PREVALENCE OF ORAL MUCOSAL LESIONS IN CHILDREN. REVIEW OF LITERATURE

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Abstract

The aim of this article is to review literature data about the prevalence of oral mucosal lesions in children in different parts of the world. A total of 16 articles on the prevalence of oral mucosal lesions in children were selected. The lesions were divided into these categories: candida infection, herpes simplex, aphthae, geographic tongue, injuries, which are the most common oral lesions seen in children. In order to get an overview of the distribution of oral lesions in children worldwide the selected studies were from all geographic areas. Each selected study comprised a total of at least 800 patients. Oral mucosal lesions in children are more common than expected with an average of 24.5%. The published results differ as to methodology which makes it difficult to assess and compare them globally. An assessment of these lesions in Eastern Europe is missing in the literature.

Keywords: oral mucosal lesions, children, prevalence, frequency

Pathology of the oral mucosa of children is very broad and differs from that of adults. Whether it is a normal variant or lesions caused by vicious habits or orthodontic abnormalities, trauma, infection or oral manifestations of general diseases, all observed changes need a diagnosis and treatment. Oral mucosa is a physical barrier to germs and also a mirror of the general health of the patient. The presence of lesions at this level is a challenge for the dentist often oriented toward dental caries pathology and its complications in children. Also the collaborating process during the oral examination may raise difficult diagnostic problems. The observed changes in children oral mucosa vary in frequency depending on the methodology and the geographic area where the study was conducted, the percentage varies between 25-50% (also includes variants of normal mucosa) [1]. Numerous epidemiological studies show large differences between different areas of the Earth due to the used methodology, clinical diagnostic criteria, local habits (chewing tobacco), lifestyle, race [2] and economic status. It is important to understand that these lesions appear on the body in full physical and mental change and so this intersection between dental pathology, paediatrics and dermatology is often neglected even though it may hide serious injuries or, conversely, a simple normal variant.

The aim of this study is to assess the prevalence of oral mucosal lesions in children in different areas around the world (candida infection, herpes simplex, chronic recurrent thrush, geographic tongue, injuries), (Table I).

Using Pub Med database in May 2015, out of a total of 221 articles that have keywords: “prevalence oral lesions,
children, review", we selected a total of 16 articles. These were published between 1988 [3] and 2014 [4]. The selection criteria were: a minimum of 800 patients, classification of injuries in the proposed format (candida infection, herpes simplex, chronic recurrent thrush, geographic tongue, traumatic lesions), representing every continent. The selected studies for this review were done in the following countries: India, Iraq, USA, South Africa, Italy, Taiwan, Brazil, Argentina, Turkey, and Mexico. All of them were chosen to form an overall picture on the frequency of these injuries worldwide. Due to methodological differences and clinical diagnostic criteria we have noticed a different prevalence of mucosal lesions. The number of patients included in all studies was between 846 [3] and 39,206 [5]. The research has been conducted in the departments of Oral Pathology Paediatric consultations both within and in the general population.

**Fungal infections** are caused by various species of Candida fungi, which are part of the normal flora of the mucous membranes of the human body. The causative factors are: medicines (antibiotics, corticosteroids) which disrupt the balance of oral flora, decreased immunity caused by HIV, malignancies, endocrine disorders, etc.

Oral fungal infections are classified in acute forms (pseudomembranous and atrophic) and chronic forms (hyperplastic and atrophic).

The frequency of fungal infections is higher in children than in adults. In children with general diseases associated, the Candida infection varies between 0.01% [5] and 8.57% [6]. In newborn babies there is a much higher prevalence 37% [4].

Angular cheilitis is a chronic inflammation of the lip commissures caused by the colonies of Candida and sometimes associated with staphylococcus aureus infection. There are studies that show a strong relationship between angular cheilitis and anaemia in children [7]. In terms of prevalence angular cheilitis values between 0.7% [8] and 6.5% [1] are reported.

