

# ORAL SOUND

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## Introduction and Definition of Oral Sound

The term **oral sound** refers to a specific class of speech noise generated by the movement and manipulation of the air stream as it passes exclusively through the mouth cavity, characterized by the minimal or complete absence of nasal resonance in its creation. This definition fundamentally distinguishes oral sounds from nasal sounds, where the air stream is simultaneously or solely routed through the nasal passages. In phonetics, the production of a pure **oral sound** requires the precise physiological mechanism of velopharyngeal closure, ensuring that the velum, or soft palate, is fully elevated and pressed against the posterior pharyngeal wall. This elevation seals off the passage between the pharyngeal cavity and the nasal cavity, redirecting all acoustic energy and airflow out through the oral aperture. Consequently, oral sounds constitute the vast majority of phonemes--both vowels and consonants--used across the world's languages, forming the backbone of articulate human communication.

Linguistically, the distinction between oral and nasal articulation is often treated as a binary distinctive feature, crucial for differentiating minimal pairs in many languages. An oral sound is defined by the negative presence of the nasal feature; it is non-nasal. The acoustic result of this articulated closure is a sound characterized by clarity and intensity, as the volume and shape of the oral cavity alone determine the acoustic filtering and resonance. When the velopharyngeal port remains open, even slightly, the resulting sound gains nasal characteristics, illustrating that the **oral sound** is defined not only by what the articulators in the mouth are doing but also critically by what the articulators in the pharynx are preventing.

While the initial definition of an **oral sound** appears straightforward--a speech noise exiting the mouth--its complexity lies in the sheer diversity of ways the oral cavity can shape that outgoing air stream. The oral cavity acts as a highly adjustable resonator, capable of producing thousands of distinct acoustic qualities based on minute movements of the tongue, lips, and jaw. This includes the full spectrum of oral vowels, where the tract is relatively open, and the wide variety of oral consonants, where the tract involves some degree of stricture, obstruction, or complete closure. The consistent requirement across all these variations, however, remains the maintenance of adequate intra-oral pressure, which is only possible when the nasal route is completely blocked.

## Mechanism of Production: The Vocal Tract

The production of any **oral sound** begins with the initiation of the pulmonic egressive air stream--air expelled from the lungs. This air travels through the trachea and larynx, where the vocal folds may or may not vibrate, determining whether the sound is voiced or voiceless. However, the defining step for the sound to be classified as oral occurs immediately after, at the junction of the pharynx and the nasal cavity, known as the velopharyngeal port (VPP). For a pure **oral sound** to be generated, the VPP must be closed; this closure is achieved by the upward and backward

movement of the soft palate (velum) until it makes firm contact with the posterior and sometimes lateral walls of the pharynx. This precise muscular coordination ensures that the acoustic energy is channeled solely into the oral resonator.

Once the air stream is confined to the oral cavity, it is shaped by the active and passive articulators. The primary active articulator is the **tongue**, a highly flexible muscular organ capable of altering its position along three main axes: high-low (vertical), front-back (horizontal), and tense-lax (muscular tension). These movements define the distinct qualities of oral vowels. For oral consonants, the shaping is more drastic, involving significant restriction or complete obstruction of the airflow. Articulators such as the lips (labial), teeth (dental), alveolar ridge, hard palate, and velum (in its role as an articulation point for stop consonants like /k/ and /g/) are brought into contact or close proximity to modulate the air stream, defining the place of articulation for the consonant.

The successful generation of various **oral sounds**, particularly oral obstruents such as stops (plosives) and fricatives, is critically dependent on maintaining high intra-oral air pressure. In stops, for instance, the articulators (e.g., lips for /p/ or /b/) form a complete closure, allowing pressure to build up behind the obstruction before being suddenly released, creating a transient burst of acoustic energy. If the velopharyngeal port were open during this buildup phase, the air pressure would leak into the nasal cavity, resulting in a weak, muffled, or entirely nasal sound instead of the intended oral plosive. Thus, the integrity of the velopharyngeal closure is paramount for the production of phonetically accurate oral sounds that rely on pneumatic power.

