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ORIGINAL RESEARCH

Comparative Evaluation of the Relationship of Severity of Asthma and Malocclusion in Children

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***ABSTRACT*:**
Aim of the Study: The Aim of this study was to evaluate and compare the relationship between severity of asthma and malocclusion prevalence in children. **Material & Methods:** 50 asthmatic children in the age group of 5-10 years were enrolled in this study**.** Children who had orthodontic treatment or were currently wearing an orthodontic appliance with history of Asthma were excluded from the study. Malocclusion was measured using Dental Aesthetic Index (DAI) in accordance with WHO recommendations. **Results:** The distribution of subjects according to their malocclusion status was found to be significantly different among groups according to severity of asthma. As the severity increases, the frequency of Normal/Minor Malocclusion cases also significantly increases, when mean overall DAI scores of subjects having mild, moderate or severe asthma were compared, then no statistically significant difference was found. **Conclusion:** The present study proves a strong relationship between severity of Asthma & Malocclusion in children.
Key words: Asthma, Malocclusion, Dental Aesthetic Index.

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INTRODUCTION:
Asthma is a chronic inflammatory disease of the airways, characterized by reversible and incidental symptoms of airways obstruction.[1] In the presence of inflammation, airway hyperactivity develops, resulting in changes in airway tone and thus airflow. When significant narrowing is present, bronchospasm develops and the characteristic wheezing is heard.[2]
The disease has a global prevalence that varies from 1% to 18% in the populations of different countries.[3] Its incidence has increased in recent decades and according to an estimate by the world health organization, in 2005

the costs of asthma medication outstrips the costs of AIDS treatment.[4]

It has been reported that 90% of those diagnosed with asthma have allergic rhinitis.[5] Asthma affects lower airway and it causes narrowing in bronchial tubes resulting in air flow limitation, which can be reversed spontaneously or after treatment. Its symptoms vary from the form of single coughing episode up to recurrent severe dyspnea, and may even cause death.[6]

Asthma is classified into two severity levels: intermittent and persistent (mild, moderate or severe). The treatment drugs can be systemic bronchodilators and / or corticosteroids and may be administered through different routes, with inhalation being the most common.[7] Thus, because of route of drug administration or because of systemic effect, there is an increasing amount of evidence as stated by clinical or epidemiological trial [8, 9,10,11,12] suggesting relation between oarl diseases in asthmatic children like mouth breathing and malocclusion being among these conditions. Dental literature shows contrasting results among respiratory disorders onset, severity and malocclusion occurrence, especially concerning bronchial asthma.[13] Therefore, this study aimed to evaluate and compare the relationship between severity of asthma and malocclusion prevalence in children and in this way provide information so that suitable dental preventive programs and therapeutic approaches can be proposed in order to reduce possible orofacial deformities related to asthma.

MATERIAL & METHODS:

50 asthmatic children in the age group of 5-10 years were enrolled in this study**;** the parents were interviewed on medical and dental history of their children, with special regard to asthma history (disease onset and its pharmacological treatment). And these data were used to classify asthma severity (table 1) and same thing was confirmed with medical records. Children who had orthodontic treatment or were currently wearing an orthodontic appliance with history of Asthma were not included in this study.

Malocclusion was measured using Dental Aesthetic Index (DAI) in accordance with WHO recommendations. Informed consent was obtained from parents before starting the clinical examination; clinical examination was performed under natural light, using CPI probes ("ball point"), mirrors #5 and air-drying, before examination each child was asked to perform tooth brushing supervised by a dental professional.

Table 1: Classification of Asthma severity[13]

Category	Occurrence at last year
Severe	2 hospitalizations or 4 acute events
Moderate	1 hospitalization or 2 acute events or 3 events of respiratory difficulties
Mild	No hospitalization or 1 acute event or 2 events of respiratory difficulties

Diagnostic criteria and codes: Professional treatment needs were obtained by assessing the children using the DAI in accordance with the WHO guideline. All 10 components of the index were assessed, data was collected & the data was statically analyzed.

