

Effects of different functional therapy protocols on airway dimensions during Herbst appliance therapy

Submission date 08/11/2018	Recruitment status No longer recruiting	☐ Prospectively registered ☐ Protocol
Registration date 06/12/2018	Overall study status Completed	☐ Statistical analysis plan ☒ Results
Last Edited 26/10/2020	Condition category Oral Health	☐ Individual participant data

Plain English summary of protocol

Background and study aims

The position of the lower jaw can influence the position of the hyoid bone and the tongue, which can then affect the dimensions of the airway. Lower jaw advancement is a type of surgery that moves the jaw, and can change the dimensions of the airway. A Herbst appliance is a device that is attached inside the mouth to move the jaw. The jaw can be moved in a single step (maximum advancement) or in smaller, multiple steps (incremental advancement) using a Herbst appliance. This study aims to look at the effects of maximum and incremental advancement using a Herbst appliance on airway dimensions and position of the hyoid bone in young adults with a retruded lower jaw.

Who can participate?

Patients aged 14-18 with mandibular retrognathia

What does the study involve?

Participants will be randomly allocated to one of two groups. One group will receive maximum advancement (MA), whereas the other will receive incremental advancement (IA). Both groups will receive mandibular advancement treatment using the Herbst-RPE appliance. The MA group will receive treatment for approximately 9-10 months. The IA group will receive treatment every 2 months until the treatment is complete.

What are the possible benefits and risks of participating?

The possible benefit of participating in this study is that patients will receive treatment more quickly, as they will not have to wait to be treated. There are no known risks to participants taking part in this study.

Where is the study run from?

Erciyes University, Faculty of Dentistry, Department of Orthodontics, Kayseri (Turkey)

When is the study starting and how long is it expected to run for?

November 2011 to September 2017

Who is funding the study?

This study does not require funding as all treatments are standard orthodontic treatments performed by Erciyes University

Who is the main contact?

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Contact information

Type(s)

Scientific

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Additional identifiers

Protocol serial number

2011/107

Study information

Scientific Title

Changes in pharyngeal airway dimensions following incremental and maximum bite advancement during Herbst appliance therapy in young adult patients: a randomized prospective clinical study

Study objectives

Null hypothesis:

There is no difference between maximum bite advancement and incremental advancement with Herbst appliance therapy on pharyngeal airway dimensions and hyoid bone position.

Ethics approval required

Old ethics approval format

Ethics approval(s)

Erciyes University Clinical Trials Ethical Committee, 06/12/2011, 2011/107

Primary study design

Interventional

Study design

Interventional prospective single-center double-blinded randomised controlled parallel trial

Study type(s)

Treatment

Health condition(s) or problem(s) studied

Skeletal class II malocclusion with mandibular retrognathia

Interventions

Participants will be randomly allocated to receive either maximum advancement or incremental advancement in a 1:1 ratio using a random number table.

Both groups will receive mandibular advancement using the Herbst-RPE appliance with a stainless steel casted splint design. For the group receiving maximum advancement, advancement will be adjusted until a tet-a-tet incisor relation or super class I molar relationship is obtained. This will be completed for approximately 9-10 months. For the group receiving incremental advancement, a 2 mm shim will be inserted to the pivot ends of the plungers after a 4-5 mm initial forward movement of the mandible. For this group, advancement steps will continue every 2 months until a tet-a-tet incisor relation or super class I molar relationship is obtained.

Intervention Type

Device

Primary outcome(s)

Changes in pharyngeal airway and hyoid position, assessed using lateral cephalometric radiography before using the Herbst-RPE appliance and immediately after appliance removal

Key secondary outcome(s)

Skeletal changes, assessed using lateral cephalometric radiography before using the Herbst-RPE appliance and immediately after appliance removal

Completion date

05/09/2017

Eligibility

Key inclusion criteria

1. Skeletal Class II malocclusion (ANB angle $>4^{\circ}$) and mandibular retrognathia (SNB $<78^{\circ}$)
2. Bilateral Class II molar and canine relationship (at least 3.5 mm)
3. Increased overjet (more than 7 mm)
4. Normal or decreased vertical dimensions (SN-GoGn ≤ 32)
5. Minimal crowding (≤ 4) and no missing teeth on upper and lower arches
6. Aged 14-18 years

Participant type(s)

Patient

Healthy volunteers allowed

No

Age group

Other

Sex

All

Total final enrolment

48

Key exclusion criteria

1. Craniofacial anomalies
2. Musculoskeletal diseases
3. Severe facial asymmetry
4. Severe maxillary transverse deficiency
5. Poor oral hygiene

Date of first enrolment

01/10/2014

Date of final enrolment

01/10/2015

Locations**Countries of recruitment**

Türkiye

Study participating centre

Erciyes University, Faculty of Dentistry, Department of Orthodontics

Kayseri

Türkiye

38039

Sponsor information**Organisation**

Erciyes University Clinical Trials Ethical Committee

ROR

<https://ror.org/047g8vk19>

Funder(s)

Funder type

Other

Funder Name

No funding

Results and Publications

Individual participant data (IPD) sharing plan

The data sharing plans for the current study are unknown and will be made available at a later date

IPD sharing plan summary

Data sharing statement to be made available at a later date

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article	results	24/05/2019	26/10/2020	Yes	No