Dental Enamel Hypoplasias Being Used as Markers to Identify Undocumented Migrants

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She/Her/Hers

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Background

Since 2014, there has been a 44% increase of migrant deaths at the southern border of the United States (International Office of Migration 2019). The leading cause for these deaths is the adoption of the "Prevention through Deterrence" policy, which funnels migrants into more treacherous terrains. These dangerous terrains have led to increasing deaths, which means bodies that need to be identified. Forensic anthropologists face a major problem when identifying whether an individual is an undocumented migrant or an American born citizen while trying to properly repatriate remains. Many migrants' remains that were identified at the Pima County Office of the Medical Examiners (PCOME) show skeletal indicators of stress such as Dental Enamel Hypoplasias (DEH), which can help during the identification process. Biological anthropologist Dr. Jared Beatrice conducted a study that indicates the presence of DEH is 3 times more frequent amongst the undocumented migrant population. It is suspected that DEH correlates with health disparities during childhood, and it was also noted that these features were rarely

visible in non-migrant remains at PCOME (Beatrice et al. 2016). Dental Enamel Hypoplasias can be useful markers in the identification process, but it is important to understand that these markers are not indicative of legal status. Rather, these markers are often helpful due to the marginalization of individuals that come from backgrounds of low socioeconomic status.

Dental Enamel Hypoplasias (DEH)

DEH are defects that occur in enamel that is still forming. During the enamel formation process, there are two main steps: 1. The layer of organic matrix begins to form and 2. The organic matrix begins to mineralize. Enamel is one of the strongest substances in the human body and does not contain living cells. DEH usually occur while the teeth are still developing, before the organic matrix has mineralized. This causes pits, grooves, and lines to form on teeth when a disruption occurs. Although DEH can occur in both deciduous and permanent teeth, it mainly occurs during youth (Holt 2001). Enamel's inability to remodel means that DEH can become a record of childhood disruptions on teeth. There are many causes that can lead to DEH, including hereditary symptoms, prenatal issues, and environmental factors such as malnutrition, stress levels, and systemic disruptions. A lot of disruptions are equivalent to those seen in immigrant and refugee communities. Migration comes with factors such as home country trauma, migration trauma, signs of disease, starvation/ malnutrition, and other traumas in general. These factors can all contribute as environmental stressors that lead to DEH forming. It is no surprise that many immigrants and refugees are leaving their home countries due to living conditions that can lead to overall poor health.

Environmental Stress in Developing Countries

The well-beings of individuals living in rural areas in developing countries have been declining. Even though 80% of the global workforce lies in developing countries, wealth is unequally distributed between developing and industrialized countries (Kortum et al. 2010). Since the North American Free Trade Agreement went into effect in 1994, foreign investors have been allowed to provide poor work conditions in *maquiladoras* (tariff-free factories that assemble raw materials and export the product) to workers in Mexico without any restrictions. These *maquiladoras* often have "poor ventilation, few rest periods, excessive noise levels, unsafe machinery, long hours of microscopic assembly work, and exposure to toxic chemicals and carcinogens" and mostly employ women (Eskenazi 1993). The people working in the *maquiladoras* are often those that left their rural towns in search of jobs. Mexico is not the only place that people have been pushed into impoverishment. These poor working

conditions can lead to a larger overall impact on people's lives. Poor working conditions can lead to health problems, and when a person does not have adequate healthcare, these problems often remain unresolved. It is important to note that, since *maquiladoras* mainly employ women, these poor working conditions can extend to an infant in utero and after birth. Working under these conditions and/or being malnourished can lead to their infants having poor stores of "zinc, vitamin A, vitamin B12, and iron. Vitamin B12 and iron are both essential for brain and central nervous development and growth" (Neumann et al. 2004). Apart from these nutrients already being affected during the developmental process in utero, children born into an impoverished community can continue to be malnourished through childhood.

In their article, Neumann, Gewa, and Bwibo discuss the various aspects leading to malnutrition as well as the development of youth in developing countries. Although initiatives and programs have been put into place to save children's lives, these efforts need to be extended to the quality of life for surviving children. Neumann, Constance, and Nimrod state that more needs to be accomplished in school, especially for those in preschool. Developing countries have trouble improving the quality of diet through "raising and consumption [of] small animals by rural subsistence households to enhance maternal and child nutrition" (Neumann et al. 2004). The cycle of malnutrition is continuous, and aid needs to start at childhood and continue through adulthood. Saving malnourished children does not solve the problem because the cycle will continue if efforts are not made for the continued survival and health of children into adulthood.

DEH formation can indicate the stress and trauma of events that individuals survived at youth. It is important to realize that most people with DEH are underrepresented and marginalized groups of individuals and are not related to origin. Because of this, it is impossible to identify migrant remains at the border solely on DEH markers, but it can work when partnered with other forensic techniques. In a study done on the prevalence of Dental Enamel Hypoplasias, a total of 698 children were followed through childhood, all coming from equal backgrounds in socioeconomic status and race. Of the 698 children, 44 of them had DEH on at least one tooth (Slayton 2000). This study was done on white Americans from good socioeconomic backgrounds. Although the number of children with DEH was not that high, it is noteworthy that it can happen to people of all backgrounds. In Beatrice and Soler's study, they found that there is a greater prevalence of DEH in undocumented migrants than in United States citizens. The prevalence rate was moderate amongst the migrant sample at 30.4% and low amongst documented citizens, 10.9% (Beatrice et al 2016).