RESULTS:

50 children's were considered for this research, regarding gender 38 patients were male and 12 were female and no statistically significant difference was found between the age of males and females in the study population (Fig 1) and frequency of mild, moderate & severe asthma cases were not found to be significantly different among males and females (Fig 2).

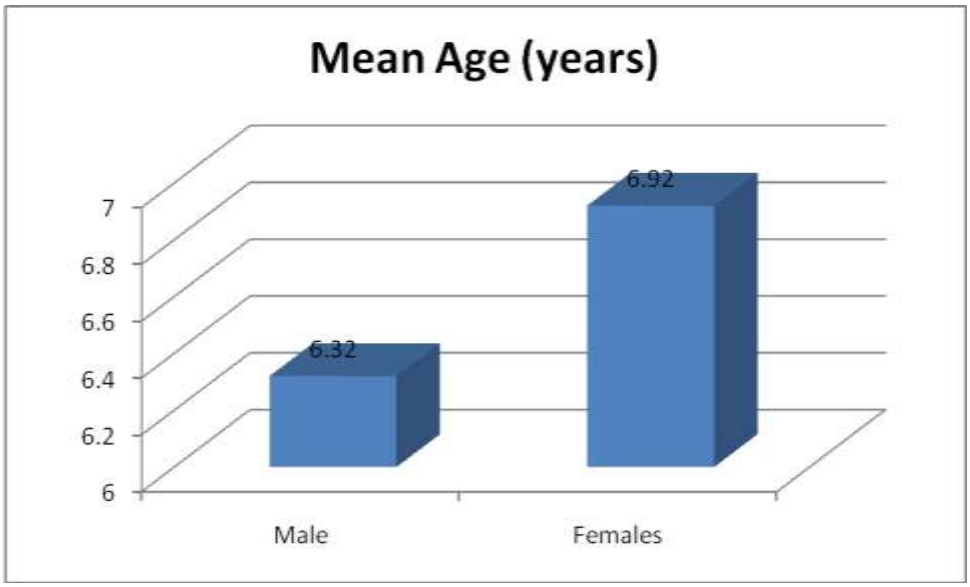

Fig 1

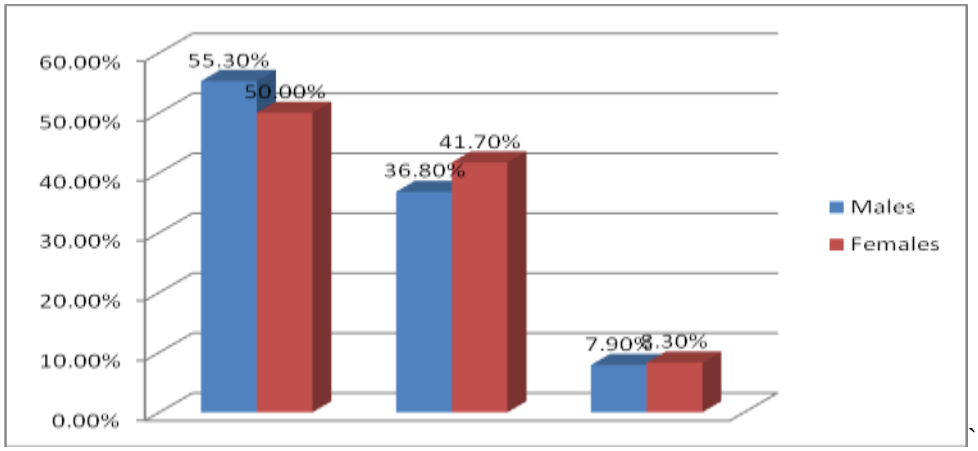

Fig 2

The distribution of subjects according to their malocclusion status was found to be significantly different among groups according to severity of asthma. As the severity increases, the frequency of Normal/Minor MO cases also significantly increases (Fig 3 & 4).

