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Comparison of Two Different Gingival Gel in the Healing of Oral Tissue

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Abstract

In recent years the Dental research never gave up to the possibility of using a topical preparation that can act on collagen neoproduction and extracellular matrix regeneration, facilitating and accelerating the healing process both of superficial and bone wounds and therefore, which could reduce the percentage of infections, which is sterile and has hemostatic and anti-edema effects. In our study, we compared clinical healing of oral tissues using two different gingival gel. One based on sodium hyaluronate with synthetic amino acids (glycine, lysine, proline, leucine) with characteristics of a medical device fibroblast-stimulating, neo-collagen and inductor of the regeneration of the extracellular matrix, the other consisting of triticum vulgare, a cereal with absorbing property, thickeners, abrasives and emollients. The experiment was conducted on a sample of 1310 Patients aged between 5 and 90 years during three years of clinical activity. Our comparison was carried out on each type of patient except for those subjects who had reported a history of an adverse reaction to the above principals. The patients were divided in two subgroups; group A: patients with identical bilateral lesions group B: different patients whit same injuries. The patients were examined at T0 (surgery time) and at T1 (7 days after). Patients treated with hyaluronic acid have shown significant clinical improvement of lesions in T1 baseline. Furthermore, the subgroup A patients treated both with hyaluronic acid and triticum vulgare reported a better comfort for the sites treated with first one during the period from T0 to T1. Hyaluronic acid could be used routinely after oral surgery. Further studies are needed to develop a use's protocol.

1. Regeneration of Tissue

In man, as in all mammals and in general in higher vertebrates, regeneration of tissue concerns in particular the processes of renewal and of cells and tissues that are substituted for a normal physiological turnover in the formation of new tissue analogous or different from that pre-existing, to repair loss of the substance or solution of continuity [1].

The phenomenon of regeneration is linked, in the presence of cells that remain undifferentiated state, similar to that of embryonic cells; sometimes however also differentiated cells may give way to a regenerative process.

In a higher organism, the differentiated tissues have less capacity to regenerate: in man there are tissues whose cells reproduce continuously, such as the lining epithelia of the skin of the mucous membranes and the blood, and in which the phenomena take place with repair remarkable consistency, others in which the ability to reproduce occurs only

under special conditions; still others who have definitely lost.

In particular the oral mucosa, presents structural characteristics similar but not identical to those of the skin, differentiated in the various areas of the oral cavity [2].

The maturation cycle of the epithelial cells of the oral mucosa is more rapid than the skin, complementing in 10-15 days. The oral mucosa contains about 500 minor salivary glands, mainly mucous and serum mucous particularly numerous in the soft palate and the inside surface of the lips.

As mentioned earlier repair tissue at the level of mucous membranes takes place with the same processes of tissue repair of other tissues, but in a shorter time, through a particular cellular process.

The various stages of tissue repair and similarly repair gum, they occur from precursor lesions to the tissues; in this context it is an example of tissue repair intervention post-extraction, a dental inclusion, a frenectomy or a simple trauma from brushing [3-4].

Hyaluronic acid is the most important glycosaminoglycan produced by fibroblasts during wound healing; its production begins during the reparative phase of healing; the subsequent fibroblastic proliferation in the regeneration phase increases the production of hyaluronic acid and other glycosaminoglycans (chondroitin-4-sulfate, dermatan sulfate and heparan sulfate), collagen and SLRP, whose secretion levels after the third day grow continuously up the third week, determining based on the availability of the same trophic and tensile properties of the wound after healing.

2. Aids-Made to Gingival Regeneration

Despite the substitution of new tissue at the gingival level occurs in a speeded, are commercially available products such as creams, gels or sprays able to accelerate the healing time.

