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**Therapy of gingival recessions using laterally positioned
flap plus connective tissue graft: Case reports.**

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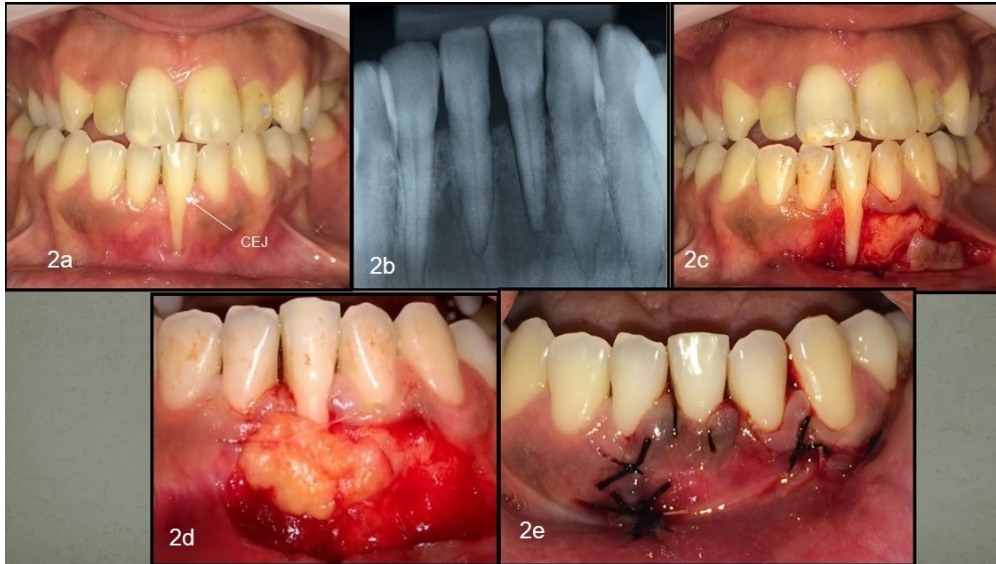
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3 TITLE: Therapy of gingival recessions using laterally positioned flap plus
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5 connective tissue graft: Case reports.
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8 “Root coverage surgical therapy”
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ABSTRACT

Background: Gingival recession is an usual clinical condition with a multifactorial etiology, and its surgical treatment aims to improve aesthetics through root coverage, reducing dentin hypersensitivity, minimizing the risk of cervical caries, and increasing keratinized tissue. Objective: The aim of this study was to report the therapy used for two clinical cases of gingival recession in lower incisors. Methods: Miller class III and II gingival recessions were treated using the lateral flap associated with the connective tissue graft, with the maintenance of a keratinized tissue band in the tooth adjacent to the recession. Results: After 6 months a partial root coverage was obtained in the first case, above 70%, and complete root coverage at second case, with increase of keratinized tissue in both. Conclusion: The lateral flap associated with a connective tissue graft showed an effective technique, with good results in root coverage, gain of keratinized tissue, reduction of hypersensitivity and satisfactory esthetics in the treatment of Miller's class II and III gingival recession.

KEYWORDS: gingival recession, esthetics, connective tissue.

1. Introduction:

The gingival recession (GR) is the apical migration of the gingival margin beyond the cementum enamel junction, and recent surveys showed that 88% of people over 65 years and 50% of people with age between 18 and 64 years have at least one site with GR ⁽¹⁾.

GR has a multifactorial etiology and may be associated to periodontal disease, mechanical forces such as trauma due to inadequate tooth brushing or occlusal trauma. Iatrogenic factors such as uncontrolled orthodontic movements, poorly adapted partial dentures, and / or anatomical factors such as gingival biotype, aberrant frenulum attachments, presence of dehiscence and fenestration

