

Chance or Genetic? Reading Mateo's Family Tree

Is Mateo's cleft a one-time chance event, or is it written into his family?

CARRY FORWARD

Mateo's cleft is best explained as a developmental pathway outcome with bounded evidence, not as one proven cause.

10-YEAR TAKEAWAY

A pedigree shows how a trait travels through a family; it does not prove that an isolated case is non-genetic.

Cells differentiate	Development sculpts	Cells move	Development can go wrong
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1. Observe the analogy before naming the biology



Illustration: A neighborhood map shows connections, not hidden wiring

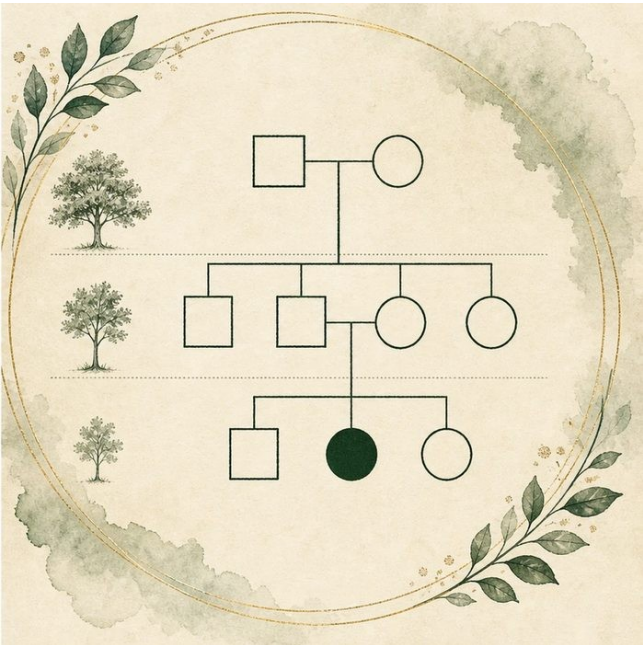
- 1. Which connections can the map show directly?
- 2. What important system remains hidden underground?
- 3. Why would one affected home not prove a random event?

2. Turn observations into rules

- 1. Rule 1: Record relationships before explaining cause. Explain it in your own words.
- 2. Rule 2: An absent family pattern lowers some hypotheses but does not erase genetics. Explain it in your own words.
- 3. Rule 3: One pedigree is evidence, not a final mechanism. Explain it in your own words.

Where the analogy stops: Families are not neighborhoods. The analogy models visible relationships versus hidden causes.

3. Map the rules onto the biomedical example



Biomedical teaching illustration: Build Mateo's three-generation pedigree

Analogy step	Biology step	How the relationship stays the same
Connected homes	Biological relatives	_____
Marked home	Affected family member	_____
Hidden utilities	Unobserved variants and multifactorial risk	_____

GENETICS LESSON 1 | CASE FILE AND DECISION

4. Use the case evidence

ID	Finding supplied in the case	Why it matters
GEN01-E1	Mateo is the only reported relative with a cleft across three generations.	The pedigree appears sporadic rather than strongly familial.
GEN01-E2	Both parents are unaffected.	A simple fully penetrant dominant pattern is not supported.
GEN01-E3	Isolated clefts can still involve inherited and new genetic risk factors.	No family history does not mean no genetic contribution.

5. Make the clinical decision

You are the intake genetic counselor. Mateo's parents ask whether the empty family history means the cleft was only chance.

- A. Say the pedigree looks isolated but cannot exclude genetic risk.
- B. Say no relatives means genes played no role.
- C. Diagnose a dominant syndrome from one affected child.

Decision. Choose the counseling statement and cite the pedigree plus its limit.

Claim ceiling: You may describe the observed family pattern. You may not exclude genetic contribution or name an inheritance model yet.

Claim. State the choice you can defend.

Evidence. Use these labeled IDs: GEN01-E1 + GEN01-E2.

Reasoning. Explain why the evidence supports the claim and stays inside the claim ceiling.

6. Reduce the lesson to one lasting idea

Take-home. A pedigree shows how a trait travels through a family; it does not prove that an isolated case is non-genetic.

- 1. What does Mateo's pedigree show?
- 2. What genetic claim can it not close?

Glossary

Term	Plain-English definition
pedigree	A family tree drawn with standard symbols (squares for males, circles for females, filled for affected) so any geneticist can read a family at a glance.
proband	The first affected person whose case brings a family in for genetic study, marked with an arrow on the pedigree.
isolated (sporadic) case	A trait that appears in just one person in a family, with no other clearly affected relatives.
familial case	An instance of a trait or condition that appears in more than one relative, often across several generations of a family.
generation	One layer of a family tree, such as grandparents, then parents, then children, shown as a row on a pedigree.

Next lesson unlock

Mateo's cleft looks isolated and his parents are unaffected, but a cleft can sometimes be one feature of a hidden syndrome. What would a syndrome look like, and how would we screen for one?

The journal links on the lesson page are optional. Everything required for this guided-notes set is already supplied here and in the case file.