## Classification of Oral Sounds: Vowels and Consonants

Oral sounds encompass the entire range of phonemes that do not inherently require nasal resonance, naturally dividing into two main categories: oral vowels and oral consonants. **Oral vowels** are those speech sounds produced with a relatively open vocal tract, meaning there is no significant constriction that causes turbulence or friction. All standard vowels in languages like English, Spanish, and German are oral vowels; they are defined by the specific configuration of the tongue and lips, which creates a series of resonances known as formants. The oral cavity acts as the primary resonator, and the resulting sound is typically voiced, continuous, and highly resonant due to the unimpeded airflow exiting the mouth.

In contrast, **oral consonants** involve some form of constriction or closure within the oral cavity that impedes the air stream. These are further classified based on their manner of articulation. The most restrictive oral consonants are the oral stops or plosives (e.g., /p/, /t/, /k/), which involve a complete, momentary closure followed by an abrupt release. Less restrictive are the oral fricatives (e.g., /f/, /s/, /θ/), where articulators are brought close enough together to create a narrow channel, forcing air turbulence and resulting in a sustained noise component. Approximants (e.g., /w/, /j/, /r/),

/l/), while sometimes acoustically similar to vowels, are also classified as oral consonants because they involve a slight constriction sufficient to categorize them as consonants, but not enough to cause friction.

A critical sub-classification within oral consonants includes specialized sounds that manipulate the air stream using mechanisms other than the standard pulmonic egressive flow. These non-pulmonic **oral sounds** include the clicks (found predominantly in Southern African languages), which use a velaric ingressive air stream, and ejectives and implosives, which use glottalic air streams (egressive and ingressive, respectively). Crucially, despite their diverse air-stream origins, these sounds are categorized as oral because the velopharyngeal port must remain tightly closed throughout their production. The manipulation of pressure and air movement necessary for these complex sounds occurs entirely within the oral cavity and the pharyngeal-laryngeal system, solidifying their status as fundamental **oral phonemes**.

### Distinction from Nasal Sounds and Nasalization

The delineation between **oral sound** and nasal sound is foundational in phonetics, resting entirely upon the status of the velopharyngeal port (VPP). A pure oral sound is characterized by a completely closed VPP, redirecting acoustic energy out the mouth. A nasal sound (e.g., /m/, /n/, /ŋ/) is characterized by an open VPP, allowing the air stream to enter the nasal cavity, which serves as an additional, non-adjustable resonator. The immediate acoustic consequence of this distinction is profound: nasal sounds introduce antiresonances (or zeros) into the acoustic spectrum due to the trapped air column in the oral cavity and the longer, more complex shape of the combined nasal and pharyngeal tracts, leading to a noticeable dampening of intensity and a shift in formant frequencies, particularly the low-frequency nasal murmur.

A more subtle but linguistically important phenomenon is **nasalization**, which involves the partial lowering of the velum during the production of an intended oral sound. This results in the simultaneous use of both the oral and nasal cavities as resonators, yielding an oral sound that has acquired a secondary nasal quality. For instance, in languages like French or Portuguese, nasalized vowels function as distinct phonemes (e.g., the difference between /a/ and /ã/). In English, nasalization is typically allophonic, meaning it does not change the word's meaning but is an automatic phonetic co-articulation, often occurring when an oral vowel precedes a nasal consonant (e.g., the vowel in "man" is often slightly nasalized due to anticipation of the following /n/).

The presence of nasalization or a full nasal consonant fundamentally compromises the definition of a pure **oral sound**. While a nasalized vowel retains many characteristics of its oral counterpart, the involvement of the nasal tract means it is acoustically and physiologically distinct from a strictly oral articulation. In clinical phonetics, the failure to maintain consistent velopharyngeal closure results in

pathological hypernasality, where intended oral stops and fricatives lose their requisite intra-oral pressure and acoustic clarity, blurring the critical phonemic boundaries between oral and nasal categories. Therefore, maintaining the integrity of the VPP closure is a prerequisite for achieving acoustically clean **oral sound** production across all segments of speech.

