PIPADOR REVISION

MRCOG Part 1 Revision Notes

Development of the Face

EMBRYOLOGY • LECTURE 77

VISUAL EXAMINATION REVISION NOTES

2026 Edition

MRCOG Part 1 Revision Notes

Lecture 77: Development of the Face

Embryology • Visual revision edition — final embryology lecture

COLOUR CODE USED THROUGHOUT THESE NOTES

PRIMARY PALATE / LIP	SECONDARY PALATE	TONGUE / CLEFT	NEURAL CREST / ARCHES	CARE

LEARNING OBJECTIVES — tick off as you go

- ☐ Name the five facial prominences and their derivatives.
- ☐ Describe formation of the lip, primary and secondary palate.
- ☐ Explain cleft lip and palate — types, risks, care pathway and counselling.
- ☐ Describe tongue development and innervation; review the pharyngeal arches.
- ☐ Recognise Pierre Robin, Treacher Collins, 22q11.2, fetal alcohol and other facial syndromes.

1 Five Prominences

IN ONE LINE: *Frontonasal + paired maxillary + paired mandibular prominences meet around the stomodeum (weeks 4–8). Bone and connective tissue = neural crest; muscles = mesoderm.*

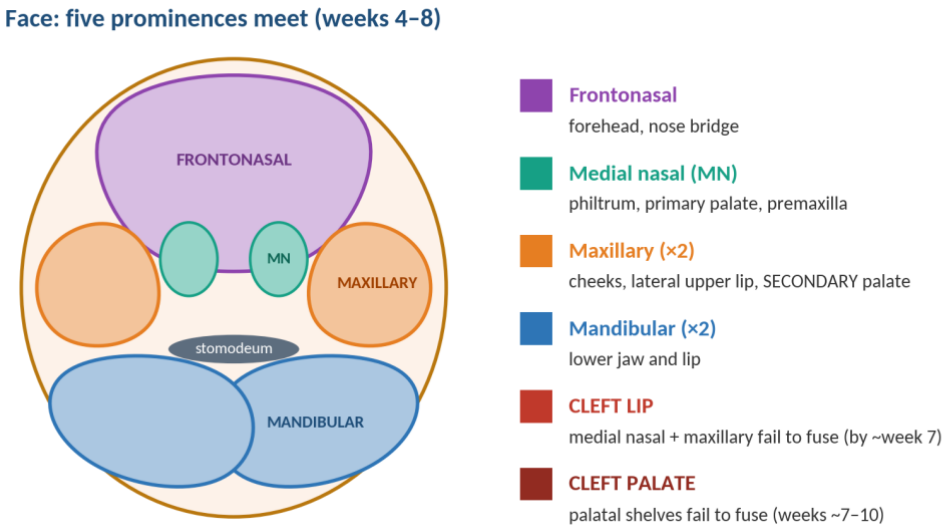


Figure 1. Facial prominences (from Lecture 52).

Week	Event	Detail
4	Prominences appear	Oropharyngeal membrane breaks down
5	Nasal placodes → pits	Medial and lateral nasal prominences ring the pits
6	Medial nasal prominences fuse	Intermaxillary segment → philtrum, premaxilla (4 incisors), primary palate; maxillary prominences fuse with it → upper lip

Week	Event	Detail
7–12	Secondary palate	Shelves rise and fuse front → back; soft palate last; meet the primary palate at the incisive foramen