Migrant Deaths at the Southern Border

At the U.S-Mexico border, there are many instances where migrants perish due to the perils of the desert, including the weather, environment, assailants, and vigilantes. Many of these deaths have been brought on by the adoption of "Prevention through Deterrence" in 1994, which allows for urban areas to be sealed off, in turn funneling migrants through more dangerous terrain. Although there are organizations, such as Human Borders, that try to prevent deaths by providing water tanks for migrants, migrants often try to avoid them unless they are desperate. The main problem with these tanks is that they are clearly marked for anyone to see, including border patrol, which means that stopping at these tanks can lead to possible apprehension. Because of this, many migrants are either going without water once their supplies run out or drinking from natural reservoirs or springs that they come across. Dehydration leads to exhaustion, which means that migrants may be unable to finish their journey. Since 2014, there have been an estimated 2,225 deaths recorded at the U.S.-Mexico border (International Organization for Migration 2019). The Pima County Office of the Medical Examiners successfully identified "65% of the 2330 migrants between 2001 and 2004" (Beatrice et al. 2016). However, since the bodies being identified are in the United States, they are having a major problem determining their legal statuses and properly repatriate their bodies.

Beatrice and Soler argue that observations of skeletal stress such as DEH can prove useful in the identification process as it can indicate whether individuals come from backgrounds of low socioeconomic status. They state that when these skeletal indicators are used in combination with other forensic techniques, such as biological, sociocultural, and contextual clues, it can aid the identification process of undocumented migrants. Beatrice and Soler also argue that when forensic anthropologists overlook these markers, they are not allowing themselves to collect all information that can help identify an unknown individual. They emphasize that these skeletal indicators are in no way an attribute of "legal" status. Rather, they should be included in the biocultural profile view, which can aid in identifying whether bodies are those of undocumented migrants or American born individuals.

Conclusion

Migrant deaths have steadily been increasing at the U.S.-Mexico border. Much of this has been brought on by the U.S Border Patrol funneling migrants through dangerous terrains. The desert can be an unforgiving place, full of beauty, dreams, and unfortunately, death. Many migrants crossing this dangerous landscape are leaving countries that are not helping their citizens. They are employed in areas with poor working conditions and low wages, which can lead to greater problems and affect health. When

these health conditions go uncared for, as many do in developing countries, it can lead to prenatal health problems in infants. These environmental stresses can leave skeletal indicators, such as Dental Enamel Hypoplasias, during youth. These skeletal indicators are not markers of origin but are instead indicators of marginalized and impoverished communities. Skeletal indicators are important to consider when identifying individuals, as it can give us context on whether they come from a background of low socioeconomic status. If forensic anthropologists are ignoring these markers, they are failing to gather important information that can help appropriately repatriate an individual. While it can be helpful, it is particularly important to remember that these markers are not indicative of "legal" status and need to be examined along with the entire biocultural profile of the individual.

Works Cited

Beatrice, Jared S., and Angela Soler. 2016. "Skeletal Indicators of Stress: A Component of the Biocultural Profile of Undocumented Migrants in Southern Arizona,." Journal of Forensic Sciences 61 (5): 1164–72. https://doi.org/10.1111/1556-4029.13131.

Eskenazi, Brenda, Sylvia Guendelman, and Eric P. Elkin. 1993. "A Preliminary Study of Reproductive Outcomes of Female Maquiladora Workers in Tijuana, Mexico." American Journal of Industrial Medicine 24 (6): 667–76. https://doi.org/10.1002/ajim.4700240603.

Holt, Ruth, Graham Roberts, and Crispian Scully. 2000. "Oral Health and Disease." BMJ320 (7250): 1652–55. https://doi.org/10.1136/bmj.320.7250.1652.

Kortum, Evelyn, Stavroula Leka, and Tom Cox. 2010. "Psychosocial Risks and Work-Related Stress in Developing Countries: Health Impact, Priorities, Barriers and Solutions." International Journal of Occupational Medicine and Environmental Health 23 (3). https://doi.org/10.2478/v10001-010-0024-5.

Neumann, Charlotte G., Constance Gewa, and Nimrod O. Bwibo. 2004. "Child Nutrition in Developing Countries." Pediatric Annals 33 (10): 658–74. https://doi.org/10.3928/0090-4481-20041001-09.

Slayton, Rebecca L, John J Warren, Michael J Kanellis, Steven M Levy, and Mahbubul Islam. 2001. "Prevalence of Enamel Hypoplasia and Isolated Opacities in the Primary Dentition." Pediatric Dentistry, 5.

"Tracks Deaths of Migrants, Including Refugees." Missing Migrants Project. Accessed December 13, 2019. https://missingmigrants.iom.int/.