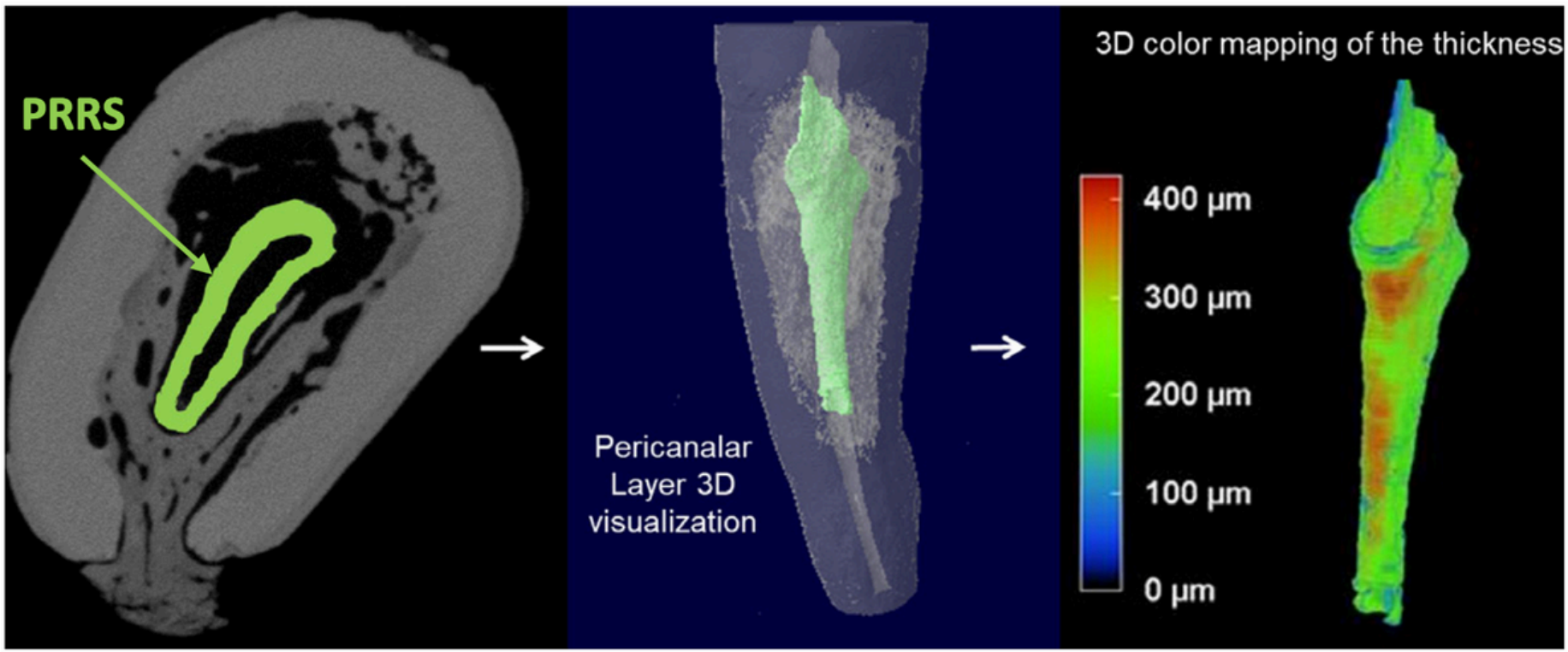
DANS LES CAS DE RÉSORPTIONS RADICULAIRES EXTERNES CERVICALES SUR DENT VIVANTE, UNE FINE COUCHE DE DENTINE PROTÈGE LA PULPE D'UNE PERFORATION : C'EST LA PRRS

ou pericanalar resorption-resistant sheet (que l'on pourrait traduire littéralement par feuillet péricanalaire résistant à la résorption) >>>

