

# Reconstruction of Congenital Arhinia with Stereolithography

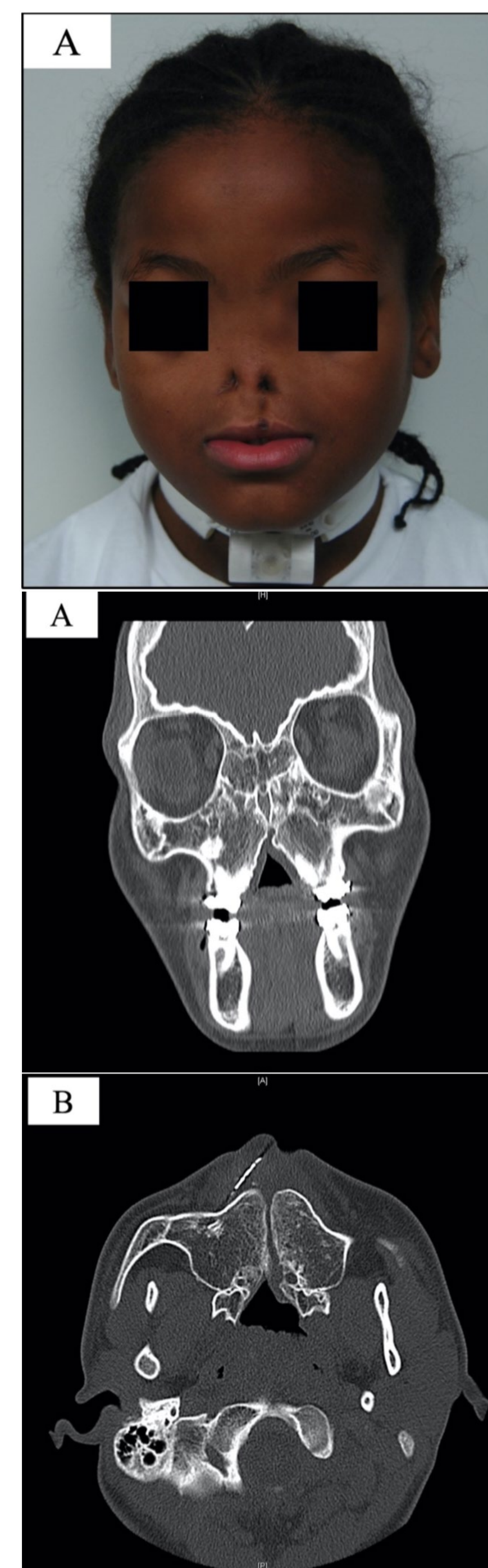
Kelly Spiller; Kaitlyne Pak; Lucas Harrison; Spencer Anderson, MD; Steven Schmidt, MD; Salim Mancho, DO  
Department of Orthopedic & Plastic Surgery

## Introduction

- Complete arhinia- rare embryologic disorder, unknown etiology
- <50 reported cases
- Often associated with congenital abnormalities of eyes, ears, palate
- Challenges with breathing, feeding early in life
- Paramedian forehead flap with cartilaginous + bony grafts most frequently reported method of external nasal reconstruction
- We present a unique alternative method of reconstruction using stereolithographic modeling with combined conchal bowl and osteocartilaginous grafts

