

A Ground Breaking Study to Treat Anodontia

Dr. Syed Abdul Jabbar basha

Associate professor in department of pharmacology, Sana college of pharmacy, kodad

Submitted: 15-07-2023

Accepted: 25-07-2023

ABSTRACT

Anodontia is the complete absence of teeth. It's a rare form of dental agenesis — a term healthcare providers use to describe congenitally missing teeth. People with anodontia don't have teeth because their teeth never developed. This condition can involve both primary (baby) and permanent (adult) teeth. Many people with anodontia also have another genetic condition called ectodermal dysplasia, which can cause abnormalities that affect teeth, hair, nails and sweat glands. Several animal species possess the remarkable ability to regrow teeth. Among them are sharks, lizards, geckos, horseshoe crabs, and axolotls. Sharks, for instance, possess multiple rows of teeth, allowing them to continuously replace lost teeth. Within a span of a few weeks, a new tooth can grow to replace the one that was shed. Healthcare providers treat anodontia with teeth replacement options. A Japanese research team is making progress in developing a medication that may enable the growth of new teeth in humans. This article reviews the study of research and data regarding the study.

Key words:Anodontia, dental agenesis, ectodermal dysplasia

- Thinning hair.
- A lack of sweat glands.
- Poor hearing.
- Poor vision.
- Missing fingernails.

Very rarely, anodontia occurs without ectodermal dysplasia. In these cases, experts believe the condition is due to an unknown genetic mutation (change).

In simple terms, anodontia is the **result of a genetic mutation** that affects your dental lamina (a band of tissue under your gums where your teeth form). People with anodontia inherit it from their parents in an autosomal recessive pattern. This means that two copies of an abnormal gene — one from each biological parent — are necessary for the condition to develop.

DIAGNOSED

Healthcare providers may suspect anodontia if your baby doesn't develop teeth by the time they're 13 months old. To confirm the diagnosis, they'll take dental X-rays to look for teeth that haven't grown in yet. If the X-rays don't show teeth, then your child probably has anodontia.

TREATMENT

Healthcare providers treat anodontia with teeth replacement options. Common treatments include:

Dentures

Dentures are removable appliances that replace missing teeth. They rest on your gums for support. You can use dental adhesive to help keep them in place. Traditional dentures work well for children and adults with anodontia.

Dental implants

Dental implants are small, threaded posts that replace missing teeth roots. A surgeon places dental implants in your jawbone during an oral surgery procedure. Once your implants heal, your dentist can attach bridges or dentures to them,

I. INTRODUCTION

Some people are born missing some, but not all, of their teeth. Hypodontia, another type of dental agenesis, is the absence of one to six teeth. Oligodontia is the absence of six or more teeth. You might hear people refer to hypodontia and oligodontia as partial anodontia. People with anodontia often have difficulty chewing and speaking. Without the ability to properly chew food, this can have a negative impact on digestive health. Anodontia can also result in gum damage and inadequate jawbone growth. This lack of bone growth can make your jaw appear smaller than it should be. The main symptom of anodontia is the absence of all natural teeth.

Because anodontia often occurs alongside ectodermal dysplasia, other symptoms may include:

- Cleft lip or cleft palate.

restoring your smile. To qualify for dental implants, you must have fully developed facial bones. For this reason, most children with anodontia wear dentures until they're old enough for dental implants.

II. CURRENT STUDY

A groundbreaking dental medicine in Japan is progressing towards clinical trials, aiming to become the world's first tooth-regrowing treatment, as reported by the Mainichi, a national news site. Scheduled to commence in July 2024, the clinical trials will take place in Japan. Should the results prove successful, regulatory approval for the medicine is anticipated by 2030, offering potential revolutionary advancements in the field of dentistry. Upon discovering that a single gene mutation could influence the number of teeth, Dr. Takahashi embarked on further investigations to target specific genes capable of promoting tooth growth. Around 2005, Dr. Takahashi returned to Kyoto University, where he collaborated with researchers who had identified a gene responsible for producing a protein called USAG-1. This protein was found to limit the number of teeth that could develop. Recognizing the potential implications, Dr. Takahashi's research team focused on developing an antibody that could bind

to the USAG-1 protein, effectively blocking its function. The hypothesis was that inhibiting this protein could potentially stimulate the growth of additional teeth. It is important to note that the concept of utilizing neutralizing antibody therapy for tooth tissue regeneration is relatively new, as reportedly observed by Kennedy, an independent expert not involved in the study. In laboratory experiments conducted in 2018, mice with a naturally limited number of teeth exhibited the growth of new teeth after receiving the antibody-based medicine. This outcome provided promising evidence for the potential effectiveness of the treatment approach.

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