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CASE REPORT/CASO CLINICO
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Mini-invasive nonsurgical treatment of class 4 invasive cervical resorption: a case series

Trattamento non chirurgico minimamente invasivo di riassorbimenti invasivi cervicali di classe 4: una case series

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PAROLE CHIAVE
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Abstract Invasive Cervical Resorption (ICR) is a pathological process that can lead to a progressive tooth destruction over time, as dentin is gradually replaced by granulomatous tissue. Unfortunately ICR is difficult to diagnose because it is often asymptomatic and can easily be mistaken for a carious lesion, especially in the early stages. According to the existing literature, class IV ICR treatment shows a success rate of 12.5% when the lesion affects more than one third of the root. In this paper we describe the conservative, nonsurgical approach we adopted in treating 5 cases of class IV ICR with the help of cone-beam computed tomography and operating microscope. Resorptions were filled with MTA in three cases and with Biodentine in two cases. The follow-up period ranged from 3 months to 2 years. All patients were found to be asymptomatic and check-up radiographic examinations did not show any signs of ICR relapse.

Riassunto Il riassorbimento invasivo cervicale (RIC) è un processo difficile da diagnosticare e che porta alla progressiva distruzione del dente con sostituzione di tessuto dentinale con un tessuto di granulazione. Questa patologia è difficile da diagnosticare perché è spesso asintomatica e negli stadi precoci assume un aspetto simile alla carie. La letteratura indica una percentuale di successo del 12,5% per il trattamento dei RIC di classe 4, in cui la lesione coinvolge la radice per più di un terzo. In questo articolo illustriamo un approccio conservativo e non chirurgico con cui sono stati

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trattati 5 casi di RIC di classe 4 grazie all'utilizzo della Cone Beam e del microscopio operatorio. I riassorbimenti sono stati riempiti con utilizzo di MTA in tre casi di Biodentine negli altri due. Il follow up varia da 2 anni a 3 mesi: tutti i pazienti sono asintomatici e le radiografie di controllo non mostrano segni di recidiva dei RIC.

Introduction

Invasive Cervical Resorption (IRC) is an inflammatory process which starts on the root surface at connective attachment level[34] and results in complete tooth destruction, since the hard dental tissue is progressively replaced by highly vascularized tissue.[14]

The causes of this process have not yet been identified, but in the meanwhile a greater incidence of ICR has been observed in association with trauma, orthodontic treatments, endodontic bleaching, surgical interventions, periodontal therapy and bruxism[14,15,27]

In 1999 Heithersay classified invasive cervical resorptions into four classes according to the extension of the defect[14]:

- Class 1 includes small resorptive lesions which are close to the cervical area and show shallow penetration into dentin;
- Class 2 includes well-defined resorptive lesions which have progressed up to the coronal pulp chamber, without extending into the radicular dentin;
- Class 3 includes resorptive lesions extending into the coronal third of the root;
- Class 4 (which is investigated in this case series) includes invasive resorptive lesions extending beyond the coronal third of the root.

ICR is rather difficult to diagnose, especially in the early stages of the disease, when the defect can be mistaken for a carious lesion on radiographs and no symptoms are present.

On traditional radiographs ICRs appear as radiolucent lesions which often show a bone-like appearance and differ from internal resorptions on account of the fact that it is possible to distinguish the contour of the root canal system which, on the contrary, vanishes in internal resorptions.[21]

Cone Beam Computed Tomography (CBCT) is a crucial tool for making a definitive ICR diagnosis, as it enables the detection of osteolytic processes starting from the cervical margin of the tooth and running parallel to the root system, without invading it. This would seem to depend on the fact that in the predentin layer there are enzymes able to prevent resorption from progression.[5,6,21,26,36,37]

ICR treatment consists in removing the granulomatous tissue and closing any communications with periodontium by resorting either to various sealing materials (such as glass ionomer cements, resin, amalgam, MTA) or to a surgical procedure.[1,8–10,17–19,25,38]

No doubt that Mineral Trioxide Aggregate (MTA) is the gold standard among the suitable materials to close communications with periodontium. It has been successfully used for this purpose and also for other ones ever since it was put on the market in 1999.[1,8,18,19,25,38]

Nevertheless a new silicate-based cement is available since 2009, Biodentine, which provides a range of applications comparable with MTA.

In the last two years researchers have been paying a lot of attention to Biodentine, so nowadays there is a large amount of literature showing that this cement has similar or even better features compared with MTA.[3,22,28,31]

As regards the prognosis, Heithersay points out that for class 1 and class 2 ICRs the success rate is 100%, whereas for class 3 ICR is 77%.

The success rate drops to 12.5% when it comes to class 4 ICR, so in this case Heithersay suggests to do nothing but wait until symptoms occur, or alternatively to extract the affected tooth.[16,17]

The aim of this case series it to propose a minimally invasive nonsurgical therapeutic approach based on the support of operating microscope and CBCT analysis and on the use of either Biodentine or MTA to treat class 4 ICRs.

Materials and methods

This case series, which includes an additional case and extends the follow-up period compared to the one published last year in the November issue of the Journal of Endodontics,[29] is about 5 ICR cases which were consecutively diagnosed in our practice between November 2013 and September 2015.

All the cases were treated according to the same protocol, as follows:

- presumptive diagnosis made on the basis of clinical and radiographic examination;
- definitive diagnosis was made with the help of CBCT analysis which provided precise information on the extension and progression of the resorption and showed a radiolucent lesion not invading the root canal system;
- in all cases a standard endodontic access was drilled using an operating microscope and then the cavity was shaped on the basis of information provided by CBCT analysis, in order to optimize visibility and to facilitate the access to the defect;
- the granulomatous tissue was removed by means of surgical microspoons, ultrasonic inserts with non-operating tips, long shaft burs mounted either on contrangle or on turbine, canal irrigants ultrasonically activated with Endoactivator (Dentsply);
- after reaching healthy tissue no longer bleeding under mechanical abrasion, 36 volumes hydrogen peroxide was used to induce ischaemia to the residual communications with periodontium and the defect was filled with MTA in three cases and Biodentine in two cases. In one case MTA was used to completely fill the canal from apex up to the coronal portion of the defect. The same was done using Biodentine in another case. In the other three cases the canal treatment was completed with Thermafil, 24 h after the first session when using MTA, which was left in touch with a cotton pellet moistened with a physiological solution;
- in four cases teeth were rehabilitated by simply performing composite restorations, whereas in one case a composite overlay was prepared.