**Viral infections** which affect the oral mucosa are caused by the following types of viruses [9]: Herpes simplex virus, Varicella-zoster virus, Epstein-Barr virus, Coxsackie virus, Paramyxovirus, Human Papilloma Virus. Herpes simplex virus is a DNA virus with two known types: herpes virus type I is the cause of primary or secondary infection which generates recurrent infections (due to the persistent infection on the nervous fibres or ganglia), and type II which involves especially the genital area. Primary infection usually occurs in childhood or young adulthood. In the first part of childhood, primary viral infection may be unnoticed or less symptomatic. But manifestations do not differ depending on the time of occurrence [10]. The prevalence of viral infections ranges from 0.4% [1] to 1.42% [11], and even up to 6.9% [6].

There are studies which link the Herpes Simplex viral infection with the standard of living, as follows: the prevalence in the high socio economic level group is of 1%,

<table>
<thead>
<tr>
<th>Authors/year</th>
<th>Country</th>
<th>Lot</th>
<th>Age</th>
<th>Candida inf.</th>
<th>Herp. Simpl</th>
<th>Aphtae</th>
<th>Geographic tongue</th>
<th>Traum. injuries</th>
<th>Normal mucosa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criveli³</td>
<td>Argentina</td>
<td>846</td>
<td></td>
<td></td>
<td>5.20%</td>
<td>10.87%</td>
<td>2.95%</td>
<td>1.41%</td>
<td>61%</td>
</tr>
<tr>
<td>Sedano¹⁸</td>
<td>Mexico</td>
<td>32,022</td>
<td>5-17</td>
<td>0.01%</td>
<td>0.78%</td>
<td>1.23%</td>
<td>0.60%</td>
<td>0.09%</td>
<td>95.9%</td>
</tr>
<tr>
<td>Kleinman⁵</td>
<td>USA</td>
<td>39,206</td>
<td></td>
<td></td>
<td>0.8%</td>
<td>1.6%</td>
<td>2.5%</td>
<td>67.1%</td>
<td></td>
</tr>
<tr>
<td>Arendorf¹⁹</td>
<td>South Africa</td>
<td>1,051</td>
<td>&lt;7</td>
<td></td>
<td>1.15%</td>
<td>1.57%</td>
<td>9.08%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bessa¹⁵</td>
<td>Brazil</td>
<td>1,211</td>
<td>0-12</td>
<td>0.91%</td>
<td>2.9%</td>
<td>3.6%</td>
<td>2.3%</td>
<td></td>
<td>73%</td>
</tr>
<tr>
<td>Shulman¹¹</td>
<td>USA</td>
<td>10,030</td>
<td>2-17</td>
<td></td>
<td>0.78%</td>
<td>1.23%</td>
<td>0.6%</td>
<td>90.8%</td>
<td></td>
</tr>
<tr>
<td>Parlak⁷</td>
<td>Turkey</td>
<td>993</td>
<td>13-16</td>
<td>0.1%</td>
<td>3.98%</td>
<td>4.27%</td>
<td>3.15%</td>
<td>5.14%</td>
<td>71.1%</td>
</tr>
<tr>
<td>Majorana⁶</td>
<td>Italy</td>
<td>10,128</td>
<td>0-12</td>
<td>8.2%</td>
<td>0.8%</td>
<td>0.1%</td>
<td>1.4%</td>
<td>5.49%</td>
<td>35.89%</td>
</tr>
<tr>
<td>Ambika⁸</td>
<td>India</td>
<td>1,003</td>
<td>4-14</td>
<td></td>
<td></td>
<td>0.4%</td>
<td>0.8%</td>
<td>0.5%</td>
<td>72%</td>
</tr>
<tr>
<td>Jahanbani¹³</td>
<td>Iran</td>
<td>1,020</td>
<td>12-15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
while in the group with low socio-economic level it is as high as 10% [3].

