

Gheorghiu Irina-Maria¹, Perlea Paula², Mitran Loredana³, Iliescu A.A.⁴, Scarlatescu Sanziana², Suciuc Ioana², Mitran M.⁵

Dental lesions and restorative treatment in molars

¹ Department of Restorative Odontotherapy, Faculty of Dental Medicine, UMF “Carol Davila” Bucharest

² Department of Endodontics, Faculty of Dental Medicine, UMF “Carol Davila” Bucharest.

³ Department of Otorhinolaryngology, Elias Hospital

⁴ Department of Oral Rehabilitation, Faculty of Dental Medicine, UMF Craiova

⁵ Department of Obstetrics and Gynecology, Faculty of Medicine, UMF “Carol Davila” Bucharest.

Introduction

ABSTRACT

This article review specific clinical issues of the molar teeth, as well as the therapeutic approach of their pathology. The dental pathology we face in the group of molars is related to: dental caries, dental trauma (crown and crown-root fractures), dental wear phenomena. The therapeutic approach of the molar teeth is represented by: restoration of the loss of hard dental tissues; endodontic treatments of pulpal and periapical complications; surgical treatment. The restorative treatments in molars are: direct restorations, with or without supplementary anchorage for obturations; inlay, onlay; prosthetic crown.

Keywords: molar; dental caries; crown trauma; dental wear phenomena; coronal restoration

Paula Perlea

Faculty of Dental Medicine, UMF “Carol Davila” Bucharest
Calea Plevnei 17-23, Bucharest

email: paula.perlea@gmail.com

On each human dental arch there are six permanent molars. The molar teeth have the largest volume in the oral cavity and the best implantation because they are pluriradicular. Their morphological particularities (large crown, extended occlusal surface, the presence of a high number of cusps: 4-5 cusps) make them particularly involved in the masticatory function by the trituration of the food.

The first permanent molars erupt at the age of 6-7 years old, distal to the second deciduous molars. This moment marks the transition from the small child to the pupil and it is an important moment marking the transition to a new stage of life. Practically, with the eruption of the permanent first molar, the dentition begins to be replaced by that which will be permanent dentition.

The pathology of permanent molars

Permanent molars may be affected by:

- Dental caries
- Dental wear phenomena (attrition, abrasion, erosion)
- Dental trauma (crown fractures)

I. Dental caries

Permanent molars are among the teeth that are most affected by the **caries process** in the oral cavity. This is due to:

- the posterior position in the dental arches which makes them less visible and so the more difficult to a proper tooth brushing;
- crown morphology: molars have the contour and convexity with sharp relief: cusps, pits, ridges, grooves, which represent retention sites for dental plaque (especially the occlusal surfaces is very retentive) [1,2];
- food retentions are favored by proximity to temporary molars which are already affected by dental caries;
- special situation regards the first permanent molars: the young age at which they erupt on the dental arch makes them vulnerable to carious attack. It is known that among the permanent teeth the molars are the teeth that are most affected by the caries, the time they spend in the oral cavity being one of the determining factors in this respect [3];
- the lack of the medical information of the parents is also reported for the absence of the proper treatments of the dental caries on the molars; practically they do not know that the teeth that appear in the posterior distal area of the arches will remain permanently. Most of the time, parents attention is directed to the front group and the anterior area, and so unfortunately the children's education regarding the correct brushing of the posterior area is not a priority [4]. Uninformed parents think that these teeth "will disappear from the dental arch". We are often confronted at a dental appointment for their child, with the situation when the parents noticed for the first time the permanent teeth that appeared in the posterior area of the arcades, they didn't know about the existence of these molars in the oral cavity;
- in many situations the children (the molars erupt at 6, 12 and 18 years old respectively) do not rigorously perform the brushing in the posterior areas. Being teenagers, they cannot be easily controlled by parents about oral hygiene, but they are not

conscientious enough to be rigorous in their actions. Daily brushing is often brief and it summarizes to the front teeth.

By their own morphological and topographical characteristics, and also because of these general conditions, permanent molars are the first teeth to be affected by the dental caries in childhood [5,6,].

Figure 1 - Dental caries located on distal surface of first mandibular molar

II. Dental wear phenomena in molars [occlusal surfaceswear]

The loss of enamel and dentin as a result of worn and dental erosion phenomena are very important in permanent molar teeth. The term dental wear includes different entities: attrition, abrasion and erosion [7,8]. We frequently encounter abrasive lesions, especially on the occlusal surface and less abfraction lesions in molars.

