

# Fractures

## Clinical Approaches

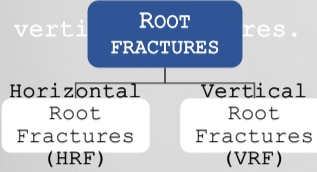
Morais C.<sup>1</sup> ; Santos F.<sup>1\*</sup> ; Fernandes R.<sup>1</sup> ; Bernardino P.<sup>2</sup> ; Freitas V.<sup>2</sup>

<sup>1</sup> Dentist, Endodontic Postgraduation Student @ IUCS @ CESPÚ

<sup>2</sup> Dentist, Endodontic Postgraduation Professor @ IUCS @ CESPÚ

### INTRODUCTION

They can be crown fractures, crown-root fractures and root fractures. Root fractures are divided into horizontal and vertical fractures. (1-5)



The research covered the period from 1980 to 2010, using the keywords: root fractures, vertical root fractures, horizontal root fractures, prognosis of root fractures and treatment of root fractures. Articles in Portuguese, English and Spanish were included. 20 articles were selected: 7 review articles, 6 research articles and 7 clinical cases.

### METHODOLOGY

### VERTICAL ROOT FRACTURES

The VRF are a constant problem in dentistry because it is difficult to diagnose in its initial stages. The following table demonstrates the VRF diagnostic criteria. (3, 13, 14)

DIAGNOSTIC CRITERIA (3, 13, 15-18)	
1.	Signs and symptoms
2.	Periodontal probing
3.	Radiographic findings
4.	History of previous treatment
5.	Surgical exploration



Figure 1 - Periapical Radiography. Note the "J-shaped" lesion around the mesial root (White Triangle) (19)



Figure 2 - Clinical photographs of the extracted tooth (a) Extracted tooth: note the fracture line in the mesial root (white triangle). (b) The fracture line became more evident after staining with methylene blue (black triangle) (19)

### CLINICAL CASE

In most cases, tooth extraction is the only reasonable treatment when the fracture is finally diagnosed. The following table presents other treatment options.

POSSIBLE TREATMENTS (1, 17, 20)		
Fracture	Type	Treatment
Complete	Intra-osseous + Non-Vital Pulp + Bone Loss + Periodontal pocket	Single rooted → Extraction indicated
	Multi-rooted + Bone Loss + Periodontal pocket	Multi-rooted → When fracture confined to one root, the hemisection is indicated
Incomplete	Supra-osseous + Vital pulp + No radiographic changes or periodontal defects	Temporary Crown → Evaluate 3 months If asymptomatic → Definitive crown. If necrosed → 2.b or 2.c
	Supra-osseous + Non-Vital Pulp + No radiographic changes or periodontal defects	Steel crown → Therapy with calcium hydroxide + evaluate every 3 months. 9-12 months without changes → Endodontic therapy + definitive crown. If periodontal pocket → 2.c
	Intra-osseous + Non-Vital Pulp + Periodontal pocket along the fracture line	Exploratory surgery. If the fracture line ends before the bone defect → periodontal treatment Depending on the pulp state → 2.a or 2.b. If fracture line beyond the bone defect → 1.a or 1.b

### CONCLUSION

- Fractures are a constant problem in dentistry because they are difficult to diagnose in their initial states.
- Knowing how to identify, making a reasonable prognosis and knowing how to act according to the clinical implications of each case requires knowing how to make a correct differential diagnosis and how to identify the different locations and extent of fractures.

### HORIZONTAL ROOT FRACTURES

The treatment of the HRF varies according to the fractured region, as schematized. (6-12) Physiological repair of HRF results from a combination of pulp and periodontal ligament responses.