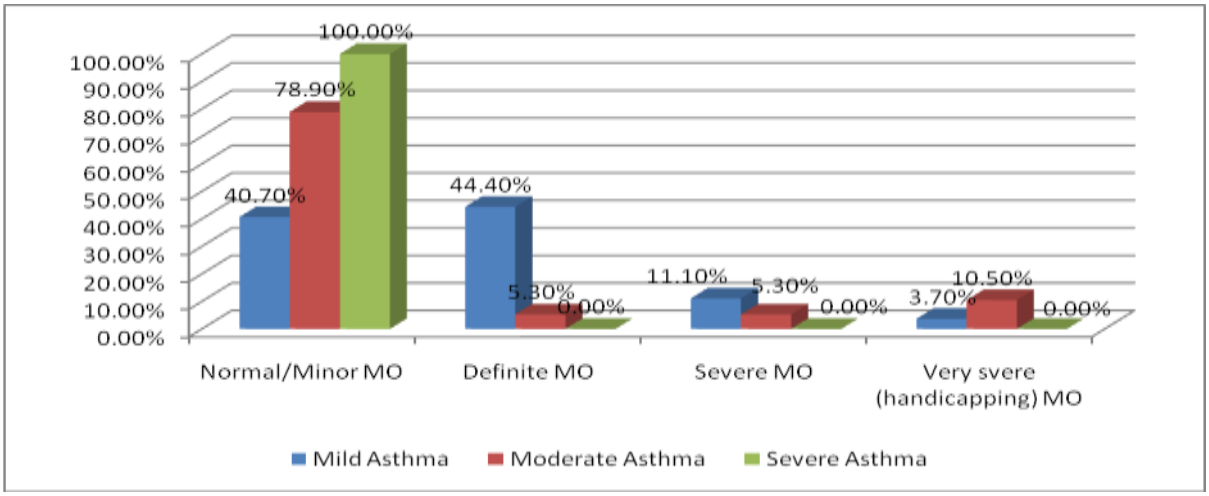

Fig 3

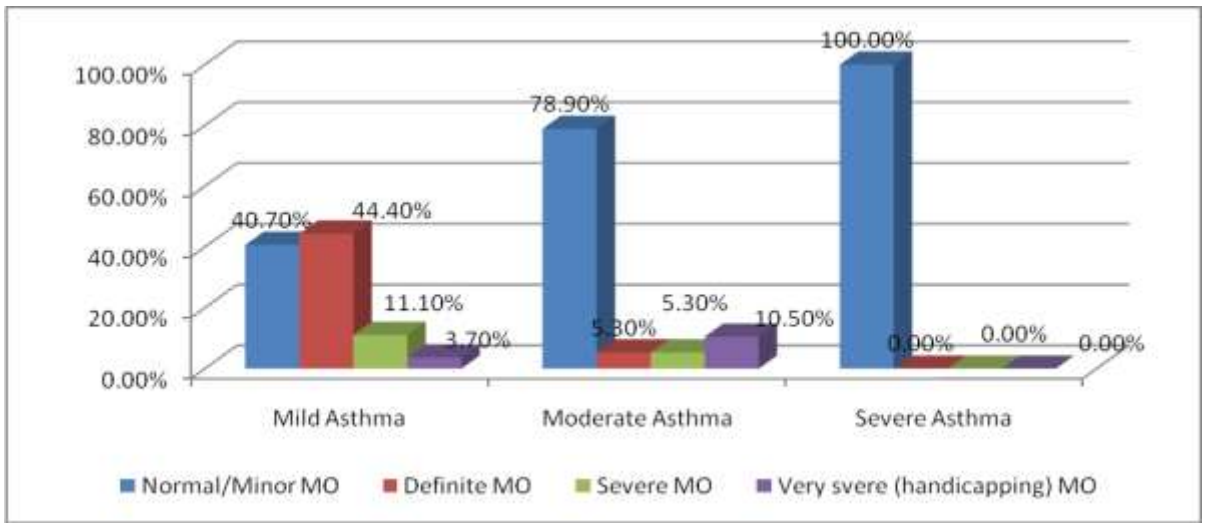

Fig 4

When mean overall DAI scores of subjects having mild, moderate or severe asthma were compared, then no statistically significant difference was found (Fig 5)

