

system just to the apical foramen in cases with apical lesions. For this reason we proposed the biomimetical obturation of the lesion and the apical zone with bioceramic of calcium phosphate.

Application of bioceramic of calcium phosphate into the zone of periapical lesion should be of favorable scaffold for bone regenerative processes and this will create a biomimetic apical control zone (Figure 9).

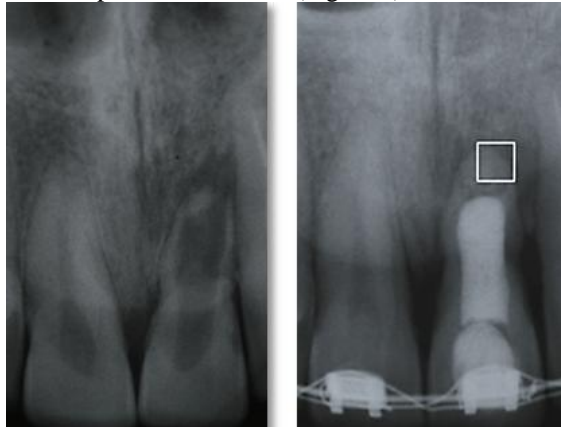


Figure 9: Application of bioceramic of calcium phosphate into zone and biomimetic approach to apical control zone (pre- and postoperative radiograph).

It is well known that calcium phosphate ceramics have received much attention as potential bone implant material. It was also shown that bioceramics of calcium phosphate have antimicrobial properties. All these problems we discussed as a complex process of bone metabolism that involves the resorption by osteoclasts and the subsequent formation of a woven bone. These activities are essential for bone remodeling, regeneration and repair for tissue engineering applications, 3D bone biomaterials must be capable of supporting the functional properties of osteogenic cells.

It is very important to know that once damaged the periodontal ligament has a low probability of regeneration and this is a challenge for root canal therapy. Repair of periodontal ligament appears to involve progenitor cells. Moreover, progenitor cells in endosteal spaces potentially migrate from the bone to periodontal ligament to form tissues of the periodontium. These mechanisms are unknown but that is a problem for the future.

2.7. Separated endodontic instruments

Success in endodontic therapy depends upon the appropriate removal of vital or nonvital pulpal tissue [22]. It is a common misconception that a broken file is the specific cause of conventional endodontic treatment failure. However, the basis of endodontic treatment failure after a file breaks is the inability to remove the remaining vital or nonvital pulp tissue due to the impediment that the separated file poses, which can lead to inflammation or infection [16].

The use of ultrasonic devices has been shown to be very successful for the removal of various canal obstructions [18]. The use of ultrasonics is advantageous over conventional methods for removal of separated instruments as it is able to set separated instruments free from canals

while making the immolate of dentin significantly less (Figure 10)[8]. The recommendations are to use endosonic tips with the smallest diameter possible in the curve of the root canals[25].

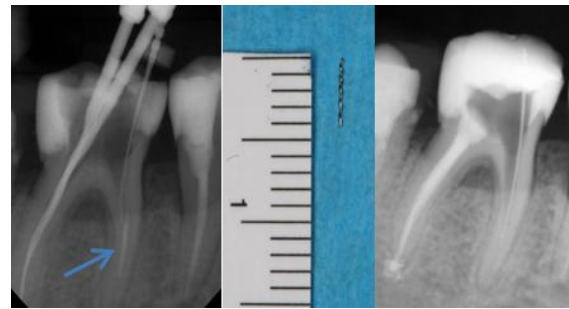


Figure 10: Removal of separated instrument

2.8. Vertical root fracture

Use of excess force during gutta-percha compaction too may cause vertical fracture. It may happen during pin placement for core buildup following endodontic treatment, when excess force is applied and when a tapered pin or a post is placed. Clinical detection of fractures can be very difficult in the initial stages of development under extensive restorations or in teeth after prosthetic treatment. Clinical signs and symptoms are often elusive in nature and may be difficult to detect or reproduce during patient examination [19]. Radiographic signs of wide periodontal space, fracture line at horizontal slice from CBCT and intraoral fistula are clear evidence of a fracture available. The choice of extraction may often be the wisest course of treatment, provided that all other possibilities have been considered (Figure 11 a, b).

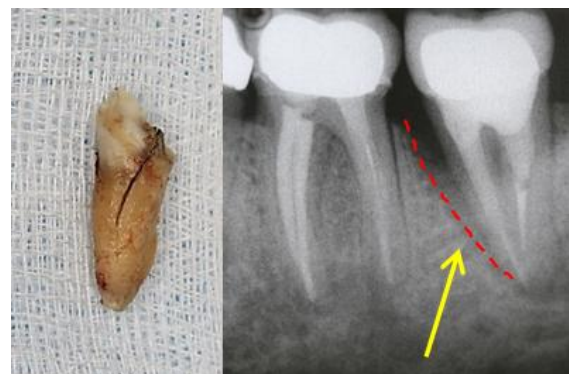


Figure 11: a/fracture line; b/radiographic sign of fracture of mesial root of mandibular molar.

3. Conclusion

Accurate diagnosis, knowledge of the root canal morphology and the principles of modern preparation techniques are all essential so that appropriate chemical cleaning and disinfection of the entire root canal system is achieved. Modern dental practice is related to the continuous improvement of clinical techniques and materials. But the problems related to the treatment process have not yet been completely eliminated.

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