

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/329875451>

Surgical treatment of a cemental tear-associated bony defect using hyaluronic acid and a resorbable collagen membrane. A two-year follow-up

Article · December 2018

DOI: 10.1002/cap.10053

CITATIONS

0

READS

63

3 authors, including:



Andrea Piloni

Sapienza University of Rome

53 PUBLICATIONS 604 CITATIONS

[SEE PROFILE](#)



Mariana Rojas

Sapienza University of Rome

15 PUBLICATIONS 5 CITATIONS

[SEE PROFILE](#)

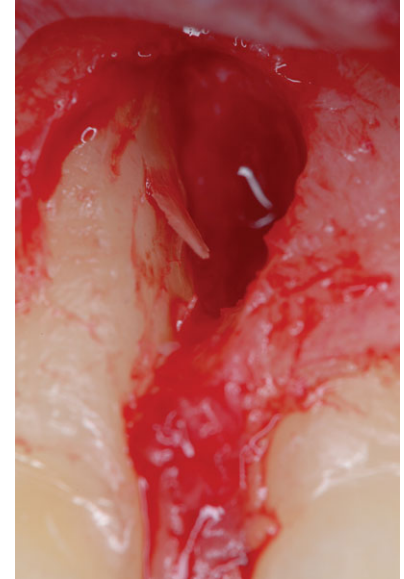
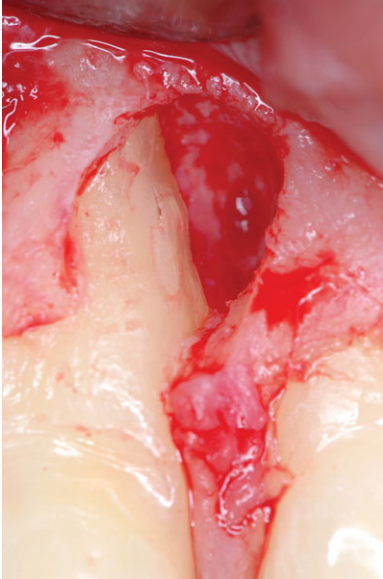
Some of the authors of this publication are also working on these related projects:



Alveolar dimensional changes [View project](#)

Surgical Treatment of a Cemental Tear-Associated Bony Defect Using Hyaluronic Acid and a Resorbable Collagen Membrane. A 2-Year Follow-Up

Andrea Pilloni,* Flavia Nardo* and Mariana A. Rojas*



Introduction: A cemental tear (CeT) is a special type of surface root fracture that may cause periodontal and even periapical tissue destruction. Unfortunately, there is limited knowledge as to how these rare cases can effectively be treated. The present case is the first reported in the literature treating a bony defect caused by a cemental tear with hyaluronic acid (HA) and a collagen membrane. The aim of this case report is to present a regenerative surgical approach with clinical and tomographic success and stability at 2-year follow-up.

Case Presentation: A 61-year-old patient presented with spontaneous pain and gingival swelling over his right central maxillary incisor. Radiographically, a radiolucent area was observed in the medial third between both central incisors. The tomographic evaluation showed a buccal bone dehiscence and a bony defect. Once the differential diagnosis with an endodontic-periodontal lesion and root fracture was performed, CeT was the presumptive diagnosis. During the exploratory flap surgery, a small root fragment (CeT) on the mesial side of the tooth was founded and removed. The bony lesion was treated with hyaluronic acid (HA) and a resorbable collagen membrane. At 2-year follow-up clinical, radiographic, and tomographic success was observed.

Conclusion: A CeT-associated bony defect could be successfully treated after removing cemental fragments and performing a regenerative approach using HA and a resorbable collagen membrane. *Clin Adv Periodontics* 2019;0:1–6.

Key Words: Cementum; osseous defects; periodontal regeneration; periodontal surgery.