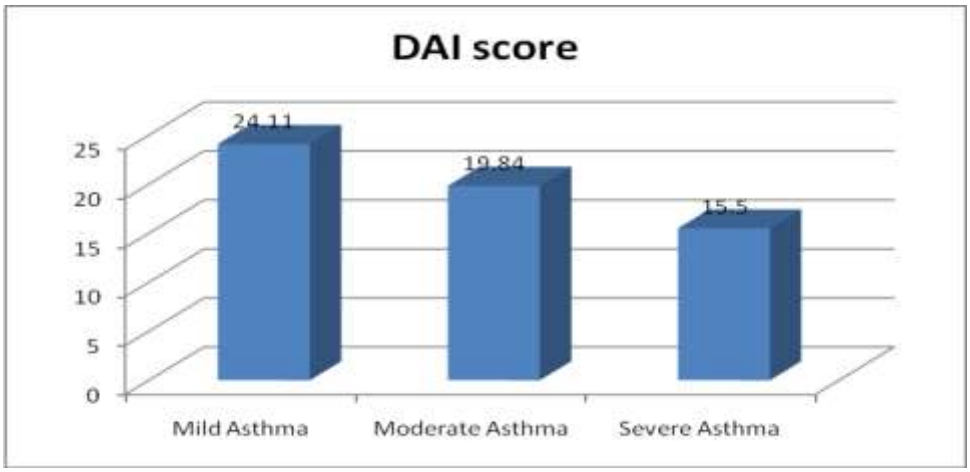

Fig 5

Distribution of study population according to severity of asthma and number of missing anterior teeth, did not show any significant difference (Fig 6).

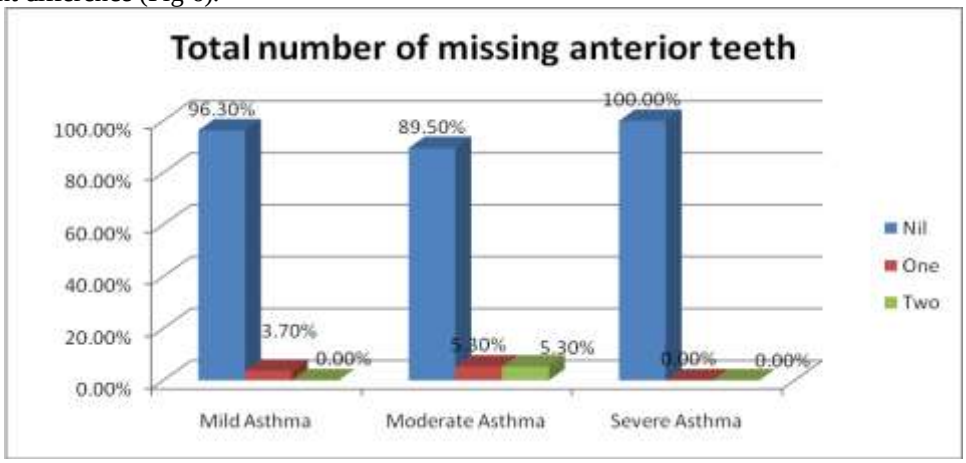

Fig 6

Distribution of study population according to severity of asthma and presence of crowding in anterior segments did not show any significant difference (Fig 7).