## Acoustic Properties and Perception

The acoustic signature of **oral sounds** is dictated by the precise manipulation of the oral cavity's shape, resulting in clear, definable spectral patterns. For oral vowels, the shape of the oral tract acts as a filter, emphasizing certain harmonic frequencies produced by the vibrating vocal folds; these emphasized frequencies are the formants (F1, F2, F3). The distinct quality of any given oral vowel is determined by the relationship between the first two formants (F1 relates to tongue height, F2 relates to tongue frontness/backness). Because the acoustic energy is channeled exclusively through the relatively compact and adjustable oral resonator, oral vowels typically possess higher overall acoustic intensity and sharper, more easily identifiable formant peaks compared to their nasalized counterparts.

Oral consonants, particularly obstruents, are acoustically characterized by the presence of noise energy rather than stable formant structure. Oral stops are identified by a period of silence (closure), followed by a sudden burst of energy, and then a period of rapid formant transitions as the vocal tract shifts to the following vowel. The spectral characteristics of the burst (where the energy is concentrated) signal the **place of articulation** (e.g., low frequency burst for bilabial /p/ or /b/; high frequency burst for alveolar /t/ or /d/). Oral fricatives, conversely, are identified by a continuous band of high-frequency turbulent noise, with the frequency range determined by the size of the cavity anterior to the constriction point.

The perception of **oral sounds** by the human auditory system relies heavily on the intensity and clarity of these acoustic features. The absence of nasal antiresonances allows listeners to efficiently track the dynamic changes in formant structure, which carry the bulk of the linguistic information in vowels. For oral consonants, the listener must rapidly process transient cues like the burst release and the speed and direction of the following formant transition to correctly identify the phoneme. This ability to accurately perceive the locus of articulation and the manner of restriction confirms the importance of the pure **oral sound** output in maintaining intelligibility and distinct phonemic contrast within a language.

## Role in Phonology and Linguistics

In phonological theory, the concept of the **oral sound** is central to understanding the organization and patterning of speech segments. The feature is often used in distinctive feature systems, such as those developed by Chomsky and Halle, serving as the default or unmarked state for most

speech segments. This reflects the fact that nearly every language relies overwhelmingly on oral articulation for its phoneme inventory. The feature then acts as a marked feature, specifying the deviation from the oral default. This binary opposition allows linguists to model phonological rules, such as assimilation processes, where an oral sound might acquire nasal properties when adjacent to a nasal consonant (nasal assimilation), illustrating the dynamic interplay between these two articulatory modes within spoken discourse.

Furthermore, oral sounds are crucial elements in defining syllable structure and phonotactic constraints. In typical syllable structures, the nucleus is almost always an oral vowel, and the onset and coda positions are predominantly filled by oral consonants. Languages often impose strict rules about which combinations of oral sounds are permissible. For example, many languages prohibit the clustering of certain oral stops, or restrict the co-occurrence of specific types of oral vowels. The analysis of these constraints reveals underlying universal tendencies toward maximizing acoustic distinction and ease of articulation, both of which are strongly facilitated by the clear acoustic profile of **oral sounds**.

The universality of **oral sounds** underscores their evolutionary significance. Because the oral cavity is highly adaptable and controllable, it allows for maximal differentiation of acoustic output necessary for coding complex linguistic information. While nasal sounds add an important dimension to linguistic contrast, they represent a small fraction of the total phonemic load in most languages, often limited to a few nasal stops and occasionally nasalized vowels. The vast inventory of oral vowels, oral stops, fricatives, and approximants provides the necessary combinatorial richness required to generate the lexicon of human language, confirming the **oral sound** as the primary vehicle for phonemic expression.

## Variation Across Languages

While the physiological mechanism required to produce a pure **oral sound** (VPP closure) is universal, the specific inventory and utilization of these sounds vary dramatically across the world's languages, highlighting the immense flexibility of the human oral tract. Some languages, such as Hawaiian, have very small inventories of oral consonants and vowels, maximizing the distinctiveness between the few available phonemes. Conversely, languages like those in the Caucasian or Khoisan families boast exceptionally large inventories of oral sounds, featuring complex contrasts in place and manner of articulation, including numerous types of stops, affricates, and lateral sounds.

