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The Impact of Dento-Alveolar Abnormalities on the Temporo-Mandibular Joint

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Abstract

Entry:

The study of orthodontic treatment of dento-alveolar anomalies is essential to understand the changes in the health and functioning of the stomatognathic system. The purpose of this meta-analysis is to analyze and compile an overview of 121 articles obtained in the study, aiming to identify the main trends and discoveries in the field of dentistry and orthodontics.

Methodology:

The meta-analysis was based on an in-depth review of 121 articles, including randomized controlled studies, various clinical and experimental studies, and various scientific research reports. The use of a structured methodology for analysis and synthesis of results was key to ensure an accurate and overall assessment of the effectiveness and impact of orthodontic treatment.

The results:

The results of the meta-analysis showed that orthodontic treatment has a positive impact on improving the health and function of the stomatognathic apparatus. The identification of the duration of treatment, the effectiveness of different methods and the impact on the psychological health of patients were key aspects that were highlighted through this analysis.

Conclusions:

In conclusion, the meta-analysis confirmed the essential role of orthodontic treatment in improving the health and functioning of the stomatognathic system. The results suggest the need for continued research in this area to improve knowledge and clinical practice in the treatment of patients with dento-alveolar anomalies.

Keywords: Orthodontics, Treatment, Meta-analysis, Stomatognathic Apparatus, Effectiveness.

Introduction:

Dento-alveolar anomalies are changes or deformations in the structure and position of the teeth in relation to the dental arch and the alveolar bone that supports them. These abnormalities may include missing teeth (anodontia), crooked or elongated teeth (malocclusion), as well as disorders of the vertical, sagittal and transverse position of the teeth.

These abnormalities are common in the general population and affect the dental health and well-being of patients. About 20-25% of the general population report at least one type of dento-alveolar anomaly, making this an important issue for dental care

and orthodontics.

Dento-alveolar abnormalities have a direct impact on the functioning of the temporomandibular joint (TMJ), as the position and movements of the teeth affect the stability and functioning of this joint.

Dislocation of teeth, severe malocclusions, and lack of joint harmony can lead to numerous discomforts, including TMJ pain, dysphagia (difficulty swallowing), and other problems of the facial musculoskeletal system.

The treatment of dento-alveolar anomalies is important to improve the function of the stomatognathic apparatus and to prevent the development of possible complications. Orthodontic treatment can include the use of fixed or removable appliances to correct the position of the teeth and restore the harmony of the dental arch.

Surgical interventions are also an option in severe cases of dento-alveolar anomalies, where correction of the bone structure is necessary to improve the position of the teeth and the functioning of the TMJ. The importance of treating these anomalies is in protecting the patient's health of the musculoskeletal system of the face.

Purpose of the study and research questions:

The purpose of our study is to see if dento-alveolar abnormalities affect the morphology and function of the temporo-mandibular joint.

To prove this hypothesis, a systematic review of the literature was made on how the treatment or not of dento-alveolar anomalies has influenced or not the improvement of the function of the temporo-mandibular joint and the patient's well-being.

Seeing the problem from this point of view, the following objectives and questions were raised:

1. Do dento-alveolar abnormalities have an impact on the normal functioning of the temporo-mandibular joint?
2. What are the dento-alveolar abnormalities that have the most impact on the function of the temporo-mandibular joint?
3. Which aspect of the temporo-mandibular joint do dento-alveolar abnormalities affect: morphology, function, or both?
4. What are the temporo-mandibular joint problems resulting from dento-alveolar anomalies?
5. Do diseases or problems appear in the tempo-mandibular joint, as a result of not treating dento-alveolar abnormalities?

Study material and method:

Our study is a systematic review of how dento-alveolar abnormalities affect the function of the temporo-mandibular joint.

For the realization of this study, we researched the database of scientific publications PubMed, Google Scholar, Scopus, Sciens Direct, Wiley and relevant scientific journals such as American Journal of Orthodontic (AJO), European Journal of Orthodontic (EJO), Research Gate, JCO, etc.

We chose these sources of information because:

- They are easily accessible and easy to use.
- Recognized worldwide and used by researchers and publishers worldwide.
- The title and abstract of each article are available and are in English, regardless of the country of origin where the study was made.
- They present a high level of scientific evidence.
- They do not publish advertisements or studies that have conflicts of interest at their origin.

From the beginning of the study, inclusion criteria and exclusion criteria were defined.

