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Learning Objectives

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

1. Compare three-dimensional printers used in orthodontics.
2. Discuss the advantages of accelerated tooth movement in Invisalign extraction therapy.
3. Combine an auxiliary canting spring with a continuous archwire for correction of a canted incisal plane.
4. Describe methods of treating patients with bimaxillary protrusion and gummy smiles.

Article 1

Groth, C.; Kravitz, N.D.; Jones, P.E.; Graham, J.W.; and Redmond, W.R.: *Three-Dimensional Printing Technology* (pp. 475-485)

1. Three-dimensional printing is also known as:
 - a) additive manufacturing
 - b) subtractive manufacturing
 - c) precision casting
 - d) deposition milling
2. In stereolithography, each build layer is formed by a liquid resin that is:
 - a) jetted out of hundreds of nozzles
 - b) cured by a projector containing a digital micromirror device
 - c) cured by a concentrated ultraviolet laser light
 - d) heated just beyond its melting point
3. A gel-like support resin is used by:
 - a) stereolithographic printers
 - b) fused deposition modeling printers
 - c) digital light processing printers
 - d) PolyJet photopolymer printers

4. More important than a 3D printer material's response to tension is its:

- a) response to tensile elongation
- b) response to flexural forces
- c) heat-deflection temperature
- d) break point

Article 2

Ojima, K.; Dan, C.; Nishiyama, R.; Ohtsuka, S.; and Schupp, W.: *Accelerated Extraction Treatment with Invisalign* (pp. 487-499)

5. In this case, the lower first premolars were extracted along with the:

- a) upper first premolars
- b) upper second premolars
- c) upper canines
- d) lower canines

6. Aligner fit was maintained during the use of attachments by:

- a) making precision cuts in the aligners
- b) trimming the aligner margins
- c) attaching the buttons and hooks directly to the teeth
- d) attaching the buttons and hooks directly to the aligners

7. The bowing effect commonly seen during space closure with aligners can be avoided by using:

- a) Class II elastics to enhance intermaxillary anchorage
- b) Class III elastics to enhance intermaxillary anchorage
- c) vertical rectangular attachments to improve aligner retention
- d) vertical rectangular attachments to avoid

tipping of the teeth adjacent to the extraction sites
8. By using an AcceleDent device, the authors were able to reduce the interval between aligner changes to:

- a) three days
- b) five days
- c) 10 days
- d) 14 days

Article 3

Musilli, M.; Grampone, F.; and Melsen, B.: *A New Auxiliary Spring for Correction of a Canted Incisal Plane* (pp. 500-504)

9. The development of a canted incisal plane is primarily attributable to:

- a) congenital factors
- b) disease
- c) trauma
- d) any of the above

10. The canting spring is activated by:

- a) bending each lateral section upward or downward in relation to the anterior section
- b) bending each lateral section close to the center of resistance of the occlusal plane
- c) placing the anterior section parallel to the incisor brackets
- d) tying the lateral sections into the premolar bracket slots

11. Since the canting spring is applied as an overlay to the continuous arch, the couples of the anterior forces act on:

- a) the teeth to which the spring is tied
- b) all the teeth in the arch in a progressive manner
- c) the posterior segments only
- d) both a and b

12. Compared to a stiffer wire, a more elastic continuous archwire:

- a) provides more control of the archform
- b) allows more change in archform
- c) allows more homogeneous rotation of the frontal plane
- d) reduces the force of the canting spring

Article 4

Hong, R.K.; Lim, S.M.; Heo, J.M.; and Ahn, J.H.: *Treatment of Bimaxillary Protrusion with Lever-Arm Mechanics and Micro-Implant Anchorage* (pp. 505-512)

13. A bimaxillary-protrusion patient with relatively normal upper-incisor inclination and a gummy smile has traditionally been recommended for:

- a) conventional orthodontic treatment
- b) compromise orthodontic treatment
- c) orthodontics and anterior segmental osteotomy
- d) orthodontics with endosseous implant anchorage

14. Because patients with dentoalveolar protrusion usually have thin and elongated anterior alveoli and/or bony defects, orthodontic retraction may cause:

- a) root resorption
- b) alveolar bone defects
- c) dehiscence of the labial or palatal cortical plate
- d) any of the above

15. Critical factors in predicting and planning esthetic movement of the anterior teeth include all of the following except:

- a) the applied moment-to-force ratio
- b) the width and depth of the palate
- c) the application point of the retraction force in relation to the center of resistance
- d) the direction of the retraction force in relation to the center of resistance

16. A square jaw may improve spontaneously during orthodontic treatment due to:

- a) masseter muscle hypotrophy caused by a reduction in masticatory forces
- b) masseter muscle hypertrophy caused by an increase in masticatory forces
- c) excessive development of the mandibular angle
- d) resection of the mandibular angle