mucosa augmentation around dental implants – an integrative review. *INPerio.* 2016; 1 (2):302-11
- [11] Cairo F, Pagliaro U, Nieri M. Theatment of gingival recession with coronally advanced flap procedures: a systematic review. *J Clin Periodontol.* 2008; 35(8 Suppl.):136-62.

- [12] Caneva M, Botticelli D, Vianò P, Morelli F, Rea M, Lang NP. Connective tissue grafts in conjunction with implants installed immediately into extraction sockets. An experimental study in dogs. *Clinical Oral Implants Res*. 2013; 24 (1):50-6
- [13] Tarnow DP. Semilunar coronally repositioned flap. *J. Clin. Periodontol.* 1986; 13:182-185.
- [14] Nelson SW. The subpedicle connective tissue graft: A bilaminar reconstructive procedure for the coverage of desnuded root surfaces. *J. Periodontol.* 1987; 58(2): 95-102.
- [15] Bernimoulin JP, Lyscher B Muhlemann HR. Coronally repositioned periodontol flap. Clinical evaluation after one year. *J.Clin. Periodontol.* 1975; 2:1-13.
- [16] Langer B & Calagna L. Subepithelial graft to correct ridge concavities. *J. Prosthet. Dent.* 1980; 44:363- 367.
- [17] Langer B & Langer L. Subepithelial connective tissue graft technique for root coverage. *J. Periodontol.* 1985; 56:715-720.
- [18] Raetzke PB. Covering localized areas of root exposure employing the “envelope” technique. *J. Periodontol.* 1985; 56(7):397-402.
- [19] Sullivan HC. Atkins JH. The role of free gingival grafts in periodontal therapy. *Dent Clin North Am* 1969; 13:133-48
- [20] Bjor H. Free transplantation of gingiva propria (abstract). In *Symposium in periodontology in Malmö. Odontologisk Rev.* 1963; 14: 321-323.