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3 are also related. The diagnosis and control of these etiological factors are
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5 essential for the therapy of lesions that affect the mucogingival complex ⁽²⁾.
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8 The gingival recessions (GRs) result in exposure of the root, and their
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10 surgical treatment aims at aesthetic correction through root coverage, reduction
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12 of dentin hypersensitivity, minimizing the risk of cervical caries, and increase or
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14 create keratinized tissue (KT). The surgeries to increase KT generally allow for
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16 easily predictable results, and the prognosis of surgeries to obtain root coverage
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18 is excellent for GR Miller classes I and II, whereas for classes III or IV only partial
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20 root coverage is expected. The selection of a surgical technique depends on
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22 several factors, such as the size of the recession, the presence or absence of KT
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24 adjacent to the recession, the width and height of the interdental soft tissue, and
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26 the depth of the vestibule, among others are related to the patient ⁽³⁾.
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30 The main mucogingival surgical techniques include the use of the free
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32 autogenous gingival graft, which are best indicated for KT gain, but with
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34 unfavorable aesthetic results and low predictability of root coverage. The
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36 coronally positioned flap (CAF) or laterally positioned flap (LPF) isolated or
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38 associated with connective tissue graft (CTG), acellular dermal matrix, enamel
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40 matrix derivatives and guided tissue regeneration have the best indications to
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42 root coverage ⁽⁴⁾. The most frequently variable used to evaluate the clinical results
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44 is the amount of root coverage obtained, expressed as the difference between
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46 the baseline clinical attachment loss and the final data, and the percentage of
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48 complete root coverage ⁽³⁾.
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54 The best clinical results are obtained with CAF associated with CTG,
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56 considered the gold standard technique for having high predictability of root
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58 coverage ⁽⁸⁾ due to both flap and periosteum nutrition ⁽⁵⁾. CAF is the first choice
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3 for root coverage when there is adequate KT close to the recession defect.
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5 However, some local anatomical conditions may hinder the use of this technique,
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7 such as the absence of KT, the presence of a very shallow vestibule and frenulum
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9 attachments, and the LPF technique may be indicated ⁽⁶⁾.
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12 Several modifications from the first report of LPF, such as marginal
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14 tissue exclusion and partial flap thickness have been described in order to reduce
15
16 the risk of recession and dehiscence at the donor site. Since then, the technique
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18 has been reported as a treatment option for localized recession defects, resulting
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20 in increased KT and high degrees of root coverage ⁽⁷⁾.
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23 Tissue healing in GR with use of LPF shows the formation of long
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25 junctional epithelium and connective tissue with parallel fibers along previously
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27 exposed root surfaces ⁽⁸⁾.
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30 The LPF has a good aesthetic results, with the increased of KT and
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32 reduced root sensitivity. However, limitations of this technique include shallow
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34 vestibule, little inserted gum, and very wide recessions with root prominence ⁽³⁾.
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36 LPF is an option for root coverage in localized GRs and has good results, with
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38 complete coverage of class I and II recessions in 62.5% of cases and partial
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40 coverage in 94% ⁽⁹⁾. The efficacy of LPF were evaluated among 120 patients with
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42 Miller class I and II GR and achieved 96% partial RC and 80% complete root
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44 coverage ⁽⁶⁾.
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50 Root coverage in Miller class III recessions, although with lower
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52 predictability, shows values between 54 and 85%, and has its potential increased
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54 with the association of the CTG ⁽³⁾. Using also the CTG + CAF or LPF, Cesar
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56 Neto et al (2019) ⁽¹⁰⁾ showed an average coverage of 74% in class III recessions
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3 and Lee et al (2014) ⁽¹¹⁾ using LPF + CTG, also in class III recessions, showed
4 coverage between 60 and 95%.
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8 Keratinized tissue gain is also an aim of mucogingival surgeries and the
9 use of CTG enhances this increase that was reported in a systematic review of
10 Miller class I and II GR therapy ⁽¹²⁾.
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13 LPF is an option among mucogingival surgery techniques, which good
14 results in root coverage and keratinized tissue gain. Thus, the aim of this study
15 was to report two clinical cases of localized GRs using LPF associated with the
16 CTG, and discuss the technique and the results obtained.
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25 26 2. Case Reports:

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28 The case reports were previously submitted and approved by the
29 Research Ethics Committee of the Federal University of Juiz de Fora under the
30 number 14111619.6.0000.5147.
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34 35 2.1. Case Report 1:

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37 Female, 43 years old, non-smoker without significant systemic changes, who
38 finished orthodontic therapy about 2 years ago, with an aesthetic complaint and
39 worried about possible tooth loss. Periodontal conditions were clinically assessed
40 using the North Carolina periodontal probe (PC PUNC 15, Hu Friedy, IL, USA).
41 The tooth 41 showed a GR = 10 mm, Miller class III and Cairo class II, almost
42 complete root exposure, absence of KT ("Figure 1a"), and with a visible proximal
43 bone loss on radiographic image ("Figure 1b"). The probing depth (PD) on buccal,
44 mesial and distal surfaces = 2mm. The patient's periodontal phenotype is thick.
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57 Scaling and root planning was performed with a Gracey 5-6 curette and then
58 a partial thickness flap was made from the mesial of tooth 43 to the mesial of
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3 tooth 42, preserving a margin of KT on the buccal face of this tooth. A connective
4 tissue graft of the palate was obtained with the trap-door technique ⁽¹³⁾ which was
5 fixed to the root of tooth 41 with 5-0 Vicryl wire. Subsequently, the flap was
6 positioned laterally over the graft and fixed with 4-0 silk thread ("Figure 1c"), which
7 was removed 10 days later. Postoperative care included 0.12% chlorhexidine
8 mouthwash and use of analgesic and anti-inflammatory drugs. The use of pre-
9 surgical anti-inflammatory reduces morbidity after surgery, confirmed by the slight
10 discomfort in the palatal area, reported by the patient. "Figure 1d" shows the
11 postoperative period at 15 days, and "Figure 1e" at six months, showing partial
12 coverage (over 70%, with a final GR = 3mm), and KT increase (gain of 4 mm). At
13 the final clinical examination, the PD on the buccal surface was 1 mm, and in
14 others surfaces = 2 mm.

2.2. Case Report 2:

31 Female, 29 years old, non-smoker without significant systemic changes,
32 with an aesthetic complaint and with a slight dentinal sensitivity, related to the
33 tooth 31. Periodontal conditions were clinically assessed using the North Carolina
34 periodontal probe (PC PUNC 15, Hu Friedy, IL, USA). The tooth 31 showed a GR
35 = 8 mm and PD = 1mm on the buccal surface, Miller's class II and Cairo class I,
36 absence of KT ("Figure 2a"), and with a slight loss in the bone proximal crests
37 ("Figure 2b"). The PD on buccal, mesial and distal surfaces = 2 mm. The patient's
38 periodontal phenotype is thick.

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Scaling and root planning was performed with a Gracey 5-6 curette and then a partial thickness flap was made from the mesial of tooth 33 to the mesial of tooth 32, preserving a margin of KT on the buccal face of this tooth ("Figure 2c"). A connective tissue graft obtained from the palate was obtained using the

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3 trap-door technique that was fixed to the root of tooth 31 with Vicryl 5-0 suture
4 (“Figure 2d”). Subsequently, the flap was positioned laterally over the graft and
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6 (“Figure 2d”). Subsequently, the flap was positioned laterally over the graft and
7
8 fixed with 4-0 silk sutures (“Figure 2e”), which was removed 10 days later.
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10 Postoperative care included 0.12% chlorhexidine mouthwash and use of
11
12 analgesic and anti-inflammatory drugs. In this clinical case, no postoperative
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14 morbidity was observed. “Figure 3a” shows the postoperative period at 20 days
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16 and the “Figure 3b” at 45 days. The “Figure 3c” presents the clinical condition at
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18 six months, with 100% of root coverage (GR = 0, PD = 1 mm on all surfaces), and
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20 gain of KT = 4 mm. The dentinal sensitivity disappeared.
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25 DISCUSSION