The occlusal face abrasion phenomenon is a result of the intense participation in mastication function or even of the presence of parafunctional activities as bruxism.

III. Dental trauma

Throughout their existence in the oral cavity, the molars may be affected by the loss of dental tissues by **dental trauma**. These may occur in molars during mastication when the resistance of the dental crowns has been affected by the previous loss of hard substance or improper restorations. Practically, the action of occlusal forces determines the fracture of one or more coronary walls. Sometimes, this fracture is a crown-root fracture and the tooth is completely compromised. Another type of molar dental trauma occurs when major accidents involving jaw bone fractures occur, with obvious traumatic damage of the soft tissues and of the teeth in that area.

Regardless of the cause of the lack of dental hard substance, subsequent pulp complications may occur, requiring endodontic treatments.

The pathological entities that are unfortunately frequently found in molar therapy are: acute and chronic pulpitis and ultimately, when periapical territory is involved, acute and chronic apical periodontitis. It is a known fact that simple and complicated dental caries therapy in molars has a much higher incidence in dental treatments than in the front group. In adulthood, practically the most dental restorations are realized on the lateral area that is most affected [9].

The therapeutic approach of the molar teeth is represented by:

- Restoration of the loss of hard dental tissues regardless of its etiology (caries or non-caries lesions). The restoration of morpho-functional integrity of the molar crowns is accomplished by: coronal obturation, inlay, onlay or prosthetics crowns;
- Endodontic treatments of pulpal and periapical complications;
- Surgical treatment (teeth extraction) when the tooth is irrecoverable

The restorative treatments in molars are unfortunately conditioned by the posterior position of

these teeth on the dental arches.

The odontal restorations in the posterior area are currently subject to the aesthetic requirements of patients almost to the same extent as the need to restore the masticatory function. Practically, the entire spectrum of modern restorative materials used in dentistry must possess excellent mechanical properties. Composite resins, glass ionomer cements, and modern combined materials as compomers, giomers, ormocers have improved fracture and abrasion resistance and also aesthetic properties in the same time: color stability, availability in a large number of shades.

The forces exerted on the teeth during dento-maxillary functions, especially in mastication, are even bigger as they are located in the posterior part of the dental arch. Restoring functionality using direct or indirect restorations to meet these occlusal challenges is predominant [10,11,12], _____

Figure 2 - Direct resin composite restoration of a mesial dental caries in first maxillary molar with recurrent caries

In the clinical situations when the loss of hard dental tissues is very important, different types of supplementary anchorage for obturations can be used:

- cemented or self-threaded pin-retained restorations
- metallic posts armed obturations
- quartz, carbon or glass fiber posts armed obturations [13]

Another way to restore dental morphology uses inlay or onlay, depending on the missing quantity of tooth structure. They can be: metallic, composite-resin or ceramic and are cemented on the

prepared tooth. The micro-prosthesis restore coronal integrity more accurately and more sustainably than direct obturations if specific conditions are fulfilled: the correct preparation of the tooth, the prosthetic restoration perfectly adapts to the cavity and the cementation is realized according to specific protocols. In this way, a much more accurate restoration of the proximal contact areas and marginal sealing of the

Prosthetic restoration of molar crown integrity takes its place when massive destruction no longer allows restoration by simple or armed obturation. Most of the time, the loss of dental structure tissue is so extended that only the tooth root is present on the dental arch. In these situations, endodontic treatment is required, followed by prosthetic restoration using root posts and prosthetic crown like: all-metal crown, all ceramic crown, total metal-ceramic crown, ceramic crown on zirconium. In the situation of massive dental crown destruction resulting from the slow evolution of chronic dental caries, we are often confronted with the problems related to the vertical space needed for a correct insertion of the restoration. The antagonist tooth migrates vertically thus reduces the space between them and the inter-cuspal relations are modified. This condition also appears when an incorrect restoration was realized without respect for occlusal morphology and the occlusal normal contacts [15]. The design and insertion of a proper restoration is unfortunately very difficult and often complex procedures may be required to create an adequate vertical space: enameloplasty or coronary amputation have to be performed on the antagonist tooth in order to correct the occlusal plane and permit the insertion of the prosthesis restoration. These procedures involve not only high cost, but more than that, sacrifice of dental health tissues. There are situations when even such dental procedures cannot improve the clinical situation.

Figure 3 - Inlay ceramic and crown preparation

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Figure 4 - Crown preparation for ceramic inlay

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