v. 5, n. 25, 2025

International Journal of Health Science

CLINICAL ANALYSIS OF THE GINGIVAL BIOTYPE OF PATIENTS WITH NON-CARIOUS CERVICAL LESIONS AT A UNIVERSITY IN SANTA CATARINA

Acceptance date: 07/07/2025

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Abstract: The periodontium is composed of gingiva, periodontal ligament, root cementum and alveolar bone. The gingival structure has characteristic anatomical diversity that allows it to be classified according to its biotypes. The aim of this study was to verify the gingival biotype in patients with non-carious cervical lesions. The sample consisted of 60 patients with right or left maxillary first premolars who attended the dental clinics of a university in Santa Catarina in the second semester of 2020. This was a cross-sectional, quantitative study whose methodology included gingival analysis through clinical probing and measurement using a Williams-type periodontal probe. The results showed that 35 patients (56.3%) had thin biotypes and 25 patients had thick biotypes (41.6%), the average probing depth of patients with thick gingival biotype was 2mm, thin 1mm and the amount of keratized tissue found in patients with thick biotype was 3mm, and in the thin biotype 1.5mm. Patients with non-carious cervical lesions have a higher frequency of thin gingival biotype with lower gingival thickness and amount of keratinized tissue than patients with thick gingival biotype.
Keywords: Cervical lesions. Periodontium. Gingival biotype.

INTRODUCTION

Nowadays, periodontal tissues stand out as parameters of aesthetic and functional relevance for patients who are looking for cosmetic or rehabilitative treatments that will bring them an adequate harmonization of their smile as a final result. Studies on the gingival biotype can provide dentistry with better control and prevention of side effects to restorative treatments, as well as favoring aesthetic results (DE MELO et al., 2016).

Anatomically, the periodontium is made up of the gingiva, periodontal ligament, root cementum and alveolar bone. The periodontium is characterized by the set of tissues located immediately surrounding the teeth, which maintain and support them in position. It is made up of the gingiva, root cementum, periodontal ligament and alveolar bone. From an anatomical and functional point of view, the periodontium can be divided into two types: protective periodontium and insertion or support periodontium. The gingiva plays the role of protecting the dental organ and forms the protective periodontium. The root cementum, periodontal ligament and alveolar bone play the role of supporting the dental organ, thus making up the insertion periodontium (LINDHE, 2005).

By analyzing the components of the periodontium using three clinical parameters: gingival thickness, keratinized tissue width and bone thickness, we define the periodontal biotype (MENEZES, 2010).

Thin biotypes are friable and at high risk of recession when injured. The reasons for this are, firstly, the thin retracted gingival margins, which can compromise the aesthetics of the anterior region of the mouth. Secondly, due to the fragility of this thin tissue, it needs to be handled delicately in order to avoid recession and, consequently, exposure of the subgingival portions. The thick biotype, being fibrotic and resilient, tends to respond to injury by forming periodontal pockets rather than recession, which may in some cases be more favorable to satisfactory aesthetic results (ALVES, 2011).

It has been shown that gingival recessions are often associated with non-carious cervical lesions (NCL), causing complaints of hypersensitivity and an anti-aesthetic appearance. Gingival recessions are commonly associated with cervical wear on the same tooth. These irregularities in the exposed root surface can have a negative impact on the degree of root coverage after periodontal plastic surgery (GUIDA et al. 2010).

Non-carious cervical lesions are increasingly frequent in young people, adults and the elderly. It is considered a public health problem. NCCLs are characterized by the gradual loss of mineralized tissue in the cervical region of the tooth, promoted by an association of factors without the involvement of bacteria (KINA, 2015).

The aim of this study is to verify the gingival biotype of patients with non-carious cervical lesions who attend university.

MATERIALS AND METHODS

This is a clinical study, approved by the Research Ethics Committee under opinion no. 4.280.228, analyzing the gingival biotype through probing and measurement using a Williams-type periodontal probe. The data collected was recorded on specific forms prepared by the researchers, after which it was categorized and presented in tabular form and then analyzed using confidence intervals. The gingival biotype of the elements was assessed by the academic, accompanied by a supervisor specialized in the field of research.

The target population was patients attending Univali's dental clinics in 2020. Of these, 60 patients met the inclusion criteria and formed part of the sample.

