Molar Substitution

Teeth Affected by Molar Incisor Hypomineralization

What is Molar-Incisor Hypomineralization (MIH)?

A tooth affected by MIH will usually demonstrate a normal shape, but with reduced mineral content that appears white-cream to yellow-brown in color in the enamel. Most of our discussion will revolve around molars, though some of the principles are applicable to the anterior teeth affected by MIH.

So, the brown stuff, what is it?

Malformed enamel with much lower Calcium and Phosphate concentrations and a much higher Carbon concentration (largely in the form of additional proteins not found in healthy enamel) specifically protein that is not found in normal enamel (specifically Serum Albumin, Type I Collagen, Ameloblasin, Alpha1-antitrypsin, Anti Thrombin III). These proteins actually inhibit hydroxyapatite crystal growth and enzymatic activity during enamel formation.

Is MIH something that was caused by something I did, or failed to do, for my child?

No it is not. The defective enamel development is believed to occur at some point during the first 3-4 years of a child's life. Though it is difficult to identify the specific cause in each case, research suggests a number of possible association between MIH affected teeth and a systemic insult to the body during these first years: premature birth, low birth weight, systemic infection of the child, high fever, seizures, antibiotics, trauma or infection to a primary tooth, genetics, etc.).

So then, is the MIH tooth softer than normal teeth?

Kind of. At least the malformed brownish/yellowish portion of the tooth *is* softer than normal enamel due to its lower mineral content; mineral that for some reason is replaced by protein.

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Why is the MIH affected tooth so sensitive/painful?

This modified brownish/yellowish molar ***typically has 300% more nerve endings***, and in the case of symptomatic MIH molars, have considerably larger diameter blood vessels than normal molars. Because of this, they can be extremely sensitive to hot, cold, sweet, chewing on hard/crunchy foods and even to toothbrushing pressures. Also, this affected mineral structure can lead to chronic stimulation of the pulpal tissue, resulting in it being very difficult to numb this type of tooth if it requires a filling or a crown. The compromised mineral structure places a tooth with MIH at higher risk than normal molars to develop decay and to fracture or break. 3-25% of children have at least one molar affected by HP.

So, Do We Need To Fix These Teeth, and if Yes, How?

Yes, usually. The goal in most cases is to do so as soon as we can. According to one study, children with hypomineralized teeth underwent dental treatment 10 times more often than children without hypomineralized teeth. Keeping in mind, the goal is for successful treatment to be achieved. Success = absence for need of retreatment. Treatment planning options for MIH affected molars include:

1) Monitor an otherwise asymptomatic tooth, rendering no treatment at this time
2) Treat affected molars with Silver Diamine Fluoride (SDF), a short-term option that might be able to offer relief from sensitivity/pain, buying time until definitive treatment can be completed
3) If the cavity is small, restore the tooth with a white filling
4) If a larger cavity of the tooth is fractured and asymptomatic (no pain), restore molar with an orthodontic band and a protective biting surface white filling
5) If a larger cavity or the tooth is fractured, restore a molar with a full coverage crown (usually stainless steel crowns initially because they are durable and can last for many years, and then later in life these SSC's can be replaced by a general dentist with a more esthetic, full-coverage white crowns)
6) If the molar has poor prognosis or is unrestorable, after an orthodontic evaluation and additional imaging, extract the molar(s) with the goal of molar substitution

What is Molar Substitution of Malformed First Permanent Molars (FPM)?

It is the planned and timed removal of permanent (adult) molars due to significant hypomineralization, MIH, Caries (Cavities) or Dental Abscess, with the intention of allowing the next set of permanent molars to erupt into the place of the extracted molars. See the images below as a reference case:

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Notice the yellow X's showing adult teeth that were removed when the child was 8 years old.

You can see that 4 years post-extraction the permanent second molars had come in and replaced the extracted permanent first molars.

