Edition 1 · Bilingual SLT

Arabic Speech Sounds

A clinical reference for speech and language therapists

ظ غ خ ط ض ص ق ح ع

Edition 1. All nine sounds, in three chapter forms.
Four complete chapters are included, alongside developmental profiles for غ, ع, ح and ض, and a dialect and merger chapter for ظ.
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Front matter

Purpose and scope

Who this is for

Speech and language therapists assessing or treating Arabic-speaking clients, particularly those working from English-language training without an Arabic-speaking colleague to consult. It covers nine consonants that English-focused phonetics and clinical training under-represent.

It is a reference for interpretation. It is not a treatment programme and not an assessment instrument.

Scope

> **Scope: broad Arabic**
>
> This guide shows broad Arabic reference descriptions, not one speaker's or region's pronunciation. Realisation varies across Arabic varieties. Use a client's own dialect and speech community as the comparison when deciding whether a production is expected, variable or needs support.

This statement applies to every chapter and is not repeated in full. Each chapter carries a short dialect reminder that points back here. No dialect-specific variant is the default anywhere in this reference.

Comparison wording

Every sound uses **closest English comparison**. Where a sound also has an Arabic contrast it is listed as a separate row. The two answer different questions and are never merged, and neither sound is described as equivalent to the other. For most of these nine the closest English comparison is none, and that is the point of the row.

How to use the figures safely

- Every figure is a **simplified schematic**. It is not traced imaging and does not show a single speaker.
- A figure shows what it draws and nothing more. Each chapter states what its figure does not represent.
- A figure is **not a production target**. Do not ask a client to match it.
- Where the evidence does not establish a detail, the figure does not mark it. **Absence of a marker is deliberate.**
- Compare a client against speakers of their own variety, never against the figure.

What every figure in this reference omits. Hyoid elevation, larynx raising and epiglottic retraction; lateral bracing and cross-sectional shape; and any timing or acoustic measurement including voice onset time. Where a sound is animated, phase durations are display conventions and represent no measurement.

Why some sounds have no figure. A schematic appears only where the evidence supports one honestly. For five sounds it does not — because the reported articulation varies too much between varieties, or because the structures involved cannot be shown in a side view. Those chapters say so, and explain why. **A missing figure is a finding, not a gap.**

Front matter

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Quick-reference matrix

Letter	IPA	Chapter type
ع	/ʕ/	Developmental profile — no schematic
ح	/ħ/	Developmental profile — no schematic
ق	/q/	Full chapter: schematic and clinical sections
ص	/sˤ/	Full chapter: schematic and clinical sections
ض	/dˤ/	Developmental profile — no schematic
ط	/tˤ/	Full chapter: schematic and clinical sections
خ	/x~χ/	Full chapter: schematic and clinical sections
غ	/ɣ~ʁ/	Developmental profile — no schematic
ظ	/ðˤ/	Dialect and merger chapter — no schematic, no acquisition trajectory

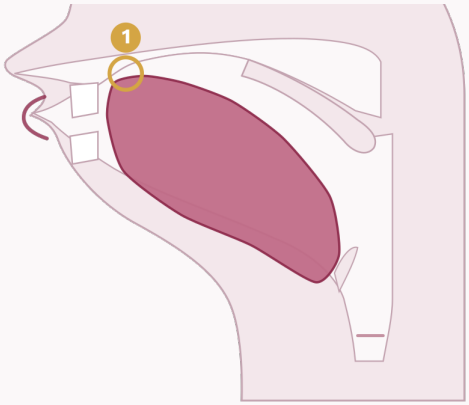
The nine sounds do not all have the same kind of chapter, and that is deliberate. Four carry a schematic and full clinical sections. Four are **developmental profiles**, with no schematic, for reasons given in each chapter.

ظ carries a **dialect and merger chapter**: **no schematic and no acquisition trajectory**, because the evidence supports neither. It is not a shorter version of the others — it answers a different question.

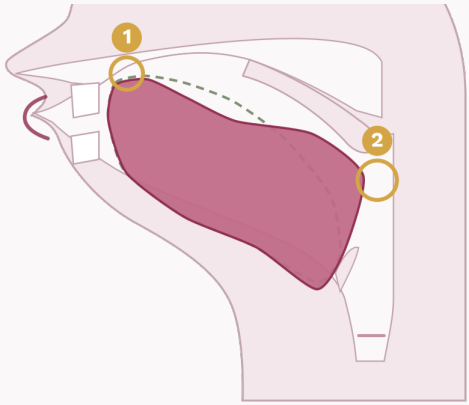
Chapter

ص /sˤ/ — the emphatic s

A voiceless alveolar or denti-alveolar fricative with a secondary posterior (“emphatic”) gesture. The front constriction is similar to /s/; the clinically important contrast is further back in the vocal tract.