Based on a sample of 60 patients, who were invited to participate when they were at the reception of the university's dental clinics and had the option to refuse, and if the invitation to participate was accepted, the research had a maximum time of 20 minutes for data collection.

The inclusion criteria for the study population were: Patients aged between 18 and 50 years; having a healthy right or left maxillary first premolar; having cervical lesions; individuals with good oral hygiene; no signs of active periodontal disease or absence of interproximal bone loss; presence of gingival recession.

The exclusion criteria are Patients under the age of 18; Patients without cervical lesions; Individuals without upper central incisors; Individuals with a history of orthodontic treatment; Smokers; Pregnant or breastfeeding women; Diabetic patients; Patients with clinical signs of periodontal disease defined as having a probing depth of more than 3 mm; People who have taken medication with any known effect on the periodontium and soft tissues; Patients with traumatogenic occlusion.

Clinical mucogingival examinations were carried out using a Williams-type periodontal probe. Elements 14 and 24, where there was a non-carious cervical lesion, were selected and only one dental element was examined per patient to observe the following clinical parameters: gingival thickness, probing depth and width of the keratinized mucosa strip. Probing depth was measured by inserting the periodontal probe into the gingival sulcus on the buccal side and corresponded to the distance between the gingival margin and the bottom of the sulcus. The width of the keratinized mucosa strip was also measured with a periodontal probe. Both measurements were taken with the Williams periodontal probe (Hu-Friedy). Gingival thickness was recorded as thick or thin, using a sample of one tooth per patient as a reference. This was also recorded by the translucency of the Williams periodontal probe through the free marginal gingiva on the buccal surface of the elements when it was inserted into the clinical gingival sulcus of the tooth being assessed.

If the probe could be seen through the tissue, it was categorized as thin; if not, it was classified as thick (De ROUCK et al., 2009). The gingival biotype of the elements was classified by a single researcher, previously calibrated by an experienced periodontist.

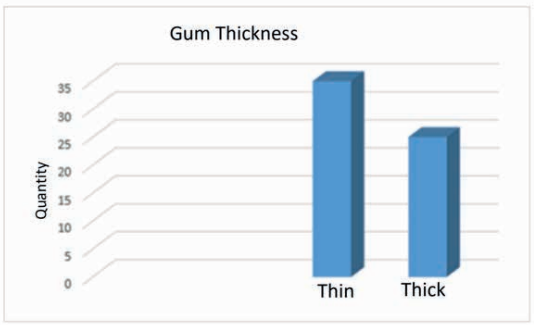
The patients were previously instructed on the evaluation method, which was not intended to cause harm to their physical and/

or psychological integrity, and were informed of the purpose of the study. At the end of the analysis, the patients were referred to the previously established clinics to continue their treatment without causing any consequences to the treatment they would be undergoing.

The means of the parametric measurements of the groups into which the 60 individuals were divided were compared using the t-test to tabulate and describe the results.

RESULTS

The sample consisted of 60 individuals, patients aged between 18 and 50, with a total of 60 teeth analyzed. Graph 1 shows that 56.3% of the teeth analyzed had a thin gingival biotype (35) and 41.6% had a thick gingival biotype (25).



Graph 1- Absolute frequency distribution of gingival thickness.

Source: (2020).

However, as shown in Table 1, the average probing depth of patients with a thin gingival biotype was 1mm, and patients with a thick gingival biotype was 2mm. Table 2 shows that the average amount of keratinized tissue found in patients with a thin biotype was 1.5mm and in the thick biotype 3mm.

Probing depth thin biotype	1mm
Probing depth thick biotype	2mm

Table 1- Average probing depth.

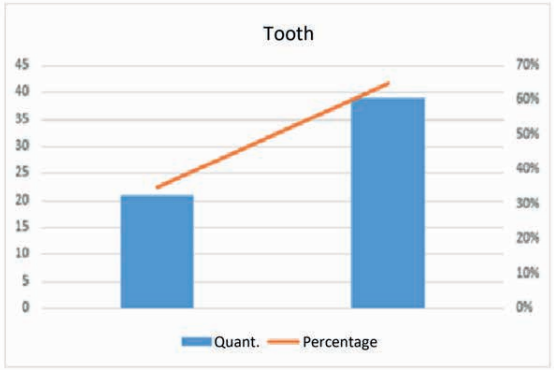
Own source: (2020)

Keratinized tissue thin biotype	1.5mm
Keratinized tissue thick biotype	3mm

Table 2- Average amount of keratinized tissue.

