CASE STUDY

Evaluation of effectiveness of a preparation on the basis of phytoecdysteroids for treatment of traumatic injuries of oral mucosa in orthodontic patients

Kuznetsova Mariya Yur'evna, Nevdakh Anna Sergeevna, Platonova Valentina Veniaminovna, Sevbitov Andrei Vladimirovich, Dorofeev Aleksei Evgen'evich

Department of Propedeutics of Dental Diseases, Sechenov University, Moscow, Russia

Abstract

Aim: To comparison of the effectiveness of the use of the phytoointment on the basis of phytoecdysteroids with effectiveness of the use of conventional synthetic drugs in the treatment of traumatic lesions of oral mucosa in orthodontic patients. **Materials and Methods**: A total of 110 orthodontic patients were examined and treated who have acute and chronic traumatic lesions of mucous tunic of lips and cheeks. Following preparations were used for treatment: Phytoointment containing phytoecdysteroids, gel cholisal, and dental paste solcoseryl. During each examination (before start of treatment and after 2, 4, 6, 8, and 10 days), a visual evaluation of the state of traumatic injury and photoplanimetric measurement of dimensions of pathological focus were performed. **Results and Discussion**: Effectiveness of treating the traumas of oral mucosa, which were caused by orthodontic treatment with the help of non-removable appliances, was compared when these traumas were treated by various preparations: Solcoseryl, cholisal, and a new preparation on the basis of phytoecdysteroids. We revealed that among the medicinal preparations, which we compare, the highest effectiveness in the treatment of erosive-ulcerous traumatic lesions of oral mucosa is provided by a new phytoointment. Taking into account low cost and absence of side effects, we can recommend this technique of the treatment for use as a method of choice.

Key words: Epithelization, oral mucosa, phytoecdysteroids, trauma

INTRODUCTION

Public reaction to appearance of teeth can seriously influence adaptation of a person in socium. Growing desire to receive orthodontic treatment is connected with an expected psychological reward. Considerable part of patients, who have underwent a course of correction of abnormalities of teeth rows and occlusion, says about the improvement of emotional status and, as consequence, confident socialization in society.

Although modern brace systems have a sufficient functionality, they can injure mucous tunic of cheeks and lips by their protrusive elements. Damages of integrity of epithelium of oral mucosa are often infected, and therefore, subsequent inflammation develops. The presence of patient's pains and discomfort as well as oncologic alarm of orthodontist prompt to look for new methods of rational therapy of consequences of oral mucosa traumas.[1,2] During everyday orthodontic practice, the medicaments of synthetic and natural origin are used for correction of pathological states of oral mucosa. Plant products have some advantages in contrast to synthetic ones: Soft action, low toxicity, and activation of not only immune system functions but also functions of nervous and endocrine systems because these products include a complex of bioactive substances which influence organism as a

Address for correspondence:
Kuznetsova Mariya Yur'evna, Department of Propedeutics of Dental Diseases, Sechenov University, Russia 49, Nahimovskij, Pr. 117418, Moscow, Russian Federation, Russia. Phone: +79687897362.
E-mail: m.yu.kuznetsova@gmail.com

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whole. In this connection, we decided to develop an optimal algorithm of treatment using a preparation which would provide a marked analgesic and epithelizing action without negative effects.[3] A promising basis of such preparation can be, for example, ecdysteroids - substances which are structurally identical or close to real hormones of molt and metamorphosis of insects. Plant raw materials are sources of extraction of phytoecdysteroids.[4-6] Principal therapeutic effect of ecdysteroids is a considerable stimulation of anabolic, mainly, protein-synthetic processes what is supplemented by a possibility of their long-term administration and the absence of any negative manifestations. Phytoecdysteroids can play a hormone-like role although they are not hormones. Conducted experiments proved a marked anabolic effect without any undesirable effects from androgen-dependent organs and tissues. During laboratory research, a significant reduction of segmented neutrophils and increase of number of fibroblasts were revealed. This fact is evidence of processes of tissues regeneration under the impact of preparations containing phytoecdysteroids.[7,8] Thus, taking into account the above-mentioned description of medicinal effects of ecdysteroids, the most efficient method is manufacturing of a preparation on the basis of a medicinal collection which has analgesic, antibacterial, anti-inflammatory, and anabolic action in combination with acceleration and optimization of regeneration processes in oral mucosa.[9] Such medicinal collection having required properties, which are determined by the presence of phytoecdysteroids, can be a combination of flowers of *Calendula officinalis*, grass of *Silene,* and *Filipendula ulmaria*, as well as rhizome and roots of *Rhaponticum carthamoides*. We received a patent for invention No. 2577240 dated December 9, 2014 for a method of treatment by an ointment based on this collection.[10] Good compatibility of collection components, synergism of action, and broadspectrum of pharmacological effects allowed to receive a medicament with high activity. In addition, an important advantage of the offered herbal collection is its availability and relative cheapness of its components. Natural bioactive substances, which are parts thereof, are widely used in the form of dietary supplements, some of them are included in official pharmacopeia.[11,12]