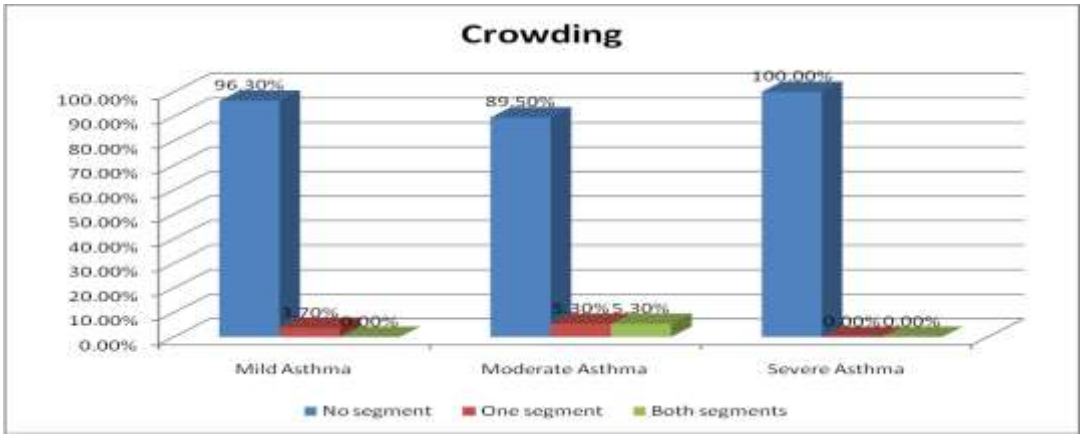

Fig 7

Distribution of study population according to severity of asthma and presence of spacing in anterior segments did not show any significant difference (Fig 8).

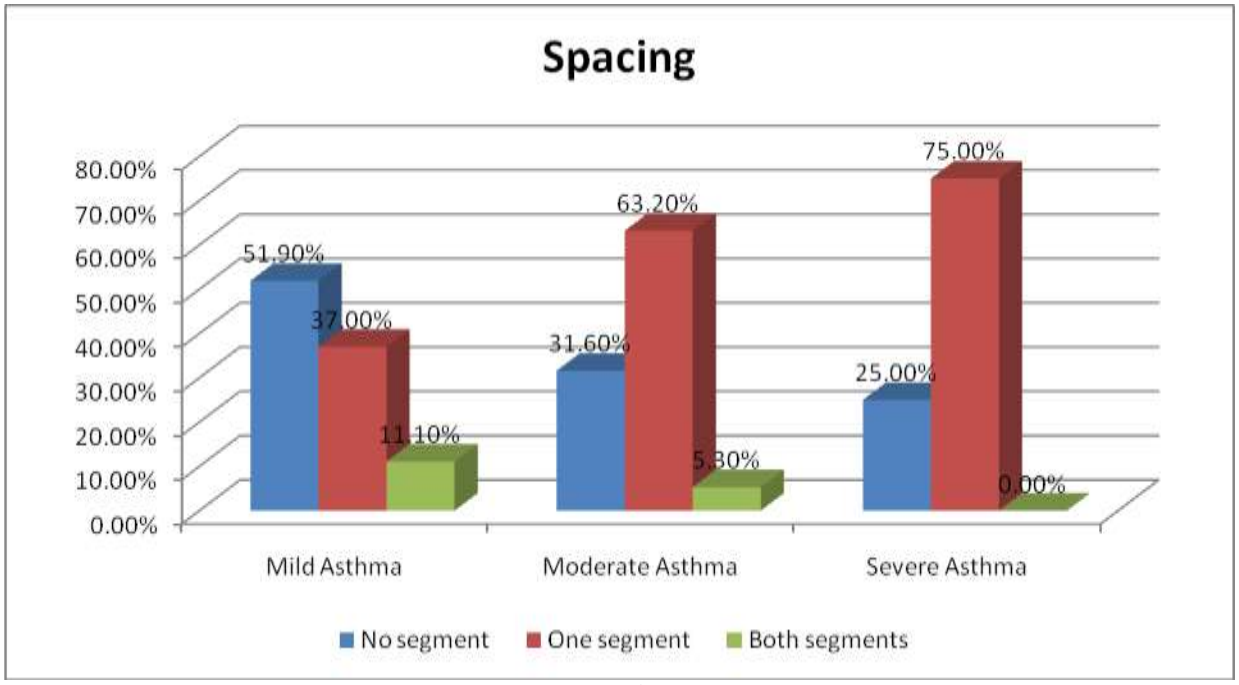

Fig 8

Distribution of study population according to severity of asthma and type of molar relation did not show any significant difference (Fig 9).

