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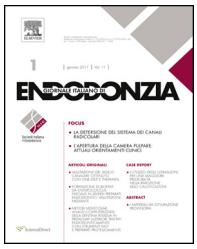

LITERATURE REVIEW/REVISIONE DELLA LETTERATURA

Modern technologies in Endodontics

Moderne tecnologie in Endodonzia

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KEYWORDS
Irrigation solutions;
Activation;
Microscope;
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Abstract
Aim: In Endodontics, a complete chemo-mechanical cleansing of the root canal system is essential to achieving success, which is gained through adequate tridimensional obturation of the endodontic space.
Materials and methods: Today, thanks to modern technologies as Operative Microscope, ultrasonic tips, M-Wire Files, devices to activate irrigation and tridimensional obturation performed with thermo plasticized gutta-percha, satisfactory results can be obtained.
Results: This study shows all the technologies that are available today to increase the chemo-mechanical cleansing and obturation of the entire and complicated endodontic system.
Conclusions: The positive results highlighted by these clinical cases demonstrate how the use of modern technologies are essential to avoid iatrogenic injury, and guarantee, on the other hand, safe and reproducible results.

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PAROLE CHIAVE
Soluzioni irriganti;
Attivazione;
Microscopio;
Punte ultrasoniche.

Riassunto
Obiettivo: In Endodonzia una completa detersione chemio-meccanica del complesso sistema dei canali radicolari è fondamentale per il raggiungimento del successo, il quale viene mantenuto attraverso un'adeguata otturazione tridimensionale dello spazio endodontico.
Materiali e metodi: Oggi, grazie alle moderne tecnologie, Microscopio Operatorio, Punte ultrasoniche, Files in lega M-Wire, dispositivi per l'attivazione degli irriganti e all'otturazione tridimensionale eseguita con guttaperca termoplasticizzata si possono ottenere risultati ben più che soddisfacenti.
Risultati: L'articolo che segue mette in risalto tutte le tecnologie che oggi abbiamo a disposizione per aumentare il grado di detersione chemio-meccanica e otturazione tridimensionale del complicato e intero sistema endodontico.
Conclusioni: Gli esiti positivi, evidenziati da questi casi clinici, dimostrano come l'utilizzo delle moderne tecnologie siano indispensabili nell'evitare danni iatrogeni e garantire, invece, risultati sicuri e riproducibili.

Introduction

The long-term success of endodontic treatment is closely linked to adequate cleansing, shaping and then to a complete tridimensional obturation of the complex root canal system.[1–3] Probably, a significant percentage of failures is caused by the presence of residual pulp tissue and to an insufficient cleansing of the roots canals.[4] The endodontic system is composed by spaces easily accessible to hand and rotary files (main canals) and, as demonstrated by many clinical and histological studies,[5,6] by not easily accessible or inaccessible spaces (isthmus, delta, loop, lateral and accessory canals and dentinal tubules) (Figs. 1 and 2).[7]

Root canal shaping is not able to reach all areas of the root canal system, regardless of the technique used; so not all sections of canal are treated.[8] For this reason it is necessary the endodontic biochemistry cleansing (accessible and not accessible spaces); once cleaned, it can be filled and obtured with gutta percha and cement during obturation.[9]

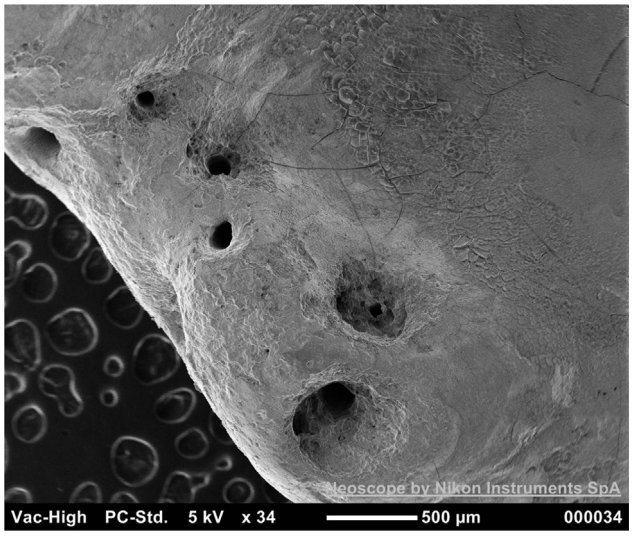

Figure 1 Root apex of the mesial root of a lower first molar at SEM: a lot of exits are shown.

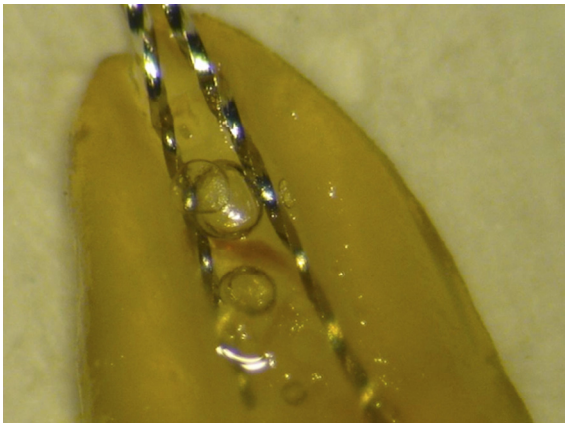

Figure 2 Diaphanization of a lower central incisor: an isthmus between the two root canals is shown.

The outcomes of current endodontic treatments are based on old working methods (operators without experience, treatments performed without the aid of the operating microscope, chemo-mechanical preparation performed with normal Ni-Ti files, use of irrigants without activation)[10,11];

In the endodontic treatment we can distinguish different phases:

(a) The pulp chamber opening, the most difficult phase in accordance with literature, because an error during this phase could compromise the treatment. The opening of the pulp chamber should be performed under constant magnification and lighting[4,12–16];
(b) The shaping phase with the new modified NiTi instruments[17–19];
(c) The cleansing phase, where irrigants are activated and enhanced[20–22];
(d) The obturation phase, where in addition to modern systems using thermoplastic gutta percha, new root canals filling materials are proposed.[23–27]

Of course, the treatment has to be concluded with an appropriate post-endodontic restoration.

After a careful analysis of the case that has to be treated, by X-ray and clinical examinations, it is possible to proceed with the endodontic treatment.