Own source: (2020)

The dental elements analyzed were the maxillary premolars (left and right), 35% (21 patients) had their analysis based on element 24, and 65% (39 patients) had their analysis based on element 14, as shown in Graph 2.



Graph 2- Absolute and relative distribution of the dental elements analyzed.

Source: (2020).

The graphs shown have a 95% confidence interval.

Bearing in mind that the patients analyzed have non-carious cervical lesions, it can be seen that there is a predominance of patients with a thin gingival biotype and less keratinized tissue, compared to the thick biotype, where consequently there was a greater amount of keratinized tissue.

DISCUSSION

Knowledge of gingival morphology is considered very important when determining dental treatment plans, including aesthetic procedures. During treatment, it is ideal to analyze gingival biotypes, taking into account the individuality of each morphotype, as this will help in better diagnosis, treatment and facilitate prognosis. In the absence of a gold

standard of measurement, many methods have been proposed to evaluate the tissues and classify these gingival biotypes. In addition to periodontal probe measurements, CT scans have helped to determine some of these parameters, such as gingival thickness and bone plate thickness (ARAÚJO, et al., 2018).

Comparing our research with the literature cited above, we can see that the thin biotype is characterized by a thin and delicate gingiva, accompanied by elongated and triangular dental crowns and a probe that is visible due to the translucency of the free gingival margin during probing. The thick biotype has fibrous and comparatively thicker gingiva, dental elements with quadrangular crowns, and the probe is not visible during probing (De ROUCK et al., 2009).

In this study, the biotype was assessed using the probe transparency method. The classification into thin or thick gingival biotypes was chosen according to the study by De Rouck et al. (2009).

As shown in the results of this study, there was a higher prevalence of the thin gingival biotype with 56.3% (35 of the teeth assessed), while the thick biotype was 41.6% (25 of the teeth assessed). This result differs from other studies carried out, such as De Rouck et al. (2009) where the thick gingival biotype is more prevalent. This difference in the prevalence of gingival biotypes may be associated with the target audience of the research, given that this study was carried out on teeth with non-carious cervical lesions. In this study, we can highlight that the probing depth was relatively lower in the periodontium characterized as thin than in the thick periodontium.

Different tooth conditions, including root caries and non-carious cervical lesions, can be associated with gingival recession. Historically, non-carious cervical lesions (NCCL) have been classified according to their appearance: wedge-shaped, disc-shaped, flattened and irregular areas. Recent studies have found a prevalence of NCCL ranging from 11.4% to 62.2%. A common finding is that the prevalence and severity of NCCL seem to increase with age (CORTELLINI and BISSADA 2018).

The association between the presence of gingival recession and non-carious cervical lesions is a common finding in dentistry. Although most professionals treat non-carious cervical lesions only with conventional restorative procedures, in most cases, the combination of periodontal and restorative treatments provides the best biological, functional and aesthetic results (TEIXEIRA, 2017).

There is an association between the shape of the dental crown of anterior dental elements and the morphology of the periodontal tissue. Square-shaped teeth have a wide periodontal layer, a short gingival papilla, a shallow cervical gingival curvature and a greater probing depth. In comparison with elongated teeth, which have a thin layer of periodontal tissue, a longer interdental papilla, prominent cervical gingival curvature and a shallower probing depth (JÚNIOR, 2019).

There are different periodontal surgical techniques that have the potential to improve tissue quality, enhancing the restorative environment. Therefore, by understanding the nature of tissue biotypes, dental surgeons can employ appropriate periodontal techniques to minimize alveolar resorption and provide more favorable results (BHUSARI, 2015).

It is easier to achieve good aesthetic results in patients with a thick gingival phenotype, because due to the thicker gingiva-bone complex, a more calculable and favorable response to inflammation, trauma or aggression is expected when compared to thin epithelia. Thin biotypes are made up of a narrow, delicate band of keratinized tissue and a limited amount of adhered gingiva which, due to its friability, presents an increased risk of recession after dental procedures. In addition, be-

cause the gingiva is thin, it reveals the color of the underlying metal structures. It is therefore crucial to understand the importance of the gingival biotype when planning dental treatments such as crown placement, implant placement, orthodontic treatment, crown lengthening or periodontal surgery (PINTO, 2015).