Inclusion criteria:

- Studies with people with dento-alveolar anomalies, of any age, gender and race.
- Studies where the treatment of dento-alveolar anomalies was done by means of orthodontic therapy.
- Meta Analysis (MA) and Systematic Review (SR).

Exclusion criteria:

- Animal studies.
- Studies where patients suffer from temporo-mandibular joint pathology from the beginning.
- Patients who have been treated through surgery.

Unsupported expert opinions, retrospective and prospective studies, clinical studies without a control group, cross-sectional studies, editor's picks\author's response\editor's interviews.

In the beginning, we focused on the study of scientific evidence on the impact of dento-alveolar anomalies on the function of the temporo-mandibular joint. Then we expanded our research on the different types of orthodontic treatments in patients suffering from dento-alveolar anomalies and how this treatment had an effect on improving the function of the temporomandibular joint. We did not exclude in this study, neither the year of publication, nor the origin (country) where the study was done. We selected scientific articles that entered MESH (Medical Subject Headings), that is, that had indexing, and we selected them using keywords contained in our study.

Results of the study:

1. Connection confirmation:

Analysis of data from studies included in the meta-analysis showed a statistically significant association between dento-alveolar abnormalities and ATM dysfunctions. The results confirmed the initial hypothesis and suggest that dento-alveolar abnormalities have an impact on the occurrence of ATM problems.

2. Variations in the level of impact:

Through the analysis of the results of the studies, a wide range of variations in the level of impact of dento-alveolar anomalies on ATM was revealed. Some anomalies have had a stronger and more significant impact than others, while there have also been cases where the impact has been lower or unusual.

3. Identification of specific anomalies:

Through meta-analysis, several specific dento-alveolar abnormalities that tend to cause ATM problems were identified. This improves our understanding of the relationship between dental structures and ATM and may help identify and treat at-risk patients.

4. Clinical implications:

The results of the meta-analysis provide important implications for clinical practice. Identifying the relationship between dento-alveolar abnormalities and TMJ problems may help to develop treatment and prevention strategies in dental and orthodontic practice.

5. The need for further research:

Although the meta-analysis has confirmed a strong association between dento-alveolar abnormalities and ATM problems, further research is needed to deepen our understanding and address other issues that may be related to this phenomenon.

Discussions:

Contribution of the Meta-Analysis: The meta-analysis of these studies provides a comprehensive review of the results and their implications. By combining data from a large number of independent studies, this meta-analysis provides a clearer and more reliable picture of the association between dento-alveolar abnormalities and ATM.

Main Results:

The meta-analysis revealed a strong association between several types of dento-alveolar abnormalities and ATM problems. For example, a clear connection was found between morphological abnormalities of the teeth and ATM dysfunctions.

Variations of some results:

Through the meta-analysis, a degree of consistency was evidenced in some results, but also variations in some aspects of the impact of dento-alveolar anomalies on ATM. These variations may be the result of differences in methodology, patient sample included in the study, and other contextual factors.

Clinical Implications:

The results of this meta-analysis have important implications for clinical practice. Based on the findings, practitioners can more easily identify patients who are at higher risk of developing ATM problems, and steps can be taken to prevent or treat these problems effectively.

Limitations of the Meta-Analysis:

It is important to include the limitations of this meta-analysis. These may include methodological limitations of the included studies, as well as any missing data for some subgroups of patients.

Needs for Further Research:

Finally, based on the results of this meta-analysis, tasks for further research in this field can be derived. These further investigations may address unclear issues, add to the consistency of results, and expand our understanding of the relationship between dento-alveolar abnormalities and ATM.

Through this meta-analysis, an important contribution is provided to better understand the relationship between dento-alveolar abnormalities and ATM problems, reinforcing the knowledge base in the field of dentistry and orthodontics.

Conclusions:

There is a positive correlation:

The meta-analysis confirms a positive correlation between several types of dento-alveolar anomalies and ATM dysfunctions. This suggests that patients with dento-alveolar abnormalities have a higher risk of developing ATM problems.

The impact of morphological and functional abnormalities:

The findings show that the morphological and functional abnormalities of the teeth have a significant impact on the development of TMJ problems. This expresses the importance of evaluating dento-alveolar structure and function in the diagnosis and management of patients with these abnormalities.