The objective of our research is comparison of the effectiveness of the use of the phytoointment on the basis of phytoecdysteroids with effectiveness of the use of conventional synthetic drugs in the treatment of traumatic lesions of oral mucosa in orthodontic patients.

METHODS

A total of 110 orthodontic patients were examined and treated who have acute and chronic traumatic lesions of mucous tunic of lips and cheeks which were caused by the use of non-removable orthodontic appliances [Figure 1]. Acute lesions were understood as focal pathology of oral mucosa (erosions, ulcerations) which appeared after application of a vestibular orthodontic appliance and stayed for no more than 7 days before visit to a doctor; chronic lesions were understood as analogous changes with duration of 8 days and more. Thus, the presence of a chronic pathology was found in 11 patients, acute one in 99 patients.

Orthodontic treatment was conducted using metallic braces according to straight-wire technique - 17 cases (15.5%), ceramic braces using multiloop wire - 56 cases (50.9%), and combined braces (ceramic and metallic ones) according to straight-wire technique - 37 cases (33.6%). During examination of patients, the traumatizing elements of the brace system were determined. Long edges of wires and fragments of metallic ligatures were corrected by an orthodontic cutter; sharp elements of braces were temporarily covered by a fluid filling material. Erosive surface of oral mucosa was dried by a cotton wool tampon on which the medicinal preparation was applied afterward. Following preparations were used for treatment: Phytoointment containing phytoecdysteroids (1st group), gel cholisal with mainly analgesic action (2nd group), and dental paste solcoseryl with predominance of effect stimulating the regeneration (3rd group).

The applied new medicinal preparation containing phytoecdysteroids is an ointment of yellow-white color, with aromatic smell of essential oils. This ointment was manufactured by extemporaneous compounding on the basis of the medicinal collection which performs analgesic, antibacterial, anti-inflammatory, and anabolic action.

Topical administration of the above-mentioned preparations was repeated 2 times a day up to full epithelization of traumatic injury. Checks of patients were conducted at least once every 2–3 days. Cases with marked pain syndrome were monitored daily. During each examination, a visual evaluation of the state of traumatic injury and photoplanimetric measurement of dimensions of pathological focus were performed.

During visual evaluation of traumatic injury, a semiquantitative method was used, i.e., each degree of observed changes

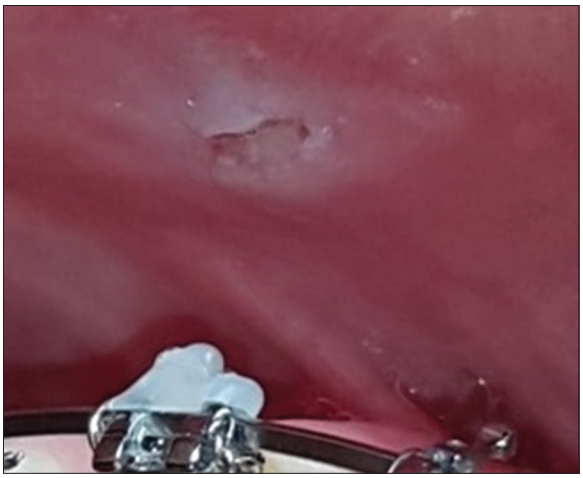

Figure 1: Traumatic lesion of oral mucosa by elements of a brace system

received one of 5 conditional ranks (points): 0 - Absence of the respective change; 1.0 - low degree of its manifestation; 2.0 - moderate degree; 3.0 - high degree; and 4.0 - very high degree. Evaluation took place before start of treatment and after 2, 4, 6, 8, and 10 days. Data, which were received in each singled-out group, were averaged and the received mean values were used in the subsequent statistical analysis. Photoplanimetric control of healing of wound surface was performed by taking photos of traumatic injuries; at that a standard enlargement thereof was applied. A dotted planimetric grid with 49 dots and a millimeter ruler for calibration of photos were laid on them. Counting of number of dots, which fall on a wound surface, and comparison of this value with a previous result allowed to determine speed of healing of a traumatic injury in the course of time. Photos were taken by a digital camera Sony a200, lens - sigma 24–70 mm f2.8 EX DG Macro; subsequently, the grid was laid in photo editor Photoshop CC; it was done before start of treatment and after 2, 4, 6, 8, and 10 days too.

