seats also had significantly better posture than those using conventional seats.

A within-subjects study used a device to assess the spinal posture of a convenient sample of dentists and dental students performing in a simulated setting. The device measured spinal deviation from neutral for the lumbar spine sitting posture, but did not consider the upper limbs or neck. Dentists seated in saddle seats adopted a more favorable posture than those in conventional seats. The latter had a more flexed and deviant from neutral spinal posture than those using the saddle seats.

Combination of Loupes and Saddle Seats

When the postures of 3 groups of dental students on a saddle seat, a conventional seat with a backrest, or a conventional seat without a backrest and using or not using loupes were compared, all 3 groups had better posture when they used magnification. The best posture was achieved when the students used the saddle seat along with the magnification loupes, with differences between and among the study groups all highly statistically significant.

DISCUSSION

Not only does the use of a saddle seat help dental professionals to adopt a more ergonomic posture, but the use of magnification loupes also appears to reduce awkward positioning and improve visualization. The best results were obtained when the saddle seat was combined with the use of loupes to increase visual acuity and avoid unhealthy back postures.

Clinical Significance

Although the saddle seats were shown to improve posture, these studies did not address whether or not they diminished the dental professional's musculoskeletal pain or MSD. Future research should address this question. It is helpful to know that magnification loupes not only improve posture but may also help to relieve shoulder pain. Using both of these ergonomic aids provides the best relief of pain and should be adopted as the best way to guard against musculoskeletal pain among dental professionals. Because such pain can begin during dental training, the use of these aids should be taught and incorporated into the education of future dentists.

Plessas A, Delgado MB: The role of ergonomic saddle seats and magnification loupes in the prevention of musculoskeletal disorders. A systematic review. *Int J Dent Hygiene* 16:430-440, 2018

Reprints available from A Plessas, Plymouth Univ, Plymouth, UK; e-mail: anastasios.plessas@plymouth.ac.uk

HYPOMINERALIZATION

Molar-incisor hypomineralization

BACKGROUND

Molar-incisor hypomineralization (MIH) is currently understood to be a developmental, qualitative enamel defect caused by a reduction in mineralization and inorganic enamel components. The result is discolored enamel and fractures. These defects can be found in any primary or permanent tooth. Dentists tend to have difficulty diagnosing and managing children with MIH, so the essential data needed were outlined.

PREVALENCE AND ETIOLOGY

The prevalence of MIH ranges from 2.8% to 40.2%. It is believed that this condition affects 1 in 6 children worldwide.

The cause of MIH remains elusive, but its clinical presentation, which includes both localized and asymmetrical lesions, suggests that the origin is systemic and includes the disruption of amelogenesis during the early maturation state or earlier. Generally, the cause is considered multifactorial, such as acute or chronic illnesses or exposure to environmental pollutants during the final trimester of pregnancy and the first 3 years of life. Number of teeth affected is associated with the timing of the disturbance, with more teeth affected with later exposures. In addition, a genetic component may contribute and interact with the systemic factors.

DIAGNOSIS

Ideally, MIH will be diagnosed as soon as it is clinical apparent in the primary or permanent dentition. The dentist should conduct the examination on clean wet teeth. If clinical signs exist, the dentist should inquire about any illness that occurred during the child's early development or first 3 years of life.