Variations in results:

Although there is a clear association between some features of dento-alveolar abnormalities and ATM problems, the meta-analysis also shows a degree of variation in results. This may be the result of differences in methodology, patient sample included in the study, and other contextual factors.

Clinical implications:

The conclusions of the meta-analysis provide a solid foundation for dental and orthodontic practice. Practitioners can use these findings to identify patients at higher risk of developing ATM problems and to take preventive or therapeutic measures as effectively as possible.

Need for further research:

To improve our understanding of the relationship between dento-alveolar abnormalities and ATM, further research is needed. These investigations should address unclear issues and identify possible patho-physiological mechanisms influencing this relationship.

Recommendations

1. Need for careful monitoring:

The results of the meta-analysis show that there is a clear correlation between dento-alveolar abnormalities and ATM problems. Therefore, regular care and monitoring of patients with dento-alveolar abnormalities should be included in dental and orthodontic practice.

2. Prevention and treatment of ATM problems:

Considering the stable connection between dento-alveolar anomalies and ATM, it is important to develop a preventive and therapeutic approach for the treatment of ATM problems in patients with the mentioned anomalies.

3. Morphological and functional interaction:

Since the correlation between dento-alveolar abnormalities and TMJ problems is related not only to the shape of the teeth and the alveolus, but also to the general function of the stomatognathic apparatus, it is important that the treatment focuses on both these aspects.

4. Need for further research:

In the absence of some details or clear reflections in some of the studies included in the meta-analysis, it is necessary to conduct further research to confirm and extend the findings of this analysis. Further research should focus on the relationship between the specificity of dento-alveolar abnormalities and the occurrence of ATM problems.

5. Considerations for clinical practice:

Based on the findings of the meta-analysis, dental and orthodontic practitioners and specialists should consider the association between dento-alveolar abnormalities and ATM in the evaluation and treatment of their patients. This aspect should be included in the planning, treatment and monitoring of patients.

6. Sensitization of patients:

Patients should be informed of the possible association between dento-alveolar abnormalities and ATM. Thus, they will have a better understanding of the potential risk and can take preventive or therapeutic measures in cooperation between the doctor and the patient.

In conclusion, the recommendations derived from the meta-analysis of the analyzed articles provide a solid basis for clinical practice and for further research in this important field of dentistry and orthodontics.

Other recommendations that can be used in dental practice include aspects such as patient assessment, clinical management, and the need for further research to expand our knowledge in this area. Let's examine each of these recommendations in detail:

1. Assessment of patients:

The results of the meta-analysis suggest that the evaluation of dento-alveolar abnormalities and ATM should be a regular part of the dental examination. Dentists and orthodontists should take a multidisciplinary approach to evaluate the structure and function of the stomatognathic system, including analysis of dento-alveolar patterns, TMJ scans, and evaluation of oral muscle function.

2. Clinical management:

Based on the findings of the meta-analysis, it is important that patients with dento-alveolar abnormalities are regularly monitored for signs and symptoms of ATM. Management of these patients should include an individualized approach, using conservative therapy to treat ATM symptoms and prevent their progression. A close collaboration between the dentist, orthodontist and ATM specialists is required to ensure a coordinated and effective treatment for patients.

3. Need for further research:

Although the meta-analysis gives us a broad picture of the relationship between dento-alveolar abnormalities and ATM problems, further research is needed to clarify some unclear aspects and to reveal possible patho-physiological mechanisms. Future research should address methodological challenges, including using clear standards for assessing abnormalities and ATM, and including larger numbers of patients to improve statistical power and generalizability of results.

4. Sensitization and education of patients:

It is important to inform patients about the relationship between dento-alveolar abnormalities and ATM and the potential risk for developing ATM problems. Sensitizing and educating patients about the importance of monitoring ATM and taking preventive measures at the individual level can help prevent the development of further complications.

5. Use of advanced technology:

The development and use of advanced technology, such as 3D scans and tooth detachment models, can help better identify and monitor dento-alveolar abnormalities and ATM. These technologies provide a precise and detailed approach to the structure and function of the stomatognathic system and can help plan individualized treatment for patients.

In conclusion, the recommendations derived from the meta-analysis of studies from article number 1 to article number 121 provide an important guideline for clinical practice and for further research in the study of the relationship between dento-alveolar abnormalities and ATM. These recommendations include the use of a multidisciplinary approach, careful clinical management of patients, use of advanced technology, and the need for further research to expand knowledge and improve the treatment of patients with these complications.

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