2 The Palate

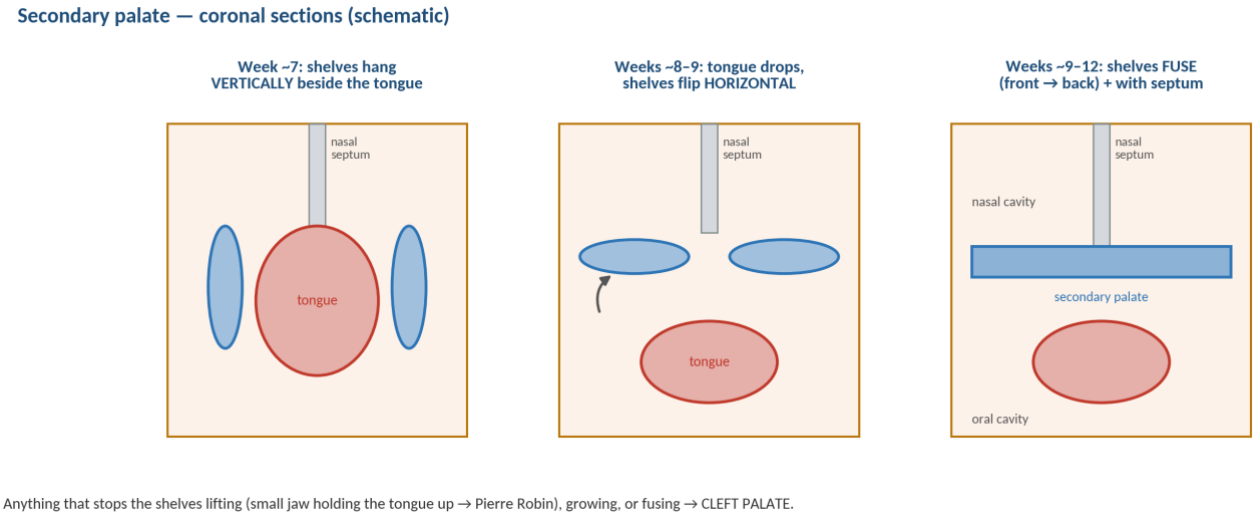


Figure 2. Palatal shelves lift and fuse.

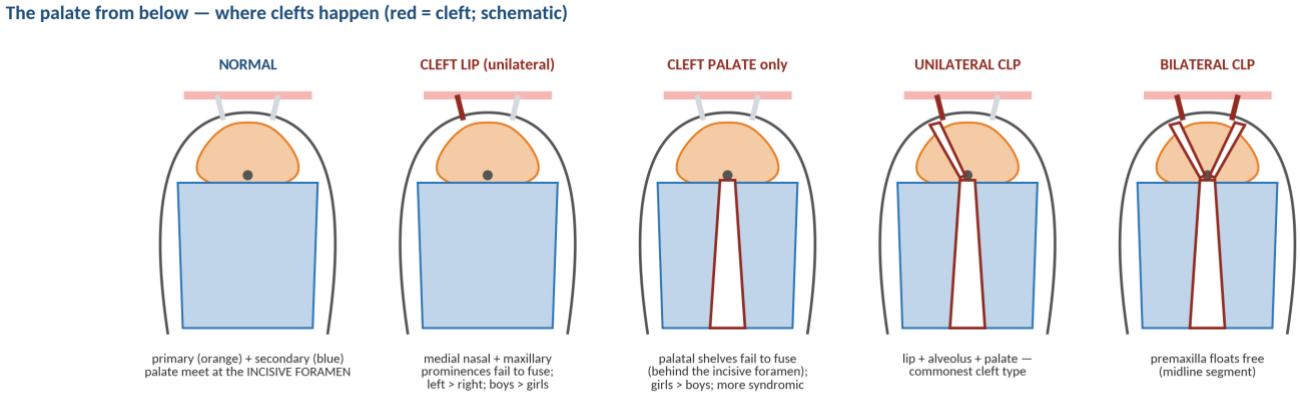


Figure 3. Cleft types from below.

> **MNEMONIC / MEMORY HOOK**
>
> **'Lip = Lateral to the philtrum (medial nasal ↔ maxillary); Palate = Plates (shelves) in the midline.'** In front of the incisive foramen = primary; behind = secondary.