س /s/ — plain s.



ص /sˤ/ — emphatic s. The dashed outline shows /s/ for comparison.

1 Front constriction, at or near the alveolar ridge. Present in both. 2 Secondary posterior narrowing, shown schematically. Present only in ص. The marked position is a schematic indication of where the narrowing is drawn, not a universal anatomical location: its height and degree vary by speaker and dialect.

Fact table

	س /s/	ص /sˤ/
Frame	Broad Arabic, see dialect reminder	Broad Arabic, see dialect reminder
Place	Alveolar or denti-alveolar	Alveolar or denti-alveolar, with a secondary posterior gesture
Manner	Grooved fricative	Grooved fricative
Voicing	Voiceless	Voiceless
Soft palate	Raised, port closed	Raised, port closed
Pharyngeal space	Relatively open; no secondary posterior constriction	Narrowed by the secondary posterior gesture; the tongue body is often more retracted, and the exact contour varies by speaker and dialect
Arabic letter	س	ص
Closest English comparison	**English /s/**	**None**
Arabic contrast	**ص /sˤ/**	**س /s/**

The front constriction is similar. The clinically important contrast is the secondary gesture further back in the vocal tract.

What the figure represents

- An illustrative front constriction at or near the alveolar ridge, shown in both /s/ and ص.
- A secondary posterior narrowing in the ص configuration, with the tongue body drawn further back than for plain /s/.
- A comparison of the two drawn configurations: the dashed outline on the ص panel repeats this reference's own /s/ contour for comparison.

What this figure does not represent

- Any single height for the posterior constriction. Tongue body shape and the degree of constriction vary between speakers and dialects.
- Hyoid elevation, larynx raising or epiglottic retraction.
- Lateral bracing, or the central groove. A midsagittal outline cannot show either.
- Any individual speaker, variety or region.

Sources. Altairi, Brown, Watson & Gick (2017), Proceedings of the Annual Meetings on Phonology 4, on dorsum and root retraction. Israel, Proctor, Goldstein, Iskarous & Narayanan (2012), Interspeech 2012, 2178–2181, real-time MRI of Lebanese Arabic. Al-Tamimi, J. (2017), Revisiting acoustic correlates of pharyngealization in Jordanian and Moroccan Arabic, Laboratory Phonology 8(1), 28, https://doi.org/10.5334/labphon.19

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A different dialectal realisation is not an error and not a therapy target without dialect-specific assessment. Compare a client against speakers of their own variety, not against this figure.

Clinical assessment considerations — not shown by the figure

These are considerations about listening to and assessing a client. They are not claims about what the figure shows.

Why it gets missed

The contrast is posterior. A mirror shows the client nothing useful, and a clinician watching the mouth sees a well-formed /s/. In connected speech the first sign is usually in the surrounding vowels rather than in the consonant itself.

It is also easy to mishear in the other direction. A correct ص can be recorded as a distorted /s/ by a clinician expecting an English inventory, which turns a target-appropriate production into a therapy goal.

Listening can also miss an emerging contrast. In the Ammani study below, some children aged 2;0 to 3;11 produced a difference between ص and س that their listeners did not hear, among productions already scored as wrong (Table 6, p. 448). This is described as covert contrast: a systematic difference that was not reliably identified in perceptual scoring. So a child recorded as not producing ص may still

Chapter

ح /ħ/ – developmental profile

This chapter covers development only. No schematic is presented for this sound; the reason is set out below, and it is not that the articulation is unknown.

> **Development only.** A schematic figure, fact table and the other per-sound sections are not included. Nothing here describes how the sound is articulated.
>
> **Source for the developmental figures.** Mashaqba & Hadban (2024). Page and table references are to that paper.

How ح develops

Mashaqba and Hadban (2024) recorded **40 typically developing monolingual children living in or near Amman**, **five children in each of eight age bands** from 2;0 to 6;0, from families of middle-to-high socioeconomic status (p. 2226). Productions were judged **by ear**.

On that study's own thresholds (Table 2, p. 2230):

Threshold system: percentage of consonants correct — Mashaqba & Hadban (2024). Customary is measured overall; acquisition and mastery require the level in **every word position tested**.