The range of possible oral sounds includes rare articulations that stretch the limits of oral motor control. For instance, the use of multiple points of articulation simultaneously, known as secondary articulation, generates complex oral sounds like labialized or palatalized consonants (e.g., /kʷ/ or /kʲ/). Moreover, some languages utilize unusual places of articulation, such as the pharyngeal or

epiglottal regions, to produce oral fricatives or approximants, which rely entirely on constrictions deep within the vocal tract while maintaining a closed velopharyngeal port. These diverse articulations demonstrate that the definition of an **oral sound** is broad enough to include any sound where air is manipulated and released primarily through the mouth, irrespective of how far back in the throat the primary constriction occurs.

Furthermore, the phonological status of oral sounds can differ significantly. For example, in English, the lateral approximant /l/ is a single **oral sound**, but it exhibits substantial allophonic variation (clear /l/ before vowels, dark /l/ in syllable-final positions) based on tongue shape, yet it maintains its oral classification. In contrast, languages like Korean or Japanese may treat certain oral approximants or flaps as being in complementary distribution with stops, illustrating how different linguistic systems organize and categorize their inventories of available **oral sounds** to achieve maximum linguistic efficiency and contrast.

### Clinical Relevance in Speech Pathology

The ability to produce clear **oral sounds** is a crucial benchmark for typical speech development, and deficits in this area are central to many speech and communication disorders. The most common clinical issue related to oral sound production is **velopharyngeal dysfunction (VPD)** or insufficiency (VPI), often associated with structural anomalies such as cleft palate, neurological damage, or muscular deficits. When the velum cannot achieve complete and consistent closure of the VPP, air escapes into the nasal cavity during intended oral productions.

The clinical manifestations of VPI are twofold: first, **hypernasality**, where excessive nasal resonance contaminates oral vowels and sonorants, making the speech sound muffled or 'twangy.' Second, and perhaps more critically for consonants, VPI results in **reduced intra-oral air pressure**. This lack of pressure makes it difficult or impossible to produce high-pressure oral obstruents, specifically stops, fricatives, and affricates. Children with VPI often compensate by substituting oral phonemes with nasalized versions or by producing nasal snorts and glottal stops, which are far less intelligible and phonologically inaccurate.

Treatment for disorders affecting oral sound production focuses heavily on restoring proper velopharyngeal function, often involving surgical repair (palatoplasty) or prosthetic devices (palatal lifts or obturators). Speech therapy plays a vital role in training the patient to achieve complete and voluntary velar closure and to utilize the oral cavity effectively. The therapeutic goal is to re-establish the mechanical prerequisites for generating high-pressure **oral sounds**, ensuring that the air stream is correctly focused and manipulated within the mouth, thereby restoring clear, non-nasal speech production essential for effective communication.

## Summary and Conclusion

The **oral sound** stands as the bedrock of human articulate speech, defined by the expulsion of the air stream exclusively through the oral cavity, a condition maintained by the essential closure of the velopharyngeal port. This fundamental acoustic category encompasses the vast majority of phonemes, including all standard vowels and the wide array of oral consonants (stops, fricatives, approximants), each shaped by the intricate and dynamic movements of the tongue, lips, and jaw. The acoustic clarity and high intensity characteristic of oral sounds allow them to carry the primary functional load in language, enabling the sharp phonemic contrasts necessary for linguistic meaning.

From a physiological standpoint, the production of a pure **oral sound** demands precise muscular coordination to seal off the nasal tract, thereby building the requisite intra-oral pressure necessary for the production of obstruents. The failure of this mechanism, as seen in clinical conditions like velopharyngeal insufficiency, severely impairs speech intelligibility, underscoring the necessity of this basic articulatory action. The study of oral sounds informs core principles of phonetics, phonology, and speech pathology, providing the essential framework for understanding how the human body converts respiratory air into meaningful linguistic segments.

In conclusion, while the definition of an **oral sound** is deceptively simple--air exiting the mouth--its realization represents an extraordinary feat of neurological and muscular control. The immense variety of oral sounds across the world's languages, ranging from simple bilabial stops to complex ejective affricates, demonstrates the unparalleled flexibility of the oral cavity as the primary speech resonator, confirming its central and indispensable role in human communication systems.