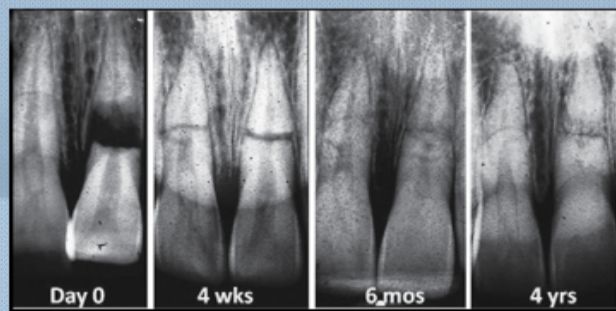
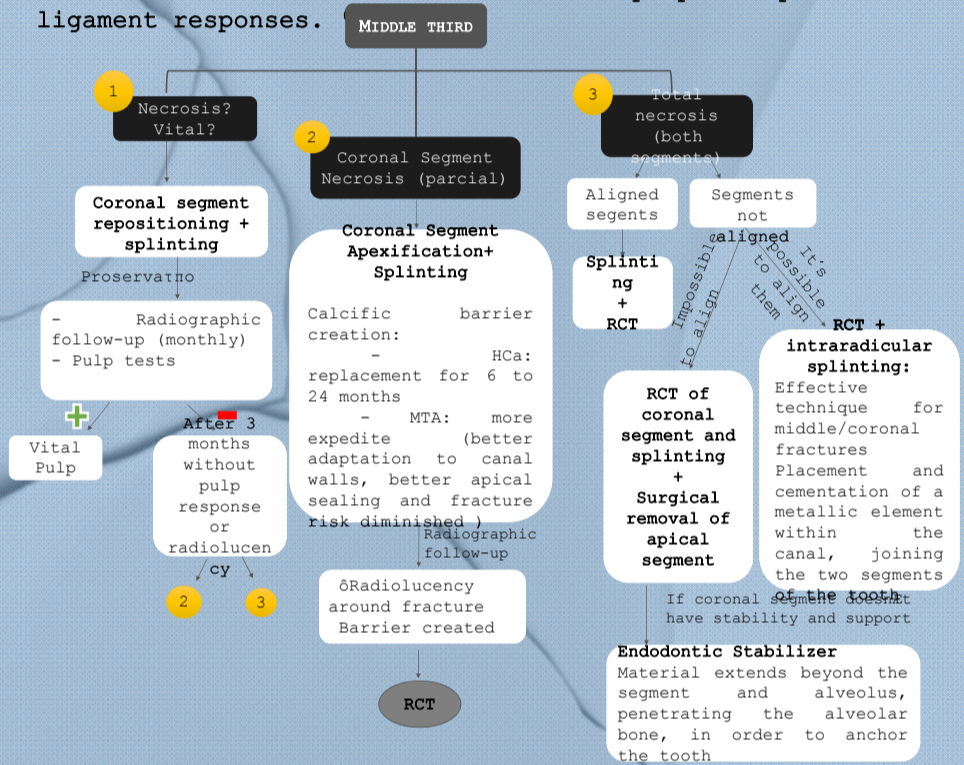
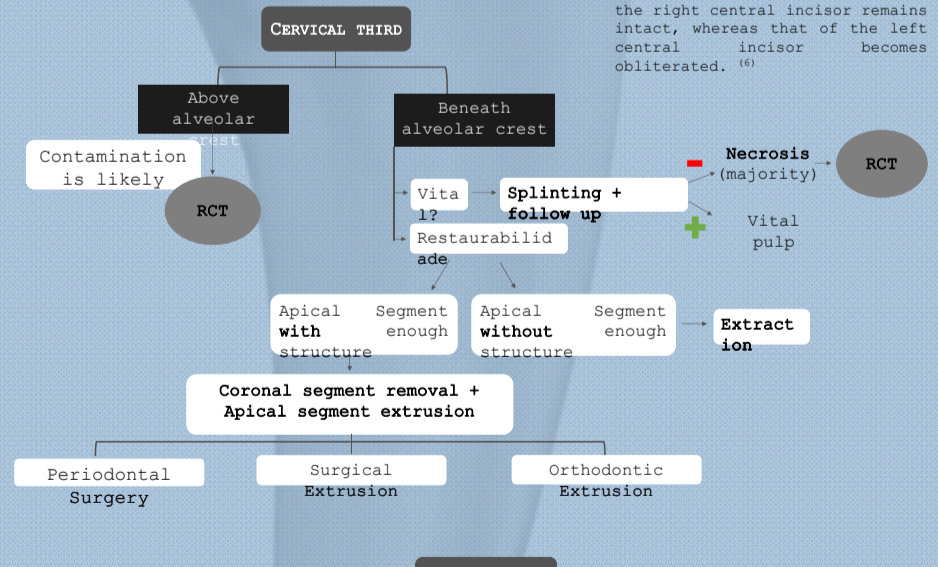


Figure 3 - Horizontal root fracture of the two maxillary central incisors. Tooth 11 without displacement of the coronal segment and repair by the pulp with formation of hard tissue. Tooth 21 with displacement of the coronal segment (extrusion), repair mainly by connective tissue produced through the periodontal ligament. Over time the tooth canal of the coronal fragment in the right central incisor remains intact, whereas that of the left central incisor becomes obliterated. (6)



- Difficult to diagnose because the coronal segment remains immobile
- Reduced percentage of necrosis because the fracture occurs below the level of the bone crest, thus there is no contamination and the pulp tissue recovers.
- There is usually no mobility of the coronal segment, so no splinting is required (done as a precaution).

