

Review
by
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**on a dissertation for the award of a
educational and scientific degree “Doctor“**

Author: Dr. Elena Todorova Dimova

Topic: „ Prevalence of white spot lesions in patients with fixed orthodontic technique and their correlation with the level of plaque control and gingival inflammation”

The dissertation contains 166 standard pages and is illustrated with 23 tables and 69 figures and 10 appendices. The literature reference includes 305 literary sources, of which 9 in Cyrillic and 296 in Latin. The dissertation is well structured, which facilitated the review preparation.

The **Introduction** emphasizes the fact that orthodontic treatment has become an inseparable part of modern life in recent decades. Fixed orthodontic appliances are used for the treatment of jaw deformities for a certain period of time, but they are a risk factor for development of dental caries, because they are retentive and support plaque accumulation. The elements of fixed orthodontic technique can change the biological balance in the oral cavity.

Apart from the closely related to the orthodontic influence (return of the teeth to their position before the treatment, resorption of the tooth root under the action of unmeasured orthodontic forces, allergy to the orthodontic components with extraoral or intraoral manifestations, etc.), the development of white carious problems is also a problem due to enamel demineralization.

The above facts give grounds for the candidate to formulate:

The aim of the dissertation: to study the prevalence and severity of white carious lesions in relation to the level of plaque control and gingival inflammation in patients with fixed orthodontic technique.

The materials and methods of the study are correctly and adequately selected, the use of a sufficient number of modern **statistical methods** for processing the obtained data ensures that reliable and objective **results** are attained.

In order to meet the set aim, **6 tasks** have been formulated and completed.

Task 1: *To study the prevalence of white carious lesions in patients with fixed orthodontic technique*

- ✚ The mean EDI value is 0.18 ± 0.17 (0-0.44).
- ✚ As the duration of treatment increases, the risk of developing white carious lesions increases.
- ✚ Children with metal braces have significantly higher EDI index values.
- ✚ The worse the childrens' oral hygiene is during the orthodontic treatment, the greater the prevalence of white carious lesions et all.

Task 2: *To study the level of plaque accumulation in children with fixed orthodontic technique and to compare with the control group*

- ✚ The mean value of the OPI index is 1.91 ± 1.33 (0-4.0), and in children from the control group the plaque index is 1.22 ± 0.75 (0-3.0).
- ✚ There was a significant difference in the plaque index in the different age groups, where the most obvious difference is in the age of 12 years (OPI 2.5 to OHI 1.1), 13 years (OPI 2.66 to OHI 1.5), 18 years (OPI 2.04 to OHI 1.59) and 14 years (OPI 1.87 to OHI 0.87).
- ✚ Patients who do not cooperate in the orthodontic treatment process have elevated plaque index values.

Task 3: *To study the level of gingival inflammation in children with fixed orthodontic technique and to compare with the control group*

- ✚ A higher number of bleeding units was observed in children with fixed orthodontic technique than in healthy controls (0.91 (0-2.50) to 0.14 (0-1.10), respectively).
- ✚ The change in GI according to the follow-up stages shows that as the duration of treatment increases, the mean value of the gingival index also increases.
- ✚ Patients treated with metal braces had higher GI values than treated with ceramic braces (0.976 and 0.244, respectively).
- ✚ Patients who do not cooperate have three times higher GI values.
- ✚ The worse the oral hygiene, the higher the GI value.

Task 4: *To assess the severity of white carious lesions in patients undergoing treatment with fixed orthodontic technique*

- ✚ The mean value of the Gorelick index is 0.90 ± 0.85 (0-2.0).
- ✚ As the duration of orthodontic treatment increases, so does the Gorelick index and the severity of white carious lesions.
- ✚ In patients treated with ceramic braces, the relative share of those with healthy tooth surfaces prevails (Gorelick = 0), while extensive carious lesions (Gorelick = 2) are observed in children treated with metal braces.
- ✚ 50% of patients who cooperate well in the treatment process have a healthy tooth surface (Gorelick = 0). In patients with a Gorelick index = 2 (extensive white lesions), the relative share of non-cooperative patients is significant (60%).