Background

The cemental tear (CeT) has been described as a “complete separation along the cementodental border or a

partial split within the cemental tissues along an incremental line.”¹

The main clinical features of CeT are: increasing probing depth (PD), periapical and periodontal tissue breakdown, pain, gingival swelling, suppuration, and tooth mobility. The histological findings have shown adherent periodontal ligament fibers, cementum lamellae, and cementocytes.² Radiographically, it often presents as a periodontal lesion with vertical bone loss or periapical lesion.³ The differential diagnosis with periodontal

*Section of Periodontics, Department of Oral and Maxillofacial Sciences, “Sapienza” University of Rome, Rome, Italy

Received June 5, 2018; accepted October 8, 2018

doi: 10.1002/cap.10053



FIGURE 1 Presurgical view (frontal view). An erythematous and swollen area can be observed in the cervical and medial third of tooth #8.

disease, vertical root fracture, and endodontic-periodontal lesion is of fundamental importance.²

Although the etiology of this lesion is still unknown, possible predisposing factors have been reported: age (>60 years), sex (male), tooth vitality (vital teeth), tooth position (maxillary incisors), and occlusal trauma.^{3,4}

With regards to treatment, the main objective is to remove the source of pathology and to restore the structure and function of the affected periodontal tissues. Different approaches as scaling and root planing and/or periodontal surgery or endodontic treatment with apical surgery may be considered.²

Previous studies have been shown clinical and radiographic success after different surgical approaches using collagen membrane,⁵ bone graft,⁶ guided tissue regeneration,⁷ or enamel matrix derivate (EMD).⁸

The present case report is the first reported in the literature treating a bony lesion associated to a CeT with hyaluronic acid (HA) and a resorbable collagen membrane.

The aim of this case is to present the regenerative surgical approach with clinical and tomographic success and stability at the 2-year follow-up.

Clinical Presentation and Case Management

A healthy, non-smoking 61-year-old male patient was referred to the author's (AP) private practice in October 2015 for evaluation of the maxillary right central incisor.

The patient reported pain, discomfort, and swelling sensation at tooth #8. Clinical examination showed an erythematous area with swelling at the cervical and medial third of tooth (Figs. 1 and 2). PD was <4 mm in all sites. Bleeding on probing (BOP) and tooth mobility were absent. A radiolucency in the medial third between the two maxillary central incisors was observed in the periapical radiograph (Fig. 3). The differential diagnosis with an endodontic-periodontal lesion was confirmed with



FIGURE 2 The swollen at the cervical and medial third of tooth #8 can be observed.

the positive result of the pulp vitality test. To evaluate the presence of root fracture, we decided to perform a cone-beam computed tomography (CBCT). A buccal bone wall dehiscence and a bony defect were observed but a root fracture could not be detected (not shown). Considering that many of the predisposing CeT factors were present in the patient (male patient >60 years, pulp vitality and type of tooth) and the clinical and tomographic examination coincided in part with this type of lesion, our presumptive diagnosis was a CeT. Therefore, we proposed to the patient an exploratory surgery with a regenerative approach to treat the bony lesion and, in case of confirming our diagnosis, remove the cemental fragment.

After receiving written informed consent, the surgical procedure was performed.

A mucoperiosteal flap was elevated⁹ (Fig. 4) and, after removal of the granulation tissue, a bony lesion in the medial third of the tooth was observed (Fig. 5).

A partially detached piece of tooth structure—what appeared to be cementum (CeT)—noted on the mesial aspect of the central incisor was removed (Fig. 6) and the root surface was polished with a rubber cap. The latter was carefully observed at high magnification using an operative microscope (20×)[†] to rule out the possibility of root fracture.

The osseous defect was then treated with HA[‡] and protected with a porcine-pericardium resorbable membrane[§] (Figs. 7 and 8).

[†]A-Series™ Dental Microscope, Saint Louis, MO.

[‡]HyaDENT BG, Regedent, Bioscience, Germany.

[§]Smartbrane, Regedent, Bioscience, Germany.



FIGURE 3 Initial periapical radiograph showing a radiolucent area in the medial third between the two maxillary central incisors.

