

COMPARATIVE STUDY OF RELATIONSHIP BETWEEN BRUXISM AND DECREASE TELOMERES LENGTH

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INTRODUCTION

Bruxism is defined as the action of clenching the teeth, bracing the jaws with tooth contact, gnashing and grinding the teeth while awake or while asleep [1,2]. The authors are unanimous about the connection between this parafunctional habit and stress/ anxiety factors [3,4].

Studies demonstrate a correlation between the telomeres length and their functions with several pathologies, such as hypertension, diabetes, neoplastic diseases, Parkinson, Alzheimer and stress [5,6]. These studies found a relationship among length decrease from telomere and stressed people. There is a possibility that a length decreasing from telomeres in patients with bruxism can also be found.

OBJECTIVE

To compare the telomeres length between a group with bruxism and a group without bruxism nor with any identified stress factors.

METHODS

1. To select the sample:

- Characterization surveys; *Bruxism guidelines surveys (self-report); Check-list symptoms stress S-SCL; Hamilton anxiety scale (HAMA)*
- Radiographic, inner and extra-oral evaluation to look for bruxism

2. Experimental protocol:

- DNA extraction from cells in suspension (*Zymo Research DNATM – Tissue MiniPrep, Catalog Nos. D3050 & D3051*)
- Agarosis gel electrophoresis
- DNA quantification
- Real-time PCR
- Length telomers evaluated

$$CT = \frac{\text{triplicate media CT's (TEL)}}{\text{triplicate media CT's (SGC)}}$$

CT (cycle threshold): number of cycles which the fluorescence emitted exceeds the level of background [7].

STD TEL: to determine telomere length because this oligomers has length and concentrated Knowned [7].

SGC: normalized the assay, to ensure that the length of genome was correct and not a result of larger or smaller number of analysed telomeres [7].

RESULTS AND DISCUSSION

The telomeres length in the bruxism group (4,82E7kb) is inferior compared to the group without bruxism who don't suffer from this parafunction and who don't reveal any stress signals (5,24E7kb), although they were not statistically significant (table 1).

Table 1: Telomeres length in different groups.

| | Study sample | Number of individuals | Median (kb) | Standart deviation |
|------------------|--------------------|-----------------------|-------------|--------------------|
| Telomeres length | Control group | 10 | 5,24E7 | 4,25E7 |
| | Experimental group | 17 | 4,82E7 | 4,83E7 |

Characterisation by gender

- **females with bruxism increased telomeres length**
- **males with bruxism decreased the telomeres length**

Table 2: Telomeres length in experimental group.

| | Gender | Number of individuals | Median (kb) | Standart deviation |
|------------------|--------|-----------------------|-------------|--------------------|
| Telomeres length | Female | 13 | 5,78E7 | 6,00E7 |
| | Male | 4 | 1,72E7 | 3,19E7 |

Table 3: Telomeres length in control group.

| | Gender | Number of individuals | Median (kb) | Standart deviation |
|------------------|--------|-----------------------|-------------|--------------------|
| Telomeres length | Female | 4 | 4,85E7 | 3,48E7 |
| | Male | 6 | 5,50E7 | 3,45E7 |

Characterization by age

- **19-25 years old bruxism increased telomeres length**
- **26-30 years old bruxism increased telomeres length**

| | Age | Number of individuals | Median (kb) | Standart deviation |
|------------------|-----------------|-----------------------|-------------|--------------------|
| Telomeres length | 19-25 years old | 7 | 1,70E9 | 1,63E9 |
| | 26-30 years old | 3 | 6,21E7 | 3,08E7 |

| | Age | Number of individuals | Median (kb) | Standart deviation |
|------------------|-----------------|-----------------------|-------------|--------------------|
| Telomeres length | 19-25 years old | 9 | 6,94E7 | 1,14E7 |
| | 26-30 years old | 2 | 4,091E7 | 2,17E7 |

Toxic consumption

- **patients with bruxism but not consuming toxic substances increased the telomeres length**
- **patients with bruxism consuming toxic substances increased the telomeres length**

Table 6: Telomeres length in experimental group.

| | Toxic consumption | Number of individuals | Median (kb) | Standart deviation |
|------------------|-------------------|-----------------------|-------------|--------------------|
| Telomeres length | Without | 12 | 1,11E9 | 9,51E8 |
| | With | 5 | 7,00E7 | 4,00E7 |

Table 7: Telomeres length in control group.

| | Toxic consumption | Number of individuals | Median (kb) | Standart deviation |
|------------------|-------------------|-----------------------|-------------|--------------------|
| Telomeres length | Without | 4 | 6,85E7 | 1,66E7 |
| | With | 6 | 4,17E7 | 3,78E7 |

Physical activity level

- **patients with bruxism that exercised increased the telomeres length**
- **patients with bruxism who didn't exercise increased the telomeres length**

Table 8: Telomeres length in experimental group.

| | To practice physical exercise | Number of individuals | Median (kb) | Standart deviation |
|------------------|-------------------------------|-----------------------|-------------|--------------------|
| Telomeres length | Yes | 6 | 2,90E8 | 5,19E8 |
| | Not | 11 | 1,08E9 | 3,46E9 |

Table 9: Telomeres length in control group.

| | To practice physical exercise | Number of individuals | Median (kb) | Standart deviation |
|------------------|-------------------------------|-----------------------|-------------|--------------------|
| Telomeres length | Yes | 8 | 5,55E7 | 2,99E7 |
| | Not | 2 | 3,99E7 | 5,51E7 |

There is no statistically significant relationship between decreased telomeres length and patients with bruxism, but we believe that such a relationship exists in people who suffer from bruxism. These results can be explained by the lack of homogeneity in the groups and the low number of individuals in the sample; the persons who joined the experimental group may also have cells with lengthening of telomeres due to checkpoint mechanisms from Rad53 protein or undiagnosed oral neoplasia or presence of inflammatory cells [8,9].

CONCLUSION

This is a pilot study that allowed to validate the selected experimental protocol and also revealed that, in our sample, people who suffer from bruxism have decreased the telomere length compared to individuals without bruxism and unidentified stress factors. New researches should be able to experimentally demonstrate that the shortening of telomeres present in bruxists. So it can be used the same experimental protocol.

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