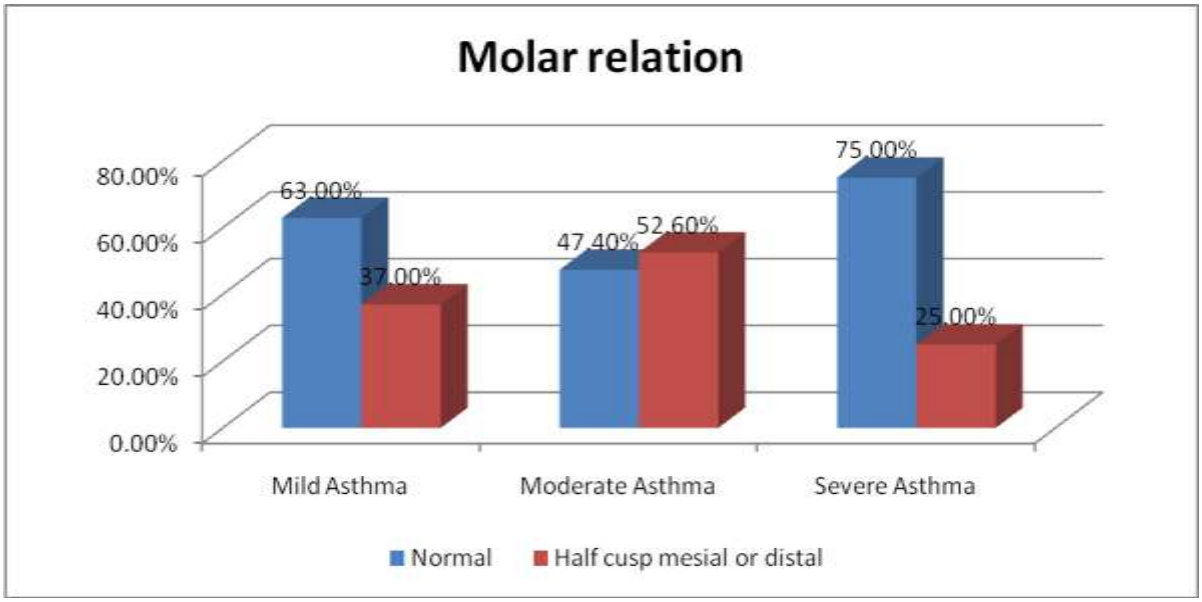

Fig 9

When mean diastema present among subjects having mild, moderate or severe asthma were compared, then no statistically significant difference was found (Fig 10).