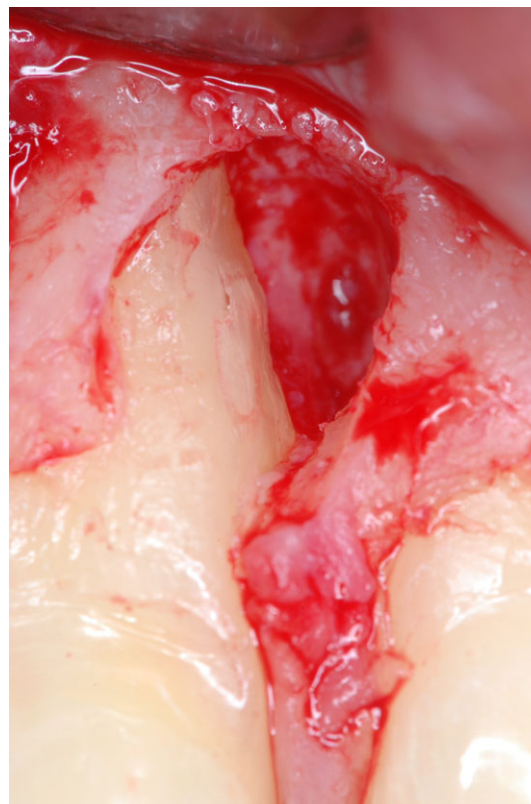


FIGURE 5 A two-wall bony defect was observed on the mesial aspect of the right maxillary central incisor.

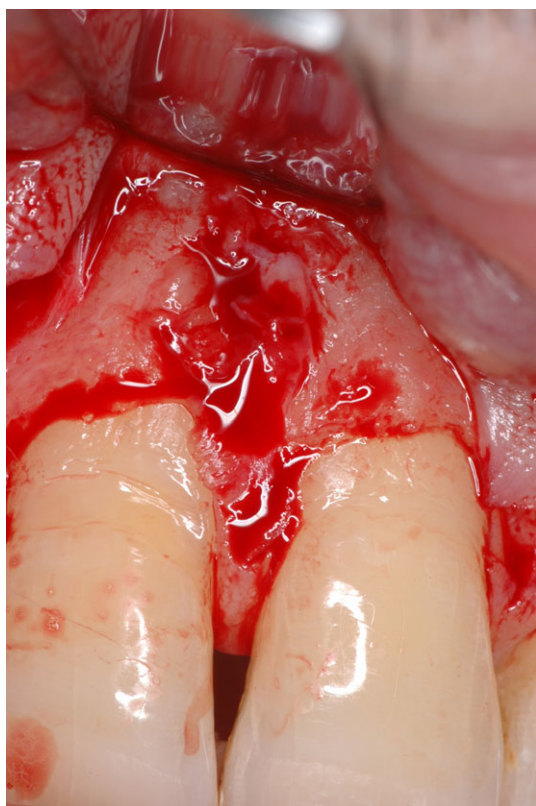


FIGURE 4 A mucoperiosteal buccal flap was elevated (modified preservation papilla technique = MPPT).⁹

The flap was coronally displaced and sling and interrupted sutures^{||} were performed to cover the CEJ.¹⁰ A frenotomy was made at the end of the surgical procedure to reduce flap tension (Fig. 9).

Postoperative instructions included ibuprofen 600 mg—at the end of the surgical procedure—and another tablet 6 hours later and amoxicillin twice daily for 1 week.

The patient was instructed to discontinue toothbrushing and a 60 second rinse with 0.12% chlorhexidine gluconate was prescribed TID for the first 2 weeks. Sutures were removed after 15 days and cleaning with a postsurgical soft toothbrush was indicated afterwards. Normal hygiene was resumed at 30 days. The patient was placed on a 3-month periodontal maintenance schedule.

Clinical Outcomes

Healing was uneventful. After 2 years, clinically healthy soft tissues were observed (Fig. 10) and the clinical examination of the tooth #8 revealed PD of 3 mm in all the sites. BOP and tooth mobility were absent. Radiographically, bone fill was observed (Fig. 11) and the CBCT showed buccal bone wall reconstruction (Fig. 12).

^{||}Prolene polypropylene 6-0. Ethicon, Johnson & Johnson, Somerville, NJ; Ethilon nylon 6-0. Ethicon, Johnson & Johnson, Somerville, NJ.