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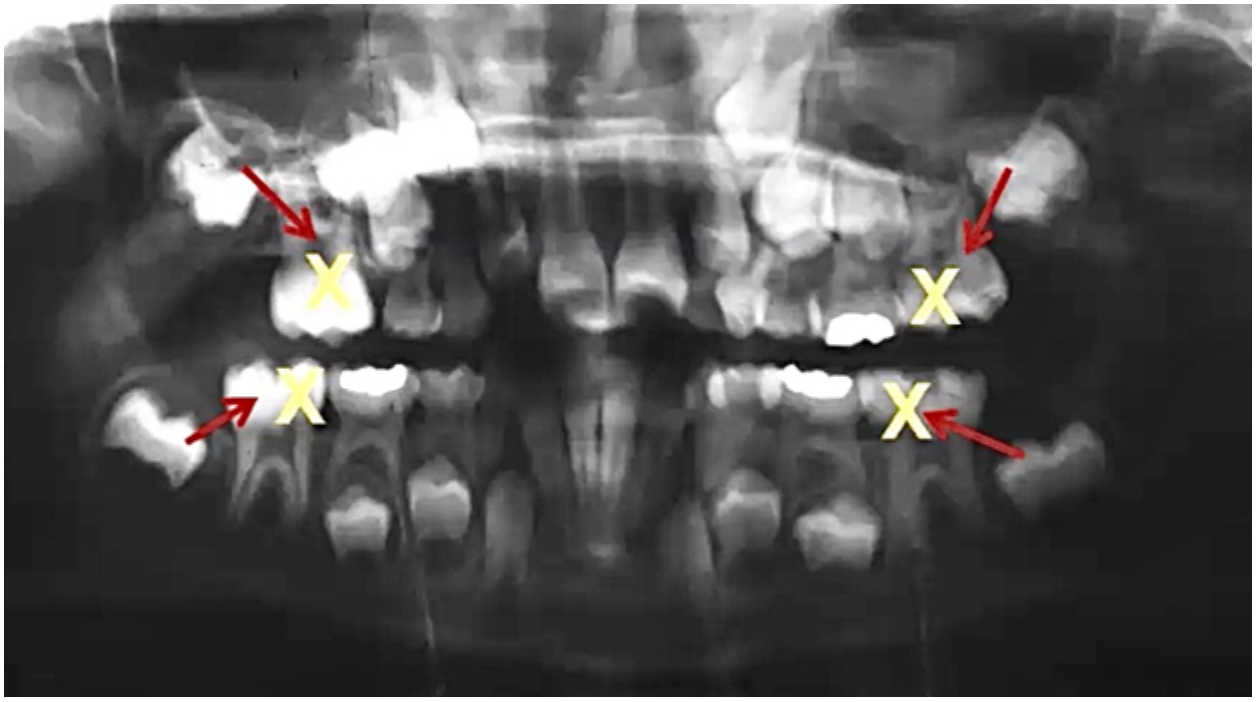