Wound healing in adults is often compromised by excessive scar formation and on the contrary, fetal wound healing is a regenerative process characterized by the evident absence of scarring. This has been a source of studies for other authors, that the way of what began their research on phenotypic differences between fetal and adult fibroblasts. Available data suggest that the phenotypic differences between fetal and adult fibroblasts are important determinants of these different ways of tissue repair. In this context, a number of groups have documented differences between fetal and adult fibroblasts in relation to such characteristics as potentially relevant migratory activity, the response mitogenic of cytokines and the synthesis of motility factors, cytokines and matrix macromolecules [5].

2.1. Hyaluronic Acid

The hyaluronic acid (HA) plays an important role in tissue repair of the oral mucosa. The HA chains formed by repeated units of D-glucuronate and N-acetylglucosamine, is the most

important glycosaminoglycan produced by fibroblasts in the process of healing of wounds and ulcers, and it seems to be able to promote proliferation, differentiation and motility cell and is involved in the repair of lesions. The collagen production by fibroblasts is one of the key factors for reconstitution tissue at sites of lack of tissue and is the nature of this type of collagen by collagen in largely determine the quality Scar [6].

The HA is biocompatible, biodegradable and non-immunogenic and has been demonstrated both in vitro and in glass, which acts primarily in the healing of tissues. HA is involved in a number of activities including the activation and modulation of inflammatory responses, promoting proliferation, migration of fibroblasts and the induction of angiogenesis, promoting re-epithelialization through the proliferation of basal keratinocytes and the modulation of the production scar. Tissue regeneration and healing of the wound begin by the proliferation of fibroblasts and their production of collagen and glycosaminoglycans depends not only on the patient's general condition (age, infections, medication, systemic diseases) as well as local conditions, such as vascularization, the availability of in situ glycosaminoglycans, precursors of the matrix (ie HA), amino acid precursors of collagen (glycine, leucine, proline, lysine) and small leucine-rich proteoglycans [7-8].

2.2. Triticum Vulgare

Triticum vulgare is a wheat belonging to the family of grasses, Flumirione order. It is a esplode genomes BAD, $2n = 42$, is derived from the hybridization of a subspecies of cultivated *Triticum turgidum* and pollen of a wild species: the *Aegilops tauschii*.

The stem is made up of nodes and internodes with leaves and inflorescence, that in wheat is called a cob ear. Each ear is formed by a spine formed by short internodes that each tooth carry a spikelet. Each spikelet contains two glumes that enclose several bisexual flowers sessile and not all fertile, each containing an ovary [9].

The grain or grain of wheat is a kernel that is, has no seeds. It is a dry fruit that does not open until it is ripe. The grain or grain, is of ovoid shape and is constituted by:

- A) embryo or germ
- B) Teguments or endosporina that protects the seed
- C) from the casing, which contains glutimido starch and protein.

The embryo and a small part of the grain but 'is essential for reproduction of the species. It contains fat, nitrogenous substances, enzymes, vitamins and hormones.

The kernels of corn are very nutritious, because of its advanced inglucidi, but also have a high biological value as rich in lipids, proteins lecithin phosphorus, calcium, minerals and vitamins.

The plants you mow in early summer, and after threshing are stored in cloth bags or jute.

The use of this cereal is very vast fact is used to:

-rinfrescare intestines

- for bloating
- for the cough of children
- to prepare a nourishing mask for the face
- as prepared for an 'old recipe.

Triticum vulgare also finds application in the medical and dental specifically, for its great absorbing properties, viscosity, softening and abrasive [10]. This aims through the use of a gel that induces the healing of oral tissues, object of our study.