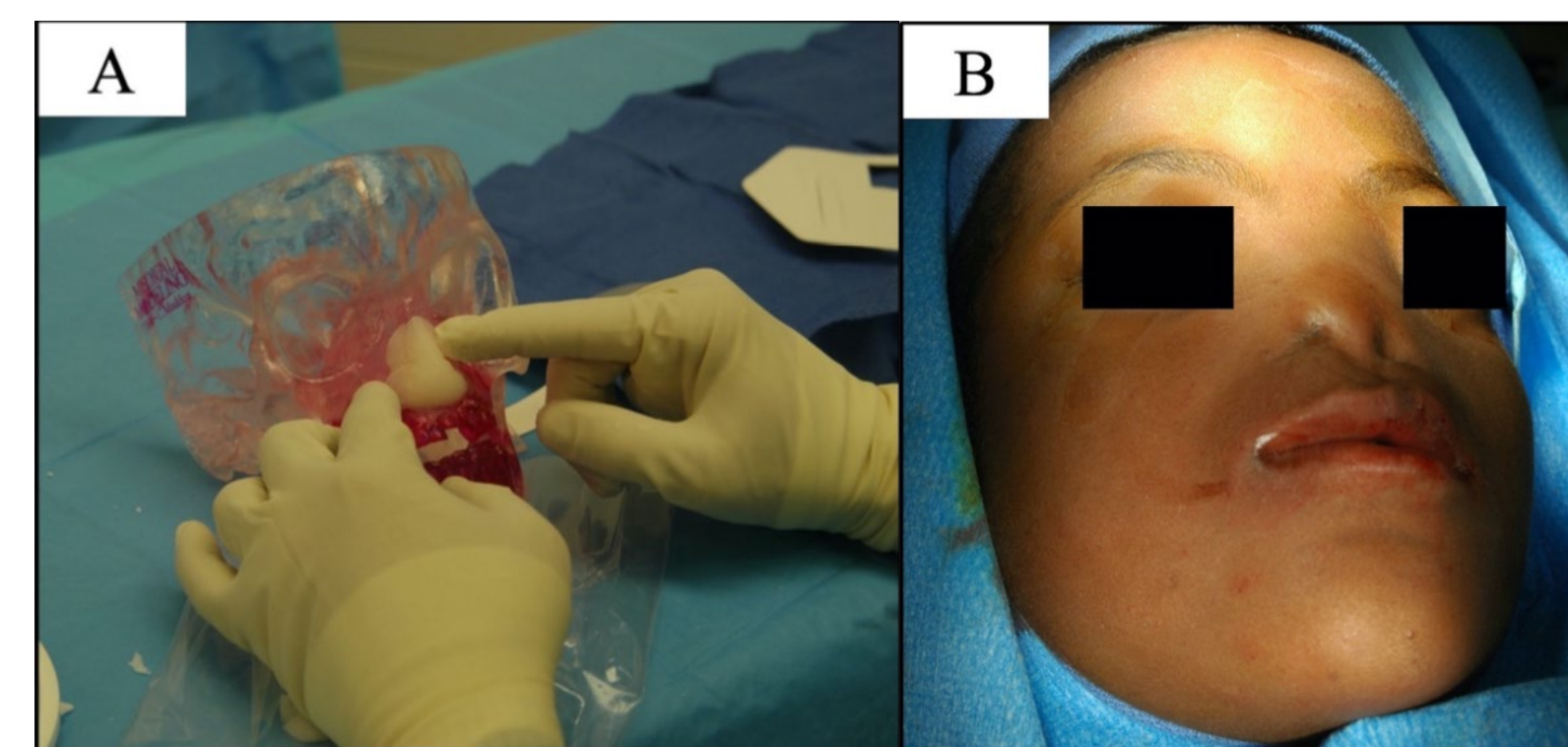
## Case Presentation

- 11 yo M presenting with complete congenital arhinia, hypoplastic midface, and choanal atresia
- S/p L cleft lip repair, tracheostomy, and red rubber catheter placement
- Family refused forehead flap due to significant scar burden
- **Goals:**
  - Creation functional nasopharyngeal airway
  - Improved aesthetics