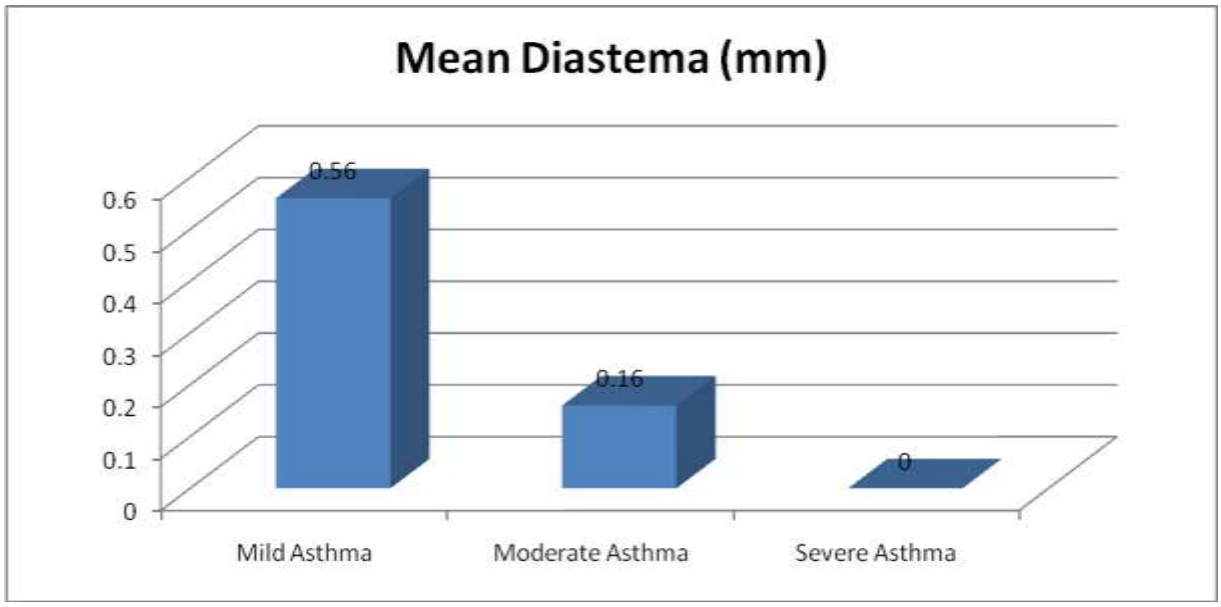

Fig 10

When mean overjet present among subjects having mild, moderate or severe asthma were compared, then no statistically significant difference was found (Fig 11).

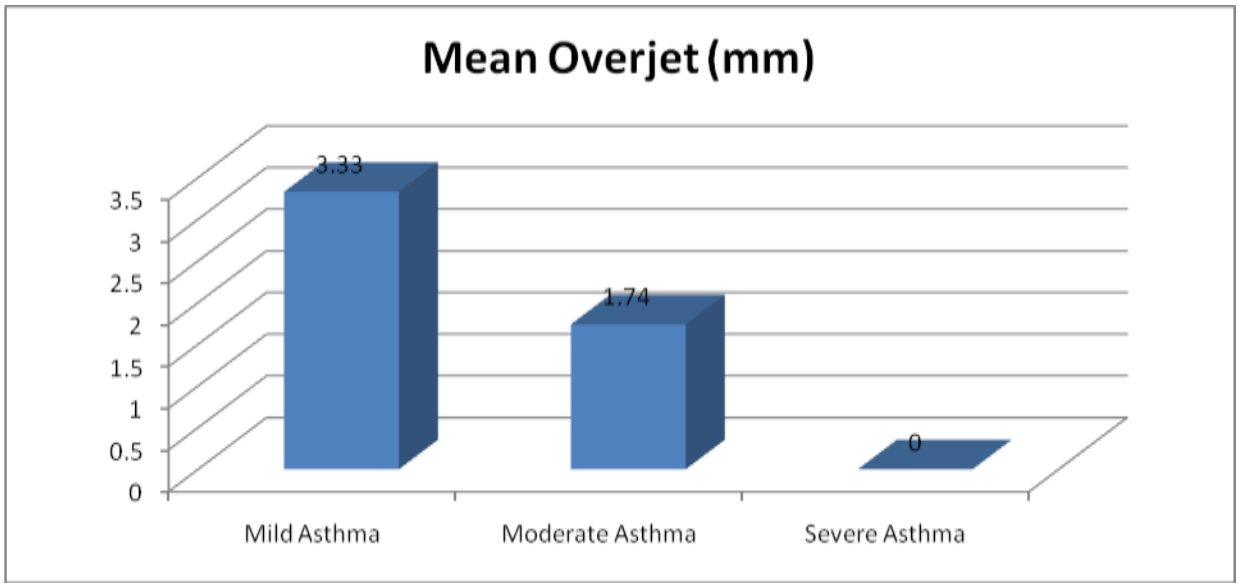

Fig 11

DISCUSSION:

The present study was designed to evaluate and compare the relationship between severity of asthma and malocclusion prevalence in children as the following variables were studied: age, frequency, distribution, missing anterior teeth, crowding, spacing, molar relation, diastema and overjet as per dental aesthetic index. Drug therapy is based on the use of corticosteroids (prednisolone) in syrup form, inhalation or spray, and levo- salbutamol in the form of an inhaled spray/ syrup. Those enrolled in the program had monthly meetings with health professionals, where they receive information about the disease. The assessment of its impact was very positive because there was reduced number of crisis and hospitalizations, which resulted in less suffering for patients and savings for the health system.[14] There are many reports about the association between malocclusion and upper airway tract diseases. However, there is a lack of information about lower airway tract disorders, such as asthma, and malocclusion development. Upper and lower airway disorders have the same pathogenesis[15, 16] and they are

usually present at the same patient. Epidemiological studies showed that nearly 74% to 81% of asthmatic patients have also allergic rhinitis.[17,18] It is important to point out that patients with allergic rhinitis or asthma as well as patients with nasal septum deviation, enlarged adenoids or nasal polyp generally present mouth breathing[19,20] which is often related to malocclusion etiology.[21] Barros et al, in a cross-sectional study, observed a positive correlation between allergic rhinitis and mouth breathing.[22] Venetikidou also reported a higher prevalence of mouth breathing in asthmatic patients.[23] On the other hand, no association between asthma and impaired nasal breathing was observed in this study, but as the severity increases, the frequency of normal/ minor malocclusion cases also significantly increases. However, Tanaka LS et al also through multivariate analysis observed that patients with an impaired nasal breathing showed a higher occurrence of malocclusion.[13] The contrasting results of this study in comparison to Barros et al[22] and Venetikidou[23] could be explained considering the fact that asthmatic patients enrolled in this study were patients of only one heathcare unit whereas the treatment is based on use of inhaled corticosteroid[14], powerful anti-inflammatory drugs[24] which reduce the inflammation on upper and lower airway tract and, consequently, improve nasal breathing.[25] Wenzel et al[26] reported that inhaled budesonide can reduce nasal obstruction in allergic children and, therefore, normalize possible changes in craniocervical angulations observed. However, cohort studies are necessary to evaluate if pharmacological treatment of asthma can effectively improve nasal breathing, preventing the establishment of malocclusion. Tanaka LS et al, [13] Bivariate and multivariate analysis showed higher prevalence of malocclusion and consequent facial changes in asthmatic children and adolescents when compared to control ones. These changes in occlusal features (increased maxillary over jet and open bite) are more common in patients with an early disease onset, when the disease started at the first year of age, especially in mixed dentition group. Faria et al [27] also reported an association between asthma onset and dentofacial changes observed in adults. Actually, the authors verified that crossbite and crowding are often observed in asthmatic adults in whom the disease begun before 14 years of age. However, Venetikidou [23] showed no statistically differences among overbite and overjet prevalence in asthma group when compared to control one. Dental crowding can be influenced by functional changes, such as impairment of nasal breathing and presence of lower airway tract diseases (asthma).On the other hand, no association between asthma and dental crowding was observed in this study. In this study, there were presence of association between asthma severity and the frequency of presence of normal or minor malocclusion. These results are in contrast with Faria et al[27] who found no association between asthma severity and malocclusion in adults, despite other study have previously reported this correlation in children. The findings of this study showed that early asthma onset, especially at the first year of age can evoke dentofacial changes. Therefore, the prompt diagnosis of asthma, as well as the correct pharmacological treatment, could improve not only its symptoms and chronic complications, but also it could reduce its impact on craniofacial development.[14] Special oral health attention should be provided to asthmatic children and adolescents as well as it can be recommended that dentists should be included at the multidisciplinary team involved in asthma assistance.

These findings from our study were clinically relevant to the Pedodontist in intercepting malocclusions at early stages. The pedodontist along with Pulmonologist, Otolaryngologist and Orthodontit together can help a suffering child have a happy, healthy and active childhood.

CONCLUSION:

The present study proves that Asthma is associated to malocclusion and onset of Asthma can influence malocclusion's establishment, especially when the disease started at the first year of age, hence there is a strong relationship between severity of Asthma & Malocclusion in children.

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