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# ANATOMICAL CHANGES AFFECTING THE AIRWAY OF THE ELDERLY POPULATION

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## ABSTRACT

Advancing age induces anatomical, physiopathological, and cognitive alterations impacting the respiratory system from the oral cavity to the larynx. Key changes encompass tooth decay, edentulism, oropharyngeal tumors, muscle atrophy around the lips, and diminished neck range of motion (*ROM*). Conditions like obstructive sleep apnea (*OSA*) and chronic obstructive pulmonary disease (*COPD*) heighten risks of oxygen desaturation. This review delineates age-related anatomical modifications in the nasal cavity, oral cavity, pharyngeal/laryngeal regions, and neck, emphasizing implications for airway patency in geriatric care. Such insights aid in anticipating difficult airways and refining management strategies.

**KEYWORDS:** Airway anatomy, Elderly, Ageing, *Rachana Sharir*, Difficult airway

## INTRODUCTION

Ageing manifests as a progressive decline in functional reserve, varying across individuals and organs, heightening disease susceptibility without constituting a disease itself. Tissue biochemistry shifts, physiologic capacity wanes, and homeostatic adaptation to stressors diminishes post-maturity. In the context of *Rachana Sharir* (Ayurvedic anatomy), respiratory structures undergo modifications paralleling *Jara* (ageing) descriptions in classical texts like *Charaka Samhita*, where *Vata* predominance leads to tissue depletion (*Dhatu Kshaya*).

This article examines anatomical airway changes in the elderly, correlating modern observations with Ayurvedic principles of structural degeneration.

## NASAL CAVITY CHANGES

The nose facilitates respiration, air conditioning, olfaction, and positive end-expiratory pressure. Age-related nasal ptosis and drooping arise from cartilaginous weakening, midfacial support loss, and skin changes including epidermal thinning and reduced tensile strength. Nasal septal cartilage surface area diminishes, particularly below nasal bones and along the dorsum, potentially disrupting airflow despite stable resistance in healthy elderly. These alterations may precipitate alar collapse, external nasal valve closure, and internal valve angle changes, akin to *Vataja* nasal obstructions in Ayurveda.

## ORAL CAVITY CHANGES

Lip cutis thins with collagen separation and *orbicularis oris* atrophy, causing dryness, fragility, and mild droop. Periodontal disease, caries, and xerostomia affect two-thirds of elderly, with untreated decay in one-quarter; gum recession exposes roots prone to infection. Edentulism and alveolar resorption alter airway dynamics, while reduced tongue pressure from suprahyoid/infrahyoid fatigue impairs swallowing (*Dysaphagia*), mirroring *Kaphaja* and *Vataja* oral imbalances in *Sharir Rachana*.

## PHARYNGEAL AND LARYNGEAL CHANGES

Oropharyngeal cancers at tongue base/tonsils limit neck *ROM* and thyromental distance. Parapharyngeal fat accumulation and genioglossus reflex impairment promote *OSA* and pharyngeal collapse independent of body mass index. Hyoepiglottic ligament elastin/collagen loss renders the epiglottis floppy, with frequent abnormalities like delayed movement, paralleling *Vata* dominance in laryngeal *Srotas* vulnerability. Tumors further immobilize it, heightening aspiration risk.

## NECK CHANGES

Degenerative conditions like rheumatoid arthritis, cervical spondylitis myelopathy, and osteophytes restrict rotation/extension via ligament destruction and disc shrinkage. Thyroid masses, goitre's, hypothyroidism (risking myxoedema coma), and hyperthyroidism (e.g., Graves' disease) add tracheal compression and systemic complications. These mirror *Jara*-induced *Sandhi Gata Vata* in Ayurveda, complicating *Snayu* (ligament) integrity and neck mobility essential for airway access.

## DISCUSSION

Ageing airway changes—nasal valve instability, oral tissue loss, pharyngeal collapsibility, laryngeal laxity, and cervical rigidity—align with difficult airway predictors, exacerbated by *COPD* and *OSA*. In *Rachana Sharir* parlance, these reflect *Dhatu Vaishamyata* (tissue imbalance) from *Vata* aggravation. Geriatric-focused assessments can preempt complications, integrating Ayurvedic *Srotoshodhana* principles with modern intubation techniques. Future studies should validate these via cadaveric correlations in Ayurvedic anatomy.

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