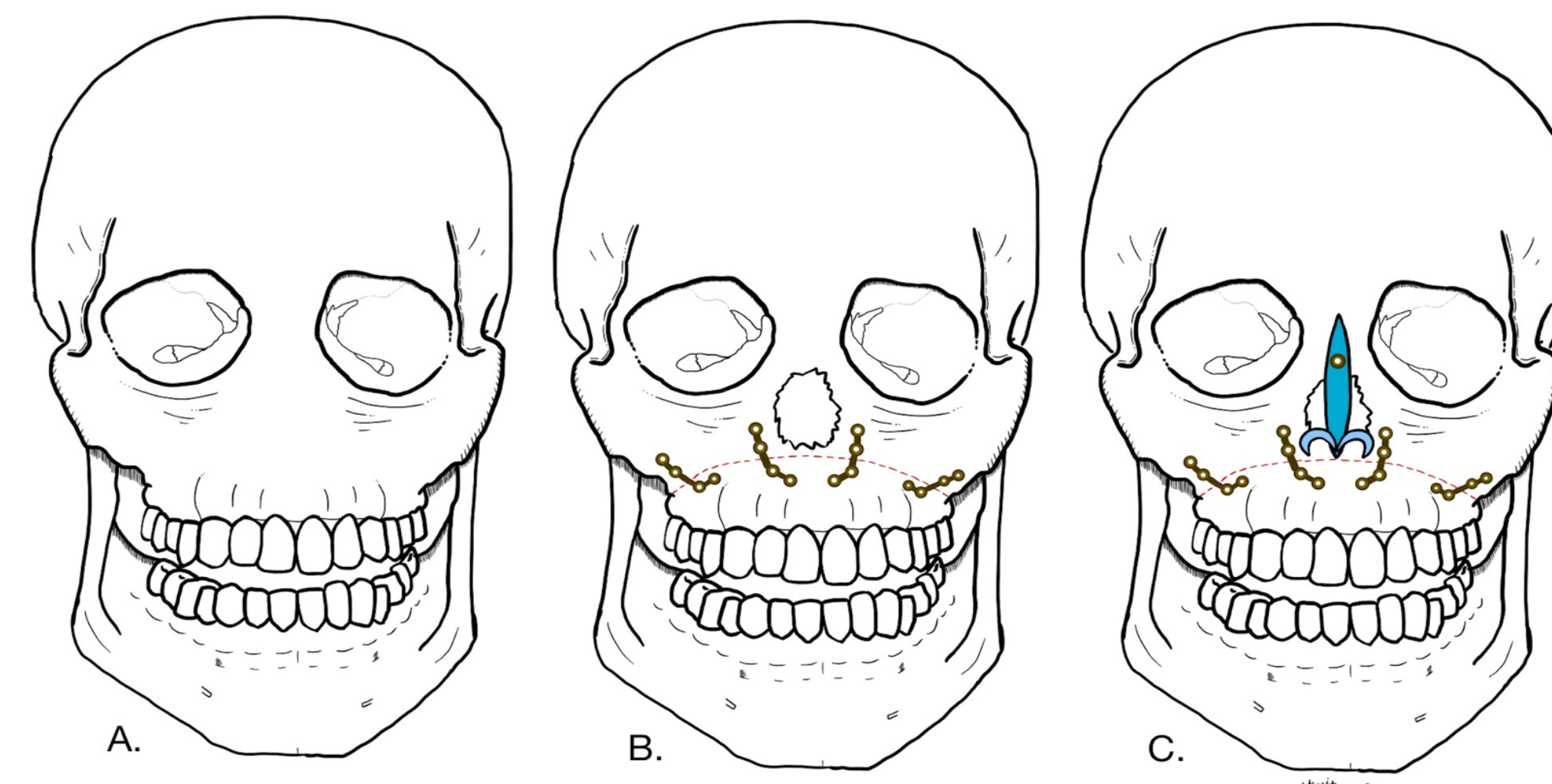


## Multi-Staged Reconstruction

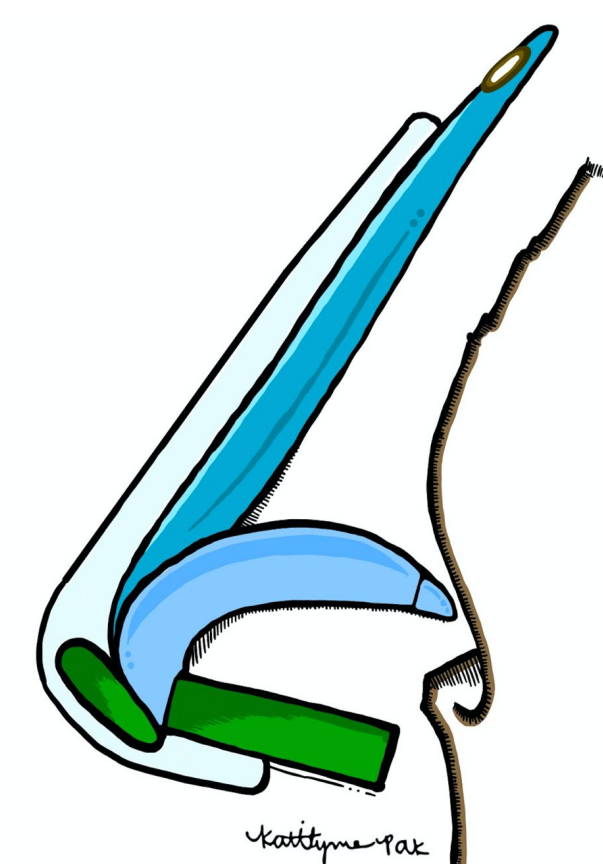
1. CT-based stereolithography + prosthesis placement (age 11)
2. Methylmethacrylate prosthesis adjustment (2 stages, ages 13 & 15)



1. Decannulation and airway reconstruction (age 22)
  - Internal maxillary artery embolization
  - Lefort 1 osteotomy (9 mm advancement)
  - Burring posterior segment
  - Full thickness skin grafting of nasal airway



4. External nasal reconstruction (age 22)
  - Shield tip graft, columellar, dorsal struts
  - Bilateral conchal bowl alar grafts



## Case Correlates

- 43 cases reviewed
- 4 cases linked to chromosomal/ genetic aberrations, potential AD/AR inheritance
- Associated physical features:

Characteristic	Total # Patients
<b>Facial</b>	
-High arched palate	20
-Hypoplastic maxilla	13
-Ear malformations	10
<b>Ocular</b>	
-Hypertelorism	17
-Microphthalmia	13
-Anophthalmia	2
-Coloboma	12
-Lacrimal sac mucocele	4
<b>Genital</b>	
-Cryptorchidism	6

## Conclusions

1. Multi-staged reconstruction w/ stereolithography, methylmethacrylate prosthesis, and combined shield tip graft, columellar & dorsal struts, and bilateral auricular alar grafts is a viable approach to complete arhinia
2. Reconstruction can be accomplished at a later age vs. traditional preschool years
3. Pros: limited scar burden, eliminates need for fore-head based or free flaps
4. Cons: multiple procedures, potential loss to follow-up

## References

Ali et. Al 2014; Fernandes et. Al 2016; Fuller et. Al 2020; Li et. Al 2015