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27 The GR causes exposure of the root surface, resulting in dentinal
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29 hypersensitivity, shallow carious lesions, cervical abrasions and aesthetic
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31 demands ⁽³⁾. Several mucogingival surgical approaches have the potential to
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33 correct GR defects by increasing the height and width of the KT. However, the
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35 success rate of these techniques in order to obtain a complete root coverage
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37 depends on some factors, such as defect classification, location ⁽¹⁴⁾, extent,
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39 availability of apical or lateral KT, and technique used ⁽²⁾.
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44 The root coverage has numerous advantages, such as improved
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46 aesthetics, root protection against greater abrasion, and decreased dentin
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48 hypersensitivity ⁽³⁾. In the two reported cases, the choice for the treatment of GR
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50 was the LPF associated with the CTG due to the presence of class II and another
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52 Miller class III recessions, both with no apical KT to the GR, which difficult the
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54 use of CAF, considered the gold standard technique ⁽⁶⁾.
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58 Some modifications of the technique recommended by Grupe and Warren
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60 in 1956 have been proposed in search of a better prognosis for the donor tooth,

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3 such as the use of partial thickness pedicle flap, keeping the donor area covered
4 by the periosteum. Chambrone et al (1998) ⁽¹⁴⁾ proposed maintaining a band of
5 KT the donor tooth margin, which allowed few clinical changes in this area. **These**
6 **two technical modifications were performed in both reported cases to maintain a**
7 **band of KT in the donor tooth, and for a better protection with the periosteum of**
8 **the donor area, which remained without loss. Zucchelli & Mounssif (2015) ⁽³⁾**
9 **suggested that the mesial–distal dimension of the flap should be 6 mm greater**
10 **than the width of the GR measured at the level of the CEJ. In two cases a lateral**
11 **flap twice of the width of the recession to be covered was made, according to this**
12 **conduct.**

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Root chemical conditioning aims to decontaminate and demineralize its surface, exposing the collagenous matrix of dentin and cementum, including citric and phosphoric acids. However, the results obtained with root demineralization have been controversial. In a study of patients with GR who were treated with CAF + CTG, the use of citric acid root conditioning did not determine significant differences in root coverage and KT increase ⁽¹⁶⁾. There is no clear evidence that the use of root conditioning improves the clinical results in root coverage ⁽³⁾. Thus, in the two reported cases no root chemical conditioning was performed, only mechanical root treatment.

In clinical examination after 6 months, both areas had an increase of KT, and this fact may be justified by the associated use of the LPF and CTG technique, as described by Chambrone et al (2008) ⁽¹²⁾ who reported greater KT width gain with the use of CTG, providing significant root coverage and clinical attachment level increase, also corroborated by Zuchelli and Mounssif (2015) ⁽³⁾.

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3 The root coverage obtained after 60 days was 70% in case 1 that showed
4 a GR with 10 mm and almost complete root exposure, and 100% in case 2 which
5 had an 8 mm recession, and these clinical appearances were maintained at 6
6 months. These root coverage results were associated with depth to shallow
7 probing and absence of bleeding on probing. In case 1, partial coverage was
8 obtained, which is consistent with the literature showing less predictable results
9 in class III GR, with only partial defect coverage ^(3, 10, 11). In case 2, a class II GR,
10 the complete coverage was obtained and is also in agreement with studies
11 showing this possibility in this kind of periodontal defect ^(6, 12).
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24 The use of LPF associated with CTG was very effective in therapy of
25 localized GRs, ensuring proper aesthetics, effective root coverage and
26 decreased sensitivity. The success of this surgical technique was directly related
27 to the appropriate gingival conditions of the lateral donor tooth, allowing for a
28 highly effective and predictable surgical technique.
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35 36 CONCLUSION

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38 The LPF plus CTG has been shown to be an effective technique for the
39 therapy of Miller's class II and III GRs, allowing root coverage and increase of KT.
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43 44 CLINICAL RELEVANCE

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46 A surgical treatment for gingival recessions using the laterally positioned flap
47 in two clinical cases provides aesthetic and functional increase, through root
48 coverage and keratinized tissue augmentation, as shown in the clinical results.
49 These cases report aims to contribute to the clinical practice of Periodontics,
50 reporting that the described technique can be a good choice for cases of located
51 gingival recessions.
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CONFLICTS OS INTEREST

There are not conflicts of interest or financial support for this study.

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