Dr Brice Riera
ENDODONTISTE

- **Couche/zone non uniforme dont l'épaisseur peut varier de 70 à 490 microns**



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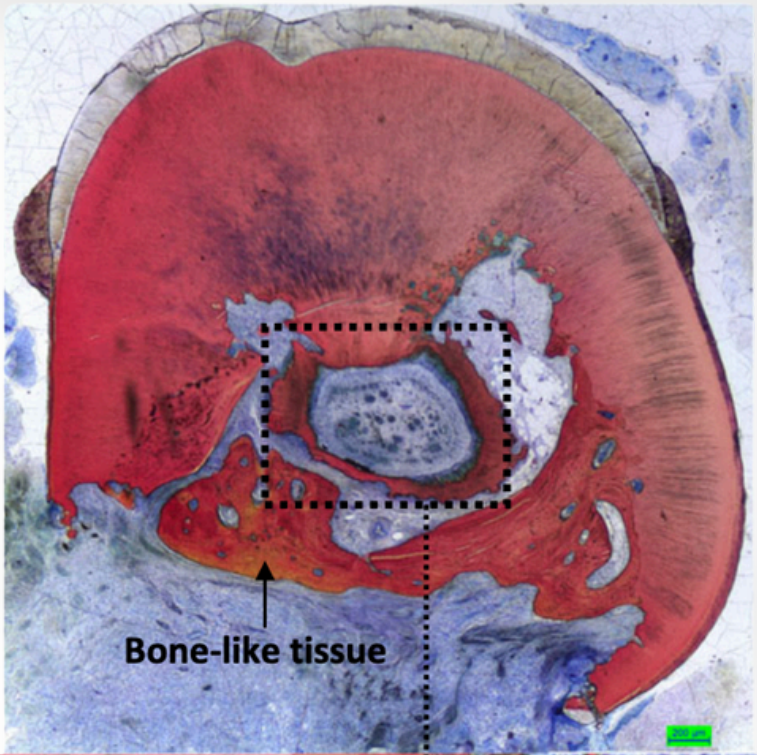
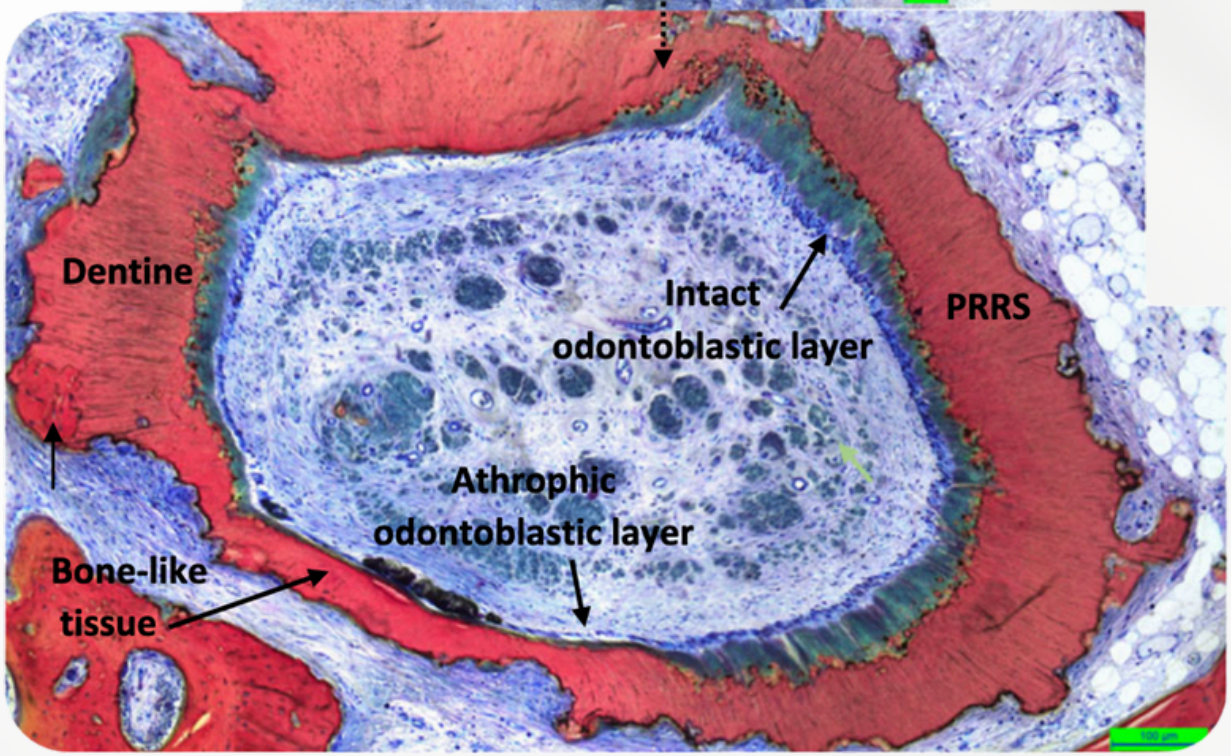


