RELEASE AUDIT | ANATOMICAL DOMAIN | 20 LESSONS

Red-Team Report

Could a student complete every task using only the materials supplied in the lesson package?

RELEASE DECISION

Ready after automated file, reading, deck, document, build, and live-route checks pass.

DISCOVERY INTEGRITY

Each lesson reveals only the evidence needed for its decision. Lesson 20 synthesizes the domain without inventing a single cause.

Audit gates

Gate	Release standard	Result
Durable idea	Every lesson names one 10-year takeaway and one of the four foundations.	**PASS in authored package**
Socratic sequence	Analogy image, observation questions, student rules, biology mapping, decision, defense, and handoff are present.	**PASS in authored package**
Closed loop	All required knowledge, evidence, definitions, visuals, and decision rules are inside the package.	**PASS in authored package**
Case integrity	Stable evidence IDs are used. No task requires invented or student-identifiable data.	**PASS in authored package**
Claim discipline	Each decision states what students may claim and what the evidence cannot prove.	**PASS in authored package**
Reading	Plain-language structured readings are supplied. Publication links are optional.	**PASS in authored package**
Alignment	Guided notes follow the deck roles and end by constructing the day's take-home.	**PASS in authored package**
Visual QA	Every lesson has separate analogy and biomedical illustrations with explicit educational labels.	**PASS in authored package**

Lesson-by-lesson dependency audit

#	Take-home	Analogy	Evidence IDs	Decision	Handoff
1	Anatomy becomes useful when each structure is tied to the job it performs.	A two-room house needs a complete ceiling and floor	ANA01-E1, ANA01-E2, ANA01-E3	Choose the anatomy correction and cite the landmark plus one function.	We have a clean map of the normal lip and palate. But a lip and a palate are not just static shapes; they have to move, close, and seal. Which muscles make a lip and a palate work? We chase that next time.
2	Muscle function depends on fiber direction, attachment, and continuity, not merely on muscle presence.	A drawstring and a lifting sling only work when their cords run correctly	ANA02-E1, ANA02-E2, ANA02-E3	Choose the revision and use both muscle examples.	We know the normal muscle plan and the rule that direction and continuity decide function. But we have not yet looked closely at Mateo. So what exactly is interrupted in his lip and palate, and what happens to these muscles? We chase that next time.
3	A cleft is not only a visible gap; it also redirects muscles and changes the forces they produce.	A torn tent seam changes both the opening and the pull of its ropes	ANA03-E1, ANA03-E2, ANA03-E3	Choose the plan and cite one lip finding plus one palate finding.	We know exactly what is interrupted in Mateo and that the muscles are displaced. But we keep describing his cleft in long sentences. How do surgeons describe a cleft precisely and briefly enough that any team in the world knows exactly what they mean? We chase that next time.
4	A useful cleft label records side, completeness, and anatomical extent without replacing the examination.	A precise address compresses a route into shared coordinates	ANA04-E1, ANA04-E2, ANA04-E3	Choose the most precise supported label and cite all three evidence cards.	We can now name Mateo's cleft precisely: Veau III, a complete unilateral left CL/P. But his is only one shape out of many. Some clefts are on both sides, some stop short of the nostril, and some hide under intact skin. What makes one cleft different from another, and what is the full spectrum of forms? We chase that next time.
5	Clefts vary along several independent axes, so one familiar example cannot stand for the whole spectrum.	A library sorts books by more than one shelf label	ANA05-E1, ANA05-E2, ANA05-E3	Choose the classification method and demonstrate it on two cards.	We have pinned Mateo to the spectrum: unilateral, complete, overt. But describing his cleft does not solve his most urgent problem. His open cleft connects his mouth and nose, and his parents are most afraid he cannot eat. Why can't Mateo feed normally, and what helps now? We chase that next time.
6	A cleft palate limits suction because the mouth cannot seal from the nose, so feeding support changes flow rather than blaming effort.	A drinking straw cannot pull fluid through an open side port	ANA06-E1, ANA06-E2, ANA06-E3	Choose today's feeding plan and cite the mechanism plus monitoring evidence.	We can keep Mateo fed today by working around the gap. But the gap is wide, and the wider it is, the harder the lip repair will be. Could we gently shape and narrow the cleft before any operation so feeding gets easier and the surgery starts from a better position? We chase that next time.
7	Presurgical molding changes the starting geometry before repair; it does not fuse tissue, and long-term benefits remain uncertain.	A guide jig aligns pieces before they are permanently joined	ANA07-E1, ANA07-E2, ANA07-E3	Choose the counseling statement and cite one measured benefit plus one uncertainty.	We have shaped Mateo's cleft into a better starting position and kept him feeding. The gap is narrower, but it is still open. How does the surgeon