Poor immune system can be considered as a predisposing factor for recurrent infections of Herpes Simplex. [6]

**Recurrent aphthous stomatitis**

The aphthas are the most common ulcer in the mouth. From the clinical point of view, the sores can be divided into: minor aphthae with a diameter of not more than 1 cm ulcer which heals within 1 week without scarring, major aphthae with a diameter greater than 1 cm; and herpetiform aphthae with only a few millimeters but in greater numbers than 10, in patients with immunosuppression and [12]. The first episode of recurrent aphthous stomatitis occurs with high frequency (46%) in adolescents between 11-20 years patients, followed by 24% in young adults between 21 to 30 years and only in 14% of cases it occurs before the age of 10 years [13]. The prevalence of aphthae in children vary between 0.67% and 10.87% [8].

Regarding the link between a high standard of living and a higher frequency of disease, there are controversial data which confirm this hypothesis [14] and studies that refute it [15]. It is certain that aphthae lesion appear in an increased percentage in children presenting immune disorders, malabsorption, malnutrition, etc [6].

**Geographical Tongue (migratory glossitis)** is a variant of normal lingual mucosa showing atrophic areas and hyperplastic filiform papillae alternant with normal mucosa. It can appear in very young children thus causing concern for the parents because of the spectacular appearance and the possible manifestation of psoriasis at this level [16]. This concerns are causing parent to seek for medical advice (pediatric, dermatology, dentistry). All these investigations often are followed by unnecessary treatment for candidiasis or antibiotics. In terms of prevalence, this varies by methodology and geographic area where the study was conducted, between 0.6% [5] and 9.08% [15]. For patients with associated general diseases there is a higher frequency than 40.6% [4]. There have also been reported cases in which the dorsal mucosal tongue is more than 1 cm; and herpetiform aphthae with only a few millimeters but in greater numbers than 10, in patients with immunosuppression and [12].

The majority of lesions of the oral mucosa in children is caused by traumatic injuries.

In the literature we did not find studies about the prevalence of these lesions in South Eastern Europe. This emphasizes the necessity of further studies to form a picture of these pathology. The prevalence studies reviewed have a large variability due to different diagnostic criteria and methodology. Some authors included also the normal variants of the mucosa, while others considered these as no lesions cases, leading to significant differences between the final percentage of the mucosa with or without lesions. Also regarding the traumatic lesions there are differences, as some authors do not include traumatic keratosis in the same category.

Gender, race, regional habits, lifestyle and general diseases are factors which modify such prevalence studies so it is difficult to standardize the results and to reach a unanimous conclusion, requiring an evaluation of each category of population.

**Conclusions**

Oral mucosal lesions in children show a different prevalence and pathology from those of adults. As can be seen from Table I, the prevalence of oral mucosal lesions worldwide is different. The difference in frequency in patients without oral lesions are from 35.89% [8] to 95.9% [5]. In terms of geographical distribution, in Italy [16] we found the highest prevalence of fungal infections, and in Argentina [3] the highest was herpes simplex and ulcers caused by chronic recurrent aphthae. In India [8], the majority of lesions of the oral mucosa in children is caused by traumatic injuries.

Regarding the link between a high standard of living and a higher frequency of disease, there are controversial data which confirm this hypothesis [14] and studies that refute it [15]. It is certain that aphthae lesion appear in an increased percentage in children presenting immune disorders, malabsorption, malnutrition, etc [6].

**Traumatic lesions** of the oral mucosa can be caused by mechanical factors, chemical, thermal, different orthodontic appliances or vicious habits such as chewing of lining mucosa (Morsicatio Buccarum). The differences in prevalence found in the studies are very high due to different classification of what is or is not traumatic, between 0.09% [5] and 12.17% [17]. Advancing in age there is also a decrease in prevalence of oral traumatic lesions [2]. The most common areas involved are buccal mucosa and lower lip [8].

**References**