3. Introduction to Study

The use of oral spray, gel, mouthwash is nearly widespread in clinical practice. We are now in a time when the attention is on patient comfort postoperatively and quickness wound healing. If time ago chlorhexidine was the one and only medicine administered to the patient in the postoperative, now clinical and molecular research is very active to find a product with anti-inflammatory and regenerative skills. Our study aims to demonstrate and compare the effects of two different gingival gel healing of oral tissues; the first based on sodium hyaluronate with synthetic amino acids (glycine, lysine, proline, leucine) with characteristics of a medical device fibroblast-stimulating, neo-collagen and inductor of the regeneration of the extracellular matrix, and a second consists of triticum vulgare, a cereal with absorbent property, thickeners, abrasives and emollients. Hyaluronic Acid (HA) has actually a lot of clinical uses [11, 12, 13, 14, 15, 16] and it's more documented than use of Triticum Vulgare [17, 18]. There are no other comparison studies of this two medical devices in literature.

4. Experimental Study

The experiment of the three-year (September 2012-September 2015) was conducted on a sample of 1,310 patients aged between 5 and 90 years, all treated in the same manner of use of the product: two applications daily (the morning and evening) of the product in situ and left to work for a few minutes, after a thorough oral hygiene, avoid eating or drinking for at least 15 minutes. The sample had to undergo surgery or was suffering from oral mucositis of varying degrees:

- 32% Simple extractions;
- 26% Extractions complex;
- 15% Cystic neoplasms;
- 12% Stomato-mucositis;
- 10% Interventions plastic mucosa;
- 7% Biopsies for precancerous lesions.

The efficacy of the products was assessed by the only criterion for visual index of healing of the surgical wound and / or the lesion.

Patients were divided into 2 groups according to two criteria:

- Subgroup A: Same patients with bilateral identical lesion.
- Subgroup B: Different patients with the same injury.

Furthermore, the 70% of patients were treated with both

types of gels, while the others one with one type or / and without any gel. During the study period, patients were asked to maintain good oral hygiene, including the use if necessary of not alcohol based mouthwashes containing chlorhexidine 0.20% 3 times of at least 1 hour prior to application of the gel and the dental cleansing. Patients were asked to avoid alcohol, smoking and extremely spicy or acidic foods that have very irritating exacerbated inflammation in the oral cavity [19]. Each patient was assessed by compiling a data card, the oral examination, registration of the signs and symptoms and photographs, recording such information at baseline, first-examination before treatment (T0) and control after 7 days (T1) for the application of the gel. The efficacy of treatment and 'was evaluated based on the following parameters of clinical cure visual index at T0-T1 using them following nominal variables:

A - complete, B - partial, C - absent, and considering the complete disappearance of the areas surrounding skin.

5. Results

Patients treated with hyaluronic acid have shown significant clinical improvement of lesions in T1 baseline. In the subgroup A patients with identical lesion at which they were applied bilaterally both gingival two devices on two different sites, on only one (site treated with hyaluronic acid) of two sites it was observed a complete healing, both for what concerns the extraction surgery simple to the complex, independently of the use of sutures. The site was found to be perfectly healed that treated hyaluronic acid than the control. Moreover, in these patients, and in these sites already at the time T1 has been possible to effect the removal of the stitches in no case without the appearance of bleeding and gum inflammation. The same result is obtained in the subgroup B and then in those patients effects from cystic tumors, cancer, interventions plastic oral mucosa or suffering from lessons precancerous. T1 to all patients treated with hyaluronic acid had a complete healing tissue in contrast to those treated with Triticum vulgare or without gel. Independently the type of product used and / or recommended, there were substantial differences between patients treated with gel Based Triticum vulgare and that small portion of patients treated without any supervision.

6. Conclusion

We are in agree with some studies [11, 12, 13, 16] wich confirm the better wound healing in patients treated with Hyaluronic Acid after oral surgery interventions. Patients treated with Triticum Vulgare showed better results respect those patients who didn't receive any gel, but poorer results respect those treated with Hyaluronic Acid. Furthermore patients treated with Hyaluronic Acid, showed not only a faster healing, but also a better comfort during the T0-T1 period. Hyaluronic acid could be used routinely after oral surgery. Further studies are needed to develop a Hyaluronic Acid use's protocol after oral surgery interventions.

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