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					actually rebuild the lip, and especially the ring of muscle inside it, into a working, symmetric whole? We chase that next time.
8	Lip repair restores a continuous orbicularis ring and aligned lip landmarks, not merely a closed skin line.	Repair a circular conveyor belt and its outer cover together	ANA08-E1, ANA08-E2, ANA08-E3	Choose the plan and cite muscle plus landmark evidence.	We rebuilt the lip and its muscle ring, but the lip was the easier door to close. The roof of the mouth is deeper and hides a different muscle that must be rebuilt into a working sling. How does the surgeon rebuild the palate, where the repair happens in the dark and the muscle must be remade across the midline? We chase that next time.
9	Palate repair must close the oral-nasal opening and rebuild the levator sling while protecting blood supply and growth.	A drawbridge needs both a sealed deck and correctly placed lift cables	ANA09-E1, ANA09-E2, ANA09-E3	Choose the plan and cite closure, muscle, and safety evidence.	We closed Mateo's palate and rebuilt the levator sling. But two children can have the very same closed palate, repaired the very same way, and one speaks clearly while the other does not. Part of that may be the calendar. When should the lip and palate each be repaired, and could timing itself help decide whether Mateo speaks clearly? We chase that next time.
10	Cleft surgery timing balances present safety, early function, future growth, and family readiness rather than following one magic date.	Repair a busy bridge during the safest useful window	ANA10-E1, ANA10-E2, ANA10-E3	Choose the calendar language and cite both ACPA timing windows.	We set Mateo's calendar: his lip repaired around three months, his palate before his first words land. We argued that the timing itself helps protect his speech. But that rests on a claim we have not proven. Why does closing the roof of the mouth matter so much for talking in the first place? We chase that next time.
11	Clear oral speech needs a moving velopharyngeal valve that closes the nasal path for pressure sounds and opens it for nasal sounds.	A railway switch sends airflow down the correct track	ANA11-E1, ANA11-E2, ANA11-E3	Choose the explanation and cite airflow plus speech-sample evidence.	We answered why palate repair decides clear speech. But here is a new clue: the muscles that move Mateo's soft palate are anchored near the skull base, right next to the tube that drains his middle ear. If those same muscles are abnormal, what happens to his ears? We chase that next time.
12	Cleft-palate muscle anatomy can impair Eustachian tube opening, so hearing needs repeated surveillance even after a normal newborn screen.	A room needs a working pressure-equalizing vent	ANA12-E1, ANA12-E2, ANA12-E3	Choose the next step and cite anatomy plus longitudinal evidence.	We followed the cleft into speech and now into the ears, and each time the same abnormal muscles explain the trouble. But Mateo's cleft also runs straight through the gum ridge, the very bone where his upper teeth are forming. What does the cleft do to his teeth? We chase that next time.
13	An alveolar cleft interrupts bone where teeth develop, so tooth position, shape, number, and eruption must be followed over time.	A missing section of garden bed changes where plants can root and emerge	ANA13-E1, ANA13-E2, ANA13-E3	Choose the counseling statement and cite the dental map plus its uncertainty.	We found that the cleft leaves a gap in the bone of the gum ridge and disturbs the teeth there. But a tooth needs bone to erupt into, and Mateo's bone has a gap. How do we fill that bony gap so a tooth has a home and the gum arch is continuous again? We chase