RESULTS

As time was going by, the degree of succulence and hyperemia of wound surface in all monitored 110 patients was reducing with different speed depending on the used medicinal preparation. For example, index of intensity of hyperemia indicated disappearance of signs thereof in the 1st group to the 6th day of monitoring, in the 2nd group to the 10th day, and in the 3rd group to the 8th day. Full disappearance of sings of succulence was, respectively, registered: In the 1st group on the 8th day of monitoring and in the 2nd and 3rd groups on the 10th day.

Results of visual control of speed of healing of traumatic injuries of oral mucosa are presented in Table 1.

The highest speed of reduction of mean point values of intensity of hyperemia and edema was registered in the 1st group, the lowest ones in the 2nd group. Intermediate values of the respective parameters were recorded in the 3rd group.

An objective confirmation of such conclusions is found in results of photoplanimetric registering the speed of reparation of erosive-ulcerous lesions of oral mucosa. Photoplanimetry of dynamics of healing of traumatic erosive-ulcerous lesions was investigated by taking the photos of pathological foci when photoruler and pattern grid were laid on the photos. Enlargement of taken photos was changed in such a manner that distance between grid dots matches millimeter marks of the ruler whereupon the dots were counted which fall on lesion focus. Results of analysis of photos are presented in Table 2.

Received results reveal that full healing (disappearance of erosive or ulcerous surface) in all patients of the 1st group was registered on the 8th day; in patients of the 3rd group on the 10th day; and in majority of patients of the 2nd group on the 10th day too.

DISCUSSION

Thus, combination of all received results allows to believe that among the medicinal preparations, which we compare, the highest effectiveness in the treatment of erosive-ulcerous traumatic lesions of oral mucosa is provided by the new

Table 1: Dynamics of intensity of edema and hyperemia of wound surface of oral mucosa expressed in conditional points, depending on different methods of treatment (M±m)

Time	1st group (phytoointment)		2nd group (cholisal)		3rd group (solcoseryl)	
	Hyperemia	Edema	Hyperemia	Edema	Hyperemia	Edema
Initially	4.0±0.5	4.0±0.4	3.9±0.5	4.0±0.5	3.9±0.6	4.0±0.4
2 days	2.7±0.4 (67.5)	3.2±0.4 (76.2)	3.2±0.5 (82.1)	3.7±0.6 (90.2)	2.9±0.5 (74.4)	3.4±0.5 (82.9)
4 days	1.1±0.2 (27.5)	1.1±0.5 (26.2)	2.2±0.4 (56.4)	2.9±0.4 (70.7)	1.6±0.5 (41.0)	2.6±0.4 (63.4)
6 days	0	0.5±0.3 (11.9)	1.3±0.3 (28.2)	1.8±0.4 (43.9)	0.9±0.3 (23.1)	1.4±0.4 (34.1)
8 days	-	-	0.4±0.2 (10.3)	0.5±0.3 (12.2)	-	0.4±0.3 (9.8)
10 days	-	-	-	-	-	-
n	38		35		37	

Table 2: Dynamics of healing of traumatic erosive-ulcerous lesions of oral mucosa according to data of photoplanimetry, depending on used methods of treatment

Groups	Time					
	Initially	After 2 days	After 4 days	After 6 days	After 8 days	After 10 days
1st group (phytoointment)	100	63.8±6.9	24.9±5.6	8.4±3.1	0	0
2nd group (cholisal)	100	89.2±5.1	66.4±4.8	29.1±4.2	11.2±3.3	4.1±1.2
3rd group (solcoseryl)	100	72.3±5.6	53.1±4.5	23.6±3.8	7.1±2.1	0

phytoointment. It is obvious that a higher proregenerative and anti-inflammatory activity of the phytoointment is determined by the presence of phytoecdysteroids among its components. This preparation has significant prospects for the treatment of traumatic lesions of lips and cheeks in everyday practice of an orthodontist.

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