Customary production	**2;0–2;6**, the youngest band tested
Acquisition	**3;6–4;0**
Mastery	**5;0–5;6**

ح is the only guttural in that study mastered before the age of six — the authors' own conclusion (p. 2231). It is already customary in the youngest group tested, and it is the only one of the six gutturals to complete all three stages within the study's age range.

These thresholds are the ones defined in the front matter and used by that study. **They summarise group results and are not diagnostic cutoffs.** The children were monolingual, in one city, five per band: **these are not bilingual norms and not broad-Arabic norms.**

Position

Word-final leads from the start, and word-initial is the slow position (Table 2, p. 2230).

Word-final accuracy is already **85% in the youngest band tested** and is at or near ceiling by the oldest. Word-medial sits between the two throughout. **Word-initial begins far behind** and does not reach 75% until 3;6–4;0 — which is what holds the acquisition threshold back, since that threshold requires the level to be met in every position.

This is the opposite of the pattern recorded for ع, where word-final was the weakest position. That is a difference in the developmental data for two sounds in one sample. **It is not a statement about how either sound is articulated**, and it should not be read as evidence that word-final production is easier for this sound across Arabic generally.

Chapter

ظ /ðˤ/ — dialect and merger

This chapter is different from the others. It is not a developmental profile and it carries no acquisition figures. It is about deciding what counts as a correct production of this letter at all.

> **Why this chapter has a different shape.** Every other chapter either describes how a sound is made or reports when children produce it. **Neither is possible for ظ**, and the reason is not a gap in the research — it is what the research found.
>
> **There is no schematic and no acquisition table.** Both omissions are explained below.

ظ does not have one spoken realisation

The letter is one written category. The sound it stands for is not one thing. Within Jordanian Arabic the reported pattern is (Mashaqba et al., 2022, p. 442):

Bedouin Jordanian	ض and ظ merge toward /ðˤ/ — a fricative
Urban Jordanian, including Ammani	ض and ظ merge toward /dˤ/ — a stop
Rural Jordanian	/dˤ/, /ðˤ/ and /zˤ/ are all reported as acceptable variants

These are **reported tendencies for varieties, not rules for individuals**. Speakers, families and communities will not always fall neatly into one group, and other Arabic varieties are not described here.

What is consistent across the attested realisations is that the sound is **voiced**. What varies is place and manner — a large difference, not a detail.

What this means in Amman

In urban and Ammani Jordanian Arabic the evidence supports a merger toward /dˤ/. So:

- **A ظ-spelled word produced as [dˤ] is the expected form.**
- **It is not, on its own, an articulation error.**
- **The written ض–ظ distinction does not necessarily correspond to a spoken contrast.**

> **The first question is not whether the production is correct.** It is **whether the child's speech community maintains the ض–ظ contrast at all.** Until that is settled there is no target to judge against.

Why there is no acquisition trajectory

This reference gives developmental figures wherever the evidence supports them. For ظ it does not, and the reason is worth setting out.

- **Mashaqba et al. (2022) excluded the sound at the stimulus-design stage**, stating that it is always replaced by /zˤ/ and /dˤ/ in Ammani Arabic (p. 446). **No tokens were elicited**, so the one study with per-band Ammani data contains no figures for ظ at all.

The figures were drawn so that no positional difference is asserted beyond what closing requires. **This reference does not claim that ق is made further back than خ.** Some studies of individual speakers report such a difference, but it rests on single speakers and is not encoded in these drawings.

Dialect safety

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ق varies more between varieties and speakers than any other sound in this reference. In Jordanian Arabic, [k], [g], [ɢ] and [ʔ] have all been recorded as acceptable realisations of underlying /q/, depending on variety, register and speaker (Amayreh & Dyson, 1998; Amayreh, 2003).

Amayreh (2003) also notes that the dorsal stop is not typically used in everyday conversational Jordanian speech, and reports it as reaching the study's acquisition criterion at 7;4 in the school-taught form — later than most consonants, and after children begin school.

> **A distinction worth carrying into assessment.** Amayreh (2003) observes that a child who produces [k] for /q/ may simply not yet have made the transition to the taught form, and that the production still communicates the intended word. A production such as [t] for /q/ is a different matter.
>
> **Do not record a production as disordered only because it differs from the canonical teaching target.** These observations come from Jordanian children in and near Amman and should not be generalised to other varieties or populations.

Intervention

No ق-specific intervention protocol, prompt set or therapy approach is presented. No intervention study for this sound was located or reviewed in this project's searches. That is a limitation of this review, not a finding that no such research exists.

Approaches described for other sounds should not be assumed to transfer to ق.