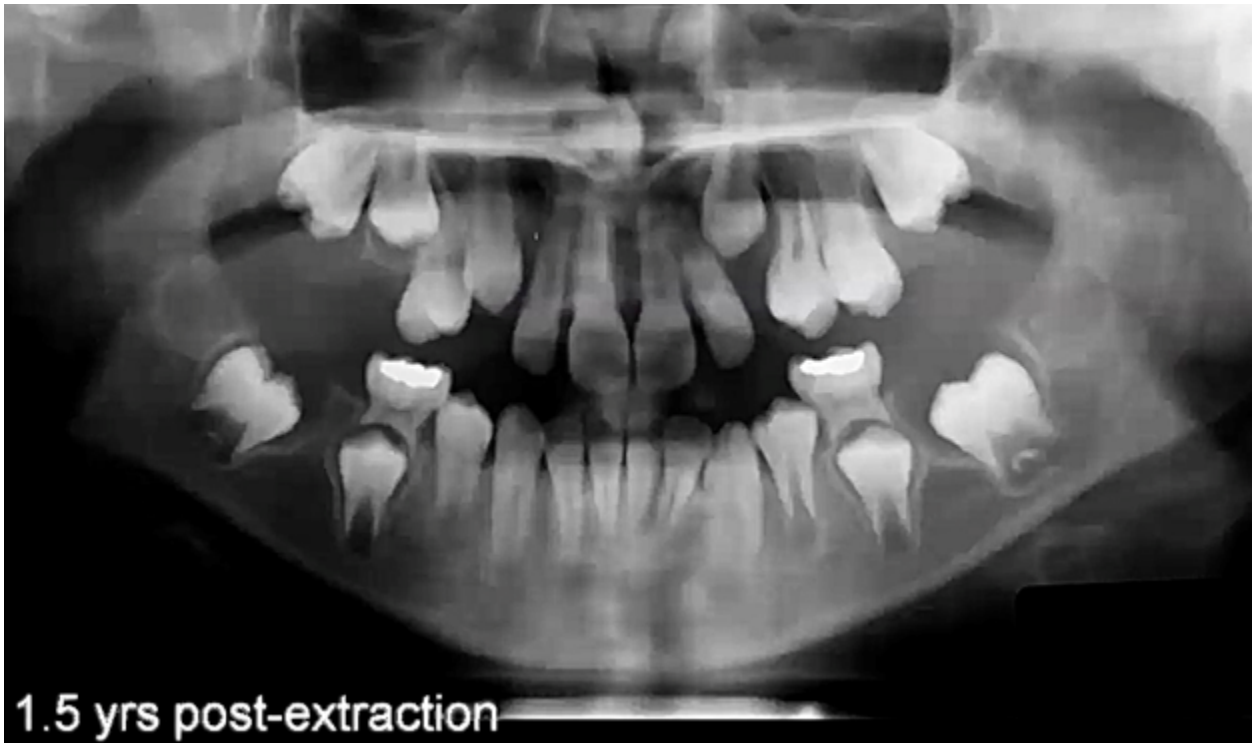

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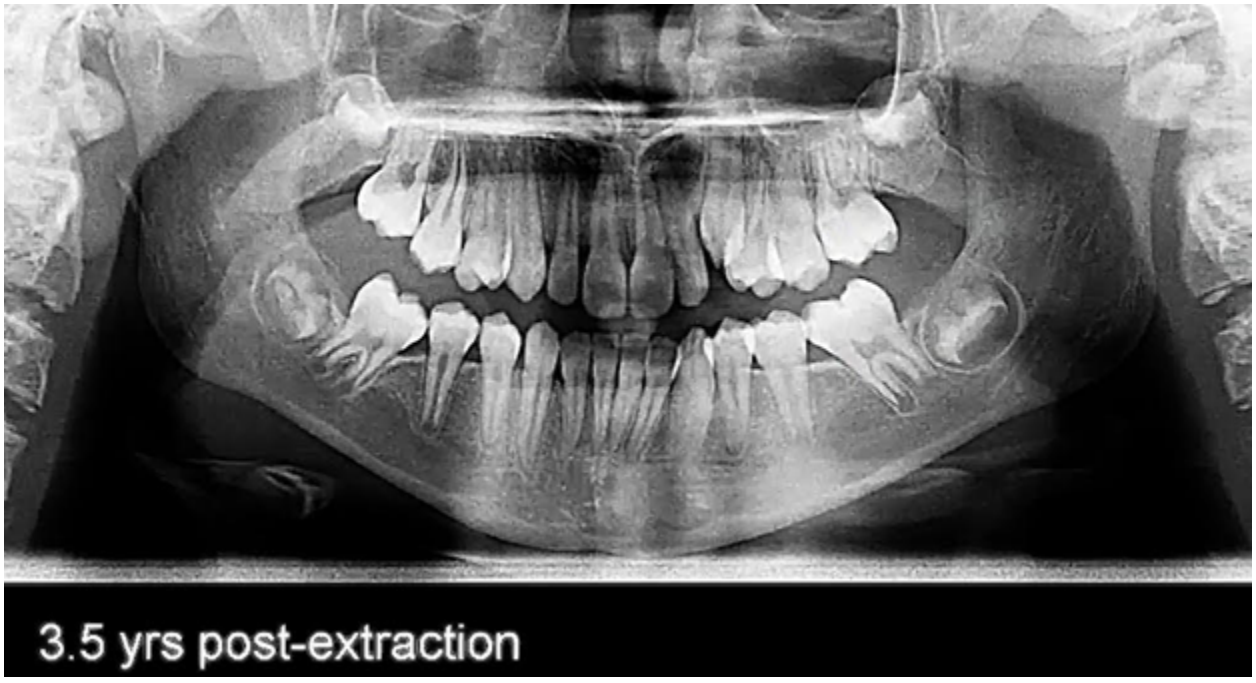