Task 5: *To assess the specific caries risk profile of patients with fixed orthodontic technique*

- ✚ The children from the control group have a higher relative share of high caries risk (61.11% high risk and 28.57% low risk, respectively), while the children treated with fixed orthodontic technique also have a higher caries risk, but with a significant lower relative share than in controls (respectively 71.43% are high risk to 38.89% low risk).
- ✚ In the first month of follow-up, a high relative share of children with low caries risk was observed (76.5%), while in the sixth month and during the retention phase, children with high caries risk prevailed (61.5% at 6 months and 81.8%, respectively for the retention phase).
- ✚ Of the patients with good cooperation, 65.38% have a low caries risk and 34.62% have a high risk. The relative share of high caries risk in non-cooperating patients is significant (80% are at high caries risk and 20% are with low caries risk).

Task 6: *To create an algorithm for prevention of white carious lesions in patients with fixed orthodontic technique depending on the level of oral hygiene*

- ✚ The largest relative share of both boys (65.12%) and girls (56.72%) indicate that they brush their teeth twice a day - usually in the morning after sleep and in the evening before sleep.
- ✚ The largest is the relative share of children aged 17 who change their eating habits during treatment with fixed orthodontic technique (75%).
- ✚ In girls with a treatment duration of up to 12 months 57.7% avoid solid foods, while those with a longer duration follow all the recommendations of the dentist (50.0% and 66.7%, respectively). This testifies to the increased aesthetic requirements of the female sex and the motivation to complete a successful orthodontic treatment.

The results of the research give the doctor reason to draw the following important **implications**:

I. Original for the country:

1. The dissertation provides for the first time in Bulgaria up-to-date data on the oral health of children undergoing orthodontic treatment with a fixed technique.
2. For the first time, a detailed analysis of the prevalence and severity of white carious lesions was performed with specially selected indices in patients undergoing treatment with fixed orthodontic technique.
3. For the first time in the risk profile of patients undergoing orthodontic treatment with a fixed technique, the behavioral factors regarding eating habits and oral hygiene were also studied.

II. With practical application:

1. A risk profile has been developed for the development of white carious lesions in patients undergoing treatment with fixed orthodontic technique.
2. An algorithm for prevention and follow-up of patients undergoing orthodontic treatment with a fixed technique has been developed and proposed.
3. Protocols for prevention of white carious lesions have been developed and proposed, which are for children with low risk, for children with high risk and / or poor cooperation, as well as at the beginning of the development of white carious lesions.
4. Informative motivational materials have been developed for children conducting orthodontic treatment with a fixed technique, as well as for their parents regarding eating habits and maintaining effective oral hygiene.

III. Confirmatory:

1. It has been proven that there is connection between orthodontic treatment with a fixed technique and increased caries, gingival inflammation and the accumulation of dental plaque.
2. The duration of orthodontic treatment, metal braces and male gender have been shown to be negative in terms of oral health.
3. It has been proven that in patients with good cooperation better results are achieved in terms of the overall course of treatment, maintenance of good oral hygiene and prevention of caries and gingival inflammation.

Assessment of publication activity

In connection with the dissertation, **Dr. Elena Dimova** presents 3 publications. This fact proves that the topic developed in the dissertation is him personal work.

The author's summary objectively reflects the dissertation. It is drawn up in accordance to the requirements of the law for the development of the academic staff.

I have no critical remarks on the reviewed thesis.

Conclusion:

The thesis of **Dr. Elena Todorova Dimova** is an in-depth study about prevalence of white spot lesions in patients with fixed orthodontic technique and their correlation with the level of plaque control and gingival inflammation.

The obtained results are valuable for clinical practice and can serve as a basis for future research.

I am confidently giving my positive vote for **the award of a educational and scientific degree "Doctor" to Dr. Elena Todorova Dimova**

Plovdiv
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(Prof. Yavor Kalachev, DMD, PhD)