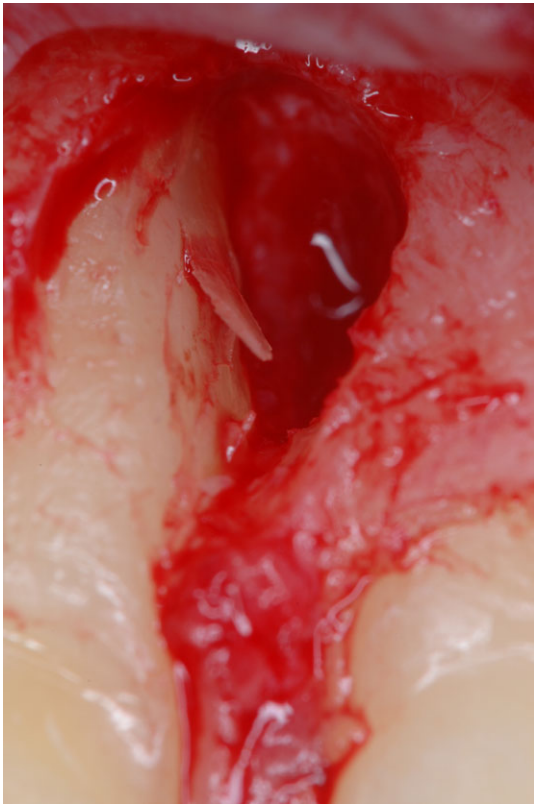


FIGURE 6 A partially detached piece of tooth structure—what appeared to be cementum (CeT)—was found on the mesial aspect of tooth #8.

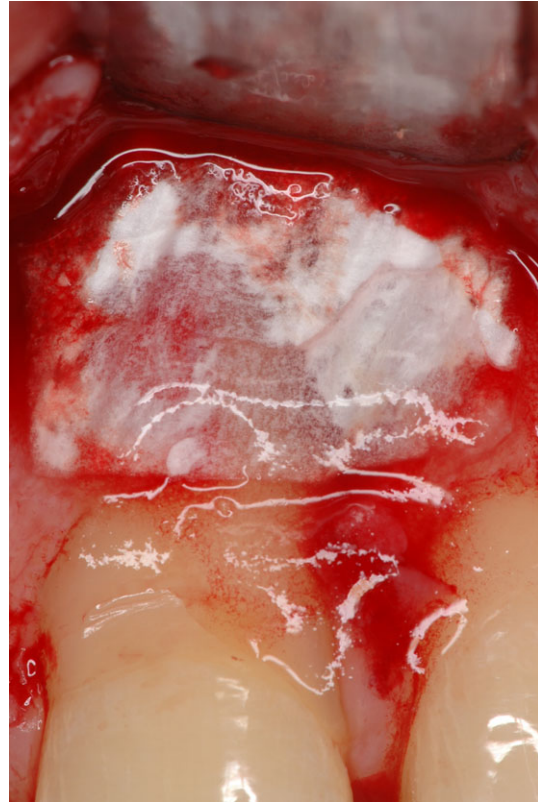


FIGURE 8 A resorbable collagen membrane was placed as barrier.

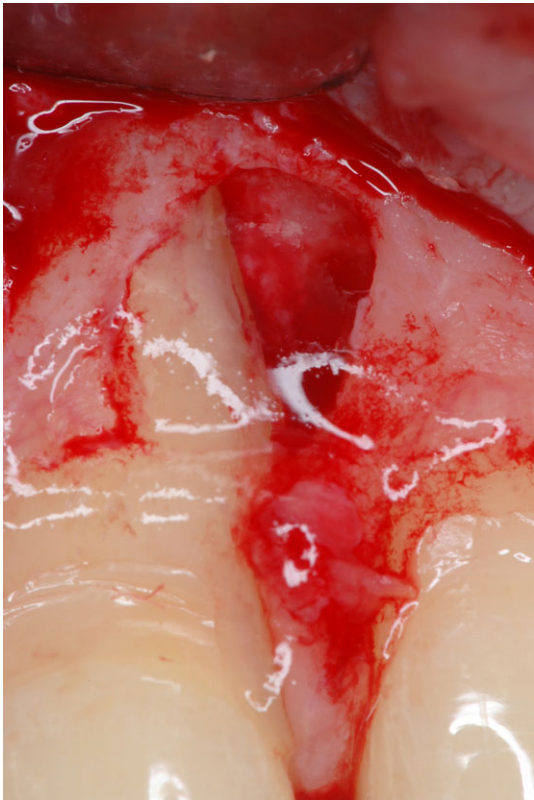


FIGURE 7 Hyaluronic acid was applied in the bony defect.