3 Cleft Lip and Palate

Feature	Key points
Frequency	All clefts ~1 in 700 births; CL ± P more in boys (left > right); isolated CP more in girls and more often syndromic
Risk factors	Family history, smoking (~30% ↑), alcohol, antiepileptics (phenytoin, valproate, topiramate), maternal diabetes, obesity, low folate
Syndromes	T13, T18, 22q11.2, Van der Woude (IRF6 — lip pits), Stickler (COL2A1 — myopia, joints), Pierre Robin

Feature	Key points
Problems	Feeding (no seal for suction — special bottles), glue ear (Eustachian tube), speech, teeth
Submucous CP	Bifid uvula, notch in the hard palate, muscle gap — nasal speech, found late
Recurrence	Isolated CLP: ~3–5% with one affected sibling or parent; higher with more relatives

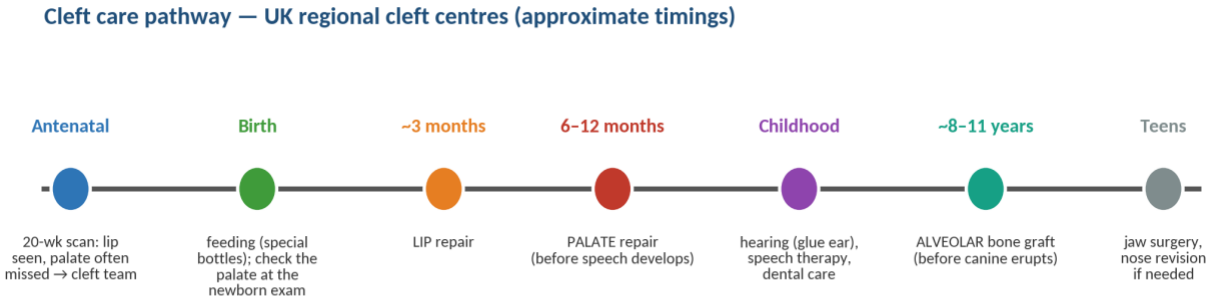


Figure 4. Cleft care pathway.

ANTENATAL COUNSELLING

- Cleft lip is usually seen at the 20-week scan; **isolated cleft palate is often missed**
- Detailed scan (heart, brain, limbs) + 3D views; offer **karyotype/microarray** if other findings
- Refer to the regional **cleft team** antenatally
- Isolated cleft: excellent long-term outcome

PREVENTION

- Stop smoking; avoid alcohol
- Pre-pregnancy antiepileptic review
- Periconceptional folic acid (modest cleft benefit; main aim NTDs)
- Good diabetes control

4 Tongue and Pharyngeal Arches

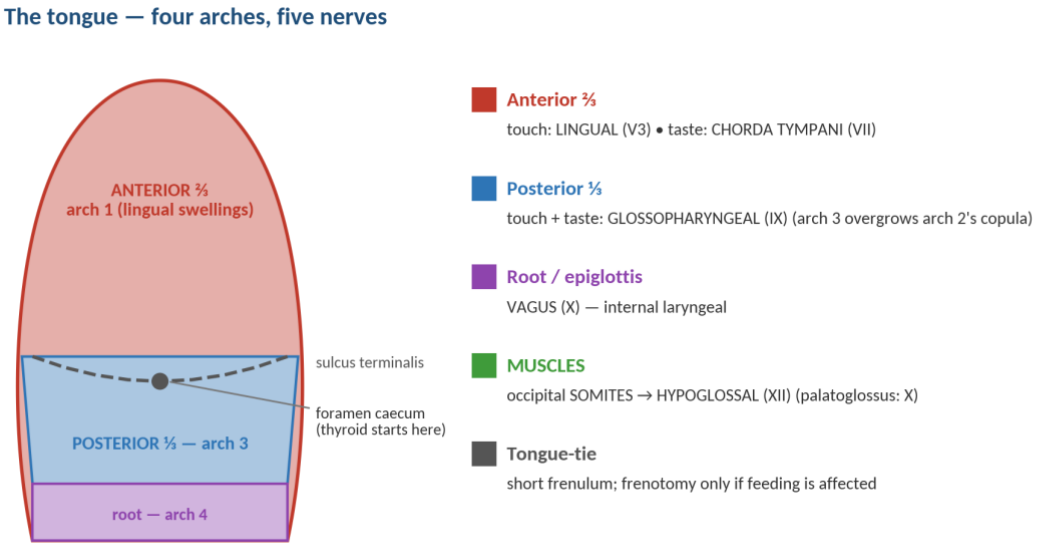


Figure 5. Tongue origins and nerves.