- Composée de prédentine, de dentine et éventuellement d'un tissu ressemblant à de l'os (bone-like tissue)
- La perforation pulpaire est possible
- Les odontoblastes autour peuvent être normaux ou atrophiques



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REVIEW

External cervical resorption-part 1: histopathology, distribution and presentation

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Abstract

Patel S, Mavridou AM, Lambrechts P, Saberi N. External cervical resorption-part 1: histopathology, distribution and presentation. *International Endodontic Journal*, **51**, 1205–1223, 2018.

External cervical resorption (ECR) is the loss of dental hard tissue as a result of odontoclastic action. It is a dynamic process that involves periodontal, dental and in later stages pulpal tissues. Over the last two decades, ECR has attracted increased interest; this is in part due to novel micro-CT and histopathological techniques for its assessment and also improved radiographic detection using CBCT. This literature review will cover the aetiology, potential predisposing factors, histopathology and diagnosis of ECR. Part 2 will cover the management of ECR.

Keywords: cone beam computed tomography, external cervical resorption, histology, nano-CT.

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Introduction

Root resorption is the loss of dental hard tissue (i.e. cementum, dentine and/or enamel) as a result of odontoclastic action (Patel *et al.* 2009a). Root resorption is desirable in primary teeth (physiological root resorption) as it facilitates their exfoliation, and subsequent eruption of the underlying permanent successor tooth. Root resorption in adult teeth is undesirable as it leads to irreversible damage, which may necessitate dental treatment, or even extraction.

Root resorption may be simply classified by its location on the root surface as *external* or *internal* resorption. External root resorption may be further subclassified into surface resorption, external inflammatory resorption, external cervical resorption, external replacement resorption and transient apical resorption (Patel & Pitt Ford 2007, Patel & Saberi 2018). External cervical resorption (ECR) usually manifests in the cervical aspect of teeth; it develops as a result of damage to, and/or deficiency of the periodontal ligament (PDL) (Andreasen & Andreasen 2007) and the subepithelial cementum.

External cervical resorption (ECR) is a dynamic process that involves periodontal, dental and in later stages pulpal tissues (Luso & Luder 2012, Mavridou *et al.* 2016a) and has attracted increased interest in the last two decades (Thönen *et al.* 2013, Mavridou *et al.* 2017a). This is due to a combination of improved radiographic detection with CBCT (Patel *et al.* 2007, 2009b, Durack *et al.* 2011), and novel micro-CT and histopathological assessment of ECR (Mavridou *et al.* 2016a,b, 2017b).