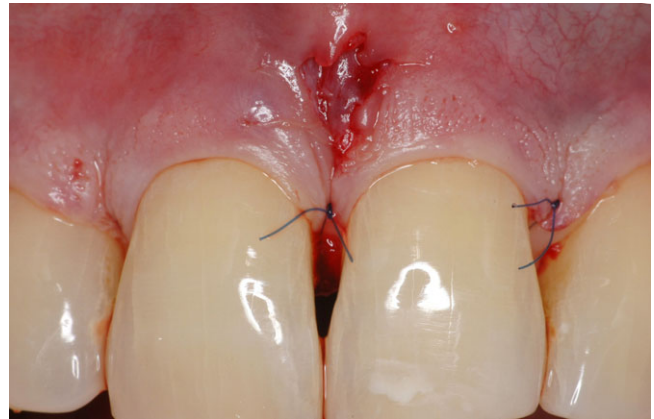


FIGURE 9 The flap was coronally displaced and sutured with sling and interrupted sutures.



FIGURE 10 Two-year follow-up showing clinically healthy soft tissue.



FIGURE 11 Two-year follow-up periapical radiograph showing osseous defect bone fill.

Discussion

The CeT diagnosis is always difficult and, at times, it is an underdiagnosed periodontal condition, originally described in the literature as an incidental histological finding from autopsy materials.¹⁻³

Several surgical treatments have been proposed to treat the osseous defects associated with CeT.⁵⁻⁸ The present case report is the first reported in the literature treating a CeT-associated bony defect with HA and a resorbable pericardium membrane. HA has demonstrated successful results when applied in intrabony defects¹¹ and guided bone regeneration procedures.¹² Moreover, clinical studies have shown the effectiveness of resorbable pericardium membranes in bone regeneration.¹³

It is important to highlight the fact that the attachment loss caused by CeT is not related to periodontal disease and cemental tissue is normally present. For this reason,

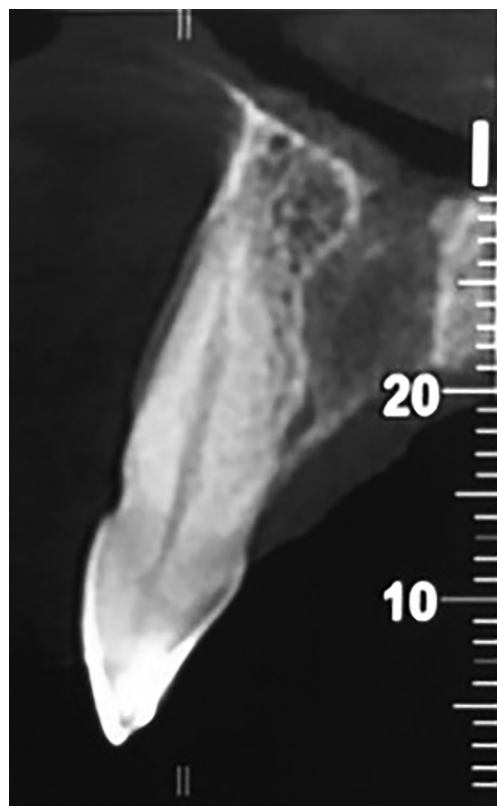


FIGURE 12 Two-year follow-up CBCT showing the reconstruction of the buccal bone wall.

we choose HA instead of EMD, to help the reconstruction of the defect and to improve the wound healing¹⁴ and; since the defect was wide and not containing, we decided to use a membrane to improve the stability of clot.¹⁵

Conclusions

CeTs are a localized tooth-related factor associated with attachment loss and, to date, pose a diagnostic challenge for the clinicians. Long-term successful treatment can be obtained with both surgical and non-surgical procedures, depending on the case. In the present clinical case, radiographic and tomographic 2-year follow-up success could be achieved after removing cemental fragments and performing a regenerative approach using HA and a resorbable collagen membrane. ■