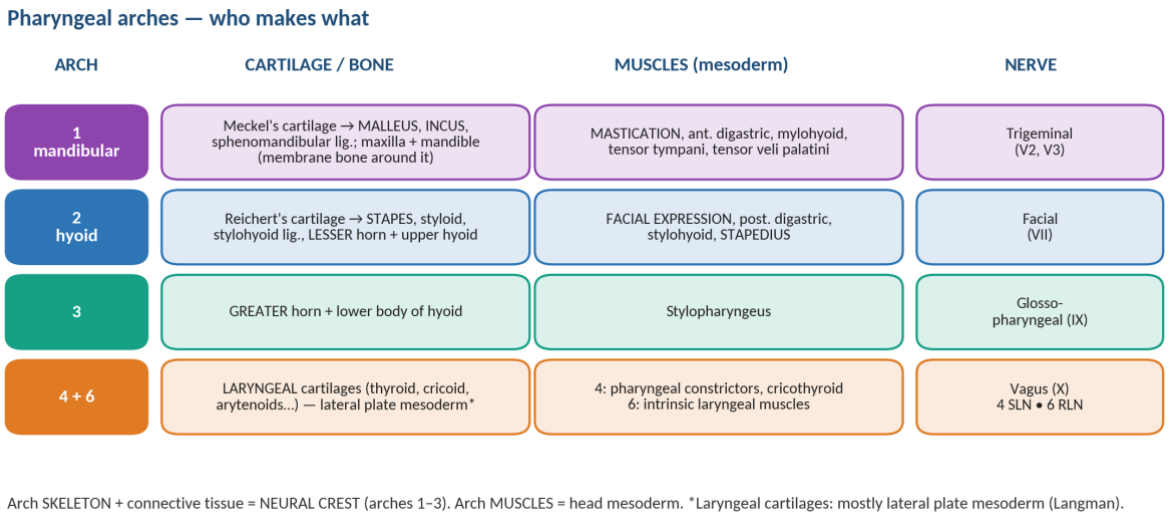


Figure 6. Pharyngeal arch derivatives (from Lecture 50).

- **Arch 1** (V): Meckel's cartilage → malleus, incus; the **mandible forms as membrane bone around it** (not from the cartilage). **Arch 2** (VII): stapes, styloid, lesser horn of hyoid, facial muscles. **Arch 3** (IX): greater horn of hyoid, stylopharyngeus. **Arches 4 + 6** (X): laryngeal cartilages (classically — newer work suggests lateral-plate mesoderm) and laryngeal muscles.