An electronic literature search was carried out and included the databases Medline (Ovid), PubMed and Embase. The cut-off date was set to October 2017. However, complementary searches were also carried out in November and December 2017. The searches used controlled vocabulary and free-text terms. These included the terms *'root resorption'*, *'tooth resorption'*, *'external cervical resorption'*, *'invasive cervical resorption'*, *'peripheral cervical resorption'*, *'extracanal invasive resorption'*, *'odontoclastoma'*, *'peripheral inflammatory*

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Understanding External Cervical Resorption in Vital Teeth

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Abstract

Introduction: The aim of this study was to investigate the 3-dimensional (3D) structure and the cellular and tissue characteristics of external cervical resorption (ECR) in vital teeth and to understand the phenomenon of ECR by combining histomorphological and radiographic findings. **Methods:** Twenty-seven cases of vital permanent teeth displaying ECR were investigated. ECR diagnosis was based on clinical and radiographic examination with cone-beam computed tomographic imaging. The extracted teeth were further analyzed by using nanofocus computed tomographic imaging, hard tissue histology, and scanning electron microscopy. **Results:** All examined teeth showed some common characteristics. Based on the clinical and experimental findings, a 3-stage mechanism of ECR was proposed. At the first stage (ie, the initiation stage), ECR was initiated at the cementum below the gingival epithelial attachment. At the second stage (ie, the resorption stage), the resorption invaded the tooth structure 3-dimensionally toward the pulp space. However, it did not penetrate the pulp space because of the presence of a pericanalar resorption-resistant sheet. This layer was observed to consist of predentin, dentin, and occasionally reparative mineralized (bonelike) tissue, having a fluctuating thickness averaging 210 μm. At the last advanced stage (ie, the repair stage), repair took place by an ingrowth and apposition of bonelike tissue into the resorption cavity. During the reparative stage, repair and remodeling phenomena evolve simultaneously, whereas both resorption and reparative stages progress in parallel at different areas of the tooth. **Conclusions:** ECR is a dynamic and complex condition that involves periodontal and endodontic tissues. Using clinical, histologic, radiographic, and scanning microscopic analysis, a better understanding of the evolution of ECR is possible. Based on the experimental findings, a 3-stage mechanism for the initiation and growth of ECR is proposed. (*J Endod 2016;42:1737–1751*)

Key Words

Cone-beam computed tomography, external cervical resorption, hypoxia, nanofocus computed tomography, reparative mineralized tissue

Significance

This work helps in exploring the evolving phenomena of ECR in vital teeth. By understanding the 3D nature and repair mechanisms, which are underestimated because of radiographic limitations and lack of know-how, a more adequate treatment decision will be achieved.

External cervical resorption (ECR) has attracted the interest of endodontists and dental clinicians because of its complex and invasive pattern (1, 2). This interest is confirmed by the amount of recently published articles in this field (3, 4). However, the majority of this research work focuses only on individual ECR case reports. Indeed, to date, only a few have attempted to thoroughly analyze the phenomena that occur during ECR (5–13). The first fundamental work was performed by Heithersay in which an extended report on ECR was introduced based on the combination of clinical, radiographic, epidemiological, and histopathological findings (6–10). This researcher observed that there are various degrees of ECR progression, indicating that this condition evolves in different stages. It should be mentioned that, in current clinical practice, the treatment and prognosis of ECR are still based on the classification proposed by Heithersay (14, 15). However, this classification has 2 main limitations:

1. This approach is only based on the 2-dimensional extent of the resorption. Indeed, the implementation of more recent *in vivo* and *ex vivo* techniques such as cone-beam computed tomographic scanning and nano–computed tomographic (CT) imaging, respectively, has provided new information on the 3-dimensional (3D) nature of this condition (16–18).
2. Heithersay's classification does not take into consideration the reparative nature of ECR. Recent reports revealed that ECR could be both destructive and reparative (16, 18).

The phenomena that occur during ECR are very complex (1). For example, during the initiation phase, the nature and structure of the portal(s) of entry (starting point of the resorption) can influence the progression of ECR (18). Furthermore, the pattern and types of cells involved during ECR progression and repair are still unclear (1). In addition, it is believed that the pulp tissue is not involved in ECR (1) and that resorption does not penetrate the pulp because of the presence of a resistant

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