

Presenting Author Name

Dania Awais

Phonetic spelling of your (full) name

DAH-nee-uh uh-WAYS

Presenting Author Category

Masters Student

Supervisor Name

Devi Atukorallaya

GBD Audio File

Mexican Tetra Jaw culture.m4a

Headshot

Dania_Awais headshot.jpg

Short Bio (100 words)

Dania Awais is a dentist and MSc student in Oral Biology at the Dr. Gerald Niznick College of Dentistry, University of Manitoba. She completed her Bachelor of Dental Surgery at the University of Sharjah in the UAE before moving to Winnipeg. Her research focuses on tooth development, regeneration, and developmental pathways, with the goal of advancing pediatric dental health. Beyond academics, Dania values community, compassion, and meaningful connections with those around her. She cares deeply about creating a welcoming and supportive environment for others and strives to make a positive difference wherever she goes.

Research Category

Basic Science

Abstract Title

A Novel Ex Vivo Jaw Organ Culture Model to study Tooth Development and Regeneration

Authors

Name	Role	Profession
Dania Awais	Presenting Author	Graduate
Devi Atukorallaya	Co Author	Associate Professor

Background

Dental anomalies in children, including hypodontia—the congenital absence of one or more teeth can arise from disruptions in developmental signaling and affect mastication, speech, and psychosocial well-being. Yet accessible models for studying living dental tissue ex vivo remain limited. *Astyanax mexicanus* (Mexican tetra) is an emerging model with continuously regenerating teeth and conserved developmental pathways between fish and humans, including Wnt signaling.

Objective

To establish and characterize an ex vivo *A. mexicanus* jaw organ culture model that preserves tooth and jaw morphology, providing a platform to investigate Wnt-mediated tooth regeneration and mechanisms relevant to congenital tooth agenesis.

Methods

Jaws were dissected from 120-day old sex matched samples of *A. mexicanus* and cultured in an air-liquid interface on PETE membranes over stainless-steel grids, in DMEM with 10% FBS and 1% penicillin-streptomycin, in a humidified 5% CO₂ incubator (25°C). Explants were monitored visually and microscopically over 6 days for morphology, size, and contamination, then fixed for morphological and genetic analysis.

Results

Explants showed transient swelling initially, followed by stable morphology, with intact teeth and no visible contamination. Viable explants maintained morphology through 6 days and were successfully fixed for further analysis including, bone staining which assesses mineralization of tooth structure. Histological staining will show how cell structure has been preserved and genetic mRNA expression analysis that will reveal key pathway genes responsible for tooth development and regeneration.

Conclusion

These preliminary findings show *A. mexicanus* jaw explants can survive ex vivo while retaining gross tooth and jaw morphology, supporting our hypothesis that a viable jaw organ culture system is achievable. This novel platform establishes a foundation for manipulating Wnt signaling to investigate tooth replacement mechanisms, with relevance to pediatric craniofacial and dental research, including hypodontia, where disruptions in conserved Wnt signaling pathways are implicated in human tooth development and congenital tooth agenesis.