5 Facial Syndromes

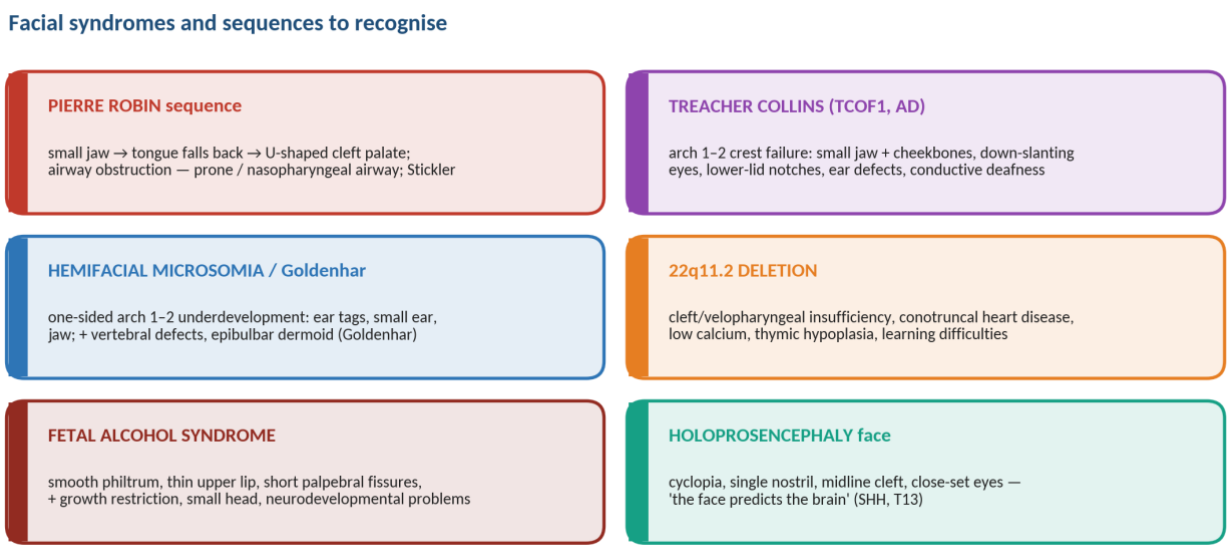


Figure 7. Syndromes and sequences.

- **Choanal atresia**: bucconasal membrane persists; bilateral → cyclical cyanosis relieved by crying; CHARGE. **Nasal bone** absent on profile view → T21 marker.

> ★ **PEARL**
>
> **Cleft lip = medial nasal + maxillary prominences fail to fuse (boys, left). Cleft palate = shelves fail to fuse (girls, more syndromic).**
>
> **Pierre Robin = small jaw → tongue up → shelves can't rise → U-shaped cleft + airway problems.**

6 MRCOG Exam Pearls — Last-Minute Page

Numbers to know

5 Facial prominences	**Wk 4–8** Face forms	**Wk 7–12** Secondary palate fuses	**~1 in 700** Clefts
~30% Smoking ↑ cleft risk	**~3–5%** Sibling recurrence	**~3 mo** Lip repair	**6–12 mo** Palate repair

HIGH-YIELD CHECKLIST

- ☐ Frontonasal + 2 maxillary + 2 mandibular; crest mesenchyme.
- ☐ Medial nasal prominences → intermaxillary segment → philtrum, premaxilla, primary palate.
- ☐ Secondary palate from maxillary shelves; incisive foramen.
- ☐ Cleft lip vs cleft palate — mechanism, sex, syndromes.
- ☐ Risks: smoking, alcohol, phenytoin/valproate/topiramate, diabetes, family history.
- ☐ Care: lip ~3 mo, palate 6–12 mo, bone graft ~8–11 y; hearing + speech.
- ☐ Tongue: V/VII front, IX back, X root, XII muscles; foramen caecum.
- ☐ Mandible = membrane bone around Meckel's cartilage.
- ☐ Pierre Robin, Treacher Collins, Goldenhar, 22q11.2, FAS.
- ☐ Isolated CP often missed on scan; karyotype if other anomalies.

Self-assessment — cover the right-hand column

Question	Answer
Five facial prominences?	Frontonasal, 2 maxillary, 2 mandibular
What forms the philtrum?	Fused medial nasal prominences (intermaxillary segment)
Mechanism of cleft lip?	Medial nasal and maxillary prominences fail to fuse
Landmark between primary and secondary palate?	Incisive foramen
Which sex has more isolated cleft palate?	Female
Taste nerve to the anterior ⅔ of the tongue?	Chorda tympani (VII)
Motor nerve to most tongue muscles?	Hypoglossal (XII)
Triad of Pierre Robin sequence?	Micrognathia, glossoptosis, cleft palate
Gene in Treacher Collins?	TCOF1
Three facial features of fetal alcohol syndrome?	Smooth philtrum, thin upper lip, short palpebral fissures

7 References

- Sadler TW. Langman's Medical Embryology. 14th ed. 2019.
- NHS Fetal Anomaly Screening Programme Handbook — cleft lip (current edition).
- Mossey PA et al. Cleft lip and palate. Lancet 2009.