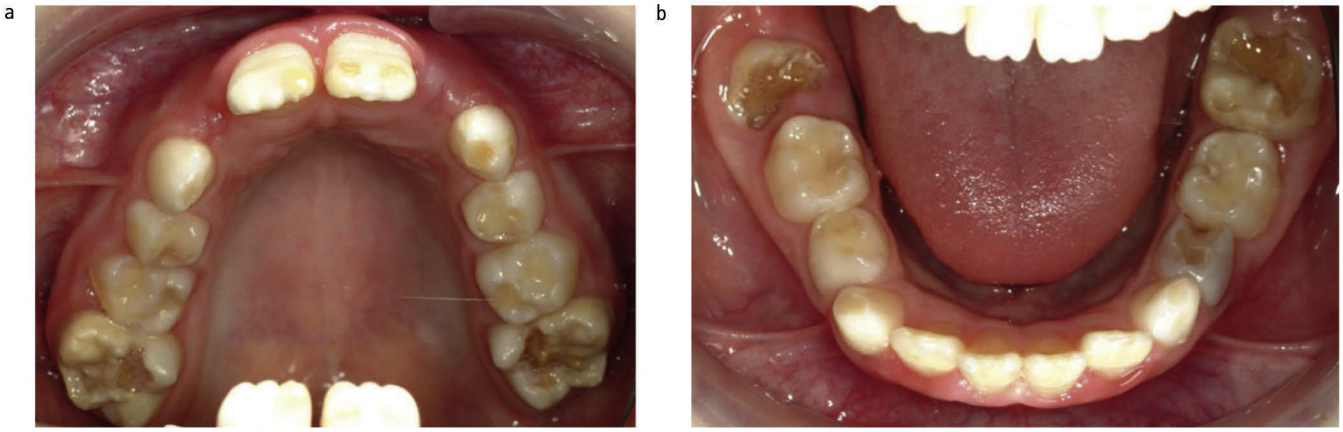

Figure 5. Patient with severe MIH affecting all FPMs and causing atypical caries and post-eruptive enamel breakdown. (Courtesy of Almuallem Z, Busuttil-Naudi A: Molar incisor hypomineralisation (MIH)—an overview. *Br Dent J* 225:601-609, 2018.)

Three levels of severity have been identified: mild, moderate, or severe.

The demarcated defects seen on molars and incisors in MIH may also appear on other teeth, such as second primary molars and tips of permanent canine cusps (Figures 5 and 6). About half of the first permanent molars (FPMs) with MIH are associated with hypomineralized second primary molars (HSPMs). As a result, HSPM can be a predictor for MIH, indicating a need for monitoring, but absence of HSPM does not rule out MIH. MIH and hypomineralized permanent canines have also been found.

The differential diagnosis must consider a number of conditions. These include fluorosis, enamel hypoplasia, amelogenesis imperfecta, white spot lesion, and traumatic hypomineralization.

Unlike other types of enamel defects in MIH the hypomineralization begins at the amelodentinal junction rather than at the surface of the enamel. While in mild MIH the hypomineralization just involves the inner enamel, in severe MIH the entire enamel layer is hypomineralized. The affected enamel has 20% less mineral concentration than normal enamel and a 3- to 15-fold higher protein content.

MIH patients can suffer several clinical problems. The most common are post-eruptive enamel breakdown, which leads to dentin exposure; tooth sensitivity; local anesthesia problems; behavioral management problems, including dental fear and anxiety related to the pain patients experience in multiple treatments; esthetic problems in the anterior teeth; tooth loss; occasional eruption difficulties for molars; negative impact on school performance; and financial concerns.

MANAGEMENT

More effective and more conservative management can be planned by identifying patients at risk and making an early

Figure 6. Demarcated opacities at both upper central incisors. (Courtesy of Almuallem Z, Busuttil-Naudi A: Molar incisor hypomineralisation (MIH)—an overview. *Br Dent J* 225:601-609, 2018.)

diagnosis. Those at risk tend to be children with poor general health during early childhood or those with HSPM(s). Currently no guidelines exist for the management of MIH. A treatment need index for MIH (MIH TNI) has been developed that is not only based on the extent of tooth structure destruction but also on the possibility of hypersensitivity. The 6 measurements for index reference are maxillary right, maxillary front, maxillary left, and the same for the mandible.

Various management and treatment options have been developed based on the current literature, as follows:

1. Enhanced prevention, remineralization, and sensitivity management
2. Local anesthesia
3. Specific to molars, care can include resin infiltration, restorations, full or partial coverage crowns, and the extraction of severely affected molars
4. Specific to incisors, care can include microabrasion, tooth bleaching, use of the etch-bleach-seal technique, resin infiltration, composite restorations or veneers, and the placement of porcelain veneers.

DISCUSSION

Once children at risk for MIH have been identified, they should be monitored during FPM eruption. If MIH develops, the management options should consider the long-term prognosis of the dentition as well as the presenting features. The most conservative esthetic management possible is the best choice, with the extent of treatment depending on the age of the child, his or her esthetic concerns, and the severity of the lesions.

Clinical Significance

Primary dental care is the most appropriate time for dentists to diagnose children who have MIH. Management should begin immediately. Among the options is referral to a dental teaching hospital or service. Because of the prevalence of the problem, routine management should not be handled through a specialist. The most conservative approaches likely include remineralization and resin infiltration techniques, but the most appropriate technique and protocol remain to be determined.

Almuallem Z, Busuttil-Naudi A: Molar incisor hypomineralisation (MIH)—an overview. *Br Dent J* 225:601-609, 2018

Reprints available from Z Almuallem, East Riyadh Specialized Dental Ctr, Paediatric Dental Dept, Riyadh, Riyadh 13226, Saudi Arabia; e-mail: zahraalmuallem@yahoo.com