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14	Alveolar graft timing follows dental development, usually before the adjacent permanent canine erupts, so living bone can support tooth movement.	Build a soil bridge before roots need to cross it	ANA14-E1, ANA14-E2, ANA14-E3	Choose the planning decision and cite dental stage plus preparation evidence.	We rebuilt the bone of Mateo's gum ridge and gave his canine a home. But the graft reminded us of something bigger: its timing did not change whether he might need later jaw surgery, because the whole upper jaw it sits on has been growing poorly all along. How does a repaired cleft change facial growth, and what does that do to his bite? We chase that next time.
15	Cleft-related midface undergrowth can reflect both underlying anatomy and treatment history, so scar alone should not be treated as a proven single cause.	A young tree's shape reflects both its starting form and the ties placed around it	ANA15-E1, ANA15-E2, ANA15-E3	Choose the interpretation and cite longitudinal plus evidence-limit cards.	We found out why Mateo's midface grows backward and ends up flat, leaving an underbite as a teenager. We can name the problem, but we have not fixed it: the lip, palate, and gum graft are all done, yet his upper jaw still sits too far back. How do we correct the bite and midface later? We chase that next time.
16	Severe maxillary retrusion may require moving the upper jaw, but the choice between methods depends on severity, growth, stability, burden, airway, and speech.	Reposition a heavy platform in one move or advance it in small steps	ANA16-E1, ANA16-E2, ANA16-E3	Choose the conference process and cite skeletal plus speech-risk evidence.	We answered how the bite and midface are corrected. But the nose sits on that midface, and even after the jaw moves forward, Mateo's nose is still asymmetric and partly blocked. How is the cleft nose itself affected, and how is it repaired? We chase that next time.
17	A unilateral cleft can distort nasal cartilage, base, and septum, so nose care addresses breathing and symmetry across growth.	A doorway can look uneven and also narrow the path through it	ANA17-E1, ANA17-E2, ANA17-E3	Choose the sequence and cite airway plus timing evidence.	We have now repaired lip, palate, bite, and nose. But some repairs do not fully hold. A hole can reopen in the roof of the mouth, and even a closed palate can let air leak into the nose during speech. What goes wrong after repair, and how is it fixed? We chase that next time.
18	A fistula is a tissue opening, while velopharyngeal insufficiency is a moving-valve problem; each needs different evidence and treatment planning.	A room can leak through a hole or through a door that does not close	ANA18-E1, ANA18-E2, ANA18-E3	Choose the correct triage and cite one differentiating finding per case.	We answered what goes wrong after repair and how it is fixed. But Mateo has now seen the surgeon, the orthodontist, the speech-language pathologist, the ENT, and more, across many years. Who does what, and when, across his whole childhood, so nothing is missed and nothing is repeated? We chase that next time.
19	Cleft care is a coordinated timeline because each specialty acts when anatomy, function, and development make its decision useful.	An orchestra follows one score, but different sections enter at different times	ANA19-E1, ANA19-E2, ANA19-E3	Choose the coordination plan and place five supplied milestones in order.	We can now lay every step out in order. But putting them in order means we have assembled the entire anatomical and surgical picture, from the first finding at birth to the last revision in the teens, and we have never once been handed a diagnosis. What is Mateo's complete anatomical and surgical story, told as one piece, and what does the whole picture finally tell us about what he has? We

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20	A complete anatomical story can define structures, functions, repairs, and uncertainties while leaving treatment comparisons open to experiment.	A final systems report separates verified faults, completed repairs, and tests still needed	ANA20-E1, ANA20-E2, ANA20-E3	Choose the final report and cite classification, claim limit, and one open comparison.	The anatomical and surgical team has finished its report. But isolated and nonsyndromic is the anatomy's verdict, not the whole answer. The clinical team can describe the lifelong care, the genetics team can ask why the cleft formed at all, and the developmental team can show the moment fusion failed. We hand them our complete form-repair-consequence picture, and every team's story points to the same conclusion.

Known limits and release receipts

- All patient imagery is explicitly educational illustration. No generated image is presented as microscopy, radiology, or a real clinical photograph.
- Typical care windows are educational examples. The site and documents state that real teams individualize timing and decisions.
- Population data describe groups and do not identify Mateo's individual cause.
- The strongest decision is the first option in the teacher guide, but students must defend it with the named evidence IDs.
- Automated validation receipts are stored with the release and are completed before publication.