Mucogingival defects, including gingival recession, occur frequently in adults, tend to increase with age and occur in populations with high and low standards of oral hygiene. Exposure to the root surface is often associated with compromised aesthetics, dentin hypersensitivity and carious and non-carious cervical lesions (CORTELLINI and BISSADA, 2018).

Thin gingival tissue is associated with a minimal amount of inserted gingiva, a wavy gingival contour suggestive of thin bone architecture and is more sensitive to inflammation and trauma (BEZERRA, 2016).

The different periodontal biotypes behave differently when subjected to injury and/or surgical manipulation. Thin periodontiums in patients with periodontitis usually present with periodontal recessions. Thick periodontiums tend to present fibrosis, edema and periodontal pockets (CUNHA, 2013).

Non-carious cervical lesions and gingival recession are closely related. By exposing the root surface to the oral environment, the root loses its protective gingiva and is therefore subject to the action of non-bacterial acids and traumatic brushing. This can cause wear in the cervical region of the tooth and create wedge-shaped defects. Traumatic tooth brushing is an etiological factor in both gingival recession and non-carious cervical lesions. The combined approach, which includes the restorative procedure and the surgical procedure, has major clinical advantages, including total masking of the cervical lesion, better control of hypersensitivity, restitution of the tooth's emergence profile, allowing better adaptation of the marginal tissue and an adequate gingival contour, which provides a harmonious result (SILVEIRA, 2016).

Periodontal recession corresponds to the loss of insertion, resulting in a lower position of the free gingival margin, anywhere on the exposed root surface. It can be present in both arches, on the buccal and lingual surfaces 41 and on any teeth. The results in the literature show that, in addition to the important etiological role of dental bacterial biofilm, periodontal recession is a condition of multifactorial etiology, although the predominant factor in a given area is impossible to identify and, therefore, it is difficult to predict whether recession will develop in a given area. (YARED, 2006).

Once it has been decided to carry out a restoration, we must always bear in mind that it must follow all precautions so that it does not act in an iatrogenic way, either for the periodontium or for the oral cavity. Therefore, both the anatomical knowledge of the dental structures, as well as the functioning, the components of the periodontium and the possible bacterial action is extremely important for the dentist (FERNANDES, 2017).

Determining the periodontal biotype is fundamental for establishing a prognosis in restorative, orthodontic and periodontal treatments. It can also help prevent the occurrence of gingival recession (CALDATO et al., 2018).

Once a correct diagnosis has been made, there is the possibility of converting the thin biotype to a thick one through surgical techniques for managing the soft tissue and prosthesis. Therefore, the diagnosis and conversion of thin biotypes may result in greater aesthetic-functional predictability of implant-supported rehabilitations (GOES, 2015).

Tooth surface loss, or non-carious lesions, is a physiological process that occurs with ageing, but can be considered pathological when the degree of destruction creates functional, aesthetic or tooth sensitivity problems. Various factors can contribute in part, but not necessarily simultaneously or equally, to the cause of non-carious lesions. One of the great challenges is to identify or quantify the influence of factors such as excessive and abusive consumption of drugs and acidic substances, environmental factors and intrinsic etiological agents such as gastroesophageal reflux (AMARAL et al., 2012).

Identifying the periodontal biotype can be important in clinical practice, since differences in gingival and bone architecture are related to the outcome of different dental procedures, including periodontal treatment. It has been suggested that inflammation associated with plaque can result in deep periodontal pockets with a smooth, thick appearance and gingival recession in a thin biotype (ZWEERS et al., 2014).

By identifying the characteristics of periodontal tissues, we can predict gingival recession due to orthodontic movement, traumatic extraction or occlusal trauma, among others, severe ridge atrophy after exodontia, tissue color change after implant placement, etc. (KAHN, 2013).

CONCLUSION

It can be concluded from the sample studied that among patients with non-carious cervical lesions, the thin gingival biotype prevails, with a lower amount of keratinized tissue and thickness than the thick gingival biotype. Therefore, diagnosing the gingival biotype prior to the planning phase is an effective and non-invasive diagnostic method that should be included in clinical practice with the aim of providing safer and more promising individualized treatment for patients.

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