Evaluation of the Effect of Three Types of Rapid Maxillary Expanders (conventional, Hybrid and MSE)a randomized controlled trial

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Evaluation of the Effect of Three Types of Rapid Maxillary Expanders (conventional, Hybrid and MSE)

a randomized controlled trial

CBCT Study

Protocol submitted in partial fulfilment of the requirements for Academic Promotion Degree in Orthodontics

By

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Introduction

Rapid maxillary expansion (RME)is a common procedure for correcting posterior crossbite, mild maxillary crowding and maxillary arch constriction through opening the mid palatal suture. [1-3]

RME can open the palatal and circum maxillary sutures, splitting of maxilla into two parts which affect nasal airway through increase nasal cavity volume followed by decreased nasal resistance and improved airflow especially in children with obstructive sleep apnea. [4-7]

Previous studies reported that RME can improve the airway [8-10]

On the other hand, other studies reported that RME does not affect oropharynx dimension. [11,12]

A systematic review mentioned that small changes in volume does not guaranty improvement in breathing mode, hence they advised the clinician not to do RME to improve the breathing mode. [13]

Current evidence suggested that the conflict might be the different protocols of CBCT between studies, Head posture, tongue position, and segmentation protocols were not standardized in the selected studies hence they recommended more accurate and reliable protocol with fixed head and tongue positioning, also the segmentation method. [14]

Other evidence showed improvement only limited to short term evaluation rather than long term one [15] While other evidence showed no improvement even with short term especially with miniscrew assisted rapid palatal expansion (MARPE). [16]

So the aim of this study was to evaluate the effect of three types of rapid maxillary expanders (conventional, Hybrid and MSE) using cone beam computed tomography (CBCT)

Aim of study

The aim of this study was to compare the effect of three types of rapid maxillary expanders (conventional, Hybrid and MSE) using cone beam computed tomography (CBCT)

The secondary outcomes

a- Evaluation of periodontal condition of maxillary first permanent molars, both clinically and radiographically using CBCT

b- Evaluation of Airway.

Material and Methods

Study design:

Prospective randomized controlled trial

Study setting and population:

This study will be conducted on patients seeking orthodontic treatment in the outpatient clinic, Orthodontic department, Faculty of Dental Medicine, Al-Azhar University, Cairo, Boys branch.

Eligibility criteria of population:

The patients will be selected according to the following inclusions criteria:

1- Patients suffering maxillary collapse with a skeletal background
2- Patients with unilateral or bilateral posterior crossbite.
3- Patients with reduced or average anterior face height.
4- Patients with no periodontal disease.
5- Patients with good oral hygiene and general health.
6- No systemic diseases that may affect bone quality or interfere with orthodontic treatment.
7- Patients with erupted maxillary permanent first molars and premolars.
8- Patients with no previous orthodontic treatment.

Sample size:

Sample size calculation using G power software was based on the observed effect sizes derived from previous article. [20]

The calculation indicated that for a study with a power of 0.95 and an alpha of 0.05, a total of at least 45 patients (15 patients in each group) .

Group allocation:

The patients will be classified and randomly allocated into three equal groups, using online generated randomization plan (Graph Pad) found at the website

http://www.graphpad.com/quickcalcs/index.cfm.:

- Group (1): The conventional hyrax.
- Group (2): The Hybrid hyrax.
- Group (3): The MSE expander.

Interventions:

The current study was conducted on a total sample of forty five young adult orthodontic patients presented with transverse maxillary deficiency with an age ranged from 11-16 years.

- All patients in this study will undergo a special protocol for oral hygiene measures for one month to standardize as possible the oral hygiene measure before expansion.
- The following diagnostic records will be taken for each patient before and after the completion of expansion treatment:
- Orthodontic study casts.
- Standardized extra-oral and intra-oral photographs.
- Panoramic and Upper occlusal radiographs.
- Other radiographic evaluations that serve the purpose of the study according to the situation.

- Radiographic analysis will be performed for each patient to evaluate the effect of the rapid maxillary expansion on the nasal airway.

Ethical consideration:

The objectives of the study will be discussed to the patients and parents and informed consent will be signed before treatment (form is attached).

Data management and analysis:

- The collected data will be statistically analyzed using SPSS.

The Institutional Ethical Committee: approval number **775/220**

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