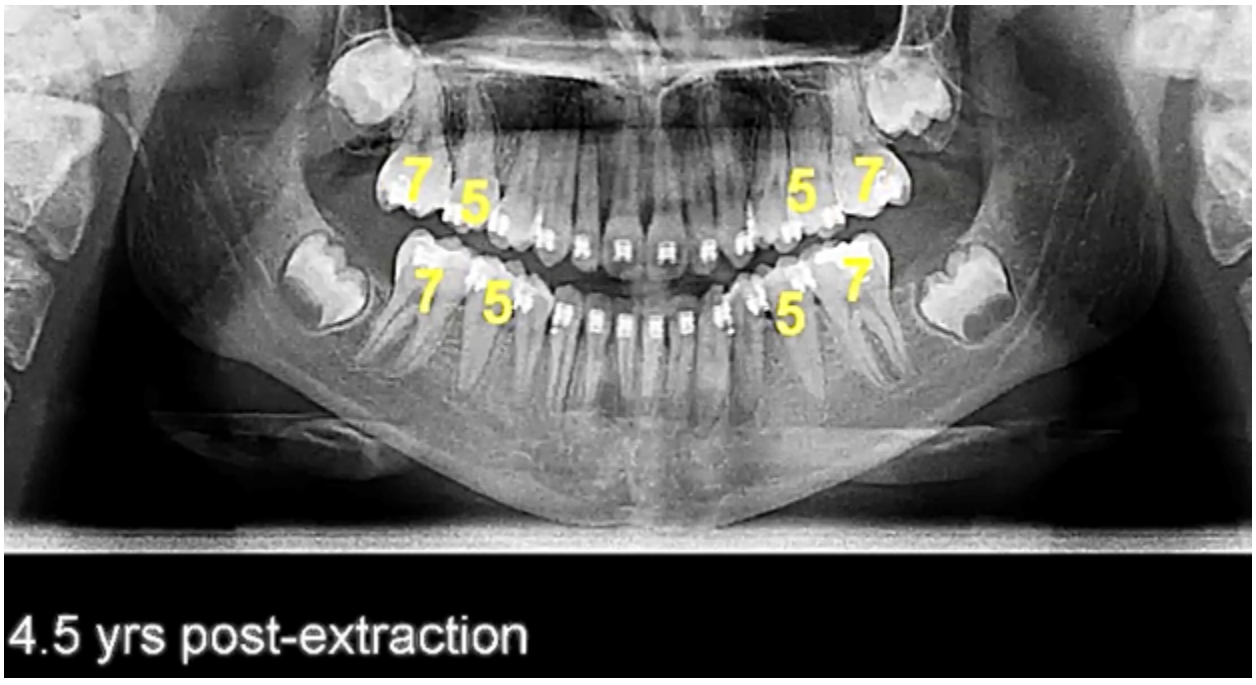

The #7 in the images above represents the second permanent molars (the first permanent molars, represented by the #6, are missing from these images).

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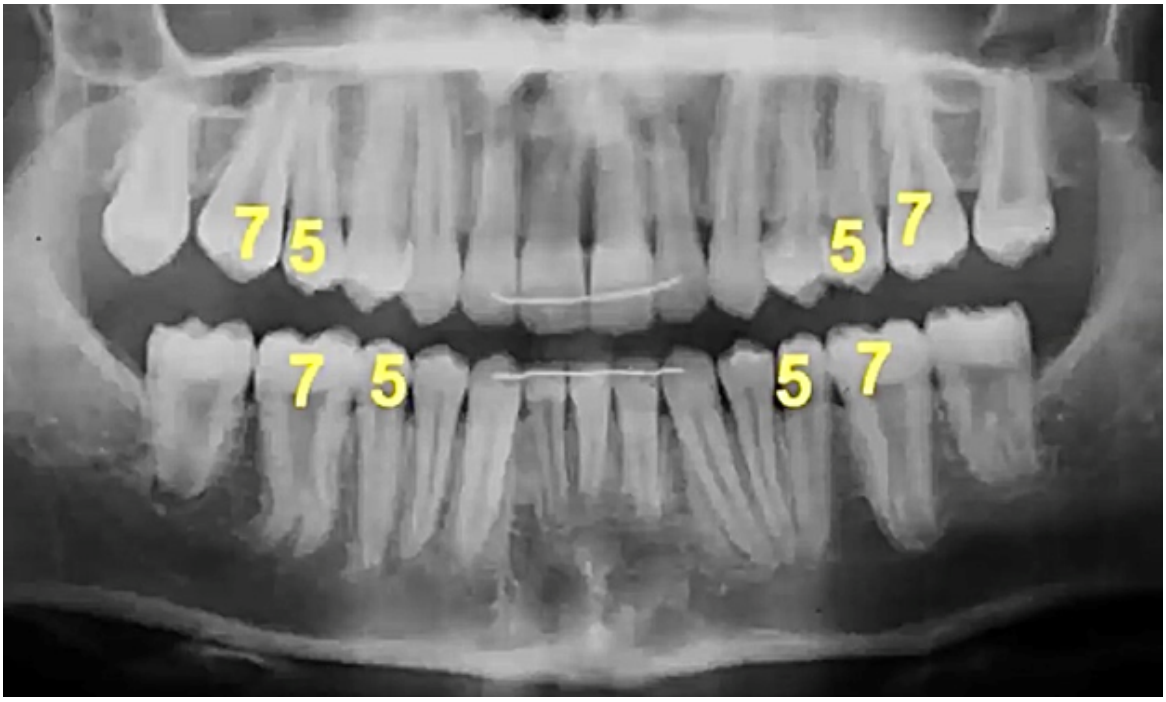

Here you have the stable final dentition, with the third permanent molars (wisdom teeth) having a place to erupt naturally, never needing to be extracted.

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