Summary

Why are this case new information?	<ul style="list-style-type: none"> ■ The present case report is the first reported in the literature treating cemental tear-associated bony defect with hyaluronic acid and a collagen resorbable membrane with clinical and tomographic success and stability at 2-year follow-up.
What are the keys to successful management of these cases?	<ul style="list-style-type: none"> ■ Proper differential diagnosis with endodontic or root fracture etiology. ■ Complete removal of fractured cemental fragments. ■ Correct evaluation of osseous defect anatomy to select adequate surgical approach.
What are the primary limitations to success in these cases?	<ul style="list-style-type: none"> ■ Simultaneous severe infection/contamination of root surface. ■ Severe bone loss. ■ Patient's compliance.

Acknowledgment

The authors declare no conflict of interest concerning the contents of the study.

CORRESPONDENCE

Mariana A. Rojas, Section of Periodontics, Department of Oral and Maxillofacial Sciences, "Sapienza" University of Rome, #6, Via Caserta, Rome 00161, Italy. E-mail: rojasmarianaandrea@gmail.com

References

1. Leknes KN, Lie T, Selvig KA. Cemental tear: A risk factor in periodontal attachment loss. *J Periodontol* 1996;67:583-588.
2. Jeng PY, Luzi AL, Pitarch RM, Chang MC, Wu YH, Jeng JH. Cemental tear: To know what we have neglected in dental practice. *J Formos Med Assoc* 2018;117:261-267.
3. Lin HJ, Chan CP, Yang CY, et al. Cemental tear: Clinical characteristics and its predisposing factors. *J Endod* 2011;37:583-588.
4. Ishikawa I, Oda S, Hayashi J, Arakawa S. Cervical cemental tears in older patients with adult periodontitis. Case reports. *J Periodontol* 1996;67:15-20.
5. Muller HP. Cemental tear treated with guided tissue regeneration: A case report 3 years after initial treatment. *Quintessence Int* 1999;30:111-115.
6. Harrel SK, Wright JM. Treatment of periodontal destruction associated with a cemental tear using minimally invasive surgery. *J Periodontol* 2000;71:1761-1766.
7. Camargo PM, Pirih FQ, Wolinsky LE, Lekovic V, Kamrath H, White SN. Clinical repair of an osseous defect associated with a cemental tear: A case report. *Int J Periodontics Restorative Dent* 2003;23:79-85.
8. Schmidlin PR. Regenerative treatment of a cemental tear using enamel matrix derivate: A ten-years follow-up. *Open Dent J* 2012;6:148-152.
9. Cortellini P, Prato GP, Tonetti MS. The modified papilla preservation technique. A new surgical approach for interproximal regenerative procedures. *J Periodontol* 1995;66:261-266.
10. Pini Prato GP, Baldi C, Nieri M, et al. Coronally advanced flap: The post-surgical position of the gingival margin is an important factor for achieving complete root coverage. *J Periodontol* 2005;76:713-722.
11. Vanden Bogaerde L. Treatment of infra-bony periodontal defects with esterified hyaluronic acid: Clinical report of 19 consecutive lesions. *Int J Periodontics Restorative Dent* 2009;29:315-323.
12. Park JK, Yeom J, Oh EJ, et al. Guided bone regeneration by poly (lactic-co-glycolic acid) grafted hyaluronic acid bi-layer films for periodontal barrier applications. *Acta Biomater* 2009;5:3394-3403.
13. Jimbo R, Marin C, Witek L, et al. Bone morphometric evaluation around immediately placed implants covered with porcine-derived pericardium membrane: An experimental study in dogs. *Int J Biomater* 2012;2012:279167.
14. Dahiya P, Kamal R. Hyaluronic acid: A boon in periodontal therapy. *N Am J Med Sci* 2013;5:309-315.
15. Reynolds MA, Kao RT, Nares S, et al. Periodontal regeneration-intrabony defects: Practical applications from the AAP regeneration workshop. *J Periodontol* 2015;86:21-29.