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Learning Objectives

After completion of this exercise, the participant will be able to:

 Compare hybrid aligner treatment to other methods of treating patients with impacted canines.
Discuss the use of a new bone-anchored customized Herbst appliance.

3. Describe digital workflows for design and manufacturing of the mandibular anterior repositioning appliance (MARA).

4. Utilize three-dimensional facial scans to evaluate soft-tissue changes in orthodontic patients.

Article 1

Sabouni, W.; Azami, N.; and Nanda, R.: Management of Impacted Canines Using Clear Aligners (pp. 591-606)

1. Impaction or ectopic eruption of a canine is found in:

- a) .1-.31% of the population
- b) .92-5.1% of the population
- c) 1-2.5% of orthodontic patients
- d) 7.5-10% of orthodontic patients

2. Factors under the orthodontist's control that can affect the success of impacted-canine treatment include all of the following except the:

- a) amount of space preparation
- b) location and angulation of the canine
- c) magnitude and direction of traction force
- d) type and amount of anchorage

3. In the authors' hybrid aligner treatment, during distal tipping of the impacted canine away from the roots of adjacent teeth, the canine movement should be limited to:

- a) extrusion
- b) distalization
- c) derotation
- d) either a or c
- 4. The refinement stage can begin:
 - a) as early as desired
 - b) as soon as the impacted canine is derotated
 - c) when the canine crown is fully exposed

d) when about three-quarters of the canine crown is exposed

Article 2

De Clerck, H.; Timmerman, H.; Nguyen, T.; Jacobs, R.; and Siciliano, S.: Facial Growth Modification with a Bone-Anchored Herbst Appliance, Part 2 (pp. 608-615)

5. A bone-anchored Herbst appliance combines a rapid palatal expander in the maxilla with mandibular:

- a) fixed appliances
- b) skeletal anchorage
- c) lip bumpers
- d) any of the above

6. The software used to generate the 3D surface models for design of the customized bone-anchored Herbst is:

- a) D2P
- b) OrthoApps 3D
- c) Appliance Designer
- d) Meshmixer

7. In the three cases presented by the authors, the bone-anchored Herbst produced chin protraction of:

- a) 1.2-2.5mm
- b) 5.2-6.4mm

- c) 4.9-7.3mm
- d) 6.1-10.2mm
- 8. The main contributor to chin projection is:
 - a) horizontal condylar growth
 - b) anterior rotation
 - c) true mandibular posterior rotation
 - d) true mandibular lengthening

Article 3

Vassis, S.; Sefidroodi, M.; Noeldeke, B.; Özkan, V.; and Kristensen, K.D.: *Digital Workflows for Design and Fabrication of the Mandibular Anterior Repositioning Appliance* (pp. 616-625)

9. The MARA can be used simultaneously with dental alignment because:

a) it has no permanent connection between the upper and lower first molars

b) its upper and lower bands can incorporate archwire tubes

c) it actively guides the mandible forward

d) it has "elbows" in the upper arch

10. The horizontal leg of the MARA's upper elbow should have the same dimensions as the:

a) vertical leg of the upper elbow

- b) lower advancement arm
- c) interior of the upper square tube
- d) upper first-molar band

11. The authors show digital workflows for digital MARA design and fabrication using all of the following software platforms except:

- a) D2P
- b) OrthoApps 3D
- c) Appliance Designer

d) Meshmixer

12. Advantages of the MARA Plus over the digital MARA include:

a) fully customizable components that can be modified to fit the patient's anatomy

b) optional additions such as lower lingual or transpalatal arches

c) faster insertion due to the elimination of pre-

fabricated crowns d) all of the above

Article 4

Albertini, P.; Albertini, E.; Pellitteri, F.; Zucchini, L.; and Lombardo, L.: *Noninvasive 3D Evaluation of Profile Changes after Four Extractions* (pp. 633-644)

13. Facial scans are particularly useful when planning extraction treatment because they offer information about:

- a) the final occlusion
- b) effects on the soft tissue
- c) tooth-size discrepancies

d) effects of fixed vs. removable appliances

14. The extraction pattern in this case involved the upper second premolars and:

- a) both lower first premolars
- b) both lower second premolars
- c) a lower first premolar and central incisor

d) a lower first premolar and retained deciduous molar

15. Facial scans taken during the upper-premolar extraction appointment and after complete space closure were superimposed using:

a) Geomagic Control X 3D inspection and metrology software

b) an EinScan H2 structured-light scanner

c) the Ortho Apps 3D module in OnyxCeph³ software

d) the Appliance Designer module in a 3Shape TRIOS scanner

16. In contrast to the authors' 3D evaluation, a conventional cephalometric analysis would have been unable to detect the most significant soft-tissue change in this case, which involved:

a) retraction at subnasale

b) retraction of the lower lip

c) backward movement of the lateral upper-lip region

d) a more retrusive profile